'CURRENT DEVELOPMENTS IN AIR AND SPACE LAW'

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PREFACE

While India's aviation and space activities have taken off, there has not been enough study of the issues which are coming up in aviation and space, especially in the non-technical sector. International Foundation for Aviation, Aerospace & Development (India Chapter) has been keen to discuss and disseminate the knowledge of air and space issues in India including legal issues. In this connection, it has been holding seminars and conferences over the last few years.

On The occasion of the third international conference of Air and space law National Law University, along with International Foundation for Aviation, Aerospace and Development (India Chapter) and MC Gill University, Canada is pleased to present the papers of the earlier two conferences in a book form. Earlier conferences in 2009 and 2011 were held at National Law University, Delhi. The expert conference was conceived in the context of the phenomenal growth of Indian aviation sector as well as developments its space programme.

Air and space law is a complex subject. It can only be studied as organic whole which requires a collaborative effort in knowledge production and dissemation by examining the particulars viz security and safety laws , liability issues, environment , air route structures, regulation of air services and bi- lateral air agreements in the framework of entirety.

The last two expert conferences set up by the organising partners took up the challenge and invited scholars from far and wide both from within and outside India to share their research on different dimensions related to the air and space law. Issues as wide as like air environment, Safety, Security, Liability, General Issues, Space Tourism, Space Debris, Militarization of Outer Space and Sub-Orbital flights, Space Medicines have all been discussed with papers presented. Concerned Scholars found that most of the air and space law is operation in multiple jurisdictions which sometimes leads makes efficient operations extremely difficult and profitable for the airline Industry. Scholars in both the conference unanimously felt that national laws need to be more coherent and uniform to enable the smooth passage of mass air transport across national boundaries. Also it was shared across the spectrum of opinion of experts that legal regime on air and space law is lagging far behind the actual developments and it was uniformly recommended to bridge the gap as a policy prescription to overcome the difficulties in the area.

One of the most interesting aspects of this conference was student participation. There was overwhelming student's participation which enriched the debate with fresh ideas. Students from almost all the National Law Universities and other law institutions in India participated in the conference.

We have now come out with a volume of this conference published as a book. Dr. Maheshwar Singh, Associate Professor, National Law University, Delhi

have worked tirelessly at various stages in the setting up the conference. This entire endeavour would not have seen the light of the day without the active and generous support of Prof (Dr.) Ranbir Singh, Vice-Chancellor, National Law University Delhi. He has always been extremely helpful and has provided direction for arranging this event.

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AIR LAW

CHICAGO CONVENTION REVISITED: REVIEW OF CHICAGO CONVENTION AND BILATERALISM IN AIR SERVICES

Dr. Sanat Kaul*

Chicago Convention 1944[1] is the basis of the present regime of civil aviation system. It also created International Civil Aviation Organization and its detailed articles are mentioned in it.

1. ACHIEVEMENTS

Starting with 44 contracting countries in 1944, there are now 198, only two short of the UN membership who have ratified the Chicago Convention 1944.The Convention provides for the formation of International Civil Aviation Organization (ICAO) and gives it a legal form with detailed articles.

Along with the main Convention two more Agreements were negotiate also in Chicago in 1944: International Air Transit Agreement and International Air Transport Agreement.

The Chicago Convention has withstood the test of time and has seen only three major amendments in its 66 years of existence.

ICAO has faced many crisis, the last one being the use of civil aircraft as a weapon of mass destruction on 9th November 2001 at New York. This led to a major revamp of the Standards and Recommended Practices (SARPs) and introduction of Audits.

It has also seen mammoth growth of air traffic and managed to keep up the regulations. Air transport has now become the preferred means of travel and has 'shrunk' the world

The Chicago Convention of 1944

Article 1 affirms the "complete and exclusive sovereignty" of every State over "the airspace above its territory" while Article 6 prohibits scheduled international flights over the territory of a State, "except with the special permission or other authorization of that State, and in accordance with the terms of such permission or authorization". Hence, scheduled international flights through or into foreign airspace is prohibited unless authorized by the State whose air territory is penetrated. This could be by a specific permission or an agreement. Normally States enter into bilateral agreements for scheduled flights between countries.

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Aircraft Nationality

Article 17 of the Chicago Convention provides that, "Aircraft shall have the nationality of the State in which they are registered".

Article 18 provides that aircraft may not be registered in more than one State.

Article 31 and 32 require registering States to provide such aircraft with a certificate of airworthiness, and issue certificates of competency and licenses for pilots and flight crew.

However, **airline nationality** is nowhere addressed in the main Chicago Convention.[2] Multilateral and Bilateral Air Transport Agreements Section 5 of the Transit greement, and Section 6 of the Transport Agreement, provide: "Each contracting State reserves the right to withhold or revoke a certificate or permit to an air transport enterprise of another State in any case where it is not satisfied that substantial ownership and effective control are not vested in nationals of a contracting State . . . . " This issue has become a major requirement for bilateral agreements and a major deterrent to cross border ownership of Airlines. This trend has continued in the modern open skies agreements. Like their predecessors, modern "Open Skies" bilaterals also require "substantial ownership and effective control" be vested in the nationals of the State designating the airline, and that failure to meet this requirement would entitle either nation to revoke, suspend or limit the operations of the offending airline.

Role of the Council

The Council is a legislative body of 36 elected countries. It makes international Air Law after due diligence and a process based on consensus. The council has also grown in size from 21 to 36 over the years.[3]

Making of Standards and Recommended Practices (SARPs) which form as Annexures to the Chicago Convention is its core mandatory functioning.

It makes them from very technical issues of navigation to security and facilitation issues including passport types.

An elected Air Navigation Commission also ably assists it in its decision making process.[4]

Settling Disputes

ICAO Council's mandatory role in settling disputes between contracting states has been a mixed bag. Many disputes are settled informally in an amicable manner and don't get noticed.

Some of the more prominent disputes settled by the Council under Article 84 and 85 of the Chicago Convention are:

Dispute between India and Pakistan

In 1952 India complained to ICAO regarding restricting passage of aircrafts over Pakistan to Afghanistan. Because of ICAOs intervention a friendly settlement was reached.

In 1971 India banned over flights of Pakistani aircrafts because an Indian aircraft was forced to land at Lahore airport and subsequently destroyed. Pakistan filed a complaint with the ICAO Council. India went on appeal to ICJ on the issue of Jurisdiction.

Dispute between US and Cuba

Dispute between US and Cuba over flights by Cuban planes over US territory was amicably settled by the Council of ICAO.

Dispute between US and EU

Dispute between US and the EU over Emissions was also resolved by the President of ICAO on behalf of the Council.

Safety and Security Audit

To add greater teeth to its functioning it has introduced Safety and Security Audit for each contracting country which makes implementation more effective and allows a watchdog function to ICAO.[5]

Safety audit has been made public so all countries are aware of each others strong and weak points. This has had a major impact on defaulting states as there was no other provision for enforcement of its SARPs.

Security audits are still confidential.

Sovereignty and Chicago Convention

Article1 of the Convention clearly recognizes exclusive sovereignty of a state over its airspace. This along with International Air Transport Agreement of 1944 has led to the concept of bilateralism in air services between countries. International Air Services Transit Agreement of 1944, however, provides in section 3 that non-stop flyover and stoppage for non-tariff purposes shall be on non-discriminatory basis.

Exclusive sovereignty has led to the right of each state to go in for bilateral agreement with another state on basis of mutual advantage. Mutual advantage is without any rules and is based on perceived advantage of each side. National airlines generally participate in the inter-governmental agreements and try and get as much commercial advantage as possible.

2. SHORTFALLS OF CHICAGO CONVENTION

Result of Bilateralism

Bilateralism has led to a cobweb of Agreements which are not always in public domain. This has led to an uneven growth of civil aviation. In fact, many states followed over-restricted policies mainly on the pressure of their national airline not understanding the harm it is causing to their own growth. Aviation is a major driver of growth in the last few decades. Even in cargo sector about 40% of cargo in value terms travels by air. Trade and Tourism are directly dependent upon efficient air services. With improved technology in aircrafts including longer endurance, point to point service is leading to a major growth both in international trade and tourism. Those countries that realize this and have liberalized their skies have benefitted from it.

Bilateralism also led to many deviations and unnecessary conflicts. The traditional philosophy of bilateralism was based on actual demand between two countries and did not cater for beyond or earlier points.This is being corrected by accepting and allowing airlines 5th and 6th freedoms.

Rise of Regionalism

As a result of insufficiencies of bilateralism in the growing international travel and globalization whose major engine was the civil aviation, US insisted in many cases limited open skies which became better known as the Bermuda type agreements.

Bermuda type agreements allowed unlimited flights between two or more international destinations.

The next stage was to go for regional limited open sky between groups of countries.

Recent Multilateral Efforts Towards Liberalization

2001 – APEC Agreement ("Kona Accord") included optional provisions waiving ownership requirements and substituted effective control, incorporation and principal place of business requirements.

2002 – OECD model all cargo template.

OWNERSHIP BY FOREIGN AIRLINES IN AIRLINES OF ANOTHER COUNTRY

Section 5 of the Transit Agreement, and Section 6 of the Transport Agreement, provide: 'Each contracting State reserves the right to withhold or revoke a certificate or permit to an air transport enterprise of another State in any case where it is not satisfied that substantial ownership and effective control are vested in nationals of a contracting State. Like their predecessors, modern" Open Skies" bilaterals continue to require "substantial ownership and effective control" be vested in the nationals of the State designating the airline, and that

failure to meet this requirement would entitle either nation to revoke, suspend or limit the operations of the offending airline.

Nationality rules are discretionary and may be waived. Foreign ownership restrictions are not unique to aviation, and exist in broadcasting, telecommunications, electric and nuclear power production, shipping and banking. The U.S. has waived the nationality requirements for airlines registered in states that met FAA Category I safety/security requirements, and that have concluded an "Open Skies" bilateral with the U.S. When Iberia Airlines gained control of Aerolinas Argentinas, the, U.S. did not object to the fact that Spanish citizens owned and control the Argentine carrier after Argentina opened the bilateral to expand traffic rights for U.S. carriers. Conversely, when British Airways sought to gain effective control of USAir, the U.S. stalled until the issue of Heathrow access under Bermuda II was resolved.[6] Hence, the presence of an ownership and control restriction can be an effective lever to pry loose concessions that would be unattainable absent formal renunciation of the bilateral in the most liberal country, the US to qualify as a U.S. flag carrier; U.S. citizens must hold at least 75% of the voting equity. (EU wants this relaxed).

Recent Multilateral Efforts Toward Liberalization

2001—APEC Agreement Kona Accord included optional provisions waiving ownership requirements, and substituted effective control and principal place of business requirements.

2002—OECD model all cargo template: Irrespective of the nationality of the airlines majority owner, the carrier would incorporate itself in a certain country, and operate under its regulatory control. EU is a newly emerging institution which is taking away the sovereignty of its member states in many respects. A common sky policy and the right to participate by EU in all bilateral negotiations of its member states are their main trend in aviation sector.

2002—EU Court of Justice decision: under the Right of Establishment provisions of Community Law, no member State may conclude a bilateral air transport agreement that excludes any Community carrier from operating on the traffic rights provided under the bilateral.

2003—ICAO Fifth Worldwide Air Transport Conference drafted a model clause for insertion into bilaterals that focused on an airlines principal place of business and effective regulatory control. Permanent residence was an optional requirement. Australia and New Zealand have created a common aviation area.

Arguments in Favour of Preserving the Status Quo

As in the maritime trade, elimination of the foreign ownership restrictions would enable the creation of "flags of convenience"[7] in international aviation, with owners of airlines shopping for countries with the least burdensome labour laws, safety and environmental requirements;

It could compromise national security, given reliance on the civilian commercial airline fleet for needed lift capacity in time of international conflict, such as the US Civil Reserve Air Fleet [CRAF] program; It would eliminate competition in the city pair markets dominated by the acquired and acquiring airline;

Because national airlines also sit along with country delegations in bilateral air service negotiations and if a foreign airline has effective control over a national airline it may sit as an advisor on both sides of the negotiating table. This would undermine the integrity of bilateral air transport negotiations in the following manner:

It would enable a carrier from a nation with less desirable bilateral relationships to take advantage of a third nation's more liberal bilateral relationships; and

It would reduce bargaining leverage against a carrier whose government had not conceded comparable bilateral opportunities to those being exercised under the bilateral whose rights the foreign carrier was operating.

Has Chicago Convention over lived its utility? Does it need an overhaul? The answer is Yes and No. There is no doubt that Chicago Convention has been very crucial to the growth of a nascent airline industry. Along with IATA, the International Airline Association it has seen to the tremendous growth in civil aviation leading to integration of world both for business and pleasure. It has overseen the tremendous task of regulating this growth in a harmonious way from all parts of the world, bringing in order in both safety and security of travel so much so that air travel is, perhaps the safest mode of travel. In doing so International Civil Aviation Organization has brought in detailed legislation both by way of Standards and Recommended Practices and 18 detailed Annexes to air law. Further, its guidelines in all area of aviation from technical radio waves to facilitation by improved passport.

Two major shortcomings in Chicago Convention was the concept of bilateral air service agreements based on sovereignty of air space of a nation and the need to have an airline substantially owned and effectively controlled by the nationals of a State. In this context it may be stated that most Airlines the world over, except for the US stated as public sector airlines funded by the state. In India it was like US but after independence all private airlines were nationalised.[8] While growth of this industry has been phenomenal, except for a few airlines like the Singapore or Emirates, many had difficult financial times and got sold off into private sector. The nature of Airline industry worldwide went through a change with the perennial overcapacity problems of airlines leading to frequent losses. Financial aspects of airline industry became fragile. On top of this was added the concept of "Substantial Ownership and effective Control" This has led to a strange and peculiar situation in the airline industry which is global in nature but is unable to merge and acquire each other which happens in other industries. The airlines started to adopt new measures and mechanisms to bye

pass this problem. This was done through new concept of code sharing, joint ventures, profit sharing and finally to global alliances.

The inadequacies of Chicago Convention provided innovative methods. It may however, be stated that the Chicago Convention does stated in its Preamble:—

"Therefore the undersigned governments had agreed on certain principles and arrangements in order that International Civil Aviation may be developed in a safe and orderly manner and that the International Air Transport Services may be established on basis of equality of opportunity and operated soundly and economically". While the Preamble does provide for operating air transport services soundly and economically, there has been no major thinking on this issue. In fact, IATA had originally come up as a cartel to fix price of ticket, but with US objection in subsequent years this was dropped and airlines went in for cut-throat competition leading to many airlines going insolvent. This issue has not been tackled by ICAO but looking into the recent worldwide recession it could be taken up. While anti-competition laws have become very assertive, excessive growth of airline fleets leading to financial difficulties has not been considered by ICAO so far.

3. ISSUES FOR THE FUTURE

World Trade Organization and ICAO

With the coming into being of WTO the Chicago Convention requires a fresh look. This is so because WTO covers Trade in Services also and aviation as a service falls well within its domain.

While Chicago Convention laid emphasis on Sovereignty and bilateralism, WTO believes in trade and services without discrimination.

Main Features of WTO

Most Favored Nation: WTO wants a country to treat all other countries equally in trade of goods and services. This is the concept of Most Favored Nation. It implies that a country should not normally discriminate between trading partners. In terms of civil aviation in bilateral agreements it should follow a more transparent and non-discriminatory policy between all countries.

This is negates the concept of bilateral agreements on air services under the Chicago convention where no two bilateral agreement may have anything in common.

(a) National Treatment

Another principle of WTO is National Treatment: treating foreigners and locals equally. This concept is not present under Chicago Convention and therefore, national airlines tend to enjoy advantages.

Reverse is also possible i.e. Chicago Convention provides for Aviation fuel and some other imports free of taxes to foreign aircrafts. In India while foreign airlines enjoy such tax free advantages, our airlines going abroad don't and therefore suffer disadvantage.

(b) Level Playing Field

Bilateralism is also based on the principle of level playing field. Both sides must get equal mutual advantage. However relative weight of the economic size of the country and the size of its fleet are two important variables amongst others. However, in bilateral negotiations it's the bargaining capacity of each side is of great advantage as there is no appeal once agreement is signed.

WTO And Chicago Convention

The philosophical difference between Chicago Convention and WTO are immense. However, developed aviation powers realize that a protected regime of air services does more harm than good to an economy. Further, protecting national airlines against foreign airlines can be detrimental to an economy.

In practice liberal bilateralism leading to open sky or even regional open sky is gaining greater recognition.

To this extent there is a natural movement from restricted bilateral agreement to regional open sky is becoming more acceptable.

The philosophical differences between Chicago Convention and WTO are, therefore, narrowing down on their own.

National Airlines, Ownership and Control of Airlines

The clear demarcation drawn up in 1944 between nationality of an aircraft and of airline company is becoming blurred. Cross/Joint ownership is making the concept of 'substantial ownership and effective control' difficult to implement. New definitions are being propounded. The need of the hour is to recognize that Airline industry is a very capital intensive and competitive industry. The concept of Flag Carriers must be replaced by the concept of airline as any other industry. However, there are two issues in this. The first one is the issue of big fish eating the small one. This will mean that if airlines are allowed to cross purchase each other there would be mergers, acquisition and consolidation. This will lead to many countries not having their own airline. This in turn could lead to two problems. First, of poor service to a country dependent upon an airline based abroad. Second, it could lead to some issues of internal security as national airlines are considered as a strategic asset to be used in an emergency. India deployed its civil fleet for emergency troop movement in Kashmir in 1947 and again for rescue of Indians stranded in Kuwait during Gulf War I which also a landmark and appeared in the Guinness Book of Records. In case of emergency most countries keep a provision of compulsory requisition of civil fleet. If there is no civil airline and a fleet of civil

planes registered in some other country then this aspect becomes a great liability. The second issue is that the extent to which we can allow an airline registered in a country to have foreign ownership. Also domestic air travel normally does not allow foreign airline ownership. The present requirement is that an airline should be substantially owned and effectively controlled. However with more globalization and the need for airlines to enhance its capital base by way of equity infusion which may not be readily available within the country, need to get equity from abroad is keenly felt. The moment equity held by foreign parties goes over 50% it does not remain 'substantially owned and effectively control'. If a foreign airline owns a substantial portion of equity then other issues of competition and cartelization also comes up at times. The concept of 'substantially owned and effectively controlled' is being substituted in bilateral agreements by 'principle place of businesses to over come the above issue.

While the US does not allow more than 49% foreign voting equity in a US registered airline, the European Union has gone a step ahead and has allowed cross ownership within the European Union and has called all airlines registered in the EU as 'Community Carriers'. Under this definition all airlines registered in EU member countries are treated as if they were part of one country where cross ownership is allowed.

Aviation Security

Each sovereign nation is responsible to provide security of all types within its boundaries. However with the changing nature of security which spreads across countries largely due to civil aviation, security cannot be treated as a sovereign function. The history on aircraft hijacking shows this and its culmination is the incident of the use of aircrafts as missiles in New York on 11th Sept 2001.Since 11th September 2001 incident there has been a major shift in the world wide inter dependent security scenario but security still remains a sovereign function with ICAO providing an overall umbrella of regulation. Post 9/11 ICAO has managed an Audit of National Aviation Security on a voluntary basis of all members, but it is inadequate and insufficient. A global approach to security is the need of the day and there is a need for interoperability of security personnel. The Universal Security Audit Programme (USAP) was launched by ICAO in 2002 in a six year cycle to provide high standards of security, quality control, training and certification of auditors.

Chicago convention provides standards and Recommendations for only international aviation and domestic aviation security is left to the country concerned. This contention cannot be accepted. The incident of 9/11 amply proves that a weak domestic security set up was used by international terrorists to achieve their aims.

ICAOs voluntary security audits are now practically compulsory. However a voluntary agreement is drawn up before audit and the audit report is not made public or shown in full to member countries.

Civil Aviation can no longer afford the luxury of allowing international security to remain a sovereign function with international audit and domestic security be kept outside the sphere.

With such intense globalization in air travel with domestic and international interconnectivity increasing, it is necessary to integrate the two securities under overall supervision of ICAO. It may be pointed out that the attack on Twin Towers of New York on 11 September 2001 by hijacking of civil aircrafts was all done in domestic flights of US and no international flight was involved.

Globalization with Aviation Security

With massive increase in international air travel which could not have been dreamt of in 1944 along with seamless integration of domestic and international travel the issues of aviation security become global concern. No state can now claim that domestic aviation can remain a domestic concern.

While ICAO is seized of the issue, it is felt that a greater degree of integration of the two securities is needed to make international travel safe. Answer lies in amendment of the Chicago Convention to allow ICAO to inspect domestic security also.

Environment and Chicago Convention

ICAO has been working hard to bring about a consensus on issues of emissions and noise. Aviation sector by its very nature crosses national boundaries. Aircraft emissions cannot be confined to sovereign air space. Aircraft flying over 30,000ft or above cross international boundaries seamlessly but could be subject to the laws of the country they are overflying as emissions coming out of the aircraft at that height impact the region and not just the sovereign air space.

Emission standards vary between countries but are difficult to implement in aircrafts unlike automobiles. Sovereignty comes in conflict with international norms. ICAO needs to provide standards which can be checked and implemented.

Noise is yet another issue which needs regulation. Airport noise and noise due to overflying at low heights, especially near airports has led to local protest leading to night curfews at many airports in developing country. Such unilateral decisions by a municipality or city are not conducive to orderly growth of aviation. If all airports around the world close down at night then international air transport will become very difficult to manage, especially getting landing slots at airports.ICAO needs to come out with Standards and Recommended Practices on this issue.

Unilateral Taxation on Emissions

The tendency to over-reach and have more stringent standards than ICAO also has its pitfalls as EU is attempting. Airline industry is perhaps one of the highest taxed industry in the world. On top of it there are moves to have an emission tax on a global level put on it which will make it more difficult to survive.

Health

International health issues of pandemics have proved that aviation can have major impact on health issues. SARs, H1N1 etc. have made the spread of virus truly global and cannot be considered localized.

Conclusion

The role of Chicago Convention in orderly growth of civil aviation has indeed been tremendous since the last 66 years of aviation. ICAO was set by the Convention and it has been greatly successful in providing international air laws to the world. But with the growth came the issues of bilateralism in air traffic which has a highly protectionist tendency and also issues of ownership which dissuades cross country ownership and control. Airline industry is not treated on par with rest of the industry due to strategic and protectionist reasons which need to be overcome by suitable amendments.

Endnotes

1. Convention on International Civil Aviation signed at Chicago on 7th December, 1944.
2. Chicago Convention mentions only aircraft nationality which will be based on its place of registration. However, Air Transport Agreement of 1944 mentions in Section 6 Air Transport Enterprise and brings in the concept of 'substantially owned and effectively controlled by the nationals of the State where it is registered'. However, this agreement has been ratified by eleven countries only.
3. The last increase in the Council Membership took place in 2003. Elections of the Council are held every three years.
4. The Membership in Air Navigation Commission was last increased to 19 members.
5. Universal Safety Oversight Audits Policy by ICAO on a voluntary basis was introduced in 1999 and Universal Security Audits Policy in 2002. It may be noted that security audits were introduced only after 9/11 incident.
6. Arranging airport landing slots are generally not part of bilateral negotiations. But in bilateral negotiations all extraneous issues can come up as discussions are based on mutual advantage.
7. "Flag of Convenience" concept prevalent in shipping can play havoc in Civil Aviation especially in context of safety and security. Small and poor states may encourage foreign airlines to setup Head Quarters of an airline entity which may be controlled by unscrupulous elements.
8. By Air Corporation Act of 1953 all airlines in India were nationalized and reorganized into two public sector airlines, Air India and Indian Airlines.

Readings:

1. Capital and Market Access in International Aviation: Nationality Requirements and Cabotage Restrictions by Prof. Dr. Paul Stephen Dempsey, McGill University Institute of Air & Space Law.
2. New Regulatory framework for Civil Aviation in India by Rohan Shah, Sudeep Mahapatra, Sumana Nagendaran, Mahfooz, Nazki, Manshur Nazki in Emerging Trends in Air & Space Law, Uppal Publishing House, New Delhi.

AVIATION INDUSTRY: EMERGING LEGAL CHALLENGES

Prof. (Dr.) Ghanshyam Singh*

Introduction

In the presence of a more globalized environment all over the world, the policies of a country act as a key determinant for getting the real benefits of the same. Particularly for the developing nations, the Government's policies largely affect its economic environments. After the adoption of the new Aviation policies in India, the country has reviewed its policies and made it friendlier in almost all the sectors.

In the recent past the outlook of the Government of India towards the Aviation Industry has undergone an intense change in almost all the areas. The emerging trends in the industry include new and different concepts of ownership, financing the projects and a hassle free management and operations. Airport owners and operators who realize this situation are trying to improve their facilities and services to attract major airlines. Therefore, airport owners and operators are devising the privatization of airports to solve the problem.

The new trends emerging in the aviation industry in a global scenario are the increased globalization of economies, liberalization of aviation policies, new technological developments in civil aviation, privatization of airlines and airports and liberal and open skies bilateral agreements. Deregulation and intensified global competition are forcing airlines to become responsive, competitive and efficient by focusing more closely on their customers and operations.

Private participation is encouraged and opportunities created for investors to realize adequate returns on their investments; Recognizing that aviation today is an important element of infrastructure, rapid up gradation of airport infrastructure to world class with priority to the busiest airports and those handling international flights; Recognizing that transportation of air cargo is vital to the economic growth of the country, creation and development of specific infrastructure for air transportation of cargo and express cargo is encouraged, "Airline operations and acquisition of aircraft" is conferred "infrastructure" status for overall growth of civil aviation sector in the country Domestic and international aviation in the country are encouraged to grow at par with world aviation industry; Inter-linkages with other modes of transport are encouraged and stimulated; Trade, tourism and overall economic activity and growth is encouraged.

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But the other side of the story is that we have grown, but grown at the cost of our own abode, the Mother Nature. The question that we have to answer at the moment is "do we belong to this earth or does this earth belong to us". The aviation industry is one of the fastest growing in the global market. Commercial aviation is experiencing dramatic growth in regions throughout the world. It consumes significant amounts of non-renewable fuel, leading not only to its fast depletion but also to the pollution of the environment. Over the past 50 years global demand for air travel has risen by 9 per cent per annum (pa) and growth (at a reduced rate of 3-7 per cent) is predicted for the next 20 years[1]. The environmental impact of the aviation industry has long been a focus of environmental activists around the world. Aviation has a number of environmental impacts that are experienced by local residents in the vicinity of airports and under flight paths. Noise has been the focus of concern in aviation and more recently air pollution and the health effects of air pollution from aircraft and land based transport have begun to cause concern. It is also associated with a significant and growing contribution to the global inventory of greenhouse gases which are thought to be implicated in climate change.

This paper seeks to bring forward the need for privatisation of the aviation industry in India, keeping in mind the environmental hazards of the same, and proposing adequate regulatory measures to achieve most efficient results.

Why Privatize?

The desire to involve the private sector in the management and provision of port Infrastructure and services is prompted by the recognition that government regulations and processes are not always conducive to efficient operations of commercial activities and by recognition of the private sector's relative strength in this field. Also, in recognizing that investment sources outside government must be tapped in the provision of such infrastructure and services involvement of the private sector provides the opportunity to share risks and, in times of rapidly changing economic environment to respond quickly to market/demands and opportunities. The principal strengths of the private sector are:

- A much stronger management capability due to its ability to recruit and compensate qualified managers and technicians.
- Relative freedom to operate outside of political and bureaucratic constraints (e.g. in procurement and the working of overtime).
- Better company specific labour management.
- Potentially greater experience in developing facilities and providing services attuned to the competitive world of global trade.
- Access to non-traditional resources for investment in the infrastructure to serve trade which some individual governments may lack.

Benefits of Airport Privatization can more efficiently deliver many goods or service than government due to free market competition. In general, it is argued that over time this will lead to lower prices, improved quality, more choices, less corruption, less red tape, and quicker delivery. Many proponents do not argue that everything should be privatized. According to them, market failures and natural monopolies could be problematic. However, some Austrian school economists and anarcho-capitalists would prefer that everything be privatized, including the state itself. The basic economic argument given for privatizations is that governments have few incentives to ensure that the enterprises they own are well run. One problem is the lack of comparison in state monopolies. It is difficult to know if an enterprise is efficient or not without competitors to compare against. Another is that the central government administration, and the voters who elect them, have difficulty evaluating the efficiency of numerous and very different enterprises. A private owner, often specializing and gaining great knowledge about a certain industrial sector, can evaluate and then reward or punish the management in much fewer enterprises much more efficiently. Also, governments can raise money by taxation or simply printing money should revenues be insufficient, unlike a private owner.

Apprehensions Towards Privatisation

If a Country wishes to consider change in the ownership or management structure of its airports, a number of issues will require to be considered. While considering such issues airport management should be involved at every stage of the process. It is also necessary to be clear about the short-term and long-term objective of the change. Some of the initial issues, which require consideration, are:

- Examine in depth the present stage of the airport infrastructure in the country and the problems faced by it, including financial and managerial problems.
- Prepare a detailed profit and loss account of the airports and the air navigation services separately, make a forecast for the future, if feasible for the next twenty years. It may be desirable to prepare such forecasts for individual airports, which are considered for privatization. Also, make an assessment of the capital development requirements and the possible options to meet financial and managerial needs.
- If privatization is considered as an option, decide what services and facilities are to be privatized and the method of privatization. Also consider what is to be done for the remaining services. It is to be noted that the private sector is essentially interested in profit making facilities or facilities which have the potential to make profit. It may be possible to tag some unprofitable airports to profitable airports so long as there is overall profitability, although care must be taken to ensure that this does not prejudice international non-discrimination principles.

For a change in the ownership and management structure of airports or air navigation services, changes in national laws may be necessary. It can be done by amending the existing laws or enacting a new legislation. The nature of legislative action will depend upon the provisions of the existing laws, rules and regulations and the selected option. The new laws apart from enabling the government to make changes in the ownership and management, should enable the government to restructure the remaining civil aviation organization.

Regulations come at a price because they place constraints on the flexibility of the private operator. Discretionary powers with the Governments in the regulations increase the risks of the private operator and these may lead to higher expectations of return on investment and possibly lesser value for the State. It is important that regulations should be the minimum necessary and precise. Wherever discretionary powers are unavoidable, the principles or guidelines, to the extent possible, should be laid down. Ideally, the regulatory authority should be an independent entity.

The overall objective of privatization should be to balance the interests of various stakeholders including private investor, passengers, airlines, business interests, local communities and wider public at large.

Every business activity has certain risks and airports cannot be an exception. The major risks are:

- The leasing entity may become bankrupt.
- The private entity may ignore safety requirements.
- If a group of airports is owned or managed by one private entity, the entity may ignore the developmental needs of those airports which are likely to yield less profitable results.
- The private entity may increase the charges too much, which may not be in the best national interest.
- The private entity may not honour the committed lease payments.
- The private entity may pressurize the State to renegotiate the terms of lease, after quoting unrealistic payments terms or if the expected traffic does not materialize.

If the contract documents have been well prepared, the risks can be minimised. Wherever privatization of airports (and air navigation services where applicable) is contemplated, the regulatory authorities should review their own organizational structure in order to be able to ensure that even in the new environment, safety of operations is assured. To this end, it may be necessary for States to review the national legislation related to aviation and have suitable provisions empowering their civil aviation administration to be able to inspect, monitor and ensure implementation of ICAO specifications. This also facilitates

the State to meet its obligations under the Convention on International Civil Aviation to comply with the ICAO Standards and Recommended Practices (SARPs) contained in the applicable Annexes to the Convention.

Increasing Commercialisation: Environmental Hazards

With increasing commercialisation and growth of the aviation industry, it is a hard fact that aviation is an unsustainable technology that it will not be a significant feature in humans' future, and it will eventually be abandoned. The main reason for this approach is that the impact of Aviation on environment is so bad. The effects of aviation that are of concern to the environment as follows:

1. Air Pollution
2. Noise Pollution
3. Water Pollution
4. The Green House Effect
5. Depletion of Ozone Layer
6. Other Environmental Hazards Caused by Aviation

Aircraft and airports have raised issues some of which have been mentioned earlier. Crop dusting, airport expansion, new airport construction, and low-flying aircraft can also negatively impact the environment with noise, emissions, polluted water runoff, and habitat destruction etc. Aerial Spraying of Pesticides results in wide environmental problems. Usually very harmful pesticides are sprayed using this means. There is every possibility that pesticide may spread to other neighbouring farms and other areas and destruct the flora and fauna. Runway Expansion may result in destruction of habitat of many animals and plants. Also it has grave impact on Impact on National Parks and Wildlife Refuges, Noise is the primary impact of aviation on national parks and wildlife refuges.

Many of these impacts are generic to most large infrastructure developments and are amenable to mitigation to some extent. For example, careful location of Airport infrastructure can avoid the most ecologically valuable sites and areas of great landscape or cultural value. Similarly, to minimise water pollution, controlling the run-off of surface water from an airport is readily achievable and subject to strict regulatory control. On waste management, Airports and Airlines increasingly acknowledge that action is necessary to minimise and recycle all types of waste. However, Airport operators point out that most waste is produced by sources outside their direct control, so waste minimisation is rarely implemented.

In order to tackle this problem there must be policy intervention into this aspect both in the International Level and at National level.

Remedial Measures And Suggestions

Now the time has come to take up remedial measures to alleviate the said concern. There is scope to reduce the environmental impacts of aviation using technological means. For instance aircraft engines and airframes can be made quieter, the emissions of air pollutants and greenhouse gases can be reduced by improving the efficiency of engines, the environmental impacts of Airport operations can be lessened through careful engineering and mitigation (e.g. recycling wastes, ensuring energy efficiency in buildings and locating infrastructure away from sensitive habitats).However, there are likely to be diminishing returns of incremental improvements to the environmental performance of aircraft. Furthermore, significant improvements in the technology to control noise, air pollution and greenhouse gas emissions will not become widely available or adopted throughout national or global aircraft fleets within the next 20 years. Moreover, even if available in the short term, were air travel to grow at forecast rates, these improvements would be negated within a decade[30].

Another problem is that Air travel has an unfair advantage over other transport modes such as the car, bus and train because airlines don't pay tax on aviation fuel. The absence of a fuel tax or an emissions based levy allows airlines to charge artificially low ticket prices as the cost of pollution is passed on to society and not the passenger.

Fuel taxes: An aviation fuel tax would encourage more efficient aircraft by taxing fuel consumption. According to the International Air Transport Association, fuel makes up less than 15 % of the cost of flying so there is little incentive for airlines to invest in more efficient aircraft. Unlike an emissions trading scheme, which will take years to develop, an aviation fuel tax could be implemented relatively quickly by removing the fuel tax exemption from existing bilateral air service agreements.

Emissions levy: an alternative way to make Airlines pay for their pollution is through a charge or tax on aircraft emissions. The European Union has suggested an environmental charge (levy) on aircraft emissions could be implemented on a European wide basis if no action is taken internationally to reduce aircraft emissions. The emissions levy has advantages over a fuel tax in that it would directly tax emissions and not just fuel consumption. It would also be easier to introduce a levy as bilateral air service agreements don't prevent levies on emissions, unlike fuel taxes.

An aviation tax or emissions levy is necessary as airlines should pay for the pollution they cause just like other transport operators, it would encourage the development of more efficient and less polluting aircraft, it would help reduce demand for air travel and it would much easier to implement than emissions trading permits.

Emissions trading - profiting from pollution: Some Airline operators are arguing for an emissions trading system to reduce greenhouse gas emissions from aircraft. Emissions trading would enable Airlines to buy and sell greenhouse gas permits. Each permit would allow an agreed level of a greenhouse gas such as CO_2 to be emitted. The attraction for Airlines is that those who have chosen to invest in more efficient Aircraft will be rewarded under such a scheme, not least because they will be able to profit from selling their excess CO_2 allowance. The other major attraction is that there will be no real constraint on air travel expansion if Airlines are able to buy emissions permits from other industry sectors.

Alternatives to flying: There have been a number of studies showing how air travel produces far more CO_2 emissions per passenger than rail compared to the emissions from other modes of transport. So air travel is more polluting than rail. There should be more investment on High speed rails. Moreover rely more on Advances in telecommunications which can reduce the need to travel. Tele- and videoconferencing are a viable alternative to flying for many business travellers. They can also reduce travelling time, traffic congestion and aircraft pollution, Government should ensure the new Airports policy has a clear strategy to reduce aircraft greenhouse gases. They should also properly enforce these policies and should suspend any further major Airport developments until its Airports policy is published.

Conclusion

The need of the hour is sustainable development in the aviation industry. A few guidelines have been put forward by the Stockholm Environment Institute in this regard, i.e. "the establishment of a wide-ranging dialogue that brings together regulators, government, the industry, citizens and NGOs, the implementation of the internalisation of external costs, the adoption of World Health Organisation recommended values on noise thresholds and implementing polices to deliver a healthy noise environment, the implementation of surface access strategies that can deliver at least 50 per cent of all passengers to and from airports by non-car modes of transport, the adoption of the "environmental bubble" concept to give airports clear quantitative limits for a small set of pollutants, ban on night-time flights (2300-0700 hrs) to protect human health, Air tickets subject to VAT (in Europe) and its equivalent in non-European countries, Governmentally supported strategies delivered by clearly defined partnerships to shift passengers from air transport to rail for journeys of up to 500km in length, improved methods for recording and monitoring the greenhouse gas emissions from aviation globally, and the incorporation of aviation's emissions in national and international reduction strategies to achieve a 60 per cent reduction in greenhouse gases from aviation by 2050".

Thus these steps could help not only in making the aviation more efficient but also guarantee a secured life for the generations to come tomorrow. We should ensure that the aviation industry develops not at the cost of our

environment. Both should be taken hand in hand and none given more importance than the other. We should satisfy the needs of the present day without putting the needs of tomorrow at stake, i.e. the concept of sustainable development which means that environmental considerations are closely integrated into the economic development processes, so as to ensure that the natural resource base that supports economic growth is not depleted by that growth, that the ecological diversity or regenerative capacity of natural systems is not reduced, and that both environmental and economic health are sustained through time.

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AIR LAW

Prof. Saligram Bhatt*

"A Look At M.K. Kaw Committee Report On Review And Restructuring of DGCA", As Also Liberalisation And Privatisation Of Civil Aviation Laws And Regulation. Paper for International Conference on current developments on air law, space law, National Law University, Dwarka Centre For Air and Space Law, Paper by Prof. Saligram Bhatt, former Prof. of Space Law, JNU, ICAO Adviser to Govt. of Botswana, Lesotho, Somalia, ICAO Panel-Member for Regulation of Global Air Transport.

1. Introduction

This paper will attempt to highlight major recommendations of M. K. Kaw Committee report that had impact on civil aviation laws and regulations for liberalisation and privatisation of civil aviation sector towards promoting market economy. The report was instrumental for bringing about changes in the organisation and structure of DGCA to respond to new global developments.

The report did not however recommend changing DGCA into An Aviation Authority, like in UK, or in USA, as it was thought that in 2005-06 time was not ripe to establish Aviation Authority for DGCA.

2. The Rerms Of Reference

The terms of reference required *inter alia*, a review of role and functions of DGCA as envisaged by ICAO, and review of air laws and regulations and procedures for discharging the duties and functions entrusted to DGCA by the State. The terms of reference also required to undertake a safety oversight audit.

Setting up of Kaw Committee received media coverage to inform the public/consumers and the industry to interact with the Kaw Committee deliberations.

3. Approach Adopted

The Committee adopted the following approach:

To study the existing status; to study the ICAO Standards and Recommended Practices; to review the regulatory organisation framework; to study and recommend optimum uses of national airspace; to study and streamline regulatory functions of DGCA; to recommend restructuring of DGCA structure.

While making a review, the Report made emphasis on additional responsibilities of DGCA, compliance requirements on air laws, development of air transport economics and statistics, facilitation of air transport at airports, and necessary augmentation of manpower in civil aviation sector.

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4. The Chapters Of This Extensive And Authoritative Report Comprise Of Following: Introduction

Emerging Aviation Scenario: Some Strategic And Poly Imperatives: Role and Functions of DGCA: Statutory Framework for Aviation Regulation: Certification of Airlines: Licensing of Personnel; System of Examination: Training requirements for Industry and DGCA Personnel: Procedure for clearance for scheduled and non-scheduled flights; Restructuring and Strengthing DGCA: Manpower Policy and requirement: Administrative and Financial Autonomy for DGC a: Whether DGCA needs to be converted into an Aviation Authority; Summary and Conclusion.

5. Executive Summary Of M.K. Kaw Committee Report:

5.1 Need for civil aviation policy and civil aviation act.

The report suggests to complete a civil aviation policy, and as a consequent a new Civil Aviation act.

5.2 Strategic Imperatives.

There is need for joint and flexible use of airspace between the civil and military requirements in the country. The control of airspace should rest with the Ministry of Civil. A three tier coordination should be established between the civil and military side.

5.3 Setting up of a National Advisory Committee on Civil Aviation.

This advisory committee should be setup under the Secretary Civil Aviation. It will review civil aviation policy from time to time to suit national needs.

5.4 DGCA as the aviation safety and economic regulator.

The committee has recommended DGCA maintain as economic regulator for airports and airlines. Enforcement of economic regulation should be with DGCA. The latter should be given enough enforcement powers for environmental protection laws and related matters.

6. Summary And Some Conclution On State Of Civil Aviation In India Today

The M.K. Kaw Committee made a roadmap for development of civil aviation in India. The report took opinion of leading experts into consideration. It did consult economists from the Planning Commission who have been reviewing global reports on de-regulation of air transport ever since the US Deregulation Act of 1978.The Committee saw academic reports from Dr. S.S. Sidgu who was former Secretary General ICAO and Chairman Foundation for Aviation And Tourism (FAST).Some academic works were done in JNU by present writer that were referred to. Besides, earlier reports by Ministry of Civil Aviation in particular by Mr. Naresh Chander were very useful. Report by JRD Tata Committee was always inspiring to read.

7. The Present Scenario Looks Bright Again After Mild Slowdown In 2008-09

That slowdown was due global economics. India has maintained some regulatory control over its financial structure. It is not given fully to market economy. Some leading economists like Paul Krugman support Indian economic policies. Joseph Stiglitz in particular is not much optimistic about market economic policies of the West. He wants regulation to ensure that economy gets back to the people. Meanwhile, India is busy making up infrastructure of roads, towns, agriculture, were civil aviation can reach and help mainstream economics, and also economic zones to make good exports. The latest news is that Ministry of Civil Aviation has accepted ICAO proposal to have DGCA as an Aviation Authority. This will enable the new Aviation Authority to develop finances to discharge its regulatory duties more efficiently. End Copyright Prof. Saligram Bhatt.

AVIATION ENVIRONMENTAL PROTECTION: IMPERATIVE FOR A SUSTAINABLE MOVEMENT THROUGH OMISSION OF (TOXIC) EMISSION

Debasis Poddaṛ*

Abstract

In the wake of increasingly organized movement of goods and services in a globalized world order, there is rising pressure on civil aviation as super fast mode of transportation. A moot point involved herein is whether and how far heavy resort to such a mode of transportation is conducive to new *mantra* like sustainable development in the post-*Rio* world.

Of the two major points of concern, e.g., aviation noise and emission, the latter constitutes focus of this paper. Aviation Turbine Fuel stems from nonrenewable fossil fuels and to be exhausted sooner or later. Further the same seems much more toxic in intensity and frequency to any other form of automobile emission in terms of air pollution. Above all, such air pollution at so high altitude seems to have overt underpinnings vis-à-vis integrity of the ozone layer and consequent greenhouse effect leading to the human induced climate change and global warming to the detriment of existing life forms on the planet. On another side of the same coin, super fast movement of goods and services seems to be an insignia of and *sine qua non* for emerging international trade. Thus civil aviation may collide at the crossroads of environment and development.

The author hereby submits few points for a rudimentary roadmap to transcend the dichotomy toward sustainable movement of goods and services all over the world. Thus crux of the points put forth is (i) decentralization of manufacturing goods and commercial services (ii) revival of modern maritime movement of goods and services (iii) resort to alternative Aviation Turbine Fuel non-toxic to ozone layer (iv) strict compliance of all state parties to international norms of emission standard set by the International Civil Aviation Organization (v) research and development for control of intensity and frequency of toxic emission from aircraft at least while flying at high altitude. Together the measures may initiate a crusade for clean movement of goods and services to facilitate transnational movement in amicable environ of trade without trade of the habitable environ of this planet being the only celestial object carrying life. Such carrying capacity of the Earth ought to prevail over the carrying capacity of goods and services through civil aviation.

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Introduction

In postwar world, and more so in the wake of newer international trade regime after establishment of the World Trade Organization, emergence of civil aviation industry all over the world seems to have appeared as one of the most crucial one which transcends territorial jurisdiction of all the nation states day in and day out in true sense of the term. To be specific, civil aviation has cut across the so called territorial sanctity of states with due permission from each one of them, an issue which seems otherwise sacrosanct under public international law. As an exception to international jurisprudence, transnational flight between nations is construed as "*dialogue between peoples*" as per the declared theme of the 2001 edition of the International Civil Aviation day, celebrated annually to mark the creation of the International Civil Aviation Organization (hereafter referred to as "the ICAO") on 7 December 1944.

Indeed an irony of fact that, on September 11 of 2001, such "*dialogue between peoples*" fell heavily on both towers of the World Trade Centre with a result that next year being centenary year of the historic flight by Wright brothers the ICAO preferred "*powered, controlled and sustained flight*" as the theme of the 2002 edition of the International Civil Aviation day. At bottom, however, the so called 9/11 attack was in a way or other an attack on official agenda of the ICAO as wellsafe and orderly growth of civil aviation.

Immediately thereafter, paragraph 3 of the Political Declaration of World Summit on Sustainable Development at Johannesburg, 2002 offered another lethal blow to civil aviation with corollary underpinnings over emission of Aviation Turbine Fuel (hereafter referred to as the ATF) and that also at so high altitude of atmosphere which has already had a delicate phase of deterioration out of greenhouse effect. Thus, methodology of "*dialogue between peoples*" seems to be apprehended to fell heavily on the new mantra of sustainable development as well. As a matter of fact, the ICAO was left with no other option but to call for the greening of aviation. Accordingly, "*maximizing compatibility between safe and orderly development of civil aviation and the quality of the environment*" was the theme for the 2005 edition of the International Civil Aviation Day. Such an emerging regime vis-à-vis aviation environmental protection with special reference to emission of the ATF constitutes focus of this paper.

Even thereafter, spectre of aviation environmental protection seems after the ICAO with the result that subsequent theme for the 2006 edition of International Civil Aviation Day was "*safety and security—first and always the top priority*" which covers experience of both—the World Trade Centre and Johannesburg Declaration. Through preference of its theme as "*global air transport—a driver of sustainable economic, social and cultural development*" for the

2007 edition of International Civil Aviation Day, the ICAO has once again put its priority over the new mantra of sustainable development for civil aviation in the post-Johannesburg world order along with introduction of a set of checks and balance instrumental to minimize aviation environmental pollution, at least in terms of emission of the ATF while meeting increasing pressure of international trade.

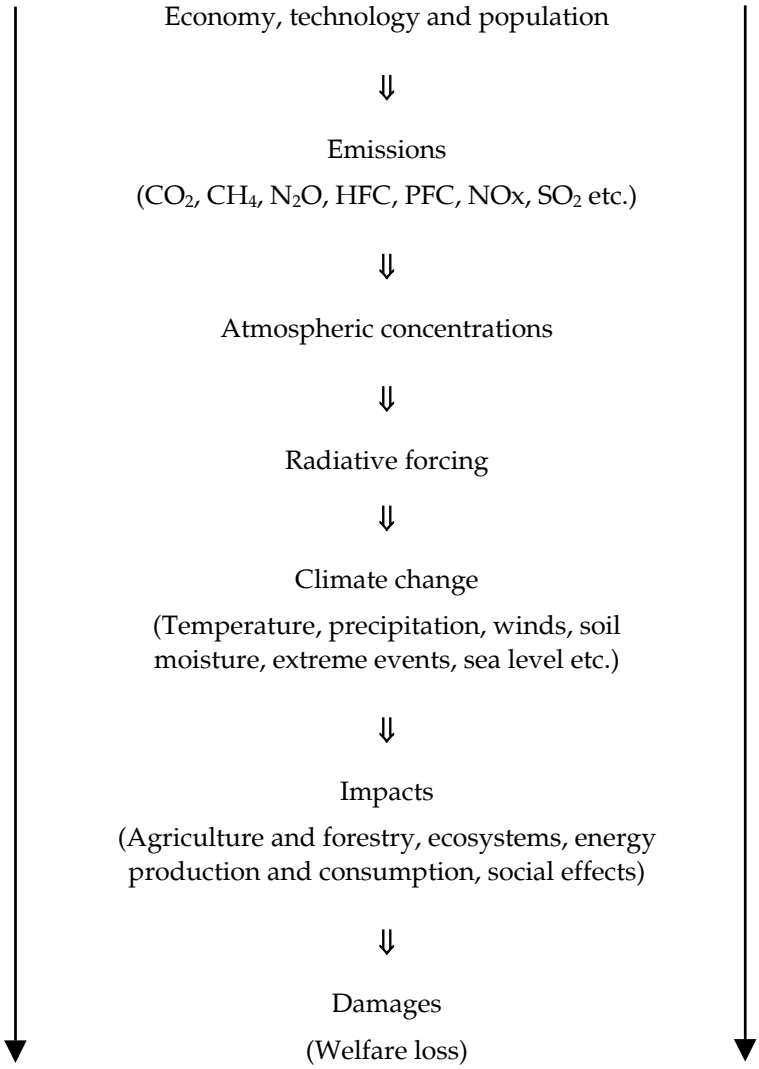
Political economy of energy efficiency

Nowadays, in an age of increasing threat toward a human induced climate change, myriad issues are involved therein which are otherwise unrelated to one another. Civil aviation and climate change constitute such nexus to hyperlink one another, along with umpteen others, since *Rio*.

As we may understand that civil aviation industry is run by uninterrupted supply of the ATF which is a refined end product and raw material of which is fossil fuel in one form or other and for the same reason exhaustible sooner or later. Supply of such non-renewable fossil fuel is therefore unsustainable as a means of production and consumption which is anathema to emerging sustainable development regime, and more so after Johannesburg Declaration.[1] Thus civil aviation industry cannot offer clean movement of goods and services instrumental for international trade. Through civil aviation in its present *modus operandi*, goods and services do move across international border at the cost of toxic emission of the ATF and that also at higher altitudes and thereby pose potential a threat to protective ozone layer leading to human induced climate change.

There seems vicious cycle operative at present mode of development-environment equation. First, constant pressure of economy and population to resort to available technology tends to emission of greenhouse gases and thereby allow the same to concentrate at high altitude of atmosphere. Second, consequent radiative forces lead toward human induced climate change with (c)overt impact on the flora and fauna of the Earth. Thus impacts occur in multiple ways, e.g., agriculture, forestry, ecosystem, etc. and thereby cause havoc damage leading to welfare loss of the people. Hard-earned result of development may thus be eaten up by unruly environment with the result that after complete cycle is over, dichotomy between development and environment may offer no passage to either. The same may be presented thus:

Chain of influences on climate[2]



Above all, consequent global warming will be melting hitherto concentrated polar icebergs and thereby contribute to rise in sea level to submerge considerable areas of human habitat including island states. Thus oncoming catastrophe is scheduled to throw seashore people in deeper water in true sense of the term. While seashore people will move elsewhere, population density will grow higher than ever before with newer predicament in decades ahead which may in turn catalyze intensity and frequency of human induced climate change.

While automobile industry contributes a lot to the process of climate change and consequent global warming,[3] contribution of civil aviation industry to this end from so called developed countries needs no introduction.[4] Under such circumstance development initiatives on the part of developing and least developed countries, most of them founded on traditional agrarian economy end in smoke out of such development induced smoke so emitted on the part of handful states in the Occident. Aftermath of toxic emission of greenhouse gases (hereafter referred to as the GHG) by such state tends to transboundary harm beyond territorial jurisdiction of state.

Idiosyncrasy of modern environmental pollution is such that, even if it so wishes, an errant state cannot contain its GHG emission within its own territorial domain as the same will spill over at higher altitudes and thus sinful emission of one state may be retributive to every sundry state on the Earth. Environment of this planet is globalized enough in true sense of the term and which state(s) may suffer from sin of which state(s) is beyond exact prediction at the given development of science. Thus the same resembles inhumanity in antipersonnel landmines to which friend and foe are all alike and which is meant for destruction irrespective of absence of belligerent object and purpose on the part of perpetrator state(s) and perpetrator state(s) themselves are not spared from adverse effects of global climate change. In fact, emission of the GHG will backfire its producer state(s) in a way or other, but along with other(s) even if not all states on the Earth. Thus, energy efficiency seems an insignia of and *sine qua non* for clean development of international trade in contemporary globalized economy.

Dichotomy between development and environment

While movement of goods and services is imperative for emerging international trade, civil aviation as a super fast mode of transportation is the flagship industry of modern market economy growth of which seems to be a moot point in the post—Copenhagen world. So often than not development and environment are perceived as antithesis of one another—a cliché which is misnomer and needs no clarification but an axiomatic erratum that development and environment are complementary and supplementary to one another and not at all at loggerheads. What is required in the post—Rio world is a pro-environ development agenda which is sustainable enough toward intra-generational and intergenerational equity all over the world. And, to this end, emission of toxic ATF and that also at high altitude is a matter of concern for civil aviation industry. Even if political economy of development and energy efficiency may be set aside, the question of sustainable development in terms of aviation environmental pollution needs to be addressed with urgency. The ICAO has identified two problems on a worldwide basis, namely aircraft noise and the impact of aircraft engine emissions.

The ICAO has established a Committee on Aviation Environmental Protection (hereafter referred to as the CAEP) in 1983 which consists of members

and observers from states, intergovernmental and non-governmental organizations representing aviation industry and environmental interests. The current structure of the CAEP includes five working groups. Of them, three deal with technical and operational aspects of aircraft emissions, and with the study of market-based measures to limit or reduce emissions such as emissions trading, emissions related charges and voluntary measures. So far the CAEP has held seven meetings ranging from 1986 to 2007 and thereby produced reports to facilitate the ICAO Council to act upon which is subject to supervision on the part of the ICAO Assembly in its meeting every three years.

Such a latest version is Resolution no. A36-22 as adopted by the ICAO Assembly in its 36th session during 18-28 September 2007. The Assembly thereby recognizes potential threat of anthropogenic intervention posed by the ATF toward climate and thereby encourages the Council to move ahead for settlement of the matter.[5] The Council is also requested to cooperate with the IPCC to ascertain the matter.[6] In the same document, the Assembly dealt with aviation impact on global climate and thereby requests the Council to offer leadership in issues like GHG emissions in particular and thereby continue its cooperation toward Conference of Parties under the UNFCCC regime.[7]

Thereafter the Assembly declared an ICAO Programme of Action on International Aviation and Climate Change,[8] to be followed by a set of market-based measures including emissions trading[9] as a comprehensive approach toward climate policy on the part of civil aviation as responsible stakeholder in international community. Whether and how far the emissions trading defeats purpose of climate protection is a point apart.

Besides the ICAO put initiative way back in 1999 to approach Intergovernmental Panel on Climate Change to work out a set of methodological issues to this end and, consequent to its endevour, there was a draft conclusion by the Chairman of Subsidiary Body for Scientific and Technological Advice on November 3, 1999 which ascertained effects of emissions resulting from fuel used for international transportation.[10] In such official document, however, there was no clear evidence on the part of the UNFCCC regime due to want of any scientific proof to this end. Together these measures reflect a bona fide political will on the part of the ICAO vis-à-vis prevention of further contribution of the ATF toward climate change and thereby resist further deterioration of environment as the cost of development of civil aviation industry.

Such a position of the ICAO seems conducive toward progressive development of law vis-à-vis climate change being the first ever global environmental agendum which by and large depends on scientific prediction of the oncoming catastrophe and demonstration of systemic lethargy over which may be too late to lament on. At least the ICAO cannot be blamed for the same.

And there lies a twist in such otherwise neat texture of climate diplomacy. The ICAO, being mindful as another organ under the United Nations

administration, handed over a contentious matter to concerned forum of the same administration and thereby played safe on its part. The IPCC, while approached by the ICAO to assert on its part, could not commit itself to declare the ATF as a potential threat since there is no such scientific evidence available to this end. So called rationale on the part of the UNFCCC regime seems contradictory enough while the regime itself dilutes seriousness of philanthropic consciousness by subversive measures like emissions trading which will allow covert trade of environ and thus facilitate environ of trade even in the wake of a proclaimed beginning of the end, if at all. As the concerned forum indulges in contentious measures like emissions trading, the ICAO follows the same. The UNFCCC, being a regime subverted from within, is yet to have a breakthrough in terms of its declared object and purpose, such as reduction of global warming and coping with hitherto increases in temperature so also is the case in case of aviation environmental pollution and climate change as corollary to the concerned regime.

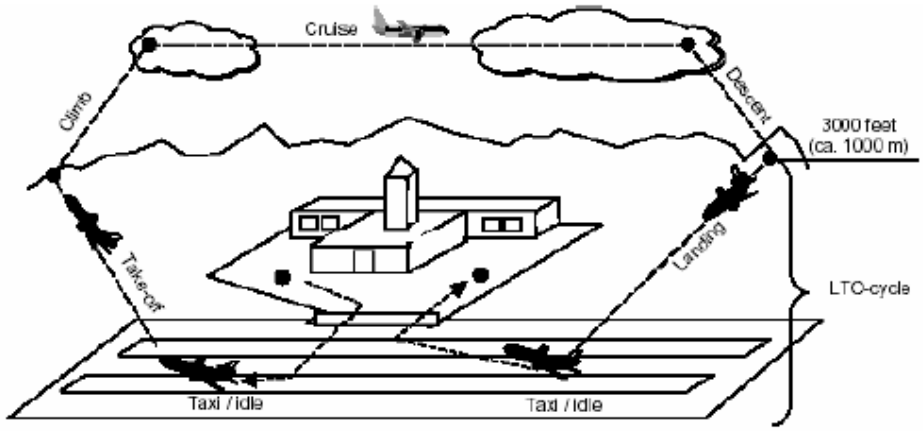
Not only could the climate change regime not move ahead with its own agenda, the concerned forum could offer no leadership to this end even after being asked for the same as happened to aviation environmental protection vis-à-vis emission of the ATF and climate change. Thus the contentious matter was mutually surfed between two platforms of the United Nations administration with no result while global public opinion may be camouflaged by such ocular opulence to this end.[11] But, at the same time, such a position on its part proves beyond reasonable doubt that the hitherto contention of pro-establishment lobby over partisan approach of the UNFCC regime in favour of an engineered craze toward protection of climate sounds empty as the UNFCCC could have otherwise (ab)used such an opportunity offered by the ICAO for whatever reasons may be. The forum seems not so moved by either side- corporate world and civil society.

Toxic emission of the ATF and climate change

Impact of aircraft—both in terms of its noise and emission- on climate is proved beyond doubt.[12] Indeed too difficult to quantify in terms of its climate impact,[13] adverse effect of toxic emission of the ATF toward anthropogenic intervention in climate change has become an axiom. While taking the take-off upto the altitude of 3000 feet, emission seems much more than cruising flight at constant altitude.[14] Thus, even if aircraft noise is set aside- another contentious issue to be dealt with elsewhere, toxic air pollution around airport atmosphere happens at highest level. Indeed extent of emission seems not so high while cruising at a constant altitude, such emission is equally toxic and at times may do more havoc than take-off time while aircraft is at higher altitude and thereby in closer proximity with stratosphere. Thus aircraft emission is instrumental to climate change during entire flight time.

Intensity and frequency of emission of the ATF may vary with the variable nature and feature of aircrafts concerned, but carbon neutral gas emission from

aircraft is still fiction till date. In a figure and a table below, there is illustration of aircraft movement and calculations of fuel burn respectively:



Representative calculations of fuel burn for a Boeing 737[15]

B737 400		Standard flight distances (nm)			[1nm = 1.852 km]			
		125	250	500	750	1000	1500	2000
Distance (km)	Climb/cruise/ descent	231.5	463	926	1389	1852	2778	3704
Fuel (kg)	Flight total	1603.1	2268.0	3612.8	4960.3	6302.6	9187.7	12167.6
	LTO	825.4	825.4	825.4	825.4	825.4	825.4	825.4
	Taxi cut	183.5	183.5	183.5	183.5	183.5	183.5	183.5
	Take off	86.0	86.0	86.0	86.0	86.0	86.0	86.0
	Climb out	225.0	225.0	225.0	225.0	225.0	225.0	225.0
	Climb/cruise/ descent	777.7	1442.6	2787.4	4134.9	5477.2	8362.3	11342.2
	Approach landing	147.3	147.3	147.3	147.3	147.3	147.3	147.3
	Taxi in	183.5	183.5	183.5	183.5	183.5	183.5	183.5

Apart from technical database cited above, there is a summary of climate change impacts of aviation emissions annexed herewith in the appendix after conclusion of this paper which provides brief introduction of atmospheric pollutant factors toward climate change. Besides CO_2 being a GHG of 100 years odd life span, non-CO_2 GHGs of relatively shorter life span also contribute toward climate change. Together all these types of aircraft emissions may constitute a potential threat to atmosphere at the level of stratosphere. Of all hitherto GHG emissions, aircraft emission seems the only one which produces toxic GHGs at such higher altitude in closer proximity of stratospheric air and thereby more likely to destabilize the delicate balance of the same.

March of law against climate change

As per the age-old maxim of *salus populi suprema lex*, which prioritizes interest of the people over and above interest of individual or interest group in particular, no action (which includes omission) is allowed to the detriment of community. There are general exceptions to an offence in the statute book of any legal system of which the underlying principle is such maxim in a way or other. Accordingly, gross violation of the same seems to constitute tort or crime, as the case may be. This principle may be applicable here.

Commercial activities, along with civil aviation as major one, indulge culpability on the part of errant states on the points mentioned below. First, civil aviation is commercial enterprise and therefore subject to public policy. While transnational civil aviation transcends territorial jurisdiction of states in terms of its trajectory, the same is subject to universal public interest and global warming is inimical to such collective interest. Thus civil aviation cannot continue emission of either CO_2 or non-CO_2 GHG to the detriment of international community. Second, emission of GHG is tantamount to unjust enrichment of one sector at the cost of others and thereby attracts the *quantum meruit* as international trade through civil aviation cannot be allowed to grow at the cost of local occupations including agriculture, being a fundamental one. Third, even unintentional damage to other(s) constitutes tort of negligence irrespective of absence of *mens rea* at the back of human mind. Thus civil aviation industry cannot plead ignorance, at least in the post-*Rio* world, and thereby stuck into last but not the least point of allegation, that of culpability while there is a series of increasingly frequent international endevours—from *Rio* (1992) to *Kyoto* (1997) to *Johannesburg* (2002) to *Bali* (2007) to *Copenhagen* (2009) to break the pace of anthropogenic interference with the climate system. While such a potential climate threat is matter of public record all over the world, *ignoratia juris non execusat* is at ease applicable to errant civil aviation industry for intentional pollution of life sustaining climate in the only planet carrying life to the detriment of such carrying capacity of the Earth. Thus onus of proof seems to lie on the accused to unfound the allegation of *mens rea* behind such emission which may trigger slow but steady motion of climate holocaust all over the world. Even if such *mens rea* cannot be established beyond reasonable doubt, allegation of criminal negligence may be pleaded and proved against civil aviation industry in terms of intensity and frequency of such offence(s).

And above all, whether such culpability being proved or civil aviation industry be condemned, effect of continued emission at contemporary intensity and frequency will not spare integrity of climate and thus existing life forms including humanity will suffer irreversible damage with impunity. Irreparable loss of bio-diversity will leave the world of flora and fauna at bay with its perennially broken food chains. Irrespective of the same is yet to be internalized by fraternity of international law, carrying capacity of the Earth is finite. Civil aviation as a means of anthropogenic intervention to climate system is engaged

in a deadly endgame across borderline of subtle balance of climate system. In long-term interest of humanity, global leadership just cannot indulge industry to play modern *Kalidasa*—to destabilize the life sustaining habitat on the planet we live since "*The Genesis*"[16] and while there is no second life sustaining habitat in the universe.

There are emerging issues in public international jurisprudence like responsibility of states for internationally wrongful acts[17] and international liability for injurious consequences arising out of acts not prohibited by international law which is again sub-divided into two—prevention of transboundary damage from hazardous activities[18] and allocation of loss in the case of transboundary harm arising out of hazardous activities[19] which may tentatively suit such an omission of emission and emission of omission on the part of civil aviation industry at higher altitude of atmosphere. While the former covers culpability on the part of people in power of states and thereby provides for responsibility for acts (which may include omission as well) perpetrated in official capacity, the latter (two) covers other action (or omission) not condemned under law for the time being in force but hazardous enough for other states to withstand such activities.[20]

In built difficulty, however, lies in the corporate identity of aviation industry. Except few- too few- state-run corporations, aviation industry is by and large full of private players; the fact which poses legal conundrum whether and how far such private players are subject to (public) international law to apply international law commission prescriptions over them. Thus matter seems to remain in domain of the conflict of laws governed by the Hague Conventions regime. Public-private confusion plays vital role to offer clandestine players to operate from safe haven. The author hereby suggests to book concerned state as per registration of errant private operator as concerned state thereby allows the same to arrive and continue at aviation industry with deficient supervision on its part. Such a norm resembles vicarious liability which is an age-old legal doctrine to determine accountability under the common law system and thereby extends wider trajectory of law beyond the phenomena at a glance. Another common law principle of strict liability also may be applicable here to book the wrongdoer through procedural technicality of judicial process. While such matter generally lies in civil jurisdiction, doctrine of criminal negligence may be invoked as well.

In a nutshell, contribution to climate change can no longer be dealt with cliché of 'polluter pays' while question of survival of all hitherto life forms on this planet seems to be in the dock. An urgent need of the hour is to prefer prevention as first and better option, and thereafter, disaster management mechanism to cure lapses, if any. As an instrument of social transformation, law ought to respond to such an unprecedented threat to humanity through jurisprudent policymaking over the matter according to requirement of changing climate- before change in environ initiates, the world needs environ of change in world order.[21]

Conclusion

In post-Copenhagen world, such a change may not arrive at one conference of parties or ministers. Efforts must be on to this end to resist beginning of the end. Carrying capacity of the planet ought to prevail over carrying capacity of aviation industry as continuance of the former is instrumental to sustenance of the latter. The same is the case in case of climate diplomacy. Politics may only be played within the planet and not without. At least in larger interest of humanity, climate cannot be set as pawn in shrewd political chessboard of international community. As one among innumerable life forms on this planet, civilized humanity has had accountability toward other stakeholders as well. While suppressing unlawful act against the safety of civil aviation under relevant international instrument of 1971, civil aviation industry cannot be allowed to be inimical to the safety of the WTC. But aviation industry continues to be inimical to the safety of the Earth despite a decade-old mutual wordplay between the UNFCCC and the ICAO which cannot prevent the scheduled unholy to happen.

To this end, alternative method of clean development is the best policy to adopt. Decentralized production of goods and delivery of services may limit requirement of such transportation. Rest of the part being essential transportation may be done through maritime transportation which is more cost effective and less hazardous. Revival of maritime transportation is essential to this end.

Unless and until such paradigm shift is possible, alternative aviation turbine fuel which may emit carbon neutral gas(es) is a viable resort for green transportation. In the absence of such green ATF to be introduced with the passage of time, the industry must undertake scientific research endeavour to reduce the intensity and frequency of toxic emissions from the existing ATF, at least to higher altitudes. States ought to comply with aviation environmental norms set by the ICAO from time to time to this end and enforce the same for all civil aviation companies registered to them. While complying with the same, technical nitty-gritty like that of technology transfer cannot be a point of pleading common but differentiated responsibilities etc. Climate fund may be constituted to take care of bona fide fiscal constraint on the part of least developed countries. Only the strong political will of civil(ized) world may stop such countdown and thereby save the world from such self-induced anthropogenic intervention toward climate change in the decades ahead. Time is running short to this end.

Appendix

Climate change impacts of aviation emissions-summary[22]

Climate Effect	Nature of Impact	Scientific Understanding
CO_2 generation	• Has same impact wherever it is emitted. • Lasts in atmosphere for up to thousands of years. • The effect is global. • Warming.	"Good". There is widespread acceptance that research provided a robust understanding of the scale and climate impacts of aviation related CO_2.
Tropospheric ozone generation	• Emissions of NOx during cruise generate tropospheric ozone (which can cause climate warming). The extent of the ozone effect also depends on altitude, location and atmospheric conditions. • The lifetime of ozone is weeks. • The warming effects are regional rather than global.	"Fair". There is uncertainty over the extent of the impact. The IPCC notes that changes in tropospheric ozone levels are mainly in the Northern Hemisphere, while those of methane are global in extent. Given this, the net regional radiative effects do not cancel.
Methane reduction	• Emissions of NOx result in the reduction of ambient levels of methane (from other sources) in the atmosphere, which results in cooling. • The lifetime is around 8-12 years. • The effects are global.	"Fair". There is uncertainty over the extent of the impact. The IPCC notes that changes in tropospheric ozone levels are mainly in the Northern Hemisphere, while those of methane are global in extent. Given this, the net regional radiative effects do not cancel.

Contrails and cirrus cloud formation	• Contrails only form at altitude in very cold, humid atmospheric conditions. Ambient temperature and level of icesupersaturation regulate the lifetime of a contrail, which may vary from seconds to hours. Contrails may in turn lead to the formation of cirrus clouds. • Warming effects are highly dependent on altitude, location and atmospheric conditions. The extent of enhanced cirrus that arises from aircraft contrails and particle emissions is not well quantified, although there is some evidence of a correlation between cirrus trends and air traffic.	"Fair" for contrails, but "poor" for Cirrus. Generally, the role of clouds, including cirrus, in climate change is one of the least understood aspects.
Soot and aerosols	• Effects are more pronounced at altitude than at ground level. • Soot traps outgoing infrared radiation and has a small warming effect. • Sulphate aerosols reflect solar radiation and have cooling effect • The lifetime of both is brief. • The effects are regional.	Understanding is "Fair".

Endnotes

1. "At the beginning of this Summit, the children of the world spoke to us in a simple yet clear voice that the future belongs to them, and accordingly challenged all of us to ensure that through our actions they will inherit a world free of the indignity and indecency occasioned by poverty, environmental degradation and patterns of unsustainable development".

   Paragraph 3, Johannesberg Declaration on Sustainable Development, 2002. Available at: http://www.un-documents.net/jburgdec.htm accessed on February 12, 2010.

2. Dr. Christian N. Jardine, Part I, Calculating the Environmental Impact of Aviation Emissions, Figure 4, Environmental Change Institute, Oxford, June 2005, p. 6. Available at: http://www.jpmorganclimatecare.com/media/documents/pdf/aviation_emissions__offsets.pdf accessed on February 13, 2010.

3. "The Greenhouse Effect is the process by which the Earth's atmosphere absorbs infrared radiation coming from the planet's surface and radiates some of it back to the ground. This phenomena leads to a cycling of heat between the Earth's surface and atmosphere which increases the planet's average surface temperature to a level that supports life forms dependent on water in its liquid state. Greenhouse gases (GHG) are the naturally occurring gaseous components of the atmosphere that contribute to the Greenhouse Effect. Anthropogenic greenhouse gases, on the other hand, are those emissions produced by human activity (e.g. burning fossil fuels, land use changes) and are mainly CO_2, CH_4, N_2O and Halocarbons. The increasing levels of these anthropogenic GHGs increase the capacity of the atmosphere to absorb the infrared radiation emitted from the Earth and re-radiate a portion back to the planet, called the anthropogenic Greenhouse Effect. These emissions increase the earth's natural Greenhouse Effect, which in turn raises the mean surface temperatures of the Earth and the troposphere. This is known as Global Warming, and the consensus among relevant scientific communities is that this anthropogenic Greenhouse effect is changing the Earth's climate.

   "The transportation sector is a major contributor to anthropogenic GHG emissions, in particular, through the use of internal combustion engines (ICE) vehicles. It is therefore not surprising that reducing GHG emissions from the transportation sector in general and ICE vehicles in particular is seen as an important part of any GHG reduction strategy".

   Executive Summary of Life Cycle Greenhouse Gas Emission Assessments of Automotive Materials, 7 December 2007. Available at:

   http://www.worldautosteel.org/uploaded/GHG_Study_ExecSummary_20071231.pdf accessed on February 14, 2010.

4. "Greenhouse gas emissions from aviation currently account for approximately 3.5% of emissions from developed countries".

   Greenhouse gas emissions from the international aviation industry, Sourcewatch. Available at: http://www.sourcewatch.org/index.php?title=Greenhouse_gas_emissions_from_the_international_aviation_industry accessed on February 13, 2010.

5. "The (ICAO) Assembly

   … … …

   Encourages the Council to promote improved understanding of the potential use, and the related emissions impacts, of alternative aviation fuels; and

   Encourages the Council and States to keep up to date and cooperate in the development of predictive analytical models for the assessment of aviation impacts.

   Paragraphs 3 & 4, Appendix I, Resolution A36-22, Consolidated statement of continuing ICAO policies and practices related to environmental protection, September 2007. Available at: http://www.icao.int/icao/en/env/A36_Res22_Prov.pdf accessed on February 14, 2010.

6. "The (ICAO) Assembly

   Requests the Council to:

   continue to cooperate closely with the IPCC and other organizations involved in assessment of aviation's contribution to environmental impacts on the atmosphere.

   Paragraphs 1(b), *Ibid*.

7. "The Assembly:

   Requests the Council to:

   (a) ensure that ICAO exercise continuous leadership on environmental issues relating to international civil aviation, including GHG emissions.

   (b) continue to study policy options to limit or reduce the environmental impact of aircraft engine emissions and to develop concrete proposals and provide advice as soon as possible to the Conference of the Parties of the UNFCCC, encompassing technical solutions and market-based measures, and taking into account potential implications of such measures for developing as well as developed countries; and

   (c) continue to cooperate with organizations involved in policy-making in this field, notably with the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) and its Subsidiary Body for Scientific and Technological Advice (SBSTA).

   Paragraph 1, Appendix J, *Ibid*.

8. For details, refer Appendix K, *Ibid*.

9. For details, refer Appendix L, *Ibid*.
10. For details, refer English text of the UNFCCC document no. FCCC/SBSTA/1999/CRP.11 dated 3 November 1999. Available at: http://unfccc.int/resource/docs/1999/sbsta/crp11.pdf accessed on February 13, 2010.
11. For details, refer update on the continuing progress of ICAO on international aviation and climate change. Available at: http://unfccc.int/resource/docs/2009/smsn/igo/059.pdf accessed on February 14, 2010.
12. "Aircraft emit gases and particles directly into the upper troposphere and lower stratosphere where they have an impact on atmospheric composition. These gases and particles alter the concentration of atmospheric greenhouse gases, including carbon dioxide (CO_2), ozone (O_3), and methane (CH_4); trigger formation of condensation trails (contrails); and may increase cirrus cloudiness- all of which contribute to climate change". Joyce E. Penner et al (ed.), IPCC Special Report: Aviation and the Global Atmosphere, in collaboration with the Scientific Assessment Panel to the Montreal Protocol on Substances that Deplete the Ozone Layer, Intergovernmental Panel on Climate Change, 1999, p. 3.
13. "The climate impacts of the gases and particles emitted and formed as a result of aviation are more difficult to quantify than the emissions; however, they can be compared to each other and to climate effects from other sectors by using the concept of radiative forcing. Because carbon dioxide has a long atmospheric residence time (<100 years) and so becomes well mixed throughout the atmosphere, the effects of its emissions from aircraft are indistinguishable from the same quantity of carbon dioxide emitted by any other source. The other gases (e.g., NOx, SOx, water vapour) and particles have shorter atmospheric residence times and remain concentrated near flight routes, mainly in the northern midlatitudes. These emissions can lead to radiative forcing that is regionally located near the flight routes for some components (e.g., ozone and contrails) in contrast to emissions that are globally mixed (e.g., carbon dioxide and methane)".

    Ibid.
14. "The fuel burn is attributed to different sections of the flight, which each use fuel at different rates. Emissions occur during:

    - The Landing and Take Off cycle which includes all activities near the airport that take place below the altitude of 3000 feet. This consists of taxi-out, take-off and climb out, and at the end of the flight, the landing approach and taxi-in. This is the fuel required to get the aircraft into the air (and down again) and are constant

irrespective of flight length. Ascents require a much more intense fuel burn than cruising at constant altitude.

- The Climb, Cruise and Descent cycle (CCD) is defined as all activities that take place at altitudes above 3000 feet (1000 m). This fuel use accounts for the bulk of the flight distance, and naturally varies with flight length.

Supra, note 3, p. 3.

15. *Supra*, note 3, p. 4.
16. Vide "The Book of Genesis", ed. by James M. Bower and David Beeman, Internet edition, 2003. Available at: http://www.genesis-sim.org/GENESIS/iBoG/iBoGpdf/ accessed on February 13, 2010.
17. Text adopted by International Law Commission at its fifty-third session, 2001and submitted to the General Assembly as part of the Commission's report covering the work of that session. Available at: http://untreaty.un.org/ilc/texts/instruments/english/draft%20articles/9_6_2001.pdf accessed on February 13, 2010.
18. Text adopted by International Law Commission at its fifty-third session, 2001and submitted to the General Assembly as part of the Commission's report covering the work of that session. Available at: http://untreaty.un.org/ilc/texts/instruments/english/draft%20articles/9_7_2001.pdf accessed on February 13, 2010.
19. Text adopted by International Law Commission at its fifty-eighth session, 2006 and submitted to the General Assembly as part of the Commission's report covering the work of that session. Available at: http://untreaty.un.org/ilc/texts/instruments/english/draft%20articles/9_10_2006.pdf accessed on February 13, 2010.
20. For details, refer commentaries of concerned drafts available at website of the Commission.
21. For details, refer W. Friedmann, Law in a Changing Society, 2nd ed., 1972, first Indian reprint, 1996, chapter 13.
22. Table 1, "Non-CO_2 Climate Change Effects of Aviation Emissions", *Sustainable Aviation*, November 2008, p. 3. Available at: http://www.scottish.parliament.uk/s3/committees/ticc/inquiries/documents/SustainableAviationnonCO2effects.pdf accessed on February 6, 2010.

AVIATION ENVIRONMENTAL PROTECTION: TOWARD A QUIETER MOVEMENT IN (LARGER) PUBLIC INTEREST

Debasis Poddar*

Abstract

Aviation noise emission constitutes a source of ultra-hazardous noise inimical to human health. Here there is a set of competing claims between development and environment to offer conundrum of choice between movement of goods and services on one side and right to health along with privacy and peace of mind on the other. Expansion of old airports and establishment of new airports are at loggerheads with ever-increasing population as airport and human habitat both require space which is but finite on the Earth.

The author hereby explores legitimacy of unabated noise emission on the part of aircraft at heavy cost of human rights for vast majority of ground(ed) people along with subhuman living beings around airport premises. In given mode of development, civilization cannot do away with aviation in its vested interest. Thus an emergent need of the hour seems to balance competing claims between affluent people willing to take a take off and subaltern people stuck beneath with technological device to minimize noise of upward advancement for blessed few. Unless and until the same may happen through longterm aviation research and development, the author works out sociolegal framework to contain aviation noise emission within tolerable decibel limits so that no further compromise with right to noiseless or less-noise life may pose threat to residuary peace of community. The same will be pleasant to flying people while they will remain at receiving end in proximity of ground reality and thereby exposed to aviation noise emission.

Introduction

Like an aircraft, aviation environmental protection discourse has had two wings emission and noise. While aviation emission is intangible in common parlance and traceable through its mediate aftermath, i.e. climate change, aviation noise is tangible enough to put public life in jeopardy with immediate effect of the same. Since introduction of Boeing 707 airplane in 1958, noise continues to chase civil aviation till date and there is no end of the same in near future. Indeed research and development has reduced 75% of aviation noise in

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terms of its intensity, as compared to initial decade,[1] noise pollution has nevertheless increased in terms of its frequency. Thus, in the wake of worldwide expansion in aviation industry, noise remains a headache of adjacent community and in turn of the state as well. Noise generated from aircraft first attacks surrounding community which passes its concern to state through political pressure put upon respective representatives of state and state thereafter passes back the buck to civil aviation industry itself. Noise of politics driven by politics of noise thereby rotates to affect peace of mind of one and all and spares none in its vicious cycle. A jurisprudent corpus of law, therefore, is required to this end.

Aviation environmental law seems an imperative of this age for a set of reasons. (i) With the passage of ever-increasing movement of goods and services throughout the world under international trade regime, civil aviation becomes sunrise industry with its expansionist mode-through extension of old airports or establishment of new airports or both and thereby set to perpetrate more noise against population adjacent to airports. In its given trend of expansion, public interest is in peril. (ii) Under common law system a piece of land, as immovable property, may also include the column of space above the surface *ad infinitum*. (iii) Under law of torts, aviation noise may at ease be considered as interference with property. (iv) Rule of contributory negligence under *volenti non fit injuria*-a Latin maxim used to excuse defendant in like cases cannot be applicable. (v) Besides population, domestic cattle and wildlife are affected by aviation noise. Adversity of aviation noise on fauna is obvious enough as compared to serenity of wilderness deviation of which may cause catastrophic change in physiological and behavioral patterns of sub-human folk. Adversity of aviation noise on flora, however, is still a matter of conjecture. In a nutshell, there is a vacuum in terms of settled law to balance between such competing and, at times, conflicting claims of interest operative within given society. The forthcoming paragraphs will strive to attain a roadmap of the same toward the trajectories abovementioned and thereby arrive at a set of propositions with special reference to India tenable under jurisprudent reasoning behind the same.

Political economy of noise efficiency

At the threshold stage, this may not be out of context to provide a clarification vis-à-vis political economy of noise efficiency. Noise sensibility and sensitivity lack universal(ized) standard all over the world. With their poles apart variation in terms of given cultural praxis, the same differs to a large extent as per their geopolitical position. Thus the community of developed states in the Occident is supersensitive to noise pollution while the same of developing and underdeveloped states in southern hemisphere is yet to be graduated to this end. Noise annoyance discourse is hereby set in this context.

In particular, in the United States of America (USA)[2] and the European Union (EU),[3] aviation industry is set to reach its time-bound target as scientific advent helps them to understand the havoc its aftermath may play with the community.[4] Not only have they thought of scientific research and development,

they introduce market-driven mechanism through imposition of noise taxation from passengers to spend part of the same for mitigation of aviation noise on the community. Also there is deterrent policy for aviation industry in the West. There are provisions for phase out of old-technology noisier aircrafts creating havoc public nuisance. Nighttime curfew poses another threat to political economy of aviation industry through which airports adjacent to metropolis may be closed down for take-off and landing purpose from late evening to early morning. Thus aviation industry is under pressure to minimize noise in its own interest.

With specific reference to India, this may aptly be illustrated as black letter law against noise seems nonexistent due to overwhelming apathy toward resistance against noise pollution in public life. Perhaps out of colonial modernity, noise earns acceptance as part of civilization so much so that aviation noise continues unabated despite a judicial observation of the Supreme Court, though eventual, over impact of aviation noise on wildlife.[5] Interestingly enough, there was no concern vis-à-vis maximum limit for aviation noise until recently Delhi High Court has issued specific instruction to the Central Pollution Control Board to fix a maximum (aviation) noise level limit and that also within its given timeframe.[6] Indeed the board was well aware of lapses on the part of aviation industry and the matter was placed on its website,[7] concerned authorities were unconcerned over the same until an aggrieved hospital authority knocked doors of the Court and the court ordered to close down two runways of the airport to the detriment of errant aviation exercise. Immediately thereafter, the Directorate General of Civil Aviation has set things on (right) track—an intervention under compulsion which could be accomplished in course of its regular duty under given mandate. Here the Court is seemingly adhered to market-driven mechanism as the language is immediately understood by corporate aviation giants.

Judicious intervention of the Delhi High Court thereby demonstrates potential of juridical institutions in the absence of corporate (self)governance in globalized market economy. Union legislature is yet to contribute to aviation governance while executive administration is seemingly in evil nexus with aviation industry. Besides political economy of noise efficiency, there are other areas of concern, e.g. crossroads of development and environment, aviation noise and human rights etc. A brief outline of the same may set moot points of this effort in their context and thereby hyperlink the same to this end.

Dichotomy between development and environment

In globalized world of international trade under the World Trade Organization regime, worldwide superfast movement of goods and services seems insignia of and *sine qua non* for axiomatic development in the given system. Civil aviation, therefore, is a default vehicle of present paradigm of development provided that the same conforms to a(ny) sustainable mode of development a

virtual *jus cogens* in the post-Rio world. Sustainable development necessarily refers to development in tandem with environment. Development sans environment cannot help sustain either and thereby bound to suffer from kneejerk setback in time ahead.[8] Noisy take-off of civil aviation is set to crash-land as the same suffers from head—on collision with environ. Environ, besides natural, includes habitable human environ on the Earth.[9] Here aviation noise lacks sustainability as the same is in conflict with human environ even if concern for a subhuman environ is set aside though the same constitutes part of natural environ.

No development may sustain for long without support from its community. As aviation industry lacks support from neighbouring community all over the world, the same faces resistance in terms of its growth—be the same may in the form of extension of old airports or establishment of new airports. Gone are the days when state used to identify terrain "far from the madding crowd" to develop its airport. On the contrary, nowadays, ever—increasing aviation noise is maddening the crowd living around. With spectacular population increase (read explosion), there is no deserted land in India except desert *per se* like that of *Thar*. Thus, with its noise, aviation industry is bound to be caught in trouble wherever the same may identify terrain for development of airport. At the same time, however, in its given mode of development, no state may afford to do away with civil aviation and therefore requires airport in its own interest. Being in same race of emerging (corporate) globalization, India is left with no other option but to indulge in its expansionism through its green-field scheme or even otherwise.[10] Such initiatives, however, face heavy resistance from within the (surrounding) community. In Tamil Nadu, for instance, the matter has initiated a tantrum.[11]

What is required is balanced approach toward development to attain sustainability and the same may be attained through confidence of the community. Recent development initiatives in West Bengal and their fateful consequences constitute exemplary illustration to this end. Mitigation of aviation noise is the only way out to this end, but the same requires time. Until aviation industry attains the same, market-driven mechanism may be applied to the community as well, e.g. prior admonition at the time of land transaction, reduction of land revenue, supply of sound resistant equipments, subsidy in purchase of basic electronic apparatus, provision for medical insurance of elderly members at affordable cost, nighttime restriction until phase out of noisier aircraft etc. Inclusion of the community as stakeholder may be a prudent policy option. One member from each family of worst affected part of the community may be offered job or reduced rate of airfare as per their order of preference. Within airport premises, innovative way out may be worked out, e.g. which ways for take-off and landing will affect least number of people who may be subject to benefits abovementioned. After runways are set accordingly, worst affected part beneath the take-off and landing trajectories may be dedicated to social forestry, so far as possible, and no further land transaction may be allowed. All these are but supplementary to mitigation of aviation noise and no substitute of the same.

All these expenses may be borne by collective funding of aviation industry and not from public exchequer. Rationale behind the same lies in hard fact that such funding is temporary pending reduction of noise within maximum tolerable limit. Also burden lies on aviation industry as the same falls short of balancing between development and environment. The proposed arrangement will work as deterrent to lethargic initiative for reduction of aviation noise.

Noise syndrome and human rights

From corporate perspective, furore against hitherto aviation noise may sound antidevelopment hue and cry. Indeed no aircraft may fly or land without noise, noise is 75% reduced than earlier and the same is done by corporate initiative. Also, except noncooperation, the community has had no contribution to this end. At bottom, however, anti-noise notion helps facilitate pro-development discourse as the same is not against aviation itself but its noise. There lies jurisprudent reasoning to this end which substantiates argumentation for contention of its noise within airport premises—this far and no farther.

With the passage of increasing movement of goods and services under international trade regime, civil aviation becomes a sunrise industry with its expansionist mode through extension of old airports or establishment of new airports or both and thereby set to perpetrate more noise against the community adjacent to airports. Thus noise, though reduced in its intensity, has but multiplied in its frequency and thereby intrudes more in privacy and peace of mind. Besides its adverse effects on physical and mental health, in particular on the aged- so often than not covert in terms of their aftermath—there are overt hazards on property, e.g. building, electronic apparatus and delicate furniture being some of them. Earlier passive, by and large two factors contribute to active resistance: multiplicity of noise and rights consciousness of the community.

Under common law system a piece of land, as immovable property, may include "the column of space above the surface *ad infinitum*" besides a determinate portion of the earth's surface and the ground beneath the surface".[12] The airspace above metropolis, under the legal fiction, belongs to private landowners beneath the same. First edition of *Salmond*'s jurisprudence book was published in 1902 A.D. In the same year, even before the historic invention of Wright brothers to develop their flying machine—the primitive form of modern airplane—in 1903, an American Court understood impracticality of the given doctrine in modern world. With the passage of time, however, pendulum of *opinion juris* moves poles apart so much so that landowners are placed at the mercy of aviation industry.[13] Even after spectacular growth of aircraft noise, the *Causby* judgment—as delivered by the Supreme Court of America- fell short of attaining optimum balance between divergent claims of interest.[14] Still the judgment is celebrated as landmark one because the Court thereby identified the inbuilt fallacy of archaic common law position and got rid of the same to attain a minimum sense in its jurisprudence. Since then, however, aviation industry

continues to exploit comparative advantage out of the archaic legal position which continues to prevail till date. Meanwhile, through permutation and combination of its intensity and frequency, aviation noise becomes much more hazardous than earlier.

Table 1: Growth of Civil Aviation in India[15]

Aircraft departures on scheduled domestic services of Indian carriers

Year	Aircraft departure (numbers)			Percentage share	
	National carriers	Private carriers	Total	National carriers	Private carriers
1999-00	92,678	68,715	161,393	57.4	42.6
2000-01	90,923	83,012	173,935	52.3	47.7
2001-02	89,817	93,662	183,479	49.0	51.0
2002-03	96,266	107,211	203,477	47.3	52.7
2003-04	105,172	129,074	234,246	44.9	55.1
2004-05	109,996	155,893	265,889	41.4	58.6
2005-06	102,499	213,326	315,825	32.5	67.5
2006-07	104,854	315,812	420,666	24.9	75.1
2007-08	112,424	408,307	520,731	21.6	78.4
2008-09	104,631	404,936	509,567	20.5	79.5

Source: ICAO ATR Form-A furnished by scheduled Indian carriers.

Further, under the law of tort(s), aviation noise may at ease be construed as an interference with property[16] which constitutes nuisance. In other words, there must be interference with the use or enjoyment of land, or some right over or in connection with it, causing damage to the plaintiff. The two main heads are injury to property and interference with personal comfort.[17] The whole law on the subject really represents a balancing of conflicting interests. Some noise, some smell, some vibration, everyone must endure in any modern town, otherwise modern life there would be impossible. It is repeatedly said in nuisance cases that the rule is *sic utere tuo ut alienum non laedas*, but the maxim is not very informative. In fact, the law repeatedly recognizes that a man may use his own so as to injure another without committing a nuisance. It is only if such use is unreasonable that it becomes unlawful.[18] Thus aviation industry cannot be caught under traditional interpretation of nuisance as noise was associated with take-off and landing of aircraft since its beginning and noise is substantially reduced than initial decade. Meanwhile, however, rights dimension of tort(s) jurisprudence also underwent a paradigm shift to introduce absolute liability on errant defendant concerned and thereby drag aviation authority to the court.

Rule of contributory negligence under *volenti non fit injuria*—a Latin maxim used to excuse defendant in like cases- cannot be fully applicable. It is well settled that it is no defence that plaintiff himself came to the nuisance. It would be unreasonable to expect a person to refrain from buying land merely because a nuisance already exists there. In general it may be said that the standard of care to which plaintiff is required to conform if he is not to be convicted of contributory negligence is not necessarily as high as that required of the defendant.[19] Therefore it is a rule in nuisance that it is no defence to plead that the plaintiff came to the nuisance.[20] Indeed it is also a rule that account must be taken of the district where the alleged nuisance takes place and that if he goes to reside in a great industrial area he must put up with a good deal more inconvenience than if he lives in the country.[21]

There is criticism against anti-noise cry in similar line and length of rationale.[22] This is but humbly submitted that the same is not the case in case of the people who reside there since airport authority initiated its operation or even before. These people constitute flip side of the coin.

Besides population, domestic cattle and wildlife are affected by aviation noise. In particular, adversity of aviation noise on fauna is obvious enough as compared to the serenity of wilderness deviation of which may cause catastrophic change in physiological and behavioral patterns of sub-human folk.[23] Consequently, an exodus of certain species may cause pandemonium in wildlife through breakdown of food chain. Arrival of wild animal in adjacent locality is a plausible aftermath though genesis of the same is a matter of conjecture. Resort to precautionary principles seems appropriate to this end.

Question of legitimacy rather than legality

So far the author is in consensus with his noise-savvy counterpart that there is no easy way out of this problem. Being federal in terms of system of governance, America and India, both are posited on same pedestal with similar predicament.[24] Aviation industry is concerned over minimization of number of people affected by incidental noise, but the same is always much more than that of its passengers. Indeed from economic perspective of cost-benefit analysis, there is valid criticism of noise regulatory mechanism as well.[25] From environmental perspective vis-à-vis sustainable (economic) development, however, the same offers no tenable position in larger public interest. For superfast movement of goods and services, people ought not to suffer from aviation noise syndrome. The position seems well settled that any mode of so called development, not in tandem with development of man, resembles no development at all.[26] Under the given philanthropic jurisprudence, even if aviation environmental law is yet to be settled to protect community from aviation noise, the impugned action or omission lacks legitimacy if not legality in true sense of the term.

Usually used interchangeably, legality and legitimacy are similar but not one and the same. In its recent judgment, Apex Court of India placed a

conjunction "and" between legality and legitimacy, which denotes that these two are not synonyms.[27]

At rare occasions, legality may indeed be divorced of legitimacy.[28]

A set of arguments and counter-arguments thus demonstrate a legal conundrum prevailing over aviation environmental jurisprudence. There is sound reasoning, founded on divergent worldviews, in both sides. In the absence of law to this end, question lies more in the legitimacy than the legality of aviation noise in India. In such an overpopulated sub-continental terrain, expansion of aviation is bound to get at loggerheads with second highest population of the world—no wonder that the Union of India is about to formulate its *de novo* civil aviation policy to work out thirty five new airports all over the country.

In developed hemisphere, however, aviation noise is required to pass tough test of legality as well. Thus there is provision for noise certification specifications besides settled system of checks and balance. Still aviation noise is recognized as a typical socio-technical rather than legal matter.[29] Indeed there are specifications in India as well. Implementation of the same is exception rather than rule. Thus lawlessness indulges in systemic subversion from within.

The International Civil Aviation Organization (ICAO)—a UN Specialized Agency and the global forum for civil aviation has established an objective to minimize adverse effect of global civil aviation on the environment and aviation noise is therefore its default concern. The ICAO initiatives are generally meant to set guiding principles which are not legally binding but indeed of persuasive value and thereby contribute to legitimacy of operation on the part of aviation industry. In its Assembly Resolutions, the ICAO emphasizes on arrest of aviation noise.[30] The ICAO conducts periodic reviews of night curfew restrictions. In its last review, pitfalls of night curfew restrictions are pointed out to prove the same as self-defeating enough.[31] The ICAO has set its rationale behind imposition of noise related charges.[32] Also there are time-bound agenda vis-à-vis abatement of noise set before member states so that the same may not be delayed *ad infinitum*.[33] As its member state, India is under international legal obligation to respect aviation environmental regime through strict compliance to the same. Indeed no member state is legally bound by international norms set by the ICAO—the way 'soft law' doctrine operates in international law—adherence to the same provides legitimacy to the states in terms of its operation.

Conclusion

From these paragraphs abovementioned, the utilitarian worldview seems implicit in domestic aviation governance and the same is explicit in the ICAO literature[34] that, while abatement of aviation noise is imperative as greater number of people suffer from the same, lesser number of people may suffer for greater interest of civil aviation which is instrumental for economic development of the country. The ICAO Assembly thereby endorsed concept of balanced

approach to Aircraft Noise Management in 2004[35] and reaffirmed the same in 2007.[36] Without entering into nitty-gritty of the same e.g., four principal elements, namely reduction at source (quieter aircraft), land-use planning and management, noise abatement operational procedures and operating restrictions—this is humbly submitted that the same falls short of being either conscionable or prudent as bull's eye of such mission ought to be minimization of suffering from noise rather than minimization of number (of people) from the same. This seems more relevant in Indian context as none may be left out in jeopardy.[37]

What seems required is a humanitarian worldview which will take due care of all and not most people of the community. As a global forum, and operating in an age of human rights, the ICAO may review its position as rights jurisprudence offers individual rights in its essence. There is no defence against the same with excuse of *salus populi suprema lex*—the Latin maxim which upholds public interest over individual interest—as community living beneath take-off and landing trajectories is invariably larger than those flying above and thereby always represents larger public interest. In India, however, urgent need of this hour is compliance with the ICAO norms before such finer issues may be dealt with. Indeed this will facilitate farther growth of civil aviation as well.

Endnotes

1. Aircraft coming off the production line today are about 75% quieter than they were 40 years ago and the aircraft manufacturers are working to reduce this even more. … These developments are reflected in ICAO Certification Standards and ICAO's continuing promotion of the implementation of noise reduction technologies.

   ICAO Environmental Report 2007, Part 2, Aircraft Noise—Defining the Problem, p. 20. Available at: http://www.icao.int/env/pubs/env_report_07.pdf accessed on September 25, 2010.

2. The challenge: Aircraft noise continues to be regarded as the most significant hindrance to increasing the capacity of the National Airspace System, largely because of nuisance noise near major metropolitan airports. Although the Federal Aviation Administration has invested more than $5 billion in airport noise reduction programs since 1980, the problem persists.

   The goal: Develop aircraft technology and airspace system operations to shrink the nuisance noise footprint around each airport until it is about one-third of its current size by 2015, about one-sixth its size by 2020, and contained within the airport property boundaries by 2025.

   Green Aviation: A Better Way to Treat the Planet, NASAfacts, Noise, p. 2. Available at:

http://www.aeronautics.nasa.gov/pdf/green_aviation_fact_sheet_web.pdf accessed on September 26, 2010.

3. By 2020, the European Union wants to cut aviation noise 10 dB. from 2000 levels, and it has established a mid-term goal of a 5-dB. improvement by 2010. The just-completed €112 million ($153-million) Silencer research program-funded equally by government and industry and involving 51 partners-highlights both the progress made and what remains to be accomplished. Robert Wall, EU Silencer Noise-reduction Program Wraps up, Aviation Week and Space Technology. Available at:
http://www.aviationweek.com/aw/generic/story_channel.jsp?channel=defense&id=news/slnc07097.xml&headline=EU%20Silencer%20Noise-Reduction%20Program%20Wraps%20Up accessed on September 26, 2010.

4. Most people exposed to chronic noise, for instance from major airports, seem to tolerate it. Yet, questionnaire studies suggest that high levels of annoyance do not decline over time. Another possibility is that adaptation to noise is only achieved with a cost to health.

   Stephen A. Stansfeld and Mark P. Matheson, Noise Pollution: Non-auditory Effects on Health, British Medical Bulletin, vol. 68, 2003, p. 254. Available at:
   http://www.sierrafoot.org/mather/scas_etc/nonauditory_effects_oxford_journal_243.pdf accessed on September 26, 2010.

5. Nowadays, the problem of low-flying military aircraft has added a new dimension to community annoyance, as the nation seeks to improve its "nap-of-the-earth" warfare capabilities. In addition, the issue of aircraft operations over national parks, wilderness areas, and other areas previously unaffected by aircraft noise has claimed national attention over recent years.

   In re: Noise Pollution- Implementation of the laws for restricting use of loudspeakers and high volume producing sound systems, with *Forum, Prevention of Environment and Sound Pollution v. Union of India and Another*, (AIR 2005 SC 3136), paragraph 45.

6. *Vide* Express News Service, IGI noise pollution case, Delhi, posted June 4, 2010. Available at: http://www.indianexpress.com/news/court-wants-noise-level-near-igi-cut-immedia/629230/accessed on September 26, 2010.

7. For details, refer to Central Pollution Control Board Annual Report 2004-2005, Table 5.21. Also available at:
   http://www.cpcb.nic.in/noise_pollution/Ambient%20Noise%20LevelinVicinityofIGIAirport NewDelhi-2004.pdf accessed on September 26, 2010.

8. In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development; and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.

   Report of the World Commission on Environment and Development: Our Common Future (Brundtland Report), paragraph 15. Available at: http://www.un-documents.net/ocf-02.htm#I accessed on September 27, 2010.

9. *Vide* Declaration of the United Nations Conference on the Human Environment, 1972, paragraph 2. Available at: http://www.unep.org/Law/PDF/Stockholm_Declaration.pdf accessed on September 27, 2010.

10. In civil aviation, a financing plan for airport infrastructure has been developed, which envisages a total investment of Rs. 40,000 crore in the sector by 2012. In addition to upgrading and modernizing Delhi and Mumbai airports and setting up greenfield airports at Bangalore and Hyderabad through private developers, other greenfield airports have also been identified for development by private entities.

    Dr. Manmohan Singh while inaugurating conference on infrastructure, October 7, 2006. Available at: http://pmindia.nic.in/speech/content4print.asp?id=414 accessed on September 27, 2010.

11. The land marked out for greenfield airport are close to Chennai-Bangalore National Highway. According to the present procedure, if there is a need for a new airport, the State government has to acquire all the required land and give it to the Airports Authority of India (which is entrusted with the project).

    Officials here made it clear land acquisition of populated areas was already a contested issue. R.K. Radhakrishnan, Sriperumbudur airport project shelved, The Hindu, online edition, Chennai, posted on February 27, 2010.

    Available at: http://www.thehindu.com/news/cities/Chennai/article114323.ece accessed on September 27, 2010.

12. P.J. Fitzgerald (ed.), Salmond on Jurisprudence, 12th ed. (1966), Indian economy reprint, Universal Law Publishing Co. Pvt. Ltd., Delhi, 2002, p. 416.

13. In sustaining a defense of trespass to an action for assault based upon an unneighborly squabble across a garden fence, the Supreme Court of Iowa once noted:

It is one of the oldest rules of property known to the law that the title of the owner of the soil extends, not only downward to the center of the earth, but upward *usque ad coelum*, although it is, perhaps, doubtful whether owners as quarrelsome as the parties in this case will ever enjoy the usufruct of their property in the latter direction.

With the invention of the airplane and the development of modern air transportation, the prerogatives embodied in common-law concepts of real property ownership have received legislative and judicial qualifications intended to accommodate the competing needs of air travel. In recent years, owners of land adjacent to airports have suffered increasing harassment from airplane noise disturbances. Their inability to achieve any judicial relief short of compensation based on the constitutional protection of private property suggests a need for re-evalution of the shrinking rights of property owners in the evolving air age. (Anonymous) note, Airplane Noise, Property Rights and the Constitution, Columbia Law Review, vol. 65, no. 28, December 1965, p. 1428. Available at: http://www.jstor.org/pss/1120437 accessed on September 28, 2010.

14. Held that a servitude has been imposed upon the land for which respondents are entitled to compensation under the Fifth Amendment.

    (a) The common law doctrine that ownership of land extends to the periphery of the universe has no place in the modern world.

    (b) The air above the minimum safe altitude of flight prescribed by the Civil Aeronautics Authority is a public highway and part of the public domain, as declared by Congress in the Air Commerce Act of 1926, as amended by the Civil Aeronautics Act of 1938.

    (c) Flights below that altitude are not within the navigable air space which Congress placed within the public domain, even though they are within the path of glide approved by the Civil Aeronautics Authority.

    Mr. Justice Douglas, United States v. Causby, 328 U.S. 256 (1946). Available at: http://supreme.justia.com/us/328/256/case.html accessed on September 28, 2010.

    (d) Flights of aircraft over private land which are so low and frequent as to be a direct and immediate interference with the enjoyment and use of the land are as much an appropriation of the use of the land as a more conventional entry upon it.

15. Available at: http://www.thehindubusinessline.com/2010/03/16/stories/2010031651590900.htm accessed on September 28, 2010.

16. The rule that the standard (of comfortable living) is determined by the locality where the nuisance is created is limited to those cases where the nuisance complained of is productive of sensible personal discomfort. … The border-line between these two classes has not been clearly drawn: noise and smoke may not only interfere with personal comfort but also make the premises uninhabitable for the purpose of the business carried on there and so cause "sensible injury to the value of the property".

    R.F.V. Heuston (ed.), Salmond on the Law of Torts, 13th ed., Sweet & Maxwell Ltd., London, 1961, p. 189-190.

17. T. Ellis Lewis (ed.), Winfield on Tort: A Textbook of the Law of Tort, 6th ed., Sweet & Maxwell Ltd., London, 1954, p. 541.

18. *Supra*, n. 17, p. 541-542.

19. *Supra*, n. 16, p. 192-193.

20. *Supra*, n. 17, p. 581.

21. *Ibid*.

22. There is no easy way out of this problem. However, it is clear that those who have property or reside in an area impacted by aircraft noise have done so voluntarily, since the airport has been in existence much longer. It is also difficult to claim that they did not know that flight movements will increase, as we all know that growth in civil aviation is a reflection of economic growth and we should have anticipated it.

    Sanat Kaul, Airport noise, Finalcial Express, online edition, posted on June 17, 2010. Available at:
    http://www.financialexpress.com/news/airport-noise/634683/0
    accessed on September 28, 2010.

22. *Vide* a Noise Pollution Clearinghouse Factsheet vis-à-vis Noise Effects on Wildlife, NPC Library archive. Available at:
    http://www.nonoise.org/library/fctsheet/wildlife.htm accessed on September 28, 2010.

23. Landowners have occasionally sought injunctive or monetary relief from aircraft operators and airports, and a few municipalities have attempted to cope with the problems of low flight and excessive noise by ordinance. Formidable difficulties, arising from theoretical and practical aspects of tort law and from the impact of a comprehensive scheme of federal regulation of aviation, have impeded the development of truly effective remedies.

    (Anonymous) note, Airplane Noise: Problem in Tort and Federalism, Harvard Law Review, vol. 74, no. 8, June 1961, p. 1581. Available at: http://www.jstor.org/pss/1338373 accessed on September 29, 2010.

25. From a political point of view, airplane noise regulations may be doing what they are intended to do; that is, the magnitude of transfers from air-lines and air travelers to homeowners is apparently a better indicator of noise regulation's political attractiveness than its efficiency effects. But the political climate may be changing, as evidenced by the current debate over regulatory reform that clearly recognizes that the costs of many social regulations exceed their benefits. Airplane noise regulation should be added to the list.

    Steven A. Morrison et al, Fundamental Flaws of Social Regulation: The Case of Airplane Noise, Journal of Law and Economics, vol. 42, no. 2, October 1999, p. 740-741. Available at: http://www.jstor.org/pss/725703 accessed on September 29, 2010.

26. Our first concern is to redefine the whole purpose of development. This should not be to develop things but to develop man. Human beings have basic needs: food, shelter, clothing, health, education. Any process of growth that does not lead to their fulfilment - or, even worse, disrupts them - is a travesty of the idea of development.

    The Cocoyoc Declaration, as adopted in the UNEP/UNCTAD Symposium on "Patterns in Resource Use, Environment and Development Strategies", Cocoyoc, Mexico, October 8-12, 1974. Available at: http://www.mauricestrong.net/20100414153/cocoyoc/cocoyoc/cocoyocdeclaration.html accessed on September 29, 2010.

27. *Vide State of Bihar v. Upendra Narayan Singh and Ors.*, (2009) 5 SCC 65, paragraph 34.

28. But if on the one hand the myth of legality could provide the basis for the subversion of the old liberal and democratic order, the notion of legitimacy on the other hand was itself deeply affected by the positivist approach and the positivist method. … The "principle of legitimacy" means to Kelsen that the "validity (of a given system of norms) is determined only by the order to which they belong", and that "they remain valid as long as they have not been invalidated in the way in which the legal order itself determines". When, as in the case with a successful revolution, "the total legal order, of which that norm is an integral part, has lost its efficacy", this only indicates that a new legitimacy has set in, in so far as "the actual behaviour of the individuals is [now] interpreted as legal or illegal … according to this new order".

    Alexander P. d'Entreves, Legality and Legitimacy, The Review of Metaphysics, vol. 16, no. 4, June 1963, p. 697-698. Available at: http://www.jstor.org/pss/20123969 accessed on September 29, 2010.

29. It is suggested that the establishment of the permissible level of aircraft noise, including any method of determination of such level, would be essentially a social and technical matter, rather than a legal one.

    Gerald F. Fitzgerald, Aircraft Noise in the Vicinity of Aerodromes and Sonic Boom, The University of Toronto Law Journal, vol. 21, no. 2, Spring 1971, p. 234. Available at: http://www.jstor.org/pss/825084 accessed on September 29, 2010.

30. Appendix C—Policies and programmes based on a "balanced approach" to aircraft noise management.

    Appendix D—Phase-out of subsonic jet aircraft which exceed the noise levels in Volume I of Annex 16.

    Appendix E—Local noise-related operating restrictions at airports.

    Assembly Resolutions in Force (as of 8 October 2004), Doc 9848, International Civil Aviation Council. Available at: http://www.icao.int/icaonet/dcs/9848/9848_en.pdf accessed on September 29, 2010.

31. 6.4 Night curfew will affect the airline operations if the Asian and African countries also impose similar kind of restrictions on public demand.

    6.5 Night curfew issues need to be addressed keeping in view the growth of aviation sector and state-of-art of aircraft design.

    6.6 Specific runways/airports could possibly be utilized for night operations to minimise the community noise problem. Duration of night curfew could possibly be reduced by airports having such night curfews.

    Review of Night Curfew Restrictions, Working Paper, Executive Committee, (ICAO) Assembly—37th Session, presented by India, dated 21/9/10, paragraphs 6.4-6.6, p. 4. Available at: http://www.icao.int/icao/en/assembl/a37/wp/wp270_en.pdf accessed on September 29, 2010.

32. The Council recognizes that although reductions are being achieved in aircraft noise at source, many airports will need to continue the application of noise alleviation or prevention measures. The Council considers that the costs incurred in implementing such measures may, at the discretion of States, be attributed to airports and recovered from the users and that States have the flexibility to decide on the method of cost recovery and charging to be used in light of local circumstances.

    ICAO's Policies on charges for Airports and Air Navigation Services, Doc 9082, 8th ed., International Civil Aviation Organization, 2009, paragraph 38, p. 13. Available at:

http://www.icao.int/icaonet/dcs/9082/9082_8ed_en.pdf accessed on September 29, 2010.

33. CAEP (Committee on Aviation Environmental Protection) continued to study options to limit or reduce the number of people exposed to significant aircraft noise, focussing on technical and operational options. The noise technical working group prepared a report on current state-of-the-art aeroplane noise technology. It contains a review and analysis of certification noise levels for subsonic jet and heavy propeller-driven aeroplanes. An independent expert panel established medium (2018) and long-term (2028) goals for reducing noise through new aircraft and engine technologies.

    Annual Report of the Council (ICAO), 2009, Doc 9921, International Civil Aviation Council, 2010, p. 48. Available at:
    http://www.icao.int/icaonet/dcs/9921/9921_en.pdf accessed on September 29, 2010.

34. In 2004, ICAO adopted three major environmental goals, to:

    a. Limit or reduce the number of people affected by significant aircraft noise Environmental Brach, Air Transport Bureau, International Civil Aviation Organization. Available at:
    http://www.icao.int/icao/en/env2010/Index.html accessed on September 29, 2010.

35. *Supra*, n. 30.

36. *Vide* (ICAO) Assembly resolution in Force (as of 28 September 2007), Appendix-C.

    Available at:
    http://www.icao.int/icao/en/Env2010/A36_Res22_Prov.pdf accessed on September 29, 2010.

37. The ambition of the greatest man of our generation has been to wipe every tear from every eye. That may be beyond us but, as long as there are tears and suffering, so long our work will not be over.

    Jawaharlal Nehru, Tryst with Destiny, speech delivered at midnight of 14-15 August, 1947. Available at:
    http://www.hindustantimes.com/news/specials/parliament/tryst%20with%20destiny.pdf accessed on September 29, 2010.

AVIATION POLLUTION–IMPACT ON ENVIRONMENT

Dr. K. Malathi*

Introduction

Civil aviation has slowly transformed itself from a mode of transportation for the elite to an essential infrastructure necessity for the society. Environmental issues associated with aviation are critically important to the future development of aviation infrastructure. The science of climate change is still relatively new and the future is uncertain.

It is true that most airports in the world are old and was constructed outside the cities. It is the cities that have grown around the airports. Palam in Delhi and Santha Cruz in Mumbai were outside city limits when they came up. Property developers and investors saw the opportunity for price escalation near the airport. Hence, most property development has taken place with full understanding that pollution will be a factor. However, having purchased, the property owners associations and NGOs protest against the pollution particular noise pollution.

The impact of aviation on Environment is much wider than simply reducing public exposure to noise. The aviation industry is cutting down aircraft noise and emission levels to an impressive level in a relatively short period of time; there is no technological "silver bullet" on the horizon that will further reduce aviation's environmental impact significantly.

Airports and aircrafts are causing pollution to Air including sound and water at many different elevations and at considerable distances.

This Paper focuses on the pollutants of aviation and environmental impact of those emissions, the laws relating to reduce or control the aviation pollution with special reference to India.

Aviation Noise Pollution

Noise by definition is 'unwanted sound'. What is pleasant to some ears may be extremely unpleasant to others, depending on a number of factors. Pollution is a noun derived from the verb 'pollute', meaning to foul. It is now increasingly understood that pollution from noise is an important component of air pollution.

Noise has been the principal environmental issue for aviation. It remains high on the agenda of public concern particularly the residents who live in the vicinity of Airports. The noise can arise from ground transport and other operational sources in addition to aircraft in the air and on the ground.

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Environmental noise pollution has severe impact on peoples' health and overall well being. Typically, noise pollution refers to any sounds that disrupt the environment. Aviation noise disturbance is a difficult issue to evaluate. The noise impact is not a lasting one on the actual environment, but it can have significant adverse effects on people living close to an airport, including interference with communication, sleep disturbances, annoyance responses, performance effects and psychological effects.

Millions of people are disturbed by aircraft noise and it will get worse. According to a study, 71% of people heard the aircraft noise, 20% bothered to some extent, 7% bothered moderately and 2% very or extremely bothered.[1]

A study of the effects of noise on children by the department of design and Environmental analysis at Cornell University in New York, found a variety of problems in children exposed to noise compared to children not exposed to noise: blood pressure elevation, learned helplessness, deficiencies inability to discriminate words and possible delays in cognitive development. Yet another reported health impact of noise is increased anxiety and levels of annoyance. In fact mere loudness accounts for less than 50% annoyance from noise.

Aviation noise has become a big issue in developed countries. It is widely recognized that aircraft flying at a height of at least 10,000 feet above the ground do not usually produce 'significant' noise impact. But this is not an absolute rule. It is normal for aircraft noise to be associated with airports, because of the low height involved. In fact, the level of noise is varying from airport to airport.

Noise is generated by engine and the airframe of the aircraft. Arriving aircrafts are less noisy than on departure because of high-level thrusts are used in departure. Aircraft also create noise on the ground when taxiing, queuing, testing engines and using the auxiliary power unit.

The most widely used unit for measuring noise levels is dB (A) – the A – weighted scale in decibels. The noise level of normal conversation is 50 – 60 dB. But a jet aircraft taking off 25 meters away gives 140 dB. The World Health Organization (WHO) has fixed 45 dB as the safe noise level. Experts believe that continuous noise levels in excess of 90dB can cause loss of hearing and irreversible changes in nervous systems. Metropolitan areas in India, usually register an average of more than 90dB noise. Mumbai is rated the 3rd noisiest city in the world, with New Delhi following closely.

The International Civil Aviation Organization (ICAO) has prescribed noise certification standards from time to time. All commercial aircrafts must meet those standards. The 33rd ICAO Assembly adopted a Resolution for introducing the concept of a 'balanced approach' to noise management. According to the 'balanced approach' concept comprise four principal elements to mitigate noise. They are:

a. reduction of aircraft noise at source.

b. land use planning and management.

c. noise abatement operational procedures.

d. operating restrictions.

Some airports are adopted noise quota system at local level for over and above the noise certification standards. Accordingly a limit on the number of movements and a quota or "noise budget" which represents sum of noise over specific period is prescribed.

In *Griggs vs. Allegheny County*,[2] the court held that the Airport was responsible for acquiring sufficient land adjacent to the airport to reduce the impact of aviation noise and, if it failed to do so, was liable for resulting damages from aircraft noise.

Aviation Air Pollution

Climate change is a change in the "average weather". Global climate changes over the long term have many implications for natural eco systems. Aircraft engines produce emissions that are similar to other emissions resulting from any oil based fuel combustion. Airports and aircraft cause many types of air pollution at many different elevations and at considerable distances. Aircraft fly overhead emitting toxic compounds in massive amounts and these emissions are spread generally over an area 12 miles long, 12 miles wide on take off, 6-12 miles on landing. Critics charge that taxiing airplanes emit hundreds of tons of greenhouse gases.

Emissions from aircraft below 1,000 feet above the ground are chiefly involved in influencing local air quality. These emissions disperse with the wind and blend with emissions of other sources from the surrounding domestic factory and transport pollution.[3]

Aviation contributes less than 4% of man-made atmospheric emissions. But some of aviation's emissions are emitted in the upper atmosphere and may have a more direct effect.[4]

Aviation air quality concerns are principally related to the area on and around airports. The chief local air quality relevant emissions attributed to aircraft operations at airports are as follows:

a. Oxides of Nitrogen (NO_X)

b. Carbon Dioxide (CO_2) & Carbon Monoxide (CO)

c. Un-burnt hydrocarbons (CH4 and Volatile Organic Compounds (VOCs))

d. Sulphur Dioxide (SO_2)

e. Fine Particulate Matter (PM10 and PM 2.5)

f. Water Vapour & Odour

According to a report, aircraft emissions include greenhouse gases such as CO_2 6.3% of British CO_2 emissions are from aviation (2005). Aviation account for around 2% of the CO_2 emissions globally. 50% more emissions from aviation expected by 2020, assuming fuel efficiency improves by 50%.[5]

Kyoto Protocol 2005, which is an amendment to the United Nations Framework Convention on Climate Change (UNFCCC) has ratified by many countries and commits to reduce carbon dioxide and five other greenhouse gases.[6]

About 5 million people's health could be affected as a result of just one airport. There are international standards (ICAO) for aircraft engines which are aimed at reducing greenhouse gas emissions. NOX is often considered the most significant pollutant from an air quality standpoint. A greater or lesser degree of the above emissions have climate change implications, as does CO_2.[7]

The quantification of airport atmospheric emissions is a complicated topic because emissions to air disperse and mix with emissions from other sources. A loaded Jumbo 747, for instance, uses tens of thousands of pounds of fuel on merely takeoff. At present there are no international standards for air quality quantification methods. However, sampling the local air and analyzing for NO_X, particulates and other important pollution species is one of the methods for measuring the emissions. Another method of assessing the emissions quantity is modelling. In this method an inventory is created for all significant emitters linked to the airport such as aircraft, ground vehicles, fixed plant and fugitive emission sources. The characteristics of emitters are also determined and the data is combined with typical weather patterns in a sophisticated model to predict with reasons accuracy, the degree of contribution of the airport to local pollution levels and what the dispersion patterns are.

It is important to note that the emissions vary for different operation types for the same equipment. Scientists estimate that effect of aviation emissions on the climate is upto five times the impact of emissions occurring on the ground. A recently disclosed report finds that airlines could hit 1.5 billion tons of carbon dioxide a year by 2025.[8]

India has revised the national ambient air quality standards in 2009 after 15 years. According to the "Minister of State for Environment and Forests, the notified ambient air quality standards in India are equivalent to the European level and exceeds the standards prevalent in the United States.

Under the revised National Ambient Air Quality Standards (NAAQS) of India, 12 pollutants will be measured compared to six in the previous to calculate the level of air pollution.[9]

The most important part of the revised standards in India is that distinction between industrial and residential areas have been removed. Now, the industries have to confirm to the same standards as residential areas and will be compelled to take necessary measures to check air pollution.

Aviation Water Pollution

Airports are known to be major source of water pollution. They dump toxic chemicals – used to de-ice airplanes during winter storms – into waterways. Millions of gallons of glycols are used for aircraft de-icing at airports. Glycols are the most voluminous water pollutants from airports.

During de-icing, the airlines mix 55% glycol and 45% water, heat the mixture to about 185°F, and spray the planes down with it. 50 – 80% of the glycols may end up in the local waterways. Ethylene glycol is more effective and more toxic than propylene glycol. Both consume high levels of oxygen during decomposition and this can deplete waterways of oxygen and kill fish. A small number of airports are successful in recapturing glycols following use and few of them to be recycled for other uses.

Recycled glycols are generally used for coal companies, paint manufacturers and general motors. But the recycled glycols are never used for de-icing in the United States unlike in Europe.

Position In India

Commercial aviation in India began in 1911. Construction of civil aerodromes was taken up at Dum Dum in Calcutta, Baramati in Allahabad and Gibbert Hill in Bombay in 1924. In 1947, 44 airports were being operated by Civil Aviation Department. There are 1,61,393 aircraft departures during 1999-2000 have been escalated to 5,09,567 in 2008-09.[10]

Indian aviation sector has transformed from an over regulated and under managed sector to a more open, liberal and investment friendly sector in the recent years. The sector is undergoing significant development with the changing scenario in the country. India is gradually becoming a focal point in the global aviation map with the growing air traffic, route expansion followed by major airport infrastructure developments. It is estimated that India would be world's fastest growing aviation market over the next 20 years not in terms of passenger and cargo traffic but also in the area of equipment supply, technology up-gradation, maintenance, repair and overhaul (MRO), training, ground handling, cargo handling and other non aeronautical revenues as well.[11]

Rabindranath Tagore says that in ancient times in India, man lived close to forests, and loved nearby surroundings. Today, however man has only plans for constant air travel, spoiling the fragile mother earth.

There can be National Committee to consider new goals for aviation in harmony with environments, and in accordance with the ecological economies.

There are no standards ascribed to noise pollution inside the airport or related to aircraft noise in India. It is a known fact that noise pollution is bound to be higher at airports than any other places. On the petition of the Indian Spinal Injuries Centre, a hospital and the Bijwasan Gram Vikas Samithi, a non-governmental organization, the Delhi High Court on March 3, 2010 directed the

Directorate General of Civil Aviation (DGCA) with no deadlines fixed to implement measures to check the growing level of noise pollution near Delhi airport. On the last date of hearing, the Court had barred Delhi International Airport Pvt. Ltd., (DIAL) from using two of the runways that are used at the Indira Gandhi International (IGI) Airport. The petitioners complained about the environmental noise pollution levels that disturb them during plane landings. The noise created by these planes spanned 75dB-A to 95dB-A, which went beyond the stipulated standards lay down under the Noise Pollution (Regulation and Control) Rules, 2000. Interestingly, India ranks 123rd in pollution control, according to the 2010 Environmental Performance Index (EPI).

The DGCA is looking at introducing continuous descent approach (CDA) at the IGIA in Delhi as an immediate measure to reduce noise pollution following the order of the Court. The CDA is a method by which aircraft approach airports before landing to reduce fuel consumption and noise. It involves maintaining a constant three-degree descent angle during landing, until meeting the instrument landing system. The DGCA recommended that use of new runway 29 for landings be restricted at night to benefit residents living near the approach path. Unlike the West where airports are closed at night and noisy old planes are banished even during day, authorities are now trying to finish this exercise at the earliest following the High Court Order.

Although a regulatory environment has slowly been built up around many activities, these do not usually address noise pollution specifically. The laws usually confine themselves to other matters, or do not adequately address noise issues.

In the absence of an adequate regulatory framework specific to noise pollution the status quo has been determined partly by the interpretation of other laws. Important among those have been Article 19 and 25 of the Indian Constitution. Unless the connections between noise and health are first judicially established, prohibition or control against their use are difficult to pass. The judiciary has nonetheless weighed in on questions of noise pollution.

The Noise Regulation Rules (2000) to Section 3 of the Environment Protection Act 1986, regulate noise levels in industrial (75dB), Commercial (65dB) and residential (55dB) Zones and also establish silence Zones (100 meters) near schools, courts, hospitals etc. The rules are clearly a step forward although they do not attempt to create comprehensive legislation on noise pollution and continue with the piece-meal approach to specific problems encountered over the years.

In recent times (2009), the Government of India have revised the National Ambient Air Quality Standards that are equivalent to the European level.[12]

Legal Provisions For Controlling Aviation Pollution

In the days before the development of environmental jurisprudence, the Common Law remedy against nuisance was the only means available to curtail

excessive noise, and this was wholly based on the discretion of the Judge. Whether a particular noise constitutes a nuisance, after all, is often a question of degree.

Modern environmental law started with Declaration of the United Nations Conference on the Human Environment made at Stockholm on 16th June 1972. In 1982, United Nations made a Charter for Nature. In 1989 'Hague Declaration on the Environment' to protect Ozone layer around the globe, and prevent global warming of the atmosphere is another milestone of the United Nations. The last United Nations Declaration was made in 2002 in Johannesburg, South Africa for Sustainable Development.

For sustainable global environment, it is necessary to revise global and national policies on civil aviation in order to provide harmony with the natural environment and maintain atmosphere in a pollution free state.

The European Community has been incorporated the 'Balanced Approach concept of aircraft noise management' into legislation as Directive to its member countries.

The European Community has enacted legislation-setting limits for different pollutants together with a requirement for Member States to quantify and publish Air Quality impact to operate planes and controls.

In 1990, the American Congress passed the Airport Noise and Capacity Act, which require that, by the year 2000, all aircraft in commercial fleets weighing more than 75000 pounds must be either stage-3 aircraft or stage-2 aircraft that have been retrofitted to dampen noise. A United State Senate bill, the Quiet Communities Act of 1997, would re-establish the office of noise abatement and control in the Environment Protection Authority (EPA) and would "challenge the FAA (US Federal Aviation Administration) to listen to the EPA and seriously consider the environmental impact of noise.

There are no specific legislations in India on control of Aviation Pollution. However, the Indian Constitution clearly stated that it is the duty of the State to 'protect and improve the environment and to safeguard the forests and wild-life of the country.' Reference to environment has also been made in the Directive Principles of State Policy as well as the Fundamental Rights.

The Constitutional provisions are backed by a number of Laws – Acts, Rules and Notifications. The Environment Protection Act (EPA) 1986 was enacted under Article 253 of the Constitution and came into force soon after the Bhopal Gas Tragedy and is considered as umbrella legislation as it fills many gaps in the existing laws. Thereafter a large number of laws such as Water Act and Air Act came into existence as the problems began arising.

The potential scope of the Environment Protection Act is broad, with "environment" defined to include water, air and land and the inter relationships which exist among water, air and land and human beings and other living creatures, plants, micro-organisms and property.

According to Environment Protection Act "Environmental Pollution" means the presence in the environment of any environmental pollutant and "environment Pollutant" means any solid, liquid or gaseous substance present in such concentration as may be, or tend to be, injurious to environment.

Under Section 15 of the Environment Protection Act, whoever fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued there under, shall be punishable with imprisonment for a term which may extend to five years with fine which extend to one lakh rupees or with both in respect of each such failure or contravention. In case the failure or contravention continues, with additional fine which may extend to five thousand rupees for every day during which such failure or contravention continues after the conviction for the first failure or contravention.

Under Section 17 of the Act, where an offence under this Act has been committed by any department of Government, the Head of the Department shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly unless it is proved that the offence was committed without his knowledge or that he exercise all due diligence to prevent the commission of such offence.

Conclusion And Suggestions

The National Air Transport Association (NATA) of United States propagating that the "theories about high altitude CO2 and NOX effects are just that, theories" and "no scientific proof that this is significant" – On the other hand the Environmentalists are concerned about the growth of aviation on the environment citing an FAA forecast that greenhouse gases (GHGs) from domestic aircrafts are expected to grow by 60% by 2025. However, aviation contributes approximately 3% GHGs worldwide, compared to other transport modes and power plants.

At the global level, some countries have requested the ICAO to review the night curfew restriction imposed by some countries on the operation of airlines and arguing that the imposition of night curfew creates a mismatch in utilizing infrastructure round-the-clock and hampers the growth of airlines.

In conclusion, it can be said that aircrafts and airports are no doubt causing environmental pollution to a recognizable extent. But in the changing scenario, aviation is gradually becoming an essential infrastructure for the overall development of a country. Therefore, instead of imposing strict restrictions on aviation, ensuring strict adherence of the measures which reduce the pollution levels of the aircrafts and airports. The following are some of the suggestive measures to conserve fuel and reduce the aviation pollution:

1. Establish a Coordination Committee between airport air traffic control and aircraft operators for aircraft noise management.

2. Depicting preferred noise routes to avoid residential areas as far as possible.
3. Avoid over flying sensitive sites viz., schools and hospitals.
4. Optimum use of runways and routes.
5. Adopting continuous descent approach, low-power-low-drop techniques and departure techniques for abatement of noise and emissions.
6. Avoiding unnecessary use of auxiliary power units of aircraft reduces sound as well as emissions.
7. Towing aircraft instead of using jet engines to taxi reduces noise pollution and emissions. Single engine taxiing reduce the emissions. But some airplanes lack the ability to taxi on one engine. The crew must be properly trained in the technique of single engine taxiing.
8. Limiting night operations. Night landings should be restricted to only aircraft with new engines, which produce less noise.
9. Providing noise insulators for the most severely affected houses of surrounding the airports.
10. Monitoring individual noise levels of aircrafts and penalizing any breach.
11. Applying different operational charges according to the noisiness of the aircraft.
12. Avoiding aircraft queuing on the ground with engines running.
13. Increase the use of public transport and pedestrian access to airports.
14. Use of electric vehicles or less polluting fuels in airport and airport buildings.
15. Energy management in buildings and for airfield systems.
16. Using fugitive emission controls.
17. Conserve fuel by making routes more direct, increasing load factor and capacity of more fuel optimised routes, operating more fuel efficient aircrafts etc.,
18. The small airlines and airports may be revived to avoid mega airports. The domestic and international hubs are to be separated to avoid congestion in airspace and on ground.
19. Mega cities need to be de-congested by careful planning of global civil aviation.
20. A nice exercise has to make a planning for better world order based on unity and diversity of global life with international cooperation,

confidence building measures among nations, regional and federal approach to suit various ecological systems and cultures and people of the world belong one human species i.e. mankind is one species.

21. Aircraft weight must be reduced to save CO_2 emissions and make engines with longer combustion zones to reduce NO_X.

Endnotes

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CONSTITUTIONALITY OF INDIA'S ANTI HIJACK POLICY

Hardeep Singh*

Introduction

As images of hijacked aircrafts crashing into the iconic World Trade Centre flashed across news channels, on 11th September 2001, Governments across the world were eager to decide a course of action that would help them prevent such threats from materializing and combating them, if they arose again. To counter the growing threat of global terrorism, the aggressive *War on Terror* led by the United States of America in the aftermath of the 9/11 attacks brought about a paradigm shift in the way the world and the aviation sector specifically perceived and chose to combat emerging threats, especially hijacked civil aircrafts, which might be used as weapons of mass destruction. In India, the Cabinet Committee on Security (CCS) in 2005 also adopted the 'no negotiation' policy as a course of action in the event of the hijacking of aircrafts. This paper questions the constitutionality of this policy and its consonance with general principles of international law.

Unlawful seizure of an aircraft, or hijacking as it is more commonly known has been a long standing threat to security of passengers in civil aviation. It was in the late 60's and early 70's when the number of hijacking increased significantly, that the request was made, to have a specific convention to address this issue. This process began in September 1968, when the sixteenth assembly of the ICAO, requested the Council of ICAO to initiate a study on measures to cope with the problem of hijacking of aircraft, at the earliest possible date.[1]

The Concept Of Hijacking

The problem of hijacking is more than 80 years old. The motives behind hijackings transformed with time over the decades. The first recorded hijacking occurred 1930 in Peru. Byron Rickards was approached by armed revolutionaries, who demanded his aircraft. Initially Rickards refused, however when the revolutionaries' uprising was successful and he was allowed to go, he was ordered to fly one of the members of the revolutionaries to Lima, Peru. Although this was not a hijacking in the meaning of the term as it is understood today, it is argued that this was the first hijacking as it led to an unauthorized use of an aircraft.[2] Between 1930 and 1967, there were a total of thirty five hijackings,

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twenty three in Europe and twelve in America. The idea behind these hijackings was mainly a search of political asylum, or petty insurance frauds etc.

In the 1960s, the number of hijackings grew at an alarming rate. There were a total of 364 hijacking across the world between 1968 and 1973 according to the U.S. Department of Transportation (DOT). The majority of hijackings in this period were for one of the following three reasons: (1) Political Asylum, (2) Release of Prisoners, and (3) financial gain.[3] By the late 60's, early 70's the world had started to fly in modern jets which could carry more people, and go longer distances, therefore leaving more at the disposal of the hijackers. This led to the states taking action against the hijackers and wanted the ICAO to take up this issue with the legal subcommittee. Meanwhile, states made sure that baggage checks were performed, and check in baggage and passengers were screened before they were let into the aircraft. This was the beginning of airports as we know them today.

The 1980s till 2001 was the time when the aviation industry transformed dramatically. Several devastating attacks on aircrafts leading to high number of casualties, worse hijacking scenarios with the perpetrators making demands on governments and engaging in negotiations led to a lot of significant changes to the field of aviation. Aircrafts were shot down as states believed them to be spy aircrafts. The Soviet Union shot down flight KAL 007 as the aircraft entered Soviet territory en route Korea from the United States. After these incidents, mainly in the 80s the aviation industry made some radical changes, which led to a relatively quiet 90's without many incidents of hijackings, leading to a false sense of security for the passengers and the industry.

The most prominent hijacking in the 90's was the infamous Kandahar hijack, in which an Indian Airlines aircraft, IC-814 was hijacked as it left for Kathmandu from Delhi. The hijacked aircraft was refuelled at Lahore, and then parked at Kandahar for a week. This episode ended only after the release of 3 dangerous terrorists.

Post 9-11: Aircrafts As Weapons Of Mass Destruction

As the Al-Qaeda trained hijackers, crashed aircrafts into the World Trade Centre, New York, it brought to the fore the new threat that hijackings had become. Hijackers, could use aircrafts as missiles, to crash into the most strategic military or financial institutions in a state, leading to killing of thousands of people, as was demonstrated on 9/11.[4]

This led to a change in the policy of states towards hijacked aircrafts. On January 5, 2003 a mentally disturbed person, flying a light aircraft, overflew the town centre of Frankfurt (Germany) and threatened to crash the plane on the Central European Bank building if he was not allowed to make a phone call to the US. General alarm was raised, buildings were evacuated, and one police helicopter and two Air Force fighters took off to track the aircraft. After 30 minutes, the man was allowed to make the phone call, and it was clear that the

threat was neither serious nor dangerous. He landed the aircraft and surrendered without violence.[5] Concerned, by what the German Government believed could have been a catastrophe, the German Government enacted the 2005 Air Security Act. Many other countries passed legislations which allowed them to act in case such an attack where aircrafts were used as missiles was to occur in their territory.

India's Anti Hijack Policy

Indian Government adopted its Anti Hijack Policy in 2005, when it was approved by the Cabinet Committee on Security. The policy among other things states:[6]

- No foreign hijacked aircraft will be allowed to land in India
- Any hijacked Indian aircraft, will be forced to land in India, and once a hijacked aircraft has landed in India, all efforts shall be made to stop it from taking off again.
- In case of any suspicious activity[7] by the aircraft, the ATS Watch Supervisory Officer, shall inform the Joint Control and Analysis Centre (JCAC), manned by IAF officials.
- In case the aircraft does not pay heed to the communication with the ground controller, it shall be branded as '*rogue*' aircraft, and in case it is aligns itself to a strategic target like Rashtrapati Bhawan, or the Parliament,[8] the aircraft shall be branded '*threat*'. Once an aircraft is declared a threat, the CCS can take a decision to shoot down the aircraft.

The CCS is the apex body for handling such decisions, however in case of emergency, the PM, Minister of Defence or under extreme circumstances an IAF official (not below the rank of Assistant Chief of Air Staff) can take this decision.

9-11, therefore not only exposed fundamental human errors in security procedure but they also brought to the new *modus operandi* of terrorists wherein aircrafts were used as guided missiles. Around the world, strategists and policy makers looked in disbelief at the apparent ease with which aircrafts brought down the WTC, and with that the warm sense of security and belief that the skies were now secure. The anxiety of the state, over combating such attacks in the future, led to this policy, which although very strict in the literal terms, is dissonant with the Chicago Convention, which India has ratified, and the Indian Constitution as well.

The Use Of Force Against Aircrafts Being Used As Weapons Of Mass Destruction

a. International Perspective

The shooting down of the Korean Airlines flight KAL 007 in 1983, led to the ICAO taking up discussions on attacks against civil aircrafts more seriously which culminated in the adoption of Article 3*bis* of the Chicago Convention in

1984. This amendment entered into force in May, 1998 when it was ratified by the required two-thirds majority of ICAO's member states (102 ratifications). In the preamble to this protocol, states expressed their desire to re-affirm the principles of non-use of weapons against civil aircrafts in flight. The new addition to the convention reads as follows:

> *Article 3bis*
>
> *(a) The contracting States recognize that every State must refrain from resorting to the use of weapons against civil aircraft in flight and that, in case of interception, the lives of persons on board and the safety of aircraft must not be endangered. This provision shall not be interpreted as modifying in any way the rights and obligations of States set forth in the Charter of the United Nations.*[9]

India is not yet a state party to Article 3*bis* of the Chicago Convention, and does not need to recognise the principle of non usage of force as laid down under it. However, long before the adoption of Article 3*bis*, abundant state practice had developed regarding the treatment of intrusions of civil aircraft.[10] In the *Corfu Chanel*[11] case, the International Court of Justice (ICJ) emphasized the principle of 'elementary considerations of humanity' which is a general principle of international law. This principle has repeatedly been invoked to denounce the disproportionate use of force against intruding civil aircrafts.[12] In the *Corfu Chanel case*,[13] Albania planted mines in the sea and failed to notify the British warships about the impending danger of those mines. British warships suffered damages due to these mines. The court affirmed that Albania had the responsibility of informing the British warships about the threat posed. The court stated:

> *...such obligations are based...on certain general and well recognized principles of international law namely: elementary considerations of humanity, even more exacting in peace than in war, the principle of the freedom of maritime communication; and every State's obligation not to allow its territory to be used for acts contrary to the rights of other States.*[14]

In the context of aviation law, the same principle would not allow states to attack aircrafts, as attacking an aircraft and killing civilians would be against the elementary considerations of humanity. Based on state practice prior to 1984, a number of commentators who were involved with the drafting of Article 3*bis* were of the view that paragraph (a) is 'not a new rule of law', but the recognition of the 'existence of a prior rule binding on all parties and prohibiting the use of weapons against civil aircrafts in flight',[15] it is declaratory of the principle of general international law, which 'had its independent existence separate from the written (codified) text of Article 3*bis*(a)'.[16] This is also evident from the text of paragraph (a) of Article 3*bis*, where the words 'recognize' and 'every state' were deliberately chosen to indicate that the effect of the provisions is not limited to contracting states.[17]

b. Domestic Perspective

Indian Law draws its character and strength from the Constitution of India. The Constitution of India grants upon all citizens the fundamental rights, which are part of the basic structure of the constitution.[18] These fundamental rights are guaranteed, and any violation of these by the state can be challenged in the Supreme Court of India.[19]

India's Anti Hijack Policy, leaves many unanswered questions. Do the people who are onboard the aircraft which is hijacked, involuntarily lose their right to life as enshrined under this article? Is a policy passed by the CCS, fall under the definition of 'procedure established by law' under the definition of Article 21? The text of Article 21 reads as follows:

> *"Protection of life and personal liberty – No person shall be deprived of his life or personal liberty except according to procedure established by law.*[20]

The most important part under this article is procedure established by law. Article 21 has been given an expanded view in order to protect the citizens from any possibility of a violation of the right to life. Therefore, it is important to notice the interpretation of 'procedure established by law' and the character of the term 'law'.

This issue first came into light, in the *Gopalan Case*.[21] In this case the court stated "the expression 'procedure established by law' introduces into India the American concept of procedural due process which enables the Courts to see whether the law fulfils the requisite elements of a reasonable procedure."[22]

The Supreme Court ruled by majority that the word 'law' in Art. 21 could not be read as meaning rules of natural justice. These rules were vague and indefinite and the Constitution could not be read as laying down a vague standard. Nowhere in the Constitution is the word 'law' used in the sense of abstract law or natural justice. The word 'law' was used in the sense of *lex* (state-made law) and not *jus*. The expression 'procedure established by law' would therefore mean the procedure as laid down in an enacted law.[23]

The decision to shoot down a hijacked aircraft which is a 'threat' is of either the Prime Minister or Minister of Defence or an IAF official (not under the rank of Assistant Chief of Air Staff). It has been made clear by a long line of precedents,[24] that to take away the right to life or personal liberty, the order must be coming from a just, fair and reasonable law. Although the word 'law' does include within its ambit 'ordinance',[25] 'rules made by the Supreme Court',[26] 'rules made for the governance of the tribal areas',[27] 'rules made by a House of the State Legislature'[28] and 'regulations made under a previously passed act',[29] two questions still remain. The first question is whether a 'policy' passed by the Cabinet Committee on Security falls under the definition of law under Article 21? The second question and the more pertinent one is that even if the policy is Law as enshrined under Art. 21, is it just, fair and reasonable?

A policy and an ordinance are different and that is the issue of contention here. An ordinance is issued by the President and is an executive decision, and therefore it is subject to the same levels of justice, fairness and reasonableness, and hence it has the status of law. However, this policy although passed by the Cabinet Committee on Security, had not been issued officially by the President, and nor has the Parliament been involved in this decision making in any way.

Before the second question is answered, one needs to take into consideration some other aspects of unlawful seizure of aircrafts. The policy states that in case of a threat, the Prime Minister would be the authority to order the shooting down an aircraft. If the PM is not available, then it would be the decision of Minister of Defence. In case both of them are not available, then an official of the Indian Air Force, not below the rank of Assistant Chief of Air Staff can order the shooting down of the aircraft. However, this policy does not take into account the nature of the threat in case such an event does happen. An aircraft-related threat would not take more than 10 – 15 minutes to materialise,[30] and a decision taken within such time will not conform to the standards of justice, fairness and reasonableness, as are required of a 'law' which would violate the fundamental right to life of a lot of people. The Supreme Court of India has reiterated again and again as has been previously shown, that a law which can take away the right to life of the people has to be just, fair and reasonable.

The order to shoot down a hijacked civil aircraft in flight would lead to the violation of the right to life of not only the people on board, but also of those people on whom the debris of the aircraft would fall. As the aircraft is approaching a strategic place in the middle of the city, such an aircraft would fall onto the city as debris, thereby causing more casualties. Keeping in mind the little time in the hands of the decision maker, the order would definitely not be just, fair and reasonable. There is no justification for allowing such an order which would violate the human rights of a large number of people, both in air and on land. With such a policy, the government implies that all the people who fly in India, let go of their fundamental right to life in the airport, as in case of an emergency, the people can be deprived of this right by a procedure which is firstly not established by law and secondly is not just, fair and reasonable. The 'right to life and personal liberty' of passengers of a hijacked civil aircraft cannot be relegated into oblivion in the interest of national security. The government has a responsibility of protecting its citizens at all times, not violate it in the name of national security.

According to elaborate procedures that have been adopted for shooting down a commercial plane, it has to be first ascertained without doubt that the hijacked aircraft will hit a strategic target. Experts[31] in the field of aviation maintain the stance that it is virtually impossible to assess from there whether the prerequisites of this policy are met. The information which the PM, Minister of Defence or IAF need for the decision to order the shooting down of a plane does

not come from the direct danger zone on board the plane. That is only indirect information which the pilot has received from the cabin crew, who is possibly under the command of terrorists. Apart from this, the situation on board can change within seconds, something which ground control probably cannot be informed of fast enough due to the long channels of communication. The possible motivation of a hijacker and the objectives of a hijacking remain speculative till the very end. The policy stipulates that such an order to shoot down the aircraft would be taken only after it is absolutely sure that the aircraft is going to attack a strategic target. The experts although believe that there can never be absolute surety about the objective of the hijackers, therefore implying that such a decision to shoot down an aircraft would be taken only on the belief of such an impending threat, when there might be none.

With the right to life, the biological and physical existence of every human being is protected against encroachments by the state from the point in time of its coming into being until the human being's death, independently of the individual's circumstances of life and of his or her physical state and state of mind. Every human life as such has the same value, including non citizens of India, who also have a right to life till they are in the territory of India.[32] Although it constitutes an ultimate value within the order of the Constitution, this right is nevertheless subject to the constitutional requirement as laid down in the latter half of the text of Article 21. The fundamental right to life can therefore be encroached upon on the basis of a 'procedure established by law'. The precondition for this is that it has to conform to the standard of 'just fair and reasonable'. It must be adopted in accordance with the legislative competences, it must leave the essence of the fundamental right unaffected pursuant to Article 21, and it may also not contradict the fundamental decisions of the constitution in any other respect.

The right to life has been expanded to include to 'living with dignity'.[33] The Supreme Court of India in the Francis Coralie[34] held that the expression 'life' in Article 21 does not connote merely physical or animal existence but embraces something more. "We think that the right to life includes the right to live with human dignity and all that goes along with it..." In the P. Rathinam Case[35] the court said "The right to live with human dignity and the same does not connote continued drudgery. It takes within its fold some of the fine graces of civilization which makes life worth living and that the expanded concept of life would mean the tradition, culture, and heritage of the person concerned."

In view of this relation between the right to life and human dignity, the state is prohibited, on the one hand, from encroaching upon the fundamental right to life by measures of its own, thereby violating human dignity. On the other hand, the state is also obliged to protect every human life. This duty of protection demands of the state and its bodies to shield and to promote the life of every individual, which means above all to also protect it from unlawful attacks, and interference, by third parties.

Taking as a starting point the idea that it is part of human nature to exercise self-determination in freedom and to freely develop themselves, and that the individual can claim, in principle, to be recognised in society as a member with equal rights and with a value of his or her own, the obligation to respect and protect human dignity precludes making a human being a mere object or being treated thus. What is thus absolutely prohibited is treatment of any human being by public authority. The policy calls into question his or her status as a legal entity by its lack of respect of the value and dignity which is due to every human being.

The state which in such a situation resorts to the measure provided by this policy treats them as mere objects of its rescue operation for the protection of others. The desperation and inescapability which characterise the situation of the people on board the aircraft who are affected as victims also exist vis-à-vis those who order and execute the shooting down of the aircraft. Due to the circumstances, which cannot be controlled by them in any way, the crew and the passengers of the plane cannot escape this state action but are helpless and defenceless in the face of it with the consequence that they are shot down in a targeted manner together with the aircraft and as result of this will be killed with near certainty. Such a treatment ignores the status of the persons affected as subjects endowed with dignity and inalienable rights. By their killing being used as a means to save others, they are treated as objects and at the same time deprived of their rights; with their lives being disposed of unilaterally by the state, the persons on board the aircraft, who, as victims, are themselves in need of protection, are denied the value which is due to a human being.

Conclusion

Growing threat posed by non state actors led to states taking up new measures in the war against terror. State policies need to be potent enough to effectively counter this growing threat. However looking at this policy from the paradigm of human security, the policy has a number of loopholes. The government in a bid to secure strategic locations has failed in not being able to strike equilibrium between the apprehension to public security and the basic human rights of the passengers.

India has always taken pride in being a champion of human rights, with an independent judiciary ensuring the same. To have a policy, neither having the character of law nor conforming to the parallel principles of 'justice, fairness and reasonableness', violating the right to life of its citizens is unreasonable.

Every citizen has an inherent right to life which he or she can be deprived of only through 'procedure established by law'. Although the term law has been given an expanded definition by the court, such an order to shoot down an aircraft based on an apprehension[36] of threat to public security can hardly fall into that definition.

The fundamental question through this paper remains whether killing of innocent people is always forbidden, even when the state needs protection

against dangers to its strategic establishments. The answer is a yes, as the state is primarily responsible for the life of all its citizens and cannot take away that right.

Endnotes

1. Sami Shubber, 'Aircraft Hijacking Under the Hague Convention 1970—A New Regime?' (1973) 22 Int'l & Comp. L.Q. 688; also see Res A16-37, para.3.
2. Air Piracy is defined under 49 U.S.C. 1472(i) as any seizure or exercise of control, by force or violence, or threat of force or violence. 'Hijacking' is a modern term for air piracy.
3. Jeffrey. C. Price and Jeffrey S. Forrest, *Practical Aviation Security*, (Butterworth—Heinemann Publication, 2007) 49.
4. 2977 people were killed in the attacks on the World Trade Centre.
5. Miguel Beltran de Felipe & Jose Maria Rodriguez de Santiago, 'Shooting Down Hijacked Airplanes? Sorry, We're Humanists. A Comment on the German Constitutional Court Decision of 2.15.2006, Regarding the Luftsicherheitsgesetz (2005 Air Security Act)', http://law.bepress.com/expresso/eps/1983, 2007.
6. Sanjan Jain, Gautam Sen(ed.), *Conceptualizing Security for India in the 21st Century*, (Atlantic Publishers and Developers, 2007) 59.
7. An aircraft shall be deemed to be a suspicious aircraft, when it stops listening to the ATC instructions and after repeated orders, does not respond or comply with the instructions issued.
8. A list of strategic targets has been prepared by the Bureau of Civil Aviation for the same purpose. http://www.india-defence.com/reports-216, last visited 29th September 2010.
9. ICAO Doc. 9436, *Protocol* relating to an Amendment to the Convention on International Civil Aviation (Article 3*bis*), signed at Montreal on 10 May 1984. This amendment came into force after ratification by the required 102 states on 1 October 1998. It has 140 parties as on 12 October 2010 (<http://www.icao.int/icao/en/leb/3bis.pdf>).
10. Dr. Jiefang Huang, *Aviation Safety through the Rule of Law—ICAO's Mechanisms and Practice*, (Kluwer Law International, 2009) 89.
11. *Corfu Channel Case* (*UK v. Albania*) (Merits) [1949] ICJ Rep 4.
12. ICAO Doc. 9436 (n. 10).
13. *Corfu Channel* (n. 12).
14. *Ibid*. at 22.

15. M.Milde, 'Interception of Civil Aircraft vs. Misuse of Civil Aviation (Background of amendment 27 to annex 2), AASL XI (1986), 105, 125.

16. Milde (n. 16) at 113.

17. In the original drafting, the term 'undertakes to refrain' was used. It was subsequently replaced by the term 'recognize that every State must refrain'. http://www.india-defence.com/reports-216, last visited 29th September 2010.

18. *Kesavananda Bharti v. Union of India* AIR 1973 SC 1461.

19. Constitution of India 1950 art 32.

20. Constitution of India 1950 art 21.

21. *A.K. Gopalan v. State of Madras*, AIR 1950 SC 27.

22. *Ibid*.

23. M.P. Jain, *Indian Constitutional Law*, (Lexis Nexis Butterworths Wadhwa Nagpur, 2010) 1179-1180.

24. *Maneka Gandhi v. Union of India* 1978 1 SCC 248; *A.K. Roy v. Union of India*, AIR 1982 SC 710: (1982) 1 SCC 271; *In re Sant Ram*, AIR 1960 SC 932, 935: (1960) 3 SCR 499; *State of Nagaland v. Ratan Singh*, AIR 1967 SC 212, 223: (1966) 3 SCR 830; AIR 1959 SC 395, 410-11: 1959 Supp (1) SCR 806; *Govind v. State of Madhya Pradesh*, AIR 1975 SC 1378, 1385.

25. *A.K. Roy v. Union of India*, AIR 1982 SC 710: (1982) 1 SCC 271.

26. Constitution of India 1950 art 145; *In re Sant Ram*, AIR 1960 SC 932, 935: (1960) 3 SCR 499.

27. *State of Nagaland v. Ratan Singh*, AIR 1967 SC 212, 223: (1966) 3 SCR 830.

28. AIR 1959 SC 395, 410-11: 1959 Supp (1) SCR 806.

29. *Govind v. State of Madhya Pradesh*, AIR 1975 SC 1378, 1385.

30. This draws from the 9-11 attacks. All the aircrafts crashed into their targets within 15 minutes.

31. The Cockpit Association; Independent Flight Attendant Organization.

32. *Louis de Raedt v. Union of India*, (1991) 3 SCC 554: AIR 1991 SC 1886; *National Human Rights Commission v. State of Arunachal Pradesh*, AIR 1996 SC 1234: 1950 SCR 88.

33. *Francis Coralie v. Delhi* AIR 1981 SC 746; *State of Kerala Scheduled Tribes Case*, (2009) 8 SCC 46, 95; *P. Rathinam v. Union of India*, (1994) 3 SCC 394.

34. *Francis Coralie v. Delhi*, AIR 1981 SC 746 at 753.

35. *P. Rathinam v. Union of India*, (1994) 3 SCC 794.

36. The word apprehension is used keeping in mind the explanation given earlier, where the author puts forward that the situation on a aircraft can change very quickly. Ground Control can never be a hundred percent sure of a situation on board an aircraft, therefore that applies to the decision makers as well.

SECOND INTERNATIONAL CONFERENCE ON CURRENT DEVELOPMENTS IN AIR AND SPACE LAW AVIATION SAFETY: INTERNATIONAL STANDARDS AND INDIA

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Introduction

This subject in about compliance and non-compliance of Safety and Security standards laid down by ICAO from time to time. Undoubtedly such standards and recommended practices have to be followed by all the 180 signatories to Chicago convention of 1944, which includes Asian states and India as well. To ensure compliance. ICAO conducts safety and security Audits.

But it has been obsevered that Safety standards are clearly not being met globally. This can be easily understood from following facts

- African aviation accounts for 25% of the world's accidents and only 4.5% of the world's air traffic
- ICAO has identified Latin America, Africa, and Asia as disproportionately responsible for airline accidents
- Absence of transparency and accountability in the growing Chinese aviation market.

Airline passenger safety has been the central public policy which remains a central public policy concern although there have been efforts by international bodies but these international efforts still require State-level enforcement to be effective.

This paper gives a detailed outline of the safety measures taken internationally and steps taken by India to improve its safety measures.

Blacklisting

Due to above stated reasons European countries and USA have followed the method of blacklisting to ensure safety in field of aviation.

• U.S. Approach to Blacklists

U.S. Federal Aviation Administration under International Aviation Safety Assessments ensures that all foreign air carriers that operate to or from the U.S. are properly licensed and with safety oversight provided by a competent Civil Aviation Authority (CAA) in accordance with ICAO standards. FAA looks

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towards Foreign CAA's capability for providing safety certification and its ability to provide continual oversight of its carriers, By routine checking into accidents for rule volitions, equipments failures, and pilot errors.[1] A country's failure to meet ICAO standards is published by the FAA.

• EU Approach to Blacklists

European Union's Program began in December 2005 as a joint venture between the European Commission and the Member States of the EU. Here member States identify carriers subject to operating bans within their territory; EU Commission then evaluates the carriers based on common criteria. Then the list of individual carriers published in the Official Journal of the European Union and updated at least every three months.

Here the Banned carriers can request a compliance review from the Commission to have itself removed from the list

Note: EU list is distinct from U.S. list insofar as it identifies non-compliant carriersrather than countries.

Criticism

According to IATA Blacklists are a punitive measure which will not necessarily lead to improved safety standards. Rather Whitelists would provide an incentive for improved safety by promoting those carriers which comply with international standards. on the other hand any national listing should be based on objective, internationally harmonized, criteria which are consistently utilized and IATA's Operational Safety Audit serves as just such a benchmark and should be looked at by all governments as the standard.

Also, criticism is based on the issue that International aviation safety standards are the product of U.S. and EU aviation hegemony and Blacklists and other similar efforts keep new entrants from primarily developing countries out of the aviation market these safety,easures apllied should also keep in mind that Many countries which do not comply with international safety standards lack resources. And the retaliatory economic measures are disproportionate to the potential harm caused by non-compliance.

International Efforts To Improve Safety

1. ICAO Standard and Recommended Practices (SARPs)[2]

It has got a Long standing history and international legitimacy. Implementation of SARPs lies with the Contracting States to the Chicago Convention.Under it comes the Universal Safety Oversight Audit Programme (SOA)[3] wherein Regular, mandatory, systematic, and harmonized safety audits are conducted. Results from these audits are published in a Summary Reports. Since there is No "neutral" enforcement body so enforcement (blacklisting) is up to individual States.

Audits of Contracting States operate in three "phases"

a. Pre-Audit - SOA evaluates pre-audit questionnaires to analyze a State's organization, implementation of SARPs, and the complexity of its air services
b. On-Site - Visit by audit team to State to assesses its safety programs and systems
c. Post-audit - Develop a comprehensive report and construct a corrective action plan for the State if necessary

2. IATA's Operational Safety Audit[4]

IOSA is the industry's attempt to self-audit and thereby bypass repetitious inspections. There are High uniform standards required for IATA membership. Since the standards comply with current best practices in the industry, there's no question that all participants will be held to the same threshold. There is One "universal" audit will remove the need to expend airline resources for multiple inspections, thus keeping operating costs down. It enjoys strong international support, including approval from the United States, European Union, and ICAO. Compliance with IOSA opens up market incentives for carriers, including code-sharing, wet lease, and aircraft leasing opportunities. But these IATA standards have no binding authority on non-members.

3. Flight Safety Foundation[5]

Its an independent, neutral, and dedicated to compiling critical research on what causes aviation accidents. It Holds itself out as an independent, nonprofit, and international organization that performs research, inspection, advocacy, and publishing to improve safety. Works closely with other aviation organizations, including the Airline Pilots Association, Air Transport Association of America, ICAO, IATA, etc. this Organization works more on the "good will" (conscience) of the industry rather than as another regulatory overseer so No enforcement mechanism in case of failure to cooperate.

Chicago Convention/ICAO And Standards

The Convention on International Civil Aviation, also known as the Chicago Convention, established the *International Civil Aviation Organization* (ICAO), a specialized agency of the United Nations charged with coordinating and regulating international air travel. The Convention establishes rules of *airspace, aircraft registration* and safety, and details the rights of the signatories in relation to air travel. The Convention also exempts air fuels from tax.

The document was signed on December 7, 1944 in *Chicago*, *Illinois*, by 52 signatory states. It received the requisite 26th ratification on March 5, 1947 and went into effect on April 4, 1947, the same date that ICAO came into being. In October of the same year, ICAO became a specialized agency of the *United*

Nations Economic and Social Council (ECOSOC). The Convention has since been revised eight times (in 1959, 1963, 1969, 1975, 1980, 1997, 2000 and 2006).[6]

ICAO apex body under United Nations formed in accordance with Part II of Chicago Convention. After intensive studies, extensive deliberations and detailed analysis ICAO laid down various standards and practices to be followed by all Civil aircraft and aviation authorities the world over for achieving Safe & orderly flow of air traffic.

International Standards & Recommended Practices

As per Article 37 of Chicago Convention, ICAO is to adopt and amend from time to time, as may be necessary, international standards and recommended practices dealing with Communication Systems, airports, air traffic control, Licensing of operating personnel, Air worthiness of aircraft, exchange of meteorological information, aircraft in distress and investigation of accidents. Any infraction of the convention and any failure to carry out recommendation or determination of the council of ICAO, is reported to contracting states as per Article 54 of the convention. Adoption and amendments in the form of annexes is as per Article 90 of convention.

With regard to international standards & recommended practices on Security, Annexure 17 has been developed by ICAO This annexure has been revised twelve times since 1944 to adapt to new risks and challenges, shifting focus since the 1970 from hijacking to attacks or fascilities to sabotage, including the use ofaircraft as weapons of mass destruction.[7] This is in force since 22.3.74 and embodies provisions on the following:

a. Potential hazards at airports.
b. New security equipments
c. Carriage of weapons
d. Pilot in command
e. Pre-flight checks
f. Safety on board of passengers
g. Security control of baggage.
h. Exchange of information by contracting states for safe guarding international civil aviation against acts of unlawful interference.

Non Compliance Of Safety/Security Standards May Lead To Accidents And Consequent Black Listing And Banning Of Flights Of Particular Airlines

- Keeping in view that lives of people are at stake Black listing on the basis of performance record is neither unwarranted nor arbitrary nor irrelevant, though black listing tarnishes the reputation of an airline and is a harsh measure having disastrous effects.

- Blacklisting prevents an airline from the privilege and advantage of entering into a lawful relationship with the Govt. for purpose of gain.
- Black lists are real instruments of coercion, as every airline whose name is on, soon discovers to his cost. Airlines in the black list are for special avoidance. It indicates that Airlines does not conform to the rules. In other words black listing censures an Airline. It creates untrustworthiness. Its adverse civil consequence is on its future business.
- Even if rules do not expressly say so, it is elementary principle of natural Justice that parties affected by an order should have right of being heard and making representations against the order. Without giving a show cause notice nobody should be black listed.

The procedure to be followed for such a declaration should be reasonably fair & just, consistent with good govt. However some inconsistencies / anomalies have come to light in respect of black listings by some countries. The same are given below:

i. Pakistan international Airlines (PIA) was blacklisted by E.U., except 777s, 747s, A 310, even though the said airlines completed rigorous safety audit required for membership of IATA. FAA ranks Pakistan as category – I meaning that country conforms to highest safety standards.

ii. Ukraine is ranked as category 2 or below par by FAA and two of its airlines i.e. Volare and Ukrainian - mediterranean were banned by E.U.

iii. Indonesia's rash of accidents drew swift sanctions from E.U which banned all the country's Airlines. The FAA had designated the airlines as Category 2. Other nations viz Brazil & Russia had a string of crashes, but were rated as category I by FAA.

iv. Phuket Airlines of THAI was banned by U.K. & France after series of safety lapses in 2005.

v. E.U Threatened to ban one of high profile Russian Airlines PULKOVO, which suffered crash in 2006.

However these could be other reasons for accidents i.e. other than safety infractions viz. Absence of runway barriers, counterfeit parts of aircrafts and shoddy maintenance. Fatality figure of 2007 i.e. 653 suggests that there is still much to be done.

Safety Audits

Safety Audits are integral part of safety program. These audits cover:

- Uncover hazards
- Reveal level of compliance with reference to regulatory standards.

- Measure effectiveness of safety programs
- Evaluate management issues that could result in hazards.

Following are the various international safety audit/ assessment programmes running worldwide-

• ICAO Universal Safety Oversight Audit Programme[8]

In 1998 the International Civial Aviation Organisation (ICAO) established a universal safety oversight audit programme, comprised of regular, mandatory, systematic and harmonized safety audits to be carried out by ICAO on all Contracting States. Since 1 January 1999, the Safety Oversight Audit (SOA) Section of the Air Navigation Bureau of ICAO has been conducting safety oversight audits of the civil aviation authorities of member countries in relation to personnel licensing, operation of aircraft, and airworthiness. The audits are designed to determine the status of States' implementation of the critical elements of a safety oversight system and the implementation of relevant ICAO Standards and Recommended Practices, associated procedures, guidance material and safety-related practices.

• FAA International Aviation Safety Assessment (IASA)[9]

The FAA's IASA program focuses on a country's ability, not the individual air carrier, to adhere to international standards and recommended practices for aircraft operations and maintenance established by the United Nation's technical agency for aviation, the International Civil Aviation Organization (ICAO). These audits are limited to civil aviation authorities of countries with existing air carrier service to the U.S., or authorities of foreign air carriers wanting to start services to the U.S.

• IATA's IOSA[10]

The International Air Transport Association (IATA) Operational Safety Audit (IOSA) Programme is an internationally recognised and accepted evaluation system designed to assess the operational management and control systems of an airline. IOSA uses internationally recognised quality audit principles, and is designed so that audits are conducted in a standardised and consistent manner. By 2007, all IATA Members will need to have successfully undergone the IOSA audit in order to achieve or maintain IATA Membership.

• EU Blacklist[11]

In March 2006 the EU published a Community list of air carriers subject to an operating ban within the European Community. Bans and operational restrictions are only imposed based on evidenc. e of violation of objective and transparent criteria. These criteria focus on the results of checks carried out in European airports; the use of poorly maintained, antiquated or obsolete aircraft; the inability of the airlines to rectify shortcomings identified during inspections; and the inability of the authority responsible for overseeing an airline to perform

its task properly. Member States reported that five countries have an inadequate system for regulatory oversight. One important consequence of the black list will be to root out the practice of flags of convenience whereby some countries issue Air Operation Certificates to dubious airline companies.

- **ECAC Safety Assessment of Foreign Aircraft - SAFA[12]**

The SAFA (Safety Assessment of Foreign Aircraft) programme is an international programme established in the countries that are members of the ECAC (European Civil Aviation Conference) or the JAA (Joint Aviation Authorities). The programme provides for inspections of foreign aircraft by the participating countries for the purpose of promoting the safety of international civil aviation.

Year	Inspected aircraft	Participating ECAC states
2003	3411	27
2002	3234	25
2001	2706	25
2000	2394	22
1999	2801	20
1998	2752	22
1997	ca. 1713	19
1996	ca 110	9

India And Compliance Of Safety Standards & Recommended Practices

- D.G.C.A (Directorate General of Civil Aviation) is the Regulatory Body in the field of Civil Aviation primarily dealing with safety issues. Vision of DGCA is Endeavour to promote safe and efficient. Air Transportation through regulation and proactive safety oversight system.[13] D.G.C.A takes all necessary action arising out of Universal Safety audit programme (USOAP) of ICAO.
- Air Safety Directorate[14] in India coordinates regional air safety offices with Air safety Headquarters.
- Air Worthiness Directorate[15] in India ensures effective implementation of safety related standards and recommended practices contained in ICAO annexes.
- Large part of Air Law in India is contributed and developed by ICAO. National aviation laws are interlinked with international air law.
- Aviation security clause is put in all bilateral air services agreements in pursuance to resolution dated. 25.06.1986. of ICAO.

- International convention lead to three acts in India viz Tokyo convention Act 1975,[16] Anti hijacking Act 1982[17] and Suppression of unlawful Acts against safety of Civil aviation Act 1982.[18]
- Section 5A was added in 1972 to Aricraft Act,[19] 1934 thereby authorizing DGCA to issue directions with regard to various matters viz Aerodromes, maintenance of aircraft, air routes, & equipments to be carried for safety in the aircraft. Non compliance of the directions could lead to 6 months rigorous imprisonment and / or fine up to Rs. 10 Lacs. In the interest of public safety, central government could issue orders under section 6 of the Act.
- As part of India's commitment to safety, IATA and its members developed IATA operational safety Audit (IOSA), the first global standard for airline operational safety management.

Conclusion

Further focal points that are required to be taken for aviation safety are- Since safety of air navigation is and will remain the overriding priority for traveling public, operators, States and international organizations, States have to agree with ICAO in further advanced international safety standards. And compliance with standards has to be strictly audited by ICAO mechanism and / or by international regional organizations.

Investigations into accidents should lead to effective corrections of any faults in Technology, procedures or human conduct. There has to be continuing vigilance to check unlawful acts against safety of aviation which in case of aviation safety is unavoidable. Good order on board is essential to prevent unruly passengers causing danger to safety of flight.

International & national legal steps need to be taken to keep aviation drug free by enforcing pre employment, periodic, post accident and random testing of aviation personnel And more and more conventions are needed to bring decline in incidents of unlawful acts against aviation Last but not the least safety management courses need to be introduced, where ever not existing at present.

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NEED OF REFORMING THE AVIATION SECURITY AND AIRPORT SECURITY MEASURES IN INDIA— A COMPARATIVE ANALYSIS

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Introduction

In earlier days, there were not much security issues in aviation. The threats started increasing along with the increase and development of aviation business. And when it became more accessible to the larger number of people, it became one of the main targets of the criminals. Curbing such criminal activities taken place in aircrafts and the airports are the main objective of aviation security. Now, by the term 'such criminal activity' we mean hijacking aircrafts with the demand of heavy ransom or release of some criminal, putting the passengers' under the threat of life by placing explosives in the airport etc. It also includes assaulting the passengers and airlines or airport employees. For the developing threat upon aviation security, now a days, it has become a common concern. Previously, there were very less number of people who showed concern about such security issues as this threat did not act upon their life. But, in today's scenario, because of the availability of cheaper flights, the number of people directly connected has increased thus increasing the concern among them.

To get into the history of the same, we must bring into light some important facts in this regard. The first hijacking of aircraft took place in the year 1931, 21st February. Byron Rickards, the pilot of the said aircraft denied taking the hijackers who were revolutionaries. They hijacked the Pan American Mail plane to spread their propaganda leaflet in Lima.[1] But, unfortunately no record of such hijacking were recorded till 1947. During 1948-57, there were 15 incidents of hijacking throughout the world which took place in different parts of the world. Later during 1958-67 this number soared up to 48. Gradually it became one of the most easily accessible weapons used by the criminals. The number of such mishaps went on increasing. It reached the highest of 8 hijacking in one month and i.e. January 1969 in Cuba.[2] During 1968-77, there were 414 plane hijacking cases which took place. The urgent need to increase security of the aircrafts was felt throughout the world as this was a question of civilians' right to life. The biggest such hijacking took place on 11th September, 2001 when, 2 al-Qaedan-affiliated Islamists hijacked American Airlines Flight 11 and United Airlines Flight 175 and crashed them into the Twin Towers of the World Trade Canter.

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Such terrorism directed towards aircrafts and airports form the major chunk of threat in aviation. Sometimes terrorists do it to spread terror in the public. Sometimes they do it because they are influences politically or economically. But in some cases the terrorists do it just to get fame or publicity. Also in some cases they are just mentally not stable. One Jack Graham had placed a bomb in the luggage of his mother in the year 1955 when she was travelling in an U.S. Airliner. He had hoped to get the compensation from the insurance company if his mother was killed in an accident. Instead, when he was caught and the reason came out, he was sentenced to death for mass killing as by putting the bomb in his mother's luggage he caused death to all the members at board.

International aviation community could figure out the seriousness of the threat of air piracy. In 1963 Tokyo Convention was drafted to bring the hijacked aeroplanes and its passengers back. Later Hague and Montreal Convention strengthened the previous convention. With the rising concern throughout the world, there were researches sponsored by the Federal Aviation Administration to find out new technologies in order to detect bombs and other weapons and also to improve aviation security which included screening of luggage before boarding and also personnel at airports. The result of such research included banning of various hazardous materials in aeroplanes.

On 8th October, 2010, the US President Barack Obama has adopted the declaration on aviation security. This declaration was an effort by the ICAO (International Civil Aviation Organization) in order to increase security and bring a universal set up for the same. According to the US President, this declaration will help protecting the world from increasing threat of terrorism in aviation.

In India, the threat in aviation was not felt so prominently previously. After the Kandahar Hijacking incident took place in the year 1999, it gave a shock to the security measures followed in Indian aviation. The main responsible body for the same is Central Industrial Security Force, which is a Parliamentary body working under the Bureau of Civil Aviation. This body created another body called Airport Security Group and given the duty of protecting Indian Airports. As part of their function, almost all Indian airports are now equipped with Airport Security Unit. Other than these regulatory bodies, airliners keep departments to look after the security issues.

To proceed further, this paper will initially deal with the US and UK laws on civil aviation safety and security. Then the paper will deal with the security issues from Indian perspective. Also security mechanisms in India are extensively dealt with.

US Laws

The threat of terrorism against the United States has increased to a great extent. The intelligence community and the experts believe that aviation is likely

to remain an attractive target for terrorists in the foreseeable future. Until the early 1990s, the Federal Bureau of Investigation (FBI), the State Department, FAA, the Department of Transportation (DOT), and airline officials contended that the threat of terrorism was far greater overseas than in the United States. However, the World Trade Centre bombing and the recent convictions of individuals charged with plotting to bomb several landmarks in the New York area clearly showed that the international terrorist threat was far more serious than what was believed. There have been various laws and conventions governing the aviation safety and security, before the WTC bombing.

International Civil Aviation Organisation (ICAO) was established in 1944 by the Chicago Convention on International Civil Aviation. It establishes security standards and recommended practises and requires member states to establish civil aviation security programs. Based on these initiatives various conventions and laws were passed in US.

The Tokyo Convention of September 1963 treaty recognizes the inviolability of a hijacked aircraft and passengers, regardless of where the aircraft may be forced to land. *The Hague Convention of December 1970* provides that every signatory state in which a hijacker is located must either extradite him to the state whose aircraft he hijacked or prosecute the hijacker and impose severe penalties.

The Montreal Convention of September 1971 provides for the application of principles of The Hague Convention to all crimes committed on board commercial aircraft and to take all practical measures to prevent them. It includes violence against individuals aboard on aircraft, damage to or destruction of an aircraft, placing devices or substances on an aircraft that could damage or destroy the aircraft, and other crimes. *The Montreal Protocol of 1988* provides procedures for dealing with acts of violence against civil aviation at airports and ticket offices. This agreement came into existence because of the terrorist attacks at the Rome and Vienna airports in 1987. *The Bonn Agreement, July 1978*, was signed by the leaders of Britain, Canada, France, West Germany, Italy, Japan and the United States. It provides that if the country in which hijacker is located refuses to extradite or legally prosecute the offender then the heads of state and government can take immediate action to cease all incoming and outgoing flights from that country.

For the civil aviation security and safety various Acts have been passed. It includes the Antihijacking Act (1974),[3] Air Transportation Security Act (1974),[4] Aircraft Sabotage Act (1984),[5] International Security and Development Cooperation Act (1985),[6] Air Traveller Protection Act (1985),[7] Foreign Airport Security Act (1985),[8] Aviation Security Improvement Act (1990),[9] Federal Aviation Administration Reauthorization Act (1996),[10] Omnibus Consolidated Appropriations Act (1997),[11] Airport Security Improvement Act (2000).[12]

These Acts were passed before the 9/11 event. However US civil aviation force was incapable of stopping the occurrence of the 9/11 event. This

demonstrated the weaknesses in the aviation safety and security. United States received a "shot in the arm" with the bombing of the World Trade Centre. After receiving this blow, United States geared up and strengthened its aviation security system. Various laws have been passed to achieve the same.

The Aviation and Transportation Security Act (2001),[13] was enacted by the 107th United States Congress in the immediate aftermath of the September 11, 2001 attacks. The Act created the Transportation Security Administration (TSA) within the U.S. Department of Transportation to regulate security in all modes of transportation. This Act federalizes the airport screening function which was previously responsibility of airlines, with the actual duties of operating the screening checkpoint contracted-out to private firms such as Wackenhut, Globe, and ITS.[14] The legislation also enhances baggage screening procedures and imposes more stringent personnel qualifications on security employees.[15]

The Air Transportation Safety and System Stabilization Act (2001),[16] is also one of the statute which was the result of the 9/11 event. This does not address aviation security per se though it aims to improve the devastating legal and financial impact of the events of 9/11.

With the enactment of *Homeland Security Act (2002)*,[17] twenty-two agencies including TSA were consolidated and transferred to the Department of Homeland Security. It has jurisdiction over transportation security, customs, immigration and agricultural inspections.

Some aviation responsibilities also vests with Federal Aviation Administration (FAA). It is responsible for the security of its air traffic control and other computer systems and of its air traffic control facilities. It also administers the Airport Improvement Program (AIP) trust fund, which is used to fund capital improvements to airports, including some security enhancements, such as terminal modifications to accommodate explosives detection equipment.

Initially TSA worked on establishing its organization and focused primarily on the deadlines provided by ATSA. It deployed federal passenger screeners at airports across the nation by hiring, training, and deploying over 40,000 individuals to screen passengers as well as baggage screening at 429 commercial airports. It has been using explosives detection systems or explosives trace detection equipment to screen the baggage. It has made substantial progress in expanding the Federal Air Marshal Service.[18]

TSA is undertaking initiatives that make greater use of technology and information in order to increase the control over access to secure areas of airports and other transportation facilities. It uses layers of security to ensure the security of travelling public and the Nation's transportation system. There are various security layers in place today. Because of their visibility to the public, they are most associated with the airport checkpoints that the Transportation Security Officers operate. But these checkpoints are only on security layer of the many.

Others include intelligence gathering and analysis, checking passenger manifests against watch lists, random canine team searches at airports, federal air marshals, federal flight deck officers and more security measures both visible and invisible to the public. These layers are lone capable of stopping a terrorist attack. By the combination of these layers, a stronger formidable system is created.[19]

The different Security layers are:

- Visible Intermodal Prevention and Response (VIPR)
- Travel Document Checker
- Behaviour Detection Officers (BDO)
- Secure Flight
- Federal Air Marshals (FAMs)
- Federal Flight Deck Officer (FFDO)
- Employee Screening
- Checkpoint Screening Technology.

From the past 9 years after the 9/11 event, TSA has been working effectively to strengthen the aviation security and airport safety. In June 2010, the Department of Homeland Security (DHS) issued a progress report on its efforts to meet the 9/11 commission report.

The report states that TSA has fulfilled one of the key 9/11 commission recommendations by implementing Secure Flight for 100 percent passengers flying domestically and internationally on U.S. airlines in June of 2010. It has taken over passenger vetting from U.S. airlines, accounting for 90 percent of all travel to, from, and within the United States. Under Secure Flight, TSA pre screens passengers directly against government watch lists, a function previously performed by individual air carriers. In addition to facilitating secure travel for all passengers, Secure Flight helps prevent the misidentification of passengers who have names similar to individuals on government watch lists. TSA expects to vet all passengers on international carriers by the end of the year.[20]

DHS has also deployed full-body scanners known as Advanced Imaging Technology machines for ensuring that baggage are safe, into the nation's airports, with plans to deploy 1,000 by the end of next year. They have even said that they are also on the track to meet the August deadlines for screening 100 percent of cargo onboard domestic flights within and out of the United States.

Homeland Security Chief Janet Napolitano said "By working with our partners across the globe, we have achieved historic advances in international aviation security – including bolstering explosives detection, strengthening the vetting of passengers against terrorist watch lists, refining passenger screening techniques and deploying tens of thousands of trained aviation security personnel—that make air travel safer for everyone". [21]

UK Laws

United Kingdom has enacted various laws which govern the aviation safety and security in to act as a counter to the terrorism.

The Aviation Security Act (1982) is a statute consolidating certain enactments relating to aviation security. Part I of the Act basically deals with offences against the safety of the aircraft and addresses the issue of hijacking among others and prescribes the form and nature of trial and punishment in an event where there is a breach of airport or aircraft security. It also deals with protection of aerodromes[22] and air navigation installations against acts of violence.

Section 21A to Section 21E of this Act deal with topics such as false statements related to baggage and cargo and identity documents; unauthorised presence in on board aircraft and restricted zone; and offences relating to unauthorized persons. These sections only act as an enforcement mechanism after the offence has been committed plausibly like a deterrent. They do not provide any details relating to the subject they are addressing. Thus these sections though prima facie substantial and procedural are actual punitive in nature.[23]

The Airports Act (1986) although relates to airport in UK, the enactment is not authoritative in terms of the law with respect to airport security. The only mention in this Act relating to the airport security is under a section titled "Directions to airport operators in the interests of national security".[24]

The British Airport Authority was established by the passing of this Act to take responsibility of three state-owned airports-London Heathrow Airport, London Gatwick Airport, and London Stansted Airport. Later on they took control over Glasgow International Airport, Edinburgh Airport, Southampton Airport and Aberdeen Airport. This Act also mandated the creation of BAA plc as a vehicle by which stock market funds could be raised.

Aviation and Maritime Security Act (1990) gives effect to the Montreal Protocol (1988).[25] This statute is also substantive, procedural and punitive in nature, and borrows in part from the Aviation Security Act (1982), majorly from Section 21A through 21E.

Terrorism Act (2000) was enacted to make temporary provisions for prosecution and punishments of certain offences, and for maintenance & preservation of peace and order in Northern Ireland. It should be noted that the contents of Section 53 read with Schedule 759 of the said legislation as they together deal with, *inter alia*, the power to stop, question and detain; searches; detention of property; embarkation and disembarkation; carding and provision of passenger information.

Now there is Terrorism Act 2006 and Terrorism (Northern Ireland) Act 2006.

Aviation (Offences) Act (2003) was established to make provisions for the enforcement of 'certain offences' related to aviation. This Act does not

specifically address airport security related offences; it may be used in a supplementary manner-when and where the need arises- to fill any gaps in existing laws. An Amendment to this Act was made in 2004

Civil Aviation Act (2006) does no relate to airport security. It basically deals with noise, vibrations and emissions of aerodromes, also deals with funding and policing of airports. Section 8 of this Act provides that it is the duty of the Secretary of the State to organize, carry out and encourage measures for safeguarding the health of persons on board aircraft.

The Department for Transport (DFT) is the heart of airport security in the United Kingdom.[26] DFT has put in place a long-term framework that balances the delivery of social and economic benefits from aviation, with the need to reduce and mitigate the environmental impacts of air transport and airport development.[27] DFT and Civil Aviation Authority's Safety Regulation group recognize that aviation safety needs constant vigilance by regulators and industry alike. There endeavour is to improve safety levels and reduce the risk of harm arising from air transport. The Transport Security and Contingencies team (TRANSEC) has a responsibility to ensure the security of passengers, workers and cargo in airports and during transit.[28]

The security alerts inn 2006 at Heathrow and in 2007 at Glasgow have alerted the airport security all over the world. As a result there were 2006 alert new restrictions on hand baggage and EU- wide limits restrictions were imposed on liquids and gels that can be taken through airport security.

On 25th December 2009 again there was an attempted attack on Northwest flight 253 to Detroit. This led to an abrupt rise in airport security measures including the introduction of the first body scanners in the UK, the introduction by the end of 2010 of explosive trace detection equipment, more passengers being searched by hand and more sniffer dogs. The passengers going to US are subject to extra security checks prior to boarding.[29]

Because of the extra checks there has been increase in delays suffered by the passengers. In an effort to reduce the delay and speed up the security process most of the airports have increased the number of security staff. Some of the airports are using new technology and improved process such as automated tray handling system at Gatwick. Other airports have come up with extra passenger search facilities to handle the issue of security.

Aviation Security Issues In India

The 9/11 incident left chilling memories in the minds of the people throughout the world. It had put a question on the security measures taken up by the airports. But in India, we had instances of threat upon civil aviation from a long time though they were never of such a great extent. An Indian Airlines aircraft was hijacked in the year 1971 at the time of the Indo-Pakistan war broke out. Later in 1976, Pande Committee was established to look into the hijacking of another

aircraft of the same airlines. Now, this was the time when separate body to look into such matters were felt strongly. In the year 1985, Air India Boeing 747, Emperor Kanishka was bombed and as a result of the same it crashed on the Irish coast. In this incident, investigation report said the bomb responsible for the said explosion was concealed in the baggage and it killed all its 329 passengers on board along with its crew members. As a result of this incident, the Bureau of Civil Aviation was established, which was now free from Director General of Aviation. This incident also resulted in constitution of Kirpal Committee which brought out the gaps in the procedures of aviation security. Almost at the same time there were more terrorist attacks in Rome and Vienna in the year 1985. As a result there was a conference held which was for the adoption of Protocol for the Suppression of Unlawful Acts of Violence at Airports Serving International Civil Aviation (also known as Montreal Supplementary Protocol) and India was a party to it. This was the time when India started actively participating in the ICAO Council. Aviation Security mechanism was created by the ICAO with the help of members including India. ICAO is the international body for safety and security of civil aviation. It gives its members to choose their own organizational structure. These should not contravene the stated mandatory standards enumerated by ICAO. India also participated in the proposed international legal instrument of Marketing of Plastic Explosives for Detection. On 22nd July, 1975, India also ratified Tokyo Convention, 1963 which is the Convention for offences and certain other Acts committed on board aircraft. In furtherance with this ratification of this Convention, Indian Parliament came up with the Tokyo Convention Act, 1935. Other than that there are few domestic laws which help India curbing civil aviation security issues. To name some of them- Anti-Hijacking Act (1982), Suppression of Unlawful Acts against Security of Civil Aviation Act (1982), Aircraft Act (1934), Aircraft Rules (1937), National Airports Authority Act (1985), Airports Authority of India Act (1994). As a result of Kanishka incident, ICAO inserted Model Aviation Security Clause in the Bilateral Air Services Agreement with UK (1988) and with Canada (1991). There was prominent time lag between the domestic laws and international conventions adopted by India to curb the evil.

After all these still the threat remains. As an instance for the same the recent incident at Thiruvananthapuram Airport can be highlighted. A 'crude' (bomb like device) was found in the cargo hold of an ATR aircraft (IT 4731) of the Kingfisher airlines on March 21, 2010 at Thiruvananthapuram Airport. Media report said that the device responsible for the same did not contain a detonator which would amount to explosion. Now, it can be easily held here that if exposition was not the intention of the perpetrators and at the same time it was a deliberate act on their part. People who were directly responsible for the security checking of the said Kingfisher aircraft were the security personnel of the air carrier. They are the ones who are responsible for anti-sabotage check before taking off and also screening and monitoring loaders. To justify their acts, they have to establish how the said material entered the restricted area where even the authorised staffs need to undergo screening properly through metal detectors. To enter into the said

restricted are all materials has to pass through x-ray checking. Identifying weaknesses in the system and taking remedial measures is an urgent imperative.[30]

Like all other countries in the world, providing civil aviation security is a responsibility which is undertaken by Government, agencies (in case of India it is Central Industrial Security Force) and airliners. The Bureau of Civil Aviation which works under the ministry of Civil Aviation works as the coordinator among the various such bodies. These are given separate segment of security job. The initiative of segmenting security function was first felt after 1999 Kandahar incident which involved hijacking of IC 814 aeroplane. The bodies responsible for the aviation security must work as if every incident in this field is a challenge for them and they should figure out their weakness and try to curb them with modern technologies. As already stated, it is not the Government only who alone can do it. There should be helping hands stretched from other stakeholders. To bring out the required standard of uniform and systematic security mechanism, everyone has to be dedicated, committed and professional. Integrity shall be shown by the parties who generally tend not to take up much responsibility sufficiently.

Security Mechanism In India

As a result of 1976 Indian Airlines plane hijacking, an investigation Committee was appointed named as Pande Committee. As per the recommendation of the said committee, on January 1978, the Bureau of Civil Aviation Security was established as a cell of Directorate General of Civil Aviation. This new cell had to look into the coordination, monitoring, inspect and train stuffs to develop civil aviation security. This is an attached office of the Ministry of Civil Aviation. For the sake of the discussion, we will call this bureau as BCAS from now on. This bureau became an independent body on 1st April, 1987 as an aftermath of Kanishka Tragedy in June 1985. The main function of the body is to come up with security measures for international and domestic civil aircrafts and airports in India. This BCAS is headed by Commissioner of Security (Civil Aviation). He is in charge of implementing Annexure 17 of the Chicago Convention of International civil aviation organization (ICAO). He is also duty bound to look into the implementation and development of National Aviation Security Programme. The BCAS has got four Regional Offices located at International airports i.e. Delhi, Mumbai, Kolkata and Chennai. The Regional Office is headed by an officer of the rank of Deputy Commissioner of Security (CA).[31] For assisting the Commissioner of Security (Civil Aviation), the bureau has posts such as Additional Commissioner of Security (Civil Aviation), Deputy Commissioner of Security (Civil Aviation) and Assistant Commissioner of Security (Civil Aviation). Other than these commissioners, this office also has Security Officers of different rank. Such as- Sub-Inspector, Assistant Sub-inspector, Head Security Guard, Head Constable and Security Guard. With the help of all these personnel the BCAS basically tries to implement rules for achieving the goal of aviation security. For this purpose they sometimes go for

dummy checks and mock exercise of professional efficiency. They also bring up suggestions for safe travelling, list of prohibited materials, transporting special items, tips for travelling with children or disabilities or medical assistance when required and above all awareness about security. In order to provide these services to the passengers, BCAS trains its employees in various different manners. To name some of these trainings- Basic Avsec Course, Avsec Instructor's Course, Avsec Management Course, Auditor's Course, Avsec Air Cargo Course, Crisis Management Course, Avsec Supervisor's Course, Avsec Profile Screening, Sky Marshall Awareness, X-Ray BIS, Screener's Certification.[32]

Actual enforcement of the security measures of aircrafts and airports are upon the police of respective States or Union Territories. As its own responsibility BCAS has established Bomb Detection and Disposal Squads (BDDS) in the 4 international airports (viz. Delhi, Mumbai, Calcutta, and Chennai). These BDDSs are having high technology devices to detect explosives and the stuffs are well trained about their way of working at any such alarming condition. To give one more level of security, the bureau has established sniffer dog squads in those 4 metros and Srinagar, one of the most threatened airports. Airport Authority of India and Airport Operators use different equipments like X-ray BSI, Metal Detectors (both door framed and handheld). The standards of these equipments are laid down by the BCAS. As a helping hand, the Bureau is planning to establish Control Rooms in every airport. This Control Room comes into action as soon as there is an emergency. It basically acts when an aircraft is seized or threats of explosives are received. A Central Committee is there to assist the Commissioner of Security (Civil Aviation) in such situations. At the same time there is an Aerodrome Committee to be contacted by the Central Committee and it issues required guidelines for such an emergency condition. In today's India, there are Control Rooms available in almost all the airports of the country. The Bureau introduced the Computerised system of Photo Identity Card (PIC) in August, 1988.This plan has to extend to international as well as domestic airports. Practically this has been implemented in almost all the airports now. This bureau is also equipped with Staff Grievance Cell for better working and enhancing the integrating of the employees.[33]

Indian Civil Aviation or its security programmes were subject to the ICAO Audit. As a practical implementation of the same, Indira Gandhi International Airport was visited by the ICAO Audit team in the year 2005.

Indian Aviation security increases from cross-border terrorism and infiltration activities. There should thorough checking of the personnel entering the aviation sector. Their background has to kept in mind before allowing them in. Otherwise they might impose threat upon civil aviation to a large extent. Also because of democratic demands, the workings of aviation sector are mandatorily transparent. But one negative side of the same is, the line between public sector and private domain gets blurred and becomes easily accessible to terrorists as well. Also because of modern communication technology, it has become easy to impose

threat upon civil aviation in India. India should be more active in international forums addressing this issue. ICAO also has a very important role to play here.

Conclusion

In order to protect the airports and aircrafts from the threat of terrorism, the urgent need of laws for curbing the same has been felt by India along with many other countries. There are some basic points which are needed to be considered to promote civil aviation security. Such as- Airport and Airline authorities should at a greater level place plain clothed security and first aid personnel who are trained for emergency services. These security personnel should be present throughout the airport and observe the passengers. In case there is anything suspicious, immediate actions can be taken by them. Also the staff must be trained to broadcast seemingly innocuous messages on the public announcement system which can alert the security personnel and by this way the person(s) under suspicion will not be able to come know about the message and might as a result keep his guard down.

At the same time it is also to be noted here that a passenger is subject to different checking by different security agencies, which may give rise to the thoroughness of the same. Along with this, no type of preferential treatment should be given to any category of passengers like diplomats, delegates, and heads of the state, physically challenged. All passengers must be equal irrespective of their age, category of travel, gender and race. The paper also suggests that Airports should not be converted into shopping hubs. The sterile areas of the airport should be kept sterile and efforts must be made to allow only the legitimate passengers and denying the entry of the others.

To conclude here, we must state that there are laws present in India, but the lack of implementation makes Indian Civil Aviation vulnerable to threats of terrorism. There should be stronger resistance system for such kind of terrorism. The strength of the chain can be determined by measuring its weakness at the first place. Thus if priority is given to the airport security then there will be a lesser need to maintain the array of cumbersome security laws which are presently deployed.

Thus, the question still remains what is India waiting for?

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RESPONSIBILITY AND LIABILITY FOR UNLAWFUL INTERFERENCE IN INTERNATIONAL CIVIL AVIATION

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Abstract

There has been a large number increase in the acts of unlawful interference throughout the Globe. As we know that such acts have been more widespread effects on the world Responsibility and liability for unlawful interference in international civil aviation is a multi faceted topic. After the incident of 9/11, the question of responsibility and liability of such acts has been an issue of major concern. Various conventions have come into force in order to decide and have a common view regarding the liability and responsibility of unlawful interference in the international civil aviation and also to decide upon the responsibility of States for such unlawful acts. Through this paper the authors have tried to define the term 'unlawful interference' and the various aspects of liability arising out of such unlawful acts, the authors have also tried to analyze the notion of State Responsibility under the international civil aviation with respect to various international conventions in the area of International Civil Aviation and the legal consequences flowing out of it.

Introduction

Acts of unlawful interference with civil aviation continue to have an adverse effect on the safety and efficiency of international air transport and endanger the lives of aircraft passengers and crews engaged.[1]

The miss-happening due to the acts of such kind have an widespread impact not on the lives of passengers travelling, crew in the air and the cargo but also to the thousands of bystanders on ground, These acts cause a billion dollar damage to property and takes tolls of lives. Moreover it even affects the economy. It is evident from the repercussions of the 9/11 incident, that such acts can rock economy, as preceding the incident the aviation industry witnessed a 25% decrease in air traffic in October and November 2001 and the transatlantic market experienced a down time by 30 %. The knock-down effects on national economies have been far more than imagined. The responsibility and liability for such acts have not been willing taken by anyone, neither the states nor the manufacturers. Therefore, seeing the after effects of such acts it's the time to decide that who should be made responsible behind these acts and who should undertake the liability, attention is also to be paid on the compensation to be

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provided to the victims of air crashes and of unlawful interference in the International Civil Aviation.

Defining Unlawful Interference

The term 'unlawful interference is often misinterpreted as a 'terrorist attack. Though legal community has not given any specific definition to the term but generally it is related to a violent attack having a motive to disturb the political regime.

Silets define terrorism as:

"terror inspiring violence, containing an international element that is committed by individuals or groups against non-combatants, civilians, states or internationally protected persons or entities to achieve political ends".

Though most of the unlawful interferences are politically motivated, but still interpreting this term in such a narrow sense would ignore the acts that are part of it, committed by suicidal persons or insane persons, or acts which do not necessarily involve violence.

According to article 2 of the Regulations on Safeguarding Civil Aviation Against act of Unlawful Interference., Acts of Unlawful Interference means an act attempted such as to jeopardize the safety of civil aviation and air transport, i.e.:

(1) Unlawful seizure of aircraft in flight:

(2) Unlawful seizure of aircraft on the ground;

(3) Hostage-taking on board aircraft or on aerodromes;

(4) Forcible intrusion on board an aircraft, at an airport or on the premises of an aeronautical facility;

(5) Introduction on board an aircraft or at an airport of dangerous goods or prohibited times intended for criminal purposes; and

(6) Communication of false information such has to jeopardize the safety of an aircraft in flight on the ground, of passengers, crew, ground personnel or the general public, at an airport or on the premises of a civil aviation facility.

Abeyratne asserts that 'unlawful interference is a generic term of the expression 'acts of aggression or other breaches of peace' used in Article 1 of the United Nations Charter.[2] Therefore it is regarded as a crime under legal principles.". A crime consists of two elements *actus rea* commonly interpreted as the physical act forbidden by law, and *mens rea* meaning intent to commit the crime. The legal implication of these prerequisite elements is that an act of interference with civil aviation will only be unlawful if the criminal policy of the jurisdiction in which the act is effected considers such an act to be unlawful. This poses a serious problem for those who endeavor to safeguard the civil aviation.

State Responsibility

The notion of State responsibility arises out of the nature of the International legal system and the doctrines of state equality and sovereignty. A state is responsible for a unlawful act committed by it and it gives rise to the establishment of International State responsibility. A breach of an international obligation gives rise to a requirement of reparation.[3] According to Shaw responsibility is as called:

'second order issues 'that it the issue of state responsibility will arise only when there is a breach of a international obligation, the rules of responsibility seek to determine the consequences of such a breach. Hence, it can be said that existence of a international legal obligation between states and a breach of such legal obligation are the prerequisites for State responsibility in International Law.

The notion of State responsibility is also affirmed by the adoption by the International Law Commission Draft Articles (ILC) at its 53rd session.

'Every internationally wrongful acts of a state entails the international responsibility'[4] *and 'there is an internationally wrongful act of a State when conduct consisting of an action or omission;*

(a) Is attributable to the State under International Law.

(b) Constitutes a breach of an international obligation of the State.

Besides this State responsibility, the responsibility of a state for its criminally unlawful acts exists in accordance with jus cogens. The notion of jus cogens was incorporated by the ILC in its draft articles on the Law of Treaties in 1996 under Article 50 which can now be found in Article 53 of the Vienna Convention on the Law of Treaties(1969).[5] It has also been embodied in the most recent articles on State responsibility. There are certain customary laws under International Law which cannot be revoked either by treaty or by any agreement between two states, until and unless a law contrary to it's formed subsequently.

Objective And Subjective Responsibility

The principle of *objective* responsibility imposes strict or absolute responsibility i.e. responsibility regardless of fault or intention, in contrast to the principle of subjective responsibility which emphasizes the need for intentional (*dolus*) or negligent (*culpa*) conduct on the part of the person concerned before that person can pronounced responsible. Shaw remarks that case law and academic opinion on the subject are divisible although there is a tendency towards strict (or objective) responsibility. The draft articles remain silent on this aspect and the accompanying commentary only serves to further bewilder its readers.[6] If a State is found to be responsible for an illegal act, it must provide reparation to the injured State.

State Responsibility For Aviation Security Under International Law

In international law, a State can only be held responsible after a breach *of* an international obligation has occurred. The contracting States have an obligation to ensure compliance with the international standards contained in Annex 17 *of* the Chicago Convention as imposed by Article 37 *of* the same convention.[7] It follows therefore that contracting States will only be responsible under international law if they do not ensure compliance with the international standards. The issue then to be resolved is what actions are necessary on the part *of* the State to discharge this obligation; a literal interpretation suggests that legislating accordingly and providing adequate means *of* checking compliance with the national legislation would be sufficient. This is what is classified as *subjective responsibility*. The other possibility is that any failure *of* a security company to provide adequate security in compliance with the international standards would automatically entail State responsibility, even where the State has passed the requisite legislation and enforces that legislation by some type *of* audit system. This is *objective responsibility*. As stated above, opinion on this subject is divided and the ILC drafts are ambiguous.

Responsibility Of Aviation Security Service Provider

ASPs are contracted out to perform the duties and responsibilities assumed to airlines and airports[8] via national and international regulations. These regulations especially the ones that are legally binding can be sued in courts to assess ASPs negligence and standard of care owed to third party claimants since the duties and obligations incurred on airlines extend to ASPs also.[9] Under the framework at international level each government implements its own security standards on national level. Usually on national level there are two types of responsibility system that is adopted by the State, either the government undertakes the primary responsibility of providing security duties (centralized model) or the government acts only as supervisory body while the airport authority undertakes the duties of providing security (decentralized model). The example where the government holds the primary responsibility of security duties through the relevant governmental bodies is Civil Aviation Authority (CAA) in United Kingdom.

Concept Of Liability In Civil Aviation

Liability Under International Law

Liability and responsibility are different concepts in international law, for liability to arise it is not necessary that a legal obligation should be there existing between the parties, thus liability arises as the consequences of the acts done by a state which are harmful to another state, the act may or may not be contrary to international law. Such international liability has become a very important element of environmental, law air and space.

When considering the 'municipal law' meanings of responsibility and liability, it can therefore be concluded that fault-based liability can only arise where there is responsibility or 'duty to take reasonable care'.[10] This cannot be applied to strict liability which requires no fault or breach of a duty to take reasonable care. It would hence be incorrect to assume that all liability are merely a strict form of responsibility. Applying these 'municipal law' interpretations of the concepts to the articles of the ILC can only result in the sort of 'unsystematic and illogical results' alluded to by Lord Cooper. Dr. Horbach summarized dilemma when she said that:

'The Commission in fact unilaterally decided to give another meaning to established notion under certain specified circumstances; i.e. to employ the common law term "liability" but designating a different meaning to that ten English international legal discourse.'

The ILC has admitted as much itself in the commentaries to the draft when it stated that '*for the purposes of these articles*', international responsibility results exclusively from a wrongful act contrary to International law.

According to Dr. Nathalie Horbach ILC has arbitrarily drawn a distinction between responsibility and liability which is an exaggeration and finds no support in international law.[11] Applying the terms' responsibility and liability' as advocated by ILC would give rise to the situation in which a state which commits an act of unlawful interference in international civil aviation would be held responsible but the foreign air carrier on whose aircraft the act of unlawful interference is committed would be liable for act caused by the harm otherwise lawful activity. Expressed in this way, the situation may appear to ne unjust and even ridiculous.

Strict Liability And Absolute Liability

There is a distinction between both the terms mentioned above, under strict liability the offending act must have been committed by the person to be held liable, even if it was caused without his fault, whereas in Absolute liability on the other hand will arise whenever the circumstances stipulated for such liability to arise are met out, it mattering not by whom the damage is caused or how it is caused.

Liability Of ASP

The question regarding the liability of the international carriers has been a debatable issue. The liability of the carrier's agent for the damaged cause to the goods, passengers and to the people on ground which does not fall under the service contract[12] or a contract of carriage.[13] Though if ASPs are held liable they can recover the amount paid by them as compensation to the victim from the carrier and through various other mechanism available to them including the liability limitation under international conventions.[14]

Generally liability comprises four main elements duty of care, breach of duty, harm, and compensation. Therefore in order to make an ASP liable the

party alleging should first prove that the ASP had a duty of care then that the ASP breached that duty and then that the harm caused is due to the breach of such duty. The ASPs contractual duties are likely to affect the third parties, thus the ASPs can be made liable in case they breach any of such obligation or do not deploy adequate security as they are expected to do, for example inadequate security service.

The first element 'Scope of Work'[15] is stipulated in each service contract ASPs have with individual airports, airlines, and government bodies. It basically outlines the everyday duties that Asps are obliged and it is the basis of the next major source of the duty of care. After defining the scope of work, to keep a record and check on the performance of the ASPS in conformity with their service duties every airport establishes 'Critical Performance Indicator', in order to meet their legal obligation under 'National Civil Aviation Security Programme (NCASP), it is used to conduct test and audits to check that the ASPs perform according to the Standards established.

The other question that has to be dealt in regard to the liability of ASPs is regarding their liability to the people on ground. The most recent development in this regard is the 9/11 litigation which deals with potential liability of the ASPs with respect to unlawful interference in civil aviation. The court in this case ruled that the Airlines and Airport Securities Company have a duty towards the people on ground as they had a duty to prevent terrorist from boarding the plane by properly scrutinizing them, and the crash of hi-jacked aircraft was within foreseeable damage resulting from the negligence in scrutiny of people boarding the airplane. Therefore, in a nut shell, we can say that the ASPs are liable to the third party also that is the ground victims who suffered damages due to the crashed aircraft.

The liability of the ASPs with regard to a terrorist attack seems to be unlimited, and as such there are no international conventions or principles that can provide some relief to the burden of unlimited liability. Hence, one terrorist attack can make the ASPs liable for ample amount of compensation that it would have to pay to the suffered party. The limitation on third-party liability is a particularly important for ASPs since its duties are closely linked to the damaged caused by an act of terrorism would likely exceed the entire asset of one business entity. Hence four possible solutions can be found through which ASPs may limit their liability for damage arising out of an act of terrorism:—

(a) A cross-indemnification clause under which the courts allow Asps to assert liability limitation available for carriers under the International Conventions.

(b) The operational solution, that is fulfilling the criteria of performance, for instance, CPI 80% to meet the national Standards and the Standard of the airport it operates.

(c) Insurance policy that covers unlimited liability exposure.; or

(d) Governmental protections announced in national regime.

Product Liability

The concept called, "strict product liability" was developed by Courts in the 1960s and 1970s to protect consumers. Judges felt that it would be too hard for victims to prove negligence in technical cases involving engineering design and manufacture. Courts created strict product liability laws to make it easier to sue manufacturers in product defect cases by switching the focus to the safety of the product rather than the conduct of the builder. Many people feel that the Courts have gone too far in protecting people against themselves and that product liability is destroying the aviation industry. To establish strict liability in a product liability lawsuit, the plaintiff must show that:

1. The product was defective when it left the defendant's control;
2. That the product was used in the intended manner or a reasonably foreseeable manner;
3. That the product caused plaintiff's injury.

Product Liability Reform

The deep pocket problem has led states, like California, to abrogate the traditional joint and several liability rules, so that a defendant will only be held liable for the percentage of non-pecuniary damages for which it is responsible. Thus, if the manufacturer is only 10% at fault, as described above, the victim can only collect 10% on his non-pecuniary damages from the manufacturer. The victim would have to get 90% of his non-pecuniary damages from the operator. (The victim can still collect their "economic" lost wages and medical expenses from either defendant). This "deep pocket" protection, which has been part of California law for over ten years, is being copied by many states as part of their "Tort Reform."

International Legislative Efforts Pertaining To Aviation Security

Chicago Conference Of 1944

The main instrument for the development of international civil aviation today still remains the Convention on International Civil Aviation, Signed at Chicago, on 7 December 1944.[16] The Chicago Convention was the most important of the four instruments drawn up in Chicago at a Conference convened at the initiative of the United States Government. The preamble of a Convention frequently facilitates the interpretation of that Convention and the drafters' intentions.

The Chicago Convention lays down the basis for the establishment of the International Civil Aviation Organization[17] (ICAO) which aims to 'ensure the safe and orderly growth of international civil aviation throughout the world'. Additionally, it should strive to 'promote safety of flight in international air navigation'[18] and 'meet the needs of the peoples of the world for safe, regular, efficient and economical air transport'.[19]

Important International Conventions On Unlawful Interference With International Civil Aviation

The Tokyo Convention (1963)

This convention was brought to light by judgements like was brought to light by judgements like *R v. Martin*[20] and *USA v. Cordova*.[21] The lack of jurisdiction was particularly problematic for the common law countries as they tended to claim territorial jurisdiction only and did not consider aircraft as part of their territory. A Sub-Committee was formed to deliberate the Convention *of* State Organization and a Report on that Convention was contemplated by the Legal Committee at its Rome meeting in 1962. A final text was also drafted at this meeting which was circulated once more to all Member States for consideration prior *to* the diplomatic *conference* in Tokyo. The final result was the Convention on Offences and Certain other Acts Committed on Board Aircraft, signed at Tokyo, on 14 September (Tokyo Convention), the first international convention drafted solely to tackle the problem of unlawful interference in international civil aviation. The Tokyo Convention contains several provisions on the power *of* the commander.

The Hague Convention (1970)[22]

The late 1960s saw a series of hijackings which induced States which previously had not ratified or acceded to the Tokyo Convention to do so. At the same time, it became clear that the provisions found in that treaty would not be adequate in the fight against terrorism and so the ICAO Assembly adopted Resolution AI6-37. The Assembly asserted therein that Article 11 of the Tokyo Convention did not provide a complete remedy. To deal with this problem a draft Convention was submitted by the Legal Committee to the ICAO Conference held at The Hague and, after much debate, was adopted in December 1970. This Convention aimed firstly to do what the Tokyo Convention had not done, namely to define the offence:

'Any person who on board an aircraft in flight:

(a) unlawfully, by force or threat thereof, or by any other form of intimidation, seizes, or exercises control of, that aircraft, or attempts to perform such act, or

(b) is an accomplice of a person who performs or attempts to perform any such act commits an offence'.

The Hague Convention can certainly be said to be wider in scope and effect than the Tokyo Convention. There are, however, a number of limitations to be discussed. Firstly, the Hague Convention can only be applied to those acts committed on board an aircraft 'in flight' as defined within the treaty. This therefore precludes acts such as sabotage or acts of seizure by remote control. A

similar limitation is imposed on the prosecution of accomplices. There is also a limitation applied in Article 3(3) whereby The Hague Convention will only be applicable if the place of take-off or actual landing is situated outside the territory of the State of registration of that aircraft. In addition to the jurisdiction already established under the Tokyo convention, all contracting States are also required to create further jurisdiction under Article 4 of the Hague Convention. Similarly to the Tokyo Convention, there is no outright obligation to extradite created in the Hague Convention.

The Montreal Convention (1971)

It was undoubtedly the *Leila Khaled*[23] incident along with two instances of mid-air explosion in West Germany and Switzerland caused by sabotage which alerted ICAO to the limitation of the scope of the Convention. Realizing the shortcomings of the Hague Convention which had not yet been adopted, and recognizing that amendments to encompass acts of sabotage would delay the adoption of the Hague Convention, ICAO initiated work on a separate treaty on sabotage. This treaty was signed in Montreal on 23 September 1971. The Montreal Convention was therefore drafted to cover attacks on and sabotage of aircraft either in flight or in service. This new term 'in flight' is defined as follows:

'*Aircraft is considered to be in service from the beginning of the pre flight preparation of the aircraft by ground personnel or by the crew from a specific period until twenty-four hours after the landing. The period of the service, shall, in any event, extend for the entire period during which the aircraft is in flight*'.

It covers a wide variety of acts including the placing of an explosive device on an aircraft or any act of violence against a person on board an aircraft in flight, where that act is likely to endanger the safety of the aircraft. In addition, it includes accomplices who commit or attempt to commit such offences. This proved to be one of the most controversial provisions in the Montreal Convention because many States felt that the regulation of sabotage of air navigation facilities was a matter purely for domestic jurisdiction and did not belong in an international treaty.

The ICAO's Strategic Plan

Apart from legislative activities, ICAO conducts other activities which impact on the aviation industry. The Strategic Action Plan (SAP) was adopted by the ICAO Council on 7 February 1997 to represent 'the first comprehensive re-evaluation of ICAO's mission since the signing of the Chicago Convention'.[24] The goal of ICAO is:

'*to become the recognized world-wide auditor of safety and security standards for international civil aviation*.[25]

In order to attain this status, ICAO would be empowered to carry out technical inspections in any State in order to ensure the uniform implementation

of the safety and security standards. In this context of safety and security standards, the author would also like to add that such action by ICAO is vital in preventing the development of a two-tier safety and security regulation. The concepts found in the Strategic Action Plan, in particular the audit system will play an essential role in the enhancement of aviation security worldwide.[26]

Thirty Third Session Of ICAO Assembly (2001)

The 33rd Session of the ICAO Assembly was convened shortly after the events of (11 September 2001). Resolution A33-1 of this session declares that misuse of civil aircraft as weapons of destruction and other terrorist acts involving civil aviation are 'contrary to the letter and spirit of the Convention on International Civil Aviation, in particular its preamble and Articles 4 and 44 and that such acts and other terrorist acts involving civil aviation or civil aviation facilities constitute grave offences in violation of international law.

The obligations imposed on the contracting States in Resolution A33-1 may appear to merely reiterate the duties which were already imposed upon States. Whether the correlation between Article 4 of the Chicago Convention and 'those who misuse civil aircraft as weapons of destruction' is deliberate, cannot yet be discerned. Article 4 is unquestionably a State's duty:

'*Each contracting State agrees not to use civil aviation for any purpose inconsistent with the aims of this Convention*.'

The appendices attached to Resolution A33-2 constitute 'the consolidated .statement of continuing ICAO policies related to the safeguarding of international civil aviation'. They supersede all the previous policies of the ICAO in this area. States are urged to take action in a number of different areas such as adhering to the international conventions. States are also urged to comply with the standards in Annex 17 and other relevant Annexes.In addition to this, the Assembly recommends that aviation security provisions be included in bilateral agreements on air services and that ICAO co-operates to the fullest extent possible with interested international organisation.

Conclusion

It can be concluded form the ILC's draft articles that the State responsibility in international law arises when a breach of an international obligation occurs. It may therefore seem curious that the obligation contained within the principal treatises on unlawful interference in international civil aviation do not address the problem of terrorism directly. Rather the obligations contained therein are directed primarily at the response of other states to such acts of unlawful interference. The author submits that the fundamental dilemma of international air law in this field is the lack of obligations upon a State to refrain from air law in this field is the lack of obligation upon a State to refrain form committing such Acts.

It is also submitted that the imposing such a heavy liability on the airlines, governments are invading their own responsibilities under general international law, European human rights law and specifically the Chicago Convention. Terrorist attacks are attacks on the whole, they are attack on society, State while the airlines and their passengers are their unfortunate victims. All acts are not unlawful interferences. A suicidal passengers who bursts out into the cockpit and attempts to crash the aircraft has also committed an act of unlawful interference but it is not an act directed at the State. Therefore, such considerations should be taken in account when calculation as to payment of compensation is done.

Endnotes

1. ICAO resolution A 26-7.
2. R.I.R Abeyrante, *Aviation Security, Legal and Regulatory Aspects,* pp. 47-48.
3. M.N. Shaw, *International Law,* (4th Edition., Cambridge, Cambridge University Press,1997) At p.541.
4. Spanish Zone of Morocco, 2 RIAA, p.615(1923); 2 ILR p.157, per Judge Herber.
5. *Vienna Convention on the Law of Treatise;*(1969) 8 ILM p.679.
6. 'Whether the responsibility is 'objective or subjective' in this sense will depend on the circumstances, including the content of the primary obligation in question. The article lay down no general rule in that regard. The same is true of other standards, whether they involve some degree of fault, culpability, negligence or want of due diligence. Such standards vary from one context to another for reasons which essentially relate to the object and purpose of the treaty provision or other rule giving rise to the primary obligation. Nor do the articles lay down any presumption in this regard as between the different possible standards.
7. Each contracting State undertakes to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures, and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation.
8. For instance, the ICAO Security Manual Document 8973 states, Basic responsibility for the security of aircraft rests with the operator.'
9. *Termaroli v. Della Irlines,* Av cas, (CCH) p. 18, 293, 294 (Civ. Ct. N.Y., 1983).
10. *Donoghue v. Stevenson*, [1932] AC 562.

11. N.L.J.T, Horbach, *Liability versus Responsibility under International law,* (Amsterdam, 1996) Stellingen.
12. Between the carrier and ASPs.
13. Between the carrier and passenger.
14. Warsaw Convention for the Unification of Certain Rules Relating to International Transportation by Air, Also Montreal Convention for the unification of Certain Rules for International Carriage by Air.
15. This term has been referred to as' scope of employment', within the scope of the carrier', 'mission of the police', all of which were used by courts to determine an agent-principal relationship between Asps and its employer.
16. Here in after referred to as Chicago Convention.
17. Chicago Convention, Part II.
18. *Ibid*., Art. 44 (h).
19. *Ibid*., Art. 44 (d).
20. [1956] 2 QB 272.
21. U.S. District Court E.D. New York, 1950. 89 F. Supp. 298.
22. Convention for the Suppression of Unlawful Seizure of Aircraft, signed at the Hague on 16th December 1970 (hereinafter referred to as Hague Convention).
23. Leila Khaled was released form a british where she was being held for attempting to hijack an Israeli aircraft in British airspace. The British Government's decision not to prosecute was part of a deal to free hundreds of hostages being held by her fellow members of the Popular Front for the Liberation of Palestine (PFLP). They had simultaneously hijacked five aircraft and forced the release not only of Khaled but also of other Arab prisoners from Swiss and West German prisons. Although the hostages were released, four aircraft were destroyed.
24. Address by the President of the Council of the lCAO, on the Occasion of the Launch of the ICAO Strategic Action Plan, Montreal, 22 May 1997, as viewed at <www.icao.intficao/enlstraCtxt.htrn> on 24th September 2010.
25. Address by the President of the Council of the lCAO, on the Occasion of the Launch of the ICAO Strategic Action Plan, Montreal, 22 May 1997, as viewed at <www.icao.intficao/enlstraCtxt.htrn> on 23rd September 2010.
26. See High Level Ministerial Conference under the Next Section.

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REGIONAL DEVELOPMENTS THROUGH AVIATION IN INDIA—CREATION OF NEW REGIONAL AIRPORTS AND REGIONAL AIRLINES

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Introduction

One of the fastest growing aviation industries in the world is Indian Aviation Industry. With the liberalization of the Indian aviation sector, a rapid revolution has undergone in Indian aviation industry. Primarily it was a government-owned industry, but now it is dominated by privately owned full service airlines and low cost carriers. Around 75% share of the domestic aviation market is shared by private airlines. Earlier only few people could afford air travel, but now it can be afforded by a large number of people as it has become much cheaper because of stiff competition. The civil aviation traffic has seen an unprecedented traffic in the past few years on account of booming Indian economy, growing tourism industry, and entry of low cost carriers in the private sector, liberalization of international bi-lateral agreements and liberalization of civil aviation policy. In future also the civil aviation traffic is expected to grow at the same pace despite current slowdown due to global recession. But airport infrastructure has not kept pace with the growth of the civil aviation traffic. This has resulted in congestion and inefficient services in major airports, limited landing slots, inadequate parking bays and congestion during peak hours for airlines. Development of quality infrastructure will have an impact on international competitiveness and economic growth. This requires faster development of civil aviation infrastructure on public private partnership mode. In tune with the requirement many initiatives have already been started in the 10th five year plan and they are expected to continue in the 11th plan also. Of a total number of 454 airports and airstrips in India, 16 are designated as international airports. The Airports Authority of India (AAI) owns and operates 97 airports. A recent report by Centre for Asia Pacific Aviation (CAPA) states that over the next 12 years, India's Civil Aviation Ministry aims at 500 operational airports.[1]

Relation of the development with the policy on infrastructure

In the policy of airport infrastructure by the ministry of civil aviation, it has been mentioned about the regional developments and creating new regional airlines and airports for better connectivity. Government is keen to encourage development of regional airlines based on small aircraft to provide air-linkages in the interior areas of the country. Regional hubs will have to act as operational

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bases for regional airlines and also have all the facilities currently postulated for model airports, including the capability to handle limited international traffic. The identification of Regional Hubs will be made on the basis of origin-destination surveys, traffic demand and the requirements of the airlines. State Govt. will be closely associated as co-promoters of regional airlines.[2]

In fact, the country has some 300 unused airstrips and it has been proposed to use them in collaboration with state governments. Smaller aircraft may be allowed to operate at these airstrips. To further facilitate regional connectivity, the Ministry of Civil Aviation has decided to upgrade night landing and parking facilities at nearly 20 non-metro airports through the Airports Authority of India. Some of these could also be converted into mid-sized airports where large planes could operate. The next round in aviation is going to be in terms of regional connectivity. Towards this, the ministry is talking of changing the classification of scheduled operators. That would see the emergence of newer regional airlines. "It is been planned to bring a sub-set of scheduled operators in regional airlines which will be confined to regional operations. Already, existing players are expanding their plans and newer players are entering the fray. Take HAL, the public sector defense craft maker, for instance. According to industry sources, it is entering the civil air services space through a joint venture with a private company to run a regional air service for groups of 6 to 20 passengers. "We are looking at an option like a London bus—hop in and hop off in not more than 30 minutes," says a top official working closely on the proposed joint venture. Air Sahara, the airline company plans to increase its regional jets strength from the current 7 to 25 over the next 3-4 years. A few other regional airlines like Trans-India and Air Dravida's applications are pending with the ministry.[3]

North East Region development through aviation

According to the civil aviation policy of 2008 by ministry of civil aviation, there are certain objectives which are laid down[4]:—

1. In the Northeast region and other remote areas, the management of airport infrastructure as well as air services is not economically viable because of low utilization and low fare structures etc. However, given the topography and inaccessibility of the region, the need for such infrastructure and air services is much greater. But at the same time, forcing commercial airlines and airport operators to invest in these areas, distort the functioning in other areas also and affect their efficient functioning commercially. Therefore, there is need to correct these imbalances.
2. It has been decided to exempt all the currently operated routes in the North-East from payment of Inland Air Travel Tax (IATT). The decisions to provide ATF to turbo prop aircraft operations at par with price for international air services and capping of sales tax at 4% would also encourage new air services in the North-East. Operation of smaller aircraft and helicopters for passenger and cargo flights will be further

encouraged through rationalization of airport charges and Avgas prices.

3. Airport Infrastructure will be upgraded wherever necessary keeping in mind the linkage with the aircraft type and traffic profile.
4. Adequate funds as grant-in-aid through North East Council (NEC) will be made available for the infrastructure development work needed to be carried out in the North-East region.
5. The air-links between the capitals of the States in the North-East region and between major stations on both sides of the Brahmaputra river will be encouraged.
6. Guwahati and Calcutta will be developed as hub station and main base of turbo-prop aircraft operations by the airlines.
7. Regular air services will be encouraged at convenient timings to enable onward connections to other parts of the country without involving night stop.
8. Suitable infrastructure like hotels, organized taxi-services at the airports and tourist spots in the North-East will be encouraged to help growth in tourism in the region.

About air connectivity in the region, the Manipur Governor Dr S.S. Sidhu who is heading a committee on air connectivity in NER in his speech in a crucial NEC meeting in May expressed serious concern over the current state of affairs in respect of air connectivity. It is revealed that the airlines which had Memorandum of Understanding with the NEC, virtually failed to honor most of its commitments. "NEC has released Rs 175 crore without commensurate benefits; Guwahati did not materialize as a Hub as per the MoU; Alliance Air operations continued to emanate from Kolkata, negating the objective laid down in the MoU and the airlines though lately increased services in the region, only 30 percent of its total operations are in the region, the remaining 70 percent are beyond NE region."

The Sidhu Committee constituted by the Minister for North East Development in its report suggested two options: Public Private Partnership model: a joint venture airline allowing the private operator majority stake (74 percent) and remaining 26 percent be hold by NEC OR Reverse Bidding Agreement (minimum subsidy route). To ensure transparency and fair play, the Committee further recommended issue of Public Notice for Expression of Interest and short listed bidders be asked to submit technical and Financial Bids.

Dr Sidhu in his presentation suggested that "The selected entity/airline should be based in North East and its operations dedicated to the Region with following objectives: Improve intra-region air connectivity; Connecting 11 other airports within one year; Inter linkages of State Capitals on daily or alternate day (depending on traffic); Pathfinder for future locations. He has also suggested that

Guwahati to be initial Hub. Sub-Hub could be set up at Imphal/Agartala. While Agartala has Night Landing Facility, Imphal will have to have NLF by December, 2007. Besides, 11 non-operational airports of the region are to be expeditiously made serviceable. The Greenfield projects could be at Kohima, Gangtok, Itanagar, Tawang and Kokrajar.

Development of regional airport in south central region

Bids for the development of four regional airports in Andhra Pradesh under public private partnership are called recently. The airports, to come up on 1,500 acre each, would be developed on a build, own, operate and transfer (BOOT) basis. The projects would be completed in 36 months from the date of award of contract. These airports would promote balanced regional development and improve the connectivity between the state capital and district headquarters. The government has identified Orvakal in Kurnool, Jakranpalli in Nizamabad, Ramagundam in Karimnagar and Tadepalligudem in West Godavari for the new airports. The Airports Authority of India has already given the feasibility reports of these places. The government has designated the Infrastructure Corporation of Andhra Pradesh (Incap) as the nodal agency for inviting expression of interest and request for proposal from prospective developers.[5]

It is one of the latest policies and development in the aviation policy of the country To expand air connectivity on Tier II and Tier III cities and to promote regional air connectivity a separate category of permit, Scheduled Air Transport (Regional) Services had been introduced with the approval of Hon'ble Minister of Civil Aviation. Accordingly, Director General of Civil Aviation had issued Civil Aviation Requirements (CAR) on Scheduled Air Transport Regional Services.

Private participation in developing regional airports

Currently, Reliance-Infra operates 5 airports in Maharashtra at—Nanded, Yavatmal, Osmanabad, Latur and Baramati on a 99-year lease. A senior executive of R-Infra said the company is eyeing at various regional airports in Andhra Pradesh and Gujarat. Also, the company is looking at other regional airports across other states in the country. In late 2008, the Andhra government had invited bids to develop 8 regional airports in Tier-IV cities. Where, more than 37 companies, including R-Infra shown interest, but the economic downturn resulted to drop the plan. According to estimates, about 3 % of Indians, largely from metropolitan cities, are regular air travelers. R-Infra sees an opportunity in the remaining 97 % and remains committed to the development of regional airports, the executive said.

The executive said regional airports can play a vital role in decongesting metro airports and can be used for refueling and cargo activities. India's geography and large population base presents multiple opportunities for airports. The executive said as R-Infra is interested in bidding for existing

airports, and at this stage it is not interested to raise new ones, which makes the company to drop the Kushinagar airport in Uttar Pradesh. He said the problems of land acquisition, local opposition and environmental concerns make it a difficult entry point for private operators. Hence, R-Infra would like some existing infrastructure assets to be present at the site before it bids. The Airports Authority of India (AAI) is also thinking of developing 15 of 40 non-operational airports in smaller cities across the country, on a (PPP) Public Private Partnership basis. The airports under consideration are in - Rajasthan, Orissa, Bihar, Uttar Pradesh, Jharkhand and the northeastern states. Reliance Infrastructure Ltd has posted a net profit of Rs 2771.30 million for the quarter ended December 31, 2009 as compared to Rs 2511.90 million for the quarter ended December 31, 2008. Total Income has decreased from Rs 28612.10 million for the quarter ended December 31, 2008 to Rs 25030.70 million for the quarter ended December 31, 2009.R-Infra interested in bids for regional airports.[6]

Financial requirements for developing regional airports

Ministry of Civil Aviation has proposed development of 35 non-metro airports, keeping in view the potential for traffic, tourism, business etc. The development of these airports was proposed in three Phases as follows[7]:

(a) **Phase-I (10 airports):** Ahmedabad, Amritsar, Guwahati, Jaipur, Udaipur, Trivandrum, Lucknow, Goa, Madurai and Mangalore. In case of project specific problems, some airports may need to be substituted.

(b) **Phase-II (15 airports):** Agati, Aurangabad, Khajuraho, Rajkot, Vadodara, Bhopal, Indore, Nagpur, Vishakapatnam, Trichy, Bhubaneswar, Coimbatore, Patna, Port Blair, Varanasi.

(c) **Phase-III (10 airports):** Agra, Chandigarh, Dimapur, Jammu, Pune, Agartala, Dehradun, Imphal, Ranchi and Raipur. Additional airports will be taken up for development on need basis.

Preliminary estimates of the cost of providing infrastructure for the expected growth in passenger and aircraft traffic at 10 non metro airports have been prepared. Estimates for the remaining airports are yet to be prepared. AAI had proposed that the capital investment for commercial development of land (city side development) of non-Metro airports shall be made by private entities. It was proposed that out of their commercial revenues, private partners would pay land lease and revenue share to AAI. Based on the reports of the consultants for ten airports, an investment of Rs.1, 150 crore had been projected for commercial development. In addition, an investment of Rs. 350 crore could be envisaged for the remaining airport. An investment of Rs. 340 crore is envisaged for development of Paykong airport in Sikkim, Rs. 150 crore for Chiethu airport in Nagaland and Rs. 120 crore for Itanagar airport. This totals to an investment of Rs. 610 crore.

Initiatives for regional airport development

Sanganer Airport in Jaipur, Rajasthan, is among India's fastest growing airports, with passenger traffic having increased almost five-fold over the past five years. But the Pink City's airport cannot take the wide-bodied aircraft that most international airlines use, and foreign tourists have to come via bigger airports, using the smaller jets of domestic carriers. Nor can its runway be extended to the ideal 2,500 feet because there's a national highway at one end and residential colonies at the other. Ergo, at the present rate of growth, the airport is likely to be saturated as early as four years from now: fiscal 2014. So, the state government is getting a second airport built, at Viratnagar, 63 km from Jaipur. Rajasthan Aviation Infrastructure, a private enterprise, is building what it calls a multi-modal logistics hub that will also handle the incremental passenger demand. "Cargo will form the primary revenue driver. We should see the first aircraft land at our airport by 2014," says Mark Martin, Chief Operating Officer, Rajasthan Aviation. Jaipur's second airport is also the country's first to come up within 150 km of an existing airport. India's Greenfield Airports Policy of 2008 makes for such exemptions in rare cases. Other states and regions are likely to get similar clearances, too. Delhi is expected to get one at Greater Noida to the east of Delhi that will take care of traffic into west Uttar Pradesh. Congestion at the crowded Mumbai airport, hemmed in by slums, could be eased by an airport at Navi Mumbai east of the port city. Going by Jaipur's example, the Union government's approach to civil aviation is markedly different from what it does in the road and rail sectors, with infrastructure being set up regulator, and its joint venture companies, are preparing to tackle future demand by building larger terminals, more parking bays for planes and extending runways. Several others, too, are taking the initiative to build so-called regional airports, which have state government participation. So far, the Union government has approved new airports at Mopa in Goa; Sindhudurg in Maharashtra; Shimoga, Gulbarga, Hassan and Bijapur in Karnataka; Kannur in Kerala; Durgapur in West Bengal; Datia near Gwalior in Madhya Pradesh; and Paladi near Ramsinghpura in Rajasthan.

All this is happening at a time that India's big cities have got modern airports. At Bangalore and Hyderabad, new, swank airports on the outskirts of the cities have replaced AAI-owned airports as the main air gateway into the regions. In Delhi and Mumbai, on the other hand, modernisation projects have expanded the old and congested ones. The Indira Gandhi International Airport at Delhi, for instance, opens its new terminal first week of July. Elsewhere, the AAI is upgrading 13 major airports, including those at Chennai and Kolkata, and 35 other non-metro airports—spending a total of Rs 12,500 crore on these projects.

That may be just the beginning in this decade. Civil Aviation Secretary M. Madhavan Nambiar estimates that India's airports will be ready to handle over 300 million passengers, including foreign travelers, annually by 2020—up from a little fewer than 100 million currently. To build out this capacity, investments

needs will be around $30 billion, including projects costing some $9 billion already identified. Analysts say the country could have about 1,000 planes in the sky up from the current 400-odd by 2020 to ferry around the domestic passenger traffic of around 180 million. Funding for airports development of that scale will need private support. Not very long ago, the AAI was in a position of comfort; it used profits earned from large airports to develop smaller and not-so-healthy airports. After it lost control over four major airports— Delhi, Mumbai, Bangalore and Hyderabad—to private operators (it receives a near-half share of revenues in Delhi and Mumbai), its source of revenue is thinning.

In 2008-09, for instance, when private airports became operational in Bangalore and Hyderabad, the AAI lost Rs 125 crore and Rs 170 crore in revenues, respectively. By the end of that year, the number of profit making airports under the body declined from 11 to nine. The way volumes are poised to grow, then, suggests private airport operators have healthy returns ahead in the years to come. A glimpse into the valuation of the unlisted Bangalore International Airport Ltd was available last year when GVK Power and Infrastructure—also the operator of Mumbai International Airport Ltd—paid a huge premium to pick up a 29 per cent stake in the Siemens-led Karnataka project for about Rs 1,175 crore.

Still, private and foreign investors are wary of investing in the sector because of age-old problems with land acquisition and road connectivity from a new airport site. "For India's growth story to percolate to its interiors, regional airports are vital. The government must develop a low cost airport model to facilitate the viability of the regional airports," says Amber Dubey, Director of the Aerospace Practice at consultancy firm KPMG. One innovative model, he suggests, could be making a state government and the urban local body key stakeholders in an airport project. Some municipal bodies in Europe patronize airlines with incentives for bringing passengers into their town. Another reason could be India's nascent aviation industry. A regional airport at new location can be viable only if it gets on an average of 6,000 passengers and 60 landings by shorthaul aircraft a day. In comparison, most regional airports today are getting between two and 10 flights a day. The challenge, however, can be overcome if the government treats air connectivity as one of national importance and extends fiscal and other incentives,. The benefits could be enormous, especially in agriculture and floriculture, which suffer from supply chain bottlenecks without airports. One example the Indian airline industry points to is in the increase in horticulture and agriculture off take from the North-East after airline connectivity improved.

Farm produce from the region that could typically take up to two weeks to reach the markets of New Delhi or Bangalore, now reaches within four days, with local logistics companies taking advantage of flights by the likes of IndiGo and Kingfisher that carry cargo in the belly of their planes to compensate for sub-optimal passenger loads. Industry and tourism could also gain. Airports and

airlines make for the classic chicken-and-egg situation. Without the infrastructure on the ground airlines cannot expand and unless the carriers increase their reach into India's smaller towns and cities, the benefits of the efficient connectivity will not spread.[8]

Upcoming new regional airlines[9]

Half-a-dozen new regional airlines are expected to start operations this year, despite a majority of the existing companies recording a combined loss of over Rs.10,000 crore. Star Aviation, Zav Airways, King Airways, Sky King Aviation, Premier Airways and a cargo carrier have received permission to import aircraft and start operations in the country. Chennai-based Star Aviation, promoted by Dubai-based real estate company ETA Star, is likely to be the first to fly.

It will start operations in recently with three Embraer 72-seater aircraft initially and provide connectivity to tier-II cities, mostly in south India. The airline will have a 10-aircraft fleet strength and will invest $300 million in the next 18 months.

Star Aviation plans to connect Hyderabad, Madurai, Ahmedabad, Visakhapatnam, Bangalore and Kochi with Chennai, the airlines spokesperson said. It will be a full-service carrier with a single-class configuration like another Chennai-based carrier, Paramount Airways.

Example of a regional airline[10]

MDLR Airlines

MDLR, Full Service Airline is wholly owned by the **MDLR** (Murli Dhar Lakh Ram) group, a pioneer leader in commercial and real estate industry. Based in Gurgaon, **MDLR Airlines** started operations on 14th March 2007. The airline connects many small cities and business towns to the four metropolitan cities of India. **MDLR Airlines** is committed to provide efficient, high standard and excellent quality onboard services to all its passengers. Country's first full service vegetarian carrier, **MDLR Airlines** uses Graphical User Interface of Airlines inventory and Reservation System of Bird group to make reservations process easy and quick for passengers. Tickets on **MDLR Airlines** can be booked through MDLR website, 24X 7 MDLR call center, authorized travel agents and **MDLR** airport offices.

MDLR Fleet

MDLR airline currently operates three luxurious and spacious 70 seater aircrafts, AVRO RJ 70. MDLR is the first **domestic airline** of India to have introduced the four engine AVRO RJ 70 jets. All aircrafts have good leg-space, plush interiors with two-class configuration and follow highest safety standards in the industry. Apart form the Economy class, **MDLR Airlines** offers Club seats

to business travellers. Providing comfortable and stress free journey to passengers, **MDLR** is looking forward to double up its fleet size by the end of this year.

MDLR Operations

MDLR airline operates regular flights to Chandigarh, Delhi, Ranchi, Kolkata, Dehradun, Dharamsala. Connecting all prominent cities to several regional destinations across India, **MDLR Airlines** also flies to many popular sectors across India i.e. Delhi – Chandigarh, Ranchi – Delhi, Chandigarh – Kolkata and Ranchi – Chandigarh. The airline plans to expand its operation to Mumbai, Surat, Goa, Pune, Bhavnagar and few more northern Indian cities in the near future. **MDLR Airlines** is also in the process of opening exclusive city lounge check-in facility at Delhi, Gurgaon and Chandigarh.

Regional airlines relating to present status[11]

Close to six months after the government announced its regional airline policy, carriers are suddenly waking up to serious infrastructure constraints and competitive pressures that, they say, will impact their viability. Regional airlines that have received approval include MDLR, Jagson Airlines, Star Aviation and Zav Air. Others like Mega Airways and Premier Airlines are still awaiting approval. Under the new policy, regional carriers that fly small aircraft (below 40,000 kg) are exempt from all airport and navigation charges and pay concessional tax of 4 per cent on fuel against 35 to 36 per cent for national carriers. Unlike national carriers they can start operations with only one aircraft (instead of five) and equity of Rs 12 crore (instead of Rs 50 crore). Regional airlines are, however, allowed to operate flights only to or from one city (except in the south, where they can operate between Hyderabad, Chennai and Bangalore). Infrastructure constraints are already hampering the operations of those that have begun. "Most of the airports do not even have a proper runway, neither in strength nor in length and cannot support an aircraft of even 40,000 kg," said Koustav M Dhar, executive director, marketing and planning, MDLR Airlines, which has started operations. He added that most of these small airports are defense airports doubling up for civilian duty so flight timings are restricted to between sunrise and sunset. These timings clash with the peak time in the bigger cities when smaller aircraft are not allowed. The other serious problem is congestion in the larger airports. Most are reluctant to permit extra flights, even from regional carriers. This leaves these airlines with little option but to operate between the smaller cities. "Traffic growth has only just begun between large and small cities. Between the small cities, it is yet to begin in a major way, which means that at least for now, there is no viable market for regional airlines in regions apart from the south. "Regional airlines have no scope in the long run under the current policy," added Kishore Zaveri, chairman of Zav Airways, which will start operations from the north-east. Zaveri added that the only way out for a regional airline was to upgrade its licence for pan-India

operations after some time. "The government has to see that the national players restrict operations on the routes on which regional players operate since regional players are not allowed to fly on the routes these carriers are flying. National carriers picking up traffic from the smaller cities have a bigger competitive edge because they can pick up traffic to and from all over the country," he added.

Launching of regional carriers or airlines[12]

More than a year after the government announced a new policy allowing small players to launch short-hop, regional flight operations, some firms that have been issued licences are cautiously gearing up to start operations despite slowing commercial air passenger traffic in an all-encompassing economic slowdown. In 2007, the civil aviation ministry introduced a policy for small start-ups to connect small towns, complementing national operators, including National Aviation Co. of India Ltd-run Air India, Jet Airways (India) Ltd, Kingfisher Airlines Ltd, SpiceJet Ltd, Go Airlines India Pvt. Ltd, InterGlobe Aviation Pvt. Ltd-run IndiGo and Paramount Airways Pvt. Ltd. A regional carrier from New Delhi was allowed to connect any other city, but not a metro of the other region. The only easing of this rule was that carriers starting operations from Bangalore, Hyderabad and Chennai were allowed to connect one another.

It has been said by civil aviation minister: "Regional (aviation) is the future because there is a lot of opportunity connecting tier II and tier III cities with smaller airlines. ATF (aviation turbine fuel) is cheaper and landing and navigation charges are waived for 80-seater and smaller planes."Since 2007, the aviation ministry has given permission to several start-ups, including ZAV Airways Pvt. Ltd, Star Aviation Pvt. Ltd, MDLR Airlines Pvt. Ltd, Jagson Airlines Ltd, and more recently, King Air Pvt. Ltd. Except for MDLR Airlines with its two Avro 146-RJ70 aircraft connecting Chandigarh, Kullu, Ranchi, Kolkata and Goa with New Delhi, and Jagson Airlines, which flies two helicopters, the others are yet to take off. "When the (regional airlines) policy came in, there was an obsession for metro routes," says Mark Martin, an analyst with KPMG's India offices, who believes that this could be a good time to start regional operations, depending on the demands of a particular region. "You can have a blend of routings now. You can do pick-and-drop service on key routes."

Analysts such as consulting firm Centre for Asia Pacific Aviation's India chief executive Kapil Kaul are skeptical, pointing out that a regional airline might cost less than a national carrier but expenses could still tote up to Rs300 crore. The cost seems to have little effect on the ambitions of regional carriers. Some are ready to take deliveries of new aircraft ahead of operations. Chennai-based Star Aviation, which has an aircraft purchase deal estimated at $220 million (Rs1,071 crore) with Brazil's Empresa SA, will take delivery of the first of its Embraer 170LR jets in April. Initial operations will start between 3 cities. Star has not made any changes in plans announced last year and the airline will have five aircraft running in its fleet by the end of fiscal 2010.

The regional carrier plans to fly sectors such as Delhi-Lucknow and Delhi-Kullu, to start with. ZAV Airways in Kolkata has scrapped plans of using ATR turboprop aircraft and will instead fly Bombardier-made CRJs. ZAV chairman Kishor Zavery said they were likely to launch services before the end of this year.

Conclusion

Till now the developments which are going on for creating new regional airports and entering of new regional airlines in the Indian aviation sector is not sufficient for the vast population. There are PPP in developing and creating new regional airports but still it can be better by cooperation of ideas. The task at hand is very huge. This challenge can be addressed through formulation of a comprehensive airport infrastructure plan, formulation of policies and guidelines, changes in the existing policies and guidelines and formulation of comprehensive financing plan. All these initiatives will enable the development of airport infrastructure on PPP to meet the growing demand of airport traffic and offer the globally comparable service standards at competitive rates. And regarding regional airlines, the routes and connectivity of those are to be increased and they should enter into competition with the national airlines.

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PRODUCT LIABILITY IN AVIATION

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Introduction

The area covered by product liability in the broadest sense is so vast that an attempt to analyse all its impact on the aviation world risks going far beyond the scope of this book. Every effort has been made to confine our review of the subject as closely as possible to its place in air law and its influence on aircraft manufacturers, airlines and passengers, in spite of strong connections with other spheres of commercial activity. A brief look at past developments will invariably touch upon these close links, But that is indispensable for a better understanding of modern trends.

Our review is largely based on American practice and American case law. This is not surprising as the idea of product liability originated in the United States.

How is the term 'product liability' to be defined or interpreted? There is more than one answer to that question. It is generally agreed that product liability is the liability resulting from damage caused by defective products. A broader definition is by Hursh,[1] reading as follows: Product liability is 'the liability of a manufacturer, processor or non-manufacturing seller for injury to the person or property of a buyer or third party caused by a product which has been sold'.

There are three grounds for a successful product liability lawsuit: (1) defective design; (2) defective construction; (3) inadequate instructions for handling a product put on the market. Whenever a product turns out to be defective after it has been sold, there are under Anglo-Saxon law two remedies available against the manufacturer: (1) breach of warranty; (2) tort.[2] It is worth pointing out here that an action for breach of warranty is available only to the direct purchaser on the basis of his contract with the manufacturer, which of course weakens its range and effectiveness. An action for tort offers the advantage of being available also to third parties who have acquired the defective product at a later stage. In tort, obligations are constituted not only by contract, but also by statute and common law;

This point is illustrated by Duintjer Tebbens.[3] He focuses in particular on the obligations affecting professionals suppliers of goods and services. Some obligations are usually created by their sales contracts, but others are imposed by law to enhance the general standards of craftsmanship and thus to protect the public at large from inferior or defective products, not only the direct purchaser.

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With an increasing number of court cases on their hands American judges and legal critics soon recognized that aircraft manufacturers bore a legal responsibility for product safety and reliability standards similar, or at least comparable, to those imposed by law on manufacturers of ordinary consumer goods. This trend of thought gained a foothold even in California, the home base of giant aircraft industries.

Martin quotes as an early, typical example of product liability in aviation the 1973 case of *Maynard v. Stinson Aircraft*.[4] In this case a passenger was awarded damages when she suffered injuries caused by an aircraft catching fire. The manufacturer was held by the court to have been negligent in the design of the aero plane on two counts. Firstly, the 'exhaust stacks' were too short to discharge the hot exhaust gases free and clear of the body of the aeroplane; secondly, the carburettor drain design was such that gasoline escaping from it was likely to accumulate on the underbody of the aeroplane where it was ignited by the exhaust gases.

The Warsaw Convention

The original text of the Warsaw convention may conveniently be examined first in terms of its applicability, and we note immediately, in Article 1,that it applies only when the transportation is international (although many nations apply its rules also to transportation within their borders.)Another notable element is that the Convention is applicable to all international carriage of persons, baggage or goods for reward. Note that by its nature the Warsaw Convention only applies to carriers; a law suit against e.g., an aircraft inspection service is not subject to the rules of the Convention.[5] Gratuitous carriage by aircraft is also covered by the Convention, but only when performed by an air transport company. Other gratuitous carriage is not included. The reason why an exception has been made for carriage by an air transport company is that free tickets are usually issued with the intention of obtaining something in return, e.g., for propaganda purposes. Rules concerning gratuitous carriage, when it occurs, are normally to be found in domestic law.[6] In the case of *Grein v. Imperial Airways*[7] 'agreed stopping place' was defined as a place 'where according to the contract the machine by which the contract is to be performed will stop in the course of performing the contractual carriage, whatever the purpose of the descent may be and whatever rights the passenger may have to break his journey at that place'. It should be noted with regard to 'agreed stopping places' that it was deemed sufficient for them to be referred to, for instance, in the time tables of the carrier, even if they had not been specifically mentioned in the documents.[8] In the same case it was ruled that 'an intermediate place at which the carriage may be broken is not regarded as a "place of destination".

The international character of the contract is determined b y the intention of the parties as expressed in that contract.

The Liability of the Carrier under the 'Warsaw System'

Jurisdiction and Forums

The convention mentions four courts for submitting claims(Art.28):—

1. The court having jurisdiction at the place where the carrier is ordinarily resident (court of domicile);
2. The court having jurisdiction at that place where the carrier has his principal place of business;
3. The court having jurisdiction at the place where the carrier mainatains an establishment through which the contract has been made; and
4. The court having jurisdiction at the place of destination

The Evolution Towards Strict Liability

As early as 1916 an American court, recognizing the limited reach of the breach of warranty action, had opened the way for third party compensation.[9] According to that decision, however, the claimant still had a heavy burden of proof. He had to demonstrate[10]:

a. that the damage had been caused by a defect inherent to the product;
b. that the defect already existed when the product left the producer; and
c. that the defect was due to negligence on the part of the producer.

Although the judgment afforded slightly better protection to third parties, the resulting position was still not nearly satisfactory. No redress was available, for instance, in cases involving products of which the defective parts had not been manufactured by the manufacturer /defendant himself. The trend in favour of applying strict liability to manufacturers grew stronger and stronger in the United States, and finally, in 1963, it was adopted, for the first time in an american court, in the case of *Greenman v. Yuba Power Products*.[11] The court ruled that' a manufacturer is strictly liable in tort when an article he places on the market, knowing that it is to be used without inspection for defects, proves to have a defect that causes injury to a human being'. Not long afterwards the principle was formally incorporated in the Restatement (Second) of Torts.[12]

Under the new doctrine the claimant had to prove that the defect causing the injury existed at the time the product left the seller's hands. The seller was not held liable if the product had been made unsafe by subsequent changes. In practical terms, the law affecting aviation products had by now become a true reflection of the general product liability law. Yet, it was still not possible to sue successfully on the grounds of defective design regardless of all other circumstances, as is apparent from the case of *Bruce v. Martin Marietta and Ozark Airlines*.[13] An aircraft of the Martin 404 type, built in 1952 by martin-marietta, had been chartered to carry a Wichita State University team and supporters to a football match in Logan, Utah. On its way to Logan the aircraft crashed in the

colorado Mountains. As a result of the terrific impact the passenger seats broke loose from their attachments and were thrown against the bulkhead of the aeroplane, blocking the exit. Shortly after the crash, the aircraft caught fire, and the accident resulted in 32 out of the 40 passengers being killed. The manufacturers were sued for damages on three counts: 'negligence', 'implied warranty', and 'strict liability'. The court stated that an aircraft manufacturer was not liable for damage arising from the crash on the grounds just mentioned for alleged defects in the adequacy of the seat fastenings and the lack of fire protection in an aircraft built as long ago as 1952. There was nothing to indicate that the ordinary consumer would expect a 1952. There was nothing to indicate that the ordinary consumer would expect a 1952 vintage aircraft to have the safety features of one manufactured in 1970.

Moreover, the air carrier, who was the intermediate owner and seller of the aircraft, and who had not made any significant changes in it during its ownership, was not held liable for damages arising from the crash.[14] Thus, the manufacturers were exonerated because the 'design' was regarded as not being defective according to 1952 standards, the year adopted by the court as the basis of its decision.

The case of *Kay v. Cessna Aircraft*[15] provides an instance of adequate instructions playing a crucial role. The pilot of a Cessna Skymaster Model 337 had, quite unforeseeably, misused the aircraft by failing to follow the operating instructions in his 'Owner's Manual'. Had he done so, he would have received a warning prior to take off that one of the two engines was out of order. The Court admitted that the instructions could have been drawn up more clearly, but found that had the pilot followed them, he could have averted the accident. The pilot's failure to comply with the instructions was ruled to be not reasonably foreseeable by Cessna, who were exonerated. The manufacturer may, of course, be granted exoneration if he can demonstrate that the injuries suffered by the plaintiff were not caused by the defect. Contributory negligence on the part of the injured person will also constitute a valid ground for exoneration. The doctrine of strict liability has been continually extended. The whole evolution one may observe in American case law derives basically from a fundamental rationale, i.e. the need to ensure that the costs resulting from defective products are borne by the manufacturers who put such products on the market, rather than by the injured persons who are powerless to protect themselves. An overriding motive behind this consideration has been has been the fact that the manufacturer is able to arrange for insurance: he can spread his cost among the general public, because such expenditure can easily be offset by a modest price increase.

An important court decision to be quoted in connection with the new trend, but also containing significant qualifications, is the case of *Kaiser Steel v. Westinghouse Electric*[16] although not relating directly to aviation, its considerations make very interesting reading because they were to affect indirectly airlines suing aircraft manufacturers. The Court of Appeal found that 'although the California rule of products liability... encompasses) situations in

which the principles of sales warranty serve their purpose "fitfully at best", the role of products liability does not subsume the entire area of a manufacturer's liability for a defective product'. The Court further noted that tort law is often resorted to as a basis for recovery when sales law, such as the Uniform Commercial Code, does not afford adequate protection to the consumer. Therefore, in an attempt to promote the cost shifting rationale, the Court established the following test to determine whether or not to apply the doctrine of strict liability in a particular situation. It ruled that (strict) Product liability does not apply as between parties who:

1. deal in a commercial setting:
2. from a position of relatively equal economic strength;
3. bargain the specifications of the product; and
4. negotiate concerning the risk of loss.

The significance of the Kaiser decision is evident, considering the fact that the purchase of an aircraft usually involves two companies of relatively equal economic strength. The impact of the strict liability rule was considerably weakened as a result of the kaiser decision.

To illustrate the evolution that took place in practice let us examine a number of cases:

1. In 1964, the dependants of passengers killed in the crash of a Boeing aircraft near Rome sued the manufacturers on the ground of strict liability. proceeding were based in this case on the law of the State of Washington, The seat of the Boeing Corporation. The Issue of Boeing's negligence with regard to the design of a part of the aircraft was, however, decided in accordance with Italian law, because the wrongful act had occurred in that country. It is interesting to note here, incidentally, that never before in Italy had passengers' dependants sued an aircraft manufacturer, and there was no provision in Italian law dealing with matters of this nature. In this instance recourse had to be taken to an article in the Italian Civil Code dealing with the liability of the owner/driver of a vehicle for damage resulting from defective construction. the Court decided, in 1971, in favour of the dependants by granting them compensation.[17]
2. An even more dramatic illustration of the consequences of strict product liability is given in the crash of a Turkish Airlines DC-10 near Paris in 1974, where 346 people from more than 10 different countries lost their lives as a result of the catastrophe. Following take-off a door had burst open and the resulting explosive decompression had caused the floor to collapse. The facts made it clear that the manufacturers, Mc Donnell Douglas, were to blame. In addition, the modifications recommended by the Mc Donnell Corporation had not been carried out

> by Turkish Airlines on its aeroplane. In the ensuing proceedings, the manufacturers were sued on the basis of strict liability, the result being that they had to pay great sums of money in compensation for the losses suffered by heirs and dependants.[18]

An interesting point at issue between several authors authors needs to be mentioned here, namely the question as to what extent the aviation repair stations are liable. Do they incur strict liability, or are they liable only up to certain limits? The trend is for them to be held strictly liable, with no limits, for two reasons; repair stations are involved in the safety of the aircraft, and moreover, the insurance option is always available to them.[19] The accident created a stir due to the US Federal Aviation Administration issuing an 'Emergency Order of Suspension' which prohibited the operation of all US-registered DC-10 aircraft.[20] Also worth nothing is the fine incurred by British Midland Airways on 25 July 1996 for criminal negligence in maintaining one of its aircraft. A mechanic had omitted to replace certain oil valves in the engines and to test their proper functioning. Only the pilot's consummate skill brought the aircraft to a successful emergency landing saving the lives of all passengers and crew.

The Tenerife accident, which took place in 1977 and is the biggest disaster yet in aviation history, occurred as a result of a series of unfortunate circumstances happening almost simultaneously. In the first place there was a congestion of aircraft at Tenerife, waiting for departure after being diverted because las Palmas airport had been closed shortly before due to a bomb scare. Secondly, during the preparations for take-off visibility deteriorated considerably, so that the Pan Am and KLM aircraft were no longer visible to each other and had to depend entirely on radio contact. Thirdly, radio contact each other and had to depend entirely on radio contact. Thirdly, radio contact was hampered by messages between the control tower and both aircraft being exchanged simultaneously and being unclear. The fog caused Pan Am to miss the exit prescribed to leave the runway which was not marked by lights at that moment. Garbled radio messages caused the KLM pilot to assume that both route clear and take-off clearance had been given, so that he made what was in fact an unauthorized start, with fatal result. In the ensuing proceedings liability was conceded by the airline companies; the insurance companies have played an essential part in settling the claims out of court by fixing the sums of money to be paid by the parties involved, including the manufacturer of the aircraft (Boeing) and the Spanish Government.[21]

In a number of cases occurring rather more recently the influence of the *Kaiser/Westinghouse* precedent is already apparent:

1. *SAS v. United Aircraft* (1979). SAS filed a suit against United Aircraft seeking relief for property damage resulting from the failure of jet aircraft engines manufactured by United Aircraft. The contracts for the purchase of the engines provided for certain limited warranties, express

or implied, in addition to an exculpatory clause.[22] After considering the clause which had been incorporated in the contract of sale, the trial judge, following United Aircraft's petition for a summary judgment on all claims, granted SAS's claims based on warranty and tort, but denied the claims based on negligence. In confirming the trial judge's decision, the Court of Appeals ruled that because of the lack of public policy the doctrine of strict liability was not applicable in this case. The decision found strong support in the *Kaiser/Westinghouse* case.[23]

2. *Tokio Marine v. McDonnell Douglas* (1980). On 28 November, 1972, a DC-8 aircraft manufactured by McDonnell Douglas and owned and operated by Japan Airlines (JAL), crashed during take-off at Moscow, killing 52 passengers and seriously injuring 10 others. Tokio Marine, the insurers for JAL. sought relief from McDonnell for the loss of the aircraft, basing its action on grounds of strict liability. The Court of Appeals decided, however, that the doctrine of strict liability in tort was not to be applied in California in a case where the sales contract was between two large corporations, negotiating from a position of relatively equal economic strength.[24]

The Liability Convention of 1972[25]

The preliminaries

Work on the may issues raised by the problem of liability for damage caused by space objects started in 1959, when the ad hoc committee of the United Nations focused the attention on this issue as one of the problems suspectible of priority treatment.[26] In 1962 this initial move was given a follow-up by UNCOPUOS, which decided to set up a special subcommittee to examine the legal implications of space activities. Following the signing of the Outer Space Treaty in 1967 the legal sub-committee stepped up its activities, but it soon found itself faced with a host of problems of great complexity, requiring the most careful attention. Lengthy discussions ensued, causing the conclusion of a convention to be delayed. On 4th July 1969, however, the Japanese delegation was able to provide the sub-committee with a perfect test-case: just previously, on 5 June a Japanese cargo ship had been damaged off the coast of Siberia by fragments of a device launched into outer space injuring 5 sailors. Shortly afterwards important draft texts for a convention were submitted by Belgium, Hungary, India and Italy, and on 19 June 1971 the subcommittee was able to agree the text of a draft convention.[27] Within a few months, on 29 November 1971, the Liability Convention was adopted by the UN General Assembly, with 94 states voting in favour none against and 4 abstentions (Canada, Japan, Iran). At 1 January 2006, the Agreement had 83 states parties and was signed by 25 additional states. Moreover, 3international intergovernmental organizations made declarations on their acceptance of the rights and obligations arising from the Convention.[28] The convention contains 28 articles.

Enhancing Aviation Safety through the Rule of Law

Safety Obligations and fundamental norms

Are there obligations inter se on the basis of reciprocity or obligations toward the international community as a whole, namely, obligations erga omnes/Determination of this issue may have a bearing upon the enforcement of these obligations and ICAO's present and future role in the aviation community.

According to Simma, now a judge in the ICJ, traditional international law is essentially 'bilaterally minded'; it 'does not generally oblige States to adopt a certain conduct in the absolute, urbi et orbi, as it were, but only in relation to the particular state or states (or other international legal persons) to which a specific obligation under treaty or customary law is owed'.[29] In the words of the ICJ in its Reparation for injuries opinion, 'only the party to whom an international obligation is due can bring a claim in respect of breach'.[30] As Simma further observed. 'an injured State may also renounce such a claim unilaterally. In this case, third states will have no possibility to object to such a course of action'.

The development of contemporary international law has gone beyond traditional bilateralism and focused more on community interest. In its advisory opinion in the Reservations to the Genocide Convention case, the ICJ pointed out that in such a convention, 'the contracting States do not have any interests of their own; they merely have, one and all common interest, namely d'etre of the convention.[31]

In the Barcelona Traction case, the Court manifestly referred to this type of obligation as obligation 'erga omnes' 'towards all' in the following obiter dictum: 'an essential distinction should be drawn between the obligations of a state towards the international community as a whole, and those arising vis-à-vis another state in the field of diplomatic protection. By their very nature, the former are the concern of all states. In view of the importance of the rights involved, all states can be held to have a legal interest in their protection; they are obligations erga omnes.

Such obligations derive, for example, in contemporary international law, from the outlawing of acts of aggression and of genocide, as also from the principles and rules concerning the basic rights of the human person, including protection from slavery and racial discrimination. Some of the corresponding rights of protection have entered into the body of general international law others are conferred by international instruments of a universal or quasi-universal character.[32]

Crashworthiness

Apart from the aforementioned grounds for supporting claims, there is also the additional factor of 'crashworthiness' to be taken into account in court cases involving product liability.[33] Crashworthiness is a comparatively new element in the game, which has been defined in at least three different ways:

1. 'Crashworthiness is the characteristic of a vehicle which protects its occupants from death in a survivable crash and otherwise protects its occupants from injury or cumulative injury.'[34]
2. Crashworthiness is 'The ability of the aircraft structure to maintain living space for its occupants';[35] and
3. A lack of crashworthiness is 'a design that aggravates the injuries caused by the original accident'.[36]

The term 'lack of crashworthiness', for instance, was used in connection with a crash involving a United Airlines Boeing 727 near Salt Lake City in 1965, where the death of most of the passengers had been caused not by the impact itself, but by toxic gases and disabling smoke forming as a result of the cabin interior catching fire.[37] In a second case, the Tenerife accident of 1977 referred to earlier, it also played a role. The Boeing Corporation, being the manufacturer of the older Panam aircraft, paid 10 per cent of the compensation on account of insufficient crashworthiness and for not taking adequate measures to prevent damage by fire.

To complete the picture it is appropriate to summarize the various types of damage usually claimed from manufacturers. They have been aptly categorized by Coie as follows.

1. personal injuries resulting from an accident;
2. damage to property other than the aircraft arising from an accident;
3. damage to the aircraft arising from an accident or incident;
4. failure of the aircraft to meet the commercial expectations of the airline; and
5. the airline's damages for loss of use of the aircraft while it is being repaired or replaced'.[38]

With changing attitudes towards product liability strongly affecting the position of aircraft manufacturers and airline companies alike, the position of the passengers did not remain unaffected either. Indeed, one might go as far as saying that it improved considerably. In the past, these persons could only sue the carrier, and their claims had to be based on one of the international Conventions on air law, wbich often offered the disadvantage of imposing strict limitations of the extent of the liability for compensation. For a passenger to sue the manufacturer was virtually impossible because the burden of proof was too difficult.

The *Greenman* doctrine changed all this, and simultaneously the general attitude of American courts in the last few years became more favourable towards an extension of the rights of the ordinary consumer, including the airline passengers. Unlike the previous situation, in which the passenger had to prove negligence on the part of the manufacturer, he can now confine himself to

claiming that the product was defective at the time it left the manufacturer's hands and that the defect was the direct cause of the damage. There is no longer a need for him to prove fault. The manufacturer is liable even if he has taken all necessary precautions. The fact that products are so sophisticated nowadays that it is extremely hard for a passenger to prove his case against the manufacturer has undoubtedly played an important role in the recent changes. There is a tendency nowadays away from negligence as the main criterion for liability, and in favour of shifting the burden of compensation onto the shoulders of those best able to pay and to insure themselves, i.e., the persons or companies with 'deep pockets'.

Punitive Damages

While discussing liability and compensation attention should be given to the so-called 'punitive damages'.[39] What are punitive damages? Punitive damages are considered to be related to misconduct that is intentional, malicious, or consists of action or inaction that is so grossly willful, or indicates such a conscious and aggravated disregard of others that a jury could conclude that the conduct takes on a criminal character, regardless of whether it is punishable as an offence.[40] In the USA, they are occasionally awarded in civil cases by juries upon request by claimants when injury has been claimed and proved. They are subsequently added to the compensation to be paid. In this manner, manufacturers have had to pay enormous sums of money during the past few years. It must be pointed out in this context that in nea1y all states of the USA the standard of strict liability is being applied to product liability. French law has also adopted strict liability in such cases, while English, German, Dutch and Canadian law are not far behind. Manufacturers may, of course, resort to insurance: to my knowledge, no insurance policy excludes coverage for punitive damages.

Haskell[41] mentions three reasons for their origin, furnished by case law They may be summarized as follows:

1. the refusal of early (Anglo-Saxon) courts to grant new trials when excessive compensation had been awarded in cases involving some form of malice, oppression or fraud;
2. the courts' failure to recognize certain injuries (e.g., mental anguish) as a proper measurement of damages;
3. punitive damages became the vehicle to reimburse the plaintiff for darn- ages not otherwise legally compensable (e.g. litigation expenses).

It should be expressly recorded here that punitive damages are not awarded in connection with product liability only: they are equally applicable in relation to other liability cases. This practice is, however confined to the United States.[42]

Conclusion

In sharp contrast with the rulings of the American law courts, we note the opinions of experts who argue that product liability should really be based oil standards laid down in laws or regulations rather than leaving it to be decided case by case, which results in a multitude of varying standards.[43]

Regulations of product liability on a national level have been devised in a number of countries, like the Model Uniform Product Liability Act in the United States.[44] Not being directly relevant to our subject they will not be considered here further. As for international rules, we must point out at once that no universal treaty or convention has been adopted by the international community of nations as yet. There are, however, agreements of a slightly more restricted range, such as the Strasbourg Convention of 1977, sponsored by the Council of Europe, which covers product liability in case of personal injury or death.[45] In addition, there is the Hague Convention of 1973 on the Law Applicable to Products Liability, which traces its origins back to the Hague Conference on Private International Law.[46] The Hague Convention is aimed at unifying rules of reference and rules of conflict, i.e., creating a body of rules determining which law shall be applicable to the substance of a given relationship. The Convention does not apply, however, to cases where the injured person has acquired the product directly from the liable party. The motive behind this important exception was that the Convention was not supposed to clash with another Convention, namely the Hague Convention on the Law Applicable to International Sales of Goods.[47]

Finally, the European Economic Community has, for its part, also published some regulations in a 'Proposal for a Council Directive relating to the Approximation of the Laws, Regulations and Administrative Provisions of the Member States concerning Liability for Defective Products'. An Amendment to this proposal was adopted on 26 October 1979 widening the definition of 'damage' to include damage for pain and suffering and other non-material damage. Moreover, indemnity ceilings for total liability were made to include 'damages related to death and personal injury.[48]

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ANTI-TRUST ISSUES WITH RESPECT TO FREQUENT FLYER PROGRAMS AND CODE-SHARING AGREEMENTS THAT PERSISIT IN THE AVIATION INDUSTRY: THE INDIAN CONTEXT

"If you are a global company and India is not on your map, then you have missed the bus".

—Dr. Manmohan Singh,
Hon'ble Prime Minister, India

Vikrant Pachnanda*

Abstract

Competition law has grown enormously in recent years, especially since the 1990's. The growth has been both in terms of geographical regions that have adopted competition law, as well as in the range of economic activities now subject to competition law. India's competition law, the Competition Act, 2002, was passed by the Parliament in December, 2002 and received the assent of the President of India on 13 January, 2003 thereby becoming the law of the land from that date.

One of the sectors which has been most effected by anticompetitive practices is the civil aviation industry. Civil Aviation plays an integral role in development of an economy. It helps in realizing the socio-economic objective of providing connectivity to foster travel & trade. There are certain factors intrinsic to the airline industry that are anti-competitive such as 'Frequent Flyer Programs' and 'Code Sharing Agreements' that are operated by various airlines and which tend to restrain competition in the market. Hence, this paper does a careful review of these agreements and alliances in order to ensure that competition in the airline industry may be preserved and enhanced.

I. Introduction

Perfect competition is when there is a market outcome in which all firms sell a homogenous and perfectly divisible product, all producers and consumers are price-takers and all firms have a relatively small market share. It also includes buyers and sellers having all the relevant information about the market including the price and quality of the product and is characterized by the industry having the freedom of entry and exit. Competition ensures freedom of trade and prevents the abuse of economic power and thereby promotes economic

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democracy which in turn leads to political stability and is a driving force for building up the competitiveness of the domestic industry as businesses that do not face competition at home are less likely to be globally competitive.[1]

One of the sectors which has been most effected by anticompetitive practices is the civil aviation industry. Civil Aviation plays an integral role in development of an economy. The air passenger transport industry has been one of the major drivers behind rapid globalization of the world businesses and the consequent shortening of the distances on the planet. With deregulation setting in, there was freedom to choose routes to operate on, set the prices as demanded/ told by the market with no government intervention on the prices. There are certain factors intrinsic to the airline industry that are anti-competitive such as 'Frequent Flyer Programs' and 'Code Sharing Agreements' that are operated by various airlines and which tend to restrain competition in the market.

The efforts to gain efficiency led to formation of hub and spoke networks wherein the "traffic feed" was brought in to a central place (the hub) from other areas in the vicinity of the hub (the spokes). This hub and spoke network is prevalent today all over the world. Globally, New York, London, Amsterdam, Dubai, Singapore and Tokyo are the best examples of the hub wherein passengers flow in from all corners of the region and again take off for their respective destinations. Through FFPs, airlines induce future loyalty amongst it customers which not only strengthens the airlines market position, but also tends to fetter competition in the market by making it difficult for new entrants to enter the market and expand.

II. Concept Of Aviation Alliance

An airline alliance is an agreement between two or more airlines to form an alliance and cooperate together in terms of destinations, airport lounges, baggage handling at airports, frequent flyer programmes, code share flights etc. thereby providing a network of seamless connectivity and connivance for international passengers all over the world. Airline alliances generally provide for a fairly substantial degree of cooperation, including widened networks, code-sharing and cost reductions (via shared back office functions and operational staff, as well as joint purchasing). They can accordingly result in benefits for passengers: lower prices due to reduced costs, a wider choice of flights, destinations and rewards due to reduced costs and more streamlined transfers.[2] At present, three alliances exist in the global aviation industry namely, Star Alliance, One World Alliance and the SkyTeam Alliance.

For example, if Air India and Lufthansa have an alliance, then if a passenger approaches Air India for a ticket from Mumbai to Geneva, then through its alliance with Lufthansa, the passenger can fly to Frankfurt on Air India and then carry his/her onward journey to Frankfurt on Lufthansa. This also results in the passenger earning miles on both the sectors by being a member

of the Air India FFP, obtaining his boarding passes of both the sectors in Mumbai itself, using the Air India lounge at Mumbai and then the Lufthansa lounge at Frankfurt, checking his bags for the entire leg of his outbound journey from Mumbai itself among a host of other advantages.

However, these alliances may also result in a bane for the passengers as they may result in creating a monopoly thereby leading to increase in prices and deficiency of services The ability of an airline to join a global alliance is often restricted by regulations and laws of the country of origin of that airline which may delay its joining the alliance. It is not necessary that the landing rights are owned by the airlines itself, instead these rights may be owned by the government of the country in which their head office is situated. Hence, if an airline merges with a foreign airline, it loses its national identity and thus existing agreements may be declared void by the country which objects to the merger.

With the concept of code-sharing becoming popular among Indian carriers especially now that the domestic private carriers can fly overseas once they complete five years of domestic operations in addition to other mandatory requirements, legal liabilities are bound to increase and become complicated. In order to identify the proper defendant claim arising from a code-shared flight, the Guadalajara Convention, which was adopted in 1961, applies to which India is a party. It ensures that a carrier performing carriage without having entered into a contract with the passenger will be liable according to the Warsaw Convention as modified by the Guadalajara Convention. This convention has formally introduced the distinction between a contracting and an actual carrier.

Code sharing involves one airline advertising and selling the services of another airline as its own and the transportation of passengers and cargo on an airline other than the one identified in the travel documents. The carrier performing the flight is usually referred to as the operating carrier while the other airline is typically identified as the marketing or contracting carrier. Code-Share agreements enable airlines to increase their traffic and revenues thereby profits, network size, service frequency, offering more destinations through its frequent flyer programmes and coordination of operations. For example, in India, Jet Airways already has a code-share agreement with Brussels Airlines among others in order to give its passengers wider destinations in Europe to choose from. Similarly, national air carrier Air India has code-share agreements with several airlines like Aeroflot, Lufthansa and Singapore Airlines to offer their passengers more destinations to choose from. Thus the role of the Guadalajara Convention will increase and become more important with a steadily growing number of flights under Code-Sharing agreements.

Frequent flyer programmes on the other hand, is a loyalty programme offered by almost all airlines in the world today. Under this, members earn frequent flyer miles or points depending on the distance and class of travel flown. These credited miles may then be redeemed for free air travel or even on

partner airlines of the FFP of which the flyer is a member or on free stays with partner hotels, free car rentals with car rental partners among other several benefits like discount vouchers for dining.etc. depending on the points available in the member's account and points required for redemption. These miles may be redeemed.

III. Competition Or Antitrust Issues That Fetter These Alliances

(1) Anti-Competitive Agreements

Section 3(3) of the Competition Act, 2002 talks about prohibition of anticompetitive horizontal agreements. It states that horizontal agreement is any agreement[3] entered into between enterprises[4] or associations of enterprises or persons or association of persons or between any person and enterprise or practice carried on or any decision taken by, any association of enterprises or association of persons, including cartels, engaged in identical or similar trade[5] of goods or provisions of services which

- Directly or indirectly determines purchases or sale prices.
- Limits or controls production, supply, markets, technical development, investment or provision of services.
- Shares the market or source of production or provision of services by way of allocation of geographical area of market, or type of goods or services, or number of customers in the market or any other similar way.
- Directly or indirectly results in bid rigging or collusive bidding.

shall have an appreciable adverse effect on competition is prohibited by law.

Hence, cartelization is one of the horizontal agreements that shall be presumed to have an appreciable effect on competition under Section 3 of the Competition Act, 2002. Cartel has been defined in Section 2(c) as an agreement between enterprises (including a person, a government department and association of persons/enterprises) not to compete on price, product (including goods and services) or customers. The object of a cartel is to raise prices above competitive levels, resulting in injury to consumers and to the economy. A cartel is set to exist when two or more enterprises enter into an explicit or implicit agreement to fix prices, to limit production and supply, to allocate market shares or sales quotas, or to engage in collusive bidding or bid-rigging in one or more markets. An important dimension in the definition of a cartel is that it requires an agreement between competing enterprises not to compete or to restrict competition.

Cartel busting requires certain specialized skills which differ from the skills required for investigation and prosecution of other infringements of competition law. An increasing number of Competition Authorities operate leniency programmes as a key tool to detect cartel infringements. The law now empowers the CCI to extend the benefit of lesser penalty to more than on party and that the disclosure can be made at any time before the submission of investigation report

by the DG with the CCI.[6] Incidentally, it may be stated that Japan has evolved a graded system of imposing reduced surcharge linked with timings of disclosures by parties and also subject to compliance of conditions prescribed in the Rules on Reporting and submission of Materials Regarding Immunity From or Reduction of Surcharges.

This section is almost identical to Article 81 of the EC Treaty. The purpose of Article 81of the EC Treaty is to preclude restrictive agreements between independent market operators, whether horizontal (between parties operating at the same level of the economy, often actual or potential competitors) or vertical (between parties operating at different levels, for example, an agreement between a manufacturer and its distributor.[7] Article 81 sets out the prohibition and prohibits collusion between undertakings which have as its objects or effect the prevention, restriction, or distortion of competition within the common market and which may affect trade between Member states.

In *European Night Services v. Commission*,[8] the CFI held that agreements containing obvious restrictions of competition will automatically be held to restrict competition within the meaning of Article 81(1). In that case, the CFI took the view that provisions fixing prices or sharing markets in horizontal agreements would be obvious restrictions of competition. Thus hard-core cartel activities, where competitors agree or otherwise conspire to fix prices, share markets, impose quotas or otherwise limit output have as their object the restriction of competition. The assessment of whether or not an agreement has as its object the restriction of competition is based upon a number of factors which include, in particular, the context of the agreement and the objective aims pursued by it. In many cases it is the detection of cartels, rather than the legal intricacies of Article 81, which presents the main difficulty.

(II) Abuse of Dominance

Section 4 of the Competition Act describes what is meant by abuse of dominant position. Dominance relates to a position of economic strength enjoyed by an enterprise,[9] which enables it to prevent effective competition in the relevant market by giving the undertaking, the power to behave to an appreciable extent independently of its competitors, customers and ultimately of its consumers.[10] This provision of abuse of dominance is almost identical to Article 82 of the EC Treaty which prohibits undertakings from committing an abuse of dominant position held within a substantial part of the common market where that abuse has an effect on trade between Member States. In the case of *United States v. E.I. du Pont de Nemours & Co.*[11] it has been observed that in order to be considered dominant, a firm must be in a position of such economic strength that it can behave, to an appreciable extent, independently of its competitors. Abuse of this dominance occurs when[12]:

- The enterprise shall directly or indirectly, impose unfair or discriminatory conditions in the purchase or sale of goods or services or

impose unfair or discriminatory prices in the price in the purchase or sales (including predatory price[13]) of goods or service. However, there is an exception which is that in case such discriminatory prices or conditions are adopted to meet adoption, then provisions of S.4 shall not be attracted.

- The enterprise limits or restricts the production of goods or provision of services[14] or market thereof or limits or restricts or limits technical or scientific development relating to goods or services to the prejudice of consumers.
- The enterprise indulges in practice[15] or practices resulting in denial of market access in any manner.
- The enterprise makes conclusion of contracts subject to acceptance by other parties of supplementary obligations which, by their nature according to commercial usage, have no connection with the subject of such contracts.
- The enterprise uses its dominant position in one relevant market to enter into or protect the relevant market.

Now the question in the last factor mentioned above is what is meant by relevant market. The relevant market is defined with reference to the competitive constraints that exist between products and regions. It is based on the "relevant product market" and "relevant geographic market". Relevant product market is defined in terms of substitutability of products.[16] It means a market comprising of all those products or services which are regarded as interchangeable or substitutable by the consumer by reason of characteristics of the products or services, their prices and the intended use.[17] It is possible for enterprises to gain dominant position through entering into agreements with other enterprises who are competitors in the relevant market.

A high profile example of an enterprise found abusing its dominant position is the *Microsoft case*.[18] Microsoft was fined 497 million pounds for infringing the EC Treaty rules on abuse of a dominant market position (Article 82) by leveraging its near monopoly in the market for PC operating systems onto the markets for work-group server operating systems and for media players. This conduct hindered innovation in the markets concerned to the detriment of consumers. To put an end to this abusive behaviour, the Commission ordered Microsoft to disclose interoperability information, which would allow non-Microsoft work group servers to achieve full interoperability with Windows PCs and servers and to offer a version of its Windows operating system without Windows Media Player. The Court's ruling confirmed that the Commission was right to prohibit Microsoft's anti-competitive conduct which harmed competition to the detriment of consumers.

In *Hoffmann-La Roche & Co. Ag, Basle v. Commission of the European Communities in Brussels*[19] the European Commission held that Roche, with a dominant position within the common market, on the markets for certain vitamins, abused that position by concluding with 22 purchasers of these vitamins, agreements which contained an obligation upon them, or the grant of fidelity rebates offering an incentive, to buy all or most of their requirements of vitamins exclusively, or in preference from Roche. On the principles on which a dominant position is to be determined, the Court stated that a number of factors would show the existence of a dominant position, a highly important factor among them being the existence of a very large market share such as:

- The relationship between market shares of the undertaking concerned and of its competitors especially those of the next largest.
- The technological led of an undertaking over its competitors.
- The existence of a highly developed sales network.
- Absence of potential competition.

IV. Concept Of Anti-Trust Immunity In The Airline Industry

In the United States, the DOT[20] has the authority not only for approving airline alliances, but also for granting those alliances immunity from the anti-trust laws. In determining whether to grant approval and anti-trust immunity for an airline alliance, DOT must find that the alliance is not adverse to the pubic interest. DOT cannot approve an agreement that substantially reduces or eliminates competition unless the agreement is necessary to meet a serious transportation need or to achieve important public benefits that cannot be met or that cannot be achieved by reasonably available alternatives that are materially less anti-competitive.[21]

(1) The American Airlines/British Airways proposal

The proposed alliance of American Airlines and British Airways-the two largest carriers in the U.S.-U.K. markets raised significant competition issues. The two airlines accounted for nearly 58 percent of the available seats on scheduled U.S. and British airlines between the United States and London. In addition, they provided over 70 percent and in some cases, all of the available seats on scheduled U.S. and British Airlines between Heathrow and several key U.S. airports, including Chicago, Boston and Miami among other routes.[22] The process for reviewing the proposed alliance was complicated by the fact that it was new and untested and some European laws had not been previously been applied to airline alliances. [23]

The proposed AA/BA alliance had network benefits and could increase competition in markets between the United States and the European continent, the Middle East, and Africa because of the number of alliances competing in these markets would increase from three to four. However, it raised serious

competition issues in the U.S.-U.K. markets. Competition issues arose because, under the alliance rather than competing with each other, the two largest airlines in the U.S.-U.K. markets would in essence be operating as if they were one airline. Restrictions on access to slots and gates at Heathrow Airport were the most significant barriers to competition in the U.S.-U.K. markets, but sales and marketing practices which included frequent flyer programs and corporate incentive programs among others could also reduce competition by reinforcing market dominance at hubs and impeding successful entry by new carriers and existing carriers into new markets, which could lead to higher fares. It was felt that if an airline was already dominant in a given market, these programs would serve to reinforce this dominance.

The American-British Airways alliance was rejected by the DOT since it felt that the two carriers simply controlled too much traffic between the United States and the United Kingdom, the largest segment of trans-Atlantic traffic and that there uncertainty about the viability of new entry of a competitive airline service between the United States and the United Kingdom. In 2007, however, the two sides agreed to open up the skies so that any U.S. airline could fly to any city within the European Union, including those in the United Kingdom, and any carrier from a European Union country could fly to any city in the U.S.

(2) KLM/Alitalia proposal

The European Commission under the provisions of the EC Merger Regulation cleared the alliance between KLM & Alitalia. The Commission considered that the alliance was globally pro-competitive, in particular in view of the largely complementary nature of the parties' activities. Nevertheless, the Commission found that the operation would have led to monopoly positions on two markets: Amsterdam-Milan and Amsterdam Rome.[24] The parties had therefore to accept undertakings with a view to attract potential new entrants on these markets and to exercise a competitive pressure on the parties. The remedies included *inter alia* the release of a significant number of slots at the congested airports in question and the reduction of the parties' frequencies (up to 40% of the frequencies actually operated when a new entrant starts operating the problematic routes. The European Commission stated in paragraph 33 of the decision in COMP/M.5181 *Delta Airlines/Northwest Airlines* that depending on their respective market shares, a merger between two alliance partners can still significantly affect competition.

"33. Depending on the market position of the merging parties on the routes concerned, it cannot be excluded that a merger between two alliance partners could significantly affect the competitive situation on some routes, in particular on hub-to-hub routes. The Commission therefore analyzes below on a route by route basis the specific effects of the creation of a permanent structural link between the two merging parties in order to assess the extent to which competition may be affected post merger."

(3) Delta and Northwest Airlines proposal

The European Commission approved the merger between Delta Airlines and Northwest Airlines under Regulation 139/2004 ("EC Regulation") by its decision of 6th August 2008.[25] An important factor while deciding the case was the extensive cooperation that was already in place between Delta Airlines and Northwestern Airlines within the framework of the SkyTeam alliance which also included amongst others Air France/KLM and Alitalia.[26] The cooperation within alliances of this kind ranged from plain code-sharing on a single route to worldwide network and fare-coordination. The European Commission concluded that airlines within the SkyTeam alliance are not effective competitors. Para 32 and 103 of the decision in COMP/M.5181 *Delta Airlines/Northwest Airlines* conveyed the said decision.

"32. The only change brought about by the merger as regards competition between Delta and Northwest is that the absence of effective competition between the will no longer result from cooperation agreements but from their integration into a single economic unit. The merger will create a permanent structural link between Delta and Northwest that replaces the extensive cooperation on transatlantic routes that currently takes place within the framework of SkyTeam."

and:

"103. In light of the relevant counterfactual for the assessment of the present case, the parties and other Sky Team 6 members cannot be considered as effective competitors on transatlantic routes. Accordingly, the present transaction does not eliminate actual or potential competition. The only effect this merger has is it changes the nature of the parties' relationship form cooperation and coordination of their activities to a structural integration."

(4) Lufthana/SAS/United

On 28 October 2002, the EU Commission decided to close its investigations under Article 85 of the Treaty into two transatlantic aviation alliances, that is the alliance between Lufthansa, SAS and United Airlines (Star Alliance) on the one hand and the alliance between KLM and NorthWest (Wings) on the other hand. The cases were important in particular for two reasons. They were the first cases in which the Commission took a formal position under the EC competition rules on a transatlantic aviation alliance agreement.[27] In these two cases, the Commission further developed its approach to transatlantic air alliances under EC competition rules, notably in terms of market definition and the identification of affected markets. In particular, the Commission concluded that on long haul routes a certain degree of substitutability between indirect services (e.g. a flight from Frankfurt, via Amsterdam to Washington) and non-stop services could be accepted, depending on a number of factors such as overall additional flight duration, airline preference, price, schedule and the availability of indirect flights.

Moreover, the Commission applied a more economic approach when identifying affected markets, by considering alliance partner A only as potential competitor of alliance partner B already operating services out of the route concerned) where carrier A had a real commercial possibility of entry. This revised approach allowed the Commission to take a more positive view on the LH/SAS/UA alliance and its initial concerns from a competition point of view could be reduced to five hub-to-hub O&D routes. the commission concluded that there was, without appropriate remedies, a risk of elimination of competition on four of the affected routes (the routes from Frankfurt to the US), given the existence of substantial market entry barriers. These entry barriers were both of a structural nature (slot shortage at Frankfurt airport) and of a regulatory nature (a possibility of price control by the German Government with regard to the fares of indirect services). In order to meet the identified competition concerns, the parties offered to surrender slots at Frankfurt airport to allow either direct or indirect) new air services on the four routes concerned.[28]

The parties offered to surrender sufficient slots to allow two additional daily competing air services on the Frankfurt-Washington route and one additional daily competing air service on each of the three other routes. In addition, new entrants using the slots, if they operate a non-stop service, would be admitted to the parties' frequent flyer programme and offered interlining facilities. Moreover, the parties would not participate in that part of the IATA tariff conference concerning services on the routes in question. The Commission's revised approach had also consequences for its examination of the transatlantic alliance between KLM and NorthWest (KLM.NW), where its initial competition concerns were reduced to two hub-to-hub O&D routes, where both parties were competitors prior to the alliance.

V. Conclusion

An increasing number of Competition Authorities operate leniency programmes as a key tool to detect cartel infringements. The law now empowers the CCI to extend the benefit of lesser penalty to more than on party and that the disclosure can be made at any time before the submission of investigation report by the DG with the CCI. Incidentally, it may be stated that Japan has evolved a graded system of imposing reduced surcharge linked with timings of disclosures by parties and also subject to compliance of conditions prescribed in the Rules on Reporting and submission of Materials Regarding Immunity From or Reduction of Surcharges. In *British Midland v. Aer Lingus*[29] dominance was found as each airline's share was in excess of 50 percent and there existed both regulatory and practical (lack of slots at congested airport) barriers to entry. When frequent flyer programmes, override commissions, and excessive capacity or frequency, are practiced by a dominant airline without persuasive business justification and if they have a significant adverse effect on the development or maintenance of competition, they are liable to constitute an abuse in the sense of Article 86.

According to the so-called "point of origin/point of destination" (O&D) city pair approach,[30] every combination of a point of origin and a point of destination is considered to be a separate market from the customer's viewpoint. This includes the direct and indirect flights between the two airports concerned, alternative transport modes (rail, road and sea), and flights between other airports whose respective catchment areas significantly overlap with those of the airports concerned (airport substitution). The key test used is whether the scheduled flight on a given route can be distinguished from the possible alternatives "by virtue of specific characteristics as a result of which is not interchangeable with those alternatives and is affected only to an insignificant degree by competition from them.[31]

For instance, on the market London-Frankfurt, passengers have the choice between direct flights offered by British Airways and Lufthansa from Heathrow to Frankfurt airport, a direct flight offered by Ryan Air between London-Stansted and Frankfurt-Han, and indirect flights offered for instance by Air France/KLM via Amsterdam and Paris. They may also travel by train or coach. Depending on the type pf passenger, the overall traveling time, the quality of service, and the frequency of services offered, some of these services may be considered substitutes while others may not.

Strategic alliances fall short of outright mergers and in particular, preserve the participant's identity and autonomy. They constitute a framework within which the participating airlines are committed to developing extensive cooperation in technical, commercial and operational areas. Typically the alliance will endeavour to attain economies of scale by joint equipment purchasing and maintaining, insurance, personnel training etc. Often the alliance is supported by small shareholdings by each of the parties in the others. Difficulties would arise where the cooperation eliminates competition on a route or where the partners control access to essential facilities. Suggestions which I would like to incorporate regarding the same include:

- Having an "open skies" agreements which are less restrictive in regard to the number and identity of airlines and routes or capacities that can be flown rather than bilateral air agreements which restrict the number of airlines as seen in the proposed BA/AA alliance.
- Clearly an effective enforcement of the Competition Act, 2002 is an essential part of such a coordinated air transport policy. Accordingly, the need for an effective enforcement of the competition rules to international transport has become yet more important. This includes adding the concept of antitrust immunity to the Act by defining it so that it may easily be applied to the various provisions of the Competition Act in a more transparent manner.
- The CCI should also enter into MOUs with competition authorities in other countries such as the Federal Trade Commission, EU Competition Commission among others to ensure better coordination and more

effective investigation as seen in the proposed AA/BA alliance which I have mentioned in one of the earlier chapters of my report where there was coordination among the DOT, DOJ, EU Commission and the UK Office of Fair Trade and hence effective investigation.

In my opinion, the system works best, however, when all airlines have an equal stake: at the time when all participating airlines had a strong influence over the allocation of slots at their home base, the slot allocation exercise was unlikely to leave any significant participants strongly dissatisfied. Now that there are ore 'new entrant' airlines which cannot rely on a strong position at their home base in order to reciprocate possible unfavourable treatment at other airports, it becomes more difficult to ensure a satisfactory outcome of the allocation process. Since airport scheduling and slot allocation rely on agreements between airlines and reduce access to essential infrastructures, to the possible disadvantage of competitors, they restrict competitors.

Endnotes

1. This article is part of a research undertaken by the author on this topic for the Competition Commission of India and would like to thank them for their assistance.
2. *"Proposed Domestic Airline Alliances Raise Serious Issues"*, GAO/T-RCED-98-215, June 4, 1998.
3. Section 2(b) defines agreement and says that it includes any arrangement, understanding or action in concert whether or not such an agreement, understanding or action is formal or in writing or whether or not such an agreement, understanding or action is intended to be enforceable by legal proceedings.
4. Section 2(h) defines 'enterprise' as a person or a department of the Government, who or which is, or has been, engaged in any activity, relating to the production, storage, supply, distribution, acquisition or control of articles or goods, or the provision of services, of any kind, or in investment, or in the business of acquiring, holding, underwriting or dealing with shares, debentures or other securities of any other body corporate, either directly or through one or more of its units or divisions or subsidiaries, whether such unit or division or subsidiary is located at the same place where the enterprise is located or at a different place or at different places, but does not include any activity of the Government relatable to the sovereign functions of the Government including all activities carried on by the departments of the Central Government dealing with atomic energy, currency, defence and space.
5. Section 2(x) defines trade as any trade, business, industry, profession or occupation relating to the production, supply, distribution, storage or control of goods and includes the provision of any services.

6. Hussain Abdullah, Bhatia G.R. & Nair Ravishekhar, "*Competition Law in India: A Legal Quagmire*, Volume 1, The Indian Journal of International Economic Law, 2008.
7. Bhatia G.R, "*Combating Cartel in Markets Issues and Challenges*", January, Competition Law Reports, 2008.
8. Cases T-374, 375, 384 and 388/94 [1998] ECR II-3141, [1998] 5 CMLR 718.
9. Section 2(h) defines 'enterprise' as a person or a department of the Government, who or which is, or has been, engaged in any activity, relating to the production, storage, supply, distribution, acquisition or control of articles or goods, or the provision of services, of any kind, or in investment, or in the business of acquiring, holding, underwriting or dealing with shares, debentures or other securities of any other body corporate, either directly or through one or more of its units or divisions or subsidiaries, whether such unit or division or subsidiary is located at the same place where the enterprise is located or at a different place or at different places, but does not include any activity of the Government relatable to the sovereign functions of the Government including all activities carried on by the departments of the Central Government dealing with atomic energy, currency, defence and space.
10. Roy Abir & Ganapathy Kartik, "*Abuse of Dominance: Intel's Insides?*", Jul.-Sept., Competition Law Reorts, 2009 at p. A-288.
11. 351 U.S. 37.
12. Section 4, Competition Act, 2002.
13. Explanation (b) of S.4 defines 'Predatory Price' as the sale of goods or provision of services, at a price which is below the cost, as may be determined by regulations, of production of the goods or provision of services, with a view to reduce competition or eliminate the competition.
14. S. 2(u) defines 'services' as service of any description which is made available to potential users and includes the provision of services in connection with business of any industrial or commercial matters such as banking, communication, education, financing, insurance, chit funds, real estate, transport, storage, material treatment, processing, supply of electrical or other energy, boarding, lodging, entertainment, amusement, construction, repair, conveying of news or information and advertising.
15. S. 2(m) defines 'practice' as any practice relating to carrying on of any trade by a person or an enterprise. Trade in furtherance to this is defined as any trade, business, industry, profession or occupation relating to the production, supply, distribution, storage or control of goods and includes the provisions of any services.

16. Bhatia G.R, "*Assessment of Dominance: Issues and Challenges under the Indian Competition Act, 2002*", April-June, Competition Law Reports, 2009.
17. Section 1(t), Competition Act, 2002.
18. Judgement of the Court of First Instance (Grand Chamber) in *Microsoft Corp. v. European Commission*, Case T-201/04 (2007), affirming the Commission's Decision of 24.03.2004 relating to a proceeding under Article 82 of the EC Treaty.
19. Case 85/76.
20. Department of Transportation.
21. "*Aviation Competition: International Aviation Alliances and the Influence of Airline Marketing Practices*", GAO/T-RCED-98-131, March 19, 1998.
22. *Ibid.*
23. *Ibid.*
24. "*Airline Competition: Issues Raised by Consolidation Proposals*", GAO-01-370T, February 1, 2001.
25. Partsch Phillippe-Emmanuel Partsch & Wellens Vincent, "*The Delta Airlines and Northwest Airlines Merger: Potentially anti-competitive co-operation as a counterfactual to assess a significant impediment to effective competition under the EC Merger Regulation?*", [2009] E.C.L.R. at p.491.
26. Decision of 6 August 2008 declaring a concentration to be compatible with the common market according to Regulation 139/2004 (COMP/M.5181-*Delta Airlines/Northwest Airlines*).
27. Negenman Monique, Directorate General Competition, unit D-2, Number 1, Spring 2003, Competition Policy Newsletter.
28. *Ibid.*
29. OJ 1992, L 96.
30. See in particular C-66/86 Ahmed Saeed Flugreisen [1989] ECR 803 and the Court of First Instance in C-2/93 Air France/Commission (TAT) (1994), ECR 323.
31. C-66/86 Ahmed Saeed Flugreisen [1989] ECR 803.

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6. Peter Augustine, "*Treatment of Dominance under Competition Act, 2002*", January-March, Competition Law Reports, 2009.
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2. The Competition Act, 2002 (India).

NIGHT CURFEW AND AERONAUTICAL NOISE— AN ANALYSIS OF THE DEVELOPMENTS IN INDIAN AVIATION INDUSTRY

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Abstract

Aeronautical noise is considered to be the main environmental problem derived from airport operations. It directly affects the quality of life of the people living close to airports. As a means to mitigate the problems caused by aeronautical noise, night curfew is one of the proposed measures.

Section I analyses environmental issues in context with the ICAO's Aircraft Noise Management through the Balanced Approach concept and the impact of the continued imposition of night curfew by European countries on developing countries and it is submitted that the increasing congestion in Asia-pacific mostly due to the imposition of night curfew by the European countries will force the countries in Asia and Africa to impose constrictions on the aviation industries which will increase the congestion. Hence, the measure of night curfew must be treated cautiously and alternatives should be explored.

Section II analyses recent acknowledgement of the option of night curfew in Indian scenario and various constraints in the imposition of the night curfew and submits alternatives like improvement of airport infrastructures and air route planning which will lead to easier rescheduling of the flights and less pollution and in turn will minimize the economic impact on the aviation industry and also measures like use of strategically placed runways from where the night flights can be operated.

Introduction

The growth of worldwide passenger traffic and freight by air is showing continuous upward trend. This would require increased operation of aircraft thereby putting pressure on existing infrastructure mainly in the developing countries. Aeronautical noise is considered to be the main environmental problem derived from airport operations. It directly affects the quality of life of the people living close to airports. Generally, these are people who do not directly benefit from the airport business. As a means to mitigate the problems caused by aeronautical noise, a night curfew is often imposed on the airport activities to minimize the existing conflicts. The existing practice of night curfews in some parts of the world impacts adversely on the availability of slots at such airports. Night curfew adds on to the airspace capacity requirements during the

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day hours thereby leading to congestion in the airspace during the day time. This in turn increases gaseous emissions due to increase in holding time by aircraft and thus further polluting the environment. This would also add to global warming problems. ICAO is already seized with the gaseous emission problem. It is, therefore, considered that the prevailing practice of night curfew in some parts of the world not only adversely impacts the air traffic handling capacity and airport infrastructure at other airports but also adds up to polluting the environment with gaseous emissions.

The airlines carried an estimated 2 billion passengers globally in the year 2006 and now the average additional passenger growth is estimated at 3 billion. The added traffic volume due to growth would put pressure on operator's service providers and may add on to the circumstances leading to unsafe situations. There is therefore need to avoid negative impact on environment as well as on safety of operations, for which efforts need to be taken at an international level.

ICAO also has a policy for noise pollution avoidance, in which a balanced approach is adopted by operational improvements in the management of air traffic by ATC, which aims to reduce the effect of noise pollution in populated areas near airports. Night curfew, however, adds on to environmental issue with regard to noise pollution since the operational improvement in ATC management gets handicapped. Growth in air transportation industry needs additional improved airspace and infrastructure capacity. In this direction it is necessary to review the need to continue with the night curfew at aerodromes, thereby making airports available round the clock for operations.

The ICAO's Aircraft Noise Management—Environment Issues

Aircraft noise is one of the most significant causes of adverse community reaction related to the operation of aircraft both in developed and developing countries. This is expected to remain valid in most of the regions of the world in the days to come. With the development and growth in aviation sector, the issue of excessive noise from aircraft operations and resistance by the communities residing in the airport vicinity has become a regular feature. The aircraft coming off the production line today are about 75% quieter than they were 40 years ago and the same is evident from ICAO's Certification Standards.

India has requested the International Civil Aviation Organisation (ICAO) to review night curfew restrictions imposed by some countries on the operation of airlines. In a paper presented to the ICAO, India has called for a review, arguing that the imposition of night curfew creates a mismatch in utilising infrastructure round-the-clock and hampers the growth of airlines. According to Government of India "The concept of night curfew adversely affects the concept of free flow of air traffic and causes inconvenience to the travelling public. In addition, curfew at some airports during the night causes congestion at other times of the day, leading to an adverse impact on the environment," It has been pointed out that night

curfew adds to the airspace capacity requirements during the day, thereby leading to congestion in the airspace. This, in turn, increases gaseous emissions due to increased holding time by aircraft, thereby further polluting the environment. India has argued that with modern aircraft becoming quieter there was a need to review the existing curfew, since night curfew was resorted to by some airports because of the high levels of noise caused by aircraft with earlier designs.

The ICAO has already upgraded the noise requirements and today aircraft for interstate operations are certified to Chapter 3 standards. These aircraft are typically quieter by 20 dB than the earlier aircraft designs, which translate into a 75 per cent reduction in noise. Chapter 3 standards were adopted in 2001 and became applicable on January 1, 2006.

Now the Chapter 4 noise standards are more stringent than those in Chapter 3. The new standards would apply to newly certified aircraft that would be 10 dB quieter than Chapter 3 designed aircraft. Further, India has pointed out that growth in the air transport industry needed additional improved airspace and infrastructure capacity.

Upon request from India and other countries to review night curfew, CAEP undertook the study of the environmental impact of curfews in one region on origin, destination in other regions, with a case study for a major airport during CAEP meeting. The concerns assigned to the Task group by the CAEP Report are as follows:

(a) Night curfew at some European airports are perceived to cause the transferring of their night-time noise burden to some developing countries where night-time noise is generated by aircraft scheduled to avoid departing or arriving during the curfew period at European airports;

(b) the need for continuing noise curfews has been questioned, given that aircraft noise Standards have improved over the years and the current aircraft in service are much quieter than when the curfews were instituted;

(c) Airports with night curfews that are capacity constrained during day time, restrict the ability to open up new slots for additional traffic which may result in opportunity costs to airlines and airports;

(d) Night curfew restrict the capability of airlines to offer flights at the most convenient times (arrival or departure) to its customers, thereby reducing customer choice and adversely affecting airlines' level of service;

(e) In the case of airports in developing countries that have excess capacity during day time, there may be additional economic costs of keeping the airport open during night-time which include air and ground crew, airport operations personnel, and general support staff; and

(f) Night curfews can cause inconvenience to passengers if they must arrive (or depart) at night-time from one airport due to restrictions on departure (or arrival) airport.

A1 Findings Of The Study

The study states that there is no inherent link between European countries and night-time movement in Mumbai, India. There is no reason why night time curfew would require flights to leave Mumbai at midnight unless it is to arrive in the early morning to make connecting flights. The report also states that European carriers operate flights to reach India before the activation of curfew hours and return to Europe after curfew hours in order to utilize the aircraft optimally. Optimal utilization of aircraft in international air transport may not want to ground aircraft during 24 hours. However, airlines can better develop their flight schedules so as to make optimal use of their aircraft if the constraint of night curfew is removed. Now airlines have to make off-optimal. This also includes the issue of congestion at airports resulting in additional emissions.

The study seemed to have digressed from the main issue that unilateral night curfew by certain European countries is not conducive to healthy international air transportation on the following grounds:

(1) Night curfews are imposed as a local protest by citizens living around the airport. These persons all over the world were aware of the noise before they bought the property but they did so with their own will and with possibly an eye to capital appreciation due to proximity to airport.

(2) Unilateral night curfews are increasing phenomena all over the world and as noise awareness grows, night curfews, if imposed by countries like India or South Africa, would limit the flight timing options between the countries. The present night curfew in Europe has effectively transferred the problem of time noise burden from the communities around their airports to communities around airports of Mumbai, Delhi, Johannesburg, etc.

(3) The need for continuing noise curfews has also been questioned given the aircraft noise standard improvements over the years and that the current aircraft engines are quieter than earlier ones mainly due to ICAO specifications. The need for night curfews has therefore, diminished. In fact, ICAO should link the reduction of engine noise rules to reduction/removal of night curfews.

(4) Airports with night curfews are generally capacity constrained during the day and restrict ability to open up new slots for additional traffic which may result in opportunity cost to airlines and airports. Night curfew restrict the capacity of airlines to offer flights at most convenient times (arrival or departure) to their customers at destination airports thereby reducing customer choice and adversely affecting airlines' level of service.

The principle of night curfews imposed unilaterally is in question. ICAO must address the issue of night curfew to help the airline business to grow. With the growth in air traffic and introduction of night curfews, there will be congestion in air between city pairs at certain times. With the improvements in noise standards mandated by ICAO, there should be a parallel imposition of SARPS for containment of night curfews. Night curfews are a result of political development which is taking place against noise at airports and for the communities living around airports and has no basis for mutual reciprocity which is the basis of air service. This issue is common to the cities where there is an airport near the city. There would be an additional cost to airports in case they have excess capacity during day time

A2 India has following comments on the CAEP Study on night curfews

(1) The CAEP study is limited in scope and at variance with its own conclusion. The issue of night curfew is to be addressed in its full scope and global approach should be attempted.

(2) Night curfew will affect the airline operations if the Asian and African countries also impose similar kind of restrictions on public demand.

(3) Night curfew issues need to be addressed keeping in view the growth of aviation sector and state-of-art of aircraft design.

(4) Specific runways/airports could possibly be utilized for night operations to minimise the community noise problem. Duration of night curfew could possibly be reduced by airports having such night curfews.

(5) International airlines operate across the globe. Time restriction is a severe constraint in developing flight schedules and off-optimum utilization of aircraft. Therefore, in the interest of airline business this constraint of night curfew should be avoided.

(6) Removal of night curfew would also help to achieve the aspirational goals of carbon neutral growth and reduction in CO2 emissions apart from providing sustainable growth to aviation sector.

A3 Environmental issues associated with airport operations include

- Noise and vibrations
- Storm water and wastewater
- Hazardous materials management
- Solid waste
- Air emissions
- Energy and water consumption.

A4 ICAO's Intiatives And Noise Requirements

ICAO has been addressing the issue of aircraft noise since the 1960s. Since the first Standards and Recommended Practices (SARPs) for aircraft noise certification were published in 1971, ICAO has made several changes in the noise standards and the latest Chapter 4 requirements were developed and subsequently became applicable in March 2002.

Aircraft manufacturers have been continuously developing technologies to reduce aircraft noise and striving for a better understanding of the source of aircraft noise. Accordingly, the inclusion of noise absorbing material in engines and engine nacelle design and mechanical refinements on engines, together with airframe adjustments, have all contributed incrementally to further reducing noise of jet powered aircraft. Although none of these improvements individually has matched the step forward that came from the increase in bypass ratio, together they have been significant.

The state-of-the-art development and stringent requirements of ICAO has forced manufacturers to achieve next generation aircraft with significant increases in carrying-capacity while achieving reductions in noise levels such as A-380. Boeing's new Dream liner aircraft B787 is also expected to have about 15 to 20 decibel (dB) below the Chapter 4 limits and therefore leading to achievement of at least 10 dB better than the older aircraft.

A5 ICAO'S Aircraft Noise Management Program

ICAO has also developed Aircraft Noise Management through the Balanced Approach concept which identifies the noise problem at an airport and then analyses the various measures available to reduce the noise using four principal elements, namely:

(a) Reduction of noise at source;

(b) Land-use planning and management;

(c) Noise abatement operational procedures; and

(d) Operating restrictions.

It may be pointed out that according to ICAO traffic growth of Asia Pacific region will become the highest air traffic region by 2012. However it will not be long before a movement for night curfew also starts in Asia and Africa and therefore the issue of night curfew has to be resolved by the Council.

Problems Of Aviation Industries

The growth in the aviation sector and capacity expansion by carriers have posed challenges to aviation industry on several fronts. These include shortage of workers and professionals, safety concerns, declining returns and the lack of accompanying capacity and infrastructure. Moreover, stiff competition and rising fuel costs are also negatively impacting the industry.

1. **Employee shortage:** There is clearly a shortage of trained and skilled manpower in the aviation sector as a consequence of which there is cut-throat competition for employees which, in turn, is driving wages to unsustainable levels. Moreover, the industry is unable to retain talented employees.
2. **Regional connectivity:** One of the biggest challenges facing the aviation sector in India is to be able to provide regional connectivity. What is hampering the growth of regional connectivity is the lack of airports.
3. **Rising fuel prices:** As fuel prices have climbed, the inverse relationship between fuel prices and airline stock prices has been demonstrated. Moreover, the rising fuel prices have led to increase in the air fares.
4. **Declining yields:** LCCs and other entrants together now command a market share of around 46%. Legacy carriers are being forced to match LCC fares, during a time of escalating costs. Increasing growth prospects have attracted & are likely to attract more players, which will lead to more competition. All this has resulted in lower returns for all operators.
5. **Gaps in infrastructure:** Airport and air traffic control (ATC) infrastructure is inadequate to support growth. While a start has been made to upgrade the infrastructure, the results will be visible only after 2-3 years.
6. **Trunk routes:** It is also a matter of concern that the trunk routes, at present, are not fully exploited. One of the reasons for inability to realize the full potential of the trunk routes is the lack of genuine competition. The entry of new players would ensure that air fares are brought to realistic levels, as it will lead to better cost and revenue management, increased productivity and better services. This in turn would stimulate demand and lead to growth.
7. **High input costs:** Apart from the above-mentioned factors, the input costs are also high. Some of the reasons of high input costs are: Withholding tax on interest repayments on foreign currency loans for aircraft acquisition. Increasing manpower costs due to shortage of technical personnel.

B1 Development of Airport Hubs

Every country wishes to develop a few airports as hub airports. Hub airports handle a large number of flights and thus provide suitable connections to other places. A successful hub benefits the country as several airlines bring their flights to the airport and indirectly benefit tourism as passengers have better connectivity. Airports also benefit in the shape of higher revenues. In the Asia Pacific region, Bangkok, Singapore, Hong Kong, Tokyo and Seoul handle over 20 to 35 million passengers per annum each and are recognized hubs. In India, Mumbai Airport handles only about 12 million passengers. The volume of traffic at Delhi and other airports is lesser. Moreover, our national carriers are weak and therefore their

contribution in bringing sixth freedom traffic is limited, which is very important for developing a hub. Private airlines are yet to establish in international market. Further, the level of services at Indian airports, including ground handling services is not up to the international standard and certainly below the standards available at other airports in Asia/Pacific region. Thus, presently the conditions are not ripe to develop major hubs in India in competition with other hubs in the region. It is necessary to improve the services at airports and increase the fleet of Indian carriers and at the same time to encourage them to bring in sixth freedom traffic to India to develop Mumbai as a major hub and also Delhi as the second hub. Hubs can also be developed for domestic traffic. Mumbai, Delhi, Kolkata, Chennai, Hyderabad airports are operating as hub airports to a large extent. Nevertheless, people wish to travel directly without changing the flight. As volume of traffic increases, more direct flights will be introduced and the role of hubs will not increase at least proportionately. Nevertheless, people will travel to major airports to catch international flights rather than domestic flights. In this situation, it is extremely doubtful if airport like Nagpur which produces negligent originating or terminating traffic can be a successful hub, either for domestic flights or international flights. The development in this meadow will not only raise the tourism revenue but indirectly it will settle the matter of night curfew. All other issues such as night curfew should be kept in mind while constructing such developed airports.

As mentioned previously, aeronautical noise is considered the main environmental problem generated by airport operations. Primarily, this problem is related to landing, take-off, taxiing and engine test operations. As a secondary factor, the noise generated by the ground support equipment can also be included, even though they affect more directly the airport workers. Thus, the choice of measures to be taken to solve the problems associated with aeronautical noise, existing options must be considered.

The most significant sources of noise and vibrations from airport operations are aircraft during the landing and takeoff (LTO) cycles, followed by a variety of ground operations equipment including aircraft taxiing; operation of ground support vehicles (e.g. passenger buses, mobile lounges, fuel trucks, aircraft tugs, aircraft and baggage tractors, and dolly carts); aircraft auxiliary power units (APUs); and aircraft engine testing activities in airports with aircraft maintenance activities. Other indirect sources of noise include ground vehicle traffic from access roads leading to the airport.

Measures for the prevention, minimization, or control of noise and vibration impacts depend on land-use planning and management activities, which may be the primary responsibility of local authorities, or the type and age of flight equipment used by the airlines.[1] Recommended noise management practices include:

(1) Planning of site for airport location (new developments and expansion of existing facilities), and orientation of routes for arriving and departing aircraft relative to actual and projected residential development and other noise sensitive receptors in the surrounding area. This may include

coordination with local authorities with influence over land use planning and overall transportation planning activities.[2]

(2) In areas where significant impacts are anticipated, implementation of preferred procedures and routes for landing and takeoff (LTO) to minimize potential noise from approaching and departing aircraft for noise-sensitive areas.[3] These procedures may include instructions on the use of descent profiles or "noise preferential" routes (NPRs), such as the "continuous descent approach" to avoid noise-sensitive areas, the use of "Low Power / Low Drag" (LPLD) procedure to fly the aircraft in a 'clean' condition (e.g. no flap or wheels deployed) as long as possible to minimize airframe noise, and instructions on minimizing reverse thrust on landing. An alternative approach may include the dispersion of noise through equal use of multiple flight tracks as opposed to a preferential flight track;

(3) Use of night time or other operating restrictions.[4]

(4) If necessary, working with local authorities to identify and implement noise prevention and control strategies in noise abatement zones (e.g. sound insulation of buildings that are exposed to aircraft noise above levels stipulated by local authorities or limitations on night time operation of certain landing routes);

(5) Reducing noise of ground operations at the source or through the use of sound barriers and deflectors.

(6) Provision of power supply to the aircraft to reduce or eliminate the need for use of APUs.

Conclusion

Aircraft noise is one of the most significant causes of adverse community reaction related to the operation of aircraft both in developed and developing countries. This is expected to remain valid in most of the regions of the world in the days to come. With the development and growth in aviation sector, the issue of excessive noise from aircraft operations and resistance by the communities residing in the airport vicinity has become a regular feature.

ICAO also has a policy for noise pollution avoidance, in which a balanced approach is adopted by operational improvements in the management of air traffic by ATC, which aims to reduce the effect of noise pollution in populated areas near airports. Night curfew, however, adds on to environmental issue with regard to noise pollution since the operational improvement in ATC management gets handicapped. Growth in air transportation industry needs additional improved airspace and infrastructure capacity. In this direction it is necessary to review the need to continue with the night curfew at aerodromes, thereby making airports available round the clock for operations. The improvement of airport infrastructures and air route planning will lead to easier

rescheduling of the flights and less pollution and in turn will minimize the economic impact on the aviation industry.

Endnotes

1. Noise management activities should be based on the International Civil Aviation Organization (ICAO), Resolution A33/7, Balanced Approach to Aircraft Noise Management. The balanced approach identifies the noise problem at the airport and analyzes measures available to reduce noise based on four principal elements: reduction at source (quieter aircraft); land-use planning and management; noise abatement operations procedures; and operating restrictions (e.g. operating restrictions and noise charge).
2. Additional information is provided in ICAO, Airport Planning Manual, Part 2 – Land Use and Environmental Control.
3. Procedures and routes are published in the Aeronautical Information Publication (AIP) of the airport and are mandatory for operating airlines. They may be used to avoid noise-sensitive areas within the limits of aircraft operational safety regulations and should be developed in consultation with local authorities and operating airlines.
4. Operating restrictions should be applied as a last resort and only after consultation and approval by the local authorities. As noted in the ICAO Assembly Resolutions, in force as of 8 October 2004, the use of operating restrictions on existing aircraft may not be financially feasible or cost-effective and aircraft noise standards and certification presented in ICAO Annex 16 to the Convention on Civil Aviation, Volume I— Aircraft Noise is not intended to introduce operating restrictions.

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THE LEGAL REGIME GOVERNING AIR PASSENGER COMPENSATION IN INDIA: EVOLUTION AND CONDITIONS OF APPLICABILITY

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Introduction

With the recent tragic crash of the Air India Express at Mangalore, one of the major growing concerns of Aviation law is the liability of the carrier towards the victims. The Carriage by Air Act, 1972, amended in 2009 pursuant to India's accession to the Montreal Convention, serves as the legal regime governing passenger compensation in India in the event of air accidents in international carriage.

The Carriage by Air Act, 1972, as amended by the Carriage by Air (Amendment) Act, 2009, consists of three schedules.

Schedule I consists within it the provisions of the Warsaw Convention signed on the 12th October, 1929. Schedule II of the Act consists of the provisions of the Warsaw Convention, as amended by the Hague Protocol signed on the 28th September, 1955. The last schedule i.e. schedule III consists of the provisions of the Montreal Convention signed on 28th May, 1999.

The researcher aims to deal with two main issues by means of this paper:

(1) The increase in the extent of liability of the carriers in international carriage in the event of death and bodily injuries of passengers by the inclusion of the provisions of the Montreal Convention, 1999 into the Carriage by Air Act, 1972.

(2) The increase in the number of jurisdictions, where suits for compensation for death and bodily injuries of passengers arising out of accidents in international carriages be filed, by the inclusion of the provisions of the Montreal Convention, 1999 into the Carriage by Air Act, 1972.

The first test for the applicability of the Montreal Convention is to determine whether the operation was an 'international carriage' or not. 'International carriage' is defined in Article 1(2) of the Convention as a carriage in which the place of departure and place of destination are situated either within the territories of two State parties or within the territory of a single State party if there is an agreed stopping place within the territory of another state, even if that state is not a party to the Montreal Convention.[1] Broadly speaking, taking the example of the Air India Express flight from UAE to Mangalore, there

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were three categories of passengers: (a) those whose contract was for carriage on the India-UAE-India route, (b) those whose contract was for carriage on the UAE-India-UAE route, and (c) those whose contract was for one way carriage on the UAE-India route. Going by the definition of "international carriage", passengers falling in all three categories are covered under the Montreal Convention as both India and UAE are parties to the Convention.[2]

Before going into the extent and limits of the liability of the carriers, it is essential to understand the wording of Article 17 (1) of the Convention.

Article 17(1) says,

> "The carrier is liable for damage sustained in case of death or bodily injury of a passenger upon condition only that the accident which caused the death or injury took place on board the aircraft or in the course of any of the operations of embarking and disembarking."[3]

Bodily Injury

Article 17(1) of the Montreal Convention only applies in the event of death or bodily injury. There has been a long running controversy as to whether mental injury (eg.fright) is actionable in itself or whether it must be accompanied by physical injury. However, the decisions in *Eastern Airlines v. Floyd*[4] and *Ehrlich v. American Airlines*[5] have seemed to resolve this controversy. It was held that the original term '*lesoin corporelle*' as used in Article 17 of the Warsaw Convention meant bodily injury, and accordingly, damages for mental injury were not recoverable under the convention.

Accident

The death or bodily injury must have been caused by an accident otherwise a claim cannot be made under Article 17.[6] The Montreal Convention does not define what is meant by the term 'accident'.

Many American courts prefer a broad approach. A situation which appears to be an accident is treated accordingly and precise definitions are rarely considered. However, they are occasionally used. For example, 'An accident is an event, a physical circumstance, which unexpectedly takes place not according to the usual course of things. If the event on board an aeroplane is an ordinary, expected and usual concurrence, then it cannot be termed as an accident.'[7] It was not until the case of *Air France v. Saks*[8] that the US Supreme Court made a detailed analysis of the term before concluding that an accident occurs where bodily injury or death is caused 'by an unexpected or unusual event or happening that is external to the passenger.'

The deliberate choice of terminology suggests that an 'accident' must be a special event and that not every occurrence enables a claim for damages under Article 17 (1).[9] The air carrier's contractual partner i.e. passenger is entitled to expect that the air carriage will be performed to an acceptable standard. The

carrier must contract with the passenger accordingly and may only escape liability if it is unable to avoid an inevitable risk.[10] The passenger may not realistically hope to avoid hazards such as turbulence since they constitute an inevitable risk which he automatically accepts upon purchasing a ticket. It is therefore unnecessary to consider whether such events might be described as 'accidents' by being 'expected' and/or 'exterior'. Accordingly, a passenger cannot claim damages if he suffers a heart attack during a normal landing or take off since both these events are a necessary part of air travel and are not accidents.[11]

The definition of an 'accident' is malleable. However, unavoidable aviation risks are not accidents under Article 17 of the Montreal Convention and the carrier cannot be held liable for them. It does not matter that the passenger is particularly vulnerable because of his poor state of health either. For example, the carrier will not be liable if a passenger suffers a heart attack because he panics as the aircraft passes though an area of mid- turbulence since this is a normal hazard of air travel over which the carrier has no control. Moreover, the chain of causation is broken in such a case since the passenger's injury is caused by his own fear and not directly by the turbulence.

The causal Connection between the Accident and the Operation of the Aircraft

The overall scheme of Article 17 requires a causal nexus between the death or injury, and the operation of the aircraft.[12] The carrier will only be liable for aviation accidents. This does not exclude accidents which might occur in other walks of life provided there is a causal connection between the accident and the operation of the aircraft.

Anyone who claims that a causal connection between the accident and the operation of the aircraft is not required is in effect arguing for a belated extension of the carrier's liability beyond that which was originally intended by the States Parties. The advocates of an extension to the carrier's liability of this sort argue that an aircraft does not represent a special risk but belongs to a general class of risks and therefore the carrier's liability should not be restricted according to whether the accident results from the operation of the aircraft.[13] The question to be asked here is whether the authors of the Montreal Convention really intended that the carrier should be liable for risks which bear no relation to air travel. Surely there is no reason why the carrier should be burdened with the passenger's ordinary risks of everyday life. This principle was also laid down in the case of *Hernandez v. Air France*.[14] Thus, according to this view, the carrier is not liable if one passenger hits or even shoots another during the flight.[15] Neither is hijacking a typical aviation risk. The contrary argument[16] fails to account of the fact that the same risk occurs in every other walk of like such as bank raids, school hostage taking etc.

Causation between the Accident and Injuries

According to the text of Article 17, death or bodily injury must be 'caused' by an accident. This requirement is obviously satisfied where the event which qualifies as an accident clearly causes the injury even though the injury may have occurred at a later date. However, it would be unfair to hold the carrier liable for any consequence which is not reasonably foreseeable in the ordinary course of events and therefore the principle of causation is tempered by the concept of remoteness.[17]

Furthermore, if the passenger's injuries do not amount to anything more than the normal, expected reaction to flying, they are not caused by an accident.[18]

While analysing the causal connection between the accident and the injuries, it is necessary to take into account two things. Firstly, that the voluntary intervention of third parties may break the chain of causation between the accident and the injuries caused.[19] Secondly, the cause of death or personal injury must be external to the victim in the sense that the cause for the injury suffered by the passenger should not be an internal factor such as ill health.[20]

The Period during which the Accident Must Occur

There is a broad divergence of views about the precise moment at which the carriage begins and ends.

Some authors do not precisely define the moment at which the carriage begins but content themselves with the general observation that it must be 'before the actual embarkation' or claim that everything depends upon when the passenger places himself in the 'care' of the carrier.[21] Unfortunately the precise definitions which have been provided by the courts and other writers are as numerous as the various stages through which a passenger must pass between arriving at the airport and boarding the aircraft. In any event, most authors agree that embarkation has commenced by the time the passenger enters onto the airfield whether by means of a gangway or otherwise.[22]

There are an equally large number of views about when the carriage terminates. Several French Courts have concluded that it terminates once the passengers have left the aircraft and its immediate vicinity whereas some authors argue that carriage continues until the passengers have crossed the airfield using the passenger gangway or otherwise, and that the operation of disembarking does not end until they enter the airport building.[23] It is agreed that the carriage is over once the passenger enters the terminal and proceeds to the baggage claim area or subsequently arrives at customs.[24]

The best test to apply while dealing with the questions of embarking and disembarking is the widely used three prong test laid down in the case of *Day v. Trans World Airlines Inc*.[25] The *Day* test considers: (a) what activity the plaintiff was doing at the time; (b) who was controlling plaintiff's activity; and (c) the location where the injury occurred.

Given the overall sense and purpose of the Convention, the carrier's liability surely extends to any period in which its passengers are exposed to any risk particular to air travel and the concept of 'embarking' and 'disembarking' should be considered in this context. The key point to remember is whether or not and to what extent the passenger is exposed to typical aviation risks.

However, there is an obvious implication that the passenger must surrender himself to the care and supervision of the carrier and must obey the carrier's instructions since it is to avoid the typical aviation risks which could injure the passenger.[26]

1. For addressing the first research issue which pertains to the extent of liability of carriers in international carriage in the event of death or bodily injuries to passengers, it is necessary to look into the provisions of the Warsaw Convention.

The Montreal Convention is the successor to the Warsaw Convention and unifies and replaces the system of liability that derives from the Warsaw Convention.[27] For the most part, the cases that have discussed the Montreal Convention have referenced its predecessor, the Warsaw Convention. Most of these cases discussing the Montreal Convention have relied upon similar provisions contained in the Warsaw Convention.[28]

Article 21 of the Montreal Convention provides for compensation in case of death or injury of passengers. The Montreal Convention introduces the idea of 'Strict Liability' of the carrier. Strict liability simply means that the carrier cannot escape its liability up to the prescribed level of damage, which is 100000 SDR (roughly Rs 69.42 lakh) for damage due to death or bodily injury as provided under Article 21(1) of Montreal Convention, even if it is not responsible for the cause of such damage.[29] Under Article 21 (1) of the Montreal Convention, the carrier incurs unlimited liability in excess of 100,000 SDR on the basis of presumed fault where damage results from the death or bodily injury of the passenger. By contrast, the Warsaw Convention renders the carrier liable for all damage on the basis of presumed fault irrespective of whether it exceeds SDR 100,000.[30]

The Warsaw and the Montreal convention permit the carries to rebut the presumption of fault by proving that the carrier was not to be blamed for the accident. However, the difference between the provisions under both the conventions is that whereas the carrier can completely avoid liability by discharging the burden of proof under Article 20 of the Warsaw Convention, the carrier can only avoid liability in excess of 100,000 SDR by discharging the burden of proof under Article 21(2) of the Montreal Convention. In other words, the presumption raised by the Montreal Convention that the carrier is to blamed for damage which does not exceed 100,000 SDR per passenger is irrebuttable whereas the presumption that the carrier is to blame for damage in excess of 100,000 SDR per passenger may be rebutted and liability avoided in

circumstances where the carrier can prove (a) such damage was not due to the negligence or other wrongful act or omission of the carrier or its servants or agents or (b) such damage was solely due to the negligence or other wrongful act or omission of a third party.[31]

Article 21 (2) (a) of the Montreal Convention states that the carrier is not liable for claims for damages under Article 17 (1) which are in excess of 100, 000 SDR per passenger if it proves that such damage was not due to the negligence or other wrongful act or omission of the carrier or its servants or agents. The carrier's burden of proof is substantially different under Article 20 of the Warsaw Convention which provides a complete defence if the carrier can prove that it and its agents gave taken all necessary measures to avoid the damage or that it was impossible to take such measures.[32]

The effect of Article 20 of the Warsaw Convention is to impose an express obligation upon the carrier and its agents to take all necessary measures where possible to avoid damage, the carrier avoids liability if it proves that it has complied with this obligation even though it commits some positive act which contributes to the damage.[33] By contrast the carrier avoids liability under Article 21 (2) of the Montreal convention by proving that the damage was not caused by the negligence or wrongful act or omission of itself or its agents or that it was solely caused by negligence or wrongful act or omission of a third party.

Article 21 (2) (b) states that the carrier is not liable for claims for damage under Article 17 (1) which are in excess of 100, 000 SDR per passenger if it proves that such damage is solely due to the negligence or other wrongful act or omission of a third party. This provision merely restates the burden of proof requires under the sub-paragraph (a) since damage which is solely due to the unlawful and blameworthy conduct of a third party cannot have been caused by the negligence or other wrongful act or omission of the carrier or its servants or agents.[34]

Article 21 (1) prevents the carrier from excluding or limiting its liability for death or bodily injury which does not exceed 100,000 SDR per passenger. This rule should be read in conjunction with Article 26 of the Montreal Convention which states that any (contractual) provision tending to relieve the carrier of liability or to fix a lower limit than that which is laid down in the convention shall be null and void.[35] These two articles ensure that the provisions of the Montreal Convention which make it easier for the passengers to sue airlines are not circumvented by private contractual agreements. If the situation were otherwise and the parties could vary the balance of burdens and advantages not only would the scheme and purpose of the individual rules be lost but the objective of creating a standardised system of international rules which properly balance competing interests would be compromised.[36]

Conclusion

In some ways, the two-tier liability structure for passenger death and injury has always existed. However, by the inclusion of the provisions of the Montreal Convention into the Carriage by Air Act, the increase in the extent of liability of carriers and the increase in compensation are indeed radical. First, the basis of the carrier's liability of the first tier has been changed from rebuttable presumed fault which was provided under Article 20 of the Warsaw Convention to 'strict', 'upon condition only that the accident which caused the death or injury took place on board the aircraft or in the course of any of the operations of embarking or disembarking', with all defences removed, except contributory negligence as provided in Article 20 of the Montreal Convention. Secondly, the limit is raised to SDR 100,000.

Even more importantly, insofar as the second tier is concerned, which technically has always been without any limit, the basis of liability is changed from 'wilful misconduct' as was a requisite under Article 25 of the Warsaw Convention, which was always difficult to prove, to a rebuttable presumption of 'negligence or other wrongful act or omission' and thus, in a monumental move, the burden of proof was moved from the claimant to the carrier.

2. The second research issue deals with jurisdiction that is where exactly a claim for damages can be made. As the Warsaw Convention used to do, the Montreal Convention makes various places of jurisdiction available to the claimant, in order to bring a claim for compensation against the air carrier on the basis of the Convention. In addition to the four places of jurisdiction of the Warsaw Convention, the Montreal Convention has created a fifth place of jurisdiction at the last place of domicile of the passenger in the case of personal injury or death.[37]

The wording of Article 33 of the Montreal Convention shows that the choice between the different places of jurisdiction is to be seen as alternative and not cumulative.[38] The alternative of having five places of jurisdiction does not mean that the claimant will have five forums at his disposal in each case. Where the locations differ, the claimant has a choice of where he wants to file his claim; it is for the applicable international or national procedural law to resolve any conflict between different proceedings, where the claimant in respect of the same carriage simultaneously asserts claims against the air carrier or carriers involved in the carriage at different locations.[39]

The five places of jurisdiction are as follows:

1. The Domicile of the Air Carrier

The Convention stipulates one place of jurisdiction 'at the court of the domicile of the carrier'. The convention does not define the term 'domicile'. This needs to be determined according to the law of the *lex fori*.[40]

The Montreal Convention does define the term 'domicile' in respect of a natural person in the context of the fifth place of jurisdiction at the domicile of the passenger; accordingly, it is justified to also take this definition into account when interpreting the domicile for the purposes of Article 33(1).[41]

In Germany and Switzerland, the domicile is determined according to the articles of association of the business whereas in France, the assumption is that the domicile and the principle place of business refer to the same location.[42] As far as the United Sates in concerned, in the case of legal persons, the location of incorporation equates to the domicile of the air carrier.[43]

2. The Principle Place of Business

Like the Warsaw Convention, the Montreal Convention offers a further place of jurisdiction at the location where the principle place of business of the air carrier is situated. This refers to the location where the airline has its central administration and where the actual administration of the business is concentrated.[44]

In practice, the predominant assumption is that an air carrier only has once principal place of business.[45] In contrast the US District Court in the matter of *Winsor v. United Airlines*,[46] allowed that there was a branch office of some significance at the location of the court seized, while the principal place f business was situated in another federal US state.

3. The Place of Business Through Which the Contract has been Made

Article 33 stipulates as the third possible place of jurisdiction that place of business of the air carrier, through which the contract was concluded.

4. Place of Jurisdiction at the Destination

The Montreal Convention, like Article 28 of the Warsaw Convention, provides the clamant with a fourth place of jurisdiction at the destination. Article 33 of the Montreal Convention does not define the term. The place which the parties agreed as final destination of the entire journey corresponds to the 'destination' for the purposes of Article 33.[47]

It makes no difference for the determination of the 'destination' that the journey in face takes place differently than agreed by the parties, and terminates at a different location to the agreed destination.[48] The agreed destination is also to be referred to if the passenger intends to travel to another destination at some later point.[49]

5. Place of Jurisdiction at the Domicile of the Passenger

In case of *personal injury or death*, the Montreal convention offers the injured party a place of jurisdiction at the domicile of the passenger. It is a condition that the sued carrier offers passenger flights from or to this country, either itself or

through another carrier, and the location is in the territory of one of the state parties.[50]

The convention defines the domicile as the place where the passenger has his principal and permanent residence.[51] Materially the Montreal Convention defines domicile as follows: 'Principal and permanent residence' means the one fixed and permanent abode of the passenger at the time of the accident. It is the time of the accident which is decisive and not the time of the conclusion of the contract.

It is up to the passenger, or, as the case may be, the claimant, to prove that the conditions for a claim at a particular location are satisfied. If he wants to claim for damages under the fifth place of jurisdiction, he must prove that the passenger did indeed permanently live at the location asserted; indications may be the possession or tendency of a house or a flat, registration with the authorities, place of employment, centre of the family, duration of the stay, and the intention of remaining permanently.

The nationality of the passenger is not decisive for the interpretation of the term domicile.[52] Neither is the domicile of the claimant to be taken into consideration where the claimant and the passenger are not the same person.

According to Article 33(2) of the Montreal Convention, there is a requirement that the air carrier must be *carrying the passengers commercially* to the country concerned at the time of the accident. This means that it must be an airline company which holds a permit in order to carry passengers to the country concerned. At the time of the accident, the air carrier must be in the process of actually carrying out such a carriage. Where the flight on which the passenger suffers the accident originates or terminates in a country in which the passenger is resident, the requirements for the fifth place of jurisdiction are satisfied without further ado. However, where the flight on which the passenger suffers the accident does not go to or via that country, then the passenger must prove, on the basis of flight schedules or data provided by the registry states of the air plane (permits), that the conditions of Article 33 are met.

Finally, one must remember, that in view of the additional criteria mentioned, a place of jurisdiction at the domicile of the passenger can only exist if this is located in a contracting state. To illustrate the utility of the fifth place of jurisdiction, let us take the example of the recent Air India Express Crash which was coming from UAE to India. The final destination of the carrier was India, where the accident actually took place. In such a case, the victim or the claimant can bring action in the UAE courts (State party) and India (State party and domicile of aircraft) or in any third state provided the passenger has his permanent or principal residence in that state and that state is also a party to Montreal Convention. Therefore, a victim who is a US resident can bring action against the carrier in US courts as well.

Conclusion

The Preamble of the Montreal Convention makes it explicit that the aim is to provide 'the most adequate means of achieving an equitable balance of interests'.[53]

The place of jurisdiction at the passenger's place of residence is a concession to consumer protection: in the case of personal injury, the injured passenger should be in a position where he can sue the air carrier in a place where he is familiar with the legal system.

The number of places of jurisdiction wherein suits for claiming damages in the event of death or personal injuries have universally increased. However, the process to decide the extent of compensation to be granted in such cases has not been universalised. This is so because they depend on local laws. It is likely that the level of compensation for each lost life may vary according to the jurisdiction chosen by a victim/claimant and according to the facts concerning each victim/claimant. For instance, it is well known that the US courts are liberal in granting compensation in torts and liability cases. On the other hand, going by the jurisprudence in India relating to compensation in motor vehicle and air accidents, it is unlikely that the victims would get anywhere near 100000 SDR.[54]

Thus, it's possible that the difference in compensation granted to two victims of the same accident in the event of death be huge. The loss of life of one person is as much a loss as the loss of life of another person. The fact that the claimants are being compensated differently merely on the basis of the domicile of the deceased is not a fair means of compensating them. This creates a discriminatory effect. The aim of International Law is to unify laws. Thus, one of the means of solving this problem is to further unify laws of compensation across the states.

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STRATEGIC FLEXIBLE PLANNING AND REAL OPTIONS FOR AIRPORTS TO GAIN COMPETITIVE ADVANTAGE

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Abstract

The commercialization and privatisation of airports in combination with the deregulation of the aviation market has introduced new possibilities for competition among airports. This in turn has meant that there are increased opportunities for airports to develop new strategies to gain competitive advantage. This paper takes a broad overview of the strategies which airports have developed. The paper begins by undertaking a competitive analysis of the airport industry from both the airline and passenger viewpoint. The competing forces are found to be very different but cannot be considered entirely separately because of the interdependence of airline and passenger demand. The paper then questions the relevance of Porter's generic competitive strategies to airports – particularly the cost leadership strategy. This is followed by an assessment of the strategic directions which airports have pursued and the strategic methods which they have used. Airport privatisation has allowed for options such as horizontal integration to be adopted, although the benefits are not always that clear. The paper concludes by discussing the options available to low cost carriers which are providing new challenges for both small and medium sized airports in the area of competitive advantage.

Introduction

The paper provides a broad overview of the strategies which airports have adopted to gain competitive advantage. It does this by firstly undertaking a competitive analysis of the industry and assessing the extent of influence which an airport operator has over the factors which affect an airport's competitiveness. The relevance of these factors are then examined within the context of the different strategies which airports have chosen to adopt, and the directions and methods which the airports have chosen to pursue these strategies. The paper concludes by considering the case of low cost carriers (LCCs) and the choices of strategic direction which are available to address the needs of these types of airlines.

This paper has attempted to relate the situation at airports to general competitive strategy theory. This is in order to assess whether the characteristics of the airport industry are so unique that necessitate airports being still treated as a special case or whether at this stage in the evolution of the airport industry, it is

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has become relevant to look to successful practice in other sectors outside of the airport industry when formulating competitive strategies.

Competitive analysis of the airport industry

The traditional view of most airports acting as natural monopolies is increasingly being questioned primarily because of the improved forces of competition which have occurred due to increased airline liberalisation and airport commercialisation. Therefore a competitive analysis of the airport industry has been undertaken before attention is turned to the actual strategies which airports have adopted. This has been undertaken by applying Porter's widely used five forces framework of competitive analysis which considers the threats of new entrants and substitutes, the power of buyers and suppliers, and the rivalry amongst existing organisations. It is the airport's key role to sell aeronautical services and facilities (i.e. the provision of runways, taxiways, aprons and terminals) to airlines. The airlines then sell their own product onto the passengers. The airport also sells services such as shops, catering and car parks, usually through concessionaires, direct to the passengers, local residents and other customers. It is useful to make this distinction when considering the five competitive forces. The analysis will start off by looking at the services provided to the airlines.

Threat of new entrants

The threat of new competing airports is generally low because of the large investment which is needed for the new infrastructure and because of the long and complex planning and regulatory processes which frequently have to be followed in order for approval of any new development to be given. Moreover it is increasingly difficult to find suitable locations for new competing sites, especially those which can offer sufficient surface transport links. In many other industries, barriers to entry also tend to be high because of the existence of increasing returns to scale. However within the airport industry, some evidence suggests that economies of scale tend to disappear once the annual output of an airport reaches around three million passengers and as airports grow much larger there may in fact be diseconomies of scale (Pels et al, 2000). This is probably due to airport operations becoming that much more complex. Overall this suggests that although there are certainly substantial barriers to entry, they are not related to economies of scale (Starkie, 2002).

Threat of substitutes

The threat of substitutes is also relatively low for most airports with probably the greatest threat being high speed rail. For regional airports, the introduction of high speed rail services can have a significant impact on air services to major airports. However at major capacity constrained airports increased usage of high speed rail for short haul trips may free up capacity for other long-haul services – although this may have a detrimental impact on the

airport's ability to act as a hub and attract transfer passengers. Improvements to the road and rail infrastructure to major airports may also reduce the necessity for feeder services from regional airports. However the recent growth of the LCC sector has changed the economic balance between rail and air travel and in many cases has made air the much more attractive and cheaper option. This is working in the opposite direction to encouraging more travel by train which is the objective of many European governments but may well be reducing the threat of substitutes for airports.

Power of suppliers

Many of the services which make up the composite airport product, such as air traffic control, security, ground handling and commercial facilities, can be provided either by the airport operator or by a third party. The way in which they are offered, and whether there are competing services, can have an impact on an airport's competitive situation. An extreme case is the management of entire terminals by different operators or suppliers. For some of the operational services, such as air traffic control and security, the airport operator may have no choice over suppliers as this will be determined by government policy. However the airport operator may not have to pay for all suppliers. Looking specifically at ground handling there may be specific regulations, as with the European Ground Handing Directive, which stipulate the number and nature of suppliers which must be used. The situation is made even more complicated since in some cases the suppliers, for example air traffic controllers or ground handlers, will charge the airline direct.

Power of buyers

The relative strength of the airlines can vary significantly. This power may influence the charging practices of the airport either directly through governmental pricing control or more indirectly through some type of economic regulation process. In lesser developed areas a national carrier can often have strong political power if its broader role in encouraging trade or tourism is taken into account. Moreover as airline alliances become larger and more established the balance of power could appear to be shifting much more in favour of the airline. However the real relative power of the airlines and airports is not really related to the relative size of the organisations but whether the airline has the ability to switch to an alternative airport. For many network carriers this may not be possible but it may well be so for the more footloose LCCs, charter and freight operators.

Rivalry amongst existing airports

The amount of rivalry amongst existing airports varies considerably. – if airports are located on small islands or remote regions, the scope for competitive rivalry is very limited or non-existent. It also tends to be weak at airports which have a high concentration of both short-haul and long-haul services. These airports appeal most to the traditional scheduled carriers who have networked

services. In these cases it is difficult for other airports to provide effective competition. However if the airports are physically close, their catchment areas may overlap and the competitive rivalry will be greater particularly for point-to-point services (ACI-Europe, 1999; Starkie, 2002; Cranfield University, 2002). This may be in an urban situation, for example London which is served by a number of different airports, or in the regions where catchment areas can be continually expanded or contracted, depending on the nature of air services and surface links on offer at neighbouring airports. As regards competitive rivalry major airports serving a distinct catchment area with a wide network of services are also not likely to be subject to much competition unless they are competing as a hub. However if the airports are physically close, the competitive rivalry will be more intense. A different set of competitive forces exist as regards the commercial services which airports sell to passengers and other consumers. Moreover airport operators are likely to be in a relatively strong position with their suppliers because of the attractiveness of their captive and often fairly affluent passenger market. However there are threats of substitutes, for example from high street and internet shopping.

Thus a different picture emerges as regards the competitive forces affecting the provision of aeronautical and commercial services. However these cannot be considered entirely independently since the services together contribute to the airport business and will both depend on the airlines offering flights at the airport as the passengers come to the airport to use the services of the airlines.

Controllability of the sources of competitive advantage

This competitive analysis can now be related to the amount of control or influence which an airport operator has over the two fundamental sources of competitive advantage, namely price and product characteristics. There are some areas where the airport operator has significant control and somewhere where there is very little control. Meincke (2002) defined these as self determinable and externally determined competition parameters.

Most control

The area where an airport operator has the most control is in the pricing and provision of non aeronautical services and facilities in the airport terminal and on the surrounding land. Hence most airports have become very experienced in taking advantage of the relative weak position of the suppliers and buyers and have exploited many of the non-aeronautical or commercial opportunities which exist. This has been achieved by increasing the number and mix of retail operators and caterers, introducing more branding and competition, expanding the space allocated to commercial and generally becoming more experienced in dealing with the growing level of expectations of the passengers and other airport customers. Although these enhanced commercial facilities may well make the airport more attractive, they will play a very minor role in influencing the passenger's choice of airport. However whilst single till

regulation may be attractive to the airlines, it may not be in the best interest for the airport operator in the long-term if it inhibits the pressures for diversification, innovation and business development which could potentially bring additional competitive advantage.

Partial control

The exact amount of control which airports have over the aeronautical aspects of operations is much more difficult to define. Not only do the forces of competition vary between different types of airports but there also numerous rules and regulations, which exist primarily for safety and security reasons, which airport operators need to follow. As regards aeronautical charging, the amount of freedom which airports have in this area will depend on the extent of direct government control or the nature of economic regulation if it exists. Clearly this will be influenced by the real power of the airline. Moreover the impact that pricing will have on demand, and hence ultimately an airport's ability to compete, will also differ depending on what type of airline is being considered and their relative degree of price sensitivity. Airport charges can be substantially more important for short-haul operations as they are levied more frequency. For LCCs and charter operators they can be even more significant because these airlines will have minimised many of the other airline costs. An airline will consider all the costs at an airport, not just the airport charges, but also other charges.

Least control

Finally there are some aspects of the airport product which the airport operators has very little or no control over. This includes slot availability and also location which is undoubtedly one of the most important factor which affects an airport's competitive position (For example see Park (2003) for evidence in Asia). The factors which will determine the attractiveness of the location include the size of the population and its propensity to fly, the economic strength of the area and its importance as a tourist or business destination (Favotto,1998). This means that the competitive position of specific hub airports which are developed primarily for transfer traffic, without a natural local market due to economic factors or tourism, may be fairly weak. The same may be the case of certain remote secondary airports which have been chosen for their operations by LCCs. Although an airport cannot alter its location, its catchment area will not be fixed and will vary. The catchment area will also change depending on the air services being offered at the airport and its neighbours, and also the relative nature and quality of the surface access links. LCCs have been particularly successful in attracting passengers from much wider catchment area than other airlines (Barrett, 2000).

Airport strategic options

Having now assessed the influence which airport operators can have over the price and product features, it is now possible to consider how this relates to

the actual competitive strategies which airports have developed. A starting point is to consider the relevance of Porter's generic competitive strategies. These acknowledge that price (or at least cost) and product characteristics or differentiation are the only two sources of competitive advantage but also that the competitive scope of target customers can vary. These ideas have come under increased criticism because of their simplistic nature and logic, particular in service industries, but nevertheless provide a useful starting point for considering strategy options.

Cost leadership

The cost leadership strategy aims to place the organisation amongst the lowest cost producers. This is realised by reducing costs, such as low cost inputs, low distribution and location costs, by offering a standardised product, and by achieving high volume of sales and economies of scale. This will then enable the organisation to offer lower prices than its competitors. There is little evidence of such strategies within the airport industry. On the cost side, the ability of the airport to achieve many cost savings is fairly limited because of its fixed location and also because of the apparent lack of economies of scale beyond a certain size. More generally, the relevance of such a strategy to airports has to be questioned given the relative price insensitivity of many of the markets and thus the lack of competitive pressures to produce a reduction in costs. Moreover the issue is complicated by the weak relationship between airport costs and prices at some airports.

Differentiation

The next generic strategic option is differentiation when an organisation will develop a product or products which are perceived as being different or unique from its competitors. This is more appropriate for a more price insensitive market. This may be achieved through enhanced service features, brand image, promotion, technology, distribution or other dimensions. In other words it can be achieved if there are real (by product design) or perceived (by advertising) differences between its products and those if its competitors. Within the airport industry, there appears to be some scope to pursue differentiation strategies. Alternatively the uniqueness could be the airport's design which enables it to handle transfer passengers in a very short period of time, or its lack of environment restrictions compared to neighbouring airports which enables it to operate for 24 hours. Interesting Zurich airport actually rebranded itself as 'Unique Zurich Airport' in 2002 to reflect a new management structure, partial privatisation and expanded facilities but does not really seem to follow a true differentiation strategy. There may be a number of differentiated products to suit the needs of different customer groups. The 'fast track' concept, when first class and business passengers are given preferential treatment through various airport processes, is a good example which is used at BAA London airports and others. Typically larger airports with more than one terminal have separated services for different types of passengers or airlines, for example short-haul and long-haul,

domestic and international, or by alliance members. However the quality standards do not usually vary significantly between terminals. There is also the option of having competing terminal products offered by different operators. However in recent years there has been growing interest, particularly with LCCs, in the possibility of having different terminals with varying quality standards and facilities, either under common or different ownership (see Section 6).

Focus or niche

The third generic strategy, in addition to cost leadership and differentiation, is the focus or niche strategy which is built around satisfying a particular small target market. With airports, this could be with a particular type of airline (e.g. charter, low cost, freight) or services to a particular geographic area. This is suitable for organisations which are not large enough to target the whole market. These strategies can either have a cost or differentiation focus. Within the airport industry, secondary airports which offer price deals to LCCs are examples of organisations pursuing a cost focus strategy which seeks a cost advantage in its target segment. There are also examples of airports who are following a differentiation strategy for instance by providing specialist cargo facilities such as Liege airport in Belgium or facilities for short-haul business such as at London City Airport. Porter defined such organisations that do not conform to one of the strategies as 'Lost-in-the-Middle'. In reality this is very much related to the less competitive environment within which these types of airports operate.

Therefore whilst these generic models are of limited use within the airport industry, they do have some relevance when considering the strategic directions and methods which airports need to adopt.

Airport strategic directions and methods

Strategic direction relates to which products and services should be developed and for which markets. The main directions are market penetration, market development, product development and diversification. Market penetration involves increasing market share of existing products in existing markets whilst market development entails introducing existing products into new market areas. Product development involves developing existing or new products for existing markets and diversification is concerned with developing new products for new markets. These directions can be summarised in the well known Ansoff positioning matrix which distinguishes between the degree of market and/or product development involved. At the one extreme, market penetration can be criticized for ignoring new opportunities whilst at the other extreme there may be many opportunities for diversification but at least some of these may come with a high degree of risk.

Internal growth

For all these directions there are different methods by which a particular strategy may be developed. Firstly there is internal or organic growth. This is the

approach that airports traditionally adopted since they really had no option because of public sector ownership and the strict regulatory air transport environment. Market penetration can be achieved internally with a typical example being a regional airport offering discounts on new regional services to encourage the use of the airport. For the passenger market there is the example of the development of loyalty cards (Jarach, 2002). Market penetration directions may be particularly relevant for airports following a niche strategy will be particularly interested in market penetration. A product development strategy could be encouragement of long-haul services to an airport that has previously only offered short-haul services. Vienna airport is a useful example of an airport which is using financial incentives to encourage services to Eastern Europe and support its role as a West-East hub (Vienna Airport, 2004). Product development can also occur internally with the non-aeronautical side of the business. For instance a number of airports include Changi Singapore and London Heathrow have developed internet booking of various of the commercial services on offer, such as car booking or foreign currency. New product development strategies also had to be devised in Europe after the abolition of duty and tax free sales in 1999 with the introduction, for example, of the Travel Value concept (Freathy and O'Connell, 2000). For airports following differentiation strategies product development is necessary to maintain differences as competitors imitate previous innovations Market development can be achieved internally by encouraging better surface access to extent the catchment area. This could include supporting local road and rail improvements through the planning process or perhaps providing financial support to bus or rail surfaces. It could also be argued that the practice of certain airport companies such as BAA, Schiphol, Fraport, Aeroport de Paris and the former Aer Rianta company in providing consultancy and management contracts in specialist areas such as engineering, construction, handling or commercial facilities is also an internal way of achieving market development. The most common way that airports have internally followed related or concentric diversification strategies is through developing shopping or leisure facilities for local residents and/or business facilities or services (such as conference facilities, offices and warehousing) for local businesses. Airports can then not only be considered as modal interfaces but attractions in their own right—Jarach (2001) calls such airports 'multipoint service-provider firms'. Schiphol is a good example of this with its Airport City concept. BAA's operation of the Heathrow Express rail link could also be considered to be related diversification. Unrelated or conglomerate diversification is also possible to achieve internally but is fairly rare because of the narrow role which public sector owners usually define for their airport operators. Aer Rianta's ownership of the Great Southern Group of Hotels in Ireland is an example of an unrelated or conglomerate diversification strategy which has been developed internally.

Integration

Airport privatisation has enabled other strategic methods to be used. This is partly because it has enabled airports to buy other airports and also because it

has given private airports more freedom to pursue other methods of strategy development. Horizontal integration, which occurs when organizations combine with other organisations in the same industry, is an important strategic development method which is used in other industries. Within the airport industry there is now the situation where established airport operators such as BAA or Schiphol or new airport operators such as Hochtief or TBI are now operating other airports (Graham, 2003). Such developments can bring about market development in that they involve introducing existing products (i.e. the established commercial product) into new market areas which could include new geographical areas but may also allow for product development as new products will be acquired. For many industries, including travel-related businesses such as hotels, travel agents and tour operators, clearly a key motive for horizontal integration is to create market power and brand strength and hence to reduce competition. This is not really the case with the airport sector. Neither are the airports marketed under a common brand although Schiphol does try to promote its Airport City concept.

The exception to all this is the airport group Plane Station which has acquired a number of old military or disused regional airports primarily in Europe and are aiming to development an integrated network of airports with common standards, processes and tariffs. This airport operator is very different that all the other operators which are expanding and is very much following a niche strategy by focusing on low cost and freight traffic. There are a few situations where horizontal integration has enabled airports to achieve market penetration by taking control of neighbouring airports. For instance this is the case with Manchester which has acquired both Nottingham East Midlands and Humberside airport in the North of England. Fraport buying Hahn airport and Schiphol likewise owning some of the small regional Dutch airport has caused a similar effect. In this case the competitive advantages of horizontal integration will be much clearer in that such a strategy is reducing the number of competitors which exist. This leads on to the whole issue of whether different airports in relative close proximity or in the same geographical region should be operated as individual entities or as a group or system. Arguments favouring group ownership and operations include economies of scale and enhanced career opportunities for employees, a stronger financial structure which can support the investment peaks and troughs at different airports and a more consistent strategic planning and investment policy. On the other hand, supporters of individual operations claim that separation would produce more competition and choice and superior local management. The argument has recently been lost in Ireland where the former airport company Aer Rianta has been split into three independent airport companies.

Then there is vertical integration, either forward integration when organisations seek increased control of distributors, or backward integration when organisations seek control of suppliers. This is not a common strategic

method which the airport industry has generally decided to follow. However In the UK there are examples of two regional airports, namely Cardiff and Norwich airport, who developed local travel agency business in an attempt to increase awareness and thus flight bookings through the airport. This forward integration can cause market development from a passenger perspective since new passengers may be persuaded to fly from the airport. It could be argued that backward integration has always really existed within the airport industry by nature of the fact that some airport operators themselves will choose supply part of the composite airport product, for example with handling or air traffic control services. However there are very few examples of airport operators who have consciously decided to grow their company by buying into a vertical integrated organisation rather than just historically maintaining an interest in an activity which has always been provided by the airport company. BAA's development of World Duty Free is one such example. Within the context of vertical integration, some airports have decided that it is favourable to adopt a strategy of developing much stronger links and partnerships with the airline - which is in effect 'the supplier' for the passenger product. This is common practice with LCC operations and also in the USA where long-term airport-airline contracts have been the norm for many years. Elsewhere airlines have usually not entered into long term pricing agreements with airports and instead have just tended to pay charges such to a published tariff with associated conditions of use. However there are now examples of airline-airport agreement in Copenhagen, some of the major Australian airport and Frankfurt where there is a risk sharing element (Klenk, 2004). This is seen by some to be a more attractive and appealing option rather than the often confrontational and defensive approach which tends to be adopted when there is a more formal regulation process. The UK regulator, the CAA has also recently suggested that the airport and airlines could negotiate more closely with each other (Civil Aviation Authority, 2004). A few airports have even gone one stage further than this with their relationship with their airline customers. For example in the UK, Norwich airport has chartered its own aircraft over recent years to prove to tour operators that there was a demand for charter flights. Planestation has also acquired the new LCC EUJet primarily to secure its existence Planestation's Manston airport. Interestingly, in a somewhat reverse situation, Coventry or West Midlands airport has recently been acquired by the travel company TUI which operates Thomsonfly.

Alliances and franchises

There are other methods of strategic development which provide for some of the benefits of collaboration without the transfer of ownership or operational control. This includes alliances and franchises. Airports quite often informally get together for example for information exchange or marketing support but Pantares, the alliance which was set up between Schiphol and Fraport in 1999, is really the only example of a more official and widely focused alliance. However unlike airline or other alliances, airport alliances cannot be driven by network

effects, or with the aim of increasing market accessibility, but instead may reap benefits from shared knowledge, expertise and financial resources and joint bidding for international projects. To date these benefits for Pantares have proved very limited but potentially there could have been some advantages. It could also reduce some of the competitive pressures which exist when the two airports are involved in the bidding process for a privatized airports as these two former rivals have agreed that they will also co-operate in this area. Franchising, which is used in other industries to gain the competitive advantage through benefiting from rapid market development of a well known brand without the need for investment, is not a practice which is used in the airport industry. This development method is only relevant if it could be proved that being branded as part of a successful airport group can substantially improve the market potential and image of a smaller airport. This does not currently seem to be the case.

Retrenchment and divesture

Since the airport business is still generally a growth industry which has yet to reach maturity all of the strategic directions and methods which have been discussed so fare are associated with growth. However clearly there are some instances when competitive advantage may well be maintained only if retrenchment strategies are adopted. Zurich and Brussels airport are two airports which had to follow retrenchment strategies such as following the collapse of their two major airlines, namely Swissair and Sabena. There then are divesture strategies which again are not very common.

Competitive strategies for LCC customers

The rapid growth of LCCs has created new challenges for airports in the area of competitive advantage. In terms of the forces of competition, for the smaller regional and secondary airports who are very dependent on this traffic, these airlines can have very strong bargaining power and a number of existing rival airports for the products very often exist. Such airports will be following a niche strategy – both in terms of offering low prices through deals negotiated with the LCCs and maybe also in terms of the simplified and uncongested product on offer. For these airports it makes much sense to attract this type of traffic as it will often use the spare capacity at under-utilised existing infrastructure. It may well act as a catalyst for additional air services and encourage economic development and tourism within the surrounding area which will be particular interest to publicly owned airports. However such a strategy will run into problems if demand grows to such a level that new facilities are needed but the LCCs are not prepared to pay for them as has happened with Ryanair at Dublin and easy Jet at Luton. At medium sized airports which serve other conventional airlines as well, the LCCs power is less as these airlines will make up a smaller share of the total traffic. Many of these airports have also encouraged the development of low cost traffic to supplement their other more traditional traffic base. However there is a danger that the LCCs

will instead act as substitutes for the conventional airlines. This will probably not be financially beneficial to the airport operator and may cause a loss in choice of hub links. Dennis (2004) cities the example of the Belfast airports where local accessibility has improved in terms of price but global accessibility has very much deteriorated because of the shift from conventional to low cost services. There are other issues to consider for medium size airports which are serving both conventional and LCCs. The conventional approach is to offer a standardised product for all its airline customer. However the LCCs have very different needs from the conventional carriers including quick turnaround time, quick check-in, fast handling services and no airline lounges (Barrett, 2004).

This is causing a number of airports to consider unbundling their services and to offer a differentiated product to different airline types Other options are possible (Pitt and Brown, 2001). This has been fiercely opposed by Air France and some other airlines who feel that the projects discriminates again them – but the regulator ComCo does not feel that this the case and has approved the development (Air France, 2004: Geneva Airport, 2004). Although experience of low cost terminals is very new, it is difficult to see how dedicated terminals, particularly when they are new facilities, can really have costs low enough to satisfy the needs of the LCCs. Another option is to have a competing terminal. Ryanair has lobbied for a separate terminal for its operations in Dublin for many years. In 2002 the Irish Government asked for expressions of interest from organisations which might wish to develop a competing terminal at Dublin, possibly for LCCs—but this does appear to have been taken very much further to date (Department of Transport, 2003). Finally for airport groups there is an alternative option of directing the traffic to one specific airport as with Stansted and the BAA London airports (although Gatwick now has LCC traffic well), Hahn in Frankfurt and Ciampina in Rome.

Conclusion

This paper has identified a number of airport competitive strategies which have been adopted. The focus has been intentionally broad and for any of the strategies which have been mentioned, a much more thorough analysis is needed to gain a full understanding of their effectiveness. However in general terms this paper has aimed to demonstrate that there are some characteristics of the airport product, for example, the existence of more than one key customer and the nature of composite product, which makes the task of formulating competitive strategies that much more complex and difficult. In addition there are many airports which still exist in a fairly uncompetitive environment and for whom the relevance of the whole concept of competitive advantage at this stage in time must be questioned. Nevertheless there are many other airports which are now operating in a much more competitive manner for whom knowledge of competitive strategy in other industries could provide additional insight for achieving that vital competitive edge.

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AIR LAW AND ECONOMIC DEVELOPMENTS

Prof. Narahari Lenka*

Civil aviation has a major impact on in 21st century. It shapes national economics. Trade is carried on by aircraft and air routes. Tourism promoted by aviation helps economics of countries like Thailand, Spain, Singapore, Malaysia, Nepal and many other countries in Europe, Africa and Asia. Aviation is an agent for change and progress as pointed out by the Secretary General of ICAO, S.S. Sidhu. On the role of modern aviation, he observed:

As you all know, civil aviation is one major field which is affected by the revolution in high technology. In a country like India which is a vast country with difficult terrain in certain areas, I think aviation has a special significance. This is all the more true when we are in a developing economy which has to progress rapidly.

It is impossible to imagine life today without these fast and safe airplanes crisscrossing all states irrespective of their claims of sovereignty. In spite of all their divisions, the world has been united as never before. Eminent jurist H. Lauterpacht had remarked that a solution to problems of international civil aviation was a matter of future. In the field of air law,. security has been an overriding goal in aviation relations. The space exploration began in 1957 and the increasing confidence being shared by nations in recent years, there is greater emphasis on the economic and commercial benefits of aviation. Long ago, a very eminent scholar and jurist, Garner gave a long discourse in India in 1922 under the auspices of Tagore Law Lecturers, containing some very perceptive analysis on the developments of air law. Another jurist Hudson wrote a long article on aviation and international law in 1930. Most of these issues are being dealt with by UN and its specialized agency, the ICAO. It is of general interest to recapitulate the Charter of ICAO, its objectives and important role in the development of air law. These include issues connected with economic development, the Chicago Convention, regional developments, security aspects, bilateral agreements, impact of outer space on aviation and development of the space transport, some aviation policies of other leading countries, and perspectives on Indian air law mostly derived from international air law.

Approach to air law

Indeed, it is a multi-dimensional discipline and involves inter-dependent factors like (i) knowledge of aviation technology; (ii) economics; (iii) air space management; (iv) private air raw; (v) public air raw; (vi) raw making by ICAO; (vri) security and safety laws; (viii) liability aspects; (ix) air routes structure; (x) regulation of air services and bilateral air agreements; and (xi) a complete

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knowledge of licencing of pilots, airports and regulation of aircraft components. The key world is "system"—for air transportation is a system, and a very complex one at that. It is made up of many parts, or subordinate systems, each closely related to another and each capable of creating a problem to the detriment of the other. Unless these many closely interrelated parts are. made to work in harmony, one with the other, the imbalance of one part will upset the ability of the total system to fulfil its intended purpose.

The Chicago Convention of 1944 have set forth the essential principles of international air raw which have helped develop air raw in keeping with global community expectations. This convention is a charter of world aviation. As Justice Krishna Iyer says—combining history with new values, new policies, new perspectives, new conventions in super-aviation makes a contribution to legal futurology. Much less is however written on the Chicago Convention than it deserves to be. The following important regal principles of Chicago Convention which help us realize the goals of international civil aviation. The preamble states: The future development of international civil aviation can greatly help to create and preserve friendship and understanding among the nations and peoples of the world…… It stress cooperation, peace, safe and orderly manner in which international air service may be established. Article 1 represents the air sovereignty of states. It reads: The contracting states recognize that every state has complete and exclusive sovereignty over the airspace above its territory.

It merely reflects the history of aviation raw ever since such an article was incorporated in the Paris Convention on civil aviation in 1919. Today air sovereignty is modified by space exploration. Security and privacy enjoyed by states as a result of air sovereignty is being substituted by international co-operation.

Article 2 refers to definition of territory which includes land areas and territorial waters. Article 3 differentiates civil and military aircraft. Article 4 prohibits misuse of aviation Article 5 the rights for non-scheduled flights for non traffic purposes without the necessity of obtaining prior permission and subject to the right of state overflow to require landing. Article 6 by special written permission of states. Article 7 prohibits sabotage. Under Article 8 pilots aircraft are not permitted to fly though this provision does not apply to spacecraft without pilots/astronauts. Article 9 prohibited areas. Article 10 makes it necessary for foreign aircraft to land at customs airports. Article 26 provides of international interest is investigation of accidents. The state in which an accident occurs institutes an enquiry into the circumstances in accordance with its laws and procedure recommended by ICAO. Some critics says the provision of Chicago Convention are mostly technical in nature.

Air Law and Economic Development

Air laws is very intimately connected with modern economic development of states. Air transport is developed on factors like export and import of cargo,

passenger movement, tourism promotion and host of other national activities. In this manner air law looks to equality of opportunity between states. It helps facilitate competing interests between counties and ensures cooperation. Collection of statistics, forecasting on traffic development and other relevant factors call for application of a systems approach to international air law for creative process. Thus air law has to include a study of international organizations like ICAO and IATA. The former regulates world aviation as already described and the latter makes possible a plethora of tariff regulations and procedures which enable airlines to issue a single ticket transcending national boundaries. IATA is also a big clearing house for airlines. Therefore, international air law is to be explored and applied to day to day problems of aviation relations and help plan future growth of aviation order in the world.

The 26rh session of ICAO Assembly in 1986 had the following agenda items relating to air transport problems of global interest: (i) model clause in bilateral agreement; (ii) regulation of non-schedule air transport; (iii) guidance material on sixth freedom; (iv) unilateral measures affecting civil aviation; (v) IATA paper on trade in services; (vi) unilateral application of competition laws; (vii) air transport fares rates; (viii) taxation in air transport industry and (ix) automation in airline industry.

In the matter of work programmes of the Legal Committee, the Assembly has emphasized the following problems for study: (i) development of instrument for suppression of unlawful acts of violence at airports serving international aviation. For this purpose a diplomatic conference was held in ICAO in 1988 and the Montreal Convention of 1971 was amended to include suppression of airport violence; (ii) the United Nations Convention on the law of the sea implication for the Chicago Convention and its annexes and other international air law conventions; (iii) liability of air traffic control agencies; (iv) study of instruments of the Warsaw Convention; and (v) preparation of a draft instrument on the interception of civil aircraft.

Conclusion

A great degree of uniformity is needed in national laws to enable mass air transport operate across national boundaries without delay. Time factor for travel in air and on ground handling has assumed great importance. Information and reservation systems in aviation are being overhauled with new computerized technology. Air law has to ensure equality of opportunity for airlines of the world as provided in the objectives of ICAO. Aviation has a major role in the economic development of states and people. International trade, economics and development that modern air law has a major contribution.

AVIATION CLAIMS IN INDIA: SOME THOUGHTS REGARDING THE NEW MONTREAL CONVENTION

Stephan Eriksson*

1. Introduction

I represented families in the Kenya Airways disaster where Indian nationals perished.[1] I am currently representing families in the recent India Air Express catastrophe that occurred May 22 of this year.[2] Out of 166 people onboard the Air India Express flight, 158 persons were killed. All but one were Indian nationals. India recently ratified the Montreal Convention 1999 (MC99).[3] In India Air Express, Indian Government officials and media have made some erroneous statements regarding how the MC99 is applied. I will therefore clarify some minor topics of interest in this paper.

2. India´s ratifications of aviation conventions and compensation levels

India entered the 1929 Warsaw Convention[4] in 1947 and the 1929 Warsaw Convention as amended by the Hague[5] in 1973.[6] June 30, 2009 MC99 entered into force in India.

Back in the early 20th century, aviation was deemed a dangerous activity. The Warsaw Convention was intended to protect the carriers from exposure by capping liability to 125,000 Poincare gold francs (approx. 8,300 USD at the time).[7] The Hague amendment raised the cap to 250,000 Poincare gold francs (approx. 16,600 USD at the time). and Montreal additional Protocol No 2 1975 changed expression of the 250,000 gold francs, as well as all other amounts in these Conventions, into Special Drawing Rights (SDR).[8] (As of November 5, an SDR is equal to 1.58494 USD or 69,62 Rupees.)

In MC99, the focus changed toward both consumers and consumer protection. No longer deemed a dangerous activity, flying by air is now a part of modern life. The old limitations were therefore replaced by a two-tier compensation system where the carrier is strictly liable up to the first 100,000 SDR. Above that level, liability attaches for unlimited damages with a reversed burden of proof. The 100,000 SDR was revised up to 113,100 SDRs (approx. 179,000 USD or 79 lakh rupees) on December 30, 2009, according to MC99, Article 24.[9]

3. The MC99 two tier system

The two-tier system means that the carrier is strictly liable for the first 113,100 SDRs of damage and cannot exclude or limit this liability, see MC99, Article 21 (1), except to the extent the carrier proves that the damage was caused

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or contributed to by the negligence or other wrongful act or omission of the passenger, see MC99, Article 20. For damages in excess of 113,100 SDRs, the carrier is not liable if the carrier proves that the damage was not caused by the negligence or other wrongful act or omission by the carrier or that the damage was solely due to the negligence or other wrongful act or omission of a third party, according to MC99, Article 21 (2).

4. MC99 and local law, are all passengers entitled to 113,100 SDRs?

The MC99 has unified certain rules relating to international carriage by air but is silent when it comes to the calculation of damages. Questions of damage law, conflicts of law, and procedural law will be governed by the law of the court seized of the case. An Indian court would therefore apply Indian law.

So are all passengers entitled to 113,100 SDR? The answer to this is no. It needs to be emphasized that the 113.100 SDRs are a limit, not a lump sum payable under any circumstances. The claimant has to prove the extent of the actual damage suffered. Thus, a young professional leaving a widow and orphans will recover more than an elderly pauper.[10]

5. Can all Indians always invoke MC99?

The answer is no. MC99 has been ratified by 98 parties.[11] The Warsaw Convention has been ratified by 152 parties and the Warsaw Convention as amended by the Hague by 137 parties. This means that the Warsaw Convention will keep playing an important role in international carrier liability for years to come. The application of MC99 is determined by MC99, Article 1 (2) where it is stated that the expression "international carriage" means that the place of departure and the place of destination are in states parties to the convention, or carriage within the territory of a state party to the convention with an agreed stopping place in another state, even if that state is not party to the convention. So if an Indian passenger is travelling to a country which is not party to MC99, for example Ghana, he can enjoy the benefits of MC99 if he travels India – Ghana - India but not if he travels Ghana - India - Ghana. In the latter case, the Warsaw Convention as amended by the Hague will be applied since India and Ghana are both parties to that convention. Again regarding Air India Express, both Dubai and India are parties to MC99 hence it is applicable.

6. The five foras of MC99

According to MC99, Article 33, an action for damages must be brought where the carrier is domiciled, or where the carrier has its principle place of business, or where the ticket has been bought through the carrier's place of business, or at the place of final destination. An action could also be brought where the passenger at the time of the accident has his or her principal and permanent residence and where the carrier operates either its own aircraft or through code sharing. For example, certain passengers in the Air India Express disaster, which was an international flight from Dubai to Mangalore, India, can

choose between bringing action either in Dubai, the place of final destination, where the ticket was bought, or where the passenger had his or her principal and permanent residence. All passengers can always bring action in India, the domicile of Air India Express.

Endnotes

1. Kenya Airways Flight 507, Douala, Cameroon, May 5, 2007.
2. Air India Express, Flight IX812, Mangalore, India, May 22, 2010.
3. Convention for the unification of certain rules for International Carriage by Air done at Montreal on 28 May, 1999.
4. Convention for the unification of certain rules Relating to International Carriage by Air signed at Warsaw on 12 October, 1929.
5. Convention for the unification of certain rules Relating to International Carriage by Air signed at Warsaw on 12 October, 1929 and the protocol modifying the said convention signed at the Hague on 28 September, 1955.
6. By a note dated 29 January 1970, India declared that it considered itself bound by the Convention (before India became independent, acceptance of the Convention was effected by the United Kingdom on 20 November, 1934).
7. International Air Carrier Liability: The Montreal Convention of 1999, Paul S. Dempsey, Michael Milde, 2005, p 15.
8. http://www.imf.org/external/np/exr/facts/sdr.HTM.
9. http://www2.icao.int/en/leb/List%20of%20Parties/mtl99_en.pdf/.
10. 8 *supra*, p. 182.
11. 10 *supra.*

SPACE LAW

SPACE LAW IN THE 21ST CENTURY

Tanja Masson-Zwaan*

1. Introduction

It is an honour to address this International Conference on Air and Space Law, organized by the National Law University in Delhi.

In this paper, I will present some current issues of space law in the 21st century. First, I would like to present a brief overview of the history of space law making in the international geopolitical context. I will also recall some of the main principles as elaborated in the framework of the United Nations. After this, I will discuss a number of topics that merit closer attention because they can have significant impact on the future of space law—and the future role of space lawyers.

2. Defining outer space

One of the fundamental questions is where outer space begins. This is an understandable question, however there is no firm answer. The topic has been debated in the UN for several decades, but no agreement has been reached so far. Various approaches and many theories exist and I will not go into those, except to say that with the advent of space tourism, the time may come when we will be in real need of a boundary between airspace and outer space – unless we stick with the 'functional' approach, where air law is applied to an entire activity if the aim or function of an activity is aviation-related, and space law if it its aim or function is space-related.

There is a major difference in the regimes governing air space and outer space, as the first is subject to sovereignty of the underlying state, whereas in outer space a regime of "freedom" exists (be it with certain limitations, of course…), and no state is allowed to claim sovereignty over outer space or the celestial bodies.[1]

Some states have recently enacted legislation proclaiming a boundary at 100 km (e.g. Australia) and this may evolve into an example that states follow, although other states remain convinced that no boundary is necessary (e.g. the USA).

3. UNCOPUOS and some major principles

The space race started around 1957 between the two "super powers", the USA and the then USSR, as the major 'players' in the space arena. This was also

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reflected in the early days of space law making. The UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS), established in 1958 first as an ad hoc and later as a permanent committee of the United Nations, initially had around twenty member states, which enabled the committee to reach consensus relatively easily. This resulted in the adoption of as many as five UN Treaties between 1967 and 1979.[2]

Since then, the membership has grown to some seventy states, including many more space "haves" but also numerous space "have-nots", and it has become exponentially more difficult to reach consensus, with the result that no more treaties have been adopted since 1979.[3]

It is noteworthy that COPUOS has from the start recognised the need to work both in the scientific and technical field and in the legal field, and has therefore created two sub-committees, the Scientific and Technical Subcommittee and the Legal Subcommittee, which both report on the results of their meetings to the full committee.

The first and therefore possibly most important principle of space law is contained in paragraph 1 of Article I of the Outer Space Treaty. It provides that "the exploration and use of outer space […] shall be carried out for the benefit and in the interests of all countries […] and shall be the province of all mankind". Of course the concepts are not clearly defined and can be subject to varying interpretations—but the general idea is clear: use of space should somehow benefit mankind. The second part of Article I however contains an important counterpart to this provision by declaring that outer space is free for exploration and use by all states, without discrimination and on a basis of equality.

The second-most important principle of space law is—no surprise—contained in Article II, which declares that outer space and celestial bodies cannot be subject to appropriation by any means. There is no 'territorial jurisdiction' in outer space. This implies that it is forbidden to claim ownership of any part of outer space, and this applies not only to states but also to private entities, contrary to what is sometimes argued, because there is no sovereign authority that has competence to confer titles of ownership.[4]

Some other keywords are, in a nutshell: peaceful uses; cooperation and mutual assistance; state responsibility (also for activities by private enterprises and individuals, which must be authorised and supervised by a state); state liability (again, also for private entities, which is a unique feature in international law); jurisdiction and control by the registration state; applicability of international law and the UN Charter, special regard for the interests of developing countries, avoidance of harmful contamination and consultation.

4. The International Space Station (ISS)

The ISS[5] is truly the first and foremost example of successful international cooperation. Its financial, technological and legal challenges are enormous and

the solutions adopted are innovative and will certainly set an important example for any future international endeavour.

Its construction began in 1998 and will be completed by late 2011. The station is expected to remain in operation until at least 2015, but this will likely be extended to 2020. An uninterrupted human presence has been present in space since October 2000, thus coming very close to the previous record held by the Russian station Mir (10 years minus 8 days). Since 2009, the number of inhabitants has increased from three to six, which means that two Soyuz capsules are constantly docked to the station to bring the astronauts home in case of an emergency.

The ISS is a joint project between five partners (USA, Europe, Russia, Japan and Canada) and their space agencies (NASA, ESA, RKA, JAXA and CSA). Brazil cooperates with NASA, and others have expressed their interest. The ISS is reportedly the most expensive object ever constructed. It is the size of a football field and can be seen when it passes over our homes each day, at 350 km above our heads. The extensive research laboratories allow for cutting-edge micro-gravity research. Astronauts and cosmonauts of 15 different countries have visited the ISS, including seven tourists. With the ending of the era of the US Space Shuttle, the Russian launcher Soyuz will be the only vehicle capable of transporting humans to the station, but other nations are trying to develop technology to send humans to the station as well.

As for the legal framework, it too is innovative. The five partners signed the Intergovernmental Agreement (IGA) on 28 January 1998. For ESA, ten member states are involved (as this is a so-called 'optional programme'). A second layer of agreements consists of so-called Memoranda of Understanding (MOU), between the five agencies. At the third level, there are bilateral implementation agreements.

One of the questions that arise in terms of legal and policy aspects of this project is whether the ISS model can also serve for future endeavors, such as a mission to the Moon, or even beyond, to Mars. As the other partners become full-fledged players in the space arena, they may want to 'go it alone'.

In any case, it is clear that the experience gained with the ISS adventure will be of huge importance for any future major international cooperation in the conquest of space.

5. Space debris

Space debris consists of objects in orbit around the earth created by humans and that are no longer functional. They include for instance spent rocket stages, defunct satellites, collision fragments, and especially the smaller pieces pose a substantial collision risk; an object as small as a marble can destroy a satellite. There are about 500 objects in outer space that need protection from debris.

The present means of protection of spacecraft can only protect against debris with a diameter lower than 1 cm. Objects have to be larger than 5 cm in diameter in LEO to be tracked, and larger than 50 cm in GSO. Out of the estimated 600,000 objects larger than 1 cm in diameter, only 20,000 are tracked.

It is clear that more accidents will happen and put satellites, large structures like ISS, humans and even the nascent space tourism industry at great risk.

In terms of liability for damage caused by space debris, under the Outer Space Treaty and Liability Convention the launching state is liable for damage caused by its 'space object'; however, a precise definition of the term 'space object' is missing. Is a 'dead' satellite, a malfunctioning satellite or even a paint chip still a space object to which liability attaches? Obviously it is hard to avoid damage if you cannot control the object, but on the other hand it would be undesirable to have numerous objects in space for which no state is liable. Additional questions will be posed in the case where a satellite is sold to a foreign state or a company in another country – it is not clear whether in that case there can or should be a transfer of registration, or even of liability, from one state to another.

The UNCOPUOS has not adopted a new treaty since three decades. It has however made an important step forward when it adopted the UN Space Debris Mitigation Guidelines in 2007, on the basis of guidelines adopted earlier by the IADC.[6] The UN General Assembly endorsed the UN Space Debris Mitigation Guidelines in January 2008.[7] The Subcommittee agreed that "Member States, in particular space-faring countries, should pay more attention to the problem of collisions of space objects, including those with nuclear power sources (NPS) on board, with space debris and to other aspects of space debris, as well as its re-entry into the atmosphere".

There are seven guidelines, each of which has its own recommended practices and rationale/justification: (1) Limit debris released during normal operations; (2) Minimise potential for break-ups during operational phases, (3) Limit the probability of accidental collision in orbit, (4) Avoid intentional destruction and other harmful activities, (5) Minimize potential for post-mission break-ups resulting from stored energy, (6) Limit the long-term presence of spacecraft and launch vehicle orbital stages in LEO after the end of their mission, and (7) Limit the long-term interference of spacecraft and launch vehicle orbital stages with GEO region after the end of the mission.

Perhaps the collision between an Iridium satellite and a defunct Cosmos satellite in 2009 will give a new boost to the international community, convincing states of the need for further rules in this field, binding rules, rather than 'mere' guidelines. But although they are voluntary, their adoption by consensus and the adherence by many states can contribute to such rules eventually developing into rules of customary law binding on all parties benefiting from the use of outer space.

6. Exploitation of space resources

Exploitation of lunar resources is the 'next step' in the conquest of space, and mainly the reason why the 1979 Moon Agreement has remained of limited influence. The Moon Agreement is the only of the five UN space treaties that explicitly addresses exploitation, and discussions about the meaning of Article 11, declaring the Moon and its natural resources the 'Common Heritage of Mankind', have sparked heated debate. The Moon Agreement prescribes that an international regime must be set up to govern such exploitation, 'as such exploitation is about to become feasible', and in relation herewith the question of the review of the Agreement was foreseen ten years after its entry into force. The Agreement entered into force in 1984, but no decision about review was taken since—probably because exploitation is still not 'about to become feasible'. There are reports of Helium 3, Titanium, and possibly other resources, but so far no viable business can be expected.

The major challenge in this field is to find the right balance between 'benefit and interests of all countries' as proclaimed in Article I of the Outer Space Treaty, and the equally vital need for return on investment and legal certainty for entrepreneurs—that need has also been explicitly recognised in the 1996 'Space Benefits' Declaration.

Parallels for the regime governing the exploration and exploitation of the Moon can be found in the Law of the Sea (LOS) regime and in the Antarctica regime. The LOS regime also contains the term 'Common Heritage of Mankind' with regard to resources of the deep seabed. Subsequent amendments have attempted to bring the system more in line with political and economic realities, and thus more readily acceptable by all states. As far as the Antarctic regime is concerned, the situation is somewhat different as several states have claimed sovereign rights over the area, which have subsequently been 'frozen' but which are still 'around' (this is not the case for the Celestial Bodies or parts thereof). In 1991 the 'Consultative Parties' (i.e. the most interested parties with regard to these claims) decided to refrain from mining Antarctica and to 'commit themselves to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems and hereby designate Antarctica as a natural reserve, devoted to peace and science'. The mineral resources of Antarctica have not been declared the 'Common Heritage of Mankind'.

In light of this, one may wonder whether it is necessary to 'renegotiate' or otherwise amend the Moon Agreement, in order to establish an 'authority', like in UNCLOS, for example, or to transform it into something more similar to the Antarctic Treaty System. Currently attempts are being undertaken to 'revive' the Moon Agreement. Noteworthy is the 2008 'Joint Statement' in the UNCOPUOS Legal Subcommittee by the states parties, attempting to convince other states to ratify the treaty by highlighting its advantages.

7. Space tourism: aviation or space activity

Very soon we will be confronted with a new activity often referred to as (sub-orbital) 'space tourism'. Is it aviation or space flight, or something new? Are vehicles that will be used aircraft or spacecraft, or something new? Several 'space tourism' ventures are taking shape—somewhat slower than expected at the time of the groundbreaking Ansari X-Prize in 2004, but they are.[8]

One of the interesting questions that arise is whether sub-orbital space tourism will be regarded as an aviation activity or as a space activity, and whether air law or space law applies to it.

As is well known, there are many differences between air law and space law, mainly because air law is based on the complete sovereignty of the state over the airspace above its territory, while space law is based on the principle of freedom of use and exploration, and rules out any claims of sovereignty. The legal regime governing aviation is very detailed, efficient and well defined in terms of liability, registration, jurisdiction, traffic- and transit rights, certification of aircraft and crew, and other matters, so if sub-orbital space tourism were regarded as aviation, there would be no major problems or lack of rules. If however it would be considered as a space activity and would consequently be governed by space law, the legal scenario will be quite different and gaps may exist, because the rules are far less detailed and mostly regulate the relations between States.

The Outer Space Treaty did foresee that private entities would engage in space activities in Art. VI Outer Space Treaty, which makes a State internationally responsible for activities carried out by non-governmental entities, provided that it authorizes and supervises such activities. Yet one of the most essential topics for private operators, namely their exposure to second- or third-party liability is not addressed. The Treaty, as well as the Liability Convention, only addresses liability at the level of the States involved: there is no cap on the liability of operators, and no opportunity for passengers or third parties to present claims for compensation directly to the private operator.

In the United States, a temporary regime has been put in place in order to allow this new industry to make a start. US law addresses space tourism in a set of rules governing private human spaceflight, offering conditions that are less stringent than for classical transport. These rules apply at least until December 2012, but this period may be extended because commercial space tourism has not commenced as early as was expected. The FAA's Office of Commercial Space Transportation (FAA/AST) issues licenses and mostly focuses on public safety and safety of property.[9]

So, it can be seen that under current international or national air or space law there is no definite answer yet about the legal status of suborbital space tourism. On the other hand, it is very clear that space tourism will happen, if we believe market surveys that were carried out and looking at the considerable

waiting lists already in place, full of very rich people who want to experience weightlessness and see the curve of our blue planet from outer space.

8. Private property rights in space

Businesses like 'Lunar Embassy' sell plots on the Moon to interested buyers. They argue that although states are not allowed to appropriate (parts of) outer space, in accordance with Article II of the Outer Space Treaty,[10] this does not bind private citizens, so they can legally sell pieces of moon to private citizens. This argument is without legal ground—of course a citizen, who is a citizen by virtue of the state giving him or her that citizenship, cannot have rights that the state itself does not have—the famous *nemo plus*[11] rule applies!

As mentioned above, current attempts to 'revive' the Moon Agreement culminated in the 2008 'Joint Statement' in the UNCOPUOS Legal Subcommittee by the states parties. In that statement, they point out that in conjunction with the OST, the Agreement is helpful for rejecting 'idle claims to property rights' that have surfaced in recent years. Also, the IISL has issued two statements, in 2004 and 2009,[12] about claims to private property rights in space. The 2009 statement says: "International Law establishes a number of unambiguous principles, according to which the exploration and use of outer space, including the Moon and other celestial bodies, is permitted for the benefit of mankind, but any purported attempt to claim ownership of any part of outer space, including the Moon and other celestial bodies, or authorization of such claims by national legislation, is forbidden as following from the explicit prohibition of appropriation, and consequently is prohibited and unlawful."

9. Militarization and weaponization of space: back to where it all started?

Even though a certain limit on the military use of space is contained in the space treaties,[13] we must observe that this principle is continuously challenged in practice. Who does not recall President Reagan's 1986 plans for a Strategic Defense Initiative (SDI), also known as 'Star Wars'?[14] Can that qualify as 'peaceful use of space'? It does not involve a nuclear weapon or a weapon of mass destruction, although one might argue that a laser beam can cause mass destruction… In any event, SDI never happened (but it did lead to the US withdrawal from the ABM Treaty).

Among the more recent examples, we can refer to the 2007 shootdown of an old weather satellite by China, and the 2008 shootdown by the USA of one of its own satellites that carried a hazardous gas that would not burn up on re-entry and thus pose a threat to health. There has been much debate about whether these were the true reasons behind the shootdown, or whether it was a testing of military capacity to shoot down an object far away in space. Possibly the truth lies somewhere in the middle, as if often the case.[15]

China and Russia believe that a new international legal instrument is needed and they promote this in the UN Conference on Disarmament. Their view is that Transparency & CBM can be complementary to a new treaty, as an intermediate measure, but cannot replace a new treaty. The latest effort dates from February 2008, by China and Russia, in the framework of the UN Conference on Disarmament, and is named the Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, Threat of use of Force Against Outer Space Objects (PPWT).[16] So far, it has not gained sufficient support.

Also in this context, the EU Council proposed in 2008 a Draft Code of Conduct for Outer Space Activities.[17] The Code is currently still being worked on. The main objective of the EU CoC is to strengthen the safety, security and predictability of all space activities. Among the "general principles" we find the responsibility of States "to take all the adequate measures to prevent outer space from becoming an area of conflict", but this general statement is not supported by any specific commitments, and the need to prevent space weaponization is mentioned nowhere.

The US opposes the development of new legal regimes or other restrictions that seek to prohibit or limit US access to or use of space.

It is undisputable that satellites are essential for nowadays' military operations (Iraq, Afghanistan, etc.). Space has been, is, and will always remain, an area with so much military interest and involvement that it seems impossible to demilitarise outer space entirely. Efforts to do so are doomed to fail, and have done so until now.

10. Conclusion

The general legal framework for space activities under public international law as contained in the UN treaties is in place, and is sufficiently general and flexible to enable and encourage states to carry out space activities in an orderly manner. It contains the basic provisions that allow parties to address the legal implications of space activities. But it is also clear that the time has come for the international community to agree on the further development of these general principles, starting perhaps with space debris, imminent 'new' uses of space such as space tourism, or some of the 'age-old' issues such as the weaponisation of outer space that will continue to require our attention and vigilance. Whether such rules can be in the form of non-binding guidelines, codes of conduct and the like, or should be embodied in solid legal instruments creating rights and obligations remains to be seen. In any case, a guideline can very well lead to considerable state practice and *opinio iuris* and thereby automatically become binding upon states as rules of customary international law.

Endnotes

1. See also below, where space tourism is discussed.
2. They are: (1) The Outer Space Treaty (1967), the 'Constitution' of space law; (2) the Rescue Agreement (1968), dealing mainly with the legal status of astronauts in case of an accident; (3) the Liability Convention (1972), addressing the question of liability in case of damage caused by a space object; (4) the Registration Convention (1975), creating an obligation to register objects launched into space both with the UN and at the national level; and (5) the Moon Agreement (1979), addressing the legal status of celestial bodies and specifically the exploration and exploitation of natural resources of celestial bodies. The first three treaties were ratified by close to ninety states, the fourth by around fifty and the last only by thirteen states. Since the eighties, several sets of 'Principles' in the form of non-binding UN Resolutions were adopted on several topics. All texts, official titles and sources can be consulted on the useful website of the Office for Outer Space Affairs in Vienna, the UN office supporting the work of COPUOS. See http://www.oosa.unvienna.org.
3. This does not mean that COPUOS has lost its relevance; to the contrary. It has been able to adapt to the changing political climate and has recently made some important reforms allowing it to continue making important contributions to the further development of space law, albeit in a different form.
4. The IISL issued a 'Statement' on this topic in 2004 and is finalising a second statement. Shrewd businessmen are selling 'lunar deeds', others claim that the existence of private property rights is a prerequisite for exploitation of lunar resources, but these claims do not hold legal ground.
5. See e.g. http://www.esa.int/esaHS/iss.html, http://www.nasa.gov/mission_pages/station/main/index.html.
6. Interagency Space Debris Coordinating Committee, see http://www.iadc-online.org/. For the COPUOS guidelines, see the Report of the Scientific and Technical Subcommittee of 2007, UN doc. A/AC.105/890, chapter V & Annex IV. Note that a European Code of Conduct for Space Debris Mitigation was adopted by ASI, BNSC, CNES, DLR, and ESA, version 2.0 of 14/9/2007.
7. A/RES/62/217, accessible via http://www.un.org/ga/62/resolutions.shtml.
8. *See* a useful overview http://en.wikipedia.org/wiki/List_of_private_spaceflight_companies, and http://en.wikipedia.org/wiki/Space_tourism.

9. See Code of Federal Regulations (CFR), Title 14, Chapter III, esp. Human Space Flight Requirements (HSFR), 14 CFR §460, http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=6a5153b45a2675c8b05adfd8d7195483&c=ecfr&tpl=/ecfrbrowse/Title14/14cfrv4_02.tpl#300. *See* also Melanie Walker, *Suborbital space tourism flights: an overview of some regulatory issues at the interface of air and space law*, in 33 Journal of Space Law (2007), 375.
10. "Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means".
11. Nemo plus iuris transferre potest quam ipse habeat; no one can transfer more rights than he himself has.
12. See http://www.iislweb.org/docs/IISL_Outer_Space_Treaty_Statement.pdf and http://www.iislweb.org/docs/Statement%20BoD.pdf.
13. Article IV Outer Space Treaty, Article 3 Moon Agreement.
14. See http://en.wikipedia.org/wiki/Strategic_Defense_Initiative.
15. See the interesting article « Sense, nonsense, and pretense about the destruction of USA 193" by J. Oberg, March 2008, at http://www.thespacereview.com/article/1073/1.
16. See http://news.bbc.co.uk/2/hi/europe/7240796.stm. The Conference on Disarmament (CD) was established in 1979 as the single multilateral disarmament negotiating forum of the international community, see http://www.unog.ch under 'disarmament'.
17. Draft Code of Conduct for Outer Space Activities, http://register.consilium.europa.eu/pdf/en/08/st17/st17175.en08.pdf

PROPERTY RIGHTS IN OUTER SPACE: PERSPECTIVES AND INSIGHTS

Ketan Mukhija*

Abstract

During the last decade until now, the character of space activities has fundamentally changed from public purposes to commercial ones. In light of the fact that space activities have a significant impact upon the welfare of humanity and society, it is necessary that there exists clarity in usage of outer space to be able to have the most beneficial impacts on the society.

This paper assesses the legal regime for the protection of technology use and new inventions in an outer space. Taking into consideration the inventions in relevance to outer space activities, one can argue that space-related inventions can be made and can be used, either on earth or in an outer space. The fact that the property laws are developed in strong associations with territorial and sovereignty of state, whereas an outer space is outside any of such state's territory, is one of the several critical issues that this paper seeks to achieve clarity on.

The current corpus juris spatialis is vague and riddled with inconsistencies as regards the issue of establishing a concrete regime of property rights on moon and other celestial bodies or parts thereof. Hence, the paper seeks to delve into a thorough analysis and interpretation of the governing regime in the contentious arena, whereby I shall elucidate upon the gaps left and the consequent imparting of a nebulous character. Concerning the Moon Treaty, it introduces the much lauded and maligned concept of the "common heritage of mankind" to the considerations of space property law. Therefore, I would contend that the common heritage principle must be defined in light of the Third LOS Convention. I shall further seek to put forth cogent economic arguments, favouring a regime of private property rights in outer space, evidently reflecting the essential basis of all human behaviour, which has been historically (though non-euphemistically) called the "Tragedy of the Commons." Besides, the international regulatory regime presently does contain some provisions which are invaluable to private exploitation of lunar minerals. Emphasis shall be laid on kinds of moratoria, if any, feared by the developed countries: a legal restriction against mineral exploitation and a de facto restriction which results from the ambiguity of the current treaties. Finally, I shall suggest alternative models of working out an efficient as well as equitable Property Rights Regime in outer space, which would take into account the interests of both the developed and the developing world at the same time. Moreover, a more concrete and consistent legal framework needs to be established so as to promote commercialization that has changed the very approach towards space activities, including prospects of extraterrestrial mining, space tourism and habitation.

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Introduction

The international environment for space activity has undergone a sea change in the past two decades or so. Originally started for reconnaissance during the Cold War period, space activities have now percolated to just about every other welfare activity. Needless to say, the processes of commercialization and privatization have followed and altered the very course of such activities.

Corpus Juris Spatialis has always regarded that the outer space cannot be appropriated by any State for its own purpose, the research and exploration must be carried out for the benefit of mankind and not for any selfish needs of the State. The two treaties on Outer Space also state that "outer space is the province of all mankind" and that it shall be "developed for the benefit of all mankind." The Moon Treaty of 1979 states that the Moon is the "common heritage of all mankind", which suggests that the treaty read in its literal sense negates the establishment of private property rights on the Moon and the Space. On the other hand, the advocates for the private property in space point out the Deep Sea Bed analogy to further their cause. There are a host of jurisprudential arguments which strongly favour the establishment of a private property rights regime on the moon.

Another very strong argument in favour of the private property rights regime is the environmental concern that of preserving the earth by looking at an alternative reserve of resources.

The paper seeks to carve an argument in favour of the regime of private property rights in outer space, evidently reflecting the essential basis of all human behaviour, which has been historically (though non-euphemistically) called the "*Tragedy of the Commons*." The international regulatory regime presently does contain some provisions which are invaluable to private exploitation of lunar minerals. Thus, the aim of the paper is to work out an efficient as well as equitable *Property Rights Regime* in outer space, which would take into account the interests of both the developed and the developing world at the same time.

Moreover, it shall advocate a more concrete and consistent legal framework that needs to be established so as to promote commercialization that has changed the very approach towards space activities, including prospects of extraterrestrial mining, space tourism and habitation.

It is well-established that exploitation of the moon is extremely profitable and commercial enterprise values the moon for its mineral resources and their uses. The minerals found in abundance on the moon can be used in their natural form or refined into structural, thermal, and electrical materials. Moreover, while the private enterprise receives the possible financial benefit from the risky undertaking, people throughout the world stand to benefit because space resources will conserve the Earth's scarce natural resources, further scientific discovery, and boost the world economy.

Legal Framework For Outer Space

Though the Outer Space Treaty (hereinafter referred to as 'OST') prohibits appropriation of celestial bodies, it does allow space faring nations to have a degree of certainty with respect to ownership of objects launched into space and material harvested from space. However, the Moon Treaty has introduced unacceptable ambiguities to the space property rights framework.

Any company planning to mine lunar minerals will require enormous amounts of capital from investors. Before making the massive capital investments needed to exploit the moon, private investors will insist on three conditions. First, they need the potential to earn profits. Second, in such a technology-based industry, they need to make an attractive return on their research and development investment. Finally, and most crucially they require a stable legal environment.

Not delving into the economics of the first two points / conditions, it is indeed incumbent on our part to analyze the third condition, and elaborate on it in greater detail. The legal environment concerning lunar mining, though, is presently unstable because the two major aspects, namely, the retention of profits and the prevention of technology transfer, remain unresolved. This instability has undoubtedly hindered investment in lunar mining and is preventing any commercial exploitation of lunar minerals. Currently, the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies ("Moon Treaty") controls exploitation of lunar minerals. This treaty declares the mineral resources of the moon the "common heritage of mankind" (hereinafter referred to as "CHM"). The ambiguity and ramifications of this phrase have left space law one of the most unstable areas of international law. As more nations and commercial enterprises prepare to embark on space ventures, the need for certainty in international space property rights law becomes increasingly critical.

Common Heritage Of Mankind: Conflict Between The Developing And Developed Worlds

Embarking on a critical conceptualization of the notion, we have two distinct interpretations of the CHM principle which exist: *the view of the developing nations and the view of the developed nations*.

According to a restricted interpretation forwarded by the developing nations, under the CHM principle, no one legally owns international areas designated as part of the "common heritage of mankind," though theoretically everyone manages the areas. National sovereignty does not exist, nor its attendant legal attributes and consequences. Under a CHM regime, no state or group of states could legally own any part of an international area. The international community, through appropriate treaties or norms of international law, would administer the area. The primary consideration for an individual state is access to the CHM area, not ownership.

Generally, expressions of territorial sovereignty by states (national appropriation of territory) are precluded in the administration of any CHM area. Characterizing "mankind" as steward of any area creates a legal regime which pays due regard to the interests of future generations, while ensuring fair present use. Environmental goals like protection and conservation operate not only as moral guides, but acquire the force of law. Implementation of the CHM principle includes creation of income- sharing schemes among states, or establishment of multilateral controls for redistributing technologies and wealth among states. Though there is no single, universally accepted definition of CHM areas, most authorities would probably agree on these five elements:

1. *The CHM area is not subject to appropriation;*
2. *All states share in the area's resource management;*
3. *States must share the benefits derived from exploitation of area resources;*
4. *The CHM area must be dedicated to peaceful purposes exclusively; and,*
5. *The CHM area must be preserved for posterity.*

On the other hand, developing nations, theoretically and practically favor broad application of CHM, regarding it as a key "*instrument for the radical revision of existing legal regimes governing the activities of states in the use of areas and resources beyond the limits of national jurisdiction*." Accordingly, CHM gives collective humanity property rights analogous to ownership, implicitly rejecting freedom of access to areas and their resources.

These antithetical approaches to areas outside unilateral jurisdiction create difficulties in forming a common ground of understanding upon which to implement the CHM principle. Complete adoption of either approach engenders inequities and contravenes express provisions of international law. Obviously therefore, the interpretation of the OST and the Moon Treaty is rendered quite ambiguous and nebulous.

Harmonising Conflicts

At this juncture, it becomes incumbent on our part to resolve the impasse between the developed nations and the developing nations, by a principled rejection of the developing states' "*common property*" theory and their strident claims for benefits from resource exploitation.

Use of proprietary language by the developing nations at this stage complicates matters and leads to semantic disputes. The expectation that developing nations should reap a disproportionate measure of benefits from the developed nations' outer space exploitation activities is unreasonable, even if only based upon the capital necessary for unilateral space travel and the safety risks involved.xvii Rejection of the developing nations' "common property" interpretation of the CHM principle does not mandate acceptance of the developed nations' theory, which is also flawed.

It is unlikely the developed nations, once they obtain resources at high risk and cost, would "equitably" distribute space resources "*for the benefit and in the interests of all countries*." The instability of space law is a symptom of a broader problem--the current distribution of power in international politics. The developed nations, those which possess the technology and private industry to exploit the moon, are severely outnumbered (and outvoted) by the developing countries, who insist upon a sharing of profits and technology anathema to private investment. As a result, the developing countries have kept all countries from reaching the moon and let a valuable source of alternative energy lie unused. Since using these minerals is in the best interest of all the nations of the world, they ought to be retrieved and for doing so, we inevitably require private entrepreneurs, who require legal stability. Thus, a binding system of law must be devised to provide incentives for commercial ventures to act and to satisfy the needs of the developing countries at the same time.

Future Legal Challenges

Taking the thread forward, concerning doubts that lingered concerning ownership, as opposed to sovereignty, they were dismissed with the drafting of the Moon Agreement of 1979. The wording of the Agreement, this time, is very clear. Article 11 first states that "*the moon is not subject to national appropriation*." It goes on to provide "*neither the surface, nor the subsurface of the moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization, or nongovernmental entity or any natural person*." While the Moon Agreement is not yet applicable to the major space powers, it is nonetheless an important part of the corpus juris spatialis, and the intent to preclude ownership of outer space property is clear. Hence, the issue at hand is whether we are then left with just a singular rule regarding outer space property, namely, "*to share and not to monopolize no matter by whom or by what means such claims may be asserted?*"

On a close scrutiny of the provisions, it is evident that the Moon Treaty has not yet created an international regime based on CHM to govern the exploitation of lunar minerals--it only requires that parties to the Treaty do so when "such exploitation is about to become feasible." From this perspective, they argue, the Moon Treaty does not currently hinder commercial development of the moon because feasibility (and thus the CHM-based regime) does not yet exist—*res communis* and favorable ownership rights still do.

This argument misconstrues the nature of commercial investment. Even assuming exploitability is not feasible and *res communis* governs, a company preparing to launch a lunar mission will do so on the assumption that *res communis* does indeed govern. But once that mission succeeds, exploitability is thereafter feasible. Once feasible, the Treaty requires the establishment of the regime, which will then impose ex post facto restrictions on mining and profit-keeping—a result which is no longer *res communis* and which thereby shatters the

assumptions upon which the company based its initial mission. This is the essence of the instability surrounding the regime. Any rational investor will be able to see this vicious circle before he invests and will place his money elsewhere. No mineral missions will be launched if there is no investment. Without missions, exploitation will never become feasible, so that a regime will never be created and the minerals will never be mined. However, creating a regime now, whether or not exploitation is feasible, will circumvent this entire morass and permit exploitation of the moon by providing stability.

The Moon Treaty declares that one of the goals of the regime is to ensure "equitable sharing of the benefits derived from those *natural* resources." Here, the greatest uncertainty arises from the meaning of "equitable," and more particularly, how this will impact the amount of profit private companies will be permitted to keep. Developed nations and commercial enterprise are willing to tolerate some "equitable" sharing, perhaps based on contribution to a particular mission or to space technology in general. Developing countries interpret "equitable" as "equal" and desire wholesale redistribution of wealth. Until a meaning is defined and the potential distribution of profits is settled, no investment will occur.

Need For Clarity In Legal Framework

Investors without security?

The problem is how to maintain the interest and investment of the individuals and states on the earth that do possess the power and resources to explore space without being able to guarantee them a stable environment in which to establish settlements on the moon or other celestial body. Ownership and sovereignty accomplish similar purposes in the modern world. They both provide a sense of security. The security lies in the knowledge that the land under the home, factory, or school that is built will not be yanked out from under the establishment in favor of someone else's idea of what should be done with the area involved. Settlers on the moon or other celestial bodies are then left with the question posed by Professor Esquivel de Cocca in his 1992 article: "*In the absence of sovereignty and of jurisdiction and a control authority, who leads and maintains order within the settlement?*" Without order, chaos reigns, and where chaos reigns, investors and new settlers are not likely to follow. Thus, the future of space exploration and settlement depend on forming provisions to be added to the corpus juris spatialis that will provide a measure of security to the investors and settlers who embark on journeys of exploration beyond current earth borders.

Ethical standards

Another difficulty in considering ethical standards for the commercialization of space is deciding whose ethical standards we accept? For example, do we adopt the ethical standards provided us by American

politician's, governments (including those other than US), world leaders, religions, corporate leaders, academics , ethics professors and ethicists, authors and writers, Hollywood, family members, a good friend, or simply a mentor? This is a complex decision to make, especially given the globalization that exists in commercializing space. When the globalization factor is added to the equation, the above question is broadened significantly to include the fact that value and ethical system vary greatly based on culture and custom, not just within countries, but even more so across national and international boundaries. And of course, one must not forget that a decision maker or groups of decision makers need to be determined so the issue of how that process unwinds even further complicates the initial stages of the problem.

Even with these above complications to the issue of ethically commercializing outer space, it is likely a given that as a people more than as any particular nation, we are going into outer space in the coming years in ways quite different from our previous space history.

Possible Alternatives For Future

Since the Moon Agreement was finalised, there have been many proposals relating to legal régimes for the exploitation of celestial body resources, ranging from a basic implementation of the terms of the Moon Agreement to a complete overhaul of the existing space law framework. There is considerably scholarly debate over the nature, composition, powers and functions that such a régime should have and it is unlikely that an acceptable régime could be agreed upon and implemented in the near future.

An autonomous panel of individuals who are not dominated or controlled by any nationalistic entities should govern the régime. Webber proposed that a small working group of delegations within COPUOS could formulate a list of space law scholars with the qualifications to be considered. These nominees would not be approved without obtaining the consensus of COPUOS members. 'The COPUOS working group should nominate individuals with the legal and technical expertise necessary to guide lunar resource development and a global vision that transcends national boundaries' and persons that represent their governments in any official capacity should be excluded from selection.

The régime would mainly constitute a licensing system that takes into consideration commercial viability, future access and environmental protection. This licence, to be granted for a sufficient period of time, should not be regarded as a conferral of permanent property rights over the area but the licensee should exclusively control the resources. Under such an international régime, the licence should be sufficient to provide adequate protection for investors seeking security in their investments.

As regards the sharing of profits, some scholars have suggested that a taxation system that would fund the international authority and even a moderate sharing of profits to developing countries. This is unlikely to be acceptable to

developed countries, such as the US, as this would provide an uncomfortable precedent for international organisations being given the power of taxation over the international activities of private individuals.

Realistically, notwithstanding the views of the entrepreneurs, the developing countries are likely to insist on a moderate sharing of profits as a minimum requirement. Hoffstadt proposes a Lunar Commission that sets a maximum return on investment for the privately-owned company in a similar way that Public Utilities Commissions in the US operate. The company would keep any profits under this maximum and any surplus is either split between the company and the Commission or given totally to the Commission.

The Commission would adjust the maximum periodically, keeping into account the commercial risks involved and the level required to attract investors to any commercial space venture. The portion of the surplus collected by the Commission could be used to defray its own costs or channelled into an international organisation such as the World Bank and distributed to the developing nations. Such a system should be satisfactory to the majority of developing countries.

Conclusion

The arena of establishment of private property rights is one aspect of the plethora of issues that need to be settled, like those of weaponisation of outer space, environmental degradation and combating of the same in the global commons, space tourism, and allied ones. As is well-established, customary international law imposes on all states an obligation to ensure that activities within their control do not injure other states, which in the face of widespread and consistent state practice has changed primarily into one of prevention and control. However, the existing legal framework abysmally fails in establishing a concrete liability regime in dealing with issues arising in outer space, high seas, Antarctica, etc. and other areas which have been aptly be described as Common Heritage of Mankind.

In order to manage these problems, it is proposed that a global organization be set up to regulate and administer properties found beyond the earth's atmosphere. The organization will have the duty of holding all the lands found in outer space as representatives of the people of earth, since all persons of earth "own" everything in the outer space found within our solar system in undivided, un-transferrable shares. Once a settler or investor can demonstrate to the organization that he/she has either occupied the outer space area, or improved it (including establishment of a resource extraction scheme) for a consecutive period of six earth months, he/she may submit an application for a lease to the organization.

The organization shall consider the lease, and extend exclusive use rights in accordance with principles set out by it. Regarding the exploitation of resources, a more defined scheme is also enacted. When production begins, the investor

shall be allowed to recover all costs incurred in the establishment of the extraction process. When costs have been recouped, the investor shall have six weeks of production wherein he/she shall retain control over 100% of the resources and profits. After that time, investor shall, in keeping with the theory that outer space shall benefit all mankind, split the benefits of production with the global organization at a rate of 60% for the investor, 40% for the organization. The organization will then determine how to disperse its 40% share, with special consideration being given to developing nations.

A more defined base from which to plan, outer space will become a much more viable alternative for exploration and development. The above proposed alternatives attempt to assure incentive and reward for those who make the initial investment in outer space, while maintaining the underlying theory of Space Law.

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ISSUES IN PROTECTION OF INTELLECTUAL PROPERTY CREATED IN OUTER SPACE: AN INDIAN OUTLOOK

KD Raju*

Summary

The 21st century, with the entry of number of governmental and non-governmental actors in space exploration provides a great opportunity to understand, discover and invent. The national intellectual property regimes are generally based on territoriality. The application of national law to situation in space might cause problems. The focus of this paper is to discuss the present space law regime vis-a-vis its implications on intellectual property protection of inventions made in the space. The first part introduces the subject. The second part examines the present space law regime and possible approach to intellectual property protection and liability of infringement in space. The third part of the paper provides a basic view of patentability criteria of inventions made in space. Trade secret protection is another area of discussion in collaborative research. Remote sensing principles and copy right protection is analyzed along with international law principle on remote sensing. The fourth part examines the Indian space activities and IP protection. The paper concludes that the present regimes are not sufficient to deal with inventions made in space and appropriate amendments should be made to the existing regimes to include inventions made in the space. Other aspects like, criminal, civil and tortuous liabilities are not part of this study.

Key Words: Intellectual Property Protection, Space, India.

1. Introduction

The scientific endeavour and quest for knowledge had always been the main driving force for any exploration, space exploration in particular.[1] The historic launch of Sputnik by the then Union of Soviet Socialist Republic (USSR) on October 4, 1957 laid the cornerstone of space race in the history of mankind.[2] In November 3, 1957, Sputnik II was launched with higher payload and carrying a dog named Laika.[3] This was followed by the United States (US) with the launch of Explorer I in January 31, 1958. The first spaceflight carrying human was undertaken by the USSR on April 12, 1961 and Yuri Gagarin travelled in the Vostok-1 mission.[4] There after several countries for e.g., China, European Union, India and many others have joined the space exploration and application programs. The monopoly of governments in space missions are going to be end with the launch of "Virgin Galactic," a private space ship (rocket plane) basically meant for space tourism by an American company located in New Mexico. In

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December 2009, the company unveiled its first space travel schedule within two years.[5] This is declared to be the first manned commercial spaceship. Space law is mostly derived from international law. The scientific programs undertaken in space mission raises many questions on international law and the creation of new technological innovations and proprietary rights raises many questions on intellectual property (IP) protection at space.[6] This assumes even more importance with the entry of private entrepreneurs in space exploration for scientific purposes.

The conventional attributes of property rights give the power to exclude others from enjoying it.[7] On the other hand, space law mostly propagates that space is a common province of mankind.[8] These two approaches may often collide. The Moon Treaty goes further by declaring that the moon to be the common heritage of mankind. The concept of common heritage of mankind and proprietary rights won't go hand in hand. Private commercial investors argues that the absence of property rights prevent them from getting external financing and getting appropriate income from their investments. Thus the argument was that lack of sovereignty in space jeopardizes their ability to make profits from investments.[9]

The absence of an international governing law and standard on rights and liabilities of IP protection for inventions made in space may require a sui-generis regime to deal with the situation or necessary amendments to the existing space law. The space research and huge investment by governments and private corporations requires specific regimes and protection of their IP generated in the space. Hence, it is imperative that the space faring nations should develop an international regime to foster space related science and technology research.

Presently the US, China and Russia have accomplished manned space flight. The EU, India and Japan have declared their intention to have manned space flight in the near future. The collaborative space missions are common at present, like the CARTOSTAT-2A launched by India along with eight nano-satellites of various countries into the orbit in 2008.[10] Collaborative research raises many questions of IPR enforcement at different jurisdictions and the jurisdiction of infringement disputes resolution is not clearly mentioned in any of the agreements.

The property rights include intellectual property rights (IPRs) include industrial property rights like patents, trademarks, copyrights and database ownership. All these rights exclude others from enjoying it for a limited period of time. Next part analyzes the existing space law and its accommodation of intellectual property rights.

2. International Law on Space and Intellectual Property Protection

The definition of space is vague and not defined in any international conventions. A universally accepted definition has not yet been adopted. The entire international law on space is contained in the following treaties and principles adopted by the UN from time to time.

Treaties

1. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967.
2. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 1968.
3. Convention on International Liability for Damage Caused by Space Objects, 1972.
4. Convention on Registration of Objects Launched into Outer Space, 1976.
5. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 1984.

Principles

1. Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, 1963.
2. Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, 1982.
3. Principles Relating to Remote Sensing of the Earth from Outer Space, 1986.
4. Principles Relevant to the Use of Nuclear Power Sources in Outer Space, 1992.
5. Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, 1996.

The treaties and principles relevant to this paper discussion, "IP protection in space" has been examined below.

The earliest treaty on the space law is the Multilateral Treaty on *Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and Other Celestial Bodies*, Jan. 27, 1967 (Outer Space Treaty: OST).[11] The declared object of the OST is to "contribute to broad international cooperation in the scientific as well as the legal aspects of the exploration and use of outer space for peaceful purposes and the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development.[12] The treaty talks about freedom of exploration of outer space and other celestial bodies, non-appropriation of outer space, the exploration in accordance with the principles of international law and UN principles, demilitarization of outer space, retention of sovereign rights over the space crafts launched and liability for space activities.

Article II of the treaty states that "outer space… is not subject to national appropriation by claim of sovereignty…" the treaty declares that the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind.[13] It stipulates that the use of space must be for the benefit of all nations regardless of their level of economic or scientific development.

Article VIII of the treaty provides that each party launches an object into outer space whose territory or facility an object is launched shall have jurisdiction and control over the persons on board. Participation of private entities like "Virgin Galactic" in outer space activities has not yet been contemplated in international law.[14] However, Article VI provides that "States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities." Even though it appears that "non-governmental entities "include private actors, it is not clear whether "national activities" include the activities of private companies or consortium of countries or personnel on board at the spacecraft and whether the registering country is liable for such activities.[15] Furthermore, the treaty imposes an obligation on nations conducting outer space activities to inform the Secretary-General of the results of such activities.

All the spacecrafts have to be registered with the UN under the Registration Convention, 1967. It also provides that "States shall bear international responsibility for their national activities in outer space and refers to the State on whose registry an object launched into outer space is carried…"[16] The jurisdiction is mostly explained as nationality rather territoriality. The liability of what is happening inside the spacecraft is clearly fixed in the convention as the liability of the launching state.[17] Here the "launching state" is charged made responsible to ensure that a private actor in outer space is acting in conformity with the OST. Article 1 of the treaty defines the launching state as:

(1) A State which launches or procures the launching of a space object;

(2) A State from whose territory or facility a space object is launched.

One way it can be claimed that every space station is a part of the launching country. However, US courts refused to implement US patent laws and exercise jurisdiction over ships and plane on or over US airspace.[18] The US government, in order to overcome these restraints imposed by the judiciary, has enacted legislation. The 1988 Space Station Intergovernmental Agreement (IGA)[19] exempts the applicability of 35 U.S.C Ş, concerns the filing of patents in foreign countries. The parties agreed that respective national legal regimes will be applicable in case of any intellectual property infringements by other partner governments.[20] In the event an invention occurs on the Space Station, the country of inventorship will be determined by the ownership and registry of the Station's element in which the invention has taken place.[21] This does not impact the

ownership of the invention, not does it preclude the right to file for a patent in multiple countries. In 1990, the US enacted Section 105 of *Patent Code* which is known as *Patent in Space Act*.[22] The Act stipulates:

> Any invention made, used or sold on a space object or component thereof under the jurisdiction or control of the US shall be considered to be made, used or sold within the US.

The language used here is "jurisdiction or control" and not "jurisdiction and control" used in IGA which conform to Article VIII of the OST. However, the above provision is subject to special agreement between the parties, if any other state launches space craft from US. This made the US to extend its patent law to inventions in space on US registered space objects.[23] It means that all inventions made in the space craft will get the same priority as if it had taken place in the US.[24] A space activity can invoke infringement of a US Patent.[25] Moreover activities taking place in the space will be considered as occurring within the US for "prior art" purposes.[26] The case law in this area is scanty but the US courts applied US laws to deal with government infringement of private patents.[27] In *O'Hair v. Paine*, an interesting question arose as during the launching of Apollo 8 and 11, whether the religious statement made by the astronauts in space violated the American Constitution. The court found no constitutional violation by NASA.[28]

The *Liability Convention, 1972* talks about payment of compensation in case of damage caused by space objects to person and property. The claim can be made against the launching state by natural or juridical persons.[29] If multiple states are involved in launching of a satellite Joint and several liability is fixed under Article V.[30] So far the *Moon Treaty 1979* has been signed by only eight countries; most of them are related one or other way to space activities except the major space explorers including India.

3. Problems in Intellectual Property Protection in Outer Space

Patents were granted for inventions as early as 1443, and the text of the oldest patent law in the world, officially announced as "Inventor Bylaws" was created in 1474 in the Venetial Republic.[31] In England, the patent law was enacted in the name of "Monopoly Act" in 1624. In US, patent protection provisions are explicitly provided in the Constitution itself. It provides that: "... in order to promote progress of useful technology and sciences .... the parliament .... shall grant limited exclusive rights for a certain period of time ..... to inventors." The patent law of 1790 was enacted in line with these provisions. It is clear that the mandates of the subsequent international agreements are to promote the protection of industrial property.

The patent rights are usually territorial in nature and it is valid only in the country where it was granted. Neither the national laws nor international conventions (multi-country protection) like Patent Co-operation Treaty (PCT) deal with infringements of inventions used in or made in the outer space. The

commercialization of space technologies require strong patent protection for technologies developed in the space. Liability for an existing patent infringement at the space has to be addressed by setting international norms through existing intellectual property regimes like the Trade Related aspects of Intellectual Property rights Agreement under the World Trade Organization (WTO).

The Paris Convention 1883 on intellectual property is the oldest one for the protection of industrial property not only on inventions it includes trademarks, service marks, industrial designs, utility models, appellation of origin etc. Under the Paris Convention, contracting parties granted right of priority in other states, if they are claiming the rights within 12 months from filing of the patent. The later applications will not be affected by the publication of the prior invention. The substantive provisions of the Paris Convention were included in the TRIPs agreement and applicable only to TRIPs members. Those countries that are not members of the Paris Convention are excluded from this agreement. TRIPs provided additional standards for all forms of intellectual property. The TRIPs agreement was signed by most of the space technology countries except Russia.

The PCT is another agreement concluded in 1970 and currently 142 countries are parties to it. PCT facilitates international procedures by multi-country registration of patents by filing of an application in a single office without delay and cost effectively. Before the PCT system, an applicant has to approach individual patent offices for registration. However, this multi-country registration arrangement does not provide an international patent rather it is largely a treaty for rationalization and cooperation with regard to the filing, searching and examination of patent applications and the dissemination of the technical information contained therein. India acceded to the instrument in 1998 as 98th contracting party. Perhaps PCT provides a possible inexpensive and less cumbersome way of filing patents in all countries involved in space related activities.

The patent laws of every country normally explain the basic patentability criteria envisaged in the TRIPs agreement which is novelty, non-obviousness and industrial application. These criteria may have an adverse bearing on the inventions made in the space and protection of patented technologies in the space.

3.1 Patentability of Inventions Made in Outer Space

Patent rights are strictly territorial in nature where it was granted. With huge investments made in to space missions for scientific research by countries individually and collectively. It is agreeable that the intellectual property value of space technologies is enormous and in normal parlance the ownership questions of inventions are primarily with the creator. This is applicable to inventions made in space. In respect to joint ownership of space stations and the resultant inventions made in such space stations makes it difficult to determine the ownership rights and place of registration of patents. In a first-to-file patent

system, time and place of invention are irrelevant. Most of the countries use first-to-file system for the determination of priority. In a first-to-file system, when more than one application claiming the same invention is filed, the priority of a right to a patent is based on the earlier-filed application.[32]

Only US, Canada and Philippines follow first-to-invent system.[33] First to invent system differs from first to patent system and the place of invention is critical for first-to-invent system. The US follows the first-to-invent system under which it considers the inventor's date of invention as date of conception. The person who converted the application into practice first will be entitled to get the patent, not the first applicant. Actual and constructive reduction into practice should be distinguished. All other countries in the world follow the first-to-file system where the first applicant gets the patent irrespective of the date of invention. It is not possible to determine always that at what time the invention is made. Laboratory notebooks and other records are usually used for proving the claims. The inventions made in the space, the territorial rules will apply for patenting of such inventions. It is not clear how the inventor will prove that the experiment made and practiced in the space or whether it will exactly work in the earth as that of space. It is also questionable the patentability in the case some of the experiments made in space and it practiced in earth.

The second criteria for patentability are the non-obvious character of the invention which was not disclosed earlier. There is no way to determine the prior art disclosure of inventions made in the space. It means that on the date of application, the invention should not be disclosed. The inventions taking place in a spacecraft are shielded from public knowledge like experiments done in a laboratory. The patentability criteria will be protected until it has been disclosed to the public or commercialization of the technology. The unintentional broadcasting of news regarding space activities will invalidate the claim of patent protection. Hence, handling of inventions made in the space should be handled carefully. On the other hand, these restrictions prevents the right of the agency to inform the world about their inventions in the space and the right of the public to know about important scientific developments until the patent is filed on the ground.

Now there is lot of collaborative efforts to send most of the space vehicles by consortium of countries. The ownership of such patents produced by joint ventures of different countries makes the matter more complex. Such partnerships are based on specific agreements and the ownership of patents is also based on the agreements between the parties. It is advisable to agree upon the extent of protection and commercial benefits before sending the spacecraft and inventions. The entitlement of legal rights should be clearly mentioned in the agreement prior to launching. In a team effort, the question of who is an inventor is a critical question in the determination of proprietary rights.

3.2 Trade Secrets

Any company or a consortium involved in the production of new technologies must protect their trade secrets. The classification of technologies and multiple protections should be the part of the intellectual protection policy of the company. The protection of confidential information is another task in all co-operative projects. It is better to have separate agreements for individual projects. It is fundamental to the maintenance of a trade secret that it be kept confidential and not be disclosed to others except under circumstances and with agreements which recognize the holder's trade secret rights. This is important in the background that in most of the counties the nomenclature of the patent law is same, but there is no uniform law in countries to protect trade secrets and it substantially varies from countries to countries.[34] The absence of specific agreements will make it impossible to protect the confidential information of the organization.

Another area where the conflict of interest is in IP rights in space is infringement of any existing patents of third parties. It is advisable to take licenses from the existing inventors on likely infringements in the space.

3.3 Copyright in Remote Sensing Data

Copyright protection is available for literary and artistic works. The protection is for the manner of expression of original works fixed in a tangible medium. It does not protect ideas. *The Berne Convention for the Protection of Literary and Artistic Works, 1888* is the oldest international instrument which provides copyright protection in the member countries. This agreement facilitated better protection of copyright all over the world. It protects literary, scientific and artistic domain and all sorts of writings, photographs and maps.

The use of remote sensing of the earth by satellite has grown tremendously since the US launched the first such satellite, Landsat 1, in 1972. In 1984, a private company named Earth Observation Satellite Company (EOSAT) was licensed to do the remote sensing under the *Land Remote Sensing Commercialization Act, 1984*. The raw data or primary data[35] was purchased by the data enhancing Industry and sell the processed data[36] for profit.

The OST provides that "The States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities…" it is not clear this responsibility will include liability for any copyright infringement by state parties or non-governmental entities in the space.

The United Nations (UN) has come up with international regulations on remote sensing when it adopted a resolution entitled *Principles Relating to Remote Sensing of Earth from Outer Space*.[37] It provides that "Remote sensing activities shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic, social or scientific and technological

development, and taking into particular consideration the needs of the developing countries."[38] If these principles had the force of a treaty, which they do not, intellectual property rights in enhanced data would not be possible.

Basically this agreement recognizing each country's sovereignty over its own wealth and resources, and also it attempts to prevent an entity from using information about a sensed state to exploit the state's resources. The processed satellite information is copyrighted and it was argued that this will reduce the accessibility of such data to users like developing countries.[39] However, it is necessary to protect the enhanced data produced commercially by this industry from piracy. Principle XV of the UN document stipulates that "any dispute resulting from the application of these principles shall be resolved through the established procedures for the peaceful settlement of disputes." Hence, it is not clear whether this provision will include disputes as to IP protection of data as well.

The *Berne Convention* protects the processed data and the space conventions and principles protect the interest of developing countries and purchases of processed data. With the strict implementation of remote sensing principles of the UN, the IP protection of remote sensing data will be difficult under the existing regime.

4. Indian Space Activities and Law on Intellectual Property Protection

India is emerging as a space power in the 21st Century. Its space programme has started in the 1950s as a part of the department of atomic energy by the visionaries Homi Bhabha and Vikram Sarabhai.[40] The formal programme had a modest start in 1962 with the constitution of Indian National Committee of Space Research under the chairmanship of Vikram Sarabhai.[41] India started its space operations by launching its first rocket on November 21, 1963. In 1965, India established its Space Science & Technology Centre (SSTC) in Thumba. Indian Space Research Organisation (ISRO) formed under Department of Atomic Energy in 1969. The Government of India established the Department of Space in 1972. The ISRO was brought under the Department and the space programmes were executed by ISRO and it become a government organization in 1975.[42] In 1975 India launched its first satellite remote sensing satellite Bhaskara-1 and 2, followed by other satellites like APPLE and Rohini. India sent its first astronaut Rakesh Sharma to the space in collaboration with USSR (then) in 1984 in space station Salyut -7. Indian Remote Sensing Satellite (IR) System was commissioned in 1988.[43] The Antrix Corporation Ltd., established in 1992, a commercial entity of the Department is dealing with marketing of various commercial space products. For the last four decades India has launched more than 50 satellites for scientific and technological applications.

In the space sector, India (ISRO) and Canada (CSA) signed an interagency Memorandum of Understanding (MOU) in 2003, which provides for space cooperation with the rapid development and equally fast rate of commercialization of space science and technology, space-related products and

services are becoming elements of significant commercial value.[44] On February 1, 2008, both American National Aeronautics and Space Administration (NASA) and ISRO signed a framework agreement in order to continue and expand their space related cooperation.[45] India signed Framework Agreements with Argentina, Australia, Brazil, Brunei Darussalam, Bulgaria, Canada, Chile, China, Egypt, European Centre for Medium Range Weather Forecasts (ECMWF), European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), European Space Agency (ESA), France, Germany, Hungary, Indonesia, Israel, Italy, Japan, Kazakhstan, Mauritius, Mongolia, Myanmar, Norway, Peru, Russia, Spain, Sweden, Syria, Thailand, The Netherlands, Ukraine, United Kingdom, United States of America and Venezuela.[46]

In April 2008, Antrix launched a remote sensing satellite, CARTOSTAT-2A along with eight nano-satellites of various countries into the orbit.[47] The company is marketing Indian remote sensing data. In October 22, 2008 India entered into another era of space research by launching a spacecraft into the moon under the name Chandrayaan-1.[48] The prime objective of moon mission was to finding traces of water on the lunar surface besides mapping minerals and chemicals on the Moon. The experiments conducted by the mission revealed the presence of hydroxyl and water molecules in moon.[49] Now India is planning to launch its first manned mission in 2015.

The development of its own technologies and collaborative efforts made India a space power and used those technologies in a variety of applications like telecommunication, remote sensing, meteorological observation, radio and television broadcasting, satellite aided rescue and operations, navigation and mobile satellite communications. The National Remote Sensing Agency is vested with the authority of acquiring and dissemination of remote sensing data for value. The *Remote Sensing Data Policy (RSDP) of 2001* provides that all data of resolutions up to 5.8 m shall be distributed on a nondiscriminatory basis and on "as requested basis."[50] The policy doesn't talk about the intellectual property aspects of remote sensing data. Government of India come out with "Satcom Policy" in the 2001 which paved the way for commercialization of Indian satellite communication. India allowed TV broadcasting and up linking through Indian satellites.

4.1 Indian Compliance with International Space Law

India is a party to four out of five UN treaties on outer space law. They are: (1) Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967; (2) Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, 1968; (3) Convention on International Liability for Damage Caused by Space Objects, 1972; and (4) Convention on Registration of Objects Launched into Outer Space, 1976. However, India is not a party to Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, 1984. India is also party to a number of space principles adopted by the UN General Assembly such as Declaration of Legal Principles Governing

the Activities of States in the Exploration and Use of Outer Space; Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting; Principles Relating to Remote Sensing of the Earth from Outer Space; Principles Relevant to the Use of Nuclear Power Sources in Outer Space and Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries.

India doesn't have a space law to enable the rapid development of space research and fixing liability under the international space law. However, the government started commercialization of the space activities including launching of satellites for other countries.

4.2 Indian Patent Law

The Indian patents legislation dates back to 1856, when it was enacted in line with the British Patent Act of 1852. However a full-fledged legislation was passed in 1911 named Indian Patents and Designs Act, 1911. After Independence Indian Government appointed Justice Rajagopala Ayyangar Committee and based on its report Indian Patents Act 1970 was passed, which prevailed over a period of three decades until it was amended in 1999.[51] The commitments in the Uruguay Round and TRIPs Agreement compelled India to amend its patent regime in 1999, 2002, 2003 and 2005.

Article 27(1) of TRIPs provides that patents shall be granted to protect inventions, which are "new, involve an inventive step and are capable of industrial application." The agreement allows Member countries to interpret 'inventive step' as synonymous with 'non obviousness'.[52] Similarly, a country can consider 'capable of industrial application' is synonymous with 'usefulness.'

The Indian Patents (Amendment) Act, 2005 defines what a "new invention" is.[53] The definition of invention and inventive step makes it clear that an existing knowledge or thing cannot be patented. Discovery is excluded from patenting subject to section 3 unlike the practice of granting patents for discovery in the US.[54] It means that discoveries made in space are patentable in US if the discovery leads to solution to a problem and the same is non-patentable in India. In the common English language, the expression "discovery" refers to "the act, process or an instance of gaining knowledge of or ascertaining the existence of something previously unknown or unrecognised."[55] Discovery essentially refers to finding out something which already exists in nature but was previously unknown or unrecognised. Therefore, unlike "invention" which refers to a new product or process involving inventive step and capable of industrial application [Section 2(1)(j) of the Patents Act, 1970].[56]

Section 2(l) provides that "new invention" means any invention or technology which has not been anticipated by publication in any document or used in the country or elsewhere in the world before the date of filing of patent

application with complete specification, i.e. the subject matter has not fallen in public domain or that it does not form part of the state of the prior art." The question raised here is the patentability of a new form of already known substance in outer space.

Section 2(ja) provides; "inventive step" means a feature of an invention that involves technical advance as compared to the existing knowledge or having economic significance or both and that makes the invention not obvious to a person skilled in the art." The Indian patent law is not going to protect the discoveries made in space even if it is not known to the human beings prior to its discovery.

India require an exclusive space regime in the wake of more expeditions and activities in the space which should also include provisions for protecting its remote sensing data as well as inventions made by Indian astronauts in the future.

5. Conclusion

There should be an international patent regime to promote innovation and inventions in space. It is necessary to provide legal certainty and incentive to invest in space related research and creation of more intellectual property on space and other technologies by experiments in space. The current patent regimes in countries may be similar under the TRIPs agreement, but the output may not be uniform. The question of jurisdiction, liability of launching state and liability for patent infringement remains problematic areas. It is evident that space aspiring nations want to protect their IP rights in space. One of the basic principles contained in the space treaties is that the exploration and exploitation of outer space should be done for all national irrespective of their level of economic development. This synergy can be seen in international agreements on intellectual property rights like the TRIPs agreement. The substantial law has to be solving the jurisdictional problem in order to avoid forum shopping by citing the launching state responsibility. The private international principle of "proper law theory" can be used to solve the jurisdictional problem. Thus the launching state or the domicile of the owner of the space craft can be the proper jurisdiction in IP related litigation relating to space. However, the problem with choice of law theory is that countries would require them to submit to municipal jurisdictions of other countries which they don't want. Mc Dougal suggested "comprehensive interest analysis" theory as a solution to the choice of law theory application in international space law.[57]

It is highly recommended for a uniform jurisdiction under the auspices of the WTO be formed, which will work effectively than any other organization. Copyright protection for processed data is necessary for further investment and development of the remote sensing industry. Moreover, any agreement on patent protection in space should also address the issue of enforcement and liability. The liability of private carriers for commercial and other purposes should be clearly fixed. Private tourism and commercial missions are already in the way. The space aspiring nations should come up with international principles that

effectively extend their notional jurisdiction to the space activities limited to the IP activities. There is no requirement of a *sui-generis* international agreement; amendments to the existing space law will serve the purpose. Harmonization with municipal laws is mandatory for successful implementation of proprietary rights in space. India should come out with its space regime quickly to cope up with its pace of development in the space activities and technologies.

However, any law should take into account the following basic premises:

1. Any law applicable to land may be inapplicable in space
2. The proposed law should cover all aspects of space activities
3. The overlapping of jurisdiction should be avoided
4. International law principles should be applicable to space activities, IP protection in particular
5. Intellectual property protection is necessary for further investment in space related scientific research.

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15. Christopher Miles, "Assessing the Need for an International Patent Regime for Inventions in Outer Space," *Tulane Journal of Technology & Intellectual Property*, vol.11, 2008, p. 62.

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17. Article I and II of the Registration Convention, 1976.

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26. 35 U.S.C. Section 101 &102, (1982).

27. See, e.g., *Hughes Aircraft Co. v. United States*, 29 Fed. Cl. 197 (1993) (ruling on issues of (1) government spacecraft infringing on private sector patents; (2) whether launchings constituted "use" of patents; and (3) government liability with respect to spacecraft associated with international space programs); *Beattie v. United States*, 756 F.2d 91, 99 (D.C. Cir. 1984) (using analogy of law governing Antarctica to the law of outer space).

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36. *Ibid*., Principle 1(c) defines processed data as "the products resulting from the processing of the primary data, needed to make such data usable."

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49. http://isro.gov.in/news/scripts/Sep24_2009.aspx, visited on 12.02.2010.

50. Para.4 of the RSDP, 2001.

51. Srividya Raghavan, "Patent Amendments in India in the wake of TRIPs", *CASRIP News Letter*, Winter 2001, p. 1.

52. Footnote 5 to TRIPs Agreement.

53. The "new invention" means any invention or technology which has not been anticipated by publication in any document or used in the country or elsewhere in the world before the date of filing of patent application with complete specification, i.e. the subject matter has not fallen in public domain or that it does not form part of the state of the art.

54. The patentability criteria laid down that the invention was known or used by others in the country or published in a printed format within or in a foreign country or in public use for more than one year prior to the filing of the application are not eligible for a patent in the US.

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NEED TO HARMONISE TRIPS AGREEMENT OF WTO AND INTERNATIONAL SPACE LAW REGIME FOR THE BETTERMENT OF HUMANITY

S. Elumalai*

I. Introduction

We are living in a technological era; there are several technologies which dominate the global economy, such as Information and Communication Technology (ICT), Bio-technology, Nano-technology and others. But all these technologies can be brought under one umbrella that is Space Technology. However the importance of space technology and its applications has not been given major focus at least in the developing countries. It is a truth that the access to the space technology is available only for a few elite nations. In this context the role of International Law developed by the UN assumes more importance which wants to eliminate the divide between the developed and the developing countries and wants to ensure that the benefits arising out of international space technology must be made available for the humanity as a whole. But this a daunting task and there is no clear cut mechanism in the international space law itself. The space technology and its applications require a huge amount of investment and naturally it requires various legal protection including intellectual property protection. Space technology is also a technology that cannot be discriminated in the subject matter of patents. Once space technology is patented it becomes private property. Therefore it is very difficult to achieve the objective common heritage of mankind, in this context let us discuss the harmonization of TRIPS Agreement of WTO and the international space law to strike a balanced mechanism.

Salient Aspects of TRIPS

The TRIPS Agreement was originally incorporated in the Uruguay Negotiations,[1] formally the WTO came in to existence by first January 1995. TRIPS Agreement was incorporated as Annexure 1 (c)[2] as one of the Agreement in the multi lateral categories[3] of the WTO Agreement. Only a few provisions of TRIPS came in to existence by the first of January 1995, such as National Treatment and MFN clause[4] whereas the rest of the provisions have come in to operation by first January 2000, other than product patent regime.[5]

II. Area Of Synergy Between Trips And International Space Law

The subject matter of copy right and patents[6] embodied in the TRIPS Agreement have a direct bearing upon the objectives to be achieved by the International Space Law, for example, the "Data protection" enunciated in the

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TRIPS can very well protect the data arising out of space technology and its applications.[7] But the protection per se may impede the sharing of benefits arising out of such a data base to the developing and that of the LDC's, without complying IP requirements.[8]

Likewise the patent protection embodied in the TRIPS Agreement mandates all the member countries of WTO to provide patent protection and to protect the subject matter of patents subject to certain conditions to "all fields of technology" whether products or process provided if it is new having a inventive step and capable of industrial application. The TRIPS Agreement also mandates the member countries that they shall not discriminate the patent protection based upon the "field of technology" and "place of invention whether locally produced or imported".[9] It should be emphasized that the space technology itself is a genus and it carries lot of species of technology such as small satellite technology, nano satellite technology, tele medicine and others.

III. Problems And Challenges Faced By International Space Law Regime And Trips Regime

International Space law owes its origin from the establishment of the Committee for the peaceful uses of outer space established by the UN in the year 1959, till now it as contributed to the conclusion of five international conventions relating to the space law and around ten declarations relating to the space law. The notable among them for the purposes of this paper are that, the Third UN Conference that is the Vienna Declaration of 1999 and the Declaration of International Exploration of Outer Space for Peaceful Purposes for the Benefit of All the Countries taking in to account the Needs of Developing Countries.[10] These are the only existing two international instruments focusing on IP protection.

The Vienna Declaration explicitly recognizes that "consideration should also be given to develop a set of measures to protect the intellectual property rights recognising this issue is in the jurisdiction of the WIPO". This is contentious as well as controversial one as identified by the author in the following ways.

International Space Law mechanism lacks competency as well as expertise to develop a set of measures relating to IP protection for space technology for its application, because the TRIPS Agreement provides for IP protection for all fields of technology including space technology, therefore there is no need to develop separate set of measures.

This issue is not only within the exclusive jurisdiction of WIPO but also essentially in the jurisdiction of the TRIPS Agreement of the WTO.

The space law regime cannot completely ignore the existence of the TRIPS Agreement of WTO at all and mere WIPO alone cannot deal with this issue.[11]

International Space Law identifies three major issues to be resolved, that is issues related to debris disaster management, nuclear power source and IP.[12] To

resolve the IP issue the UN General Assembly provides a broad mandate to the Committee, to promote cooperation within the "entities of UN and the relevant international organizations".[13] The word "relevant organizations" can very well include the WTO, therefore it is mandatory for the Committee to provide at least a permanent observer status to the TRIPS Council of the WTO in all its meeting.

The place of invention as envisaged in the TRIPS Agreement should not be interpreted so widely as to include the outer space, till a concrete and tangible step is taken by the international space law regime. Therefore it is highly desirable to address this issue in the ministerial meet and include this as an agenda for t heir future negotiations.

Doha Declaration of TRIPS on public health provides waiver of paten protection to address certain epidemic situation and emergency requirements to combat certain deadly diseases but it does not explicitly recognise the relevance of space technology, tele medicine and others arising out of space application in addressing the public health prices. In the absence of such an waiver by the TRIPS Council, the exercise of the international space law mechanism will become futile, therefore it is desirable to provide permanent status to the Committee in the WTO meetings too.

To resolve the issues relating to the ownership and access to the resources available in the outer space the mere efforts of international space law mechanism alone are not sufficient, therefore the coordination of the WTO on space law mechanism is highly desirable.

IV. Conclusion

It is estimated around 600 billion US dollar worth of trade has taken place during 1996–2006. Since it is an essential interest of trade the trade related IP aspects of space law cannot be determined only by WIPO and international space law mechanism. No doubt international space law mechanism advocates the non-appropriation of outer space and the common heritage of mankind on the same time it also recognises the need of IP protection too. If the international space law mechanism recognises and cooperates with the WTO it can result in to the better culmination and achievement of the UN Millenium Development Goals, such global health, sustainable development, poverty eradication, so on and so forth. After all these are some of the basic objectives of the WTO too.[14] So the TRIPS Agreement is not conflicting but can be complimenting the international space law mechanism provided if there is an effective coordination and cooperation among the two regimes.

Endnotes

1. It is the eighth and final rounds of GATT Negotiation which has been culminated in to the WTO, held during the 1983-1984, one of the lengthiest and most comprehensive in the WTO jurisprudence.

2. There are four Annexes in the WTO, Annexure 1 alone contains, 1(a), (b) and (c) respectively for trade and services and Trips.
3. The Annexures 1 to 3 belong to the multi lateral category, Annexure 4 belongs to pluri lateral category whereas in the multi lateral category it is mandatory for all the members of the WTO to become a party to the Multi lateral agreements wheras it is optional in the case of pluri lateral categories. See Also, Article 2 of the Agreement establishing WTO.
4. Articles 3 and 4 of the TRIPS Agreement of WTO.
5. The operationalisation of the TRIPS Agreement have been differed depending upon the economic status of the country, for example, only one year period has been given in the case of the developed countries and five years in the case of the developing countries, ten years period have been given to developing countries to implement product patent, in the case of LDC's the dead line has been extended for a longer time by the TRIPS Council, in the Doha Ministerial Meet, Also see Article 65 of TRIPS Agreement of WTO and Article 11 (2) of WTO.
6. Article 9 to 14 of Section 1 of Part II of TRIPS Agreement Article 27 to 34 of Section 6 of Part II of TRIPS Agreement respectively deals with the subject matter of copy rights and patents.
7. For example, data relating to remote sensing, weather and climate, natural resources including biological resources and others.
8. The issue of non payment of royalties and damages for the breach of violating data protection. Also See Article 10 of the TRIPS Agreement of WTO.
9. Article 27 para 1 of the TRIPS Agreement deals with the protectable subject matter of patents. But Article 27 para 2 and 3 of the said agreement provides discretion to the member countries in protecting certain subject matter of patent rights, such as "…surgical methods, therapeutic/diagnostic methods of treatment for human…", and "also anything which violates public order morality". The patent protection may be denied on some other grounds such as "anything which causes serious prejudices to the environment, hazardous to the human health, animals, plants and others, anything which is essentially of biological origin other than micro biological process and micro organisms".
10. UNGAR No. 51/122 E.
11. See Page No. 8 of the Vienna Declaration.
12. See Page No.2 of the Vienna Declaration.
13. Refer Paragraph 46 of UNGAR 64/86 E of 2010.
14. Refer the Preamble of the WTO and Article 7 and 8 of the TRIPS Agreement of WTO.

OUTER SPACE COLONISATION: OUTER SPACE TOURISM

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For the wise men look into space and he knows there is no limited dimensions.

—Laozi

Space law is maturing, and in its process it is bifurcating. Principles have been established, many a issues are now considered as to being settled; other formerly contentious issues appear dead, some of them are reappearing in altered forms. In the early days of the space age, states alone were the actors. Now we have the emergent commercial uses of space and their requirement of the regulation, whether it is national or international.

Civilisation has come a long way. There was a time when warriors of the world wanted to capture the entire earth. With the scientific development attention has been shifted towards colonisation of outer space. It means human habitation outside the earth. The first space colony may be established on moon and mars. For this access to food, water, space, people, construction materials, energy, transportation, communications, life support, simulated gravity and radiation protection. It is likely that colonies would be located to the vicinity of such resources.

There are few pertinent questions attached to life in outer space.

- Spread of life and beauty throughout universe
- Survival of species
- Save the environment of earth
- Distributing population.

The reason behind choosing the topic is its 'futuristic approach' which they hold for coming generation with little negative impact. One should not forget that Outer space Colonisation will prove to involve massive amounts of financial, physical and human capital devoted to research, development, production and deployment. Apart from this the habitant has to be adjusted with the atmosphere of the outer space.

Outer space colony will be nothing but a human expansion from earth. This human expansion should be for the betterment of civilisation and not for effectuating the imperialistic policy of few nations.

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Outer space Colonisation can be divided into parts:

(i) Outer Space habitat

(ii) Outer Space tourism

Currently it is an alluring idea to be settled at Outer Space and occupy the various Planetary, satellite and asteroids. In this entire situation the role of Outer Space Treaty needs to be considered. It contains the noble idea and open great prospects before mankind for its entry into outer space. It emphasises further on the aspect of use of outer space for peaceful purpose for the benefit of all human kind irrespective of their economic and scientific development. The noble idea of mutual understanding among the nations and their friendly relation is inherent in the Outer Space Treaty.

Article II of the treaty states that Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.[1]

Outer Space should be exploited without any discrimination. Irony to the matter is that it contains certain loopholes which are badly manipulated by the people. People like Dennis Hope states that as the law on Outer Space says nothing about individual holder 'it is un owned land'. For private property claims, 197 countries at one time or another had a basis by which private citizens could make claims on Japan and U.S.A to have plans for moon colonies.

Article VIII deals with A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return.[2]

The above provision has been interpreted to confer 'limited property rights' on the private entities. It is on this basis that the concept of 'Outer Space Property Rights' has developed and evolved. Implementation of this legal property rights will give impetus to the new international aspects of Outer Space regime. It will provide legal certainty to the investors and entities participating in the development and settlement of outer space.

At the same time specific issues brings specific concern. To deal with 'property rights of outer space' specialised courts and specialised judges shall be set up to deal with specific scientific issues. With such occurrence of process with advancement in communications and the globalisation of business interests on earth, there will be a flow of cross-fertilization of legal ideas.

In the midst of all these one has to consider feasibility of property rights in Outer Space. Some where we need to strike a balance between space faring and non space faring nation.[3]

Outer Space tourism will become the booming industry in coming year. The Outer Space tourism is governed by private enterprises and it is beneficial for the country having private economy. This is an entire new realm of industry which is going to play its own part in near future. Outer space treaty talks about exploration and use of Outer Space. Outer Space tourism falls within the scope of use of Outer Space.

In human space flight the law relating to space tourism must be develop on an international as well as national basis.

Solutions for this problem area may also inter relate with some of the problems of the space plane.

In the present law the concept of 'astronaut' is not suitably defined to cope up with these novelties. The precise status of "Space flight participants" must be clearly distinguished from that of "crew" and their relationship with ARRA (Agreement on Rescue of Astronauts, the Return of Astronauts and the Return of Objects launched into the outer space - 22nd April 1968) and similar provisions clarified. The status of "Space Hotel" also requires considerations from the perspective of International Law, irrespective of what may be provided by relevant national laws.

Outer Space Treaty stipulates a national State responsibility for Outer Space activities, no matter if government or private organisation carries out these activities.

In respect of space tourism Liability Convention provides for responsibility of launching state to pay for any compensation for the harm to be made by space object on earth.

The Registration Convention is required to co-ordinate launches on one hand and to ensure identification of the launching state on the other hand in order to affix liability under Liability Convention. There are certain practical difficulties that have to be borne in mind.

(i) In near future space tourism shall be conducted by different space agencies and this could lead to a lot of registration.

(ii) All launching state may not be a member of Registration Convention.

Within the limits of Rescue Agreement, the 'space tourist' are not among the person needs to be rescue. It is because, the time Rescue Agreements were made, space tourists were not covered within the fold.[4]

"Rights" in space may be recognized remains to be settled. This is most obvious in relation to "immovable property" on the Moon and other Celestial bodies. The present law makes clear that national appropriation cannot occur, with the corollary that not state can invest its nationals with rights of property in

celestial bodies. Nor will an individual or private entity secure "title" to space or to any naturally occurring celestial object, simply by claiming it. Over the years many individuals have sought to claim title to lands and invariably these have not been recognized by the states. Whether "recognition" is declaratory or constitutive it is necessary for an effective title. It is however clear that in the future some method will have to be developed in which some effect will be given to at least an analogue of "property" rights. Entrepreneurs need to be assured that the security of the return on investment afforded by "terrestrial property law" will be available for investment in space.

Apart from being careful as to innovation, we must also ensure that international space law does not come up to become something separate from general international law. Were it to be so done, it would necessarily become encysted and sterile. There is an argument that space law is a 'Lex Specialis and of course some of its provisions are such; but this argument is away from fact as it does not become separate from the general international law. In Space we seek the 'rule of law' and not 'rule by law' where rules are simply adhered to when convenient to the powerful and altered at their behest.

Endnotes

1. Outer Space Treaty, 1967.
2. Outer Space Treaty, 1967.
3. Wayar N. White Jr, Implications of a proposal for real property rights in outer space in www.spacefuture.com, last visited on 17.02.10.
4. Wollersheim Michael, Considerations towards the legal framework of space tourism at 2nd International symposium on Space tourism, Bremen April 21-23 1999 at www. Space future.com.

REMOTE SENSING SATELLITES: LEGAL ISSUES IN EMERGING TECHNOLOGY

Animesh Sinha*

Summary

"This paper aims to establish that the international law regulating imagery by remote sensing satellites is interstitial and aims to suggest the required measures to fortify the existing regime. The paper aims to analyse all principles of international law that may assist in preparing a universally acceptable law to regulate imagery by remote sensing satellites."

Introduction

The evolution of laws relating to outer space has not expended human energy over centuries; a few decades mark the pedagogy. And the development of its subsets has taken even shorter time periods. The subset, law relating to imaging satellites, characterises spontaneous evolution and has defeated expert opinion in short periods of time discovering uncontrolled conduct and urging fortification of pre-existing controls. It is sciolistic to confine science into set classifications of good or bad. Scientific inventions or discoveries do not inherit such classifications. It is the use humankind shall put such invention or discovery to that may attach a reputation to it. Imaging satellites as an invention is a colossal scientific achievement carrying immense potential to impact the standard of human life and it is this potential which not only opens infinite opportunities but also imputes a burden upon humankind to fetter the abuses that may result from its usage. To discharge the burden it is incumbent upon us, humankind, to devise a 'system of control' which shall form the border trenching the precincts of the law controlling and regulating the conduct of imaging satellites.

Importance Of Imagery By Remote Sensing Satellites

Most activities pertaining to outer space catch our imagination and lead us into the realm of sci-fi. If I were to propose the requirement of a study to equitably apportion land mass on the planet Saturn it will surely elicit cacophony. However, activities pertaining to outer space need not necessarily lead us into the realm of sci-fi and certain activities have become a benefactor for humankind. Communication satellites are one such example which has played an integral role in providing impetus to globalisation and affecting the daily lives of ordinary individual citizens.

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The activity of imagery from remote sensing satellites promises to be a leading benefactor and there is an urgent requirement to develop a system of control to prevent the activity of imagery from remote sensing satellites from being chapterised as a bane in the annals of human history.

Definition & Meaning

At the outset, the basic tenets of imagery by remote sensing satellites need to be explained. The Land Remote Sensing Policy Act, 1992 defines remote sensing as "the collection of data which can be processed into imagery of surface features of the earth from [a] . . . satellite."[1] Satellites orbiting the earth, either in geosynchronous orbit or in an inclined or polar low-earth orbit, detect electromagnetic radiation from sensed objects in one of two ways: [a] Passive instruments detect radiation from the sensed objects, and [b] active instruments emit energy and then detect the energy reflected from the sensed objects. Subsequently, the ground station selects if the data should be received and if received 'unpacked' into suitable imagery.

The data may be classified into: [a] 'primary data', which consists of a stream of unprocessed energy signals collected by the satellite; [b] 'processed data', which is primary data that has been processed to a point where it can be interpreted; and [c] 'analyzed information', which is an interpretation of the processed data based on both the data itself and information derived from other sources Applying this classification system to interpretation of remotely sensed images, a processed image of an aircraft would become analyzed information after outside data or information was used to determine the specific type of aircraft.

Resolution of remotely sensed images refers to the area that can be clearly discerned from the photograph. For example, an object measuring ten meters square could be discerned by a satellite capable of ten-meter resolution. Applying resolution capacity to the military context, ten-meter resolution can detect structures such as bridges, buildings, and concentrations of tanks or aircraft; two-meter resolution can identify aircraft, vehicles, and roads; one-meter resolution can precisely identify types of aircraft, tanks, cars, and troop units, and can differentiate between fighters and bombers or missile launchers and trucks.

Necessity For A System Of Control

To appreciate the requirement for a system of control to regulate remote sensing satellites it is important to highlight the paradigm within which the possible abuses of the activity of imagery from remote sensing satellites is confined. The impending necessity for a system of control stems from two primary concerns, [i] the rapid advancement in technology and [ii] the increasing commercialisation of the imagery industry.

In continuation with the axiom regarding the independence of science being classified as good or bad, advancement in technology is not our adversary but the pervasive access to our daily lives provided by the advanced technology compels predilection for a system of control. The recently launched GeoEye-1 claims to be the most sophisticated commercial remote sensing satellite with resolution capacity of 0.41 m for a panchromatic image (black & white) and 1.64 m for a multi-spectral image (colour). CARTOSAT-2, the remote sensing satellite, launched by India is equipped with a spatial resolution of less than a meter. Such resolution capacities in decimals enables satellites to determine the exact model and make of a motorvehicle and could thus enable private parties to obtain data about anybody in whichever part of the world at costs as frugal as $30. Moreover, the advancement in technology enables dissemination of data in less than a few hours. The objective of procuring such high resolution data may no longer be for a military objective but may be utilised for infringement of privacy of individual citizens. The rapidly improving resolution capacity coupled with the growth in nanotechnology could enable live recording instead of imagery in the near future and we are left to imagination to perceive the threat posed by unfettered usage of remote sensing satellites.

Balancing the seesaw between commercial interests and social welfare shall require a strengthened legal regime. It is fair to add that the fulcrum of the seesaw, the legal regime, must not only exist but must be stolid to bear the burden. The commercialisation of the remote sensing satellite industry began with the launch of LANDSAT 1 in 1972 and the US government under the LANDSAT programme made remotely sensed images commercially available to the public for the first time and the commercial market has tremendously grown thereafter. The French government followed with the launch of Syteme Probatoire d'Observation de la Terre (SPOT) I in 1986 and the former Soviet Union launched its own remote sensing satellite in 1987 to provide imagery to the commercial market. The international market for commercial satellite technology has blossomed as well, with Russia, Canada, Japan, Israel, France, India, China, Brazil and South Korea all Jockeying to offer low resolution satellite imagery. These countries can be grouped into three distinct categories. First, the United States of America which is the only country with an entirely independent commercial satellite industry. Second, the French, Israeli, Russian, Indian and Canadian governments which provide satellites to private companies for commercial use. Third, the Chinese, South Korean and Brazilian governments operate the satellites exclusively, with very little commercial use of imagery. The details of the private companies and the satellites operated by it are not being reproduced herein for the sake of brevity and the mention of the existence of such private companies suffices to build the necessity to regulate the commercial remote sensing satellite market.

Illustrations Of Possible Abuses

In the backdrop of these concerns, the possible abuses need to be illustrated. Such illustrations contain the dangers faced by imagery from remote sensing

satellites and also situations that may be imagined but not be classified as sci-fi in the present time set. Remote Sensing technology, and the prospect of immediate and widespread dissemination of the imagery, creates grave vulnerabilities for national security. Remote sensing technology can provide an adversary with near real-time visibility of military posture 'at both the strategic and theatre levels' and allows an adversary to pre-emptively destroy military installations using the long-range precision strike weapons against preselected targets. Such worst-case scenarios cannot be dismissed as pure science fiction, as there is substantial evidence that details of satellite imagery of the U.S. bases in Qatar and Diego Garcia was available at the website www.globalsecurity.org much in advance to the commencement of operation Iraqi Freedom. These images were easily accessible on the Internet and could be procured by anyone; the American news industry, private persons and also the adversary in the war. It is a chilling thought to imagine what benefit use of such data can bring to terrorists or rogue regimes. The clarity of the imagery (the resolution capacity as discussed above), the speed with which it can be disseminated (within a few hours) and the cost to procure such data(in the range of $30-300) poses a threat to the existence of humankind. The potential terrorist threat posed by dissemination of this type of information is evidenced by a number of actions taken by the US government post 9/11. The Nuclear Regulatory Commission, which had provided detailed information such as the longitude and latitude coordinates of 103 nuclear plants, engineering schematics of the plants and aerial photographs to the public closed the entire website in October 2001. The Federal Energy Regulatory Commission removed detailed information on hydropower plants, natural gas, oil pipelines and other critical installations. In the near future, with advancement in resolution capacity this technology shall raise the debate on infringement of privacy of individual citizens as monitoring would no longer require installed cameras and could be done from continents away. The possibilities of abuse of imagery from remote sensing satellites is myriad and every major abuse is not being enlisted as the illustrations cited above are sufficient to indicate the threat posed by dissemination of such data.

Effectiveness Of The Existing Regime

The concerns listed above along with illustrations cited have settled the argument in favour of a requirement to develop an effective system of control to regulate remote sensing satellites. Prior to delving into the details regarding an 'effective system' the existing system needs to be analysed and its effectiveness should be put to judgement.

Sources Of Law

The 'existing system' is contained within the 'sources of law' enshrined under art. 38 of the Statute of the International Court of Justice. The Statute of the International Court of Justice does not claim to define or state 'sources of law', as it is one of the sources itself, however it is considered to be the sentinel for

sources of law and recognised as a state practise to consider so. The provision entails:

"(1) The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:

(a) International conventions, whether general or particular, establishing rules expressly recognized by the Contesting States;

(b) International custom, as evidence of a general practice accepted as law;

(c) The general principles of law recognized by civilized nations;

(d) Subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.

(2) This provision shall not prejudice the power of the Court to decide a case *ex aequo et bono*, if the parties agree thereto."

Art. 38(1)(d) of the Statute must be read alongwith art 59 of Statute of the International Court of Justice and it is reproduced herein:

> "The decision of the Court has no binding force except between the parties and in respect of that particular case."

There is no statement asserting hierarchical supremacy of any of the sources, however, in one of the drafts the presence of the word 'successively' corroborates the intention of the draftsmen to give it an order. Therefore, the authority of international conventions (a) shall override that of international custom (b) and that of (b) shall override (c) and so on.

Conspectus Of Treaties Pertaining To Outer Space Law

The supremacy of international conventions mandate foremost enunciation of the conventions pertaining to space sensing by remote sensing satellites. There is no treaty that specifically confronts remote sensing. The international treaties relevant to the commercial remote sensing industry include: (1) the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty);[2] (2) the 1975 Convention on Registration of Objects Launched Into Outer Space (Registration Convention);[3] and (3) the 1972 Convention on International Liability for Damage Caused by Space Objects (Liability Convention).[4] India has signed and ratified all three treaties. In addition, in 1987 the United Nations General Assembly (UNGA) adopted the non-binding UN Remote Sensing Principles (Resolution 41/65).[5] The prevailing regime of regulating space sensing by remote sensing satellites has proved to be interstitial and inefficacious. The sporadic and unorganized development of the regime of imagery by remote sensing satellites makes it interstitial while incomprehensive jurisprudence makes the regime inefficacious to replicate in different municipal systems and circumstances.

Outer Space Treaty

The Outer Space Treaty of 1967 is the oldest multi-lateral convention pertaining to space laws. Art. I states: "exploration and use of outer space . . . be carried out for the benefit and interests of all countries . . . and shall be the province of all mankind".[6] This presents a quandary. Space is deemed to be the province of all mankind implying thereby it is an anti-thesis to the doctrine of sovereignty. It may be argued the doctrine of sovereignty is applicable only on earth, which includes land as well as airspace, while it is impossible to partition outer space. Moreover, individual countries cannot subsume parts of space at their own will as this shall impede growth of mankind. But then the inadequacy of this provision runs deeper. It does not require adducing complex legal arguments or technical advancements to explain the fact that it is impossible for the drafters of the treaty in 1967 to foresee such advancements in remote sensing technology which will make mapping of the earth surface to a resolution in decimals. The freedom of all states enshrined in art. I do present us with this quandary.

Art. IV of the Outer Space Treaty provides for the attribution of State responsibility for the acts of commercial remote sensing industry including civilian actors. The provision may have been certified as adequate in 1967 but today a number of aspects remain unanswered. What are the elements attributing responsibility to a State? Are acts of private actors attributable to the state? What are the methods of attributing responsibility in cases of non-governmental actors who are not private actors entirely? Can responsibility be attributed to plurality of states? And these are just a few which have been specifically presented.

The conundrum of attributing responsibility to a state extends to the payment of damages or reparation or compensation. Until it is conclusively determined as to which state incurs responsibility the liability to pay does not arise. Moreover, the Liability Convention does not provide any specific provision dealing with payment of damages arising from abuse of imagery taken from remote sensing satellites.

Registration Convention

The Registration Convention mandates the registration of every satellite in the registry with the launching state. Such information is to be communicated to the United Nations as well. However, there has been fortuitous change of circumstances. The Registration Convention dates back to 1975 when all satellites launched were owned by governments or governmental organizations. Today, in 2010 the private commercial satellite industry is worth over two to three billion dollars. Some of the popular private satellites are the IKONOS satellite, Quickbird-2 owned by Digital Globe in United States, ImageSat in Israel and the recently launched GeoEye-1. The Registration Convention fails to deal with the registration of satellites owned by private entities.

UNGA Resolution 41/65 of 1986

The requirement of a multi-national treaty specific to the sector of remote sensing lead to the United Nations General Assembly Resolution 41/65 in 1986. It is the solitary international instrument pertaining to space sensing by remote sensing satellites. While the original hope had been to adopt a binding treaty, the document finally submitted to the UNGA was a non-binding instrument. In the process of formulating these principles, many developing nations, especially Latin American nations, argued that because of their sovereignty over natural wealth and resources, they should also have sovereignty over information concerning those resources gathered through remote sensing technology. These developing nations argued that due to the absence of protection in Resolution 41/65 they would be subject to economic exploitation by countries possessing remote sensing technology. Specifically, many of these nations were concerned that their bargaining power would be compromised by negotiating with multinational corporations that possessed detailed (satellite-generated) information on the country's mineral and fuel deposits. These countries contended that before any data or information could be collected through remote sensing technology, they should be presented with the right to either grant or deny approval. The United States diametrically opposed this consent-driven position, arguing that Article I of the Outer Space Treaty established absolute freedom in space, and that remote sensing policy should be established consistent with the open-skies doctrine, under which consent of the sensed state is not required and remotely sensed data is available on a nondiscriminatory basis. It is critical to underscore that Resolution 41/65 applies, as stated in Principle I, to remote sensing conducted "for the purpose of improving natural resources management, land use and the protection of the environment," and makes no mention of military reconnaissance, or general media purposes. Because the Principles fail to address military concerns, they are incapable of dealing with the national security issues posed by improved resolution and the international proliferation of the remote sensing industry. Thus, Resolution 41/65 is of limited use in assessing the validity of remote sensing of a nation's military or strategic interests, the primary concern of PDD-23.

International Custormary Law

The development of the technology of imagery from remote sensing satellites has not developed any principles of customary international law specific to it and aid cannot be taken from any such principle to provide panoply to the other sources.

General Principles Of Law Recognised By Civilised Nations

The development of principles in the realm of space law often do not expend much human energy and time due to the rapid advancements in technology. This has necessitated the formation of the principle of short custom. The sources of international law allow 'general principles of law recognized by

civilized nations' as a valid source. While the United States has put in considerable effort in embedding regulations in its municipal system by way of legislations, directives and rules and regulations the development in other countries is only marginal. Certain countries like Canada, France and India do possess specific policies pertaining to imagery by remote sensing, however legislative sanction is pending. Such policies carry the risk of change and therefore cannot be classified as general principles of law.

Even in the United States the principle of shutter control has been analyzed in comparison with the fettering of the freedom of press to cover wars. The practice of the United States in allowing or disallowing media coverage of wars has been highly inconsistent. While the national security exception has been accepted at most times it has not been without much opposition and challenge from the press. It shall be the effort of the researcher to succinctly acquaint the reader with the instances where this inconsistent approach is alleged. These are: [a] US Civil war—Initially press coverage was allowed but upon realization of potential national security risk certain publications were suspended, [b] Spanish-America war of 1898—No prior restraint exercised [c] World War I- Elaborate system of voluntary and non-voluntary censorship acted as prior restraint, [d] World War II-System of mandated and voluntary censorship until after the attack on Pearl Harbor stringent measures were applied, [e] Korean war- Extremely strict censorship, [f] Vietnam war—No formal prior restraint however backdoor restraint in making press's access to battlefield restricted, [g] Invasion of Grenada in 1983- Strong prior restraint in banning reporters during first two days of invasion. Subsequently limited access was granted. Sidle Panel instituted to prepare a report in this matter. No leverage was granted even after a favorable report for media access. [h] Invasion of Panama in 1989- No prior restraint but due to delayed arrival of the pool of reporters no combat coverage was possible, [i] Operation Desert Storm- Prior restraint in the form of limited access under strict regulations. Selection of a percentage of reporters was challenged in the case of *Nation Magazine v. United States Department of Defense*.[7] However, before judgment on the injunctive relief could be delivered the war was over and the point became moot.[8] [f] Operation Iraqi Freedom—An embed system introduced by which journalists were included in the infantry divisions. No prior restraint was imposed but certain restrictions like non-disclosure of troop movements and equipments were imposed. It was criticized for bias as the reporters may be manipulated by the troops who guaranteed them security.

This dialectic between prior restraint and media access received affirmation from the United States Supreme Court as a *dicta* in 1931 and a conclusive judgment in 1979 in favor of prior restraint (national security exception).

Therefore, the existing legal regime to regulate imagery by remote sensing satellites is interstitial and inefficacious for the reasons stated above and the aforestated inadequacies must be redressed and there is requirement of a more effective legal regime.

Propositions For An Effective Regime

The possible abuses from space sensing by remote sensing satellites urge immediate formulation of a universally acceptable law in the form of a multi-lateral treaty. This multi-lateral treaty must not only fortify the interstitial nature of the 'existing regime' but should embed the general principles of international law of state responsibility, ascertainment of liability, damages and reparation or compensation for an 'effecting regime' to regulate imagery by remote sensing satellites.

Responsibility Of States

Elements constituting state responsibility

It is imperative for the researcher to explicate the elements constituting attribution of state responsibility. The ILC Draft Articles on State Responsibility provides for a State to be internationally responsible for a wrongful act.[9] The Mexico-United States General Claims Commission in the *Dickson Car Wheel Company Case* noted that for a State to incur international responsibility, "an unlawful international act be imputed to it, that is, that there exist[s] a violation of a duty imposed by an international juridical standard."[10] The parameters establishing state responsibility in the *Diplomatic and Consular Staff Case*[11] were considered, to include "treaties in force or under any other rules of international law that may be applicable."[12]

The terminology "breach of an international obligation" is inclusive of both treaty and non-treaty obligations.[13] In the *Gabćikovo-Nagymaros Project case* the I.C.J. referred to the relevant draft article provisionally adopted by the commission in 1976 in support of the proposition that it is "well established that, when a state has committed an internationally wrongful act, its international responsibility is likely to be involved whatever the nature of the obligation it has failed to respect".[14]

State responsibility for non-governmental actors

The classic approach mandated state responsibility for government actors only. However, a conjunctive reading of Art. XIV of the UN Principles on the Observation of Earth from Space along with Art. VI of the Outer Space Treaty, 1967 exhorts state responsibility for acts of non-governmental entities as well. They do not advocate a blanket attribution of responsibility making it subservient to authorization and continuous supervision.[15] The need for supervision emanates from the overriding security concerns regarding commercial remote sensing activity restricting the freedom of scientific investigation and space exploration in outer space[16]; hence the contentious principle of prior restraint(shutter control).

Further, as recognized in the *Phosphates in Morocco case*,[17] conduct can only give rise to state responsibility if it is attributable to the state under international

law. International law does not attribute conduct of non-State actors, such as acts or omissions of private persons, mobs, associations, corporations, trade unions, or unsuccessful insurgents, to a State,[18] which was also made clear under the 1980 ILC Draft Articles.

State responsibility for individual conduct

Individual conduct can be so attributed under ILC Draft art. 8 if the person is in fact acting on the instructions of, or under the direction or control of the state, i.e., as a *de facto* agent of the state and the conduct complained of was an integral part of that operation.[19] Attributing conduct in this way requires a "specific factual relationship" between the person and the state and conduct to be attributed must be an 'integral part of that operation'.[20] Only if there is connivance or complicity, approval or ratification, can a state be responsible.

This Court closely considered the concept of control in the *Military and Paramilitary case*[21] stating that a "high degree of dependency" alone was not sufficient and the United States must have either expressly directed the acts or possessed 'effective control' over the paramilitary operations in the course of which they were committed. Therefore, if a state is capable of 'effective control' over the remote sensing satellite or the entity controlling the satellite state responsibility shall be attributable.

Due diligence and constructive knowledge

Acts or omissions of non-state actors under the Draft Articles are themselves generally not attributable. However, the state may incur responsibility not for negligence but for failure to exercise due diligence in preventing or reacting to such acts or omissions. It has been stated that an omission should be judged by a subjective standard of willful neglect, or fault, rather than an objective standard of inaction or simple negligence. The relevance of due diligence here is that States must make sure through a level of judgment, care, prudence and, determination that their territory is not used for the purposes of activities involving the violation of the rights of people or the territory rights of another State.

In the *Corfu Channel case*,[22] Albania was held internationally responsible for failure to take necessary steps to warn approaching ships of the danger of mines based on the knowledge of their presence from the close surveillance over its territorial waters.[23] The Court, however, stated that it could not be concluded from the mere fact of the control exercised by a State over its territory that that State necessarily knew, or ought to have known, of any unlawful act perpetrated therein. In the Tehran Hostage case,[24] the Court recognized the acts of the militants in seizing the Embassy and in taking hostages as conduct of the State of Iran only after the new government ratified the initial non-State conduct and failed "to take appropriate steps"[25] to protect the Embassy. Both these cases are evidence of the fact that constructive knowledge and ratification of the activities

of a state or non-state actor is essential for attributing responsibility upon the state. Therefore, to prevent abuse by a remote sensing satellite is a positive duty upon the state. States cannot escape from responsibility even if they were not aware of the possibility of the abuse if they could have prospectively discovered.

Damages And Reparation

Payment of damages and causal relationship

Another ancillary effect is the payment of damages by the injury caused by a remote sensing satellite. The payment of damages or reparation is consequent upon liability incurred. Liability only exists if there is a direct causal relationship between that breach and the damages claimed. Under traditional and contemporary standards of tort jurisprudence,[26] proximate cause in tort actions involves two factors: avoidability and foreseeability of risk.[27] Unless causation is established, no damages may be considered to fall under the ambit of international liability.

The Chorzow Factory case stated the general principle behind liability in the international context: "reparation must, as far as possible, wipe out all the consequences of the illegal act."[28] Nevertheless, states cannot recover for damages that are indirect, or overly uncertain or remote. Three elements must be present in order for liability to be appropriate in an international dispute: a legal obligation must exist, that obligation must be breached, and damages must result from that breach. For example, in the 1928 Naulilaa Arbitration, the international tribunal found no causal link between German actions and a native uprising in a Portuguese colonial territory.[29] The damages claimed were simply too remote to be attributable to the German activity.

The international community took this principle into account when it adopted the 1972 Convention on International Liability for Damage Caused by Space Objects, the primary authority for liability determinations in cases involving outer space objects. Although the preamble of the Convention recognizes that damage will occur in the development of space,[30] the Convention expressly limited damage to direct losses such as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations."[31] If the drafters of the Convention wished to allow recovery for indirect and remote damages, they would have explicitly written that intention into the treaty, especially in light of the exclusion of such damages under customary international law.

International experience reflects this limitation of recovery to direct, rather than remote, damages. In the case of Cosmos 954, the only international case where one state has paid another for damages caused by its outer space activity, the crash of a Russian naval reconnaissance satellite resulted in radioactive fallout throughout Canadian territory.[32] Russia took the position that its damage

settlement did not include compensation for Canada's unnecessary clean-up measures.[33] Rather, its settlement only included payment for direct damages such as the diminution in value of Canada's property.

Reparations

Reparations for breaches of international obligations is the principle legal consequence for international wrong.[34] International law mandates states to bear responsibility by virtue of its position as an international person.[35] Any act performed by a government or those of its officials or private individuals performed at the government's command or with its authorization imputes original responsibility.[36] The PCIJ has stated, quite unequivocally, in the *Chorzow Factory* case that: "It is a principle of international law that the breach of an obligation involves an obligation to make reparations in an adequate form."[37]

The incorporation of these principles of public international law into the legal regime regulating imagery by remote sensing satellite shall strengthen the 'existing regime' and aid in making the current system effective.

Conclusion

Having stated all sources of international law relating to regulation of imagery by remote sensing satellites, verifying it as interstitial and inefficacious and stating the need and process of regulating ancillary effects of imagery by remote sensing satellites the burden to suggest an alternative proposal to fortify the legal regime of imagery by remote sensing satellites tempts the researcher to formulate a draft of the multi-lateral convention on remote sensing. However, the researcher desists from wording the proposal in legal language for two reasons: *first*, the process of formulation of any multi-lateral treaty involves participation of States through designates and the draft is a reflection of individual requirements of each state and *second*, the scope of the paper is to highlight the interstitial and inefficacious nature of the regime and suggest ways to fortify it rather than exhort states to consider proposals in the letter and form contained in this paper. The proposals are enlisted below:

Proposal-1: Effect of the treaty

The requirement is for a binding treaty. The treaty must incur absolute responsibility upon the states signatory to the treaty. The maxim *pacta sunta servanda* is to be considered sacrosanct.

Proposal-2: Scope of the treaty

The treaty must be able to arbitrate the dialectic of sovereignty over satellite imagery between the developed countries and the developing countries. To be able to do so the treaty must have applicability on sensitive imagery alone. This will not only maintain space as *res communis omnium* but also safeguard the sovereign rights of nations. The sensed data must not be discriminated on its military/non-military characteristic.

Proposal-3: Meaning of Sensitive Imagery

A generic definition is sought which should be capable of qualifying all types of sensitive imagery as protected. Sensitive imagery may be defined to include any imagery of a sensed state or its territories, holdings, or assets abroad that could potentially compromise that state's national security. The following list of sensitive imagery is offered by way of illustration only, and is not meant to be exhaustive, as the final determination of whether an image is classified as sensitive depends as much on context as it does on the actual image itself. Sensitive imagery, depending on the context, could include images of military bases at home or abroad, troop deployments, nuclear facilities, reservoirs, airports, etc. To illustrate the role context must play in assessing whether an image is deemed sensitive, imagery of a reservoir might not, in and of itself, be considered sensitive, while in the context of a credible threat of biological terrorist attack, such an image would be considered sensitive.

Although resolution is critical in determining whether an image is sensitive, there is no bright-line resolution at which an image becomes sensitive. Rather, determinations must be made on a case-by-case basis. For example, ten-meter resolution imagery of a military installation, incapable of revealing number or type of aircraft, might not be considered sensitive, while one-meter resolution imagery capable of discerning both number and type of aircraft would be considered sensitive (given the appropriate context).

Proposal-4: Access to data

Every state must be given exclusive rights over the 'unprocessed data' and 'imagery' of its sovereign territory. Under no circumstances should this preferential right be defeated.

Proposal-5: Validation of unprocessed data

Sensed data is processed at the ground station to obtain imagery. All unprocessed data which carries the apprehension of security, which pertains to a classified area where sensing is prohibited or the sensing of which has been temporarily requested to be withheld from the authorized body must not be processed and made commercially available without validation from the concerned state.

Proposal-6: Mechanism of validation

Every state must be allowed independence to formulate there own validation process. However, such process must be notified with an International body exclusively dealing with space sensing. In situations where a country finds it difficult to carry the validation by itself it may refer the matter to the International Body.

Proposal-7: International body for remote sensing

An exclusive International body for remote sensing must be set up. The constitution and functioning of which must be detailed as consensually accepted by the signatories to this treaty. The body must be equitably represented by designates of each nation. Special care must be taken to quell the apprehension of developing countries to be able to negotiate with developed countries.

Proposal-8: Dispute resolution

There should be a three tier process of dispute resolution. Any state or entity may appeal from the decision of the office validating unprocessed data to the International Body. The appeal may further be taken up by the International Court of Justice. However, the International Court of Justice at its discretion can accept only those cases which appear complex for the International Body to deal with or where a case of prima facie bias exists.

Proposal-9: State Responsibility

State responsibility is not to be attributable in accordance with the provision of any other treaty or source of law. Responsibility is not to be for the acts of governmental actors alone but also for acts of private entities. Specific provisions must be made for attributing responsibility to para-statal entities. State responsibility must be attributed to the state owning the satellites in precedence with the launching station.

Proposal-10: Payment of damages

Consequent upon attribution of state responsibility the defaulting state must make reparation or compensation as determined by the International Body.

Proposal-11: Enforcement mechanism

Enforcement of the treaty is to be vested with the International Body. All states must extend full co-operation to the International Body in enforcing the provisions of this treaty.

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14. *Gabćikovo-Nagymaros Project* (*Hungary v. Slovakia*), 1997 I.C.J. 7, 54, ¶47 (Sept. 25).
15. Outer Space Treaty, *Op. cit.*, at art. VI.
16. Id.
17. *Phosphates in Morocco* (*Italy v. France*), 1938 P.C.I.J. (ser. A/B) No. 74, at 10; *See also* ILC Draft Articles, *Op. cit.*, art. 2; *See also United States Diplomatic and Consular Staff in Tehran* (*U.S. v. Iran*), 1980 I.C.J. 3 (May 24).
18. Report of the International Law Commission on the Work of its Thirty-Second Session, (1980) 2 Y.B. Intl'l L. Comm'n 30, 32, U.N. Doc. A/CN.4.SER.A/1980/Add.1 (Part 2). *See also* Townsend Gregory, "*State Responsibility For Acts of De facto Agents*" (1997) 14 Arizona Journal of International and Comparative Law 635, 639.

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30. Liability Convention, *Op. cit.*, art. I.
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REMOTE SENSING SATELLITES: LEGAL ISSUES IN EMERGING TECHNOLOGY

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Summary

"This paper aims to establish that the international law regulating imagery by remote sensing satellites is interstitial and aims to suggest the required measures to fortify the existing regime. The paper aims to analyse all principles of international law that may assist in preparing a universally acceptable law to regulate imagery by remote sensing satellites."

Introduction

The evolution of laws relating to outer space has not expended human energy over centuries; a few decades mark the pedagogy. And the development of its subsets has taken even shorter time periods. The subset, law relating to imaging satellites, characterises spontaneous evolution and has defeated expert opinion in short periods of time discovering uncontrolled conduct and urging fortification of pre-existing controls. It is sciolistic to confine science into set classifications of good or bad. Scientific inventions or discoveries do not inherit such classifications. It is the use humankind shall put such invention or discovery to that may attach a reputation to it. Imaging satellites as an invention is a colossal scientific achievement carrying immense potential to impact the standard of human life and it is this potential which not only opens infinite opportunities but also imputes a burden upon humankind to fetter the abuses that may result from its usage. To discharge the burden it is incumbent upon us, humankind, to devise a 'system of control' which shall form the border trenching the precincts of the law controlling and regulating the conduct of imaging satellites.

Importance Of Imagery By Remote Sensing Satellites

Most activities pertaining to outer space catch our imagination and lead us into the realm of sci-fi. If I were to propose the requirement of a study to equitably apportion land mass on the planet Saturn it will surely elicit cacophony. However, activities pertaining to outer space need not necessarily lead us into the realm of sci-fi and certain activities have become a benefactor for humankind. Communication satellites are one such example which has played an integral role in providing impetus to globalisation and affecting the daily lives of ordinary individual citizens.

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The activity of imagery from remote sensing satellites promises to be a leading benefactor and there is an urgent requirement to develop a system of control to prevent the activity of imagery from remote sensing satellites from being chapterised as a bane in the annals of human history.

Definition & Meaning

At the outset, the basic tenets of imagery by remote sensing satellites need to be explained. The Land Remote Sensing Policy Act, 1992 defines remote sensing as "the collection of data which can be processed into imagery of surface features of the earth from [a] . . . satellite."[1] Satellites orbiting the earth, either in geosynchronous orbit or in an inclined or polar low-earth orbit, detect electromagnetic radiation from sensed objects in one of two ways: [a] Passive instruments detect radiation from the sensed objects, and [b] active instruments emit energy and then detect the energy reflected from the sensed objects. Subsequently, the ground station selects if the data should be received and if received 'unpacked' into suitable imagery.

The data may be classified into: [a] 'primary data', which consists of a stream of unprocessed energy signals collected by the satellite; [b] 'processed data', which is primary data that has been processed to a point where it can be interpreted; and [c] 'analyzed information', which is an interpretation of the processed data based on both the data itself and information derived from other sources Applying this classification system to interpretation of remotely sensed images, a processed image of an aircraft would become analyzed information after outside data or information was used to determine the specific type of aircraft.

Resolution of remotely sensed images refers to the area that can be clearly discerned from the photograph. For example, an object measuring ten meters square could be discerned by a satellite capable of ten-meter resolution. Applying resolution capacity to the military context, ten-meter resolution can detect structures such as bridges, buildings, and concentrations of tanks or aircraft; two-meter resolution can identify aircraft, vehicles, and roads; one-meter resolution can precisely identify types of aircraft, tanks, cars, and troop units, and can differentiate between fighters and bombers or missile launchers and trucks.

Necessity For A System Of Control

To appreciate the requirement for a system of control to regulate remote sensing satellites it is important to highlight the paradigm within which the possible abuses of the activity of imagery from remote sensing satellites is confined. The impending necessity for a system of control stems from two primary concerns, [i] the rapid advancement in technology and [ii] the increasing commercialisation of the imagery industry.

In continuation with the axiom regarding the independence of science being classified as good or bad, advancement in technology is not our adversary but the pervasive access to our daily lives provided by the advanced technology compels predilection for a system of control. The recently launched GeoEye-1 claims to be the most sophisticated commercial remote sensing satellite with resolution capacity of 0.41 m for a panchromatic image (black & white) and 1.64 m for a multi-spectral image (colour). CARTOSAT-2, the remote sensing satellite, launched by India is equipped with a spatial resolution of less than a meter. Such resolution capacities in decimals enables satellites to determine the exact model and make of a motorvehicle and could thus enable private parties to obtain data about anybody in whichever part of the world at costs as frugal as $30. Moreover, the advancement in technology enables dissemination of data in less than a few hours. The objective of procuring such high resolution data may no longer be for a military objective but may be utilised for infringement of privacy of individual citizens. The rapidly improving resolution capacity coupled with the growth in nanotechnology could enable live recording instead of imagery in the near future and we are left to imagination to perceive the threat posed by unfettered usage of remote sensing satellites.

Balancing the seesaw between commercial interests and social welfare shall require a strengthened legal regime. It is fair to add that the fulcrum of the seesaw, the legal regime, must not only exist but must be stolid to bear the burden. The commercialisation of the remote sensing satellite industry began with the launch of LANDSAT 1 in 1972 and the US government under the LANDSAT programme made remotely sensed images commercially available to the public for the first time and the commercial market has tremendously grown thereafter. The French government followed with the launch of Syteme Probatoire d'Observation de la Terre (SPOT) I in 1986 and the former Soviet Union launched its own remote sensing satellite in 1987 to provide imagery to the commercial market. The international market for commercial satellite technology has blossomed as well, with Russia, Canada, Japan, Israel, France, India, China, Brazil and South Korea all Jockeying to offer low resolution satellite imagery. These countries can be grouped into three distinct categories. First, the United States of America which is the only country with an entirely independent commercial satellite industry. Second, the French, Israeli, Russian, Indian and Canadian governments which provide satellites to private companies for commercial use. Third, the Chinese, South Korean and Brazilian governments operate the satellites exclusively, with very little commercial use of imagery. The details of the private companies and the satellites operated by it are not being reproduced herein for the sake of brevity and the mention of the existence of such private companies suffices to build the necessity to regulate the commercial remote sensing satellite market.

Illustrations Of Possible Abuses

In the backdrop of these concerns, the possible abuses need to be illustrated. Such illustrations contain the dangers faced by imagery from remote sensing

satellites and also situations that may be imagined but not be classified as sci-fi in the present time set. Remote Sensing technology, and the prospect of immediate and widespread dissemination of the imagery, creates grave vulnerabilities for national security. Remote sensing technology can provide an adversary with near real-time visibility of military posture 'at both the strategic and theatre levels' and allows an adversary to pre-emptively destroy military installations using the long-range precision strike weapons against preselected targets. Such worst-case scenarios cannot be dismissed as pure science fiction, as there is substantial evidence that details of satellite imagery of the U.S. bases in Qatar and Diego Garcia was available at the website www.globalsecurity.org much in advance to the commencement of operation Iraqi Freedom. These images were easily accessible on the Internet and could be procured by anyone; the American news industry, private persons and also the adversary in the war. It is a chilling thought to imagine what benefit use of such data can bring to terrorists or rogue regimes. The clarity of the imagery (the resolution capacity as discussed above), the speed with which it can be disseminated (within a few hours) and the cost to procure such data(in the range of $30-300) poses a threat to the existence of humankind. The potential terrorist threat posed by dissemination of this type of information is evidenced by a number of actions taken by the US government post 9/11. The Nuclear Regulatory Commission, which had provided detailed information such as the longitude and latitude coordinates of 103 nuclear plants, engineering schematics of the plants and aerial photographs to the public closed the entire website in October 2001. The Federal Energy Regulatory Commission removed detailed information on hydropower plants, natural gas, oil pipelines and other critical installations. In the near future, with advancement in resolution capacity this technology shall raise the debate on infringement of privacy of individual citizens as monitoring would no longer require installed cameras and could be done from continents away. The possibilities of abuse of imagery from remote sensing satellites is myriad and every major abuse is not being enlisted as the illustrations cited above are sufficient to indicate the threat posed by dissemination of such data.

Effectiveness Of The Existing Regime

The concerns listed above along with illustrations cited have settled the argument in favour of a requirement to develop an effective system of control to regulate remote sensing satellites. Prior to delving into the details regarding an 'effective system' the existing system needs to be analysed and its effectiveness should be put to judgement.

Sources Of Law

The 'existing system' is contained within the 'sources of law' enshrined under art. 38 of the Statute of the International Court of Justice. The Statute of the International Court of Justice does not claim to define or state 'sources of law', as it is one of the sources itself, however it is considered to be the sentinel for

sources of law and recognised as a state practise to consider so. The provision entails:

"(1) The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:

(a) International conventions, whether general or particular, establishing rules expressly recognized by the Contesting States;

(b) International custom, as evidence of a general practice accepted as law;

(c) The general principles of law recognized by civilized nations;

(d) Subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.

(2) This provision shall not prejudice the power of the Court to decide a case *ex aequo et bono*, if the parties agree thereto."

Art. 38(1)(d) of the Statute must be read alongwith art 59 of Statute of the International Court of Justice and it is reproduced herein:

> "The decision of the Court has no binding force except between the parties and in respect of that particular case."

There is no statement asserting hierarchical supremacy of any of the sources, however, in one of the drafts the presence of the word 'successively' corroborates the intention of the draftsmen to give it an order. Therefore, the authority of international conventions (a) shall override that of international custom (b) and that of (b) shall override (c) and so on.

Conspectus Of Treaties Pertaining To Outer Space Law

The supremacy of international conventions mandate foremost enunciation of the conventions pertaining to space sensing by remote sensing satellites. There is no treaty that specifically confronts remote sensing. The international treaties relevant to the commercial remote sensing industry include: (1) the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty);[2] (2) the 1975 Convention on Registration of Objects Launched Into Outer Space (Registration Convention);[3] and (3) the 1972 Convention on International Liability for Damage Caused by Space Objects (Liability Convention).[4] India has signed and ratified all three treaties. In addition, in 1987 the United Nations General Assembly (UNGA) adopted the non-binding UN Remote Sensing Principles (Resolution 41/65).[5] The prevailing regime of regulating space sensing by remote sensing satellites has proved to be interstitial and inefficacious. The sporadic and unorganized development of the regime of imagery by remote sensing satellites makes it interstitial while incomprehensive jurisprudence makes the regime inefficacious to replicate in different municipal systems and circumstances.

Outer Space Treaty

The Outer Space Treaty of 1967 is the oldest multi-lateral convention pertaining to space laws. Art. I states: "exploration and use of outer space . . . be carried out for the benefit and interests of all countries . . . and shall be the province of all mankind".[6] This presents a quandary. Space is deemed to be the province of all mankind implying thereby it is an anti-thesis to the doctrine of sovereignty. It may be argued the doctrine of sovereignty is applicable only on earth, which includes land as well as airspace, while it is impossible to partition outer space. Moreover, individual countries cannot subsume parts of space at their own will as this shall impede growth of mankind. But then the inadequacy of this provision runs deeper. It does not require adducing complex legal arguments or technical advancements to explain the fact that it is impossible for the drafters of the treaty in 1967 to foresee such advancements in remote sensing technology which will make mapping of the earth surface to a resolution in decimals. The freedom of all states enshrined in art. I do present us with this quandary.

Art. IV of the Outer Space Treaty provides for the attribution of State responsibility for the acts of commercial remote sensing industry including civilian actors. The provision may have been certified as adequate in 1967 but today a number of aspects remain unanswered. What are the elements attributing responsibility to a State? Are acts of private actors attributable to the state? What are the methods of attributing responsibility in cases of non-governmental actors who are not private actors entirely? Can responsibility be attributed to plurality of states? And these are just a few which have been specifically presented.

The conundrum of attributing responsibility to a state extends to the payment of damages or reparation or compensation. Until it is conclusively determined as to which state incurs responsibility the liability to pay does not arise. Moreover, the Liability Convention does not provide any specific provision dealing with payment of damages arising from abuse of imagery taken from remote sensing satellites.

Registration Convention

The Registration Convention mandates the registration of every satellite in the registry with the launching state. Such information is to be communicated to the United Nations as well. However, there has been fortuitous change of circumstances. The Registration Convention dates back to 1975 when all satellites launched were owned by governments or governmental organizations. Today, in 2010 the private commercial satellite industry is worth over two to three billion dollars. Some of the popular private satellites are the IKONOS satellite, Quickbird-2 owned by Digital Globe in United States, ImageSat in Israel and the recently launched GeoEye-1. The Registration Convention fails to deal with the registration of satellites owned by private entities.

UNGA Resolution 41/65 of 1986

The requirement of a multi-national treaty specific to the sector of remote sensing lead to the United Nations General Assembly Resolution 41/65 in 1986. It is the solitary international instrument pertaining to space sensing by remote sensing satellites. While the original hope had been to adopt a binding treaty, the document finally submitted to the UNGA was a non-binding instrument. In the process of formulating these principles, many developing nations, especially Latin American nations, argued that because of their sovereignty over natural wealth and resources, they should also have sovereignty over information concerning those resources gathered through remote sensing technology. These developing nations argued that due to the absence of protection in Resolution 41/65 they would be subject to economic exploitation by countries possessing remote sensing technology. Specifically, many of these nations were concerned that their bargaining power would be compromised by negotiating with multinational corporations that possessed detailed (satellite-generated) information on the country's mineral and fuel deposits. These countries contended that before any data or information could be collected through remote sensing technology, they should be presented with the right to either grant or deny approval. The United States diametrically opposed this consent-driven position, arguing that Article I of the Outer Space Treaty established absolute freedom in space, and that remote sensing policy should be established consistent with the open-skies doctrine, under which consent of the sensed state is not required and remotely sensed data is available on a nondiscriminatory basis. It is critical to underscore that Resolution 41/65 applies, as stated in Principle I, to remote sensing conducted "for the purpose of improving natural resources management, land use and the protection of the environment," and makes no mention of military reconnaissance, or general media purposes. Because the Principles fail to address military concerns, they are incapable of dealing with the national security issues posed by improved resolution and the international proliferation of the remote sensing industry. Thus, Resolution 41/65 is of limited use in assessing the validity of remote sensing of a nation's military or strategic interests, the primary concern of PDD-23.

International Custormary Law

The development of the technology of imagery from remote sensing satellites has not developed any principles of customary international law specific to it and aid cannot be taken from any such principle to provide panoply to the other sources.

General Principles Of Law Recognised By Civilised Nations

The development of principles in the realm of space law often do not expend much human energy and time due to the rapid advancements in technology. This has necessitated the formation of the principle of short custom. The sources of international law allow 'general principles of law recognized by

civilized nations' as a valid source. While the United States has put in considerable effort in embedding regulations in its municipal system by way of legislations, directives and rules and regulations the development in other countries is only marginal. Certain countries like Canada, France and India do possess specific policies pertaining to imagery by remote sensing, however legislative sanction is pending. Such policies carry the risk of change and therefore cannot be classified as general principles of law.

Even in the United States the principle of shutter control has been analyzed in comparison with the fettering of the freedom of press to cover wars. The practice of the United States in allowing or disallowing media coverage of wars has been highly inconsistent. While the national security exception has been accepted at most times it has not been without much opposition and challenge from the press. It shall be the effort of the researcher to succinctly acquaint the reader with the instances where this inconsistent approach is alleged. These are: [a] US Civil war—Initially press coverage was allowed but upon realization of potential national security risk certain publications were suspended, [b] Spanish-America war of 1898—No prior restraint exercised [c] World War I- Elaborate system of voluntary and non-voluntary censorship acted as prior restraint, [d] World War II-System of mandated and voluntary censorship until after the attack on Pearl Harbor stringent measures were applied, [e] Korean war- Extremely strict censorship, [f] Vietnam war—No formal prior restraint however backdoor restraint in making press's access to battlefield restricted, [g] Invasion of Grenada in 1983- Strong prior restraint in banning reporters during first two days of invasion. Subsequently limited access was granted. Sidle Panel instituted to prepare a report in this matter. No leverage was granted even after a favorable report for media access. [h] Invasion of Panama in 1989- No prior restraint but due to delayed arrival of the pool of reporters no combat coverage was possible, [i] Operation Desert Storm- Prior restraint in the form of limited access under strict regulations. Selection of a percentage of reporters was challenged in the case of *Nation Magazine v. United States Department of Defense*.[7] However, before judgment on the injunctive relief could be delivered the war was over and the point became moot.[8] [f] Operation Iraqi Freedom—An embed system introduced by which journalists were included in the infantry divisions. No prior restraint was imposed but certain restrictions like non-disclosure of troop movements and equipments were imposed. It was criticized for bias as the reporters may be manipulated by the troops who guaranteed them security.

This dialectic between prior restraint and media access received affirmation from the United States Supreme Court as a *dicta* in 1931 and a conclusive judgment in 1979 in favor of prior restraint (national security exception).

Therefore, the existing legal regime to regulate imagery by remote sensing satellites is interstitial and inefficacious for the reasons stated above and the aforestated inadequacies must be redressed and there is requirement of a more effective legal regime.

Propositions For An Effective Regime

The possible abuses from space sensing by remote sensing satellites urge immediate formulation of a universally acceptable law in the form of a multi-lateral treaty. This multi-lateral treaty must not only fortify the interstitial nature of the 'existing regime' but should embed the general principles of international law of state responsibility, ascertainment of liability, damages and reparation or compensation for an 'effecting regime' to regulate imagery by remote sensing satellites.

Responsibility Of States

Elements constituting state responsibility

It is imperative for the researcher to explicate the elements constituting attribution of state responsibility. The ILC Draft Articles on State Responsibility provides for a State to be internationally responsible for a wrongful act.[9] The Mexico-United States General Claims Commission in the *Dickson Car Wheel Company Case* noted that for a State to incur international responsibility, "an unlawful international act be imputed to it, that is, that there exist[s] a violation of a duty imposed by an international juridical standard."[10] The parameters establishing state responsibility in the *Diplomatic and Consular Staff Case*[11] were considered, to include "treaties in force or under any other rules of international law that may be applicable."[12]

The terminology "breach of an international obligation" is inclusive of both treaty and non-treaty obligations.[13] In the *Gabćikovo-Nagymaros Project case* the I.C.J. referred to the relevant draft article provisionally adopted by the commission in 1976 in support of the proposition that it is "well established that, when a state has committed an internationally wrongful act, its international responsibility is likely to be involved whatever the nature of the obligation it has failed to respect".[14]

State responsibility for non-governmental actors

The classic approach mandated state responsibility for government actors only. However, a conjunctive reading of Art. XIV of the UN Principles on the Observation of Earth from Space along with Art. VI of the Outer Space Treaty, 1967 exhorts state responsibility for acts of non-governmental entities as well. They do not advocate a blanket attribution of responsibility making it subservient to authorization and continuous supervision.[15] The need for supervision emanates from the overriding security concerns regarding commercial remote sensing activity restricting the freedom of scientific investigation and space exploration in outer space[16]; hence the contentious principle of prior restraint(shutter control).

Further, as recognized in the *Phosphates in Morocco case*,[17] conduct can only give rise to state responsibility if it is attributable to the state under international

law. International law does not attribute conduct of non-State actors, such as acts or omissions of private persons, mobs, associations, corporations, trade unions, or unsuccessful insurgents, to a State,[18] which was also made clear under the 1980 ILC Draft Articles.

State responsibility for individual conduct

Individual conduct can be so attributed under ILC Draft art. 8 if the person is in fact acting on the instructions of, or under the direction or control of the state, i.e., as a *de facto* agent of the state and the conduct complained of was an integral part of that operation.[19] Attributing conduct in this way requires a "specific factual relationship" between the person and the state and conduct to be attributed must be an 'integral part of that operation'.[20] Only if there is connivance or complicity, approval or ratification, can a state be responsible.

This Court closely considered the concept of control in the *Military and Paramilitary case*[21] stating that a "high degree of dependency" alone was not sufficient and the United States must have either expressly directed the acts or possessed 'effective control' over the paramilitary operations in the course of which they were committed. Therefore, if a state is capable of 'effective control' over the remote sensing satellite or the entity controlling the satellite state responsibility shall be attributable.

Due diligence and constructive knowledge

Acts or omissions of non-state actors under the Draft Articles are themselves generally not attributable. However, the state may incur responsibility not for negligence but for failure to exercise due diligence in preventing or reacting to such acts or omissions. It has been stated that an omission should be judged by a subjective standard of willful neglect, or fault, rather than an objective standard of inaction or simple negligence. The relevance of due diligence here is that States must make sure through a level of judgment, care, prudence and, determination that their territory is not used for the purposes of activities involving the violation of the rights of people or the territory rights of another State.

In the *Corfu Channel case*,[22] Albania was held internationally responsible for failure to take necessary steps to warn approaching ships of the danger of mines based on the knowledge of their presence from the close surveillance over its territorial waters.[23] The Court, however, stated that it could not be concluded from the mere fact of the control exercised by a State over its territory that that State necessarily knew, or ought to have known, of any unlawful act perpetrated therein. In the Tehran Hostage case,[24] the Court recognized the acts of the militants in seizing the Embassy and in taking hostages as conduct of the State of Iran only after the new government ratified the initial non-State conduct and failed "to take appropriate steps"[25] to protect the Embassy. Both these cases are evidence of the fact that constructive knowledge and ratification of the activities

of a state or non-state actor is essential for attributing responsibility upon the state. Therefore, to prevent abuse by a remote sensing satellite is a positive duty upon the state. States cannot escape from responsibility even if they were not aware of the possibility of the abuse if they could have prospectively discovered.

Damages And Reparation

Payment of damages and causal relationship

Another ancillary effect is the payment of damages by the injury caused by a remote sensing satellite. The payment of damages or reparation is consequent upon liability incurred. Liability only exists if there is a direct causal relationship between that breach and the damages claimed. Under traditional and contemporary standards of tort jurisprudence,[26] proximate cause in tort actions involves two factors: avoidability and foreseeability of risk.[27] Unless causation is established, no damages may be considered to fall under the ambit of international liability.

The Chorzow Factory case stated the general principle behind liability in the international context: "reparation must, as far as possible, wipe out all the consequences of the illegal act."[28] Nevertheless, states cannot recover for damages that are indirect, or overly uncertain or remote. Three elements must be present in order for liability to be appropriate in an international dispute: a legal obligation must exist, that obligation must be breached, and damages must result from that breach. For example, in the 1928 Naulilaa Arbitration, the international tribunal found no causal link between German actions and a native uprising in a Portuguese colonial territory.[29] The damages claimed were simply too remote to be attributable to the German activity.

The international community took this principle into account when it adopted the 1972 Convention on International Liability for Damage Caused by Space Objects, the primary authority for liability determinations in cases involving outer space objects. Although the preamble of the Convention recognizes that damage will occur in the development of space,[30] the Convention expressly limited damage to direct losses such as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations."[31] If the drafters of the Convention wished to allow recovery for indirect and remote damages, they would have explicitly written that intention into the treaty, especially in light of the exclusion of such damages under customary international law.

International experience reflects this limitation of recovery to direct, rather than remote, damages. In the case of Cosmos 954, the only international case where one state has paid another for damages caused by its outer space activity, the crash of a Russian naval reconnaissance satellite resulted in radioactive fallout throughout Canadian territory.[32] Russia took the position that its damage

settlement did not include compensation for Canada's unnecessary clean-up measures.[33] Rather, its settlement only included payment for direct damages such as the diminution in value of Canada's property.

Reparations

Reparations for breaches of international obligations is the principle legal consequence for international wrong.[34] International law mandates states to bear responsibility by virtue of its position as an international person.[35] Any act performed by a government or those of its officials or private individuals performed at the government's command or with its authorization imputes original responsibility.[36] The PCIJ has stated, quite unequivocally, in the *Chorzow Factory* case that: "It is a principle of international law that the breach of an obligation involves an obligation to make reparations in an adequate form."[37]

The incorporation of these principles of public international law into the legal regime regulating imagery by remote sensing satellite shall strengthen the 'existing regime' and aid in making the current system effective.

Conclusion

Having stated all sources of international law relating to regulation of imagery by remote sensing satellites, verifying it as interstitial and inefficacious and stating the need and process of regulating ancillary effects of imagery by remote sensing satellites the burden to suggest an alternative proposal to fortify the legal regime of imagery by remote sensing satellites tempts the researcher to formulate a draft of the multi-lateral convention on remote sensing. However, the researcher desists from wording the proposal in legal language for two reasons: *first*, the process of formulation of any multi-lateral treaty involves participation of States through designates and the draft is a reflection of individual requirements of each state and *second*, the scope of the paper is to highlight the interstitial and inefficacious nature of the regime and suggest ways to fortify it rather than exhort states to consider proposals in the letter and form contained in this paper. The proposals are enlisted below:

Proposal-1: Effect of the treaty

The requirement is for a binding treaty. The treaty must incur absolute responsibility upon the states signatory to the treaty. The maxim *pacta sunta servanda* is to be considered sacrosanct.

Proposal-2: Scope of the treaty

The treaty must be able to arbitrate the dialectic of sovereignty over satellite imagery between the developed countries and the developing countries. To be able to do so the treaty must have applicability on sensitive imagery alone. This will not only maintain space as *res communis omnium* but also safeguard the sovereign rights of nations. The sensed data must not be discriminated on its military/non-military characteristic.

Proposal-3: Meaning of Sensitive Imagery

A generic definition is sought which should be capable of qualifying all types of sensitive imagery as protected. Sensitive imagery may be defined to include any imagery of a sensed state or its territories, holdings, or assets abroad that could potentially compromise that state's national security. The following list of sensitive imagery is offered by way of illustration only, and is not meant to be exhaustive, as the final determination of whether an image is classified as sensitive depends as much on context as it does on the actual image itself. Sensitive imagery, depending on the context, could include images of military bases at home or abroad, troop deployments, nuclear facilities, reservoirs, airports, etc. To illustrate the role context must play in assessing whether an image is deemed sensitive, imagery of a reservoir might not, in and of itself, be considered sensitive, while in the context of a credible threat of biological terrorist attack, such an image would be considered sensitive.

Although resolution is critical in determining whether an image is sensitive, there is no bright-line resolution at which an image becomes sensitive. Rather, determinations must be made on a case-by-case basis. For example, ten-meter resolution imagery of a military installation, incapable of revealing number or type of aircraft, might not be considered sensitive, while one-meter resolution imagery capable of discerning both number and type of aircraft would be considered sensitive (given the appropriate context).

Proposal-4: Access to data

Every state must be given exclusive rights over the 'unprocessed data' and 'imagery' of its sovereign territory. Under no circumstances should this preferential right be defeated.

Proposal-5: Validation of unprocessed data

Sensed data is processed at the ground station to obtain imagery. All unprocessed data which carries the apprehension of security, which pertains to a classified area where sensing is prohibited or the sensing of which has been temporarily requested to be withheld from the authorized body must not be processed and made commercially available without validation from the concerned state.

Proposal-6: Mechanism of validation

Every state must be allowed independence to formulate there own validation process. However, such process must be notified with an International body exclusively dealing with space sensing. In situations where a country finds it difficult to carry the validation by itself it may refer the matter to the International Body.

Proposal-7: International body for remote sensing

An exclusive International body for remote sensing must be set up. The constitution and functioning of which must be detailed as consensually accepted by the signatories to this treaty. The body must be equitably represented by designates of each nation. Special care must be taken to quell the apprehension of developing countries to be able to negotiate with developed countries.

Proposal-8: Dispute resolution

There should be a three tier process of dispute resolution. Any state or entity may appeal from the decision of the office validating unprocessed data to the International Body. The appeal may further be taken up by the International Court of Justice. However, the International Court of Justice at its discretion can accept only those cases which appear complex for the International Body to deal with or where a case of prima facie bias exists.

Proposal-9: State Responsibility

State responsibility is not to be attributable in accordance with the provision of any other treaty or source of law. Responsibility is not to be for the acts of governmental actors alone but also for acts of private entities. Specific provisions must be made for attributing responsibility to para-statal entities. State responsibility must be attributed to the state owning the satellites in precedence with the launching station.

Proposal-10: Payment of damages

Consequent upon attribution of state responsibility the defaulting state must make reparation or compensation as determined by the International Body.

Proposal-11: Enforcement mechanism

Enforcement of the treaty is to be vested with the International Body. All states must extend full co-operation to the International Body in enforcing the provisions of this treaty.

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15. Outer Space Treaty, *Op. cit.*, at art. VI.
16. Id.
17. *Phosphates in Morocco* (*Italy v. France*), 1938 P.C.I.J. (ser. A/B) No. 74, at 10; *See also* ILC Draft Articles, *Op. cit.*, art. 2; *See also United States Diplomatic and Consular Staff in Tehran* (*U.S. v. Iran*), 1980 I.C.J. 3 (May 24).
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29. *Naulilaa Claims* (*Portugal v. Germany*), 2 R.Intl' .Arb. Award 1013, 1037 (1928).
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TERRITORIAL SOVEREIGNTY IN THE OUTERSPACE: SPATIAL ISSUES

Dr. Hemlata Sharma
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Abstract

"Man must raise above the earth-to the top of the atmosphere and beyond—for only this will fully understand the world in which he lives."

—Socrates

This famous aphorism though laid down about centuries ago is verbatim true that sovereignty is essential for the defense and security of a state, acclaimed by the Chicago Convention.[1] That talked about the freedom of aerial navigation for commercial, scientific and humanitarian purposes. To reconcile these conflicting needs the concept of functional sovereignty cannot be discarded. It is a high time to set the definition and to set delimitation of air space and outer space. Sovereignty is the stamp of a legal personality of statehood and no one can interfere in the matter of internal affairs, in fact state have an absolute jurisdiction on its affairs. Bashkirian Airlines v. Federal Republic of Germany, 2006 is the case related to sovereignty issue.

The explorations are the concerns of socio-political-economic and technological enhancement, but the man made boundary marks baffled this issue which has metamorphosed from a techno legal challenge into economic and political imbroglio. Airspace is not the monopolistic area of any nation. Every nation has the right to expand its' techno-scientific and remote sensing and satellite technology to explore new hidden facts of celestial world. This paper is an attempt to fix the vertical and spatial limits and bounds of nations and the sovereignty issues of airspace and outer space. It will also highlight the upcoming challenges to developing countries like India in the jet age.

I. Introduction

"We live on the shores of this tiny world, the third planet of nine, circling an average star, the Sun. This star is just among billions in a great city of stars, the Milky Way, itself just one among a billion other stellar cities stretching on perhaps forever. This Universe is more vast than all imagining, and filled with wonders more than we can dream, is a heritage for all mankind."[2]

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It is a very puzzling issue that which State all over the world can exercise the territorial sovereignty over air space and outer space. Though the question of air space territorial limits is whoever resolved by the various treaties and mutual agreement by the concerned States all over the globe, but the issue of outer space territorial sovereignty is sill is an unshackles agenda. There is no customary rule of international law in regard to giving innocent passage through the territorial air space.

Edward Collins has aptly said, "States have complete legal control over the airspace over their territory, other States have only rights in it as are acquired of treaty. There is no customary right of innocent passage through territorial airspace……."[3]

There are two views for the division, definition and delimitation of air space and outer space. The repercussions on the territorial sovereignty are the time immoral issues. But in the arena of the advanced technological and scientific age, there is a dire need to over emphasize on the practical and legal necessity to define the legal boundaries between the air space and outer space.

II. Concept Of Territorial Sovereignty

Territorial sovereignty is an important and inseparable aspect of Statehood. A State cannot be called as sovereign if it does not have absolute control over its territory. Under this domain, the State can exercise exclusive jurisdiction over persons and objects. Other States have no right to interfere. The unauthorized landing made by spacecraft can violate territorial sovereignty of a State. The term 'territorial sovereignty' signifies that within this territorial domain jurisdiction is exercised by the state over the persons and property to the exclusion of other states. This concept bears some resemblance to the patrimonial notions of ownership under private law, and in fact International law adopted many of the civil principles of the property in their treatment of state territorial sovereignty. To this day, their influence has persisted so that in particular the rules as to acquisition and loss of territorial sovereignty plainly reflect the influences of civil law.[4]

State sovereignty over airspace and territorial waters is a fundamental principle of international law. In certain circumstances States agree to relax their claim to sovereignty. However if none of the conditions are satisfied, there is violation of the State's sovereignty. If the violation of a State's sovereignty is because of 'national activities of another State, then that State whose activities have violated the sovereignty is held responsible under international law.[5] "Outer space,... the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies."[6]

In the case of *Island of Palmas Arbitration* between Netherlands and United States Judge Huber summarily defined territorial sovereignty in terms of the

existence of rights over territory rather than the independence of the state itself or the relation of persons to persons. It was remarkably held that:

> "Sovereignty in the relation between the States signifies independence. Independence in regard to a portion of the globe is the right to exercise therein, to the exclusion of any other State, the functions of a State."[7]

The development of national organization of States during the last few centuries and, as corollary, the development of international law, have established this principle of the exclusive competence of the State in regard to its own territory in such a way as to make it a point of departure in settling most questions that concern international relations.[8]

Territorial sovereignty in *Corfu Channel* case explained that something which involves the exclusive right to display the activities of a State. This right has a corollary duty: the obligation to protect within the territory the rights of other states, in particular their right to integrity and inviolability. It is a way of contrasting 'the fullest rights over territory known to the law' with certain minor territorial rights.[9]

III. Mandates Of Various The Outer Space Treaties

Outer Space may be described as the area of the universe where the atmosphere of the earth ends. Where aerial sovereignty ends, outer space begins. It includes all space above the lowest perigee achieved by any satellite put into orbit. Celestial bodies and the moon also form parts of the space.

Space law, agreements concerned with the regulation of the exploration and use of outer space, developed since the first launching (1957) by humans of a satellite Sputnik into space. Space law is an aspect of International law, has developed under the aegis of the United Nations.

The Space Treaties do not expressly and explicitly permit space objects to pass through the territory of other States or to make an unauthorized landing. The logic behind the fact is that the Outer Space Treaty is premised on equality of access to outer space is insufficient to prove that territorial sovereignty has been relaxed to cater for the over flight of space objects. Article-4 of the Rescue Agreement only imposes an obligation to rescue and return downed astronauts. It does not prevent the State from obtaining reparation for a violation of sovereignty.

UN Declaration (1963) explained that the exploration and use of outer space would be for the benefit and in the interest of all people of the universe at unanimous footing ; that no sovereignty could be claimed in space; that objects and persons launched into space would be returned promptly and safely if they landed in a foreign country; and that nations launching objects would be responsible for damages caused by them.[10]

In 1967,[11] a general treaty embodying these principles and adding a prohibition on the military use of space and a provision for the inspection of

installations on celestial bodies went into effect. A UN treaty on use of the moon's resources was drafted in 1979. The boundary between airspace, which is subject to sovereignty and outer space, remains an object of discussion. Some favour definitions based on the composition of the atmosphere and others favour a functional approach; thus, if commercial airlines use a particular layer of the atmosphere, it is to be considered airspace.[12]

The Charter of United Nations recognizes the principle of territorial sovereignty in Article 2 (4). This Article reads as follows:

> "All members shall refrain in their international relations form the threat or use of force against the territorial integrity or political independence of any State, or in any other manner inconsistent with the Purposes of United Nations."

Any State, if makes an unauthorized landing, in the territory of another State can be said to use force against the territorial integrity of the State in which it has landed. Hence, it can be concluded that the State, which has made unauthorized landing has violated the laws of territorial sovereignty of the concerned State.

Liability of a State as far as violation of territorial sovereignty is concerned can be established on many principles. When a spacecraft makes an unauthorized landing, territorial sovereignty can be violated as regards to the airspace or as regards to airspace and territorial waters (if the landing is made at high seas) both.

The Outer Space Treaty solidified the concept of no claim of sovereignty in outer space. It states unequivocally, "Outer space…..is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." Airspace differs from outer space where international law generally forbids a subjacent country from asserting sovereign authority. Thus by very nature of space travel, the Chicago Convention is not applicable. Hence, a State violating the Chicago convention will not be held liable for the violation of the territorial sovereignty. The pith and substance of the Outer Space Treaty waxes very eloquent as defined in Article 1, 4 and 7.[13]

IV. The Liability Treaty

The liability convention has been ratified by 84 States and signed by a further 24 as of January 2006.[14] The basic law of the liability convention is at Article II and III as:

> "A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight."

In the case of damage being caused elsewhere than on the surface of the earth to a space object of one launching State or to persons or property on board such a

space object by a space object of another launching State, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible.

The liability convention enhances a few little niceties as traditional barristers are familiar with such as a one-year limitation period, an international arbitration process, and:

> "Nothing in this Convention shall prevent a State, or natural or juridical persons it might represent, from pursuing a claim in the courts or administrative tribunals or agency of a launching State."[15]

V. The Moon Treaty Of 1979

The Moon Treaty has been an abject failure, signed and ratified by a handful of smaller nations, which do not, in any event, conduct any space exploration.

A science fiction-like conspiracy theory exists in international law that a society known as "L5" lobbied the US government to reject the Moon Treaty in 1980, denying the Treaty with the support of the superpower, and effectively killing it. It has been reported that L5, an organization devoted to extraterrestrial colonization, was vehemently opposed to the Moon Treaty's prohibition against private property rights in outer space.[16]

Moon Treaty is still on the books and available for signature. Although it is called the Moon Treaty, the proposed treaty is far more extensive purports to apply to all "celestial bodies within the solar system".

The Moon Treaty purports to prohibit the use of "celestial bodies" for military purposes and that further, "use of... celestial bodies... shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development".

VI. Multi-Dimentional Approach Of Territorial Sovereignty In Air Space And Outer Space

(A) Limited Applicability Of Airspace Law With Regard To The Sovereignty

Article 1 of the Chicago Convention boldly declares that:

> "Every State has complete and exclusive sovereignty over the airspace above its territory. While this statement seems to give State absolute rights over its airspace, the article is not without its exceptions. A State only has exclusive sovereignty "over the airspace" above its territory. If the landing is made at the sea, then the territorial sovereignty of the State is not violated. For a State to prove the violation of its territorial sovereignty, it is necessary to show that the spacecraft landed in the territorial waters of the State."

(B) Exception To The Sovereignty In Outer Space

As Professor De Saussure explained:

> "No nation protested the orbiting of Sputnik over its territory and the first freedom, the freedom of over flight became established with that launch. The absence of any objection from the other States meant that the orbiting of satellites around the earth was not a privilege but a right given to all nations."[17]

Sputnik I solidified the inapplicability of the Chicago Convention to space. The Outer Space Treaty solidified the concept of no claim of sovereignty in outer space. It was observed that:

> "Outer space…..is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means. Airspace differs from outer space where international law generally forbids a subjacent country from asserting sovereign authority."[18]

Hence, a State violating the Chicago convention will not be held liable for the violation of the territorial sovereignty. The Chicago Convention is not applicable in space travel.

VII. Astronauts' Space Activities For Mankind

The entire jurisprudence behind the rescue agreement aims at the safe and prompt return of astronauts. Further, they should be treated as envoys of mankind. Conclusively, it can be said the entire objective is the benefit of the astronauts. Such benefits clearly stand upheld if the state of nationality of the astronauts is granted *locus standi* to ask for the astronauts. NASA is the best example of such activities.

An envoy of mankind is a very elaborate term. It has never been used as such in any of the cases. But it is a space law obligation to treat astronauts as envoys of mankind. Rescue Agreement confirms this point. It is the duty of the Court to interpret the word in its natural and ordinary sense. But since no case as such as arisen in which importance of these words is in question, not much weight is given to them except the fact that they are there in Rescue Agreement and Treaty on Principles Governing Activities of States in Exploration and Use of Outer Space, including Moon and other Celestial Bodies.[19]

Space activities are accepted as benefiting all mankind and it is in the legal interest of all States that the astronauts are not prosecuted for landing in territorial waters. This is because the spacecrafts landing in unintended locations is also an acknowledged possibility in space law. In the age of new discoveries and inventions, outer space issues are also full of various challenges that, includes the rapid growth and change in commercial space-launch services, increasingly important issues of international trade in space-related goods and services, the expansion of space-based communications services, these have

forced the jurist to the move to rethink for the betterment of 'the common heritage of mankind.'

VIII. Violation Of Territorial Sovereignty vis-à-vis Unauthorized Landing

Article VI of the Treaty Governing the Activities of States in Exploration and use of Outer Space, including Moon and Other Celestial Bodies states that:

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.[20]

Article-3 of the 1968 Astronauts Agreement applies to astronauts who have 'alighted on the high seas or in any place not under the jurisdiction of any State.' 'Those contracting parties which are in a position to do so shall, if necessary, extend assistance in search and rescue operations of such personnel to assure their speedy rescue.' In reply to a question from a representative of Brazil, the United States representative explained: 'it was not the intention of Article 3 to impose an obligation to assist in search and rescue operations on countries in geographical vicinity to the aircraft which had alighted on the high seas or on any other place not under the jurisdiction of any State. It was intended mainly to allow for the possibility of the contracting party's ships being near the scene of accident and therefore in a position to help with the rescue.[21]

IX. Return Of Astronauts

If astronauts land in the territory of contracting State or have otherwise been recovered by it, they shall, under Article- 4, 'be safely and promptly returned to the representatives of launching authority.' In as much as the 1967 Space Treaty requires its contracting parties to return astronauts to the State of registry of space craft a State party to both treaties can be faced with conflicting treaty obligations. The possibility of returning the astronauts to representatives of the launching authority instead of launching authority itself, on the other hand, greatly facilitates the task of territorial State.[22]

X. Assistance To And Return Of Astronauts And Return Of Objects Launched Into Space

The problem of assistance to return of astronauts is one to which the Soviet Union attaches a great deal of importance. Early in 1962 in reply to a message

from President Kennedy, Mr. Khrushchev proposed, in addition to a general treaty on space, the conclusion of special agreement on the subject, and a Soviet draft on this effect was introduced before the Legal Sub Committee on 6 July 1962. The draft applied also to the rescue of the space ships.[23]

Further, Article VIII defined objects launched into space provides as:

> "Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall upon request, furnish identifying data…."

Thus the Agreement on the Rescue and Return of Astronauts and the Return of Objects Launched into Outer Space were brought to a successful conclusion on 15th December 1967, and the Draft agreement received the unanimous commendation of the General Assembly on 19th December. It was opened for signature on 22nd April 1968.

XI. Common Heritage Of Mankind

The idea of the "common heritage of mankind" is to some degree also reflected in the legal framework for the protection of the environment of Antarctica where reference is made to "the interests of all mankind". The concept to this area would, however, at a minimum require the extinguishment of all national claims and the establishment of a more universal regime of administration and control. Such a development does, at least at present, not seem to be in sight. On the other hand it is obvious that key elements of the Antarctic Treaty of 1 December 1959 such as peaceful international cooperation for scientific research and environmental preservation have inspired the new legal regime for the oceans as well as the law of outer space.[24]

India once again strongly advocated the application of the common heritage, principle to the Moon and other celestial bodies, their subsoil as well as their resources.

XII. The Outer Space Treaty And Space Security

It is becoming more difficult to guard against casualties in outer space. All space technology is dual-use; however, the capabilities of dual-use space based technologies are increasing and can be used directly for a range of space system protection and negation purposes. On the one hand, newer, more adaptable technologies such as small satellites are facilitating more active space system defences. Small satellites can provide key protection capabilities such as on-orbit servicing, greater maneuverability in space, in-orbit space surveillance, faster hardware replacement in the event of satellite failure, and clusters of defensive satellite configurations. On the other hand, the same benefits of size and maneuverability can also support more active negation activities. Small satellites are easy to hide and difficult to detect. They can be discreetly released into orbit, approach other satellites and cause physical harm.[25]

XII. Conclusion And Suggestions

While this field of the law is still in its infancy, it is in an era of rapid change and development. Arguably the resources of space are infinite, and limited only by our ability to use them in a manner that is fair and equitable to all nations and which is environmentally ethical. If commercial space transportation becomes widely available, with substantially lower launch costs, then all countries will be able to directly reap the benefits of space resources. In that situation, it seems likely that consensus will be much easier to achieve with respect to commercial development and human settlement of outer space.

High costs are not the only factor preventing the economic exploitation of space: it is argued that space should be considered as a pristine environment worthy of protection and conservation, and that the legal regime for space should further protect it from being used as a resource for Earth's needs.[26]

India's concern is to keep outer space a zone of peace and tranquility. Evidently, ISRO being a civilian research agency with a mandate to explore and exploit outer space for peaceful uses, cannot openly associate itself with project focusing on the development of an anti satellite device. But then DRDO will be in a position to make use of the technologies developed by ISRO to give a quickening impetus to the development of a killer satellite system. Chemical fuel, navigation as well as control and command systems are among the hardware that are common to both a satellite launch vehicle and a missile. However the hitting accuracy of a missile should be more precise than that of a launch vehicle.[27]

The concept and need for a global policy for the space age like an International organization is necessary. Such a policy shall guide states in the discharge of their responsibilities for future success and establish a stable system of law and order in the outer space.[28] It highlights the legal foundation upon which outer Space laws are founded and explores the emergence and evolution of the concept of Outer space as territorial sovereignty.

The exploration and use of outer space would be for the benefit and in the interest of all people of World. No sovereign could be claimed in space; that objects and persons launched into space would be returned promptly and safely if they landed in a foreign country; and that nations launching objects would be responsible for damages caused by them.

Country like India needs a more comprehensive air and space surveillance and identification capability. The detection and identification of objects penetrating or orbiting over Indian Territory are critical functions that must be performed if our nation wishes to remain sovereign.

Therefore the future of public order of space is heavily dependent upon cooperation among States both at multilateral and bilateral level[29]— xxxxxxxxxxxxx. Thus for the economic enhancement, enrichment of knowledge, explorations for the humanity purposes, for the peaceful enjoyment of nuclear

power and for the betterment of education in the countries like India, there should not be any restraints on the name of territorial sovereignty in the outer space.

Endnotes

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    Its preamble refers to the "common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes" and that the "exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development". The Outer Space Treaty is

considered the granddaddy of space law. Several of its component parts have been expounded upon in subsequent treaties specific to certain issues available at http://www.duhaime.org/LegalResources/InternationalLaw/Law Article-182/Space-Law.aspx.

12. *Space* law: Information from Answers.com, www.answers.com/topic/space-law.

13. "The exploration and use of outer space, the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

    "Outer space,... the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies."

    "States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner."

    "Each State Party to the Treaty that launches or procures the launching of an object into outer space... and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space available at http://www.duhaime.org/LegalResources/InternationalLaw/ LawArticle-182/Space-Law.aspx.

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SPACE MEDICINE AND THE LAW

The beauty of the cosmos continually inspires wonder and curiosity. Throughout history, space has provided humanity with both practical benefits and fertile grounds for the imagination. Together with future generations, we will be the next explorers to unravel the mysteries of the universe [United Nations, 1999].

Dr. Lily Srivastava*

Space medicine involves understanding and dealing with physiological and psychological effects on human in space environment and to adopt the necessary counter-measures. Medically significant aspects of space travel include weightlessness, strong inertial forces during liftoff and re-entry, radiation exposure, absence of the day and night, and existence in a closed environment. Space medicine is concerned, for instance, with osteoporosis caused by weightlessness and the resultant increased risk of fracture.[1]

Space Medicine is a developing area of health care that has roots in aerospace medicine but that is focused on the health of individuals so that they can perform in, and return in good health from, increasingly distant extreme space environments, for example, from short-duration space flights, long-term space station flights, missions to the Moon, and in the next stages, exploration-class missions beyond Earth orbit, including missions involving planetary colonization ["Safe Passage".[2] Space medicine has at its core the purpose of supporting the mission of human flight into and exploration of space.[3]

In this paper, the terms space tourist, space passenger, private space explorer, and spaceflight participant will be used interchangeably, except where specifically denoted.

Definition of Space Medicine in an Astrosociological Context

Space medicine requires another complementary dimension. In the area of space medicine, then, a focus on biology and physiology alone misses the social dimension that includes ethics and social inequality. Space medicine represents one side of a single coin on which medical astrosociology exists on the other side. The two brought together create a complete perspective in space research, just as terrestrial medicine and medical sociology belong together on Earth... Medical astrosociology turns the attention of those interested in space medicine from a social-scientific perspective to a single new specialization.[4]

In 1948, nine years before Sputnik I, Col. Harry G. Armstrong, convened a panel to discuss "Aero medical Problems of Space Travel." The panel discussion included presentations by Hubertus Strughold and Heinz Haber, two of the German physicians, and commentary from six noted university and military

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scientists. At this panel, Strughold first coined the term "space medicine in 1948. Later, through the excellence of his work, Dr. Hubertus Strughold (1898-1986) is nicknamed as the "Father of Space Medicine."

He was a co-founder of the Space Medicine Branch of the Aerospace Medical Association in 1950. In 1963, the Space Medicine Branch initiated the "Hubertus Strughold Award," which is given each year for the greatest achievement in space medicine.[5]

Recently, physician/astronaut, Dr. Joe Ker win, a former executive at Wyle who flew aboard the 28-day Skylab 2 mission in 1973 is honored by the Aerospace Medical Association (AsMA) at its annual conference in Phoenix in May 2010 for his works advances in the understanding of human physiology during spaceflight and innovation in the practice of space medicine.[6]

Aviation medicine

It is the study of the biological and psychological effects of aviation. Medically significant aspects of aviation travel include exposure to changing temperatures, large inertial forces, oxygen deprivation, and air sickness, as well as pilot fatigue. Aviation medicine is concerned, for instance, with the spread of disease by air travel and the adverse effects of noise and air pollution.

Aerospace medicine

The fields of medicine concerned with the maintenance of health, safety, and performance of those in aviation and space travel. Aerospace medicine is the sum of aviation medicine and space medicine-health in flight both inside and outside the Earth's atmosphere. Aerospace medicine is a sub discipline of preventive and emergency medicine that ties together physics, life support, and medicine to protect aircrew and patients in the realm of aerospace.[7]

The ambient environment quickly becomes hostile to humans. From the earliest physiologic observations of balloonists in the 1700s to Paul Bert's altitude chamber experiments in 1878 to the latest 2008 reports from the US Air Force School of Aerospace Medicine, our understanding of aerospace medicine has advanced exponentially. The US led War in Iraq and recent hurricanes and earthquakes have necessitated rapid advances in the technology and strategies available to rapidly evacuate critically wounded soldiers and large numbers of non ambulatory patients.[8]

The Indian Society of Aerospace Medicine was founded in 1952 with a charter to (a) advance the science and art of Aviation and Space Medicine, (b) establish and maintain co-operation between medical and other sciences concerned with aero medical development and progress and (c) promote, protect and maintain safety in Aviation and Space ventures. Towards furthering this cause the Society promotes the specialty by organizing annual conferences, facilitating its members to interact with specialists across the world, publishing a

biannual Indian Journal of Aerospace Medicine and sponsoring research work to foster the spirit of the subject.[9]

Astro-scientist Prof. K. Kasturirangan has called for introducing Space medicine as a subject in medical courses in view of the tremendous potential in the field, he stated "In a space environment, the human beings face micro-gravity condition, it makes the flow of body fluids such as blood different from what we are accustomed to on the surface of the earth. This in turn alters the quantity and distribution of body fluid, being free of the gravitational effect.''[10]

To provide necessary support to the Human Space Programme (HSP) of ISRO, the Institute of Aerospace Medicine IAF Bangalore has defined the following areas of work.[11]

(a) Selection of Vehicle Crew and Training.

(b) Environment Control and Life Support System (ECLSS).

(c) Human Engineering Work Station Design for Crew Module.

(d) Isolation and Psychological Management.

(e) Human Factors considerations in Manned Space programme.

(f) Microgravity Research.

(g) Gravitational Stress Management in various Phases of Space Flight.

(h) Clinical Space Medical and Surgical Management.

(j) Radiation Protection.

(k) Toxicology in Space.

(l) Emergency Survival System Design.

(m) Space Station Life Support System.

(n) Extra Vehicular Activity (EVA) Design.

(o) Heat Stress Management.

(p) Operational Space Medicine.

(q) Scientific and Technical Manpower Management.

(r) Infrastructure Development related to aero medical Support.

NASA and Aerospace Medicine

The successful launch of Earth's first artificial satellite by the Soviet Union on October 4, 1957, was the initial step in a series of events that made the State of Texas the home of the United States manned space-exploration program, for a combined total presence in space of more than 70 years.[12] *Sputnik* I provided the impetus for President Dwight D. Eisenhower to propose and Congress to approve the National Aeronautics and Space Act, which was signed into law on July 29, 1958.After World War II, 130 German scientists and engineers, led by

Werner von Braun, were brought to the United States and stationed at Fort Bliss in El Paso, Texas, to continue their work on rockets.

Aerospace Medicine and Manned Space flight

Project Mercury provided confidence in the ability of the astronaut to perform satisfactorily in the weightless environment and in the capability of the spacecraft environmental-control system to support life in space. In 1963, at the height of Project Mercury, had grown to 2,500 civil-service employees, but only about 500 supported Project Mercury. The rest of the employees were involved in preparing for the Gemini and Apollo projects. Project Gemini included twelve manned space flights. The Gemini spacecraft, launched by a modified Titan missile, carried two astronauts. The two longer flights, *Gemini V* (eight days) and *Gemini VII* (almost fourteen days), included nine medical experiments designed to investigate the problems identified during the Mercury missions. These experiments provided an opportunity for the medical community outside NASA to participate in the space-flight experiment program. The biomedical results of Apollo were impressive. The Skylab missions, which occurred between May 1973 and February 1974, differed significantly from all previous manned missions. From its inception, Skylab was intended to be a science program. The final flight of an Apollo spacecraft took place on July 15, 1975. The Apollo-Soyuz Test Project was a nine-day international mission; the first shuttle orbital flight was launched on April 12, 1981. Commanded by John W. Young with pilot Robert L. Crippen, this mission was a flight test of the Space Shuttle *Columbia*. The shuttle program was an outstanding success. Its performance was even better than anticipated until January 27, 1986, when the shuttle *Challenger* exploded shortly after liftoff. One of the solid rocket boosters malfunctioned, and the resulting explosion killed the seven crew members. By late 1994 Spacelab had flown eight times, and each mission included biomedical investigations.[13]

Space Medicine: Challenges and Future direction

The expansion of human space flight to low earth orbit and beyond over the past forty years has provided a challenge to clinicians responsible for the health and safety of astronauts. Space medicine is currently entering an evolutionary phase of incorporating the understanding of the physiological changes associated with human space flight into the prevention, diagnosis and therapy of illness and injury in space.

The operational priority for the next decade will be to develop and utilize the research capabilities of the International Space Station to enable safe human space travel beyond low earth orbit. The next phase of exploration may involve humans returning to the moon for prolonged periods at lunar habitats, or could involve sending humans to Mars to search for evidence suggesting the existence of life elsewhere in our solar system. If the development of space technology follows the rapid development of aviation over the past century, as we enter this millennium the humans may very well become a space faring society.[14] The day will come when some human beings will spend all their time in space.

Voluntary reporting systems of medical issues

An overarching paradigm describing space medicine is to expose the normal physiology of a career astronaut/cosmonaut to microgravity and subsequently mitigate the changes which could jeopardize on-orbit health as well as re adaptations to Earth. Gregory Olson, the third spaceflight participant to International Space Station, was exceptionally forthcoming in allowing his complex medical case to be published in the medical literature. The article "Medical Qualification of a Commercial Spaceflight Participant: Not Your Average Astronaut" documented the efforts to take an initially medically disqualified individual and successfully fly him after appropriate intervention.[15]

Knowledge gained from this case and other future challenging cases will provide space medicine with an evidence-based approach to address medical standards and onboard medical care systems. A voluntary national reporting system could potentially be established to create a repository of knowledge on items such as types of medical conditions evaluated and approved /disapproved for flight, scope of diagnostic evaluations or treatments utilized to clear a given patient, medical or safety incidents arising during preflight training and all phases of flight. This system would help promote health and safety by increasing knowledge in space medicine about the physiological impacts of flight on a host of underlying pathologies and conditions. Participation by foreign companies in such a system would certainly add to this information, thus serving passengers and crew safety internationally.

NASA, wishing to broaden its knowledge of space medicine and promote safety, may be well suited to become a data management clearinghouse for such a reporting system.[16] The current NASA Longitudinal Study of Astronaut Health (LSAH) is an established database compiling and evaluating information on active and retired Astronauts across a spectrum of physiological/clinical parameters and mission profiles. Such a program can mitigate risk and decrease liability as both the medical community and business enterprises strive to maximize health and safety for the flying public.[17]

In 1999, the Aerospace Medical Association (AsMA) approved a resolution urging that appropriate agencies develop relevant U.S. Federal policies, procedures, guidelines, and regulations to guarantee the health and safety of human crewmembers and passengers involved in manned commercial space flights. On November 20, 2000, AsMA convened a task force to develop a position paper on "Medical Guidelines for Space Passengers". Two sets of guidelines were published in the "Aviation, Space and Environmental Medicine" journal in the October 2001 and November 2002 issues.[18]

On February 11, 2005, the FAA Office of Aerospace Medicine released a report on "Recommended Guidelines for Medical Screening of Commercial Space Passengers" during the 8th FAA Commercial Space Transportation Forecast Conference.[19] The International Space Station (ISS) medical program has

been developed by the five partner space agencies in the U.S., Russia, Europe, Canada and Japan. Medical standards have been developed as one aspect of the medical program and one specific set of standards addresses paying passengers called Space Flight Participants (SFP). These SFP standards permit flights up to 30 days in length.

U.S. is the only country that has established licensing requirements for manned commercial space operations. The U.S. Commercial Space Launch Amendments Act of 2004 (H.R. 5382) defines a suborbital space passenger vehicle, clarified the process of licensing such vehicles and authorizes FAA to issue permits, and allowed paying passengers to fly into space at their own risk.. The Act necessitates the space passengers to be fully informed about all of potential risks of participating in space flights. Since the beginnings of manned space exploration, relatively healthy professional astronauts have been selected to participate in space flights, and, from a medical fitness point of view, they should not be considered a representative sample of the general population. However, even among these professional astronauts who have been subject to very thorough initial medical selection tests and to subsequent medical screening and monitoring evaluation procedures, some have experienced a variety of ground and in-flight medical events.

Medical liability during in-flight medical event:

The standard of medical care expected of doctor passenger on board aircraft is the same as those for doctors working in a hospital environment. The medical standard of care is a medical judgment as established by the Bolam test in the landmark case of *Bolam v. Friern Hospital Management Committee*[20] Per McNair said: "The test is the standard of the ordinary skilled man exercising and professing to have that special skill. A man need not possess the highest expert skill; it is well-established law that it is sufficient if he exercises the ordinary skill of an ordinary competent man exercising that particular art." Under the Bolam test, a doctor is not negligent if he has conformed with responsible professional practices. He is judged by the standard of awareness and sophistication to be expected of a doctor in his type of practice. A doctor conforming to responsible professional practices would not be negligent simply because 'there is a body of opinion who would take a contrary view'. To determine whether a doctor is negligent, the court will rely on expert professional opinion. The standard of medical care is a medical judgment *Sidaway v. Bethlem Royal Hospital Governors*.[21] The Bolam test established that the standard of medical care was that of professional colleagues, which must accord with a 'responsible body of medical opinion'. The Court of Appeal has ruled that the Bolam test is supplemented by the House of Lords decision in *Bolitho v. City & Hackney Health Authority*[22] in that "even if the doctor's actions were supported by a body of medical opinion, the court would still examine the expert testimony to see if it was founded on a logical basis". Thus the Bolam test does not give immunity from judiciary inquiry over the medical process. To qualify as a 'responsible' body of opinion, such

testimony must satisfy the threshold test of logic. This means that the experts must direct their minds to the comparative risks and benefits and have reached a 'defensible conclusion' on the matter.

Duty of care owed by volunteer doctors

The passenger doctor does not owe a duty to volunteer medical help unless there is a pre-existing doctor-patient relationship. This is the case in the United Kingdom, United States, Canada and Singapore. In Singapore, doctors are bound by the Singapore Physicians' Pledge (derived from the Hippocratic Oath) and biomedical ethics to render medical assistance when they are asked to help. (Section 45 (1) (d) of the Medical Registration Act on 'professional misconduct'). Other European countries do impose an obligation to render assistance. America has the 1988 Aviation Medical Assistance Act which gives limited "Good Samaritan" protection to any medically qualified passenger who provides medical assistance on board an aircraft during an in-flight medical emergency. The doctor must be a 'volunteer' giving care in good faith and receiving no monetary compensation. Gifts in the form of travel vouchers or seat upgrades are not compensation. Although this Act frees the passenger doctor from responsibility for assisting during an in-flight medical emergency it does not free him if he is guilty of gross negligence or willful misconduct. It is interesting to note that the Aviation Medical Assistance Act also relieves airline carriers from liabilities due to the performance of the air carrier in obtaining the assistance of a passenger-doctor in an in-flight medical emergency.[23]

Ethical Viewpoints from a Medical Perspective

Space medicine, and terrestrial preventive and occupational medicine, cover similar grounds. Medical decision-making involves achieving a balance between safety, well-being, career livelihood of individuals and attainment of mission success. Every aspect of space medicine practice is influenced by these variables, from the mission design, development and execution to the selection, training, monitoring and follow-up of the crew. Given the potential hazards offered by the space environment, every in-flight medical contingency cannot be predicted. However, generalized on-board protocols for anticipated medical scenarios can provide a framework for crew and ground personnel to minimize deliberation when making decisions that will impact the mission such as evacuation or mission abort.[24]

Doctor's ethical duties and liabilities

All physicians should understand basic air evacuation principles in case natural or manmade disasters warrant mass evacuation such as happened after the Chinese earthquake in 2008 and Hurricane Katrina in New Orleans in 2005.[25] In ideal situations, during organized large civilian or military airlift operations, physician responsibilities include the following:

- Aero medical screening: Define the patient classification as ambulatory, litter, monitored, intubated, or psychiatric. This triage effort also entails a decision about "precedence" (now, soon, or when space is available), and special medical requirements such as suction equipment or IV drips.
- Validation: Review by an aero medical specialist when possible. This would be a civilian or military flight surgeon. Consult can be telephonic, but during large-scale evacuations, these specially trained physicians usually are prepositioned at the aero medical staging site (outbound airfield).
- Medical preparation: "Packaging" the patient for the stressors of flight including, splints, antiemetic, and stocking of sufficient supplies of required medications and equipment.
- Clearance: Final patient review and acceptance by receiving facility.[26]

The Clinical Care Capability Development program

As part of the Space Medicine Program at the Johnson Space Center, the Clinical Care Capability Development Program (CCCDP) is an endeavor to develop guidelines and practices to provide medical care onboard space vehicles such as the International Space Station. Prior to accepting any technology or recommending any technique it must be analyzed from the Space Medicine perspective. Procedures or techniques must be reviewed to determine the specific limiting factors that may be encountered in the space environment. Volatile anesthetics or intravenous fluids could not be used in the standard fashion, which requires gravity. Given the prohibitive costs involved in testing any procedure in orbit, the KC-135 aircraft becomes an essential microgravity test-bed. This aircraft constitutes the NASA Reduced Gravity Research Platform, and allows investigators to simulate the weightlessness of space while remaining only a few miles off the earth's surface.[27]

Medical liability issues and other legal aspects

The thorough study of medico-legal aspects of commercial orbital space flights aims to fulfill four objectives:

1. Ensuring passenger / flight participant safety;
2. Advancement of the commercial space flight industry;
3. Development of the rule of law against medical requirements in a new field of space applications; and
4. Guaranteeing certainty in medical and legal issues for commercial space flight operators.

This requires a consideration of the following legal issues: (1) the applicable law; (2) jurisdiction, authorisation and licensing; (3) liability for medical risk exposure; and (4) informed consent.[28]

It is assumed that international space law and the various national space legislations apply.

Following the launch of the first satellite in 1957, the United Nations formed the Committee for Peaceful Uses of Outer Space (UNCOPUOS) in 1959. This committee set up five major international treaties.[29]

Jurisdiction, Authorisation and Licensing of International Treaties

The rescue treaty (1968)

This treaty presents a convention on astronaut rescue and return of objects launched into space.

Convention on registration (1974)

Under international space law, a space object is to be registered by the launching State" in accordance with Article II of the Registration Convention. The State of registry pursuant to Article VIII of the Outer Space Treaty "shall retain jurisdiction and control over such object, and over any personnel hereof, while in outer space", Subject to certain restrictions including the application of state's national laws.

Space liability treaty (1971)

The launching country would be absolutely liable to pay compensation for loss of life, injury, or damage to property resulting from objects launched into space by that country.

Article III of the 1972 Liability Convention makes a "launching State" liable for damage caused to persons on board a space object where the damage is due to its fault or the fault of persons for whom it is responsible. Article I(c) defines a "launching State" as a State which launches or procures the launch of a space object, or a State from whose territory or facility a space object is launched.

Outer Space Treaty (1967)

This treaty establishes that outer space is not subject to national appropriation and is to be used only for peaceful purposes. Article VI of the 1967 Outer Space Treaty makes States Parties "bear international responsibility" for activities in outer space, even where such activities are carried out by non-governmental entities. Such activities require "authorisation and continuing supervision" by the appropriate State. This obligation is generally fulfilled through a licensing process. It is significant, however, that these treaties do not require States to adopt safety and certification standards for crew, vehicles or passengers.

The Moon treaty (1979)

It deals with commercial exploitation of the Moon. In addition to the above treaties, governments have adopted non-binding conventions. They are referred to as resolutions and mainly concern international broadcasting from satellites, remote sensing, and the use of nuclear power in space.

A lack of safety regulations could result in international liability under the Liability Convention... Thus far, no rule of customary international law has been developed regarding passenger safety or medico-legal liability in relation to commercial orbital space flights due to a lack of clear practice and the belief that such practice is obligatory.[30] Minimum regulation and general compliance to minimum passenger safety standards appear to be sufficient.[31] There are conventions listing other transportation systems' liabilities that can be used as a framework in the event of passenger death or injury. The ''Convention for the Unification of Certain Rules Relating to International Carriage by Air'' (Warsaw Convention1929), Article 17 declares an airline liable, for damage sustained in the event of the death or wounding of a passenger or any other bodily injury suffered by a passenger. If the accident which caused the damage so sustained took place on board the aircraft or in the course of any of the operations of embarking or disembarking.[32] If there is a claim against an air-carrier, under which jurisdiction can the injured passenger or next-of-kin sue? Under article 28 of the Warsaw Convention 1929, the passenger can choose one of four jurisdictions to sue, namely:

— The place of incorporation of the carrier

— The place where the carrier has its principal place of business

— The place of destination

— The place where the carrier maintains an establishment through which the contract was made.

The main advantage of arbitration is the easy enforcement of foreign arbitral awards over foreign judgments due to the multilateral treaty—the 1958 New York Convention on the recognition and enforcement of foreign Arbitral Awards.

Liability under Tort/Delict and Contract Law

Passenger liability can be established by contract or delict/tort if the applicable national law so provides. With respect to tort/delicts, in many jurisdictions such claims are subject to the lex loci delicti rule, the law of the "place of the wrong" being applicable. Criteria proposed in the determination of the applicable law include contractual stipulation, law of the plaintiff or defendant, or law of the forum.

Waivers of Liability

To stimulate space tourism industry, the parties' freedom of contract is upheld to the greatest extent possible. In this context it is also important to note that, while space flight remains inherently risky, the informed space tourists are voluntarily putting themselves at such high risk. Therefore, contractual waivers of liability, including in case of death of a space flight participant, would be recommended.

Insurance

Other mechanism to reduce the risks of medico-legal liability is insurance in the form of passenger life and passenger liability insurance policies. Passenger liability insurance protects the operator against its legal liability to passengers. Insurers undertake to pay on behalf of the insured entity all sums which the insured shall become legally liable to pay as damages.

Informed Consent

Each space flight participant has to provide his/her written informed consent to participate in the space flight as well as written certification of compliance with the physical examination.[33]

Conclusion

"The best way to predict the future is to invent it".

—Alan Kay

Space medicine that originated from aerospace medicine in the 1940s is now rapidly developing to meet the requirements when common citizens as well as astronauts expand their habitats to space. In the interest of promoting space medicine and its applications for the benefits of humankind, on Earth and in space, we commit to providing an international, intercultural, and interdisciplinary approach to the dissemination of knowledge in aerospace medical sciences and to the development of state-of-the-art space medicine in support of future space exploration.

When we legally investigate the topic then we find that, there are primarily two very distinct parts of our juridical work. We have to study existing applicable law especially Space Law, and also what should be the future law. It is generally agreed within the scientific community that provision of appropriate medical facilities and administration of quality health care to astronauts are of great importance. However, for the more complex and remote missions envisaged for the future, issues of liability, responsibility and damage relating to medical practice may take on a greater significance and will need to be addressed and expanded in national sphere as well as International sphere. We are attempting to use an international laboratory, investing in tomorrow, in search of greater scientific knowledge which may contribute to maintaining the beautiful

environment on Earth so that the next generation can live safely. It is our hope that the importance of manned space development will be fully understood by more and more people.

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A NEW FRONTIER IN TRAVEL: SUB ORBITAL

Dr. Sanat Kaul*

Introduction

'Commercial human spaceflight is poised to emerge as a viable industry in the next few years. Initial success will lead to new services, markets, routes, missions, and possibly lower prices. Failure of commercial spaceflight to develop could stymie orbital services that depend on economies of scale. Governments will likely need to regulate commerce, travel, and military and diplomatic national interests in space. Collectively, this will increase the importance of international and multilateral cooperation between governments, and underline globalization and international strategic business planning for commercial space companies. Whether space is used to greater effect by governments or commercial interests, it is a common domain shared by all who operate in space and it is in the collective interest to preserve the space environment both now and in the future.

The Space Report 2010<1>

The Space Report 2010 is the result of extensive research by the Space Foundation.

Commercial Air Travel industry is barely 60 years old and is facing the beginnings of a new frontier. This is the challenge of travelling from one point on earth to another through air and space. 81 years after the Warsaw Convention of 1929<2> and 64 years after the Chicago Convention of 1944,<3> the two major Conventions which regulated air travel; there has been a tremendous growth in air travel. One of the earliest countries to set up a commercial airline was Poland on 1st January 1929. The growth of commercial airlines has been seamless without much difficulty. Thanks are largely due to the formation and efforts of International Civil Aviation Organization (ICAO)<4> formed by the Chicago Convention of 1944 and later supported by IATA in 1945. One can compliment ICAO for the tremendous work put in by the organization and it's Permanent Council, an elected legislative body currently consisting of 36 member nations, and it is also a tribute to the cooperative spirit of all member countries that this organization has managed to produce with consensus, such detailed set of laws consisting of Standards and recommended Practices (SARPs), Guidelines and other documents spread over 18 annexes covering all aspects of Air Law from licensing to passports. The legislative function is a continuous function taking into account the current needs of aviation. The powers to make such laws is provided in Art 37 of Chicago Convention and it also lays down the area where it may make these laws but also states that it may make these SARPs on such

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matters concerned with safety, regularity, and efficiency of air navigation as may from time to time appear appropriate' The second most important aspect of Chicago Convention is that it provided air space above a country (and its territorial waters) as its sovereign area. Air Space over High Seas was therefore, left common to all.

It is strange that while putting in a tremendous work in codifying the air law, the delegates to Chicago Convention of 1944 never codified the definition of 'air'. Chicago Convention provides sovereignty of air space to countries, but it does not define what air space is. This is perhaps due to the fact that in the early days there was no need for a clarification or explanation as aircrafts remained and functioned where they could work and fly by displacing air. Chapter 1 of Annex 7 of The Chicago Convention defines an aircraft as a machine that derives support in the atmosphere against reaction of the air (except other than that of earth's surface). An aero plane has been defined as an object which is heavier than air but derives its lift from aerodynamic reaction of air. Generally it has been informally accepted that air surface extends vertically up to 100 kms and after this starts space/outer space.<5> The *Fédération Aéronautique Internationale* established the *Kármán line*, at an altitude of 100 km (62 mi), as the boundary between the Earth's atmosphere and the outer space, while on the other hand some in US consider 100 miles (160 kms) to be the boundary between air and space. Nonetheless both the Kármán line and the U.S. definition are merely working benchmarks, without any real legal authority over matters of national sovereignty. So far aviation never challenged this informal definition of air as aircrafts could only fly in the air and then beyond came spacecrafts which went into outer space. The more important aspect of air was the provision of sovereignty of air space above the territory of a country and thereafter starts the outer space which was defined by the Outer Space Treaty as 'common heritage of mankind'. Here again, the Outer Space Treaty or for that matter any other space treaty has also not defined the separation limit between air and space. This duality is now troubling matter in defining sub-orbital flight. On the technical side an aircraft will not be able to fly on air displacement principle at certain high altitudes and will need rocket propulsion to move.

The 1967 Outer Space Agreement (The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies) is the main agreement on Space issues also never defined the demarcation between air and space. It has stated that the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind; the main features of this Agreement are:

- Outer space shall be free for exploration and use by all States;
- Outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means;

- States shall not place nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies or station them in outer space in any other manner;
- The Moon and other celestial bodies shall be used exclusively for peaceful purposes;
- Astronauts shall be regarded as the envoys of mankind;
- States shall be responsible for national space activities whether carried out by governmental or non-governmental activities.

Issues of Aero-Space

We have now reached a stage of technological development where the definition between an aircraft and spacecraft is getting blurred. The concept of Sub-Orbital Flight is gaining ground. A sub-orbital flight can be defined as a hybrid which is both an air flight and a space flight. A flight which takes off as an aircraft but switches to rocket propulsion at a certain altitude to go up to say 100 km vertical and then re-enters atmosphere. What is a sub-orbital flight? It is like a normal air flight to begin with but later it goes up practically vertically through air to enter space or micro gravity and then reenters air to save time on inter-continental travel. The saving in time to travel across the globe would be tremendous. This is future of civil air/space commercial travel.

The X Prize<6> and the beginning of Space Tourism: the beginnings of this technology breakthrough in commercial travel started in 2004 with Prize, a prize announced by Mr. Anoushah Ansari and Mr. Amir Ansari for $10 million for a Non-Government Organization to launch a reusable manned spacecraft into space twice within two weeks to be conducted as a sub-orbital flight carrying up to three passengers. This prize was won by Burt Rutan on 4th October 2004 in a special vehicle called Spaceship One attached and carried by an aircraft called White Knight. It may be recalled that a similar prize instituted by one Raymond Orteig for crossing the Atlantic from New York to Paris and went to Charles Lindberg for nonstop crossing of Atlantic on 20-21st May 1927. Similarly, Spaceship One was the first private vehicle to complete two sub-orbital flights within two weeks carrying three human beings. It went up to 100 km to win the Ansari X Prize. The modus operandi was that the Spaceship One was carried piggyback by an aeroplane up to 50,000feet (9.5miles) where it was released into a glide. It then propelled itself vertically for 80 seconds by a rocket motor to an altitude of 100 kms. It then fell back to earth, reentered earth atmosphere and glided for 15-20 minutes before landing back on the same runway surface from it had departed.

Post success of Spaceship One plans has been announced by Virgin Galactic,<7> again a private company, for development of a fleet of five sub-orbital vehicles to carry passengers. Booking of tickets has also started. There are likely to be other companies competing in this effort. We are now at a crucial

juncture where we need to put up rules and regulations which will control such flights because as more countries join in there can be a chaotic growth of sub-orbital traffic. What is the position today? Since US is leading in this area the Federal Aviation Authority (FAA) of US has already been mandated to prepare rules and regulations for this new efforts driven by private sector. The US Commercial Space Launch Act (CSLAA) was enacted in 2004 which entrusts Department of Transportation with the task of making regulation and FAA the responsibility of regulating for safety crew and space flight participants. Accordingly, FAA has issued Guidelines in 2005 for 'Commercial Sub-orbital Reusable launch Vehicle Operations with space flight participants.

Such legislation by US is good and timely but does not have international consensus. So long as these sub-orbital flights remain 'domestic' i.e. leaving a country and returning to the same country and not entering anyone other country's airspace there is no legal issue. But once a sub-orbital flight leaves one country and lands in another, it amounts to an international flight and many issues of international law come in to play. We now also face the issues of launch vehicles having multiple owners/operators. Virgin Galactic is a US based company with its parent company in UK planning a fleet of five sub-orbital vehicles to carry six paying passengers per vehicle who may be of any nationality but will probably operate from US. The first space Tourist Dennis Tito was a US national but he took a commercial space flight from a Russian Government owned Soyuz spacecraft from Kazakhstan in 2001 which docked with the International Space Station (ISS) and he stayed there for eight days. Luckily the flight was successful. However, in case of a mishap there would be legal issues of compensation. Other countries like UK have also enacted UK Outer Space Act<8> which authorizes the Secretary of State to give a license for space activities. Similarly other States like Russia, Ukraine have their own laws. More and more countries are coming up with their laws concerning commercial space flights but are not harmonized with each other. As long as these flights remain' domestic' there may not be an issue, but the moment they become international, many issues will come into play.

Success of Spaceship One and announcement by other companies brings out the fact that travel through sub-orbital trajectory is no more a futuristic dream but an immediate possibility. How are these flights to be treated? Do they come under air and therefore under Chicago Convention of 1944 or are the Space flights? Second, should we not make rules for them as we had done civil air flights? It may also be noted that this time the efforts are of private companies and not of government or public sector. Will not the laws of Air apply to them or will they come under Space laws? There is no clear cut decision on it. When this issue was taken in the Council of ICAO by the Indian Representative and was included as an item of agenda and later brought to the Council as a working paper.

The present legal status of sub-orbital flights

As already brought out the Council of ICAO has a clear mandate to adopt Standards and Recommended Practices for civil international under Article 37 of the Chicago Convention. It has achieved this by providing Air laws in the form of 'Standards and Recommended Practice'. All members' countries of ICAO have to follow it and ICAO conducts audit to check the implementation by each country terms of safety and security. There are 18 Annexes to the Chicago Convention laying down there SARPs in different categories.This system is working well and air travel has become the safest mode of transportation.

However, for Outer Space flights there are a separate set of Conventions under International Law. The main one is the Treaty on Principles Governing Activities of States in the Exploration and Use of Outer Space Including the Moon and Celestial Bodies (1967) better known as the Outer Space Treaty. Under Article II of this Treaty there is no sovereignty in outer space. The treaty states that Outer Space 'is not subject to national appropriation by claim of sovereignty, by means of use or occupation or by any other means' and therefore it is the other side of Chicago Convention which bestows sovereignty on air space above a sovereign nation. The jurisdiction and control over a space object is however, that of the registering state and therefore, all liabilities also devolve upon it. The second Treaty on the space issue is the Convention on International Liability for Damage Caused by Space Objects (1972). This agreement also stipulates in its article II that 'the Launching State shall be absolutely liable to pay compensation for the damage caused by its space object on the surface of the Earth or to aircraft in flight'. Again no vertical limit to air has been provided. However, at a certain height gravity cedes to micro gravity which renders aircrafts from flying and rocket propulsion becomes necessary to fly in this medium. Would a civil craft run on rocket propulsion in atmosphere also be subject to Chicago Convention? While Chicago Convention mentions aircraft it does not define it. Its definition is available in an Annexe to the Chicago Convention which defines aircraft as a machine that can 'derive support in the atmosphere from the reaction of the air other than reaction of air against the Earth's surface'. But an annexe is a subordinate legislation and therefore, cannot restrict the articles of the convention if they don't provide for it specifically. It is therefore, possible that a rocket based craft would come within the purview of Chicago Convention in spite of the restricted definition of aircraft in the annexe. Now a sub-orbital flight is a flight similar to an aircraft based flight except for the fact that it leaves 'air' or 'atmosphere' for a short period and again re-enters the atmosphere. It, therefore, cannot be kept outside the purview of aviation annexe notwithstanding.

We now have the concept of 'Space Asset' and 'Aircraft' governed by two separate international treaties. So far this was alright as aircrafts and satellites were different types of vehicles with different areas of operation except for the fact that Spacecraft would use air surface as a part of its early trajectory. However, with the sub-orbital flight the two concepts start merging. In fact, in a

sub-orbital flight the flights take-off from one sovereign air space after going into space for a short while they re-enter air of another sovereign country. As a result the need to provide flight path and monitor the progress of a sub-orbital flight becomes even more essential as issues relating to re-entry are another set of technical requirements. It is, therefore, a moot question whether a sub-orbital vessel could be treated as an aircraft or a spacecraft. In the present form of Spacecraft One it used both air displacement principle and rocket propulsion principle. They have qualities of both aircraft and space craft.

What are the issues which we should take account of? The main issue is that we should look into safety as well as sovereignty issues which involve security as well. We also need to look at environment issues as destruction of a space faring craft can cause immense damage in space and to the existing problem of space debris. We also need to look into the issue of an Agency/Institution which will be responsible to provide Air Traffic Management (ATM) as well as Communication, Navigation and Surveillance (CNS) functions while the object is in space and at the point of re-entry.

Safety: Safety is of paramount importance. Over the last 66 years safety in international travel has increased tremendously. This is largely due to the improvement on both the technical parameters of Aviation and the rules and regulation concerning aviation. While nobody wants an accident, each country wants to maintain sovereignty over its air space. The role of ICAO in bringing in a set of detailed rules, regulations and guidelines to harmonize the national laws and rules without infringing the sovereignty has been a tremendous achievement.

Let us take the example of Spacecraft One. Can we consider this as an aircraft or a spacecraft? The position is like this. Spacecraft One is a hybrid. A large part of its journey is through air. It has external winged payload of an aircraft with jet engines but at about 50,000feet it disengages from the aircraft on which it was riding piggy back and uses its own rocket boosters to move upon return journey it glide downs on the principle of air displacement. So Spaceship one is essentially, a hybrid using its aircraft capability during flight up through air and again on reentry it behaves as glider and uses its aerodynamics. While it is in micro-gravity we have the issue whether it is outside the jurisdiction of an agency controlling aircrafts. There is a need to examine the various international conventions and treaties both on air side and space side to understand the implications of future sub-orbital flights from one country to another.

On the air side the legal issues are well settled and clear. Air Space above a country and its associated territorial waters is its sovereign property. The management of this airspace is governed by various articles of the Chicago Convention of 1944.The Oceanic airspace is the responsibility of ICAO and ICAO in turn has parceled out the oceanic airspace to various to various adjoining countries for air space management. But these states cannot claim sovereign right over the oceanic airspace under their management. The safety and security of air flight management is the top priority of ICAO. In this respect ICAO has

produced elaborate Standards and Recommended Practices along with detained annexes and guidelines etc. Even with the huge increase in air traffic the safety in air travel has improved and today air travel is, perhaps, the safety mode of travel. ICAO has also introduced USOAP (Universal Safety Oversight Programme) and USAP (Universal Security oversight Programme) along with safety and security audit which makes compliance to these Standards & Recommended Practices very essential as a poor audit report will caution other countries. Leading air traffic countries have also introduced their version of audit of countries whose aircraft fly into their territory. The US FAA has categorized countries whose aircrafts fly into their country into two types: category 1 and 2. Category 2 countries are those whose safety standards are poor and suffer from some infirmities. European Union has also their own ways of differentiating safety standards. Instead of categorizing countries like the US FAA the categorize Airlines. They refuse entry of certain Airlines when they feel their safety standards are not up to the mark. Between the ICAO audit, FAA categorization and the EU system of debarring airlines there is enough deterrence to slackness of safety requirements in international civil air travel. Will this apply to sub-orbital flights also?

The issues of spaceports in the civil sector are also a matter of concern. Airports are well regulated by SARPs issued by ICAO. All aspects governing an international airport are well covered by these annexes. Should the spaceports be also regulated? The trend towards construction of Spaceports as a standalone entity has already taken off. Virgin Galactic has already tied up with the State of New Mexico in US to build a Spaceport which will cost around $200 million. Many more have been announced in the US and in other countries like the UAE and Singapore.

So far only a few countries have gone in for legislation on issues of private travel in space. US, of course, lead in this respect. While NASA leads in the US, Federal Aviation Authority (FAA) deals with private sector aviation. With Space and Air interacting more and more FAA has been mandated to regulate US commercial space transportation by enacting the Commercial Space Launch Amendment Act of 2004—and has mandated it with commercial human space flight on the principle of "informed consent "It has the following features:

1. Safety related information.
2. All space flight passengers must be fully advised in writing of risks and must agree to accept them.
3. Training for Space Participant.
4. Crew notification.
5. Pilot Certification.
6. Vehicle hardware and soft ware information.

FAA has also created within it the Office of Commercial Space Transportation with the mandate to 'ensure of public, property and national security and foreign policy interests of the United States' for both a launch, reentry. It is also mandated to encourage and promote US commercial space transportation. Under the Commercial Space launch Amendments Act of 2004, FAA is also authorized to issue experimental permits. FAA is also issuing permits for spaceports. In addition US have also created within FAA a Centre of Excellence for Commercial Space Transportation which includes the following institutions:

(A) New Mexico State University.

(B) Stanford University.

(C) Florida Institute of Technology.

(D) New Mexico Institute of Mining and Technology.

(E) Florida Institute of Advanced new Propulsion.

(F) University of Colorado.

(G) University of Texas.

Such a centre of excellence is expected to give a boost to commercial space transportation from 4 major research areas namely Space Launch, Operation and Traffic Management, Commercial Human Space Flight and Space Commerce. A budget allocation of US$1 million per annum has also been provided.

US Space programme has three components namely; Civil, Military and Commercial. FAA has been mandated with the work related to commercial space issues which mainly involves licensing and promoting commercial space management. In this connection it may be stated that FAA has already issued over 200 launch licenses, has approved 8 launch sites popularly known as spaceports and is also the safety regulator for these.

The responsibility of commercial space flight is now a live issue. So far governments controlled space flights. The Liability Convention also places the responsibility with the launching state. But now the issues become complicated with commercial space flights, especially which are manned. To start with ownership of a space vehicle can be diverse. The launching state need not be the owner of the space vehicle. The space vehicle could be owned by a public limited company with diverse ownership. All this will complicate issues of safety and liability. In air law issues are clearer. The principle of substantive ownership and effective control of an airline is well established in aviation, although it is getting challenged. Still it makes liability and responsibility simple. There is no airline which is not owned substantially by the nationals of the country where it is registered. However, this restriction will not apply in the case of a spacecraft as it does not come within the definition of aircraft and, therefore, Warsaw 1929 or Montreal Convention 1999 will not automatically apply. That having said the behavior and the objective of a spacecraft would not be very different from that of

an aircraft- transporting passengers from one point to another. There is therefore a need to harmonize the definition of an aircraft and a spacecraft. It may be stated at this stage that already 10 countries have acquired unmanned space launch capability, while 50 countries have Satellites in orbit and 19 countries have sub-orbital capability. The existing Space treaties provide General Principles and unlike Chicago Convention of 1944, they do not have implementation rules/articles.

If we take an example and consider the difference between an airport and a spaceport it will show that while a spacecraft may be launched with rocket propulsion, though Spaceship one uses jet propulsion for launch, its requirements for navigational guidance through space could be quite similar to an aircraft. As more and more commercial spacecrafts start operating there will be a need to regulate the traffic for aircrafts and spacecrafts simultaneously. This will bring in the issue of common safety requirements. In fact, it has been estimated that by 2020 the commercial space tourism industry could be worth in billions of dollars.

Safety Issues

Safety issues are paramount is aviation and ICAO has achieved excellent results in harmonizing safety procedures in the entire world and raising safety norms over time. It has also sought agreement of all countries to carry out safety audits of its members and to point out deficiencies. The commercial Space Launch also requires building up of safety standards. As more and more countries are likely to have their own spaceports and some may be privately owned, standards for uniformity in safety will need to be in place to ensure that no untoward incident takes place. The takeoff and landing of both aircraft and spacecrafts require elaborate Standards and Recommended Practices. While elaborate details are available in ICAO annexes, there is a need to have for spacecraft takeoff and then the two needs to be harmonized to effect economies and also best practices.

Risk Analysis and risk Management is another discipline which needs to be given its due recognition in management of space flights. The main purpose of safety of air or space is to protect life and property against any malfunction. For example, commercial off the shelf equipment available is a matter of concern as this is generally modified to suit each launch and, therefore, is subject to malfunction. The identification of high hazard area need to be indentified and a hazard radius need to be built up in a manner similar to the flight funnel to protect life and property. The identification of a malfunctioning trajectory also to be identified. Another issue of safety in spacecrafts is a possible debris generating event. Since the spacecrafts in sub-orbital fly in a low orbit while in space the impact of a debris creating event will have a greater impact on space as such debris is more prone to hitting and damaging other spacecrafts than had they been on a higher altitude. In case they enter atmosphere, while the chances of getting burnt out a higher, they are still prone to damaging aircrafts on its path down to earth or hitting something on ground.

International Space Station and Space Tourism in Outer Space

International Space Station (ISS) is a major international Endeavour and success. With the participation of five countries this nearly 10 year old platform in space about 460 km in low earth orbit has added a new dimension to space flights. Dennis Tito, the first commercial space tourist visited this station and stayed for nearly 8 days in orbit. The ISS programme also achieved a major success bringing about a commonality of documentation between the Kennedy Space Centre in the US, The Guiana Space Centre in French Guiana and the Tanegashima Space Centre (TNSC) of Japan. This is indeed a major international achievement in cooperation in space.

Role of COPUOS

COPUOS (Committee on the Peaceful Uses of Outer Space), a 69 member committee of the UN, set up in 1959, controls the Office of Outer Space Affairs (OOSA) and its two sub-committees, has done a fine job but time has come for it to distinguish between sub-orbital flight and flight into outer space. While issues like that of space debris or management of space objects are much bigger issues, we need to regulate commercial sub-orbital flights. This can be done by greater monitoring of debris at the confluence of air and space where the sub-orbital flight will curve back. Space is full of debris some natural which we call natural debris and the other is man-made debris. Space is therefore, not an empty vacuum but is full of moving objects which keep going round and round. While natural debris cannot be discarded, it is the increasing man-made debris which is worrying as it is increasing in numbers. The man made debris consists of about 500.000 objects in orbit whose size is above 1 cm and consist of abandoned satellites to small pieces of rubber, bolts clamps lens caps etc. The US Space Surveillance Network keeps a track of 19.000 such objects. As these space objects come closer to the air surface of earth they get dragged into the atmosphere by the atmospheric drag which ultimately leads to reentry of these objects into earth's atmosphere. Upon reentry they are either get burnt out or fall to earth, which can be damaging to ground including loss of property and life. Removal of space debris is a problem which has no solution. Only live satellites which have some life left can be parked at a higher graveyard orbit, but in doing so there is a loss of commercial life of such satellites and, therefore, a loss of profit over its life. The possibility of accident from existing debris is yet another problem.

Debris hitting space objects is a common feature. In 2003 after the space shuttle Columbia accident a risk assessment from the threat of space debris was performed. It was felt that risk of orbital debris is far greater than failure of engines or solid rock boosters etc. It was also seen on inspection that of a shuttle that small debris impacts are common and items like glass windows need replacement in shuttles because of hits.

One of the issues of space debris is that private satellites when run out of their life need to be parked in the graveyard. But to do so there is a need to use a

booster available with the satellite. If this booster is used it will take away about one year's commercial life and to that extent the satellite company loses out on profits. Since there is no space regulation in place there is no compulsion on satellite operator to do this.

The situation becomes worse as we enter the era of nano and even smaller satellites. These new types of satellites can be compared to what happened with Laptops replacing PCs and now even smaller and smarter note pads taking over from Laptops. With these becoming smaller in size is not leading to reduction in power. In fact, they are becoming more powerful. In a similar manner the future now belongs to nano satellites which are much cheaper to produce

Space Tourism and issues of liability

As space tourism develops and the price of a space journey to low earth orbit comes down to $20,000 to $10,000 it has been estimated that in near future up to one million tourists may take part bringing up the business up to a $10 billion a year. This kind of a market will require a liability regime. The existing Montreal Convention 1999 (Successor to the Warsaw system) on legal liability extends only to air flights and there would be difficulties in case an accident takes place in space. The Liability convention for space provides damages under article II. It states that a launching state shall be absolutely responsible to pay compensation for damages caused by its space object on the surface of Earth or to an Aircraft in flight" While no vertical limit of air has been specified it does not specify the damage caused by space debris but only damage caused by the space object in air and on ground. It is therefore interesting to note that neither Montreal Convention 1999 nor the Liability Convention can mitigate the issue of a sub-orbital flight getting hit by space debris. The issue of launching state is another interesting feature. Today there are only a handful of launching states while procuring states, that is state of manufacture, are many more. As a result the responsibility of a launching state becomes very high especially as more and more nano satellites will be put into orbit.

Convergence of Air and Micro-gravity

How do we proceed from here? While convergence is taking place between air and space in connection with the coming of commercial sub-orbital flights, the legal regime governing the two also requires convergence, harmonization and a filling up of the vacuum in the laws governing the two. How can this be achieved. It was in 2005 that this issue was first considered. It was India that raised this issue but it was opposed by Canada on grounds that since Chicago Convention confines itself to only Air this issue cannot be included even in the Agenda for the Council. However, this was not agreed to and in the 175th session of the Council of ICAO the concept of sub-orbital flight was first discussed as a working paper. The President of ICAO has stated in a letter of June 2009 that while the Council took note of the working paper on the Concept of Sub-orbital flights, the ICAO secretariat shall continue to pursue its 'good cooperation and exchanges' with the

United Nations office for Outer Space Affairs" which will include sub-orbital flights. ICAO's reaction has not been proactive enough. It may also be said that ICAO would not like to promote itself in the UN family to try and capture the possible role it can play in space legislation including subordinate legislation with regard to framing of standards and recommended practices.

The issue that comes up is whether there is need for an international agency for the purpose of convergence and if so whether a new agency is required or an existing agency can perform the work. Also the US FAA is also making US legislation on the subject and whether this is good enough. It may be pointed out that in the present situation the United Nation's Committee on Outer Space (COPUS) is the main body which is looking into issues of outer space. This Committee was established in 1959 by the United Nation General assembly and it reports to the General Assembly. Its main purpose is to review international cooperation in peaceful uses of outer space. With two sub-committees one on legal issues and the other on technical & scientific issues, it reports to the General Assembly for making Resolutions. Of late COPUS is working on two major issues of space namely, use of Nuclear Power Sources in outer Space and developing standards for space debris mitigation. The achievements of COPUS have been limited. While it has established a good working relations with space faring nations it scope and membership is limited. In the meantime, US FAA has already started making rules and regulations for commercial use of space. They have an office of Commercial Space Transportation and within it a Space Systems Development Division. While the commercial space transportation is still in infancy, commercial use of satellites for various applications is already very high and space industry is already a $50 billion industry and needs international regulation. FAA being a national agency will not have international recognition which an Agency like ICAO commands.

Another organization which is also a UN Specialized Agency and is closely associated with aviation and space activities is the International Telecommunication Union (ITU). ITU is a well established multilateral organization, older than the UN. It has the most important function of allocating radio frequencies and spectrum to all countries which have now become a scarce commodity. ITU, therefore, has a crucial role to play in aviation and in space. ITU has critical functions to perform in Space industry. It not only allots a bandwidth to a country but it also allocates the parking slot to each satellite. However, as the chief of ITU lamented recently, not all procuring or launching countries are reporting the correct or updated number of launches.

As has already been pointed while Air Law provides for sovereignty over air space of a country's land mass there is no sovereignty issue over high seas. Therefore, there is no difference between the air over the high seas and outer space as regards sovereignty. However, Chicago Convention vide article 12 assigns itself and ICAO, an organization set up under this convention, to manage air traffic above the high seas. As ICAO has no capacity of its own to manage the

air traffic over the high seas it has delegated area of high seas management to neighboring countries who are well equipped with an organization and technical capacity to manage it. Thus FIRs have been allotted by ICAO over high seas to countries adjoining it. But these states have no sovereignty over this air space and cannot close them for their national purpose. ICAO can also take it away and give it to some other nation as has done earlier. Outer space has no sovereignty issue and is a common heritage of all mankind. However, to monitor it and ensure that it remains the common heritage of all mankind there is a need for a neutral arbiter. This can be provided by a multilateral institution, existing or set up for this purpose. Instead of setting up such an institution the existing set up of ICAO provided under the Chicago Convention can be suitably modified to extend some activities of management of Space especially the commercial space transportation, the example of North Atlantic crossing over Iceland, Greenland and Denmark is well recounting. Due to heavy aviation traffic over North Atlantic there was a need to provide better navigation facilities and diversionary airports by these countries. Due to heavy expenditure involved ICAO under its auspices arranged Joint Support Agreements with these countries both technical and financial along with a group of countries who were using this air corridor more. This arrangement started in 1953 still continues. This is a case of how ICAO arranged cooperation has made navigation possible in difficult terrains.

ICAO and management of sub-orbital travel

It has been over 60 years since ICAO was formed. Over the years its achievement has been outstanding. This is proved by the fact that in 1944 civil aviation as an industry was in a nascent stage. Today it has over a billion passengers flying around the world in a year and yet it has become one of the safest modes of transport. ICAO, which forms a part of the Chicago Convention, has legislative power to make international law. It has a permanent Council elected by its members for a term of three years and a permanent secretariat. It has 18 annexes to the Convention covering all aspects of aviation including issues of passports and environment. It is working full the time on improving the same. As and when a new situation develops, ICAO reviews and revises these annexes. For example after the incident of attack on the twin Towers in New York in 2001 the entire issue of security has been revised and new items have been incorporated in Annexes. The General Assembly of ICAO meets once in three years and passes important resolutions. One of the Resolution namely Resolution A29-11 (1992) the General Assembly resolved "that ICAO be responsible for stating the position of international civil aviation on all related outer space matters."<20> The General Assembly has also directed the Council "to carry out a study of those technical aspects of space activities that affect international navigation and that, in its view, call for special measures, and report the results" and for the Secretary General to "ensure that the international civil aviation positions and requirements are made known to all organizations dealing with relevant space activities and to continue to arrange for the Organization to be

represented at appropriate conferences and meetings connected with or affecting the particular interests of international civil aviation.

Following a request by the ICAO Council, the Secretariat prepared a study on the concept of sub-orbital flight C-WP/12436 of 30thMa y 2005, to consider the pros and cons of whether such flights fall within the scope of Chicago Convention of1944. After a full analysis of all factors it stated in the conclusion:

> "From a specialist viewpoint, there is no clear indication in international law on delimitation between airspace and outer space which would permit to conclude on the applicability of either air law or space law to sub-orbital flights. On the other hand, it might be argued from a functionalist point of view that air law would prevail since airspace would be the main centre of activities of sub-orbital vehicles in course of an earth to earth transportation, any crossing of outer space being brief and only incidental to the flight. The United Nations Committee on Peaceful Uses of Outer Space (UNCOPOUS), and more particularly its legal sub-committee, is considering the question of possible legal issues with regard to aerospace objects but no final conclusion has been reached as yet."

UNCOPOUS is a committee of UN and is not empowered to make rules and regulations the way the Council of ICAO is. It is the institutional structure of COPOUS which inhibits it from making international law. The Council of ICAO, on the other hand, is empowered to do so. The question of whether it has the jurisdiction to make rules with regard to sub-orbital flight has been discussed in this paper in detail. There is, perhaps, no need for any additional amendment to Chicago Convention to make Standards and Recommended Practices for Sub-Orbital flights.

Note 1

The space report 2010 is produced by the space foundation and is in authoritative guide to space activities.

Note 2

The War Saw Convention of 1929 is called a Convention for the unification of certain rules relating to international carriage by air, signed a Warsaw on 12th October, 1929. A number of amendments, conventions and protocols that followed this to fine tune it are known as The War Saw System. However, in 1999, a convention for unification of certain rules for international carriage by air, better known as Montreal Convention, 1999, became the new Convention on liability incorporating and refining the War Saw System.

Note 3

Chicago Convention, 1944: A Convention called at the initiative of the Govt. of USA in Chicago on International Civil Aviation was signed on 7th December,

1944. This convention also contains the Articles in which provides for the formation and the functions of International Air Civil Organization.

Note 4

ICAO: International Civil Air Organization came up as a result of Chicago Convention of 1944. It joined the United Nations as a Specialized Agency subsequently. Today its membership is nearly as many as the UN. The elected Council of ICAO is empowered to make air laws known as Standards and Recommended Practices.

Note 5

Space Treaties: There are five space treaties but none of them have rules made under it. As a result, these treaties remain very general in nature and there is no body which is monitoring them.

Note 6

X-prize: The x-prize was instituted by X-Prize Foundation. This Foundation is an educational non-profit organization whose mission is to create radical breakthroughs for the benefit of the humanity thereby aspiring formation of new industries, jobs and revitalizations of markets that a currently stuck. They are recognized as fostering innovation through competition.

Note 7

Virgin Galactic: A company started in the US by Sir Richard Branson, owner of Virgin Airlines. Virgin Galactic is a commercial venture to take passengers/tourists to take them for a sub-orbital/flight experience.

Note 8

UK Outer Space Act, 1986: Confers powers on Sec. of State to secure compliance with International obligations of the UK with respect to launching and operations of space objects.

INTERNATIONAL SPACE LAW REGIME AND PROTECTION OF ENVIRONMENT: EMERGING ISSUES

Dr. Y. Padmaja Rani*

With the accelerating activities in Space by the different Nations, there is an urgent need to strengthen the contours of the International Environment Law.

This Paper argues for the urgent need for an enforceable space law for the protection of global environment. The paper cites the doctrine of 'Common Heritage of Mankind' for advocating an International Legal Regimes for regulating the Environment of both Inner and Outer Space. It is argued that the present five Legal Treaties under the auspices of U.N. should be the framework to chalk out further Legal Regimes that can cope up with the burgeoning onslaught on the environment of Outer Space.

Introduction

Outer Space is the space upwards from the Air Space surrounding the earth. It is impossible to physically determine where the atmosphere ends and outer space begins. As yet this is an unresolved legal issue, The current 'Environmental Law' applicable to 'inner space' should logically be extended to 'outer space' with the proviso of substantial modifications based on the 'doctrine of 'Common Heritage of Mankind'. It is envisaged that the 'emerging Issues' would be resolved by the Global Community harmoniously through Negotiated Treaties, Protocols and multi-lateral understandings in view of the progressively evolving nature of 'Environmental Space Law'.

The Three Eras of the International law of Outer Space

The history of the International Law of Outer Space can best be understood in terms of three eras:

1. The Classical period (1957 – 1979)
2. The Transitional Period (1980 – 1991)
3. The Modern Period (1992 – continuing)

The Classical period was the time for creating the Basic Structure and main principles of Space Law. It was also the time of the 'cold war' and domination of the military and foreign affairs. Consequently, U.N. Space Law at the time reflects a 'prostate anti-free enterprise' ideology. Starting in the 1980s, the number of States involved in Space activities began to increase rapidly. The variety of new practical interests in the Space Sector made it impossible to find

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agreement such as that which enabled adoption of the U.N. Space Treaties in the previous decades by consensus. Particularly relevant was the emergence of commercial space applications. With International Space Law having come to a standstill, other areas of legal regulation had to step in. Hence, the 'Transitional Period' was marked by the development of trans-national contracts among states and corporations and domestic legislation. The UNCOPUOS, unable to produce new Space Treaties, concentrated on the development of non-binding norms and guidelines, instead. That is, the Principles Declarations of 1980s and 1990s

With continuing development in technology and markets, Space Commerce has further expanded, often taking the form of Trans-national Corporations and International joint ventures. Although national and military considerations remained relevant, the increasing cooperation at various levels has diluted many of the ideological and nationalistic underpinnings in the space sector. The 'modern period' of space law has also witnessed the demise of the Soviet Union (and the end of the 'cold war'). Consequently, Space law has focussed increasingly on the commercial development of space. Today, there seems to be a new activity even in International Space Law, albeit only in the form of declarative statements and non-binding standards so far.

It remains to be seen whether and how the International Community manages to produce new norms of a more binding character for the regulation of the evolving Space sector. This is the fundamental question in this Paper, From an Environmental perspective in particular, U.N. Space Law continues to provide very little. Fortunately, more recent and more plausible efforts to alleviate environmental problems related to space activities by common norms have taken place. For instance, recommendations to promote environmentally more benign practices in the use of outer space, especially as concerns the problem of space debris, have been issued by many organs. This Paper examines in more detail the work of such organs as the Inter-Agency Space Debris Coordination Committee (IADC), the International Law Association (ILA), and the UNCOPUOS, all of which have been trying to mitigate the hazard of Space debris. Also, the International Academy of Astronautics issued a position Paper on 'Orbit Debris'[1] in 2001 A sub-committee of the International Organization for Standardization (ISO) has started working on standards based on space debris-mitigation guidelines developed by the IADC.[2] Also, the Committee on Space Research (COSPAR) has long been working on issues related to planetary protection[3] and has discussed other environmental aspects of space activities.[4] Also, there is an increasing number of national efforts that deserve attention

International Legal Regime in Space Law and Environmental Law

Outer space is the space upwards from the 'Air Space' (atmosphere) surrounding the earth. As the composition of atmosphere does not change dramatically at a certain height, it is impossible to physically determine exactly where the atmosphere ends and outer space begins, consequently, the problem of limitation is more of a political and legal issue than a technical one.

Various alternatives have been suggested over the years as the most suitable criterion for making this distinction. There are two predominant approaches, the spatial and the functional[5] the latter requires a definition of 'space activities', where as the former allows a far more straight forward definition of outer space: one based on distance, one example of the difficulties related to the functional approach is the United States (U.S) space shuttle. which is launched like a rocket into the earth orbit but uses aerodynamic lift like an airplane when returning to the earth's surface. Functionally, the shuttle might thus be classified both as a space craft and an air craft and should be governed by space law and air law, depending on the phase of the mission.[6] In accordance with the spatial approach, it has been proposed, for instance, that arealistic limit for the beginning of outer space might be the altitude of approximately 80 Km, given the composition of the atmosphere and the history of aeronautical and astronautical activities.[7]

Some kind of a fixed limit would be welcome because the air space partly falls under national sovereignty,[8] where as outer space never does. Nevertheless, no legal boundary between the contiguous areas of the air space and outer space – and hence, between the ares of application of air law and space law, respectively – has yet been agreed upon,[9] the Legal Subcommittee of the U.N. Committee on the Peaceful Uses of Outer Space (UNCOPUOS) has discussed the definition and the delimitation of outer space as an agenda item since 1967. Some nations have voiced the opinion that due to 'scientific and technological progress, the commercialization of outer space, emerging lagal questions and the increasing use of outer space in general', there is a need for a definition of outer space that would delineate it from air space.[10] Some others, however, consider that the current legal framework functions well enough and hence no such definition is needed, at least as yet, it has even been argued that 'an attempt to define 'outer space' would currently be only 'a theoretical exercise' and, moreover, even counterproductive as it' could lead to complicating existing activities and might not be able to anticipate continuing technological developments'.[11] The issue remains unresolved.

Despite the fact that the International Community has not agreed on a set limit between the air space and outer space, this has not (at least thus far) created notable problems in the utilization of either area.[12] During the past half a century, human kind has managed to extend its active environment from the earth and its atmosphere into outer space. Satellites are a major achievement of the human technology that has enabled this development, providing us with tools that facilitate the daily lives of millions of people worldwide. For instance, satellite navigation systems are used for positioning purposes in all fields of transportation today.[13] Another important user of outer space is the remote sensing industry. To name but a few of the purposes it serves, it provides us with data for meteorological services (including weather forecasts), land and agriculture management, environmental planning and mapping, as well as national reconnaissance. A last but by no means the least, branch of space

activities is telecommunications satellites which enable us to receive radio signals, intercontinental telephone calls, T.V programs and any transmission of data, video, audio or graphics. In addition to satellite activities, there are also other unmanned and manned space missions which operate in earth orbits (such as the manned International Space Station) or beyond (unmanned planetary missions).

While the technological progress of space activities is quite impressive, it is unfortunate that we not properly learnt the lessons of terrestrial history regarding the utmost importance of environmental protection. The world space community has long known that space activities contribute to pollution and contamination of the environment.[14] A very disturbing factor about the space environment is its lack of resiliency, as many parts of outer space cannot regenerate after disturbances in the way that earth's environment is inherently capable of.. However, at the initial stages of the space era, all human space activities were so challenging that any method seemed acceptable for placing objects in outer space.[15] This has progressively lead to substantial environmental threats that constitute increasing hazards to the environment of outer space and even to the extent of jeopardising life on earth.

Environmental Space Law

The field of International Legal Regulation most obviously applicable to space activities is the International Law of Outer Space. The body of International Space Law consists of five U.N. Treaties:

1. 1967 treaty on Principles governing the activities of states in the exploration and use of outer space, including the moon and other celestial bodies (herein after 'the outer space treaty or OST')
2. 1968 agreement on the rescue of Astronauts, the return of Astronauts and the return of objects launched into outer space (herein after ' the Rescue Agreement')
3. 1972 convention on International Liability for damage caused by space objects (herein after 'the Liability Convention')
4. 1975 Convention on Registration of Objects launched into Outer Space (herein after 'the Registration Convention')
5. 1979 Agreement governing the activities of States on the moon and other celestial bodies (herein after 'the Moon Treaty').

Unfortunately, the U.N. Space treaties have relatively little to say about environmental issues. At the time of their conclusion, such considerations were not among the highest ranking items on the agendas of space faring nations, and it has later proven very challenging for the actors in that arena to agree to new legally binding international rules. Even the most recent U.N. Space Treaty, the Moon Treaty, dates back to 1979. Moreover, it did not gain the five ratifications required for its entry into force until 1984 and has to date attracted no more than

twelve ratifications, all by States that do not conduct independent launch activities. In practice, this renders the treaty void. In contrast, the first and most fundamental of the U.N. Conventions, the 1967 Outer Space Treaty has received virtually universal acceptance and has been ratified by about half of the Nations including all States active in Space utilization

Another important regulator of space activities is the U.N. sponsored – International Telecommunication Union (ITU). The ITU strives to guarantee undisturbed telecommunication activities, including those that are space based. It also produces legally binding International Instruments, but their focus in the space sector is somewhat different from that of the U.N. Space Treaties, as will be discussed below. Nevertheless, the Instruments of the I.T.U. have relevance from an environmental point of view.

U.N. Principles applicable to the Use of Outer Space

Further more, the U.N. General Assembly has adopted five sets of principles applicable to the use of outer space:

1. The 1963 declaration of Legal Principles governing the activities of States in the exploration and use of Outer Space
2. The 1982 Principles governing the use by States of Artificial Earth Satellites for International Direct Television Broad casting
3. The 1986 Principles relating to remote sensing of the Earth from Space
4. The 1992 Principles relevant to the Use of Nuclear Power Sources in Outer Space (herein after 'the NPS Principles')
5. The 1996 Declaration on International Cooperation in the Exploration and use of Outer Space for the benefit and in the interests of all States, taking into particular account the needs of Developing Countries (herein after 'the Space Benefits Declaration').

These rules are, however, not legally binding. It is unfortunate, because whatever is not legally binding, can only be enforced with the voluntary consent of the different States.

Doctrine of 'Common Heritage of Mankind'

Territorial sovereignty has in large part defined both international relations and international law since the 1648 Treaty of Westphalia. The primary exception to this principle is the international commons. In these areas, which include the deep international seabed, the Arctic, Antarctica, and outer space, concerns over free passage outweighed the great Western powers' territorial ambitions and Grotius's *mare liberum* triumphed. As a result, these regions were gradually regulated to a greater or lesser extent by the Common Heritage of Mankind (CHM) principle, in which theoretically all of humanity became the sovereign over the international commons. Yet there remains no commonly agreed-to

definition of the CHM amongst legal scholars or policymakers. Developing and developed nations disagree over the extent of international regulation required to equitably manage commons resources. These disagreements have played out in the diverse legal regimes of the Antarctic, deep seabed, Arctic, and outer space, each with its own version of the CHM principle. Although no universal definition exists, most conceptions of the CHM share five primary points. First, there can be no private or public appropriation of the commons. Second, representatives from all nations must manage resources since a commons area is considered to belong to everyone. Third, all nations must actively share in the benefits acquired from exploitation of the resources from the common heritage region Fourth, there can be no weaponry or military installations established in commons areas. Fifth, the commons should be preserved for the benefit of future generations. But now even these basic preconditions are in flux, with states claiming large tracts of the Arctic; the United States, Russia, and China pursuing space weaponry; and oil companies drilling further out into the deep seabed. As resource competition intensifies at the extremes of human civilization, "special sovereignty areas" (SSAs) and in particular the communal property principle of the CHM are under pressure with the need for greater private economic development. With resources becoming increasingly scarce and technology advancing to meet surging demand, longstanding principles of communal property in the international commons will either be reinterpreted or rewritten outright.

The only question is whether this redrafting will occur proactively with the international community laying out a multilateral legal regime to oversee these areas, or retroactively, formalizing a sub-optimal status quo. A historical examination of sovereignty coupled with case studies of new territorial claims on the deep Arctic seabed and the re-conception of space law to favor private property rights will demonstrate this process. By exploring the development and interconnected nature of these branches of international law, we can understand how the regulatory frame works and theoretical justifications for these areas are evolving and in turn impacting the commons. Existing comparative case studies on commons territories focus on the similarities and differences of commons regimes while neglecting the co-evolution and converging fate of the CHM regions, specifically that all components of the international commons are either now being challenged or already shrinking. The international commons must thus evolve to survive. A fervent appeal is now made that the principle of 'survival of the environment' must be inseparable from any future evolution of the CHM doctrine.

Established Norms Of International Environmental Law

Some established norms of International Environmental Law are now presented with the suggestion that these norms be extended to the Spatial Environment as well, with appropriate modifications where necessary. Norms are general legal principles that are widely accepted. This acceptance is

evidenced in a number of ways, such as international agreements, national legislation, domestic and international judicial decisions, and scholarly writings. The leading norms in the field of international environmental law are addressed below:

(1) Foremost among these norms is Principle 21 of the 1972 Stockholm Declaration on the Human Environment. Principle 21 maintains that 'States have, in accordance with the Charter of the United Nations and the principles of international law, the *sovereign right to exploit their own resources* pursuant to their own environmental policies, and *the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction*".

(2) Another widely shared norm is the *duty of a state to notify and consult* with other states when it undertakes an operation that is likely to harm neighbouring countries' environments, such as the construction of a power plant, which may impair air or water quality in downwind or downstream states.

(3) Over and above the duty to notify and consult, a relatively new norm has emerged whereby states are expected to *monitor and assess* specific environmental conditions domestically, and disclose these conditions in a *report* to an international agency or international executive body created by an international agreement, and authorised by the parties to the agreement to collect and publicize such information.

(4) Another emerging norm is the guarantee in the domestic constitutions, laws or executive pronouncements of several states, including India, Malaysia, Thailand, Indonesia, Singapore and the Philippines, that all *citizens have a right to a decent and healthful environment*. In the United States, this fundamental right has been guaranteed by a handful of states but not by the federal government.

(5) Most industrialized countries subscribe to the *polluter pays principle*. This means polluters should internalise the costs of their pollution, control it at its source, and pay for its effects, including remedial or cleanup costs, rather than forcing other states or future generations to bear such costs. This principle has been recognized by the Indian Supreme Court as a 'universal' rule to be applied to domestic polluters as well. Moreover, it has been accepted as a fundamental objective of government policy to abate pollution.

(6) Another new norm of international environment law is the *precautionary principle*. This is basically a duty to foresee and assess environmental risks, to warn potential victims of such risks and to behave in ways that prevent or mitigate such risks. In the context of municipal law, Justice Kuldip Singh of the Supreme Court has

explained the meaning of this principle in the *Vellore Citizens' Welfare Forum Case*, which is excerpted later in this section.

(7) *Environmental impact assessment* is another widely accepted norm of international environmental law. Typically, such an assessment balances economic benefits with environmental costs. The logic of such an assessment dictates that before a project is undertaken, its economic benefits must substantially exceed its environmental costs. India has adopted this norm for select projects which are covered under the Environmental Impact Assessment (EIA) regulations introduced in January, 1994.

(8) Another recent norm is *to invite the input of non-governmental organizations (NGOs)*, especially those representing community-based grassroots environmental activists. This NGOs participation ensures that the people who are likely to be most directly affected by environmental accords will have a major role in monitoring and otherwise implementing the accord. This principle is mirrored in the Indian government's domestic pollution control policy and the national conservation policy, and is given statutory recognition in the EIA regulations of 1994. The Supreme Court has urged the government to draw upon the resources of NGOs to prevent environmental degradation.

(9) In October 1982, the United Nations General Assembly adopted the World Charter for Nature and Principles of *Sustainable Development*. The agreement expressly recognised the principle of sustainable development, defined as using living resources in a manner that 'does not exceed their natural capacity for regeneration' and using 'natural resources in a manner which ensures the preservation of the species and ecosystems for the benefit of future generations.' The principle of sustainable development was also acknowledged in the 1987 report Our Common Future, published by the United Nations World Commission on Environment and Development. This report defined sustainable development as 'humanity's ability... to ensure that [development] meets the need of the present generation without compromising the ability of future generations to meet their needs.' The Supreme Court as well as the Indian government have recognised the principle of sustainable development as a basis for balancing ecological imperatives with developmental goals.

(10) *Intergenerational equity* is among the newest norms of international environmental law. It can best be understood not so much as a principle, but rather as an argument in favour of sustainable economic development and natural resource use. If present generations continue to consume and deplete resources at unsustainable rates, future generations will suffer the environmental (and economic)

consequences. It is our children and grandchildren who will be left without forests (and their carbon retention capacities), without vital and productive agricultural land and without water suitable for drinking or sustaining cultivation or aquatic life. Therefore, we must all undertake to pass on to future generations an environment as intact as the one we inherited from the previous generation.

In *State of Himachal Pradesh v. Ganesh Wood Products* the Supreme Court recognized the significance of inter-generational equity and held a government department's approval to establish forest-based industry to be invalid because 'it is contrary to public interest involved in preserving forest wealth, maintenance of environment and ecology and considerations of sustainable growth and inter-generational equity. After all, the present generation has no right to deplete all the existing forests and leave nothing for the next and future generations.

(11) At the 1982 United Nations Conference on the Law of the Sea (UNCLOS) developing countries, led by India, articulated the norm that certain resources, such as the deep seabed, are part of the *common heritage of mankind* and must be shared by all nations.

(12) The 1992 Rio de Janeiro Earth Summit articulated the norm of *common but different responsibilities*. With regard to global environmental concerns such as global climate change or stratospheric ozone layer depletion, all nations have a shared responsibility, but richer nations are better able than poorer nations to take the financial and technological measures necessary to shoulder the responsibility.

JUS Cogens, Healthful Environment, Sustainable Development

As mentioned, norms of customary international law evolve through custom and usage. Not all norms are of equal importance however, some being accorded the status of *fundamental norms*. The category of fundamental norms comes under the doctrine of jus cogens, or the doctrine of *peremptory norms*. The 1969 Vienna Convention on the Law of Treaties serves to clarify the concept in Article 53 as follows:

A treaty is void if, at the time of its conclusion, it conflicts with a peremptory norm of general international law. For the purposes of the present Convention, a peremptory norm of general international law is a norm accepted and recognised by the international community of States as a whole as a norm from which no derogation is permitted and which can be modified only by a subsequent norm of general international law having the same character.

Many scholars also believe that the norm expressed in Principle 21 of the Stockholm Convention has risen to *jus cogens status*. Principle 21 is based on the Roman maxim, *sic utero tuo et alienum non laedas*, which roughly means 'do not behave in a way that hurts your neighbour.'

Conclusions

This Paper concludes with a recommendation for strong affirmative action by the Global Comity of Nations to protect the Environment of Space, Two recent catastrophes have caused immeasurable damage to the Spatial environment; the 'volcanic eruption in Iceland' immobilized Air Travel for more than a week in North America and Europe causing immense damage both to the Airlines and passengers. Also, the recent 'Oil Spill' in the Gulf of Mexico through a B.P. drilling platform, devastated the flora and fauna of the region for the foreseeable future. Both incidents unequivocally support the arguments advocated in this paper for perpetually perseverant efforts by all the Nations (more so, by the advanced States) to put in place concomitant Legal Regimes that can cope up with measures to protect, preserve and defend the environment of Space.

Endnotes

1. Many of the experts working with Environmental questions related to Space activities seem to share the opinion that an International-level set of Rules is what is now needed. See, for example, 'Space Debris Mitigation' – the case for a code of conduct, 2005.
2. As the UNESCO's Working Group on the 'Ethics of Outer Space' put it: "Ethics must precede and guide the Law and not *vice versa*". Refer 'The Ethics of Space Policy", 2000, p. 25.
3. The most prominent example of such a development so far is the Sea Launch Company which launches Sattelites from a sea platform in International Equatorial Waters. It was created in 1995 and has completed some twenty launches todate.
4. All the more so, as Space Objects, once launched, are even more difficult to control than maritime vessels, which physically remain on Earth and have to visit harbours.
5. Report of the Legal Subcommittee, 44th session 2005, Annex 1, para 8 a.
6. Harris – Harris 2006, p.6. These authors are in favour of a fixed, spatial demarcation line, yet one 'sensitive to technological advances'.
7. An authoritative example of the spatial approach is the Australian Space Activities Act of 1998 (as amended in 2002), which now uses the limit of 100 kilometers as the altitude where Outer Space begins. For example, prescribing that to 'launch' a space object means to 'launch the object into an area beyond the distance of 100 Km above msl, (or to attempt to do so, Sec. 8). Although such a limit applies only as regards domestic purposes, it is surely the first regulatory attempt to define where space begins and hence has a much wider relevance. In the latter part of this paper, it is urged that India should take a lead in enacting a similar Act as per the conscious emerging by that time in Internationally as also among the sovereign Space Nations.

8. Air Space comes under national jurisdiction and sovereignty where it lies over national territory and territorial waters. Otherwise, it is not subject to national sovereignty, for example, over the high seas. Refer Convention on International Civil Aviation, Arts 1 and 2. U.N. Convention on the Law of the Sea, Arts 2, 58, 78, 87. Air Space over a States exclusive Economic Zone and the Continental Shelf is comparable in status to Air Space over High Seas.
9. Application of the Law of Outer Space is indeterminate not only as concerns the height from the earth where it begins but also from the extent. It does not necessarily appear feasible (or justifiable) for humans to extend their Legal Regulation into the Infinity of Space. At the moment only one of the U.N. Space Treaties (the Moon Treaty) explicitly limits its application to the Moon and other celestial bodies within our Solar system only. The other Space-Treaties only refer to a somewhat abstract manner to 'Outer Space'. Presently, the ability of Human kind to conduct activities in Space remains very limited. However, the important questions of the extent of our authority to regulate Space Activities and of the Legal Status of Outer Space are fundamental.
10. Report of the Legal Subcommittee in its 45th session 2006, para 90: "Some delegations expressed the view that the lack of a definition or delimitation of Outer Space brought about legal uncertainty concerning the applicability of Space Law and Air Law and matters concerning the State Sovereignty and the boundary between Air and Outer Space needed to be clarified in order to reduce the possibility of disputes among States", *ibid*., para 91.
11. *Ibid*., para 92. For a summary of the discussion concerning the question over the years, see the UNCOPUOS document "Historical Summary on the Consideration of the Question on the Definition and Delimitation of Outer Space" prepared in 2002.
12. It has been suggested that as Space Exploration affects the 'totality of the environment', such physical separation of Air Space and Outer Space would not even be necessary.
13. The primary system used throughout the world for Satellite navigation is the U.S. Government 'Global Positioning System (GPS)'. Russia has a corresponding military network, the Global Navigation Satellite System (GLONASS). The European Space Agency (ESA) and the European Union (EU) are now creating Europe's own exclusively civilian navigation system (called GALILEO), which is scheduled to be fully operational by 2012 or 2013. The U.S. and ESA/EU were long at odds over frequency allocation and inter-operability between the GPS and GALILEO; but they finally reached an agreement on the issue in February 2004.

14. The potential damage from experiments in Space was recognised by the Scientific Community as early as in the 1950s, and the International Council of Scientific Unions (ICSU) formed a Committee on Contamination by Extra-terrestrial Exploration (CETEX) to study the issue. The task was assigned to the Committee on Space Research (COSPAR) when CETEX was disbanded in 1959. COSPAR then established a consultative group on the potentially Consultative Group on the Potentially Harmful Effects of Space Experiments (with a broad mandate to make recommendations regarding Space Activities) and a Panel on Potentially Environmentally Detrimental Activities in Space to consider the various problems related to the Space Environment. Today there are numerous organisations and bodies concerned with the issue (to a greater or lesser extent and for different reasons).
15. Over half of the early attempts to put a satellite in orbit failed (23 out of 40). At the time of the first manned Space Flight, the over all failure-percentage of space missions was still around 50.

JURISDICTION IN OUTER SPACE: CHALLENGES OF PRIVATE INDIVIDUALS IN SPACE

Jyotima Nagvanshi
Aishwarya Sharma*

Introduction

Man in his quest to explore the realms that exist in this universe has been hindered at various stages by factors, such as lack of knowledge, lack of technical skills, geo-political considerations, etc. Currently, space is one of the realms that are the least explored by mankind, while taking into consideration the giant leaps humans have made in all the other spheres. Since the technical skills and cost of engaging in exploration is exceptionally high, space exploration is limited to a select few nations. The very fact that exploration is done only by a select few countries and the concern that exploitation of resources available in space would be dominated by the select club of "space-faring" nations, led to formation of treaties stating that no nation may appropriate any portion of space or celestial bodies by claim of sovereignty through use, occupancy or by any other means. At the beginning of Space Age, space activities were predominantly public activities or governmental space programs mainly devoted to exploratory and experimental as well as military space operations, but they were not commercial. However, in the last decade until now, the character of space activities have fundamentally changed from public purposes to world commercial ones. The global policy for the free goods and service trade as well as fair competition have expanded and thus, create new patterns of relative investment (especially) in space activities. They range from government-government, government-private sector, to business enterprises themselves. This lies in the areas of exploration, usage and commercial exploitation of outer space.[1]

Space activities are, like all human beings' activities, subject to international and national laws and regulations. The space activities for profitable commercial ventures bring about the motives for international cooperation and competition which create new legal problems, emerging from other activities e.g. space communications, space industries, and launching of the services, etc. Nevertheless, for space activities themselves, a number of regulations can be mentioned which are applicable to space activities but depending on the nature of such activity. For instance, satellite telecommunications activities are subject to public international law, international space law, international telecommunications law, as well as their own national law.[2]

At the beginning of Space Age in 1957, discussions began in the State community, within the UN, precisely on the legal status of this new issue. Several legal concepts of traditional public international law could be applied to

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a newly 'discovered' area. At final, the approach, which was chosen by the State community, was quite different from but comparable with the regime established for the high sea, where no State sovereignty is accepted. An outer Space was declared as a *res communis* which is not subject to the sovereignty of any State, and where States are bound to refrain themselves from any acts that can adversely affect the use of an outer space by the other states. The Outer Space Treaty was a landmark in an establishment and a progressive development on the rules of international space law. The principles of international space law constitute the most general rules of behaviour for states in their space activities.[3]

The 1967 Outer Space Treaty specifically states that appropriation of property is not permitted by sovereign nations and the Moon Treaty declares moon and celestial bodies to be the common heritage of all mankind. It is a common notion that the concept of private property is non-existent in view of the existing treaties.There is a growing opinion that recognition of property rights is essential in space activities. It is advocated that for the maximum utilization of the resources in space, which may include both commercial and non-commercial activities, private participation is essential.[4]

Assuming that an alternative clean fuel is discovered on the moon, which can replace the current fuel, mining of such fuel, can be done by a private enterprise, subject to the broad objectives of the moon treaty. In other words, the State may delegate certain functions to private bodies, relating to exploration and use of space.

"The Earth is the cradle of mankind, but one cannot stay in the cradle forever."

—Konstantin Tsiolkovsky

CORPUS JURIS SPATIALIS: AN EVOLVING

Jurisprudence

The existing Corpus Juris Spatialis is indistinct, consisting mainly of treaties enacted under the auspices of the U.N. It gives an obfuscated view characterised by pedantry, as regards the issue of establishing a concrete regime of property rights on moon and other celestial bodies or parts thereof. The power struggle between the United States and the former Soviet Union, the two nations involved in the race to space, along with the paranoia and suspicion resulting from the Cold War, fuelled the avoidance of a "race to own" any part of space. The former Soviet Union emerged as the pioneering leader when it launched the first satellite (Sputnik) into orbit in 1957 and landed the Luna IX on the moon in 1966, sending waves of alarm through the United States, which feared that the Soviets would stake a property claim in the moon. This prompted the United States to initiate treaties limiting activities in outer space to peaceful purposes and preventing any state from exercising ownership. Other nations feared that the two rising superpowers would dominate space and claim it for themselves. The space race

cooled greatly throughout the 1970s and 1980s. The two superpowers shifted their focus from exploring the Moon to developing and employing space stations. Today, the international community is witnessing an immense interest in space exploration. Many new developments have shaped the focus of space law in the 21st century.[5]

The Past: What went before?

Currently there are several treaties in effect that were created to address space exploration. Most of these treaties were drafted during the Cold War, when outer space was seen as the next battlefield and the moon as a potential military outpost. These fears were fuelled by the "space race" between the United States and the Soviet Union, which gained predominance after the later launched 'Sputnik', with each country trying to best the other. In 1959, the United Nations General Assembly established the standing Committee on the Peaceful Uses of Outer Space (COPUOS) to respond to this need. Thus the first seeds of materialization of these efforts came in 1967, when the United Nations drafted the first comprehensive instrument in this regard which came to be commonly known as the Outer Space Treaty, which has 98 States parties, and is said to be the *magna carta of Corpus Juris Spatialis*. The provisions were inspired by the principle of freedom of seas and the Antarctic treaty. It was enacted with the objective that "the exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind." It was followed up by the 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (the "Rescue Agreement") and had 88 States parties, which stipulates that astronauts are to be regarded as envoys of mankind in outer space, and are to be rendered all possible assistance. This agreement has more elaborate assistance provisions than the outer space treaty.[6] The 1972 Convention on International Liability for Damage Caused by Space Objects (the "Liability Convention") had 82 States, which basically supplements the liability rules stipulated by the outer space treaty, in this convention the principles of the Outer Space treaty are elaborated in order to meet a variety of possible situations, including launchings by international organizations. The 1975 Convention on Registration of Objects Launched into Outer Space (the "Registration Convention") had 44 States parties and has 22 articles providing in considerable and important detail for the machinery of registration; however the articles fail to make clear a time by which the registration has to be made, seemingly a major pitfall.[7]

Finally in 1979, the United Nations adopted the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the "Moon Agreement"), which had 10 States parties and governs the activities of states on the Moon and other Celestial bodies. The substantive provisions of the treaty have two principal objects; to prevent certain military uses of the moon and other celestial bodies, and to establish a juridical regime for the exploration and exploitation of celestial bodies and of their

resources. The Outer Space Treaty and the Moon Treaty[8] is considered by many as the primary body of international law relating to the utilization of space resources.

The problem of Judicial Jurisdiction in Space

In the midst of the space race that began in the 1950s, jurists began defining what legal rules would apply in outer space. The United Nations formed the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) which drafted the so called Outer Space Treaty (OST). This treaty (and the four other general treaties on space that followed) set out rules that governed the interactions between States in outer space. These treaties as a whole, though, tend to ignore the gamut of possible interactions between individuals in space. Because there are "no detailed rules... in the treaty on Outer Space governing the exercise of State Jurisdiction in outer space," there are nebulous jurisdictional areas in space. The state parties did agree that space would be the "province of all mankind," creating an extra-jurisdictional international territory. At the time this did not present a real problem because "the great cost of space exploration meant that it was a matter for government appropriations." In recent decades the climate of space exploration has changed dramatically. The private sector has become more instrumental in the exploration and exploitation of space. This means that there will soon be new types of relationships occurring between individuals in space who are not necessarily representatives of a state entity and that the treaty regimes have not anticipated.[9]

Since the "notion of jurisdiction finds its origins in the concept of territory, the principle of sovereign equality, and non-interference with the domestic affairs of states," nations will have to use new and innovative legal regimes in order to exert legal controls over people in space.[10]

The space visa will seek to treat spaceports as border regions, much as airports are treated today. Through the auspices of the space visa, a state will grant permission to leave the territory and enter space. In exchange for the permission, the space traveller will subjugate himself to the personal jurisdiction and laws of that state. The result will be a regime in which every individual in space will be subject to at least one state's jurisdiction at all times, and that states will be better equipped to fulfil their duty to supervise non-governmental entities in space.[11]

Legislative Jurisdiction

Another related problem is that of legislative jurisdiction. States may not, due to the constraints of the OST, extend their jurisdiction over outer space. This includes legislative jurisdiction, which "refers to the supremacy of the constitutionally recognized organs of the state to make binding laws within its territory." This does not inhibit states from extending legislative jurisdiction over its nationals abroad. For instance, a state could make it illegal to for its citizens to chew gum in space. The state cannot, however, abuse the right to legislate, especially in such a way that would "infringe the sovereignty and independence" of another state. Complications arise when a state attempts to extend legislation

over foreigners. It is not entirely clear whether a state, using passive personality, has violated the OST if it passes a law that makes it a crime for anyone to assault one of its citizens in space. Crimes are usually legislated on a territorial basis, thus a law such as this could be seen as an extension of a states jurisdiction into space. This legislative problem obviously creates a loop hole in which some acts could be crimes on Earth, and not in space (if a state has not properly extended its criminal statutes). This creates a good argument for an international space code; but, like an international enforcement body, will be long in the making and is unlikely in the near future.[12]

New ways for humans to interact in space

1. Space Tourism-Emerging challenges to air and space law

Early market forecasts of the space tourism industry place its worth at more than USD $1 billion by 2021. Many companies, alert to the vast economic potential of space tourism, have made ambitious plans for commercial orbital and sub-orbital flights, the earliest of which are scheduled for launch in 2009. This is in addition to the already well-known flights of certain individuals aboard the International Space Station (ISS). These breathtaking events in space economics throw the gauntlet at the feet of international space law. Emerging challenges include the issues of the applicability of air law and space law, registration and jurisdiction, authorisation, and liability.[13]

One of the newest developments in relation to outer space is the idea of space tourism. On April 30, 2001 Dennis Tito became the first space tourist when he visited the International Space Station (ISS) as a guest of the Russian Government. Space tourism of the future will most likely be more closely modelled on the terrestrial tourist industry in which private companies provide the service of facilitating space travel. This model is exhibited in ventures such as Virgin Galactic, which is scheduled for its first flight into space with space tourists on board in 2008. It could also serve to create the biggest challenges for the legal regime in space since the initial rush of treaties that followed the moon landing. Those treaties, which created a legal regime amongst state actors in space, could prove vastly insufficient when addressing the new ways in which private citizens could be interacting with each other in frontiers of space. Tourists could be an especially volatile development, since they are not military-esque state actors that have generally been sent to space as the "envoys of mankind," nor would they even feel constrained by the rules and regulations of a private company with operations in space as an employee of that company might. Their interactions would most closely resemble interactions of the average citizen on earth where crime and other conflicts regularly occur.[14]

2. Renewed interest in Moon exploration

The renewed interest in exploration and possible commercial exploitation of the moon and its resources is another development that enhances the need for

clarification of jurisdictional rules. The United States, Great Britain, China, and Japan. Have all expressed renewed interest in lunar exploration. Exploration of the moon as an economic resource could be big business for those involved. These nations' interest is rooted in "industrial competitiveness that could lead to securing rights to acquire resources in outer space in the future." For example, China's space policy is based around its desire to "develop its economy and continuously push forward its modernization drive." Attenborough's principle on space tourism can be applied to the interest in exploiting the resources on the moon: if it is commercially feasible, the private sector will get involved.[15] This investment could lead to large numbers of private individuals interacting on the moon. These private individuals are cause for concern. The companies they will work for are currently well regulated under national laws, however the discrete individual is left to guess at what law applies and where.

Common Heritage of mankind

There is a widespread debate as to whether the "common heritage concept" is indeed part of customary international law, with strong views expressed on both sides. However it is felt that, the common heritage concept is not in tune with the development in today's world. In the age of private and commercial wealth, asserting ownership in outer space seems no longer unimaginable. According to the common heritage of mankind principle, nations manage, rather than own certain designated international zones. No national sovereignty over these spaces exists, and international law (i.e., treaties, international custom) governs. The common heritage of mankind principle deals with international management of resources within a territory, rather than the territory itself. Developed nations interpret the principle as meaning that "anyone can exploit these natural resources so long as no single nation claims exclusive jurisdiction" over the area from which they are recovered. Simply stated, every nation enjoys access and each nation must make the most of that access. The heritage lies in the access to the resources, not the technology or funding to exploit them. The Common Heritage concept, formulated during the cold war era, though well intentioned, does not serve any useful purpose in the current scenario – the free market economy. The freedom granted to the states for exploration and use cannot be mired. In this regard, it is pertinent to note that the earlier Environmental Law provisions, starting with the Stockholm declaration, 1972 did not specifically address the development agenda, in the line of commercial use. However later on the international community had to give in to the development concerns and draft the subsequent provisions accordingly as amply illustrated form the Rio Declaration, 1992. Besides as discussed earlier, by virtue of the Outer Space treaty and Moon treaty, the states have the freedom to 'explore' and 'use' the outer space, which including using them for commercial purpose. It is our view that the space faring nations, with their advanced technology should not be prevented form utilizing the resources of the space. What has to be done in such a case is to ensure that, it does not adversely affect outer space and its

resources than to have a blanket ban on such activities. The Common Heritage Concept binds nations and firms to make the most of what their access grants them. Thus, if a nation or firm is unable to properly exploit a resource found in international territories, then that resource should be left to a nation or firm that is able. This view is aligned with the "*first in time, first in right*" view of ownership. Industrialized nations promote this view because, unlike the limited access view of the developing world, unlimited access promotes and rewards private investment. Therefore it is clear that possessionary rights do exist in space, even going by the treaties. Thus as a naturally following corollary, the states may grant property rights, in this regard to the private individuals, in compliance with International Law.[16]

The Law Applicable In Outer Space

While space law itself is not a "coherent or self-contained body of law," its main source is international law. Article 3 of the OST states that state parties will act "in accordance with international law, including the Charter of the United Nations." Outside the five space treaties, general international law is the governing law in space. The sources of international law are stated in the Statute of the International Court of Justice, which is "widely recognised as the most authoritative statement as to the sources of international law." The Statute states that the court in deciding disputes shall apply:

(a) International conventions, whether general or particular, establishing rules expressly recognized by the contesting States;

(b) International custom, as evidence of a general practice accepted as law;

(c) The general principles of law recognized by civilised nations;

(d) Subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as a subsidiary means for the determination of the rules of law.

Of the four sources recognized by the Statute only three are binding on the court, and these are the ones that can be seen as substantive international law. The other items, judicial decisions and the teachings of scholars are only persuasive. This paper will deal primarily with law made through international conventions and international custom. The general principles of law as a source of international law have a "fairly limited scope" in determining actual principles of international law. These principles usually represent very broad and indefinite determination; this is especially true when it comes to things such as jurisdiction and criminal acts. For example it can be assumed that murder is illegal in all legal systems, but the constituent elements of murder may differ dramatically from one system to the next, leaving no concrete international definition for the term. Procedure is one of the "most fertile fields" for development of international principles from general principles of law. This would include jurisdictional determinations, but these also vary drastically across practice of the states.

Therefore, jurisdictional bases must be examined from perspective of those customarily accepted within the international framework. It should also be noted, that municipal law from the individual states is an active legal force in the arena of outer space and "its relative importance is likely to increase." Most importantly, while jurisdictional bases are accepted through custom and state practice, for a court to exercise that jurisdiction domestically it must be a valid basis in the domestic law of the particular state. Municipal law, while exceedingly important to space law, can result in a patchwork of norms that are not uniform in outer space.[17]

State's responsibility for and supervision of private activities

Air law and space law is often juxtaposed due to the proximity of these two regimes in their physical location. Interestingly these two regimes of international law are very far removed from each other. Air law emphasises State sovereignty and exclusive territorial jurisdiction, and is bolstered by the large corpus of international and national legislation typical of a well-established field of the law. Conversely, space law highlights non-appropriation, jurisdiction on the basis of registration and launching, and State liability for damage caused. It is also one of the youngest fields of international law, and correspondingly, one of the fields without a comprehensive legal framework.[18]

The State is responsible for the activities of its private sector entities in an outer space congruent with Article VI of Outer Space Treaty. In order to assure compliance with the Treaty, the State must authorize and continuingly supervise non-governmental activities in an outer space use.

Treaty Law

- **Outer Space Treaty**

Article II of the Outer Space Treaty, which states that "Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means" stands as the major hindrance as regards the recognition of property rights. There is disagreement about whether this treaty restricts the ability of individuals to hold property rights or whether it simply restricts the rights of sovereign nations to claim portions of celestial bodies.[19] There is a view that the restrictions placed on sovereign nations would naturally extend to individuals through their citizenship, and therefore property rights in outer space is outside the parlance of individuals and individual companies Another point of discussion is, with reference to the prohibition of appropriation. Some argue that the appropriation clause simply bars ownership of the land, not the resources found within the land, which can be extracted and removed as private property. Others argue that the resources are part and parcel of the land and cannot be treated separately from it (Art 11, paras (3), (7) (a), Moon Treaty, 1979). In addition, critics also argue that this provision is a result of the socialist ideals that were prevalent at the time but it is outdated and at

loggerheads with today's prevailing free market economy. Nevertheless, there is actually a wide variety of space activities involving clearly delineated ownership recognized by national legal bodies throughout the world. Anything that is launched into space is deemed to be owned by the launching party or state, including the launch vehicle, all of its associated stages and parts, and the payload that is placed into space (Art. VIII, Outer Space Treaty, 1967). Not only do property rights attach to these objects, but the owners can be held singularly and jointly liable for damage caused by these objects (Art., IV, Liability Convention, 1972). Thus, sovereignty in some form exists for satellites and aboard space stations. Similarly, ownership of permanent structures that might be constructed on celestial bodies, including the moon, will vest in the company or state building the structure, at least to the extent it is placed "on a celestial body." Anything taken from space and returned to the earth becomes the property of the person, company, or government that performs the action, given the absence of United Nations treaty provisions prohibiting such ownership.[20] Thus we can see that as the treaties stand today, on accepted interpretations of the provisions of the treaties, ownership and possession rights are not entirely divorced from the sphere of Corpus Juris Spatialis.[21]

- ***Moon Treaty***

The Moon Treaty was signed in 1979 as the expanding US space program led to the possibility of actually using lunar resources. The moon treaty however, has not been able to command the same popularity as the Outer Space Treaty, 1967 moreover this Treaty was not accepted far and wide. Besides no major space power has signed it, presumably because it further restricts ownership and prohibits any property rights until an international body is created and the requirement of "equitable sharing" is met consequently.[22] The Moon Treaty does allow "States Parties in the course of scientific investigations to use mineral and other substances of the moon in quantities appropriate for the support of their missions" and it permits individual states to construct space stations on the moon and retain jurisdiction and control over these stations (Art. VI). While the Common Heritage doctrine as developed in the Moon Treaty is arguably beneficial for the developing states, the space powers see it as a hindrance to the development of space due to the restriction it places on property rights and ownership of resources. The developed nations fear that adoption of the common heritage principle in space exploration would tantamount to transfer of wealth, political power, and technology from the space-faring nations to the Third World countries. Some scholars consider the Moon Treaty to have little practical value, while others consider it already obsolete. On further analysis of the treaty, the language prohibiting a claim to property rights of "natural resources in place" ostensibly permits, by negative inference, the removal of natural resources not in place or removed from their natural setting. In addition Article XI's language which states that "neither the surface nor the subsurface of the moon, nor any part thereof or natural resources in place, shall become property." would run

contrary to this view. However, when compared with the specific activities associated with property rights, the Moon Treaty does envision substantive property rights.[23]

- ***The Liability Convention***

The 1972 Convention on International Liability for Damage Caused by Space Objects (hereinafter referred to as the "Liability Convention") provides greater specifics on the subject of liability than do the corresponding provisions of the Outer Space Treaty. What is more, unlike the Outer Space Treaty, the Liability Convention establishes a claims settlement procedure. Despite this advantage of specificity, the scope of the Liability Convention appears limited to cases involving damage caused by space objects themselves, whereas other damage incidental to the use of such objects appears to fall outside its scope. Thus, a television satellite crashing to the surface of the Earth would be a likely candidate for application of the Liability Convention, whereas damage to reputational interests caused by a broadcast from the same satellite would not.[24]

Challenges

In addressing private property rights one must necessarily address the challenges arising in the event that property rights are granted. These vary from environmental concerns to use of such rights to defraud people. In the project I have felt a need to address the core concerns related with property rights in space.

Degradation of Celestial Bodies

One of the primary concerns is the degradation of celestial bodies in exercise of property rights granted to persons. The International community fears whether degradation of celestial bodies would have a negative impact on the environment of the Earth. Man seems to have an inherent trait to alter the ecology of his habitat sometimes knowingly, sometimes unknowingly.[25] Space is one of the very few realms that mankind has not been able to effectively pollute, but even that challenge is being overcome. The issue of space debris is one of such concern. Even in the absence of private players, space debris is now assuming alarming proportions, especially since mankind's contribution to the increase in space debris is substantial. In the event that there exists a possibility that, the climate of earth maybe negatively affected, a thorough study must be undertaken to swot up the possible repercussions of such degradation. And if property rights are indeed deemed to be fit to be incorporated into space law, the issue of pollution of space environment will need to be addressed on "*war footing*". Another classical example is the offer of the company TransOrbital. It is a private company that, through its "TrailBlazer lunar orbiter," is offering the "first delivery service to the moon". TransOrbital claims it is "the only private company to be authorized by the [U.S.] State Department and [the National Oceanic and Atmospheric Administration] for commercial flights to the Moon". The company's delivery system will take capsules that contain items of the customer's choice, including business cards,

jewellery, art, and cremated remains, to the Moon. While, it maybe argued that such action is detrimental to the ecology of the moon, it cannot be said to be the first of its kind. Although the various Space treaties explicitly prohibit the conducting of nuclear tests in space, space tourism will cause its fair share of problems including despoilment of the moon surface.[26]

Res Nullius, Res communis, & principle of sovereignty

The second major challenge is choosing between the concepts of *res communis, Res Nullius, common heritage of mankind and principle of sovereignty*. Under Roman law, the idea of *res communis* meant community property incapable of being appropriated by any person. In the final version of the 1967 Space Treaty, *res communis* principle was explicitly articulated in the Preamble and Articles I and II and implicitly expressed in Articles III and IV. For any principle to be accepted by the international community, primarily, it must be clear and well defined so that the international community may integrate the concept into international law. Next, nations must abide by the principle and widely agree on its authority in international law. Finally, customary recognition of the concept must be manifested by States or, at a minimum, be supported worldwide to verify its broad acceptance. It is the argument of the authors that *res communis* is a recent principle and furthermore is limited to merely the signatories to the treaty. The fact that *res communis* concept is not a binding principle of international law may already be implied within Article XVI of the 1967 Space Treaty, which allows parties to withdraw from the Treaty after they give one year's written notice. Consequently, nations can easily withdraw from the 1967 Space Treaty and disregard the *res communis* classification of outer space once their nation's colonization of space becomes a reality. The Concept of *Res Nullius* again is of Roman origin and states that a property does not belong to any person till a person claims ownership rights. Unlike *res communis* the property is capable of being appropriated by a sovereign. This is a corollary to the sovereign principle in international law.[27] However, the application of *Res Nullius* is incapable in Corpus Juris Spatialis consequential to the existence of Article II in the Outer Space Treaty which specifically prohibits the national appropriation of parts of moon or other celestial bodies If one were to discard the *Res Nullius* principle on the basis of Article II then one must necessarily discard the sovereign principle on the same ground.[28] As stated earlier the *Res Nullius* restriction does not apply to countries that are not parties to the treaty. Therefore, it maybe argued that non-members to the treaty may discard the provisions of the treaty especially in light of Article IX and Article XVI of the treaty. Having considered all of the above principles, it is the opinion of the authors that the principle of '*res communis*' is the most apt to the concept of space law. Though '*Res communis*' prohibits appropriation of property by a person, it does not, however prohibit occupation or use of such property.[29]

The legal challenges of human space travel

"Law must precede man into space."

—Andrew G. Haley

The laws of the early days of space exploration were sufficient to precede states into space, but now new laws must be developed in order to precede the growing private sector into space. This will be a daunting task since there has not been a new space treaty since the Moon Agreement which entered into force in 1984 and has not been widely ratified.

There are pressing legal issues associated with the regulation of space transportation of passengers on a commercial basis, seen in the light of Article 1 of the Outer Space Treaty of 1967, which states that the 'exploration and use of outer space […] shall be carried out for the benefit and in the interests of all countries […] and shall be the province of all mankind'. An appropriate balance must be found between the commercial and technological opportunities that will arise and the principles upon which the development of international space law have thus far been based.[30]

Proposed Model for Property Rights

The proposed model for property rights is based on the doctrine of first possession along with the principles of *res communis* and *res nullius* to a limited extent. The *principle of sovereignty* cannot be applied since all the treaties relating to the exploration and use of outer space are unanimous in their opposition to sovereigns claiming sovereignty over portions of outer space including moon and other celestial bodies.

Principle

The doctrine of first possession is the pre-eminent system for establishing initial property rights in land or a resource, as it accords claimants with legitimate property rights over territory and resources before other prospective claimants can do the same. First possession rules are a basic component of and exist extensively in common law statutes and judicial decisions, civil law, traditional Islamic and African legal systems, and informal custom-made law. The proposed model for property is based on the *res comminus* and the *doctrine of first possession*. The primary concern of any person seeking to invest in space is protection of resources invested and reaping benefits from the resources so invested. Thus, to encourage investment in space, property rights in some form must be granted. In The Outer Space Treaty, 1967 the concept of *res communis* was accepted to serve as a defence against sovereign appropriation of property. The proposed model along with its implementation mechanism seeks to address the concerns of both the under-developed and the developed nations. In the proposed model the first pre-requisite is actual possession coupled with carrying on a space activity considered acceptable under international law. Mere possession of property without the conduct of any work will not grant the possessor any rights that he may enforce against third persons. As long as actual possession can be proven rights of the possessing party in exploiting the area under its control would be protected. The preliminary concern with regard to determining the permissible activities in Space may be addressed by the international organization envisaged under the proposed

model, which maybe established under the aegis of United Nations in conjunction with Committee on Peaceful use of Outer Space.[31]

Property rights would not accrue merely by reason of possession. In all instances where either actual possession of the property is lost or, the space activity, which was undertaken, ceases, property rights of the possessor cease to exist. An excellent suggestion forwarded by many is the maintenance of a registry of claims. A registry of claims maybe maintained of property claims along with a description of purported activities that are sought to be carried out in such area. Space activities that may be considered to be acceptable maybe decided on the basis of treaties which should have at least all the space exploring nations as signatories. The first difficulty that may be encountered can be in the following form. What if X reaches asteroid Y first and Z reaches later. But, Z is able to commence operations before X. In such a case who maybe called as the possessor? Here, the proposed model would operate in the favour of Z. This is primarily to ensure that a no fruitful claim does not arise. Another recommendation forwarded to ensure only genuinely interested parties make a claim is by attaching a small fee for application, which is non-refundable. *The second difficulty is transferability of rights to other persons. As regards sale, since ownership rights cannot accrue there can be no sale of extra-terrestrial property* (vide art. II; Outer Space Treaty, 1967, art. XI; Moon Treaty, 1979). *With regard to rights to lease, it can be stated that such rights maybe permissible to a limited extent. In such cases, an amount that maybe considered as adequate maybe fixed by the International Space Resource Management Organization. Where there is transfer of right an amount maybe fixed by the International Space Resources Management Organization to be paid to it over and above the consideration for the transaction. Furthermore, in all cases of transferability of rights approval of the International Space Resources Management Organization must be obtained as a condition precedent. The purpose of imposition of payment for transaction is two-fold. Primarily, it will operate as a check upon unnecessary transfer of rights and secondarily, it will help the body function independently since it's funding would be sufficient to carry out its responsibilities fairly and with due regard to all the relevant factors.*[32]

Recent Developments

In January 2004, the US President George W. Bush announced his vision for the future of space exploration and the development of space resources and infrastructure and created the Commission on Implementation of United States Exploration Policy which recommends that Congress increase the potential for commercial opportunities related to the national space exploration vision by:

(1) providing incentives for entrepreneurial investment in space;

(2) creating significant monetary prizes for the accomplishment of space missions and/or technology developments; and

(3) assuring appropriate property rights for those who seek to develop space resources and infrastructure.

The report also recommends protecting and securing the property rights of private industry in space and recognizes that the issue of private property rights in space is a complex one involving national and international issues.[33]

A general view in this regard is that the implementation of this vision requires an overhaul of the current treaties and laws that govern property rights in space in order to develop better and more workable models that will stimulate commercial enterprise on the moon, asteroids, and Mars. The expansion of a commercial space sector to include activities on celestial bodies requires the establishment of a regulatory regime designed to enable, not inhibit, new space activity. The development of specific laws, which are consistently applied, will create a reliable legal system for entrepreneurs, companies, and investors. The establishment of a reliable property rights regime will remove impediments to business activities on these bodies and inspire the commercial confidence necessary to attract the enormous investments needed for tourism, settlement, construction, and business development, and for the extraction and utilization of resources. The working of the International Space Station ("ISS") and the International Telecommunications Union ("ITU") is showcased as the steps to be emulated in order to achieve a workable framework, so as to recognize some form of property rights in space. The Antarctica Treaty model (Antarctica Treaty System, 1959) is also another approach that is said to be adaptable with regard to space laws.[34]

All these developments showcase a growing need to address the concept of property rights in space law. In addition, space exploration is no more limited to nations alone, and neither confined to realm of science fantasy only. Commercial activities in space are gaining momentum, and more and more participation of private individuals is the need of the hour, for which an explicit recognition of property rights is a necessity.[35]

Conclusion

"One of the great things about working in this field is the realization that the future – the future that imagination has taken us to so often before – is closer now in a real way than it has ever been. Private Citizens will fly in space on private vehicles."

—Patricia Smith

A related issue to jurisdiction is the actual enforcement of the rule of law in space. While in the future there may be ample opportunity for a plethora of peoples to be able to gain access to outer space, it will most likely remain that only a very few governments will have extensive space programs in the initial years of the new space boom, creating two significant implications. First, the burden of enforcement of rules of law will fall upon the governments that have the resources to enforce them. Secondly, and following from the first, this could mean that there is a selective enforcement of laws in space, which will be biased in favour of the enforcing government. Another, problem that might arise is that

the government that is functioning as the enforcer in space could feasibly attempt to assert jurisdiction over crimes based on the fact that it enforced the law i.e. that the only link between the state and the alleged criminal act is that the state enforced.[36]

The realm of outer space is an uncertain area; however, exploration of it will be fostered by certainty of the law that applies. A space visa helps to cure this ill, by providing a primary body of law that the holder can depend on - not only to punish him, but also to protect him. Additionally, the space visa would lend more certainty to civil law jurisdiction by creating a situation where there is at least one definite forum with a connection to a space defendant. Finally, the space visa would create a uniform, yet flexible, state of law, able adapt itself to the ever changing situations in outer space that comes with mankind's increasing presence there. Law has preceded the nations into space.[37]

Space tourism gives rise to many normative and practical challenges, the effects of which will be felt for some time in the air and space law community. The issues of the applicability of the law, registration and jurisdiction, authorisation, and liability all lead back to the source questions of international law: those of compliance, enforcement, and the rule of law. Commentary on the challenges posed by space tourism reflects the economic, political and technological advances in the field of space activities; reactions to the ambient developments in the field will determine whether air law and space law will continue to remain relevant in the next evolution of aerospace activities.[38]

The legitimacy, cogency, applicability and urgency necessary in addressing these issues become readily evident in the recent developments in the field. The tide of space tourism waits for no law – but the rule of law must prevail in the exploration and use of outer space. It is left to the international legal community to ensure that air and space law are not swept away by the relentless tide of change.

It is time that the immense resources of space are made use for the betterment of mankind. Recognizing some kind of property rights and paving way for private players to animatedly participate in space activities would in effect be a calculated stride towards the achievement of this objective.

However it would not be practicable to disregard the entire jurisprudence in this regard which has the backing of the majority of the international community and is under the auspices of the United Nations.

Therefore an astute way out would be the creation of a workable format under the current species of legislation, which is in tune with the current developments and is adequate to hold ground for the considerable future as well. Thus the granting of Possessionary rights to private parties by virtue of transfer of such rights from the states would be in tandem with this purpose. And the creation of an independent international authority, for the monitoring of such activities involving the developing nations would ensure that there is at least some kind of transfer of technology in addition to the safeguarding of various

common interests along with the outer space environment as well. Finally, Article I of the Outer Space Treaty declares that, "*the exploration and use of outer space…… shall be the province of all mankind*". Thus, the recognition of property rights in outer space, which goes on to facilitate the application of this principle, is to be considered and effectively put to application in order to make the best use of the colossal resources that outer space has to offer.

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I.C.T. AND REGULATORY FRAMEWORK IN INDIA WITH REFERENCE TO SATELLITE COMMUNICATION: AN OVERVIEW

Ashok Kumar
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Abstract

The information and communication revolution have restructured patterns of development all over the world. But revolution effects have not been uniform in the developed and developing nations. Science and technology came to rescue of human being in many areas. After the invention of new technologies, computer, internet and satellite played an important role in communicating information, knowledge and messages. From the development of wireless to the satellite communication world has become closer in the global context fulfilling the spirit of global village and India is not an exception. Approximately 300 (S.T.V.) satellite television channels are broadcasting in India.

The Constitution assigns all legislative and executive power over communication to the Union government. Only parliament can make laws to govern and regulate communication. The Union government has made its efforts on Communication regulatory laws some of the Bill e.g. broadcasting Bill, Convergence Bill.

This paper highlights the various aspects of communication, its regulatory framework in dealing with communication and Media.

Introduction

Communication is an exchange of information and messages. The history of human society is primarily the history of evolution of human communication. The word Communication is of Latin Origin Communes means; to establish commonness of experience. Communication is fundamental of human society from Primitive to Modern but depend on human's capacity to transmit his knowledge, intentions, and experience from person to person.

The communication has undergone a remarkable change in the wake of information communication satellite, technological innovation. The use of Technology based media a have given it the tremendous stage that it has, to influence human being. The invention of new Technology like computer, internet and satellite played an important role in communicating information, knowledge and messages. Satellites are used for various purposes like communication satellite, Navigation satellite, weather satellite, research satellite.

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Indian Context

The use of technology has added a new dimension to the use of words as a tool of communication. The printing press, the radio and other mode of communication have multiplied words and their use to an immeasurable extent. Telecommunication in the real sense means transfer of information between two distant points in space. The popular meaning of telecom always involves electrical signals and nowadays people exclude postal or any other row Tele-Communication methods from its meaning. So Therefore, the history of Indian telecom can be started with the introduction of telegraph. The first experimental electric Telegraph line leas started between Kolkata and diamonds Harbor in 1850. First satellite earth station for domestic communication established at Secunderabad, A.P. The Telecommunication is the life line of the rapidly growing information Technology Industry.

Satellite television took off during the first gulf war with CNN. There are no regulations against ownership of satellite, dish antennas. The first with facial satellite was sputnik I. launched by Soviet Union on 4 October, 1957.

India first experimental telecommunication relays in 1981 and in July 1992 launch, INSAT 2A. The Satellite Telecommunication Experimental Project (STEP), Conducting using Franco-German symphonic satellite during 1976. Presently India has a large network of optical Fiber cables, digital microwave and satellite communication system. April 19, 1975. Aryabhata, the first Indian space satellite, was launched for India and in August, 1993. The Rohini-3 communication satellite launched.The satellite popularly known was. "Teachers in the sky" can lead to a considerable improvement as a means of communication on earth; space communication is the latest in the list of effective instruments for this purpose satellite are bringing countries nearer one another. They have an important side to play a creating an atmosphere of International harmony in thought and action. The communication services in India are governed by loose patchwork of different laws and Regulations. This patchwork includes the Telegraph Act, 1885, the Cable Network Act, 1995 the TRAI Act, 1997, the parssar Bharati Act, 1990 and Information Technology Act, 2000.[1]

International Provision

The International Telecommunication Union (hereinafter ITU) is an agency of the United Nations which is regulate information and communication technology issues. ITU Coordinates the shared global use of the Radio spectrum, Promotes International cooperation assigning satellite orbits works to improve Telecommunication in infrastructure in the developing world and establish worldwide standards. To establish sustainable and affordable access to International and Communication Technologies (herinafter ICT).

ITU are based in Geneva, Suitzerland and its 191 Member states. The legal frameworks of ITU are adopted by the Plenipotentiary Conference, the optional

protocol on the settlement of disputes. ITU also set up the International Telephone and Telegraph consultative committee (hereinafter CCITT) in 1992.

World Summit on the Information Society, (WSIS) It's provided a global forum on the thereof ICTs for development. European Conference on Postal and telecommunication Administrations. (hereinafter CEPT) was established on June 26, 1959. As a Coordinating body for European State Telecommunication and Postal Organizations, CEPT also create of the European Telecommunication standards Institute in 1988.

The legal and regulatory frame work in India for communication

Constitution and communication Law

The constitutions of India have a significant influence over the regulatory and legal framework for communication. The impact of constitution law on communication classified in to four categories. *First*, under India's federal system, the Constitution of India ordains whether and to what extent the centre and the states have competence to regulate, controls and tax communication. *Second* the Constitution protects citizens and other persons from arbitrary and subversive state action by guaranteeing them certain fundamental rights. This guarantees the right to freedom of speech and expression. *Third*, a set of constitutional provisions called the directive principle about appropriate role of the state in economic matters including the provision of communication service. *Finally*, the constitutions guarantee of Equal protection of administrative law principals that affect the manner in which licensing and regulatory decisions are made.

Federal system of Governance

India is a federation which comprises of the Union, various States and Union Territories.[2] The Constitution apportions executive and legislative power between the Union and States.[3] Parliament which is the Union legislature, con make law for the any part of India.[4] As a default rule, the union gets to make and implement laws for any matters that are not expressly included in any of the three lists in the Seventh Schedule[5] contains point, the Supreme Court has described India as federation with a bias to the center, although states are supreme within their assigned competences.[6]

Union Government responsibility for Communication

The Constitution assigns all legislative and executive power over communication to the Union: only parliament can make law to govern and regulate communication. The seventh schedule entry 31 in Union List: Post and telegraphs; telephones, wireless, broadcasting and other like forms of communication.

It gives the Union are ability to make laws for new Technologies and service that developed over time. Therefore; although the Internet and satellite are not expressly mentioned in entry 31 as they constitute other like forms of communication.[7]

States are forbidden from directly regulation communication because Art-246[8] provides that parliament has exclusive power be enact laws for items, such as entry-31 Union List. It should be noted that entry 13 in the state list also was on term communication that entry focuses on physical means of communication such as roads, bridges. It does not over electronic Radio visual communication, which the subject of Union List entry 31.[9]

State and Local Regulation on Communication

Although central Government plays a dominant role in regulating communication, but State and Local Government are also important players in the regulatory land scope for several aspects. First; state government are responsible for enforcing various Central statutes as party their General responsibility to maintain law and order in their territories second, state health and safely lows can affect the operations of telecom and communication network thirds, state levy a significant amount of sales, entertainment tax on communication services.

Public order, law enforcement function and communication

Law and order is a state subject.[10] There for state police and law enforcement agencies are usually responsible for implementation of central law like Telegraph and communication laws. The case on point recent controversy over the condition Accuses system (CAS) satellite based cable Television.

In case of *PUCL v. Union of India*[11] Supreme court held that the state law enforcement agencies have to monitor and intercept communication.

Fundamental Rights and Communication

The Constitution protects every activity and, in some cases all person against state action that violates the fundamental right in part III of the constitution fundamental rights and it is important to obtain a basic understanding of these rights.

Freedom of Speech and Expression

The Constitution of India includes various basic freedoms in Article 19(1) (a) right freedom of speech and expression. This Article is of tremendous significant to communication, it read as follows: All citizens shall have the right- (a) to freedom of speech and expression. Unlike the more recent South African constitution, India is constitution does not expressly recognize media freedom.[12]

Life and personal liberty: The Constitution of India provides that no person shall be deprived of life or personal liberty except according to procedure established by Law.[13]

We are of the view that to have a communication telephone, satellite phone as connection from the government nowadays is a necessity in order to load a meaningful life within the meaning of Act 21 of the constitution of India.[14]

Right to Communicate and telecast

The Supreme Court decision Cricket Association[15] was a defining event in the evolution of India free speech jurisprudence. In this case supreme court recognized and strong linkage between Act 19(1)(a)[16] and Broadcasting communication freedom.

Restriction of free speech and communication

Article 19(2) provide that the government of was impose reasonable restrictions on free speech and explosions in the interest of India's sovereignty and integrity, state security, friendly relation with Foreign states, public order, decency, morality contempt of court defamation and incitement of an offence.

Statutory Framework and communication

Indian communication law started from the Indian Telegraph Act, 1885. This statute was passed by British Government for India and electric Telegraph were the Principal means of electronic communication. Although the Telegraph Act is more than 120 years old, it remains the principal pillars of the regulatory framework for communication. The statute, legal rule and regulatory provisions are organized around the concept of a Telegraph. This term is capaciously defines in the Act this definition covers within it most modern from of communication including landline telephone, cellular service, satellite Radio and the internet. However, statutes such as the telegraph Act, that regulate technology and scientific matters must be given a progressive construction to accommodate new inventions and innovations that arise after the first enacted.[17]

Other Statutes that Regulate Communication

Telecom Regulatory Authority of India Act, 1997

Telecom Regulatory Authority of India Act is a key element in the regulatory framework for Indian communication. The TRAI Act builds upon and establishes the telegraph Act is basic legal architecture. Its main objective was to establish an independent regulatory system for communication, licenses and to protect consumers. The Act was substantially amended in 2000 and provides to the establishment of (TDSAT) Telecom Disputes Settlement and Appellate Tribunal exclusive dispute resolution forum for communication. The directions, regulations and recommendations have contributed to the emergence of distinct communications jurisprudence in India.[18]

The Wireless Telegraphy Act, 1933

The act deals with wireless equipment like transmitters, cellular phones and radio to obtain a license.

The Telegraph Wires (Unlawful possession) Act, 1950

The telegraph wires (Unlawful possession) Act a penal statute designed to curb the theft of copper wires used in telegraph and telephone service.[19]

The Prasar Bharti Act, 1990

The Prasar Bharti Act establishes a legal framework for public broadcasting in India. The Act provides the Prasar Bharti Corporation as the principal public broadcasting agency.

Cable Network Act, 1995

The cable television networks (Regulation) Act, 1995 regulates the operation of cable television networks in India. The Act was amended in 2003 to require cable operators to sue 'addressable systems' also called (CAS) conditional access systems based on satellite.

Convergence Bill

A legislative proposal is pending in parliament since 2000 called the communication convergence Bill.[20] The main propose of this law is to create a single regulatory and licensing umbrella for all type of telecommunication and communications broadcasting and cable services. It would replace following statutes:—

- The Indian telegraph Act 1885.
- The Indian wireless telegraphy Act 1933.
- The India wireless (Unlawful possession) Act 1950.
- The telecom regulatory authority of India Act, 1997.
- The cable television networks (Regulation) Act, 1995.

The Prasar Bharti Act is not covered under the Bill. The proposed law would establish the communication commission of India as the super regulator of India communication systems with both power regulatory and licensing functions. The Bill also proposed to create a commission appellate tribunal to hear appeals from the communication commission's decision.

Broadcasting Bill

The government also announced a new broadcasting Bill. The will establish a broadcasting regulatory authority to regulate broadcasting and cable service.

The information technology Act, 2000 This Act not exclusively deals with the communication but some provision of the Act that's includes communication technology.[21]

Satellite communication scenario in India

The satellite communication covers-satellite internet access, satellite phone, satellite radio, satellite television, satellite navigation, weather satellite, earth observation satellites, research satellite etc. Space stations and human space craft in orbit are also satellite.

The world has become a global village through satellite communication. Communication satellite frequently called birds or teacher's in sky' are merely orbiting solar powered relay stations. They receive up linked, signals from special satellite, earth stations equipped with suitable transmitters and dishes, which retransmit the signals earth worlds as the speed of light.

Satellite broadcasting implies the direct reception of radio and television programming through dish antenna. In India the most common form of satellite television is direct-to-home (DTH).

Committees Set Up By Government On Communication

The union government appointed a high powered committee in 1981 to study the need for administrative reorganization of post and telegraph service[22]: *The Sarin committee* submitted over 400 recommendations the committee proposed splitting the post and telecom department in to two and collaboration with Foreign Telecom Companies, but government ignored these recommendations entirely.

Athery Committee

The short lived government of Prime Minister Shri Chandra Shekhar established television restructuring committee in 1990. It was headed by M.B. Athreya a management professor. The committee recommended to the creation of an independent telecommunication regulator.

Regulatory and Telecom Agencies

Under the constitution of India, telecom, broadcasting and cable service are regulated by the union government. The following agencies involved in communication regulation.

- Telecom Regulatory Authority of India (TRAI), Department of Telecommunication (DoT) and Telecom Commission and Prime Minister Office.[23]
- Telecom disputes settlement and appellate tribunal (TDSAT).
- Ministry of Information and Broadcasting.
- Prasar Bharti Corporation.

Conclusions and Suggestion

Broadly speaking, technology of communication and internet are going to set of the contours of further technological advancement in the current decade and the decade to next. The most recent initiative aims at convergence of voice and data received from multiple sources, both website based and real do streams in mobile devices, global satellite system, have made virtual presence possible almost everywhere and any where outreaching the barriers of distance and remoteness.

In zeal of becoming convergence, India the second country in the world to have a communication convergence law in pipeline. First country is Malaysia. The convergence bill hardly addresses issues of public interest such as universal access; public address broadcasting any regulatory regime draws its need from public interest.

- The regulatory law should be made as per International Standard.
- Some provisions must be made in the proposed convergence bill to address the public interest as like cross media.
- The anti monopoly aspects of telecommunication must also brought in the Bill.

Endnotes

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3. *Ibid*., Article 73 and Articles 162 Extent of executive power of state— Subject to the provision of this Constitution, the executive power of state shall extend to the matters with respect to which the legislature of the State has power make laws.
4. *Ibid*., Article 245(1) Extent of laws made by parliament and by the legislature of State: (i) Subject to provision of Constitution; Parliament may male law for whole or any part of the territory of India, and the legislature of State may make laws for the whole or any part of the State.
5. *Ibid*., Article 248 Residuary power of legislation—(1) Parliament has exclusive power to make any law with respect to any matter not enumerated in the concurrent List or State List and schedule VII List-I, entry 97.
6. *S.R. Bommai v. Union of India*, AIR 1994 SC. 1918.
7. *Gujarat Cable T.V. Operators v. State of Gujarat*, AIR 1999 Guj. 330.
8. See, Constitution of India, Article 246(4) Parliament has the power to make laws with respect of any matter for any part of the territory of India not include [in a State] notwithstanding that such matter enumerated in the state List.
9. *Bharat Shantilal Shah v. State of Maharastra*, (2002) 1 BOM. L.R. 529, Seventh Schedule (Art. 246) List-I Entry 31. Post and Telegraphs; telephones, wireless, Broadcasting and other like forms Communication.

10. See, The constitution of India, Sch. VII, List-II, Entry: 1. Public order [but not including (the use of any Naval, military or air force or any other armed force of the Union or of any other force subject to the control or of any contingent or unit thereof in aid of civil power)] 2. Police (including railway and village police) Subject to the entry of List-I.
11. AIR 1997 S.C. 368.
12. The Constitution of the Republic of South Africa, Sec. 16(1)(a),However Indian judiciary has inserted media rights as part of Art.19(1)(a) through interpretation some of the cases are; Romesh thoper case.
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14. *Francis Coralie v. State of Delhi*, AIR 1981 SC 746.
15. *Secretary, Ministry of Information and Broadcasting v. Cricket Association of Bengal*, AIR 1995 SC 1236.
16. See, Constitution of India, Article 19 Protection of certain rights regarding freedom of speech, etc.—(1) All citizens shall have the rights – (a) to freedom of speech and expression.
17. *Senior Electric Inspector v. Laxminarayan Chopra*, AIR 1962 SC 159.
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OUTER SPACE DEBRIS: AN INTERNATIONAL OBLIGATION TO MITIGATE AND CONTROL

Amrendra Kumar Ajit*

Space flight is not a random activity, but one requiring decisions and Commitments with very long lead times and very long consequences.

—Albert Gore[1]

According to Ulf Merbold, the first West German astronaut, our genes are like a program that continuously pushes us beyond the horizon of our experience in order to conquer new positions, finally leading us into outer space.[2] The basic nature of the human being to explore its surroundings has been transformed to the extent of the exploitation of the outer space. The historic journey of exploration, previously unknown and inaccessible realm, was started fifty three years ago with Sputnik and reached upto the uncontrolled multipurpose use (like telecommunication, strategic, research, tourism etc.) of the outer space by the different countries which raised the serious global concern. Outer Space is *res communis* like Antarctica and High seas, any country of the international community can use and explore it.

Earlier concept shows that outer space is infinite and it is true in theoretical reality but practically only upto certain limit outer space can be used. The universe is infinite but the position of outer space is in reality just like a thin shell around Earth, where we have the ability to place stable satellite. Satellite in low earth orbit can reach a maximum altitude of about 5,000 km, which is just 10 to 15 per cent of earth radius, whereas satellites in geosynchronous orbit can reach a maximum altitude of about 36,000 km, which is less than 1/10 of the distance to the moon. Thus our boundless outer space is really minuscule compared with the size of universe we try to observe.[3]

The rapid growth of science and technology in the different parts of the world has provided the opportunity to the various counties to exploit the outer space and in the last half century the world has seen uncontrolled exploration and exploitation of the outer space by the developed and developing countries. Now the recent research shows that that the uncontrolled use of the space by the various countries in the limited and useful area of outer space has caused the pollution in form of junk of debris which is the great threat to the future satellites and space stations. This research paper will try to analyse the causes of the space pollution, the international measures and states obligation to mitigate the situation and what may be the effective control mechanism in this regard.

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Chief Pollutant: Space Debris

What is space debris?

Space debris' is synonymous with 'orbital debris'. There are, also, a number of colloquial phrases to describe 'space debris'.[4] These terms include 'space trash',[5] 'space garbage',[6] 'space refuse'[7] and most commonly 'space junk'.[8] However many expressions there are to refer to orbital debris, the international space community has yet to agree on a single definition.[9] A generous definition could, nonetheless, be provided. That is to say, 'space debris' are all man-made objects launched in to outer space by space actors undertaking space-related activities, and these objects served their or have no useful function.[10] It is suggested that the absence of a legal definition of space debris might have had attributed to the uncertainty for the space community to accept a universal one. The US National Science and Technology Council Committee on Transportation Research and Development is of the view that 'orbital debris is a popular rather than a legal term'.[11] Reading on the face of international space law framed by the United Nations, 'debris' is not even mentioned. Efforts have been invested by interested space bodies to form a definition in the absence of a legal one, nonetheless. In 1999, the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful uses of Outer Space states:

> '*Space debris are all man-made objects, including their fragments and parts, whether their owners can be identified or not, in Earth orbit or re-entering the dense layers of the atmosphere that are non-functional with no reasonable expectation of their being able to assume or resume their intended functions or any other functions for which they are or can be authorized*'.[12]

In its Position Paper on Orbital Debris, the International Academy of Astronautics offers a closely related definition, and provides that 'space debris' are:

> '*any man-made Earth orbiting object which is non-functional with no reasonable expectation of assuming or resuming its intended function or any other function for which it is or can be expected to be authorized, including fragments and parts thereof. Orbital debris includes non-operational spacecraft, spent rocket bodies, material released during planned space operations, and fragments generated by satellite and upper stage breakup due to explosions and collisions*'.[13]

So mainly debris is man-made non-functional substance in the orbit. But when we consider about the dimension of space, it is difficult to imagine that problems of pollution could ever arise. But the rapid increase of pollution in outer space is a serious problem and is becoming worse. Space debris in lower-earth orbit poses hazards to spacecraft, astronauts' lives, and to the integrity of scientific experiments. Lives and property on earth are also endangered by dead satellites that re-enter the atmosphere. Space was free of man-made pollution until 1957, when the Russians launched Sputnik. Since that time 15,000 large objects have been discarded in orbit, including rocket boosters and fuel tanks,

dead satellites, tools and garbage jettisoned from manned spacecraft.[14] Forty thousand smaller objects (approximately 2.5 cm in size) and billions of tiny flakes of paint also float in space.[15] Space debris in near-earth orbit is particularly hazardous because it travels at approximately 17,500 miles (29,575 km) per hour.[16] At these velocities, even a tiny flake of paint 1/50 of an inch (0.51 mm) across could puncture an astronaut's spacesuit. A paint fleck that is 1/10 of an inch (2.54 mm) in diameter can damage a space-craft.[17]

Several unexplained failures of satellites have been attributed to possible collisions with space debris. Analysis of the Solar Maximum Mission Satellite shows that one hundred and fifty visible holes were found in a five-foot square area from its surface. About one-half of the holes were caused by micro meteors, which are objects naturally found in space. The other half were created by man-made garbage. Chemical analyses re-vealed that most of the man-made holes resulted from collisions with paint flakes. The international community is confronted with the serious question of whether present planning for space activities will bring about unacceptable probabilities of collision between active spacecraft and space debris. Chobotov recentlye stimated this probability to be as much as 50 percent for a 50-meter spacecraft in a 1,000-day, circular, low-altitude orbit.[18] This probability is clearly unacceptable and must be improved.

So considering the various incidents, orbiting debris is the main source of space pollution and adversely affecting the space environment. There is an increased risk of additional debris being generated due to collision between space objects, and such fragments remaining in space permanently. Every space actors, whether State-sponsored, civilians or commercial, are affected by the space debris population. Human lives are endangered: astronauts undertaking extra-vehicular activities or even the paying public enjoying commercial human spaceflights run the risk of colliding with pieces of debris. The continuing growth of debris in heavily used orbital regions, like Low Earth Orbit and Geostationary Earth Orbit, not causes minor or complete abruptions to space operations, but potentially could prevent launches of planned space vehicles; thus, denying future access to, and use of, outer space. There are several example which provide ample evidence regarding damage done by debris like:—

- In April 1984, the shuttle crew brought back to earth some malfunctioning electronics boxes on the Solar Max satellite. National Aeronautics and Space Administration (NASA) found the outer surface peppered with around 160 small holes created by fling paint chips.
- On its seventh moission in July in 1983,the shuttle orbiter Challenger was hit by something that chipped a window. NASA concluded that the damage was done by a tiny(0.2mm) flank of white paint, possibly the kind used on U.S. Delta rockets.
- In July 1981, the Soviet navigation satellite Kosmos 1275 broke up over Alaska in a pattern suggesting it had been hit by debris.

- The Soviet surveillance satellite Kosmos 954, with a nuclear reactor abroad, suddenly depressurised and fell to earth over northern Canada in January 1978, also in a way that suggested a collision had occurred.
- The European Earth observation satellite, GEOS-2, suffered injury to its solar panels in 1978, apparently when hit by debris.

The National Aeronautics and Space Administration Agency, moreover, had to take evasive measures to avoid colliding with debris which would otherwise have had affected its operations. NASA's Earth's observing System, as from May 2009, had been manoeuvred three times to avoid collision with orbital debris.[19] NASA tracked a large piece of debris from a spent European rocket which was launched in August 2006 to send two communications satellites in orbit.[20] The decision to steer the docked Shuttle and the International Space Station to dodge the debris was not executed as it passed at a safe distance.[21] A small piece of space litter from a derelict 2007 Chinese weather satellite, which was destroyed under a coordinated effort by the Chinese government with a military missile, was detected by NASA on September 7, 2007.[22] Although it was expected to head towards the ISS, the debris did not pose a threat as it passed the orbiting laboratory.[23] In November 2009, the Agency announced that a small piece of space debris approached some 1,640 feet from the ISS. Although the debris posed no threat to the Station or its crew, the six astronauts were informed that as a safety precaution they might have to evacuate the ISS to board their Russian Soyuz spacecrafts lifeboats. NASA further revealed that it had difficulty tracking the object because of its very small size, and that it was too late to steer the orbiting laboratory away from the close encounter.[24]

Sources of Space Debris

According to various scholors of space law, the main sources of space debris has been categorised into four parts as follows:—

Inactive payloads

These are launched space objects which have become derelict and cannot be controlled by their space operator for a re-entry to Earth.

Operational debris

It relates to all associated material used to carry out the space endeavour which remains in space. Such debris includes spent and discarded upper rocket stages to provide the necessary thrust for the launched space vehicle to enter space.

Fragmentation debris

It is the third source, and is produced when there is a break up of a space object as a result of an explosion, collision or for some other cause.

Microparticulate matter

Microparticulate matter, which consists of particles, gases and space glow64. Such debris is generated from different sources, including solid-propellants rocket motors, surfaces of in-orbit objects and manned spacecrafts.

Space debris has emerged as a chief pollutant in the outer space in the last century and shows its presence through various accidents as above mentioned. So the appropriate measures should be adopted within the reasonable time by the international community.

Space Debris Mitigation and International Approach

What should be the limit of pollution in the outer space or how much pollution should society be willing to permit in outer space? Generally it is argued that the less space pollution is the better. The less pollution there is, the smaller the chance is that accidents will occur. But this assertion is incorrect. The issue is not total pollution free environment in outer space, but rather how much pollution is optimal. It is not possible to maintain total pollution free environment in the outer space with its exploring mindset. The world's resources are limited and the gains from reducing space pollution must be weighed against the costs, in terms of other goods and services that could be produced with the resources being devoted to pollution abatement activities.[25]

The international community should devote resources to limiting space pollution until the marginal gain from reducing space debris is exactly equal to the marginal cost of reducing the pollution. There can be too little space debris.

In opening statement before the US House of Representatives Committee on Science and Technology's Subcommittee on Space and Aeronautics on '*Keeping the Space Environment Safe for Civil and Commercial Users*', Chairwoman Gabrielle Giffords described the 'relentless growth of space debris', which has been a continuous concern for policymakers and interested bodies.[26] These sentiments were later echoed by Al Gore who indicated that problems with orbital debris and nuclear contamination polluting the space environment warrant international concern and coordinated action in order to sustain access to, and use of, outer space.[27]

Many space-faring nations have started to realize the problem posed by space debris and have adopted various measures to mitigate it. Today, there is a wide interest in the problem from the scientific community and various initiatives and organizations have been set up to debate andpromote various guidelines or codes of conduct. Now I will try to analyse the various measurres adopted by the state and non state entities,

United States

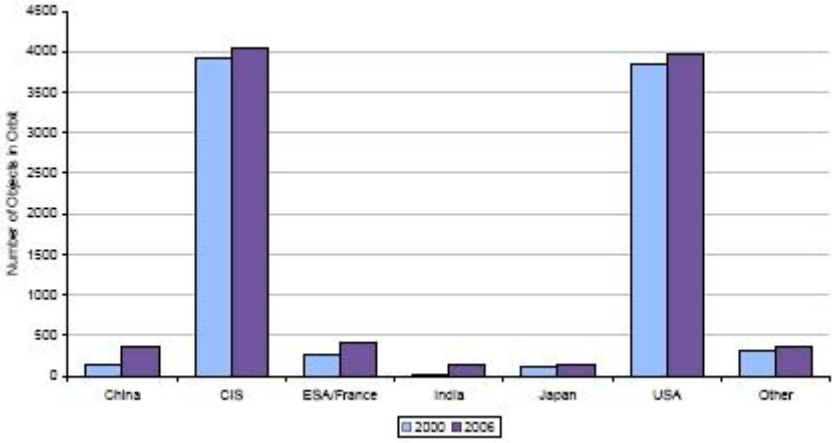
It is worth noting that the debris problem has its origin in the space competition between the former USSR and the U.S. Since 2000, the number of in-orbit objects larger than a bowling ball has increased by nearly 10 percent, with the United States and Russia each contributing approximately 40 percent of the total debris. The following graph illustrates the origin of space debris and clearly it becomes obvious that the role of the U.S. in dealing with this problem cannot be marginal.

Although at this time the U.S. Government does not see the need or benefit for a new legal regime to address the topic of space debris, the U.S. has played a

crucial role in tracking, cataloguing, and modeling space debris. NASA has been at the forefront of orbital debris mitigation efforts in the U.S. government. With authority over all civil government space missions, the agency has developed a policy and specific procedural requirements for orbital debris mitigation.

A NASA Orbital Debris Program Office, located at the Johnson Space Center, is recognized worldwide for its leadership in addressing orbital debris issues. Researchers at the center develop an improved understanding of the orbital debris environment and devise measures that can be taken to control its growth. The Office plays a key role within the Scientific and Technical Subcommittee of the UN Committee on the Peaceful Uses of Outer Space in promoting mitigation guidelines.

FIGURE 1: GROWTH IN NUMBER OF OBJECTS IN ORBIT, BY COUNTRY/ORGANIZATION, FROM 2000 TO 2006



Source: Futron Corporation, 2006.

National Space Policy document of U.S.flagged the progress made both nationally and internationally regarding proliferation of orbital debris over the past decade but also underscored the worrisome nature of space junk. The White House document stated:Orbital debris poses a risk to continued reliable use of space-based services and operations and to the safety of persons and property in space and on Earth. The United States shall seek to minimize the creation of orbital debris by government and non-government operations in space in order to preserve the space environment for future generations.[28]

This is a major step but the intentions have to be followed by actions. For instance, NASA guidelines known as the U.S. Government Orbital Debris Mitigation Standard Practices have been issued in 2000 for mitigating the growth of orbital debris. However, they are not considered binding regulations and responsibility and accountability is not legally enforceable. More importantly,

national security and other government programs can be granted orbital debris waivers today, demonstrating that the current regulatory regime contains loopholes in terms of applicability of standards.[29]

European Union

European Space Agency (ESA) has a long history in tracking space debris. In 1986, the Director General of ESA created a Space Debris Working Group with the mandate to assess the various issues of space debris. The findings and conclusions are contained in ESA's Report on Space Debris, issued in 1988. In 1989, the ESA Council passed a resolution on space debris where the Agency's objectives were formulated as follows:

(1) Minimize the creation of space debris;

(2) reduce the risk for manned space flight,

(3) reduce the risk on ground due to re entry of space objects,

(4) reduce the risk for geostationary satellites. ESA's Launcher Directorate at ESA Headquarters in Paris also coordinates the implementation of debris mitigation measures for the Arianespace launcher.

Over the last few years, ESA developed debris warning systems and mitigation guidelines. Following the publication of NASA mitigation guidelines for orbital debris in 1995, ESA Published a Space Debris Mitigation Handbook, issued in 1999, in order to provide technical support to projects in the following areas: Description of the current space debris and meteoroid environment, risk assessment due to debris and meteoroid impacts, future evolution of the space debris population, hyper-velocity impacts and shielding, cost-efficient debris mitigation measures.

Inter-Agency Space Debris Coordination Committee (IADC)

The Inter-Agency Space Debris Coordination Committee (IADC) is one of the world's leading technical organizations dealing with space debris. ESA is a founding member of IADC, together with NASA, the Russian Aviation and Space Agency, and Japan. IADC is today an in forum of governmental bodies for the coordination of activities related to the issues of man-made and natural debris in space. The primary purpose of the IADC is to exchange information on space debris research activities between member space agencies, to facilitate opportunities for co-operation in space debris research, to review the progress of ongoing co-operative activities and to identify debris mitigation options. Generally speaking, the organizations reached a consensus of adopting the mitigation guidelines as proposed by the IADC. The IADC Space Debris Mitigation Guidelines was drafted in 2002 as the first international document that is specialized in field of space debris mitigation and based on a consensus among the IADC members. In February 2003, at the fortieth session of the Scientific and Technical Subcommittee of the UNCOPUOS, the IADC presented

the IADC Guidelines as its proposals on debris mitigation. This document serves as the baseline for the debris mitigation in two directions:

(1) toward a no binding policy document, and

(2) toward applicable implementation standards.[30]

One criticism of the IADC Space Debris Mitigation Guidelines is that they remain voluntary and are not legally binding under international law. Still, IADC is an ideal forum on space debris due to its wide membership among the leading space agencies and provides a basis for further international cooperation when elaborating a space debris convention. Indeed, IADC standards have facilitated the discussion on space debris mitigation guidelines and opened the door to further research related to the cost of mitigation measures. Thus, recently, various studies have been conducted on the effectiveness and the costs of debris mitigation measures. These studiesexamine a number of important problems: prevention of on-orbit explosions and operational debris release, reduction of slag debris ejected from solid rocket motor firings, de-orbiting of space systems in LEO with various limitations on the post-mission lifetime, and re-orbiting ofspace systems to above the LEO & GEO protection zones (graveyard orbiting).

United Nations

Over the past years, the United Nations On Peaceful Use of Outer Space (UNCOPUOS) and its Scientific and Technical Subcommittee (STSC) have played an important role in debating space debris issues. UNCOPUOS was set up by the General Assembly in 1959 in resolution 1472 (XIV). At that time, the Committee had 24 members. Since then, it has grown to 67 members—one of the largest Committees in the United Nations. In addition to states, a number of international organizations, including both intergovernmental and non-governmental, have been granted observer status with UNCOPUOS and its Subcommittees. The Committee has the following goals:

(1) review the scope of international cooperation inpeaceful uses of outer space,

(2) devise programs in this field to be undertaken under United Nations auspices,

(3) encourage continued research and the dissemination of information on outer space matters, and

(4) study legal problems arising from the exploration of outer space.

The resolution establishing UNCOPUOS also requested the UN Secretary-General to maintain a public registry of launchings based on the information supplied by states launching objects into orbit or beyond. Those terms of reference have since provided the general guidance for the activities of the Committee in promoting international cooperation in the peaceful uses and exploration of outer space. The Committee is divided in two standing subcommittees: the Scientific and

Technical Subcommittee and the Legal Subcommittee. The Committee and its two Subcommittees meet annually to consider questions put before them by the General Assembly, reports and issues raised by the Member States.

The United Nations Office for Outer Space Affairs (UNOOSA) implements the decisions of the General Assembly and of UNCOPUOS. The office has the dual objective of supporting the intergovernmental discussions in UNCOPUOS and of assisting developing countries in using space technology for development. The Office is the focus of expertise within the United Nations Secretariat. It serves as the secretariat for the intergovernmental Committee (UNCOPUSOS), and implements the recommendations of the Committee and the United Nations General Assembly. The Office is also responsible for organization and implementation of the United Nations Programme on Space Applications (UNPSA).

International Obligation and Its Acceptance

There is a critical weakness in the international law on space debris. Existing space law is related to the use of space and not to debris regulation. Most of existing treaties have been overtaken by technology advancement. While the rules developed by the Outer Space Treaty or the Registration Convention is useful, it does not apply to the space debris issue. This means that commercial and government-sponsored space launches can still create more debris without limits. Today, any country or corporation can launch a rocket and/or place equipment into orbit without permit. The only constraint is that they are required to record the launching as stipulated under the Registration Convention.

Furthermore, nothing is said about the destruction of satellites in space and the creation of space debris resulting from it. In international law, nothing can prevent a nation from destroying one of its own satellites. The arms control provisions of the Outer Space Treaty forbids the placing of nuclear weapons or any other kinds of weapons of mass destruction in orbit. The treaty also forbids establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the Moon and other celestial bodies. However, nothing is mentioned about spacecraft destruction and space debris thus created. Recently, in February 2007, the UN reached a consensus on the draft of space debris mitigation Guidelines and adopted them. However, all of the existing guidelines remain voluntary and are not legally binding under international law. At the UN level, some nations have expressed the view that a legally non-binding set of guidelines was not sufficient. Some delegations at the Scientific and Technical Subcommittee (UNCOPUOS) expressed the view that the Subcommittee should consider submitting the space debris mitigation guidelines as a draft resolution of the General Assembly rather than as an addendum to the report of the Committee. At the meeting of UNCOPUOS on February 2007 in Vienna, the view was also expressed that the states largely responsible for the creation of the present situation and those having the capability to take action on space debris mitigation should contribute to space debris mitigation efforts in a more significant manner than other States.

Conclusion and Suggestions

In 21st century, where chance of space exploration is unlimited, orbital debris are great threat for government and commercial satellite operators and manufacturers. Orbital debris are bound to grow as long as there are launches of satellites and other spacecraft. However, the greatest challenge is about our ability to successfully coordinate and implement, a set of measures to deal with space debris in the coming years. There is requirement of a global norm in form of a convention, which must be developed through common conciousness to get a cosistant practice by nations. Furthermore, the convention would cast in stone some of the principles for dispute resolution and liability damage. The convention is to be organized around the following objectives:

Independent Tracking of space debris by states and its Cataloguing—A similar pattern database should be maintained by United Nations Office for Outer Space Affairs secretariat. Specific procedures will need to be drafted and enforced to ensure that information and data must be collected in a timely and exhaustive manner.

- Laying down the standered for Space Debris Mitigation and Disposal Standards—There is urgent requirment for internationally agreed standards that can enforce appropriate debris mitigation and disposal measures.
- There must be Space Preservation Provision—The convention must secure the protection of some orbital regions because of their scientific and economical importance: the Low Earth Orbit ranging from 200 km to 2000 km altitude, and the Geostationary Earth Orbit between 33000 and 36000 km altitude.

Space debris pollution problem is giving a negative effect on, space tourism, space commerce, the exploration of space, the use of raw materials from space and celestial bodies like moon and mars. A new space debris convention is thus *sine qua non* for fearless exploitation of space now.

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CURRENT DEVELOPMENTS IN SPACE TOURISM: SPACE TOURISM—'A TOOL TO BREAK THE EXISTING SHACKELS'

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Abstract

In today's times, there is an increasing scope for space tourism which would help us overcome and connect us in a better way to the seemingly attractive Space World. However, the roles of governmental organizations here play a vital role in exploring this untouched avenue.

Despite having used some billions to develop space technology, government space agencies have not reduced the cost of space travel from what it was when Yuri Gagarin first flew to orbit in 1961. However, private activities aimed at realizing space tourism have recently demonstrated the prospect of achieving sub-orbital space flights at less than 1% the cost of comparable flights performed by NASA in 1961. The escalation of sub-orbital tourism could lead on to orbital tourism services, for which there is known to be very large potential demand. The growth of a large space tourism industry will be very beneficial both for the space industry which is shrinking for lack of demand, and for the world economy as a whole at a time when unemployment is at historically high levels due to lack of new industries.

In this proposal, authors have tried to focus on the unexplored and majorly-hyped avenue of Space Tourism. Moreover, through this paper the writers have tried their best to enlighten the reader with their varied interest in the field of Space Law. Furthermore, the authors have also tried to throw a light upon the Recent Developments in the field of Space Tourism.

Introduction

The feasibility of space tourism depends centrally on the cost of traveling to and from space. This has remained extremely high through more than 40 years of human space activities, thereby preventing space tourism services from developing. It is widely believed that this high cost is an inherent problem of space flight - the need to accelerate to 8 km/second in a vehicle of which the structure is light enough to carry a large mass of propellants but sufficiently strong to withstand high aerodynamic pressures and re-entry heating. However, recent events have clarified that the current high cost of reaching low Earth orbit is not an unavoidable physical necessity, but is

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largely due to the dominant role in launch activities played by near-monopoly government space agencies over several decades. Although this may seem surprising or improbable to those unfamiliar with the case, it is merely a rather extreme example of the well-understood tendency of monopolies to raise costs and suppress innovation, and it is predicted by the economic theory of bureaucratic organizations.[1]

To date, OECD countries' space agencies - Nasa, Esa, Jaxa and national agencies in Europe - have spent approximately $1 trillion (measured in current dollars) on nominally civilian space activities, much of it to develop equipment and technologies used in these activities. However, despite this enormous expenditure, when Dennis Tito? became the first person to pay for a flight to space in April 2001, he flew on a Soyuz rocket, developed during the 1950s, because this is the cheapest and safest vehicle available. It is also essentially the same rocket that carried Yuri Gagarin 40 years earlier.

This simple fact shows that the cost of travel to and from space today remains the same as it was in 1961, despite OECD countries' space agencies having spent $1 trillion of taxpayers' money. The only plausible explanation is that these space agencies have not been trying to reduce the cost of travel to space. When one considers the "tidal wave" of new technology that has been developed since 1961 - from wide-body airliners to microcomputers, new materials to satellite navigation, the World Wide Web to mobile telephone networks, supercomputers to nanotechnology - it is obvious that there must be enormous potential to reduce the cost of reaching Earth orbit below the cost in 1961- probably by several orders of magnitude.

Fortunately, concrete proof of this possibility is starting to become available. Scaled Composites Inc's "SpaceShipOne" and other passenger vehicles under development by private companies are showing that the cost of making a short sub-orbital space flight today can be as low as 0.1% of the cost of Alan Shepard's sub-orbital flight in 1961. This implies that the potential for reduction of launch costs by applying some of the many new technological capabilities developed since 1961 is fully three factors of ten below today's expendable and partly expendable vehicles developed and operated by government space agencies. The key flaw in the organisational design of space agencies is that they provide no services to the general public, and so do not experience the continual pressure that keep more successful government organisations' activities reasonably efficient, as described in [2]. Hence they are prone to diverge from contributing to economic growth and to give priority instead to political objectives.

(It is worth noting that the US government's partly reusable "space shuttle" was not designed to carry passengers to orbit at low cost but to carry large military payloads following military specifications. Its nominal cost per passenger is therefore of very little relevance for estimating the cost of carrying passengers in a dedicated vehicle - comparable to the several factors of ten difference in cost per passenger between a Boeing 777 and a B52.)

Thus it seems clear that, from the technical point of view, orbital passenger transportation services are feasible at much lower cost than the $10 million/person cost of Soyuz. However, government space agencies and their political overseers have not to date considered it to be in their interests to develop the necessary vehicles; their primary focus has been "technology development" and (on a much smaller scale) scientific research. This might be judged a reasonable use of taxpayers' funds, except that OECD government space agencies also have statutory responsibility for commercialisation; for example, Nasa is required by US federal law to "..encourage to the maximum extent possible the fullest commercial use of space".[2] The public and media largely believe that they are doing this - but space agencies have emphatically not fulfilled their responsibility to date: turnover of commercial space activities is about 1/50 of the scale it would be if the $1 trillion used to date had been invested in normal commercially successful activities. Indeed, space industry employment has been shrinking due to the very limited demand for satellites launched by expendable rockets, which are the only significant commercial product to have resulted from space agencies' enormous expenditure. Other than telecommunications and broadcasting, space agencies have also made very large investments in remote-sensing satellite systems on the grounds of their being "commercial". However, the commercial interest in this services has been far too small to justify the huge investment to date, and the main users are governments themselves, and particularly military services.[3] Moreover, aerospace companies are moving operations to lower-cost countries which are rapidly improving their technological capabilities.

Despite this very poor result of space agencies' nominal encouragement of commercial uses of space, they have performed almost no research on space tourism - certainly none commensurate with its apparent economic potential, as confirmed in Nasa's own very positive report on the subject,[4] and as revealed by independent research discussed below. Even if the probability of success was estimated to be as low as 1/1,000, a substantial budget should be devoted to related research from space agencies' annual expenditure of nearly $20 billion on non-science, "space development" activities.

In this context it is important to recognise that little research and development or innovation in the entire aerospace industry is privately financed; most aerospace R&D is, either directly or indirectly, government-supported to some extent. Consequently, in the absence of any significant funding by space agencies, companies and investors are understandably reluctant to invest in developing passenger space vehicles which face technological and regulatory risks in addition to normal business risks (market, financial, management and others). In the absence of investment to develop this new field, the space industry is stagnating, with employment falling markedly in recent years.

CHAPTER I

A BRIEF VIEW ON SUB-ORBITAL BREAKTHROUGH

Fortunately a sub-orbital passenger vehicle can be developed at much lower cost than an orbital vehicle, with far lower technical risk, due to the far smaller propulsive energy used - just 1-2% of an equivalent orbital vehicle - and so proportionately smaller re-entry heating and stress. (For this reason there is no need for fragile ceramic tiles for thermal protection; ordinary aerospace metals can be used; and vehicles can be re-flown repeatedly like aircraft.) Consequently such a project is within the means of private investors, and recently a number of groups are coming close to success. Most notably, on the 100th anniversary of the Wright Brothers' first flight, the rocket-powered "SpaceShipOne" performed the first ever privately-funded supersonic flight, reaching Mach 1.2 during a 60o climb. It is hoped that it and other sub-orbital vehicles will reach space during 2004.

The activities of companies developing low-cost, sub-orbital vehicles will be aided by the emerging competition between would-be commercial "Spaceports", which are becoming increasingly interested in the field of space business that shows the most promising market potential. During the late 1990s it was believed that satellite launch services would grow considerably, and plans for spaceports in several US states focused on this possibility. However, that prospect evaporated with declines in the forecast demand for commercial satellite launches, and managers of several spaceports are refocusing their efforts to concentrate on passenger launch services, starting with sub-orbital flights.

Companies developing sub-orbital passenger vehicles should benefit from growing competition between spaceports in different states and regions. Just as airports compete to provide attractive services to airlines, passengers and the many related businesses that contribute to serving more than 1 billion air travellers/year, prospective spaceports will play a key role in turning the potentially large demand for space flights into a safe, profitable, growing, international business activity with excellent world-wide growth prospects. Over the next few years spaceports will be able to differentiate themselves by providing a friendly government interface to support the growth of "spaceline" operations, as well as many ancillary and related activities, including personnel training and certification, insurance, marketing, and even related entertainment services such as Visitor Centres and spaceflight simulations.

Once sub-orbital space flight services are in successful operation - popular, profitable and growing - investors will have a base on which to develop more ambitious plans. In particular, once a team of experienced engineers proposes a credible orbital passenger vehicle we can expect a consortium of investors, which may include both private and public sector organisations from several countries, to support it. Taking the position that passenger space flight is the concern of private industry alone is not only contrary to space agencies' actual responsibility

for commercial development of space, but would represent a double-standard, whereby governments spend some $20 billion/year on space agencies' activities that earn a return of some minus 100%, while refusing to aid the development of activities that have much better commercial prospects. That is, government support in some appropriate form is economically better justified than its support for most space agency activities.

Orbital Tourism

To date, the two most detailed proposals for developing orbital tourism are the Japanese Rocket Society's study of the VTOL SSTO" Kankoh-maru"[5] and Bristol Spaceplanes' plans for the HTOL TSTO "Spacebus",[6] both of which featured on Nasa's web-site for several years (when searched for "space tourism"). Once such orbital passenger vehicles are in operation the prospects for further growth of space tourism services will be excellent, due to the very large unsatisfied demand revealed by market research.[7] From a certain stage, investment in orbital tourism services can be expected to grow rapidly to exploit the large number of new business opportunities that will arise - lack of which today is the main cause of the record unemployment around the world.

Government's Role In Promoting Orbital Tourism

Governments' role in the development of space tourism remains to be seen. If governments' activities are appropriately targeted, it will be possible for them to play a very constructive role, considerably accelerating its development, to the great economic benefit of taxpayers. It is very unfortunate that, due to their history and institutional structure, space agencies cannot now encourage the development of space tourism without facing a deep conflict of interest. That is, having resisted the development of passenger travel for decades, the successful development of space tourism services would be humiliating. On the contrary, difficulties, cost over-runs, delays and even accidents in the early stages of tourist space flights would be seen as vindicating space agencies' negative stance to date. It is clear that organisations which have this interest can not be relied upon to develop space tourism as quickly and as well as possible. Consequently it seems likely that aviation organisations, which have far greater experience and expertise in aerospace passenger transportation, will make greater contributions than space agencies - as indicated by the *FAA*'s greater support for the subject than Nasa's.

Recently Apollo scientist-astronaut Harrison Schmidt has called for Nasa to be abolished and replaced with a new organizational structure which would be populated by managers in their 30s and engineers in their 20s, like Nasa during the Apollo project.[8] Perhaps only re-organisation on this scale - equivalent to a fresh start - could overcome the legacy problems described above. In truth it was misguided for taxpayers to trust that government space agencies' activities would be more economically valuable than simply supplying services which the public want to buy - the true "American way". That this mistake should have been made in the USA is particularly extraordinary.

It has been said that fighting a war makes you become like your enemy, and the cold war seems to have had profoundly damaging effects on the USA. Among other influences, the very concepts of a "space agency" and a "space program" which have been adopted and retained so enthusiastically by government officials in the USA, Europe, Japan and elsewhere, came from the Soviet Union. Bureaucrats and politicians everywhere face the same organisational environment and incentives, and once a government monopoly space agency was set up in the USA it proceeded to act in its own interests - at enormous and continuing cost to US taxpayers, as recently described at length in.[9] This costly waste of more than 3 decades must not be allowed to continue; politicians are therefore needed who will press for appropriate change in this matter.

It would clearly be disastrous for governments to continue to rely for space commercialisation on space agencies as they currently exist, having a clear interest in the continuation of the current failure of commercial development of space. However, although space agencies as currently organised have shown themselves unsuited to generating economic value from space activities, governments have the precedent of their successful role in aiding the growth of civil aviation to guide them. In order for taxpayers to reap the economic benefits of space development, responsibility for commercialisation should be removed from space agencies, which are clearly not suited to commercialisation, and some 10% of their budgets allocated to stimulating civil aviation-like space travel services.

CHAPTER II

THE FUTURE OF SPACE TOURISM MOVEMENT

It is therefore time to recognise that, far from being an eccentric, even misguided "fringe" activity, space travel and tourism should already be the *mainstream* - and it would have been were it not for the enormous economic and social distortions caused by the cold war. But we do not need to be the passive victims of history - particularly of unfortunate episodes such as the cold war which wasted vast quantities of resources, killed millions of people, and seriously distorted the development of the space industry to focus on missiles and expendable launch vehicles developed from them. Initially this accelerated the development of expendable rockets capable of delivering heavy payloads to orbit, and thereby accelerated the first crewed flights to orbit. But as a result civilian space activities based on expendable vehicles became tangled up in cold war politics, and are still dominated by government space agencies' political agendas, rather than generating economic value.

The optimism about space development in the USA during the 1950s and 1960s - recorded in documents such as contemporary issues of aerospace journals and publications of the American Rocket Society (which later even disappeared) - should have led on to passenger space travel services starting in the 1970s. With

the development of rocket-planes during the 1960s, commercial sub-orbital space flights could and should have started even before the end of the Apollo project. It is time to face the fact that fully 30 years have been wasted, and the history of the last 30 years has been terribly distorted from how it could have been. If commercial space travel and related activities had been contributing to the US economy for 30 years already, instead of government-run "civilian" space activities having become a $1 trillion quasi-military burden on taxpayers, the US economy would clearly be in far better shape today. If space had followed the route that aviation, pioneered by the Wright Brothers, followed so successfully through focusing on commercial passenger services, the US lead in space would surely have been maintained, instead of having been diluted to the extent that both Russia and China now have an order-of-magnitude cost-advantage over the USA in space travel.[10]

The growth of what it is now reasonable to call the "Space Tourism Movement" is going to have a hugely beneficial cultural effect, and widen humans' horizons as appropriate for the 21st century. Under its influence, "space development" is going to resume its natural meaning of economic development in space, instead of its present meaning of development of government-selected technology for use in space, generally without economic benefit. And "space age" will have its natural meaning of the era when people go to space - as passengers, customers, employees, operators, managers, tenants - all the roles in life on Earth, instead of just government employees. As such, tourism is going to be not just a small part of future space activity, a small-scale activity dwarfed by government space agency activities - it is going to be the mainstream space activity. It should have been for decades already. It is an extraordinary *and deeply un-American* idea that private citizens traveling to and from space should not be the main activity in space. The idea that government officials know better than the general public how their money should be spent is fundamentally a Soviet one. Of course this idea is very popular among government space agency officials in every country. But after using $1 trillion on government space activities with no commensurate economic benefit to taxpayers, it is high time for the public to insist that this mistaken policy be corrected and their wishes be made central to space development, as they are in aviation.

Cultural Renewal

The European Renaissance was a wave of innovation and cultural revival that swept through Europe, mired for centuries in the "Dark Ages". It was fired and propelled by researchers of the day using Arabic mathematics and science to prove that fundamental ideas that had been taught in Europe for more than a thousand years were wrong, and that new ideas based on the scientific method were truer and more valuable than many of those based on traditional authority. Most famously, Copernicus proved that the Ptolemaic system of Earth-centred astronomy supported by the Christian educational establishment was wrong, thereby deeply undermining its authority and world-view. Galileo's prosecution and imprisonment by the supreme church court in Rome for supporting

Copernicus' views even one hundred years later is testimony to the extreme, self-interested resistance of powerful establishments to such valuable new ideas.

The analogy with the change of "paradigm" that is occurring today regarding space activities is surprisingly close. This case cannot of course match the more than 1,000 years of error in European astronomy; but the equally mistaken ideas that access to space is inevitably extremely expensive and available to only a few government-selected individuals, and that there is little of economic value to be done in space, have held sway *through the entire era since the first space flight*. Only recently, with the growth of the Space Tourism Movement, is the possibility that these ideas might be completely wrong beginning to be widely considered.

In this perspective, the start of sub-orbital space flights at a cost 1/1,000 of that achieved by government space agencies has the historic significance of Copernicus' proof that the Earth orbits the Sun. The increasingly complex theory of "epicycles", that had been developed to try to reconcile the false Earth-centred theory with actual observations, is matched by the increasingly bizarre plans by Nasa and other space agencies to continue spending $20 billion/year on developing massively expensive equipment for "space exploration" *based on expendable* launch vehicles - a technological dead-end unsuited to passenger travel left over from the cold war.

Although these false ideas about space flight have held sway for a much shorter time than the millenium for which Earth-centred cosmology was taught, the economic loss due to space agencies' maintaining high launch costs has arguably been greater due to the much faster rate of technological progress today than during the middle ages. The loss of such valuable business opportunities for fully the last third of the 20th century has resulted in serious distortions in the pattern of industrial development, and contributed greatly to the excess competition seen in most business fields today. Consequently the spreading understanding that the "accepted wisdom" taught for decades by government space agencies is wrong - space travel, like air travel, can be economically available to most of the middle class - has revolutionary importance for the continuation of peaceful economic development of the human race. Specifically it offers the hope of preserving the possibility for all humans to have ever-improving standards of living through the coming century.

This is because it is widely believed in government circles that, in order for the "Haves" in the rich countries to protect their own standards of living it is necessary for them to control the "limited resources of Earth" before they are overwhelmingly outnumbered by the "Have nots" in poorer countries. But this belief, which is so unpromising for world peace, is based on the belief that the resources available to humans are limited, which is based in turn on the two false ideas which we have been taught to believe by government space agencies - namely that access to space is inevitably prohibitively expensive, and that there are few activities of economic value to be performed in space. Once these errors are corrected and the cost of a flight to LEO is brought down to less than

$100,000/person - and then to $20,000 or less, as is expected with the growth of orbital tourism to 1 million passengers/ year [6, 7] - the unlimited resources of the solar system, including particularly energy and the industrial materials needed to use it, will be easily accessible.

Moreover, the rapid growth of orbital tourism services and related aerospace engineering activities will lead to a spreading boom in economies of participating countries. It is well-known that US student enrolments in physics and engineering courses peaked during the Apollo project and have declined steeply since, at great cost in loss of competitiveness of US manufacturing industry. The urgings of successive Nasa administrators and staff have repeatedly failed to reverse that decline; but is there any real doubt that the growth of space tourism - the understanding by young people that they too will be able to travel and work in space - could do so?[11]

The growth of space tourism can also be expected to lead to wider cultural re-invigoration analogous to the Renaissance, because many aspects of the cultural and economic stagnation in the rich countries can be traced to this blockage of the economic growth path that should have been taken. These include unpalatable though inescapable facts such as falling educational standards in the USA (especially in engineering and science) and falling average incomes - with more and more people facing the shocking reality that they will not be able to afford to live in the houses of their childhood.[12] In addition, the growth of space tourism will stimulate the development of what will be literally a new culture in "zero-gravity". As a unique new living environment for humans, this will generate new approaches to all aspects of living - from architecture and interior design, to cookery, clothing, hairstyles and human interaction - but these have not begun yet due to government domination of all space activities.

It is thus not overstatement to talk of a "New Renaissance" - a rebirth of innovation and optimism across all fields of human endeavour, fired by the growth of space tourism which has been pent-up for decades. In view of this potential - which is available to us as soon as we decide to do it - we can see that we are living today at the end of one era and the beginning of another. Historians have described the turbulence that occurs at the turning point between eras, as the clash between opposing world-views makes various forms of political turbulence inevitable. Those who profit from the dying world view try to maintain their grip as its justification becomes increasingly hollow and narrowly self-interested - and they try to prevent advocates of the new world-view from gaining influence and power.

In its full flowering over coming decades, economic growth in space is going to lead the human race to a future of economic expansion that sadly is barely conceivable to those trapped in the "pre-Copernican" viewpoint. However, these people's position is becoming increasingly untenable, as shown most recently by the lack of public support for the US administration's "new space policy" - the very best, most "popular" idea that the last spokesmen of the

dying paradigm could think of - a resumption of visits to the lunar surface by Nasa staff. We are truly witnessing the death throes of the idea that a government monopoly agency should decide what US citizens do in space.

However, we must prepare to repel new errors. These include the recent idea that we cannot look forward to peaceful economic growth in space until terrorism has been conquered and the world has been "pacified". This is the opposite of the truth: it is the lack of sufficient new business opportunities that is leading large corporations from the rich countries to become increasingly brutal and dishonest in their dealings with developing countries and governments, thereby causing growing international friction. The defence of the interests of large corporations has in turn led the governments of the richer countries to take deeply hypocritical positions on more and more issues, which are increasingly apparent to those in poorer countries, and undermine any moral authority the more developed countries might otherwise have had.

In this delicate situation, the growth of a major new axis of business development in space will greatly expand the arena of business activities (including particularly for the aerospace industry, which is still proportionately larger in richer countries), and thereby help to alleviate the excess competition in existing fields of business which is having increasingly damaging effects world-wide. The opening of hugely wider fields for business growth will permit the flowering once again of the best of capitalism rather than the worst, of the admirable "can do" culture of innovative, ambitious, independent businesses rather than the monopolistic practices, government subsidy, large-scale fraud and financial instability seen increasingly in recent years. In an earlier era Cooperative and Quaker companies famously proved that honesty and treating workers fairly is not incompatible with capitalist vigour and profitability - but they cannot survive unfair competition from companies benefiting from government collusion and other contemporary business practices.

The flowering of space tourism will also prove wrong those who argue that humans are "running out of work". The world-wide crisis of unemployment, with the highest levels of unemployment experienced since the 1930s in Japan, Europe and the USA, as well as in many poorer countries, is said to be inevitable due to ever-increasing productivity reducing the demand for labour. In near-Earth space, which is readily economically accessible through the development of passenger space vehicles, there is limitless scope for economic growth through development of new services for which there is strong commercial demand from those with middle-class incomes and higher. This is obviously an infinitely more attractive prospect than the "solution" to the unemployment of the 1930s - except to those who profit from war. Their interests must not be permitted to prevent the start of humans' peaceful economic expansion through the solar system, but in order to achieve this, their mistaken world-view must be corrected.

Ultimately, by reducing the cost of space activities, the development of space travel will lead to the permanent and progressive expansion of human culture into

space. In doing so it will enable the realisation of the vision which inspired so many great space pioneers in many countries, many of whom could have had the opportunity to visit space themselves if governments had given priority to supporting passenger space travel, as they did earlier to supporting passenger air travel: visionary writers such as Heinlein, Anderson, Brunner and Roddenberry; rocket engineers such as Goddard, Korolev, Braun, Hunter, Cleaver, and many others.

The Space Tourism Movement is becoming unstoppable, and through realising the limitless scope for growth and innovation in space travel offerings it is going to show the way to a brighter future for the human race than the "race to the bottom" under way today as international corporations compete in over-supplied markets to reduce costs by any means, leading collectively to falling standards of living.[13] In democracies, governments' role is to manage the legal system as required to achieve overall social benefits that competition between companies can not achieve. For example, companies have an endless interest in reducing wages; but if they impoverish the population they stifle economic growth. Thus governments must be able to resist short-term commercial interests. But this very ability is greatly weakened by the present high levels of unemployment, giving large corporations greater leverage over governments, which they use to further their own interests, including blocking needed innovation. The opening of wide new fields for business expansion in space offers an alternative to this vicious circle of stagnation. Maximising the benefits of this opportunity depends on the public in many countries compelling their governments to make the institutional changes needed to overcome the decades-long stagnation of space activities maintained by the space agencies and their clients who profit from present arrangements.

Humans have outgrown the Earth. The truth is that we outgrew it several decades ago. It is time to correct the accident of history that led to governments subsidising expendable launch vehicles for generations, and thereby deceiving both themselves and the public into believing the myth that space is a barrier rather than a sea of opportunity. Over-turning this myth has taken a long time, but with the rapidly improving prospects for the start of sub-orbital passenger space flight operations from newly-developed commercial spaceports, we are near to a break-through—to the realisation that Earth is not a prison growing increasingly crowded, but the cradle of a space-faring species. All that is delaying this development which will so benefit the world, is lack of imagination and leadership - and these the Space Tourism Movement can supply in full measure.

Conclusion

Legal aspects and regulatory framework

The challenges for space tourism are not only technical ones. Especially in the European context, there are important aspects to be addressed from a legal standpoint. Space tourism will be carried out substantially in the airspace of a given country and therefore, it will be subject to the local legal framework—

which might be different from country to country. It is therefore essential that the civil aviation regulatory authorities of the countries concerned and the competent agencies of the European Union are at the forefront of the setting up of a regulatory framework for space tourism adapted to the European scenario. ESA must also consider other legal matters. Space tourism will certainly have a significant influence on aerospace industry, in view of the opportunities it may create, but also of the competition it may foster. In order to support the emergence of new European capabilities without distorting such competition, ESA should carefully define the boundaries of any space tourism support activities in line with the ESA.

Convention. Finally, since in the longer term space tourism should involve traveling in space, some rules of space law may also find application for space tourism; in particular, the notion of ' launching state(s)', through its administrative national agency designated for carrying out space activities, will have a role to play in exercising jurisdiction and control over that activity.

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COMMERCIALIZATION OF SPACE: EMERGING LEGAL ISSUES

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Introduction

"There are some who question the relevance of space activities in a developing nation. To us, there is no ambiguity of purpose. We must be second to none in the application of advanced technologies to the real problems of man and society."

—Dr. Vikram Sarabhai

The vision of Sarabhai was the vision of the country when we started the space research and technological developments in space in India, today we have no doubts or questions as such in mind which can be raised on the relevance of space activities rather man is preceding towards commercialization of space and space technology.[1]

Inaugurating a two-day national seminar on "Access to Justice", organised by the Supreme Court Advocates on Record Association in association with the United Nations Development Programme, Dr. Kalam said that we have laws of the sea, air and environment and intellectual property and cyber laws would get a new shape. However, he emphasised that there is a need of law for protection of Indian space above 30 km altitude as the international law on space may not be sufficient. The geo-synchronous orbit has become a competitive business orbit (above 38,000 km.). When we look at the Space Vision 2025 statement given by Prime Minister Manmohan Singh, he said "it should reflect how the country could more effectively harness space technology for development. Exploring new frontiers of space technology aimed at low-cost access to space, development of heavy lift boosters to launch heavier satellites, realising high power and high bandwidth communication satellites and remote sensing satellites with all-weather capacity are some of the challenges."[2] As an idea or a concept it sounds fascinating 'commercialization of space and space activities' though it has many positive aspects attributed to it, this can also lead to technological disasters with uncertain legal implications as laws and regulations in space are next to none. Unclear without precedents and being a part of international law these laws boil down to moral obligations.

Man has explored space in a very short span of time. But, when it comes to space, it is an area of law where law still lags behind. Space being a common heritage of the mankind needs more cooperation and understanding between

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developed, developing and least developed nations. However the space vogue has not been very old but problems are apparent, and this can also not be refuted that few problems are yet to come up. As developed nations started exploration early, they have an upper hand and an equally bigger contribution to these problems. Problems vary from space debris to rapidly filling orbits, but a major threat is of lack of responsibility of attributing liability to those who are responsible for these threats which result in loss of life, limb and property.

Issues related to launch services, satellite navigational services and intellectual property rights, transfer of technology and national security are apparent as concerns today. This research article highlights the vacuum in legal regime when it comes to space commercialization, and commercialization of services provided for space exploration. This article also highlights the issues and problems of implementation of the space treaties between nations and against corporate entities. Towards the end of this article it is emphasized that with the help of an appropriate national regime and multilateral treaties, India can help the whole world in the development of space law which would also result in encouraging the balanced and sustainable development to tap the potential of space commerce and industry in India.

Developments in space and India

Man started exploring space during mid twentieth century. Within last fifty years, great changes have been brought to world and society due to uses of spacecraft for various purposes like communication, direct broadcast, television, earth resources monitoring, earth observation for peaceful uses as also for self defence. Besides, space exploration has opened a new means to explore the cosmic frontier, as also the Moon, Mars, Black Holes, and life in other planets and cosmic frontiers. There has been tremendous impact on global society due to rapid changes in time factor, as also in integrating knowledge through the internet.[3]

The entire planning process of global environment has been given a new look by space exploration. Moreover, there is a knowledge revolution flowing from an integrated approach to all disciplines of law and science. The world society is more integrated like one family. The predominant concern is to find out an ecological approach to the use of space science and space law to keep the planet earth in a healthy and steady state.[4]

The Indian space programme started about half a century ago with the explicit mandate to promote the development and application of space technology for the socio-economic benefit of the nation. India launched its first rocket in 1963, under the visionary eye of Dr. Vikram Sarabhai. Over the past four decades, under the successive leadership of Professor Satish Dhawan, Professor U.R. Rao and Dr. Kasturirangan, Sarabhai's original vision has crystallized into a series of missions, with varying success. The Indian Space Research Organization (ISRO) has built communication satellites, remote sensing satellites and launch vehicles. India is now one of the seven nations in the world

to have satellite-launching capability.[5] Today, it has gone beyond that mandate to the point as India has become one of the major space powers in the world, particularly after the successful launch of Chandrayaan-I lunar mission.[6] Moreover, the Indian space sector is being opened up for private participation and has begun commercializing certain technologies and services internationally. In India the privatisation and commercialization of space technologies make it imperative for the government to legislate national space law(s).

Indian Space Research Organisation[7] has picked up the language of business with the increasing global pressure and competition in the space domain. Scientists have been burning the mid night oil to get their (ISROs) teeth into the commercialization of space services. On April 18, 2001 the much-awaited GSLV (Geosynchronous Satellite Launch Vehicle) took off from Sriharikota (Andhra Pradesh), using a Russian cryogenic stage. GSLV marks the end of India's dependence on others for launching its communication satellites. The first launch was an overall success despite the velocity problems that put its cargo GSAT (Global Satellite) into a slightly incorrect orbit. In 1999 ISRO launched PSLV (Polar Satellite Launch Vehicle) C2, which carried an Indian oceanographic satellite but also put South Korean and German satellites into polar orbit. Last year, PSLV C3 placed two foreign satellites (German and Belgian) into orbit.[8]

India's commercial launch program, development goes back to 1982, still has much to prove. India is yet to handle a major commercial payload. The foreign satellites carried on both flights weighed less than one-tenth of the Indian satellite on board. Real commercial success will come when the primary payload is a non-Indian entity, and to this end, ISRO has set up the *Antrix Corporation*.[9]

'*Antrix Corporation*' is the marketing arm of ISRO. *Antrix*, drawing upon the heritage of the Indian Space Programme and ISRO's vast experience and proven scientific talent, markets data from Indian Remote Sensing satellites, undertakes turnkey contracts for building satellites and ground systems to user specifications, offers subsystems and components for satellites, provides launch services & mission support services, leases transponder capacity and provides training and consultancy in space related technologies.[10] Today *Antrix Corporation* offers services like Mission Planning and development, Launch and Early Orbit Phase (LEOP) Support including on orbit operation service, Transfer Orbit Support Services (TOSS) Telemetry, Tracking and Command Support for LEOP in S and C bands and on orbit TTC services in Extended C and Ku band support for GEO missions In Orbit Test (IOT) Service for Bus Systems and Payload Characteristics, Network Operation and Control, Round the clock spacecraft health monitoring.[11]

India has launched sixteen consecutive successful flight of PSLV most recent being CARTOSAT - 2B launched from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota. It was launched from one of the India's Polar Satellite Launch Vehicle (PSLV-C15).[12] Developments in the space exploration India have taken place at a rapid rate as can be observed from the above brief given by the

researcher. Thus, in a very small time India has come up with a successful lunar mission plans, not only this but it is also started providing services to other countries. This has given rise to concerns with respect to the developments in law and implementation issues borne out of these changes.

India: Laws of Space

India has space co-operative agreements with countries like USSR on Thumba Equatorial Rocket Launching Station, German Aerospace Centre, National Institute of Aeronautics and Space etc. In India, the matters related to space activities are dealt by the Space Commission which works for the development and application of space technology, along with drafting of policies and guidelines for the research institutes. These agreements enable India in furtherance of better research and facilitate technological advancement and aids. Today India coming at par with the other space agencies around the globe and India constantly learn from their policies and methods of research and development. The ambitions of the Indian space agencies can be realized from its first unmanned scientific mission to moon Chandrayaan-I. Issues related to space till date under the Concurrent List in the VIIth Schedule of the Constitution of India but for fast and bold development we need to put it under direct control of central government under the Union List.[13]

There is no special legislation in India dealing with outer space issues. We are still dependent on our constitution to solve problems related to space industry.[14] As space is common heritage of mankind, it sneaks in the blanket of international Law and under the Constitution of India few Articles are mentioned in the foster respect for International Law such as, Article 51 of the Constitution imposes on the state, the obligation to strive for the promotion of international peace and security, including maintaining just and honourable relations between nations, respect for international law and treaty obligations, and settlement of international disputes by arbitration.[15] Moreover, under Article 73 the executive power of the Union extends (a) to the matters with respect to which Parliament has power to make laws, and (b) to the exercise of such rights, authority and jurisdiction as are exercisable by the government of India by virtue of any treaty or agreement.[16] Lack of law acts as a disability in the path of peaceful and predictable growth of technology for space exploration. It is not only threat to property, and life but also to the faith of the common masses in the well established system of justice. Without these laws there also exists a possibility where there can be conflict of jurisdiction as in US. There exists jurisdictional conflict involving NASA (National Aeronautics and Space Administration), FAA (Federal Aviation Administration) and other agencies within the Department of Transportation, the Dept. of Commerce, the Dept. of Defence, the FCC (Federal Communications Commission) and other federal agencies.[17] Despite the jurisdictional conflicts, the statutes on space activities provide a legal character to the space programs and the guidelines and procedures for licensing ensures equal opportunity and transparency in

operations. India needs to critically and objectively study the provisions contained in the space laws of other countries.[18]

India needs a codified space law which shall enable and include provisions for[19]:

(i) Peaceful use of outer space for the benefit of all mankind and aimed at welfare and security of India.

(ii) Promoting orderly and organized growth of space business by providing recognition and legitimacy to ongoing space programs.

(iii) Providing opportunity to potential space operators, domestic and international.

(iv) Procedure for adoption and implementation of space programmes.

(v) Promoting development of indigenous technology matching international standards.

(vi) Providing mechanism for enforcement and prevention of misuse of space activities.

(vii) Providing strict action against violators of law with penalties.

(viii) The procedures related to licensing and registration etc. must be made stringent.

(ix) Indian Space laws must be in consonance with the space treaties and space laws of other nations and may adopt their provisions considering the nation's compatibility and adaptability.

(x) Must imbibe basic international legal principles such as non-appropriation of outer space by any country, arms control, the freedom of exploration, liability for damage caused by space objects, the safety and rescue of spacecraft, astronaut's scientific investigation, contamination issues, the exploration of natural resources in outer space and settlement of disputes etc.

(xi) Provide for aeronautical and space functions to be controlled by civilian agency.

(xii) Promote commercial use of space.

(xiii) Protection of property rights in inventions.

(xiv) Environment safety and liability.

(xv) Promoting international cooperation for public safety and space related businesses.

(xvi) Promotion and management of autonomous educational institutions of international standards for nurturing space professionals.

(xvii) Providing co-operation with defence machinery.

(xviii) By adopting few provisions from The Chicago Convention of 1944 such as issues related to national sovereignty over air space can be incorporated.

(xix) The rules applicable for high seas can be imbibed by the international law and be made applicable to the laws governing outer space.

(xx) Governing the use of remote sensing .

Concluding Remarks

"Remember, the space settlement dream was born in you so that you would strive for its fulfilment in this generation, not defer it to the next. It was, and is, a call to you to take some action in this lifetime; and if you are not meant to see it through to completion, then you must at least lay a foundation on which those who will follow can build."[20]

—Steven Wolfe

In India till date, there is no specific legislation or law dealing with space or space related activities in India. However, it is very essential for maintaining the position in the international arena and to become one amongst the leading nations in the space activities to have a clear and comprehensive law on the subject. Every individual and his nation will have to share the domain of space. No one can claim sovereignty over area which lies in the possession of one and all. A well-defined space law shall enable better capitalization and optimization of existing infrastructure and resources.[21]

The specific legislation which we need to enact must be capable of handling the issue of responsibility and liability of state vis-a-vis private entities working in the state it must also include key provisions for peaceful use of outer space for the benefit of all mankind worldwide and aimed at welfare and security of India. It must provide for aeronautical and space activities to be controlled by a civilian agency except those associated for development of weapons systems, military operations, or the defence of India. Most importantly it should provide for licensing norms for space entrepreneurs associated with various commercial activities and applications so that the issues that arise at the time of liability are already settled beforehand.

Participation of non state actors in the development of space technology and space exploration has generated an immediate need for enactment of a legislation for making its activities more focused and resourceful. Space has become a place that is increasingly used by a host of nations, consortia, businesses, and entrepreneurs. The business of space operates beyond the sovereignty of national borders. Efficiently drafted law will help in growth and development of the nation thereby leading to its progress and economic stability.

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SPACE TOURISM—LEGAL ISSUES AND CHALLENGES WITH SPECIAL REFERENCE TO INDIA

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Abstract

Space is the final frontier to everybody. So when it is used for tourism purposes, the whole dimension is different. Here legal aspects regarding space tourism are the only focus of discussion. The main question naturally arises whether the existing Space Laws are sufficient for future space tourism activities.

Also this paper deals with the issue of authorization and supervision of the space tourists. Another issue is the registration of the aircraft/space object carrying the tourist, jurisdiction of the state and control over the same. The most controversial aspect as regards space tourism is the passenger liability and more specifically, third party liability.

As regards the future of space tourism in India, it is still an emerging area. The interest in space is on the rise especially after the successful launch of Chandrayan—I in 2008. In conclusion, there is a need for a comprehensive as well as exhaustive Indian legal framework.

Introduction

Space tourism is an excellent starting point for other private space endeavors. As a means of entertainment, it has the potential to bring in investors and enthusiasts, create immediate profit, and lay the groundwork for greater research and funding in other space applications. There can be no doubt that the prospect of commercial space tourism flights has captured widespread imagination. The public perception of commercial space travel has changed from mere fantasy to a possibility and will soon be a reality.

Requirement of Law

It is assumed that when the space tourism industry finally takes off there will be legal issues that will need to be addressed first. The disclaimers and releases will need to be signed by participants deciding to hurl themselves into space. But, there is also a question of law in outer space, such as if someone breaks the law or is thought to have broken the law and also as to dispute settlement mechanism. All these legal issues will have to be addressed for the space tourism industry as well. For instance, if an Indian spacecraft is passing over Pakistan when an alleged crime occurs, whose jurisdiction is it? If a space plane collides with a satellite, then who has the right of way? Since space tourism is such a new endeavor, these legal queries regarding the proliferation of human

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being in space have not yet been worked out. But, they will need to be worked out since the space tourism is set to commence in a couple of short years.[1] Even the competition between two companies starts.[2]

Space Tourism –Basic Concept

"Space tourism" has been defined as "any commercial activity offering customers direct or indirect experience with space travel".[3] The official definition of tourism offered by the World Tourist Organization (WTO) and the U.N. Statistical Committee in 1994 reads thus, "The activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure...." [4]

Tourism, hence, requires the availability of three distinct elements:

(1) a discretionary income available for leisure travel;

(2) ample leisure time to spend on both preparations for and taking the trips themselves; and

(3) An infrastructure supporting tourism that offers accommodations, food and amenities, transportation systems, and attractions to see and do at the place visited.[5]

Different Stages Involved in Space Tourism

One of the main aspects of space tourism is transportation, which means transportation to outer space and back as well, and, transportation within outer space. So, there are different approaches of space tourism with different stages and therefore with different legal implications.

1. Earth's Surface

Space tourism starts and ends on earth's surface. So mainly domestic law rules this part of space tourism. Thus, there are some exemptions by international space law that interfere. For example continuous supervision of non-governmental activities in outer space by states, obligation for the launching state to register space objects and to inform the Secretary General of the United Nations etc.

2. Airspace

Since space tourism of course does not restrict itself to the earth's surface, the next region touched is airspace. Airspace is basically subject to state's territory and sovereignty. In respect of space objects, this rule is limited and an international right of passage is out of question. This is justified considering that airspace is just a necessary stage to get into or back from the next region, outer space.

3. Residence in orbit – ISS

One project of space tourism plans to establish a hotel-module linked to the International Space Station[6] (ISS). The questions of jurisdiction have to be

regarded under the viewpoint of the ISS-Agreement (International Government Agreement on the Space Station), which basically follows the link-up-principle. Liability in respect of the ISS-Agreement could be a contractor or subcontractor of a Partner State, a user or customer of a Partner State, and a contractor or subcontractor of a user or customer of a Partner State. The Partner States are enabled to exclude by domestic law the applicability of the Liability Convention[7] concerning the ISS with effect against third parties.

4. Outer Space

A significant provision is Art. VIII of the Outer Space Treaty, 1967[8] that says a state party to the treaty on whose registry an object launched into outer space is carried, shall retain jurisdiction and control over such object, and over any personnel thereof while in outer space or on a celestial body. Here, State and private interests are affected as well. It is quite clear that this provision means that national law, and consequently principles of inherent private international law, is applicable on space objects.

5. Residence on Celestial Bodies

This stage is mainly regulated by the Moon Agreement[9] (1979). Additional provisions can be found in the Outer Space Treaty, but these are rather broad and imprecise. Without a doubt the basic rules of space law, like the freedom-principle and the common-heritage-principle, are fully applicable. An additional aspect is of the ecological and ethical kind, because permanent bases or colonies on celestial bodies will have to deal with weather-conditions that are rather different from earth. The aspect of terraforming[10] to establish an earth-like atmosphere and environment on a celestial body - is apart from technical difficulties less of a legal problem, but merely an ethical question.

Issue of Authorization and Supervision in Space Tourism

Authorization of space tourism activities is granted by national authorities in accordance with the relevant legal provisions of air and space law. In some instances, air law will likely be applicable to the aircraft and the attached space vehicle prior to separation if an air launch is undertaken.[11] In contrast, space law may be applicable to the separated suborbital vehicle using rocket propulsion for thrust, as well as to the two space objects used when a space capsule is launched by a rocket. Under both international and national air law, an aircraft will require authorization. Since air law contains comprehensive and detailed regulations, authorization in this context does not raise further difficulties. The same cannot be said for space law.

After separation, the suborbital vehicle will require authorization according to international and national space law. If the space tourism activities are conducted by means of a space capsule launched by a rocket, authorization will also be required for both vehicles involved.

By virtue of Article VI[12] of the Outer Space Treaty, states are obligated to authorize and to continuously supervise their national space activities. This obligation can best be complied with by enacting national space legislation, preferably with a licensing regime for private activities in outer space, including certification of space vehicles. For instance, example of national laws that regulate licensing requirements for space activities can be found in Australia, Europe, Germany, Russia, and the U.S.[13] At this point, national space legislation often lacks specific regulations concerning space tourists. However, the U.S. recently set an example for such specific regulation with its Commercial Space Launch Amendment Act of 2004. The amended Section 701 of Title 49 to the United States Code contains explicit reference to "space flight participants," enabling additional license requirements "for a launch vehicle carrying a human being for compensation..."[14]

The most significant requirements for the licensing of any space activity carrying space flight participants include the following[15]:

(1) Written information on the obligations of the licensee towards the space flight participant,

(2) Written informed consent by the space flight participant,

(3) Physical examination,

(4) Training, and

(5) Security requirements.

Regarding authorization of space flights including space tourists, it can be summarized that international space law does not have specific regulations. Moreover, most national space legislation also fails to provide specific regulations; the recent U.S. regulations provide some minimum requirements and take into account the increasing prevalence of space tourism activities.

The Registration of the Aircrafts/ Space Objects Carrying Tourists

The aircraft used in an air launch, as well as the space vehicle prior to separation, would need to be registered according to air law. In contrast, the space vehicle used in an air launch, as well as both space objects used when a space capsule is launched by a rocket, must be registered according to space law. Specifically, registration must be pursuant to the Registration Convention[16] and national space laws. However, the Registration Convention does have deficiencies in light of a marked decrease in the registration of space objects.[17]

Accordingly, the UNCOPUOS (UN Committee on the Peaceful Uses of Outer Space) Working Group on the Practice of States and International Organizations in Registering Space Objects has considered altering the Registration Convention to make it more effective in registering space objects. Its objective is to "encourage States to adhere to the Registration Convention, improve the application and enhance the effectiveness of the Convention and

assist in developing and strengthening national legislative norms relating to the registration of objects launched into outer space."[18]

With increased space tourism activities occurring on more of a regular basis, classification of space vehicles used as space objects would certainly necessitate the effectiveness of the Registration Convention.[19]

Legal Status of Space Tourists

The main question is whether the passengers can be considered astronauts, or whether they should be granted a status similar to that of astronauts. This could have a considerable impact on passenger rights and obligations.[20] The terms "astronauts,"[21] "personnel of a spacecraft,"[22] and "envoy of mankind,"[23] have not yet been defined in international space law. As has been observed, they bear different connotations: "astronaut" has a more explorative or scientific meaning, "personnel" has a more functional meaning, and "envoy of mankind" has a more humane meaning.

Thus, the main implications of the status of an astronaut are obligations in case of emergency, which are further specified in the Rescue Agreement[24]. According to the Rescue Agreement, such obligations apply more generally to "personnel of a spacecraft." Moreover, Article V of the Outer Space Treaty confers to astronauts the status of "envoy of mankind." This seems to be of rather symbolic value. The preparatory works in UNCOPUOS suggest that states did not assume that any specific legal rights or duties would result from the status as "envoy of mankind." Article VIII uses the term "personnel." It is clear that Article VIII of the Outer Space Treaty was not intended to exempt passengers from the jurisdiction and control of the state of registry. Thus, a broad interpretation might seem appropriate, including not only persons involved in the operation of the spacecraft, but also passengers'.[25]

Passengers could thus be regarded as "personnel" of a space object, with the consequence that the state of registration could exercise jurisdiction and control over every person on board the space object.[26] If the personnel of a space object visit the space object of another state of registry in outer space, these individuals should come under the jurisdiction and control of the state of registration of the visited space object.

However, the opinion has been expressed that only persons that exercise certain functions with respect to the operation of the space vehicle can be regarded as "personnel". Also, states may not be willing to grant privileges and immunities of personnel to travellers on board a suborbital transport vehicle who do not participate as specialists in a mission or who do not represent their countries for research purposes. The profile of these passengers does not correspond with the image of astronauts that states had in mind when drafting the Rescue Agreement. Furthermore, the relatively short period of time that these persons will spend in outer space can militate against a privileged treatment of passengers. Whether a

suborbital vehicle can be considered a "space object" depends on the profile of the mission. If the space vehicle is intended to reach an altitude which would qualify the object as a "space object," the moment of "launch" was established as the moment of separation. Such interpretation would, however, result in a change in the status of passengers at the time of separation. It is highly desirable to find a solution which would make the persons on board a vehicle subject to the same legal requirements throughout the entire journey.

International space law has not yet reached a level where the legal status of commander, crew, and passengers are sufficiently defined. Some aspects of specific space law, in particular the legal documents relating to the International Space Station (ISS), do indicate a trend toward the clarification of the astronaut's definition and the status of crew and passengers. Explicit reference is made to the various types of persons engaged in space travel. For example, in early 2002, the space agencies participating in the ISS project reached an agreement as to who was allowed on the ISS (the 2002 Agreement).[27] According to the 2002 Agreement, there are two types of crewmembers: "professional astronauts/cosmonauts" and "spaceflight participants". According to the Agreement, a professional astronaut/cosmonaut is an individual who has completed the official selection and has been qualified as such at the space agency of one of the ISS partners and is employed on the staff of the crew office of that agency. Spaceflight participants are individuals (e.g. commercial, scientific and other programs; crewmembers of non-partner space agencies, engineers, scientists, teachers, journalists, filmmakers or tourists) sponsored by one or more partner(s). Normally, this is a temporary assignment that is covered under a short-term contract.[28]

Such crewmembers can be further divided into the categories of expedition or visiting crew members. Expedition crewmembers are the main crew of the ISS and are responsible for implementing the planned activities for an increment. Based on experience to date with visiting vehicles to the ISS, visiting crewmembers travel to and from the ISS, but are not expedition crewmembers. Consequently, the visiting crewmembers do not count as a use of a sponsoring agency's allocation of flight opportunities or crew time on-orbit rights. They may be either professional astronauts/cosmonauts or spaceflight participants. The 2002 Agreement further provides general guidelines for selection, assignment and training of ISS crewmembers and defines certain criteria with regard to the certification of crew flight readiness.

Apart from international space law, national laws could specify the way jurisdiction and control shall be exercised on space objects that are on the national registry.[29] In this respect, it is interesting to refer to the recent U.S. legislation, which also introduces the notion of "space flight participant." The term is defined as "an individual, who is not crew, carried within a launch vehicle or reentry vehicle".[30]

Taking all these aspects into account, it could be argued that passengers participating in space tourism activities should indeed come under the command

of the space flight commander. However, they have only minor functions to fulfill in a space mission, if at all. Whether they are considered as crew or not, their subordinate function in space travel should be clearly reflected in their status.[31]

Passenger Liability and Third Party Liability

In terms of liability, there needs to be a fairer and more inclusive international agreement on liability for damage, greater domestic protections, and more incentives for private enterprises to develop space industry technology.[32] Currently, under the Liability Convention, the launching country is absolutely liable for damage caused by the space activity. The Outer Space Treaty provides that the nation that authorizes or licenses the activity or registers the space object has jurisdiction over the object and is responsible for the activity. Liability for damage by space objects differs from responsibility in that, "the launching State is responsible for launching but not internationally responsible for the conduct of the space object(s) launched by it, when in outer space, unless it concerns a 'national activity' of the launching State". The liability structure should be reformatted to require proportional assignment of liability and authorization, and to take into account privately contracted companies that may have little to do with the launching state, or even the state in which they are incorporated, but contribute to a damaging space object.[33]

Space tourism activities are, if modeled on Space Ship, the law governing liability will likely be determined based on whether the space vehicle is still attached to the aircraft or whether the two objects have separated. When the aircraft is attached to the suborbital vehicle, the relevant air law provisions may be applicable. For example, the Montreal Convention of 1999 and the Rome Convention of 1952 may apply if both parties are Parties to these Conventions. Once separated, space law, such as the Liability Convention of 1972 may apply to the suborbital vehicle using rocket propulsion for thrust.[34] The Liability Convention would also apply to both space objects if the space capsule is launched by a rocket.

Regarding passenger liability for damage occurring while on board the aircraft, the Montreal Convention[35] and its two-tier system of liability might apply. In cases of passenger injury or death, the Montreal Convention provides for unlimited liability of carriers. Limited liability, however, may apply to damages in case of delay if the carrier proves that "all necessary measures" were taken to avoid the damage.[36]

Most importantly, the Liability Convention is effectively an elaboration of Article VII of the Outer Space Treaty[37] and is based on the premise of state liability.[38] As a consequence of this Article and the Liability Convention itself, a state is internationally liable for any damage caused by a space object, regardless of whether it may be owned, operated, launched, or paid for even by a private entity, as long as that state qualifies as "launching state" of the space object concerned.[39]

The Liability Convention, though not referring anywhere explicitly to the concept, only deals with third-party liability.[40] Most clearly, this third-party liability arises from clauses referring to cases involving more than one state in the causation of damage, where only the inter-party distribution of third-party liability was referred to, which depending upon the case was then explicitly or implicitly left for those states to address.[41] Finally, Article VII of the Liability Convention excludes "foreign nationals participating in the launch" from the scope of the Convention in case they suffer damage caused by the space object launched.

The Liability Convention only deals with third-party liability to the extent it is international in character. Article VII specifically excludes claims against a launching state relating to damage suffered by nationals of that launching state; any such claims are considered a matter of relevant national law and not to require any measure of international "harmonization" or treaty-obligations resting upon the state(s) concerned. Two types of liability are then applied by the Convention. On the one hand, when it comes to damage caused on earth or to aircraft in flight, absolute liability applies--that is, the mere establishment of the causal link between the damage and the space object and the identification of the launching state(s) of the latter suffices for liability to arise. Only where the victims have somehow substantially "contributed" to the occurrence of their own damage, for example by ignoring warnings that a satellite might re-enter into a certain airspace and not keeping aircraft out of the area, could the absolute character of the liability be taken away.[42]

For the purpose of the ISS, the United States, Canada, Japan, and eleven member states of the European Space Agency (ESA) had concluded an international treaty in 1988,[43] which was renegotiated following the demise of the Soviet Union to allow the Russian Federation to join, leading to the currently applicable version of the Intergovernmental Agreement (IGA) in 1998.[44] Logically following from the public character of the IGA, the question of any damage sustained in the course of ISS-related activities was regulated principally at the state-to-state level, though with far-reaching flow-down provisions to ensure the space agencies, contractors, and sub-contractors involved under the guidance of the states would abide by the liability regime as well. That liability regime actually provided for a quite far-reaching cross-waiver of liability, as between all the states and their agencies, contractors, sub-contractors, and anyone else involved in the chain of developing, building, launching, and operating the space station.

For understandable reasons, there is no arrangement in the context of ISS activities for something which might be called "personal" liability. Up to this time, all persons having entered outer space were astronauts, cosmonauts, or taikonauts, highly-trained employees of governmental space agencies, whose presence in outer space was primarily or exclusively for professional reasons. This meant that any issues of such persons causing damage and raising questions of liability were dealt with in the context of their professional employment, with any "personal" liability likely being waived absent gross negligence or disregard of orders.[45]

As discussed in the first part of this paper, there are gaps in the international legal system pertaining to Space activities which has to be mitigated by relevant and efficient laws. Even though there is a set of principles governing space activities are in existence, there is no uniform law or principles on space tourism. Being an emerging commercial activity it has to be regulated in the international sphere. The policy should mainly deal with primary aspects such as licensing, authorsation and supervision of space objects, training and licensing of prospective tourists and also most importantly the liability issues. Keeping in mind these issues, the second part of the paper will discuss about the space tourism activities in India

Space Tourism in India

Space activities in India are developing very rapidly. Even though there is a void of space legislation the activities pertaining to the same are effectively organized under the auspices of the Indian Space Research organization (ISRO). The launch of Chandrayan -I is the landmark in the space activities undertaken by India. Space tourism in India has attained a certain degree of excitement and glamour in a very early stage. Quite a number of prospective space travellers have been evincing keen interest on space travel.[46] This is also evidenced by the number of people registered for India's maiden space flight "Virgin Galactic" space flight in the near recent future.

With the space tourism industry gearing up for flight within the next two years, accredited space travel agents are also getting ready to pitch the wonderment to potential space tourists Richard Branson's Virgin Galactic, a global commercial space tourism group, has entered the Indian market with an eye on wooing Indians into space.[47] Virgin Galactic has opened its office in New Delhi and will act as a facilitator for Indians to book tickets to space. The spaceship will be launched at a height 50,000 feet above earth and, on release from the mother ship, will take a vertical trajectory at three times the speed of sound. Carolyn Wincer, head of astronaut sales of Virgin Galactic, told the press that nearly 300 people, including four Indians, have bought tickets to travel on the spaceship. Santhosh George Kulangara, based in the US, is the first Indian who has booked a ticket to space in the first year of the commercial operation of this adventurous venture.[48] Extending good wishes to Virgin Galactic, the statement coming from one of the top officials of Aviation Ministery "I am sure with disposable income increasing among Indians, many will go to space. The adventurous spirit of Indians will get a further boost by venturing into space via commercial spaceships."[49] These availabilities will promote effectively the commercial activities under the space regime in India.

Requirements for Space Tourism Activities in India

There are certain important requirements which a qualified space system should have and it is true for India also. These requirements are essential for

space tourism infrastructure also. The most important requirements[50] a space tourism system have to meet can be summarized as follows:

- The space tourism system has to come up to expectations of space tour participants, namely to the most preferred ones: looking at earth and experience of weightlessness. The vehicle design should therefore provide a sufficient number of windows and sufficient interior space to fly around.
- High inclined orbits are favourable, covering a greater proportion of earth's surface.
- Due to medical restrictions the acceleration level should be kept lower than 3G.
- Although most survey participants prefer longer space trips, it would be recommended to limit the space tour to several hours in accordance to avoid space sickness. There is no general time limit until space sickness will occur, but it has been shown that in the first hours of space flight the space sickness rate is at low levels.
- By reducing flight time, some space tourists may think to get insufficient service for their money. To compensate for this feeling a kind of luxurious space camp should be implemented before each space flight. In providing technical information, health monitoring and professional space training, a space camp will intensify the feeling of becoming a "real astronaut". A great psychological momentum in gaining customer's content.
- In general, appropriate procedures are required to proof health conditions of space tourists. Because of the fact that some tourists will be dismissed from space flight due to medical reasons, it would be recommended to accomplish health inspections very wise, best in connection with a space camp.
- Most important, it would be essential to meet the demand price figures. Considering the market surveys, a sufficient demand will be established at ticket prices of $50,000 or less.

A space tourism vehicle which obviously will meet these requirements has been developed in 1994 by Kawasaki and Fuji Heavy Industries, Japan.[51]

Another important aspect other than infrastructure facility is with respect to licensing and authorization of space objects and human beings properly. The Government should take initiative in proper training of prospective tourists and also awareness programs should be undertaken. Countries like US already have various national policies on authorization and supervision of space objects and human beings. Another important aspect is state liability. With respect to the state level policy in cases of state liability in ISS, the Intergovernmental Agreement adopted by different nations in 1998 sounds effective. To promote the state

activities especially commercial activities in a country like India, membership of such an agreement will be efficient.

The greatest challenge before India is allotting funds for all these above mentioned requirements. In order to meet this challenge an effective and enforceable national space policy should be enacted.

Need for Domestic Regulations in India

The matters related to space activities of the Government of India are under the overall responsibility of the Space Commission (SC), which formulates guidelines and policies to promote the development and application of space science and technology. There is an immediate need for a codified National Space Policy (NSP) for making its activities more focused and resourceful, as space has become a place that is increasingly used by a host of nations, consortia, businesses, and entrepreneurs, and as space business operate beyond the sovereignty of national borders. The NSP should focuses on commercial exploitation of various potential space business activities like: space manufacturing; space resources for space and earth; space business parks; satellite and space transfer services; travel and entertainment (space tourism); R & D in space; space transportation; space infrastructure; space utilities; space solar power; etc.

Based on this national space policy or regulations, the domestic market for space tourism will expand. This will also be supported by insurance industries in India.[52] A detailed project report on the over all aspects of space tourism were prepared.[53]

Conclusion

As private space travel becomes less a dream of the future and more a summer vacation plan, international and domestic law need to evolve to accommodate the requirements of the industry. A consistent remedy available to those injured in space is a necessity. The dangers posed by space debris, almost wholly the result of government space activities, represent a real risk to space flight participants. These participants must have a forum in which to bring claims for loss and the means to hold a responsible party liable. The policy renewal is urgent in other sense also because of the growing danger of unemployment, economic stagnation, climate change, educational and cultural decline, resource wars and loss of civil liberties which the civilization is facing today. In order to achieve the necessary progress there is a particular need for collaboration between those working in the two fields of civil aviation and civil space.

Regarding India, the step first require is to create the consciousness amongst the common people that how space tourism is important not only for tourism but also for our future interest. As because India is not so much economically developed, so the direct space tourism activity cannot be feasible now. But it may come through creating some 'space parks' where the tourist could enjoy the feelings of outer space on earth itself. They will be interested by

this way. Then gradually they will register their name to space flight depending on other factors also. This type initiative will support the whole country in the long run. Finally it is recommended that India requires a separate policy or regulation to promote space tourism.

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INDIA AND OUTER SPACE: INDIA AND MILITARISATION OF OUTER SPACE

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Introduction

Clear delineation and demarcation of boundaries have given rise to competitive tendencies among human beings. Man is basically a warring animal. There is a propensity among individuals to subjugate their counterparts and emerge as the superior. This tendency of human beings gets reflected at the macro level in the form of nations' unquenchable thirst for domination. Along with the development of human ingenuity in all other walks of life, the science and technology of warfare have become greatly changed as a result of which the interrelationship between countries has become much more complicated. The race for superiority has resulted in the amassing of huge amounts of weapons which if used even once can lead to the elimination of life from the earth. The intensity of this process of militarization is so high that it has not only enveloped the earth in its unsavoury clutches but has also extended to the outer space. The nations after establishing their sovereignty on land now are also aiming to control the territory beyond it. Unimpeded access to outer space and unrestricted freedom to use outer space and celestial bodies provides a tempting opportunity for a technologically advanced country to seize control of outer space and deny freedom of use to other countries that stand in its way. A country in possession of unique advanced space technology and with the will and means to use it for military purposes might achieve dominance over non-space faring countries. These reasons have triggered the programme of 'weaponisation' of the outer space. Various countries through their space and satellite programmes are indulging in the creation of a strong military base in the outer space so as to enhance their security. This paper explores the military usage to which the outer space is being subjected to. It examines in detail the role that India is playing in the militarization of space. India has always been a peace loving country and has been committed towards maintenance of harmony in the world. The Research question which the author would be dealing with is that whether India's role towards the militarization of the outer space has been that of a contributor or a protector.

History of militarization of space

Militarization of space is not a novel idea but has been a debatable topic even before the launch of the Sputnik I. Even in those times it was argued that whether the military activities should be permitted in outer space and whether aggressive military uses should be prohibited.[1] The 1957 launch of the Sputnik by

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the then USSR created a crisis among the western military thinking.[2] The possibility of a surprise attack from outer space became apparent. In 1958 USSR proposed a ban on the 'use of cosmic space for military purposes' to go along with the states undertaking to launch rockets into the space only as part of an 'agreed international programme'.[3] This proposal was however allied with the elimination of foreign military bases on the territories of other states, the establishment of that international space programme and the creation of a UN agency to supervise what was done under it.[4] Military and public opinion on this question in The United States was varied. Many scholars were of the opinion that the USSR by launching the Sputnik has infringed upon its sovereign space.[5] But President Eisenhower of the USA opined that outer space should not be subjected to claims of sovereignty but it should be free.[6] The Soviets also had an orbital weapon known as the FOBS (Fractional Orbit Bombardment System). The concept was to place a hydrogen bomb in low earth orbit (LEO) for quick launch against a ground target if need arose. The system was secretly tested from 1966 to 1970, and the Soviet government revealed that it had 18 FOBS launchers in their inventory at Tyaratam.[7] The Cold War was in its full swing and the hostilities between the two Superpowers was leading to an accelerated accumulation of arms. The danger of a third world war and the objective of prevention of the arms race in the outer space ultimately led to the signing of the Outer Space Treaty (OST) in 1967.[8] But despite the signing of this treaty and repeated assurances by nations that outer space would not be put to the macabre use of militarization, they have hardly adhered to the principles which they have themselves formulated. US officials issued a statement to the effect that US Policy as announced in 2006 does not lead to weaponization of outer space.[9] But, all these statements convey hollow commitments as despite repeated efforts and constant debates the anti-militarisation of space has yet not been achieved.

Legal Instruments Related To Militarisation Of Space

The gigantic ambitions of nations to enhance their security and strengthen their military base by extending it to the outer space was not seen with much favour by the International community as a whole. Hence, in order to curb the skyrocketing ambitions and to protect the space from being subjected to such hazardous and harmful usage various Treaties and Conventions were drafted which would serve as effective international legal instruments and would place limits on the activity of 'militarization of space'. The United Nations which is the hallmark of International law in its Charter specifically disapproves the use of space for military activities. Article 2(4), outlining the fundamental obligations of states regarding military action, in space or elsewhere states that, "All members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any manner inconsistent with the purposes on the United Nations."[10] The first use of military power in outer space is per-se illegal, if undertaken without justification as outlined in the charter under Article 51 (self-defense), or unless authorized by the

Security Council.[11] The 'magna carta' of anti militarization of space is the Outer Space Treaty which was signed in 1967.[12] Its primary goal was the avoidance of colonial competition and military rivalry in space. Some of the relevant sections of this treaty which put limits on the militarization of space are:

- Article I stated, "The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interest of all countries."[13]
- Article II held that space "is not subject to national appropriation by claim of sovereignty."[14]
- Article IV informed states to "undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.[15]
- Article VII outlined how a state that launches a satellite "is internationally liable for damage to another state party to the treaty or to its natural or juridical persons by such object or its component parts on the Earth, in the air space or in outer space."[16] But despite such weighty provisions, still the OST has provided for flexibilities which dilute its positive effects. The treaty does little to define what constitutes "peaceful" utilization of space therefore, it implicitly allows for the following military activities:
- Objects carrying nuclear weapons or other weapons of mass destruction (WMD) can freely transit outer space as long as they do not orbit the Earth.[17]
- Other non-nuclear/non-WMD weapons may be placed in orbit and used to attack targets in space or on the Earth.[18]
- Weapons, including nuclear/WMD, may be tested in outer space.[19]
- Countries may use satellites to perform military functions including, telecommunications, reconnaissance, and navigation.[20]
- Nuclear powered satellites are permitted.
- There is no direct ban on non-nuclear anti-satellite or anti- missile weapons, whether space or Earth-based.[21]

Apart from the Outer Space Treaty the second most effective treaty that has contributed towards the demilitarization of space is the Limited Test Ban Treaty, 1963.[22] Article 1 of this Treaty states that, "all parties undertake "to prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control: in the atmosphere; beyond its limits, including outer space; or under water."[23] Another Treaty which was drafted for the protection of space was the Anti Ballistic Missile Treaty, 1972 which was subsequently withdrawn by the U.S. in 2002.[24]

Under Article V of this treaty, both parties undertook "not to develop, test, or deploy ABM system or components which are…space based.[25] "Each party additionally undertook in Article XII "not to interfere with the national technical means of verification (understood to include photoreconnaissance and other satellite-based censors) of the other party" and "not to use deliberate concealment measures which impede verification by national technical means.[26] "The above mentioned treaties form the corpus of international legal instruments which regulate the militarization of space.

India's Role in Militarization Of Space

India has been a peace-loving country since its inception. It has been committed to the maintenance of peace and harmony in the world. India's space operations are managed and controlled by the Indian Space Research Organisation (ISRO).[27] It has focused its efforts on two major activities:

— Satellites used for remote sensing, meteorology and communications.[28]

— Rockets and launch capabilities for its satellites.[29]

National economic development has been the primary goal of India's space program. Initial programming decisions focussed on building stepping stones to national satellite production and national launching capability. Programs also sought to decrease dependence on outside technology. Space assets that produced tangible development benefits at the national level were the organization's priority.[30] From ISRO's inception, a driving objective has been delivering services such as remote education, telemedicine, weather forecasting, and disaster-monitoring[31] – all efforts aiding primarily in national economic development. The commercial arm of ISRO, Antrix, is also successful, and brought in more than $500 million in 2006 – which is over half the operating budget of the entire ISRO.[32] The defense sector of Indian technology is essentially managed by Defense Research and Development Organization (DRDO).[33] This organization operates under the Indian Ministry of Defense, and India's missile technology was developed by DRDO. In the past, some cooperation between ISRO and DRDO has been evident. However ISRO's institutional preferences, and the limits of its civilian mandate, have acted as a significant check on DRDO attempts to involve the former in military endeavors. While ISRO defines itself as a civilian organization and consistently denies any interaction with DRDO, there are indications that ISRO does cooperate on military objectives.[34] ISRO's launch of increasingly capable imaging satellites with implications for spying is one such indication, and some sources have even hinted the satellites were built by DRDO.[35] The question of the level of military or dual-use projects worked on at ISRO is not new, though, as is evidenced by the U.S. State Department's May 1992 decision to impose trade sanctions against ISRO for proliferating missile, specifically rocket engine, technology.[36] Two major military priorities emerge out of India's current space capabilities. One is improvement of satellite reconnaissance capabilities, and the second is an integrated aerospace defense

command.[37] These efforts were further prioritized after China's ASAT test;[38] however both pursuits have been on the Indian agenda since the late 1990s.[39] The primary motivations originated in the 1999 Kargil conflict and continued instability with Pakistan, coupled with India's rising regional role. The powerful impact of space assets on military power – particularly in the United States and China – and the ambitions of other nations in Asia also are noted by Indian defense officials.[40] Many arguments have been advanced in favour of India strengthening its military capabilities in the outer space. One of the major reasons that trigger concern among the intelligentsia is China's advancing militarized use of space. Chinese space programs, both in military and dual-use terms, are "evolving at an extremely rapid pace, to the extent that it has decisively altered the balance of power overwhelmingly in its favor."[41] The use of satellites to expand and enable military capabilities has been occurring in India for some time, and it is likely that dual-use programs in terms of ASAT capabilities and space weapons will be pursued in order to keep pace with potential adversaries.[42] After China acknowledged the destruction of its own satellite, India joined the United States, Britain and Japan in lodging a formal diplomatic protest to Beijing.[43] The strategic decision of whether India will follow the lead of China and the United States in demonstrating ASAT capabilities is one that puts the political leadership's goal of ensuring the peaceful uses of outer space to the test.[44] Apart from the above-mentioned reasons there are other factors too which act as a stimulant for India to embark on militarization of space. These factors include for reconnaissance of the ground-based and troop movement of the enemy, for tapping communication, jamming the enemy network and destroying enemy satellites.[45] Hence, it can be deduced from the arguments stated above that though India is not a full fledged participant in the militarization of space it is not completely alienated from it too. The space militarization programme in India is at an inception level but India in its effort to build up the space technology is not going to compromise on the principles of peace and harmony it is committed to.

Conclusion

Military uses of outer space should be viewed within the context of and the limitations established by existing international law. The legal framework consists not only of the UN Charter and special international laws on military activities in outer space; it also includes existing space law treaties and agreements. Civilian commercial activities have increased exponentially in the outer space and they would be adversely affected by the military action in outer space. Militarization of space is taking military competitiveness among nations to unprecedented heights. It would act as a hindrance in the maintenance of peace and harmony in the world and would lead to chaos. India threatened by its military competitors and in pursuance of its safety has off late been trying to develop a military base in the outer space. It has not achieved high levels of militarization but is in the process of building up a defence system in the space.

But, India, unlike other nations like China and U.S.A is not espousing an aggressive space militarization programme but is only using the outer space for limited defence purposes. It cannot be imputed that India is contributing towards the ever increasing danger to the security of the world which is the inevitable consequence of the militarization of space.

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SPACE LAW WITH SPECIAL REFERENCE TO SPACE DEBRIS

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'A hundred times every day I remind myself that my inner and outer life depend on the labors of other men, living and dead, and that I must exert myself in order to give in the same measure as I have received and am still receiving'.

—Albert Einstein

Space law is an area of the law that encompasses national and international law governing activities in outer space. International lawyers have been unable to agree on a uniform definition of the term "outer space". It has also well accepted that outer space generally begins at the lowest altitude above sea level at which objects can orbit the Earth, approximately 100 km (62 miles).It is to be noted that space law began with the launch of the world's first artificial satellite by the Soviet Union in October 1957. The Spacecraft named- Sputnik, (the satellite) was launched as part of the International Geophysical Year. Since then, space law has evolved and assumed more importance as humankind has increasingly using the space from place spotting to weather forecast.

Since 1957, bilateral and multilateral talks started taking place. The International Law Association(ILA) set up Space Law Committee 50 years ago during the Fifty-eighth Conference of the Association (New York, 1958). In 1959 the UN also created a Committee on the Peaceful Uses of Outer Space (COPUOS). The ILA Space Law Committee is a permanent observer to COPUOS. The COPUOS, in turn, created two sub- committees-the Scientific and Technical Subcommittee and the Legal Subcommittee. Since then, the COPUOS 'Legal Subcommittee' has been a primary and first forum for discussion and negotiation of international agreements relating to outer space.

In the 1963, Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water ("Partial Test Ban Treaty") banned the testing of nuclear weapons in outer space.

Under the auspices of COPUOS, following Five international treaties were negotiated and drafted—

1. The 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty). *Article 1 of the Outer Space Treaty declares the principle of 'freedom scientific investigation in outer space', and*

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encourages States to 'facilitate and encourage international cooperation in such investigation'.

2. The 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue *Agreement*).
3. The 1972 Convention on International Liability for Damage Caused by Space Objects (*Liability Convention*).
4. The 1975 Convention on Registration of Objects Launched Into Outer Space (Registration Convention).
5. The 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Treaty). As a sequel to that, Member States of the European Space Agency, Japan, Russian Federation and the United States of America entered into an agreement in 1998 concerning cooperation on the *Civil International Space Station* (the Space Station Agreement).
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Above treaties have been entered as many countries have started using space by sending their satellites for various purposes. Some of them have stopped working as they completed their lifetime or have become useless since they achieved their purpose or become defunct because of some technical snag or malfunctioning.

What is Space Debris?

In the light of the above treaties, several space crafts/satellites weather testing instruments, orbit-stations and space missiles were sent to space. Almost all are in the space and their presence in the space has caused a great concern as some of become defunct or their life span has completed. Some of them have also disintegrated in the space. Therefore, much junk/debris (also called 'artificial space debris') has collected in the space. This space junk, also known as space pollution, is assuming threatening dimensions. For example, On 11 January 2007, a Chinese ground-based missile was used to destroy the *Fengyun*-1C spacecraft, an aging satellite orbiting more than 500 miles in space since May 1999. Although the test was hugely successful, it caused great concerns to both the military and scientific communities.

Article 1 (c) of the *Buenos Aires International Instrument on the Protection of the Environment from Damage Caused by Space Debris*, 1994 has defined the term Space debris as—

- '*man-made objects in outer space, other than active or otherwise useful satellites, when no change can reasonably be expected in these conditions in the foreseeable future*.
- *Space debris may result, inter alia, from*:
- *Routine space operations including spent stages of rockets and space vehicles, and hardware released during normal maneuvers*.
- *Orbital explosions and satellite breakups, whether intentional or accidental*.
- *Collision-generated debris*.
- *Particles and other forms of pollution ejected, for example, by solid rocket exhaust*.
- *Abandoned satellites*.'

Space debris or 'artificial space debris' is the unusable, unserviceable space-crafts or parts of space crafts i.e. objects in Earth orbit that do not serve a functional purpose. Space debris generally refers to man-made material in orbit that no longer serves a useful purpose. Accor ding to some estimates, 95% of all man-made objects currently in outer space can be classified as 'space debris'.[1] These objects range from sub-millimeters to meters in diameter, are difficult to detect and can have impact velocity on collision of up to 15 km/s.[2] Their speed can play havoc at such speeds; studies show that an impacting particle of 1 g mass compares by approximation with the explosive energy of 10 g of dynamite.[3]

Various types of debris[4] identified are as follows:

(a) Defunct spacecraft, such as satellites that have ended their useful life. Commercial satellites have an average lifespan of only around 15 years, due to the harsh radiation environment in space;

(b) Spent rocket bodies used to launch satellites into orbit;

(c) objects released during missions, such as waste vented from the Space Shuttle;

(d) Small fragments caused by collisions, explosions or deterioration of active satellites or larger pieces of debris.

Recently in February 10, 2009, the first collision between two satellites (an active US communications satellite, the other a defunct Russian satellite) occurred 800km (in Lower Earth Orbit) above Northern Siberia. They collided at a speed of over 40,000km/h, causing complete break-up of both satellites. The collision created around 1400 catalogued debris objects.

Disastrous Consequences

This threatening dimension of the problem has been described as follows- 'In shattering the old weather-watching satellite into hundreds of large fragments, the Chinese created a large—debris cloud. The debris is now spreading all around the earth, the majority of them residing in very long-lived orbits. The debris cloud extends from less than 125 miles (200 kilometers) to more than 2,292 miles (3,850 kilometers), encompassing all of low Earth orbit.' As of 27 February 2007, the U.S. military's Space Surveillance Network had tracked and cataloged 900 debris fragments greater than 5 centimeters in size, large enough to create potentially serious collision problems. The total count of objects could go even higher based upon the mass of Fengyun-1C and the conditions of the breakup, which could have created millions of smaller pieces. The Chinese test has demonstrated that the actual system.'[5] Therefore, Space debrishas become a source of increasing concern. The scientific and engineering communities have studied the problem of space debris for decades; large space debris has been tracked and catalogued. Looking to the shocking results, they have warned of the dangers. The increased pace of small debris has also been identified and studied to know their likely fallouts.[6]

Maureen Williams has also identified it as major threat to mission space in following words—'Space debris is an increasing threat to security in outer space. In addition to active satellites—as well as abandoned or inactive satellites—orbiting the Earth, small particles originating from collisions between these objects, known as *"second generation debris"* imply an extremely serious risk of collision with active satellites, sometimes with untold consequences. These small particles because of their size cannot be detected from Earth at the present state of the art. They travel at very high speeds (roughly 8km per second) and there are currently tens of thousands of those pieces in outer space'.[7]

The China's catastrophic destruction of a defunct weather satellite has created an orbiting blizzard of long-lived shards. This breached international guidelines covering the mitigation of space debris, which are defined by the *Inter-Agency Space Debris Coordination Committee* (IADC). The China's motivation for exploding the satellite was unclear, but this act has demonstrated that Chinese delegates had has developed the technique to intercept such object. Since IADC guidelines were ignored, there is urgency that these guidelines be incorporated in domestic law.

According to one estimate 'if space operators simply continue to operate as they do currently, the growth in debris will be such that spaceflight in near-Earth orbit will be paralyzed within 100 years'.[8] The risk of collision and destruction of satellites launched would be unthinkable. Even immediate complete cessation of space activities will not help to reduce the amount of debris currently in orbit. There would be self-sustaining chain which in turn will produce more debris. The object launched are permanently in the orbit unless the fall on the ground,

which will cause loss to man and material on the earth. Thus, it has become very difficult to remove debris and clean the orbit.

Looking to widespread ramifications of the space debris, it has become a matter of grave concern.[9] *Reasons of this concern* are:

a. The proliferation of objects in the sky can adversely affect ground-based astronomical observations, which depend on extremely high sensitivity and resolution.

b. Such debris also great threat space-based observatories, since the consequences of the impact of even a small particle of space debris could be catastrophic for such satellites.

c. They are also threat to the space crafts in the space as in 1996 the French CERISE spacecraft was struck and partially disabled by the impact of a fragment of an exploded Ariane upper stage.

d. Presence of such debris results in over-crowding in the space. This will be major problem in times to come.

e. Any accident also results into chain reaction including environmental pollution.

f. There is no mechanism to clean the space debris present in low-Earth orbit at present.

g. Falling of such debris on earth also causes loss to man and material.

h. We have to take care of the legal issues that would be involved in destroying or removing space debris owned by another State.

i. Fixing the liability in such cases invokes many other aspects of the problem.

During last decade, various efforts have been made to contain and control this problem. Major space agencies have been developing a set of *orbital debris mitigation guidelines* aimed at stemming the creation of new space debris and lessening the impact of existing debris on satellites and human spaceflight. A draft of these guidelines was unanimously approved by the United Nations in 2008. Several States are either in the process of implementing or have already implemented these voluntary measures. One of the options is the establishment of an international regime for dealing with orbital debris, similar to the Missile Technology Control Regime, or perhaps the *Limited Test Ban Treaty* of 1963.For example, the *NASA Procedures and Guidelines of 2007* and the *U.S. National Space Policy* of 200 have come out with some guidelines to tackle debris problem. Recently about 3,000 experts from around the globe met at the 61st *International Astronautical Congress (IAC)* to discuss all facet of 21st century space activity.[10] This problem also involves issues *like jurisdiction and control over space debris, international responsibility for space debris, their identification and, finally, liability for damage caused by space debris. Environmental pollution is also connected with it*.

Legal frame work

The State liability and State responsibility has always been recognised from the very inception of the space mission started. When the Cosmos 1954, an erstwhile Soviet Union satellite, fell in Canada in January 27, 1978, the than Soviet Union was asked to pay compensation only. Many scholars have voiced their concern and come out with various theories of state liability. As Rode Verschoor recommended for setting up the international warranty fund[11] and Haley suggested for mandatory insurance of such loss. The Tokyo Conference of the International Law Association (1964) declared that if space activity is conducted by a private entity on the territory of a state, that private party should be held responsible for the loss.

A study of the present day international Agreements/Conventions or Resolutions passed by the U.N. General Assembly would reveal that there is no comprehensive legal frame work available at present. Articles VI–IX of the *Outer Space Treaty of 1967* provides for the liability and registration. The Convention establishes a regime of consultation, registration, international responsibility and liability for damage caused by objects (which includes component parts of such objects) launched into space. The liability is based on 'fault theory'. That would mean that if space debris hit another space object, the launching state producing the debris would be responsible unless it was a distinct change of trajectory of the other space object which made it crash into the space debris. It is also impossible to trace the origin of the debris or the part which causes damage to other objects or other space craft or physical damage to sensitive instruments. Moreover, the complaining state has to show some negligence on the part of the debris-producing State as per requirement of the fault theory. The requirement of the foresee ability and reasonableness will also be looked into.

Article 14 (1)of the *Agreement Governing the Activities of the States on the Moon and other General Bodies*, 1979 also held that the States to the treaty must bear the international responsibility for all space activities carried on their land –whether 'carried on by the governmental agencies or non-governmental entities'. The above motioned Outer Space Treaty deals with the activities in the space, but this treaty encompassed the space launching activity on land also. Accordingly, all private space activities[12] carried on by private entity requires prior authorization by the State and continuing supervision of the concerned/appropriate state. In both the circumstances, liability is strict. Thus, it has introduced the doctrine of 'vicarious liability' of the originating state for the loss caused by the space activities. But the treaty is silent about the personal liability of the non-governmental actors. It require that domestic laws must take care of such liability as the U.K. has tried to regulate private space activities by Passing the *Outer Space Act*, 1986.

The International Law Association (ILA) adopted in 1994 a *Draft Instrument for the Protection of Damage Caused by Space Debris*. This Draft Instrument and explicitly makes states internationally and 'strictly liable' for damage caused by

'space debris' originating from objects launched by them into space. A duty has imposed on the States to cooperate to implement the Draft Instrument and the reduction and control of 'space debris.' An obligation has also been imposed to negotiate 'in good faith' with other states to whom the proposed or foreseen production of space debris is of concern. The dispute resolution mechanism has also been provided by the instrument. But the loop side of the Draft resolution is its non-binding nature. The *STSC (the Scientific and Technical Subcommittee)*—a sub-committee of *the United Nations Committee for the Peaceful Uses of Outer Space (COPUOS)*, has taken a positive step in this direction with the recent decision to produce a high-level space debris mitigation document, with completion scheduled in 2007. In 1999, it gave its provided an understanding of the debris environment, assessed risks and analysed debris mitigation measures being undertaken by various operators. The *Inter-Agency Space Debris Coordination Committee (IADC)*, an international forum of national and regional space agencies, developed a 'Mitigation Guidelines to reduce space debris emissions', in the year 2003. The IADC Mitigation Guidelines include two main aspects (a) orbital explosions of satellites (both during and post-mission) should be avoided through venting of residual fuel, discharging of batteries and depletion of flywheels and momentum wheels,(b) satellites in near-Earth orbit should be de-orbited after their functional lifetimes, preferably crashed directly into an ocean. Caution must be taken that the debris does not reach to earth as to avoid damage to people. In 2005, the STSC resolved to create a concise space debris mitigation document based on the IADC report, providing high-level qualitative guidance to states.[13] This development is disheartening as these Reports are only recommendatory in nature.

Report of the Scientific and Technical Subcommittee on its forty-fourth session, held in Vienna from 12 to 23 February 2007 suggested two type of measures to deal with space problem—(a) to curtail the generation of potentially harmful space debris in the short term, which includes curtailment of the production of mission-related space debris and the avoidance of break-ups, (b) to limit their generation of space debris in long term which includes end-of-life procedures that remove decommissioned spacecraft and launch vehicle orbital stages from regions populated by operational spacecraft.

The seven guidelines have been adopted by the U.N. Scientific and Technical Subcommittee of COPUOS (*Committee on the Peaceful Uses of Outer Space*) for the launch, mission and disposal phases of spacecraft and launch vehicle orbital stages were as follows:

- *limit debris released during normal operations;*
- *minimize the potential for break-ups during operational phases;*
- *limit the probability of accidental collision in orbit;*
- *avoid intentional destruction and other harmful activities;*
- *minimize potential for post-mission break-ups resulting from stored energy;*

- *limit the long-term presence of spacecraft and launch vehicle orbital stages in the low Earth orbit region after the end of their mission; and*
- *limit the long-term interference of spacecraft and launch vehicle orbital stages with the geosynchronous Earth orbit region after the end of their mission.*

Above mentioned guideline have become the guidelines reached the status of UN Guidelines on Space Debris Mitigation in 2007.

Liability

As the cost of damage or destruction of a satellite by space debris could run to many millions of pounds the *UN Liability Convention of 1972* provides that liability for incidents in space falls on the state responsible for the launch of the offending object. There are several complicated problems in applying this Convention. There are various types of debris which have not been addressed by it, e.g. if a collision is caused by an object too small to track, it may be impossible to identify the launching state; a claimant must prove that the launching state was negligent. It is difficult to identify a particular negligent act that created a debris object; a state must prove causation. When two objects collide in space, both states involved could claim the other caused the collision. Till this date, no case has been pursued under this Convention. *The Outer Space (UK) Act, 1986* requires UK based companies to indemnify the government prior to launch, without limitation, against all liability.

India and Space debris

Indian scientists were aware of this problem from the time they started working on space mission. The *Indian Space Research Organization* (ISRO) has realized the importance of the current space debris scenario and its impact on the effective utilization of space technology for the improvement in the quality of life on the Earth. ISRO has worked on various aspects of space debris including mitigation measures. It has been observed and realized that most of space debris has originated from 'On-orbit explosions of spacecraft and upper stages'. These breakups are caused by a wide variety of causes: battery failure, over-pressurization and/or ignition of fuels, accidental collisions, deliberate detonation, etc. It has adopted the method of '*vehicle passivation*', i.e. removal of all forms of stored energy, which would eliminate most such events. Other effective measures include the expulsion of residual propellants by burning or venting, the discharge of batteries, the release of pressurized fluids, safing of unused destruct devices, etc'. This mechanism has been adopted in India's launch vehicles. PSLV and GSLV, and the satellites IRS, INSAT and GSAT were designed in such a way that no 'operational debris' is created in the launch and deployment phases of the mission. Moreover, ISRO's communication satellites in GSO are designed with margins for re-orbiting to a higher orbit at the end of their useful life. Various mechanisms have been developed by Indian scientists.[14] It is to be noted that India is a member of the *UN Committee on the Peaceful Uses of*

Outer Space (UNCOPUOS); and through ISRO's membership in the *Inter-Agency Space Debris Coordination Committee (IADC)*,[15] India is contributing significantly to the international efforts to solve and mitigation of space debris problem.

In cases of space debris accidents liability may be on land or in space, we have to invoke the principle of 'absolute liability' in place of the principle of 'strict liability'. The Supreme Court[16] has declared that in modern scientific era with hazardous and dangerous activities, under law of tort the principle of absolute liability is the only answer for the loss arising of space accident or from space debris on earth.

This development and efforts by various international bodies shows the various efforts have been made in this direction to bring out universally accepted instrument to contain and control the problem of space debris including responsibility and liability of the state government for non-governmental entities. But looking to the newer developments in the era of globalization and commercialization much has to be done.

In the light of above discussion, it is suggested that there must be some international binding instrument which must include (a) international responsibility, cooperation, liability provisions, (b) a technical 'code of conduct' along the lines of the Mitigation Guidelines, (c) these guidelines should be incorporated into national licensing regimes for space activities, (d) technical rules (binding mitigation measures), (e) the scientific and economic imperatives must also be taken into account. There is also an urgent need to pass a comprehensive law to govern the space activities-including the activities by non-governmental entities in India, encompassing the international principles of liability and responsibility. Looking to the 'future wellbeing of humanity' and sudden rise in private commercial space activities, there is an urgent need that all-inclusive legal frame work must be evolved as early as possible.

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SPACE TOURISM—FUTURE INDUSTRY

Ms. Priti Atrey*

Over the past few decades other forms of tourism have been becoming more popular, particularly: Adventure tourism, Agritourism, Ecotourism, Cultural tourism, Heritage tourism, Health tourism, Sport tourism, Disaster tourism, Medical tourism, virtual tourism and Space tourism. The opinion of Space Tourism has changed from being considered "science fiction" to becoming recognized as an important new target for the space industry. Space Tourism (ST) is a recent phenomenon where wealthy individuals or corporations will have the opportunity to travel beyond the Earth's atmosphere and experience orbital flights. California multi-millionaire Dennis Tito spent $20 million on space tourism to become the first paying tourist in 2001 Tito the founder of Wilshire Associates and former JPL scientist traveled aboard Russian Soyuz capsule launched by Space Adventures Ltd. U. S. company where he spent 7 days aboard the International Space Station.[1]

Apart from scientific viewpoint of space, there is an increasing interest for new ventures like space tourism. Reasonable space access is fundamental for the development of new space business, especially space tourism.[2] Among the primary attractions of space tourism is the uniqueness of the experience, the amazing and thrilling feelings of looking at Earth from space, status symbol, and various advantages of weightlessness—potential for extreme sports, health benefits, especially to older people.

Space tourism is expected to "take off" in the first quarter of the 21st century, although compared with traditional destinations the number of tourists in orbit will remain low until technologies such as space elevator make space travel cheap. Technological improvement is likely to make possible air-ship hotels, based either on solar-powered airplanes or large dirigibles. Underwater hotels, such as Hydro polis, slated to open in Dubai in 2006, will be built. On the surface of the ocean tourists will be welcomed by ever larger cruise ships and perhaps floating cities.[3]

Space

Space has been defined in many dictionaries as:

Space is the boundless, three-dimensional extent in which objects and events occur and have relative position and direction.[4]

The empty area outside the Earth's atmosphere, where the planets and the stars are.[5]

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The infinite extension of the three-dimensional region in which all matter exists.[6]

In mathematics, a space is a set with some added structure.[7]

A-Space (est. 1991) is a collectively run anarchist community center and art gallery located at 47th St & Baltimore Avenue in Philadelphia, Pennsylvania.[8]

A boundless three-dimensional extent in which objects and events occur and have relative position and direction.[9]

So term Space can refer to various phenomena in science, mathematics, and communications. In astronomy and cosmology space is the vast three dimensional regions that begin where the Earth's atmosphere ends. Space is usually thought to begin at the lowest altitude at which satellites can maintain orbits for a reasonable time without falling into the atmosphere. This is approximately 100 kilometers above the surface of the Earth. Astronomers may speak of interplanetary the space between planets in our solar system, interstellar space between stars in our galaxy or intergalactic space between galaxies in the universe.[10]

Tourism

The terms *tourist* and *tourism* were first used as official terms in 1937 by the League of Nations. Tourism was defined as people travelling abroad for periods of over 24 hours. The word *tour* gained acceptance in the 18th century. Tour which means a journey in a circuit where the most essential word is circuit which signifies a return journey to the origin point. Tourism can be defined as the act of travel for the purpose of recreation, and the provision of services for this act. A tourist is someone who travels at least fifty miles from home, as defined by the World Tourism Organization.[11]

A more comprehensive definition would be that tourism is a service industry, comprising a number of tangible and intangible components. The tangible elements include transport systems - air, rail, road, water and now, space; hospitality services - accommodation, foods and beverages, tours, souvenirs; and related services such as banking, insurance and safety & security. The intangible elements include: rest and relaxation, culture, escape, adventure, new and different experiences. For the past few decades other forms of tourism have been becoming more popular, particularly: Adventure tourism, Agritourism, Ecotourism, Cultural tourism, Heritage tourism, Health tourism, Sport tourism and Space tourism.

Space tourism is the recent phenomenon of space travel by individuals for the purpose of personal pleasure. Among the primary attractions of space tourism are the uniqueness of the experience, the awesome and thrilling feelings of looking at Earth from space (described by all astronauts as extremely intense and mind-boggling), status symbol, and various advantages of weightlessness—potential for extreme sports, unusual sex, health benefits, especially to older

people. This service is for persons to access and experience space for adventure and recreation. Space tourist is a person who travels to experience space for adventure and recreation as space traveler, space client and space passenger. Essentially space tourism can be divided into two categories: i.e. suborbital and orbital tourism.

1. Sub-orbital Tourism

A sub-orbital spaceflight (or sub-orbital flight) is a spaceflight in which the spacecraft reaches space, but its trajectory intersects the atmosphere or surface of the gravitating body from which it was launched, so that it does not complete one orbital revolution.

For example, any object launched from Earth that reaches above sea level and then falls back to Earth, is considered a sub-orbital spaceflight. Some sub-orbital flights have been undertaken to test spacecraft and launch vehicles intended for later orbital spaceflight. Other vehicles are specifically designed only for sub-orbital flight; examples include manned vehicles such as the X-15 & Space Ship One and unmanned ones such as ICBMs & sounding rockets.

Sub-orbital spaceflights are distinct from flights that attain orbit but use retro-rockets to deorbit after less than one full orbital period. Thus the flights of the Fractional Orbital Bombardment System would not be considered sub-orbital. Instead these are simply considered flights to low Earth orbit by definition a sub-orbital spaceflight reaches an altitude higher than 100 km above sea level.[12]

2. Orbital Tourism

During freefall the trajectory is part of an elliptic orbit as given by the orbital equation. The perigee distance is less than the radius of the Earth, hence the ellipse intersects the Earth, and hence the spacecraft won't complete an orbit. The major axis is vertical; the semi-major axis is more than one half of the radius of the Earth, and almost always less than the radius. Orbital spaceflights: a low Earth orbit (LEO), with an altitude of about 300 km, needs a speed around 8 km/s, requiring a delta-v of about 10 km/s.[13]

Extensive travel by air, sea and land for pleasure and business is a commonplace fact of modern life. In contrast, travel in space has only been available essentially to a small number of highly trained government astronauts, and the public's perception is that it cannot be otherwise. In fact Public Space Travel (PST) or "Space Tourism", routinely available to the general public at affordable prices, is much closer at hand now. The period between 1957 and 1991 saw the dawn of the space age with flights to the planets, footprints on the Moon and global communications.

The development of commercial passenger travel services to space is the key innovation needed to generate an economic return on the cumulative investment made in space capabilities to date. It is technically feasible using existing technology and it is expected to grow into a much larger business than

satellite communications. In addition it will have important macro-economic impacts by helping to overcome the current global depression caused by world-wide over-capacity in older industries and insufficient innovation of new ones. Governments currently spend $25 billion/year on civilian space activities but essentially none of this is aimed at realizing passenger space transportation.

Tourism industry with receipts in excess of US $450 billion, given the generous revenues associated with tourism, public space travel represents a huge potential market. Although human spaceflight is currently the privilege of a few space-exploring nations, recent advances in space technology and entrepreneurship are about to change the status. China with the assistance of Russian technology was able to place an astronaut in space in 2003 in a fraction of the time that it took other space powers such as the USA and USSR. The first credible private space-tourist venture is already a reality. The first space tourist Mr. Dennis Tito took the first trip to the space as a tourist in 2001 in a government vehicle and his flight was privately funded.[14]

Space Tourists

1. *Dennis Tito* is the first official space tourist in history who paid $20 million for his own flight ticket. Although multimillionaire Dennis Tito doesn't like being called a space tourist, he was given this moniker by the media for his historic flight in April 2001 aboard the Russian Soyuz TM-32 to the International Space Station (ISS). Tito made arrangements with Space Adventures, Ltd., to launch into space and stay aboard the ISS for a trip that lasted almost 8 days. Dennis Tito fought bouts of motion sickness on the initial adventure and upon his 128 orbits around the earth.[15]
2. *Mark Shuttle* Worth was the first African in space and the second paying space tourist in history. Mark Shuttle worth made his fortune as an Internet tycoon in the 1990's and on April 25, 2002 made history by flying aboard a Russian Soyuz TM34 capsule as a cosmonaut to the International Space Station (ISS). He paid $20 million for the flight to Space Adventures.[16]
3. *American millionaire* entrepreneur Greg Olsen is the third paying space tourist of record flying with Space Adventures upon a Russian Soyuz TMA-7 on October 1, 2005. For a reported price tag of $20 million, Greg Olsen, Ph.D. flew to the International Space Station (ISS) for a 10-day trip as part of a regularly scheduled Russian "taxi mission" to replace crew members.[17]
4. *Anousheh Ansari* is the first female space tourist and the fourth overall to make the trip from Russia to the International Space Station (ISS). Anousheh Ansari's trip, by Space Adventures was aboard a Russian Soyuz TMA-9 spacecraft which was launched on September 9, 2006 from Kazakhstan's Baikonur Cosmodrome.[18]

5. *Charles Simonyi* is the second Hungarian in space and the fifth space tourist overall. Charles Simonyi may be best known for being the brains behind the success of Microsoft's major applications of Word and Excel. On 7th April 2007 American billionaire businessman Charles Simonyi Ph.D. commenced his 14-day mission from Space Adventures aboard a Russian Soyuz TMA-10 to the International Space Station (ISS).[19]
6. *John Glenn*, some have argued is the first space tourist, while others point to Dennis Tito. John Glenn is in fact, the first non-paying space tourist, which some have criticized as more or a far-fetched political junket while Dennis Tito is the first paying space tourist.[20]

Imagine someone in 1905 tasked with writing a survey article on 'New Commercial Opportunities in Aeronautics', he would probably have started with a review of the commercial uses of balloons. He would then have described the latest developments in lighter-than-air technology and how this would improve the capability of balloons to attract larger or new markets. We could be facing an analogous situation with regard to commercial opportunities in space. The first space plane, Space ship One (SS1), was designed for commercial use in 2004. This was the first flight to space of a fully reusable flying machine since the last flight of the X-15 in 1968.[21]

The main causes of the high cost of present space stations are low production rate, high political profile and high cost of access for repair and maintenance. None of these factors need to apply when space planes enter service and provide low-cost access. The cost per unit weight of space hotels should then become comparable to that of airliners which are orders of magnitude less than that of space stations to date. Because of their reusability space planes have a potential cost per seat to orbit roughly 1,000 times lower than today's largely expendable vehicles when used in large numbers and developed to airliner standards of maturity as measured by life and number of flights per day. Space tourism is likely to become a large enough market to provide the required funding and high traffic levels.

The model of a small orbital space plane, needed to activate this line of development could be built in about six years using existing technology at a cost equivalent to one or two flights of the Space Shuttle. It would be used mainly for launching small satellites, supplying the International Space Station and for pioneering orbital space tourism. The timescale required to advance the small prototype to mature airline operations to orbit depends mainly on how rapidly the market for space tourism grows up. If there is a 'gold rush' with major players racing to invest heavily it could possibly be achieved in as little as ten years. The pacing item is probably the development of a long-life rocket engine.

Low-cost access to orbit will lead to rapid developments in space science and exploration, and to new commercial uses of space especially manufacturing of orbit and solar power satellites. The environmental impact is likely to be

highly beneficial. Space tourism requires an aviation approach to transport to and from orbit, which will be of wide benefit to both aviation and spaceflight.

By sponsoring space plane development, governments at one stroke will not only save money on presently planned programmer but also forward a new 'space plane age' of astronautics that would be as far ahead of the present 'missile age' as the 'aero plane age' of aeronautics was from the 'balloon age'. The prototype of a small orbital space plane needed to trigger this line of development could be developed in about six years at a cost comparable to one or two flights of the Space Shuttle. It might be possible to progress from this prototype to airline operations within ten years which has given a massive development effort.[22]

Public Space Travel (PST) is sure to become a huge commercial space industry in near future which will completely change all conventional uses of space. Most government space activities are funded through national or international space agencies and which is strongly influenced by their history. The largest of these, the US National Aeronautics and Space Administration (NASA) was established during the Cold War. This activity became known as the US 'space program'. The 'Apollo project' to land two people on the Moon before the Soviet Union was effectively a strategic step in the Cold War, and in order to realize it NASA's budget grew rapidly during the early 1960s, while its employees grew from 3,000 to 30,000. Other countries governments also established 'space programs', and eventually 'space agencies', to develop space technology partly to subsidies the development of ballistic missile technology and partly to benefit from economically valuable applications which it was said would arise.

The current funding level of space agencies is approximately $25 billion/year, comprising of $14 billion for NASA; $6 billion for the space agencies in Europe, of which the European Space Agency (ESA) receives about half; some $3 billion for the various space research organizations in Japan, including the National Space Development Agency (NASDA); and several billion dollars spread between Russia, China, India, Israel, Brazil, Korea and other countries. Of this funding about 10 - 20% is spent on space science research including astronomy micro-gravity science and biology. Consequently, in round figures, the G7 countries' space agencies (i.e. USA, Europe and Japan) spend some $20 billion/year on a range of 'space development' activities in large part comprising development and operation of expendable launch vehicles satellites for various applications, and development and operation of space station equipment. In total, government space agencies have spent approximately $1 trillion (in current US$) on civilian space activities to date although it is difficult to estimate accurately due to major currency adjustments and inflation since the 1960s.[23]

However, the lack of economic benefits from the very large expenditures by government space agencies during the 30 years since Apollo 11 and more particularly since the end of the Cold War would appear to be due more to the

fact that government organizations are not primarily economically motivated. In order to understand these reasons better it is informative to identify some of the economic interests of the main interested parties following the public choice approach. Being government organizations space agencies are motivated towards self-preservation that is to ensure the continuation of their funding from governments. In order to achieve this among other things they need to avoid criticism this leads them to avoid risks that might lead to the perception of failure and to avoid innovation which inevitably involves such risks. High costs and inadequate innovation are well-known weaknesses of monopolies both private and governmental since space agencies' costs are high, they can avoid criticism by preserving the high cost of space activities, which they can do by preventing the emergence of effective competition. This motivation acts in the same direction as the fact that being monopolies, space agencies are motivated to preserve their monopoly status. Avoiding making promises that might not be fulfilled and using their public relations budgets to manage public expectations, continually emphasizing the difficulty of their work, and the need for larger budgets, etc, all work to the overall end of preserving their status. This motivation also leads to the "making mountains out of molehills syndrome" whereby every project becomes more complex than necessary and costs many times more than necessary thereby employing larger numbers of staff.

The combination of space stations, space hotels, reusable heavy lift vehicles for launching their modules, and space planes for frequent and regular supply flights will provide a low-cost orbital infrastructure of benefit to all commercial and scientific users of space. Space hotels will have a life in orbit measured in decades. The cost of launching them is therefore relatively small compared with the cost of operating them, the largest component of which is the regular supply of transport by space plane. Thus, present expendable (and therefore expensive) heavy lift vehicles, such as Ariane 5 could be used for launching their modules without greatly affecting total cost. At a later stage technology from space planes could be applied to large launchers to provide reusability and hence to reduce their cost per flight. Space planes can remove the launch cost barrier which at present prevents three commercial uses of space from developing - manufacturing solar power collection and orbital tourism. Let us consider each in turn.

Three fully reusable transportation vehicles were designed for this application sized for 20, 60, and 180 passengers' capacity per launch. A launch rate increasing from 100 to 6,000 launches per year was adopted in order to accommodate the eventual demands for the number of passengers. These vehicles do not require technologies beyond those that will be proven within 2 years on the X-33, but must be designed for high reusability and reliability a number of paper businesses were defined for PST. They showed that low enough seat prices could be offered to actually enable the large passenger rate required by the market elasticity data. An IRR of 35-55% is achievable by such businesses when carrying 1,000-10,000 persons per year. When the vehicles carried cargo as well as advertising, ticket prices were offset sufficiently that IRR levels of at least 45% were

attainable even at 1,000,000 passengers per year. What is more, these figures were achievable even when charging less than 30 $/Kg for carrying cargo into space. Thus PST could be highly synergistic with an SPS business. Thus a business can be created that generates over $30 Billion profit annually for an investment of $ 7.6 B. In addition a smaller scale business using a Kistler-type vehicle was de-signed in order to begin services incrementally, at passenger rates of 100-2,000 per year. It is shown that such smaller scale business can also be economically viable with IRR of 25-35% readily attainable with investment under $ 2 B.[24]

Although they are related, air transportation and accommodation are different industries. Likewise space transportation and accommodation is basically a different industry. In supplying the demand for space tourism, each will create business opportunities for a range of other companies. Launch vehicle manufacturer's rocket engine, component maker's propellant producers and materials companies will all participate in the cash-flow of the vehicle operating companies. Architecture, construction, component production, interior design, food and drink and entertainment companies will all participate in the cash-flows of the operators of hotels in Earth orbit. Both of these activities will also create new business for companies providing investment, insurance, leasing, banking, marketing, media and law services. And if we consider a revenue stream growing to trillions of Yen/year (tens of $ billions), it is clear that this new customer-driven industry will infuse new life into the aerospace industry which is still painfully shrinking.

The fall of the Soviet Union was fundamentally a result of the much greater creativity and productivity of free enterprise than of government-controlled activities. When the same commercial forces are applied effectively to space activities, the effects will be revolutionary. So perhaps the most important fact about space tourism is that it will be a normal commercial industry. In contrast to the situation today in which government-funded agencies and the companies to which they pass contracts are involved in a permanent effort to persuade taxpayers' to increase or even just to maintain their funding, space activities will become a race to the fastest. One of the most important lessons of business, though not a law of nature, is that being the first company to successfully provide a new service to the general public gives great advantage in dominating a new industry. Names such as Edison, IBM, Coca-Cola, Thomas Cook, are all testimony to this.

The development of this exciting and popular new industry should be financed and in turn very significant social and global benefits that can be expected. A contributing reason for the recent slow economic growth in the rich countries is that the cumulative investment of $1 trillion that has been made by governments in space technology development has yet to earn a commercial return. When put to profitable use in the way outlined in this paper it will create a lively new field for business investment and growth. But until this happens, the slow growth may be expected to continue.[25]

On this scenario, traffic of 5 million passengers per year in 2030 would imply that the cumulative number of passengers at that time would reach app. 40 million people or perhaps 3% of the middle class population of the time. However, in market research most people say that they would like to travel to space, and in addition a large proportion, particularly of younger people say that they wish to do so several times. The tourist activities described above will represent a turnover of the order of some $100 billion/year by 2030 assuming 5 million guests paying $20,000 each. Although this is far larger than space activities today it will still be only a few percent of civil aviation at that time, which is projected to exceed $2 trillion/year. Over and above the selling of travel services to customers the provision of accommodation services in addition to space transportation will create new markets in space for a wide range of products and services creating many new commercial opportunities in these fields.

It is particularly interesting to note that the activities described above will create several million permanent jobs in the aerospace, hospitality and related industries, a large proportion of them in leading industrial countries. This is in striking contrast to the effect of government space spending: the current level of $25 billion/year maintains employment at some 1/2 million - in jobs which will disappear when this taxpayer support ends.

The importance of this result is that $12 billion is less than half of one year's funding of government space agencies today and it is therefore readily affordable. The paper extrapolates the JRS scenario to the year 2030, based on market research results. By that time space tourism activities could have grown to a scale of $100 billion/year, creating several million jobs. It thereby demonstrates the very great economic value of such a development - approximately $1 trillion greater than the value of continued taxpayer funding of space agencies' activities without developing space tourism. The paper also discusses the potentially critical importance of this new industry in maintaining economic growth in the world economy against the deflationary pressures caused by excess capacity in older industries and inadequate investment in new ones.[26]

These third-world countries can send their astronauts to space only once because the high cost prevents a multiple trip. However, the rise in both educational level and economic standing of the third world has increased the awareness of the general public in the 21st century. And if a third world country has an astronaut program, it cannot send only one astronaut. Instead, it must create a program that will give its citizens the opportunity to be selected as astronauts in the near future.

Because building a space tourism vehicle will be more expensive than sending an astronaut to space, space tourism development activities do not require a third world country to build a passenger-carrying orbital vehicle. The program can consist only of activities that contribute to the development of space tourism, which involves as many of the general public as possible. The government needs only to organize public programs such as space tourism

lectures, exhibitions, and competitions and provide administrative support to space tourism activists and organizations. This is already enough to contribute to and be part of space tourism development. The program will be able to make the people feel as if they are part of a project and to provide an opportunity for them to go to space, like astronauts.

In early 2003, the Malaysian government announced its intention to send an astronaut to the ISS by 2006. Later, the government announced that it will send an astronaut to the space station by the end of 2007 via the same package offered by Roscosmos to space tourists. The astronaut program became very popular in Malaysia when the government announced in newspapers, TV, and websites that it was looking for suitable candidates of Malaysian citizenship to be trained as astronauts. By October 2003, 10,000 Malaysians applied for the astronaut candidacy, which requires the candidate a first class degree or professional pilot license as well as to be healthy. Out of the 10,000 applicants 900 were short-listed and finally by September 2006, two were selected for the training for the trip to the ISS. However, only one candidate has been selected by Soyuz launch vehicle, while the other remains as a substitute. According to the Malaysian government the astronaut was taken to the space station in October 2007.

Space tourism was first promoted in Malaysia as early as July 1999, when a public lecture on space studies organized by Perak state government with space tourism as the major content was presented by one of the authors at the School of Aerospace Engineering University of Science Malaysia. In the lecture the author stated that the management of Kuala Lumpur International Airport (KLIA) should consider the emergence of space tourism which will affect the design and operation of the airport. This statement was reported by a major English language newspaper in Malaysia a day after the lecture.[27]

The recent growth of activities towards developing passenger space travel services is very promising; however, there is a widespread but mistaken idea that space tourism will remain a small-scale activity of the very wealthy. The truth is that having been delayed for over three decades by government space agencies failure to develop more than a small fraction of the commercial potential of space the start of space travel services is long overdue and so they are capable of growing rapidly into a major new industry. That is, the technical and business know-how exists to enable space tourism to grow to a turnover of 100 billion Euros/year within a few decades if it receives public support of even 10% of space agencies' budgets. This development would sharply reduce the cost of accessing the resources of space which could prevent the spread of the "resource wars" which have begun so ominously. No activity therefore offers greater economic benefits than the rapid development of low-cost space tourism services. A range of government policies should be revised to reflect this. In recent year's business and government leaders have spent much time explaining to the public that we live at a time of rapid technological change and that we must adapt to this in many ways. Competition-driven costs are falling

continually, so companies facing global competition have to race to survive; consequently staff have to accept the need to change jobs periodically, and so on. The phrase "labor flexibility" favored by economists who support market liberalization has become infamous as a euphemism for salary reductions, longer work hours, worsening labor conditions, welfare and pension benefit reductions, dismissals, and other reductions in standards of living. However, the same policy-makers do not seem surprised when elements of the space community tell them that "Space is different". That is despite the literally uncountable technological advances in every field, including materials, computing, combustion engineering, manufacturing, electronics, robotics, simulation and many others, no-one can make rockets cheaper than the R7/Soyuz, designed 50 years ago. They add that this will not be possible for several more decades - if then. Economic policy-makers do not complain even when this is followed by the request to continue giving space agency's 20 billion USD of taxpayers' money every year in order to develop various machines for which there is little or no commercial demand.

At a time when almost no other area of government spending seems to be safe from cut-backs - education, health, pensions and environmental protection - what is the reason for this leniency towards "space policy"? Could the explanation be that the designer of the Soyuz rocket was a "Soviet Leonardo da Vinci" whose work still cannot be matched even half-a-century later? Or maybe even a century later if we are to believe space agency leaders' projections?

Developments in 2004 suggest that, excellent though the R7 designers surely were, their outstanding genius is not the explanation for the stagnation in launch costs. The successful sub-orbital flights by "Spaceship One" in June, September and October showed that it is possible to reduce the cost of getting to space today very sharply - to about 1% of the cost of Alan Shepard's 1961 sub-orbital flight using an expendable rocket. That is, the Spaceship One project does not represent a "magic solution" to the costs of spaceflight, but it demonstrates that if a focused effort is made to use existing technology to reduce the cost of traveling to space specifically by using a piloted reusable vehicle – something which space agencies have not done since the X-15 in the 1960s – a very small investment can reduce it dramatically below space agencies' costs.

As another point of comparison the total cost of the "Spaceship One" project was 20-25 million USD. By comparison the US government's space agency NASA spends some 16 billion USD/year or some 44 million USD/day; consequently the "Spaceship One" project cost the same amount as NASA spends every day before lunch. Thus, it would have been a minimal burden for NASA Esa or even Jaxa to have developed a similar vehicle during recent decades but they all chose not to do so - and they continue not to today. The reason for this is not because space agencies have any justification for believing that it is better not to develop such services for the public but because they do not want to. The first item of "invisible cost" is the cost of having delayed the

development of sub-orbital space tourism services. In 2003 NASA published its Analysis of Space Concepts Enabled by New Transportation (ASCENT) Study which included an estimate (quoted in the OECD's report) that sub-orbital travel alone could reach a turnover of 4 billion USD/year or about 5 times the current turnover of the commercial satellite launch industry. (NB the ASCENT study was not a feasibility study, but a study of potential markets for reusable launch vehicles.) It hardly needs to be pointed out that, on these grounds alone space agencies are clearly not fulfilling their legal responsibility to encourage the maximum possible commercial use of space so long as they continue not to encourage the development of passenger travel Among these benefits, providing young people with a vision of a bright future as described so excitingly by such engineer-writers as Clarke and Heinlein before governments established monopoly space agencies is highly desirable. This is clearly greatly preferable to the cultural stagnation the "dumping down" that would be inevitable under governments which based their policies on the presently dominant but erroneous "closed world" philosophy. Among many other such benefits growth of space tourism seems likely to lead to highly desirable growth in the numbers of young people choosing to study engineering and science.[28]

We can lay out a vision of space tourism activities 30 years in the future based on the provision of a growing range of commercial space travel services to the general public. Extending the JRS scenario linearly to 2020 passenger numbers would reach 1 million/year after 10 years of operation. Thereafter it seems reasonable to project continued growth both in the number of customers and in the range of services offered as this would follow the pattern seen in the travel and tourism industry on Earth. This growth would be fueled by rising incomes growing middle class populations and commercial competition between service providers to attract customers from around the world. On this basis, passenger numbers traveling to low Earth orbit (LEO) of 5-10 million/year 30 years from now would imply average growth rates of 18% - 26%/year through the decade 2020-2030, which are certainly possible.

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COMMERCIAL SPACE ACTIVITIES—SPACE FOR A 'SPACE LAW'

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Why Space Law?

Outer Space is the area where the atmosphere of the earth ends. The aerial sovereignty of a state ends with the atmosphere from where the space area begins.

Launching of the first sputnik by the U.S.S.R. on October 4, 1957 accelerated the affinity with the outer space of earthly people. After sputnik (First), few more states launched their satellites in the space which was a necessary call to the United Nations to regulate the space activity. The space exploration has brought the world together and the final out come was the Space Law, which can be understood as the Law which has been made to regulate the relations amongst the states and their relations with international organizations in the sphere of outer space, celestial bodies and moon. Scientific developments are indispensable, and undoubtedly necessary, at the same time legislations to regulate the scientific explorations are most wanted need of modern time. Space Law can be understood as a unified approach of science and law.

We are watching dynamic additions in International Law. This Law is facing to multi-dimensional problems of the world society. The proper, balanced and sustainable management of global resources is the highest challenge today. With that introduction of the Private Space activities and their commercialization has hampered our ecosystem to be watched and controlled seriously. So to keep a constant watch on Ecology is also a big problem for lawyers and scientists. International law including space law is much more concerned with the maintenance of global natural resources, rivers, oceans, forests, and agriculture, wild and sea life. Relationship of living organisms and their peaceful adaptation to the environment is the main object of modern law.

The concept of Sovereignty should also be seen or understood from global welfare perspective. The exploitation of global resources - the common property, by the developed countries is also main basis behind the space law. In fact the notion of sovereignty permits use of common property for only lawful and for peaceful purpose. It is not at all related with the competence of a nation state. Every living being including human is a part of global ecological system - this is the fundamental principle on which the modern international law depends. Man

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must learn to live in harmony with nature rather to conquer it. The same view has also been supported by Professor Upendra Baxi.[1]

Joint efforts in the direction

Prior to first launch of sputnik on October 4, 1957, nobody thought Space Law. In 1958 the 'question of peaceful use of outer space' was considered by the United Nations,[2] its resolution recognized 'the common interest of mankind in outer space'. It was also resolved that the outer space shall be used for peaceful purposes only."

The United Nations adopted the resolution and established a committee on peaceful uses of outer space and it was the first major step of United Nations to fill up the legal vacuum in outer space.[3] Timely the urge for the Space Law gained momentum in International sphere and a series of treaties were entered through genuine and sincere efforts made by the U.N.O...

In December 1963 the U.N. General Assembly unanimously adopted a Declaration of Legal Principles Governing the Activities of State in the Exploration and use of outer Space.[4] On December 19, 1966 The General Assembly through a resolution[5] adopted certain principles which are known as the Outer Space Treaty of 1967. It was a significant step in this direction.

The Outer Space Treaty (1967)

The Treaty can be termed as milestone towards the establishment of a legal regime of outer space. The main tenets of the treaty are:

- Freedom of Exploration of Outer Space
- Non-Appropriation of Outer Space
- Use of Outer Space peacefully
- Jurisdiction and control of states over objects launched
- International Responsibilities for National activities
- Rendering help to space craft and
- International Co-operation in the use of Outer Space

The Treaty provided the basis and limitations for space use and also a framework for a number of pacts between the nations. Some of them are as under:

- The agreement on the Rescue of Astronauts, the Return of Astronauts and Return of objects Launched into Outer Space (1968).[6]
- The convention on international Liability for Damage caused by Space objects (1971).[7]
- The convention on Registration of objects launched into Space for the Exploration or use of Outer Space (1974).[8]
- The Agreement Governing the Activities of States on the Moon and other celestial bodies, 1979.[9]

Apart from these, few more declarations were adopted by the General Assembly like- the Direct Television Broad Casting (1982), Remote Sensing of Earth Resources (1986), use of Nuclear Power Sources in Space (1992) and cooperation for the Benefit of all States (1999). Still the procedure of reviewing and revamping is continuing.

All the above efforts mandate the world nations to use Outer Space with mutual cooperation, and to make Space research a joint enterprise for the benefit of mankind.

Indian Scenario

With the adoption of Indian Constitution,[10] it gave rise to a welfare state with a promise that this republic will work for the welfare of people and give strength to the world peace and its development. On this humanistic theme, our Space programme was initiated about 45 years ago with the aim to promote the development and application of space technology for the socio-economic benefit of the people. Launch of Chandrayan-I, has empanelled the India amongst space powers. It is the era of Globalization; we are now open before the world. Today our space sector is open for private participation also. Such participation has given a start to commercial space activities which necessitates our own Space Law.

In the beginning, the Outer Space was the subject for the States only but the technological advancement opened new vistas of commercial activities through space area. The enormous quantum of profit available from outer space activities allured private investment. The entry of private activities gave rise to few new chapters for scientists and lawyers.

Till now the Indian Space Programme is controlled by the government of India, more or less still it is a governmental function. It is being controlled by Indian Space Research organization (ISRO). The main guideline for ISRO was to promote the development and application of Space technology for the socio-economic gain of the India. Today the space programme is under the direct charge of the Prime Minister through the Space commission and the Department of Space. The ISRO is having its 'marketing cell' which is responsible for international marketing of space products and space services. The same cell encourages private sector participation with a view to facilitate the development of domestic space commerce and industry.

Main Considerations for Space Law

Now the eternal question automatically springs out is that what space activities are doing for economic equality and progress of mankind on the earth. The 'Space' has opened a new vista for its commercial use. Huge amount of profit is being anticipated through Space activities.

The allurement of excessive profit has always brought disadvantages to the world. The cleavage between rich and the poor has widened through profit making which is the basic cause for people's unrest on this world. The Space Law

should take special care for have-nots. The real peace on the earth can only be attained by the eradication of hunger, unemployment, illness, and poverty from the earth. The balanced and sustainable distribution of global resources and maintenance of ecological balance should be main goal of space law.

As per J. Bentham's Utility Principle, Law must be useful for the maximum. Law must increase the pleasure of the maximum and diminish the pain. The Space Law must strictly adhere to the principle. The development of space law should very carefully follow the principle of 'Lassiz-fare'. World peace and sustainable development with a view to uplift the have-nots should be the main goal for our International and National Space Law.

Commercial Space activities should not be a source of accumulation of wealth and power in few hands only, the direct and indirect benefits of Space activities should be properly and uniformly distributed among the people of the world.

The Space Law can also be developed with a view that Nations have boundaries but space is yet not divided. We all share common frontier in common. It is a hope which can fulfill the dream of a Single Nation World, having the common problems with common solutions. The concept of global society can ipso-facto solve a considerable number of evils from this earth, such as arm race, unfair economic competitions, problem of time and space etc. The Common property-the Space, must be commonly governed and used, and fruits of research in space be distributed equally.

Now the time has come when the joint and separate attempts should be made to regulate space activities. The developed countries should make joint ventures in space with the developing countries so the benefits can be shared uniformly.

The space has really provided a wide space for human development and world peace; but we have to act with a caution and the message that space must have 'Space for all'. If the message is not read and followed properly, the space will vanish and this will ultimately leads to chaos and controversies.

Endnotes

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