

COMMERCIALISATION OF OUTER SPACE ACTIVITIES: NEED FOR A LEGAL REGIME IN INDIA

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1. INTRODUCTION

The stars, the galaxy and the sky, from time immemorial, have been a matter of great attraction to the poets, scientists and even common human beings. The best of our scientific knowledge tells us that there is no life on any of the planet or galaxies other than the earth.¹ Very few experts in the space-faring community are aware of the current technologies, policies, law and economic initiatives and the recent trends in the rapid development of space research. The main mandate of the outer space exploration is peaceful exploration and non-appropriation of outer space. We need to develop our outer space to be sustainable and conflict free. Freedom and equality to proceed with the recent trends should form the basis of the core principle of common heritage of mankind.²

The ingress into outer space after the second half of the twentieth century is undeniably one of the greatest achievements in the human history.³ Space discovery resulted in a number of scientific and technological breakthroughs. The internet technology, direct television broadcasting, communication, weather forecasting, etc. are the direct results of the artificial satellites activity in space exploration. Space technology can also be used for the sustainable advancement of the humanity as a whole, in fields like information technology, telemedicine, tele-education, etc. In this era of twenty-first century and scientific development, the states are extending their scientific experiments and technological capability beyond the perimeter of the earth. They are also exploring the space not just to find newer dimensions of science & technology but also for

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¹ Fabio Tronchetti, *Fundamental of Space Law and Policy* (Springer 2013).

² Edythe E Weeks & Ayodele A Faiyetole, 'Science, Technology and Imaginable social and behavioural impacts on outer space developments' (2014) 95 *Acta Astronautica* 163-173.

³ S Marchisio & Nandasiri Jasentuliyana, 'The Legal Dimension of the Sustainability of Outer Space Activities: The Draft Code of Conduct on Outer Space Activities' (2012) 55 *Proceedings of International Institute Of Air And Space Law* 1, 3-22.

economic advancement and benefit of entire mankind.

The year 1957 is a very important milestone for space exploration. In 1957, the Union of Soviet Socialist Republics (hereinafter 'USSR') sent its first spacecraft to the outer space. From 1957 to 1979, international space law has seen five international conventions which constitute the jurisprudential base of space law.⁴ Apart from this, different states developed their own national legal frameworks also for dealing with outer space developments. But in the early 1980s, space law has seen a gigantic shift from scientific exploration to commercial exploration and private use of outer space. This shift changed the picture of outer space exploration a lot. Since the establishment of Indian Space Research Organisation (hereinafter 'ISRO') in 1969, India has witnessed fast developments in space science and technology. India, despite being the signatory to four major space conventions, could not yet enact any national space legislation for regulating the space activities and the developments of the nation. This is mainly attributed to the non-privatisation of the space sector in India.

2. HISTORICAL DEVELOPMENTS BEFORE 1957

The genesis of space law actually comes from aviation law. The flying history starts by the design of first aircraft (a hot air balloon) conceived by Montgolfier Brothers. The very next year 'lieutenant police' in Paris passed an ordinance to prohibit balloon flights to fly without special permission. It is the first air law in its kind. In 1785 and 1786, a similar type of prohibition was made in council of Namur, Belgium and senate

⁴ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, (adopted on Dec. 19, 1966, entered into force on Oct 10, 1967) 18 UST 2410, 610 UNTS 205 [hereinafter OST 1967]; Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, (adopted on Dec 19, 1967, entered into force on Dec 3, 1968) 19 UST 7570, 672 UNTS 119; Convention on International Liability for Damage Caused by Space Objects, (adopted on Nov 29, 1971, entered into force on Sept 1, 1972) 24 UST 2389, 961 UNTS 187; Convention on Registration of Objects Launched into Outer Space, (adopted on Nov 12, 1974, entered into force on Sept 15, 1976) 28 UST 695, 1023 UNTS 15; Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, (opened for signature on 18 Dec 1979, entered into force on 11 July 1984) GA Res 34/68, Dec 5, 1979; Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, GA Res 37/92 (Dec 10, 1982); Principles Relating to Remote Sensing of the Earth from Outer Space, GA Res 41/65 (Dec 3, 1986); Principles Relevant to the Use of Nuclear Power Sources in Outer Space, GA Res 47/68 (Dec 14, 1992); Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking Particular Account of the Needs of Developing Countries, GA Res. 51/122 (Dec 13, 1996).

of Hamburg respectively.⁵ In 1819, the first resolution in safety of air navigation was passed during harvesting time considering the decision of 1815, where the court decided that the aeronaut will be liable for any damage done by the balloon.⁶ Again in 1822, the New York Supreme Court came up with a decision for fixing tortious liability to the aeronaut for destroying harvesting by common people while watching the balloon.⁷ Following the year of 1903, the Wright brothers successfully carried out human flight. The second incident was the flying of German balloons in the French territory and the reaching of agreements between them. Further, these developments resulted in the 1910 Paris Convention and the Warsaw Convention of 1929.⁸ Warsaw Convention 1929 makes sure that the country that possesses the land also possesses the sky. But after the Second World War, space law began as a separate branch of legal domain.⁹

The development of space law started in the late twentieth century. It is evident from the history that by 1955 the literary work was already done on how to regulate space flight. Until 1950, all the literature and discussion was mainly over the sovereignty of the air limit. There was no substantial legal progress in space law during this period 1910 to 1950. Like Mandl, other authors in the 1940s and 1950s argued for a specific legal regime for rockets crossing the atmosphere.¹⁰ First book was published by a Czech engineer, attorney, inventor, pilot and author Vladimir Mandl in 1932. Again in 1926 in an air law conference in Moscow, a paper was presented by a senior official of the Soviet Union Ministry, V.A. Zarhar.¹¹ But the content of the paper was mainly on the sovereignty of the aerospace.¹²

The first book on space law was written by Dr. Vladimir Mandle. The name of his book is 'Das Weltraum-Recht: Ein Problem der Raumfahrt'. The book was written on the needs and the extent of law that would emerge relating to space flight activities. But the

⁵ Peter H, 'A Historical Survey of International Air Law before Second World War' (1957) 1 McGill LJ 7, 24-42.

⁶ *Pickering v Rud d* [1815] 4 Camp 219; 1 Stark 56; 16 RR 777; Kuhn, Arthur K, 'The Beginniugran Aerial Law' (1910) Am J Int'l L 109-132.

⁷ *Guille v Swan* [1822], 9 Johns (NY), 381; (1928) USA v R, 53; CCH A v Cas 1 (1947).

⁸ Tang u Fong, 'Air Law, Aeronautical Law', <www.dsaj.gov.mo/EventForm/DisplayEvent.aspx?Rec_Id=494> accessed August 28 2014.

⁹ *ibid* (n 5).

¹⁰ Rita M Lauria, 'The Space Age-United States Beginnings' <<http://www.lacba.org/Files/Main%20Folder/Sections/International%20Law/InternationalLawNewsletter/files/Doyle.pdf>> accessed April 30 2014.

¹¹ V A Zarhar, "Mezhondunarodonoye Publichnoye Vozdushnoye Pravo" (Public International Air Law).

¹² *ibid* (n 13).

first article of the twentieth century was written by a French writer & lawyer, named Emile Laude in 1910. At that time, he was essentially writing on air law. However, it is clear that after the launch of Sputnik 1 in 1957 that the real space age had started. Emile Laude ended his discussion with a comment.

*“But the term will never apply to the air proper...all the problems raised by the new locomotion are going to move beyond the air...a new law will govern the new juridical relations. These will no longer Aerial law... but it is certainly it is question of law of the space.”*¹³

3. DEVELOPMENT AFTER 1957

The decades of the 1960 and 1970 saw a substantial and significant success of the United Nation Committee on Peaceful use of Outer Space (hereinafter ‘UNCOPUOS’) mainly in drafting international space law. The first and foremost important document is 1963 Declaration of Legal Principles Governing the Activities of the States in the Exploration and Use of Outer Space.¹⁴ During 1960 to 1970 United States (hereinafter ‘US’) and USSR were the only substantial players in the space activities. Thus, the United Nations’ (hereinafter ‘UN’) concern to find out some solution for peaceful use of outer space, so that both the powers should agree and assent to international agreement for space flight activities.

Most significantly in 1992 the UN came up with an Office of the Outer Space Affairs in the UN secretariat. After the establishment of Committee on the Peaceful Uses of Outer Space (hereinafter ‘COPUOS’), it successfully drafted five important treaties governing the outer space activities. Apart from this different states also developed national legal framework for dealing with outer space developments. But in the early 1980s, space law saw a gigantic shift from scientific exploration to commercial exploration and private use of outer space. This shift changed the picture of outer space exploration a lot. From the establishment of ISRO in 1969, India has seen a fantastic development in the space science and technology. India despite being the signatory of four major space conventions has so far failed to enact any national space legislation for regulating the space activities and the developments of the nation.

4. RIVALRY BETWEEN US AND RUSSIA

It is common understanding that the space age was a product of the rivalry between US and USSR during the Cold War. It was USSR that first launched the artificial satellite Sputnik 1 in 1957, and in response, US launched its first satellite the very next year in

¹³ *ibid.*

¹⁴ General Assembly Resolution, 1962 (XVIII).

1958 named, the Explorer 1. The efforts for exploring new paths were started but with a caution to maintain peace and security in outer space.¹⁵ Due to these alarming developments, UN began discussing the way out for the peaceful use of the outer space. The bilateral discussion between US and USSR resulted the creation of new forum and COPOUS came into picture out of this discourse. COPOUS in turn created two sub committees: the Scientific and Technical Subcommittee and another, the Legal Sub-Committee. The Legal Sub-Committee is the primary forum for discussion and negotiation of international agreements relating to outer space.

5. COMMERCIALISATION OF OUTER SPACE

It is said that world is at its third industrial revolution, concerning the ability to extend the work and live in the outer space. The development of commercial space activities offers a new hope for the profitable development. After the year 1980, the commercialisation and privatisation of outer space began in the US.¹⁶ The terms commercialisation and privatisation are used interchangeably, although they have significantly different meanings in space business. Commercialisation means using domestic capabilities for the economic development of a country.¹⁷ It includes also using the advancement of the space technology for commercial purpose by the concerned state, e.g. launching facilities, telecommunication, remote sensing, etc. On the other hand, privatisation means, shifting to private sector for acquisition of goods or services required for space activities. The development of private commercial space activities is, however, underestimated by many of the space capable countries. The possibilities of commercialisation and privatisation are enormous. However, it is important to keep in mind that considerable efforts are necessary to realise profitable development in space business. Those efforts must not only be technological but legal too.

It is quite evident that commercialisation of space is not possible without the desirable development in the legal field, especially dealing with the private commercial activities. A trend already has been set by the US by implementing effective rules for the space commerce. The US is one of the first nations to introduce space legislation for commercial purpose namely, the Commercial Space Launch Act 1984 (hereinafter 'CSLA'). Domestic legislation is very important in bringing changes to space commerce. Both public international law as well as private international law play an important role in conduction of commercial space activities. For the first fifty years of space law

¹⁵ Eligarsadeh, *Space Politics and Policy: An Evolutionary Perspective* (Springer, 2002).

¹⁶ Zach M, 'Private Commercialisation of Space in International Regime: A Proposal for Space District' (2010) 30*Nw J Int'l L& Bus* 241, 241-61.

¹⁷ Huang Huikang, 'Space Law and the Expanding Role of Private Enterprises, with Particular Attention to Launching Activities' (2001)5 *Sing J Int'l & Comp L* 55 55-62.

development, the world has witnessed a progress in public international space law. However, little has been done for the private international space law. Development of space private international law is important for the proper development of privatisation and commercialisation of space activities.

Commercial space activities can be classified mainly into Satellite Telecommunication, Remote Sensing, Global Navigation Satellite System, Space Tourism and Space Transportation. Firstly, Satellite Telecommunication is defined as “any transmission, emission, or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems or any transmission, emission, or reception of signs, signals, writings, images, sounds, or information of any nature by wire, radio, visual, or other electromagnetic systems.”¹⁸ Secondly, “Remote Sensing means Sensing earth from outer space. Thirdly, Global Navigation Satellite System implies a complex satellite system, gives information to the receiver about his actual position on the earth. Space Tourism means taking people to the space for visiting purpose. Lastly, the Space Transportation is a business where one country gives facility to another country to launch their space object to the required orbit.”¹⁹

6. COMMERCIALISATION OF OUTER SPACE IN INDIA

Over the past few years, after the successful launching of ‘Chandrayaan 1’ and ‘Mangalyaan’ into outer space, the world’s perception of India’s space capabilities has changed dramatically. Not only this, Government of India’s attitude towards the space industry also changed for the last few years.²⁰ Now Government of India is seriously thinking about the space commercialisation and privatisation. There is no doubt that commercialisation and privatisation will give more competence to the capability in space exploration and scientific discovery. This capacity building will strengthen the space industry in India, which can help earn huge foreign currency to the Indian reserve. The Citizen Charter issued by Department of Space also specifies that India is committed to achieve indigenous capacity for the design and development of spacecrafts, technologies for communications, the survey of national resources, research and development in space science and associate knowledge and technologies, and the application of space program for national development. To facilitate the space industry in India, ISRO has established its commercial entity, the Antrix Corporation Ltd. in the year 1992, for commercialisation of space products, technical consultancy service and

¹⁸ International Telecommunications Union, Radio Regulations Geneva, January 1, 1998.

¹⁹ Yun Zhao, ‘An International Space Authority: A Governance Model for a Space Commercialisation Regime’ (2004) 30 J Space L 277277-96.

²⁰ Ranjana Kaul & Ram Jakhu, Space Law in the Era of Commercialisation (2010) (1st edn, Eastern Book Company).

technology transfer.²¹ Though India has made significant development in the space exploration but there is hardly any legal development for governing space exploration. Considering the scientific and technological development, India needs a legal governance system for better flourishing of this sector.

Though the five space conventions have not defined the term outer space, but it is customary practice that space beyond 100 miles above the sea bed is considered as outer space.²² The outer space is mainly divided into four kinds of orbit for satellite communication.²³ The most important is the Geostationary Orbit (hereinafter 'GSO') at approximately 35700 km from the earth.²⁴ GSO satellites take the same speed as the Earth. GSO is mainly used by Telecommunication Satellites. The Low Earth Orbit (hereinafter 'LEO') is another important orbit, where most of the modern telecommunication satellites operate.²⁵ This orbit can hold a larger number of satellites than the GSO. The Middle Earth Orbit (hereinafter 'MEO') is a compromise in between LEO and GSO.²⁶ The last is a Near Earth Orbit (hereinafter NEO). NEO is mainly used for remote sensing and military inspection.

7. COMMERCIALISATION AND PRIVATISATION OF OUTER SPACE AND LEGAL IMPLICATIONS

International space conventions are mainly entered between state actors. There is little scope for private entities to play a role in these conventions. So far as the basic five conventions are concerned, they only marginally deal with space commerce (except Article VI of the OST 1967 where non-governmental organisation are mentioned; here, non-governmental means actors other than state parties, i.e. private companies). Therefore, it is very difficult to find any legal solution for commercialisation and privatisation of outer space under the existing international space conventions. The OST 1967 is considered as a jurisprudential pedestal for law of the outer space. The

²¹ Antrix Corporation Limited, <<http://www.antrix.gov.in/>> accessed December 14, 2014.

²² Jasentuliyana, Review of the Work of the United Nations Committee on the Peaceful Uses of Outer Space, (1983) 11 J Space L 125.

²³ Yates JM, Spanbauer BW, Black JT Geostationary Orbit Development and Evaluation for Space Situational Awareness (2012) 81 Acta Astronautica 256, 256-272.

²⁴ Loo KW & Giam H, 'Geostationary Earth Orbit Satellite Model Using Easy Java Simulation' Ministry of Education Technology, Singapore <<http://arxiv.org/ftp/arxiv/papers/1212/1212.3863.pdf>> accessed 18 December 2014.

²⁵ Inter-Agency Space Debris Coordination Committee, September 2007.

²⁶ NASA, <<http://gcdm.nasa.gov/User/suppguide/platforms/orbit.html>> accessed December 17 2014.

entire treaty is based on the premise of exploration and peaceful use of outer space by the states.

According to the Registration Convention 1975, registration is compulsory for any spacecraft (Article 2) before launching to the outer space in order to ensure that if any accident occurs, liability can be attributed to the launching state. Articles II and III of the Liability Conventions clearly say that liability will be determined by national laws, hence the liability will be determined by private international law and not by the public international law or by Liability Convention or Registration Convention. The important point here is that until and unless international law exists, supplemented by national law, it is almost impossible to determine the liability of private parties. Further, the issue of fixing the highest ceiling limit of insurance by domestic law (as France and the US have done by making legislation for fixing the upper limit of private companies' financial liability) in commercial space contracts in space business is very important.

The Liability Convention 1972 makes the launching country liable for any accidental situation in the outer space as well as in the earth.²⁷ However, this provision will discourage states to employ private bodies to enter into space commercialisation. On the other hand, if any state by national law shifts complete liability to private body, this will also discourage private bodies to enter into space commercial transaction as there is no mention for private bodies.

Legal aspects of space commercialisation from the point of view of the manufacturer are very important. Manufacturers are those, who supply different equipment or parts to space agencies for building spacecrafts. Taking into account the possible litigation from space activities, the main financial consequence of defective items supplied and the technical complication that manufacturers are facing in the particular environment in the outer space itself is a subject matter for better understanding of the complex space commercialisation issues.

In addition, the product liability in space is a matter of concern. Product liability is similar to manufacturer liability. Products are the different parts of spaceflight and a part of the spaceflight as a whole. According to the Registration Convention preamble paragraphs numbered 2 and 3, the registered country will be liable for any damage. Here, the question is how the product liability will be shared by the manufacturer and the registered country in the absence of any guiding principles. Most importantly the absence of any national law in a particular country is a matter of concern.

²⁷ Convention on International Liability Caused by Space Objects 1972, Preamble para 2, 3 and art III, IV.

For fixing product liability under international space law, absolute liability is the only option under the existing international space regime. Absolute liability means fixing the liability even when there is no fault. If any damage has been done, the liability will be fixed automatically in spite of due care and caution undertaken.²⁸ On the other hand, national space laws impose fault-based liability or put a limitation on liability. There is therefore, a vast difference in the determination of liability from any damage in the international and national regimes. To prove Absolute Liability, establishment of negligence is important, but in space related activities, the determination of liability is not an easy option. Secondly, breach of 'implied warranty' arises from the party. For fixing product liability under the international regime, the Hague Convention 1973 is extremely relevant.²⁹ Articles 4, 5, 6 and 7 describe the applicable provisions in case of dispute between the parties. The Hague Convention 1973 says the applicable law will be internal law of the state of injury (Articles 4 and 7) or Habitual Residence of the suffered person or the place of the business (Articles 5, 6 and 7).

Space law disputes and dispute settlement mechanism are also an area of major concern. The Permanent Court of Arbitration formulated new Arbitration Rules in 2011 for the settlement of space disputes. Law of the place of injury or defendant's place of business will be applicable (Articles 18 and 23 of the Optional Rules for Arbitration of Disputes Relating to Outer Space Activities 2011) for dispute settlement under these Rules. The Liability Convention attaches liability to the launching state. But, to transfer the liability to a third person, the country needs domestic law. As in the US, the Commercial Space Launch Act 1984 provides safety and financial viability to the launching provider. United Kingdom (hereinafter 'UK') also developed national legislation, i.e. Outer Space Act 1986 to deal with the outer space activities. Like the UK, France and Germany also developed national legislations for space activities, that is, the France Space Operation Act 2008 and the Law Governing the Transfer of Responsibility of Space Activities 1990 respectively.

Launching and operating spacecraft is a highly specialised field requiring both spacecraft launch and operation to comply with national and international regulations. The acquisition of spacecraft licenses, responsibility and supervision of launching space objects, national security and liability for damage are the issues of legal concern in spacecraft launching. The legal implications are multiple and complex due to the characteristics of space transportation. Various legal regimes are involved in launching and operating a spacecraft. Space law has been developed from 1960 to deal with the commercial launchings. Apart from this, launching states also developed national laws to deal with the situations and countries aspiring to launch businesses also need to develop national law to streamline the process of commercialisation. However, the

²⁸ Hanneappel PPC Product Liability in Space Law, (1979-1980) 2 Hous J Int'l 55.

innovative market has displayed the necessity to bring a legal framework to handle the governmental and non-governmental launching facilities. In space business, launch and related activities such as licensing process, management of liability risk, etc. are challenging tasks.

Apart from the new possibilities that open up with deregulation of space activities from the government or public sector, the presence of private players in the galactic business raise a number of specific issues and questions about Intellectual Property Rights, safety and liability. Hence, any legislation with regard to controlling and directing private activities has two facets, the international, where the legislations are guided by '*jus cogens*', UN conventions, international treaties like The Hague Convention on Product Liability 1973 etc.,³⁰ and the national, which imposes an obligation on states to formulate the legislation to clarify liability of private space parties in case of accidents or solutions to problems relating to safety, liability and IPR in space inventions. Thus, a need for an international treaty along with a model national legislation for regulating the private players in space arena is imperative.³¹

Except for the 1979 Moon Treaty, India is signatory to all the important space treaties such as the OST 1967, the Rescue Agreement 1968, the Liability Convention 1972, and the Registration Convention 1974. Article 51 (Promotion of international peace and security) of the Indian Constitution provides that India should respect its international treaties. Further, the Article provides a duty incumbent upon the state for maintaining international peace and security. It obligates the implementation of international treaties into domestic legislations. India is now morally and legally bound to the international community to enact domestic law to give application to these treaties. However, so far India does not have any domestic space legislations. The commercial outer space legal issue creates two categories of legal problems. First, the International Treaty obligations of a particular country who is a signatory to the space conventions. Second, the legal issues that will arise when private companies come to the market to fulfil the demand space services. The first problem can be given effect by enacting national laws, and as India is a signatory of the OST as well as other important treaties relating to outer space, the concept of absolute liability (Article VI of the OST 1967) of the launching state for outer space activities is applicable. On the other hand, other countries which are involved in commercial outer space activities have their domestic laws in place. Their domestic laws clearly prescribe the limitation of liability as well as insurance for liability. In the US, the ceiling limit for the third party is \$500,000,000 and \$100,000,000 for US property. If the claim surpasses the amount, then the US government undertakes

²⁹ The Hague Convention on the Law Applicable to the Product Liability, October 2, 1973.

³⁰ Malcolm N Shaw, *International Law* (Cambridge University Press 2008) 481.

³¹ *ibid* (n 22).

to pay up to \$ 1,500,000,000.³² Private companies are cautious and hesitant in their Indian endeavours, unsure of regarding India's legal position. In case of any damage, it is not clear whether India will make them absolutely liable or like other countries there will be ceiling on the liability and make liability based on fault basis. The legal vacuum in India is a major drawback for India's space commerce.

India's recent push for commercial activities will definitely boost to the Indian economy. Presently India has a Remote Sensing Data Policy of 2011, the Satellite Communication policy 1997, the Norms, Guidelines and Procedures for Implementation of the Policy Framework for Satellite Communications in India (hereinafter 'SATCOM Policy'), National Telecom Policy 2012 and Mapping Policy 2005 to deal with commercial activities. Very recently India also opened its market for private players in space market mainly in the telecommunication sector. India is consistently continuing to emerge as a serious contender in the international space market. India has not yet formulated any national space policy, with the only policy dealing with space activities being the SATCOM Policy.

The SATCOM Policy 2000 exclusively deals with the satellite telecommunication. SATCOM Policy sets procedures and guidelines for commercial space exploration in the telecommunication sector, though this policy applies only for the application for licenses in telecommunication. There are almost no provisions on commercial launches, insurance, indemnification or dispute settlement. Government of India has not yet initiated any process for enacting Domestic Space Legislation or amending any relevant existing legislation to give effect to its international space treaty obligations. In spite of this India is increasingly opening its market for commercial space activities. The commercial space activity in India continue to be the subject matter of the Department of Space in the Government of India. There are also however, guidelines and procedures that have been occasionally issued for outer space activities in India like the Remote Sensing Data Policy 2011, Satellite Communication policy 1997, SATCOM Policy 2000, National Telecom Policy 2012 and Mapping Policy 2005. The legal issues relating to private space activities are largely dealt by other normative laws of India like Contract Act 1972, Sales of Goods Act 1930, Transfer of Property Act 1972, and all intellectual property rights laws, which are largely not modified or amended for commercial space explorations.

8. CONCLUSION AND RECOMMENDATIONS

The requirement of the present hour is to harmonize the international treaty and national laws at the domestic level. From the above analysis, the lack of international law to deal

³² The Commercial Space Launch Act 1984, art 19 PubL No 98-575, 98 Stat 3055 (1984).

with commercial space activities in the present date is clear. All the present international agreements are not sufficient to deal with the present space commercialisation move. In light of the same the recommendations are:

1. There is a serious need for the revision of the present space law agreements.
2. It is important to formulate new international space law concerning the commercial space activities.
3. Not only this, there is an urgent need for enacting national law for India, following other countries who are increasingly engaging in space commerce successfully.
4. There is an urgent need for enacting corresponding national law in compliance with international law.

There remains a need for important issues like safety and control, contracts, dispute resolutions and space liability, etc., to be addressed. Apart from this, the laws of contract, transfer of property, stamps duty, registration, copyright, patent, insurance law and last but not the least arbitration law needs to be revised to cover space related activities within the ambit of domestic laws. No provisions exist now for participation of private parties in space activities in India, and there is also no legal regime to protect or to curb the operator and the government for any damage or in fixing liability. The domestic laws remain unrevised, especially the IPR laws, to include space related activities. Internationally it was agreed that any space related disputes will be handled by arbitration, but our arbitration laws are not updated according to present space agreements. Another important issue is insurance law. Risk coverage is one of the important things in business and therefore domestic laws relating to third party risk in space activities need a clear legal regime.