A COMPARATIVE STUDY OF INTELLECTUAL PROERTY RIGHTS ISSUES IN SPACE ACTIVITIES IN U.S.A., CANADA AND INDIA

Prashanti Upadhyay*

ABSTRACT

The constant evolution of high technology and the ever- changing geopolitical situation underlines the need for the universal harmonization of industrial and intellectual property laws. Building a strategic IP portfolio is economically important from both an offensive and defensive standpoint. At a fundamental level, intellectual property is the core work product of a technical organization. The National Aeronautics and Space Administration (NASA) produce a variety of intellectual property including: patents, trademarks, data rights, copyright and rights associated with National Security. For a scientific organization to properly manage its work product it has to manage its intellectual property.

The paper also highlights how the intellectual property be managed to meet the objectives of program implementation, technology transfer and security. This paper assesses the national policies and space programs of India and Canada in an effort to suggest the basis for enhanced bilateral cooperation in space activities between the two countries. Canada's niche world-class expertise in the space sector lies in two fields: Earth Observation (remote sensing) and space robotics. India, on the other hand, has been able to develop and continually advance an array of access to the ISS for microgravity research and human activities in space. The official visits of high-level delegates from both countries have resulted in a review of their bilateral economic relations and formulating initiatives that would strengthen their partnership. One element of such a partnership envisages cooperation in the field of science and technology in general, and space technology in particular. 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.

This paper provides brief descriptions of the national policies and space programs of India, their strengths and needs for cooperation, and the challenges to such cooperation. Due to their specific national needs, India has developed advanced satellite capabilities for communications. A separate and focused study should be undertaken due to the complexity and extensive breadth of the communications industries in both the countries. This paper analyzes existing regulatory barriers and suggests some viable policy and regulatory options. It is undertaken in the general context of India- Canada political and economic relations. The paper also highlights issues involving IPRs in respect of inventions made or used in outer space which might require harmonized international norms for their solution. Finally we promise that our research paper will be one of substance, if given an opportunity.

Intellectual Property Rights And Space Activities

The constant evolution of high technology and the ever-changing geopolitical situation underlines the need for the universal harmonization of industrial and intellectual property laws. The analysis of the specific problems relating to intellectual property rights (IPRs) arising from the utilization of the future International Space Station and from satellite remote sensing are examples which illustrate this need

How to reconcile space law and intellectual property law

Space Law Is Extraterritorial, IP Law Is Territorial Space Law Same For All States, IP Law Different In Each State Space Law Is Extraterrestrial, IP Law Is Terrestrial Space Law Says Share Benefits, IP Law

* Student, LL.M., Prashanti.upadhyaya@gmail.com, 09792642209, Law College Dehradun

Grants A Monopoly

IPR are legal rights granted to the Owner by a State. The Owner of such rights may seek enforcement in that State. Logically, “IPR in Outer Space” means rights which a State is ready to grant which may have effect in Outer Space but enforceable in the State. The right then becomes that the owner forbids others from using the IPR in Space.

Relevant provisions for the applicability of domestic IPR law to Space Activities exist only in US law today, found within the US Space Bill and the NASA act. The US Space Bill extends the applicability of US patent law into Outer Space. The NASA act includes a provision to consider a “space object” as a vehicle.

Excerpt From The Us Space Bill

...Any invention made, used or sold in outer space on a space object or component thereof under the jurisdiction or control of the United States shall be considered to be made, used or sold within the United States for the purposes of this title, except with respect to any space object or component thereof that is specifically identified and otherwise provided for by an international agreement to which the United States is a party, or ... carried on the registry of a foreign state in accordance with the Convention of Registration of Objects Launched into Outer Space....

Issues Related To IPR In Outer Space

These issues have, at this moment, still a somewhat 'exotic' character. This because microgravity activities, which take place in the near-zero gravity of outer space, have not developed as quickly and did not yet mature and create a commercial dimension as other space applications, such as, for instance, satellite remote sensing and satellite telecommunications. Furthermore, the private sector's entities active in the field of space activities are not necessarily very interested in microgravity research at this stage. Although pharmaceutical and biotechnical industries may have a potential interest in microgravity activities, this is a far cry from a market of (commercial) production in outer space. Apart from the technical and financial barriers for microgravity research, a clear legal structure is also needed in order to encourage private sector participation.

The issue of IPRs in outer space currently concerns mainly telecommunication and remote sensing activities. Patentability of inventions made in outer space, in other words: who has the right to patent protection, who has the control over the rights which are granted with the patent? Here the differences between the two main patent systems existing in the world, i.e. the first-to-file and the first-to-invent patent systems, underline the need for harmonization. In fact, all the criteria to determine to whom the invention belongs, the relevance of the place where the invention has been made, the evaluation of the prior art and novelty, are different.

Infringement Of Existing Patents By The Use Of Technology In Outer Space

Here the activity performed in space will infringe a patent where the activities can be considered as occurring in the territory of the country (e.g. Article 21 IGA) in which the patent has effect. A prior identification of which patent may potentially be infringed and the granting of a license is a solution which, however, is not always easy to enforce.

These problems have been the object of various colloquia and debates, last of those have been organized in December 1994 in Paris by ESA and ECSL. The Workshop focused on the global aspects of

IPRs and space activities and aimed at identifying the requirements of the various players in the space area, with respect to intellectual property protection, which could range from the harmonization of the existing specific regulations, to the identification and/or elaboration of common practice.

The differences between national space agencies approaches in this field, the coexistence of a multitude of actors, of a public and private nature, the political constraints on the activities, showed how space activities traditionally have been isolated from the general debates which always characterized intellectual property protection.

Ideal Goals In Evolution Of Intellectual Property Law For Space

1) Restore the expected advantages of IPR .

2) Establishing legal certainty for Space IPR.

3) Establish space and its access as a single territory with a single uniform law .

4) Establish a single enforcement body such as an International Arbitration .

5) Come to an agreement for use of space IPR by 3rd parties consistent with the provisions of the Outer Space Treaty for space –based inventions, and the UN resolution of 1997.

Legal Certainty: Possible Corrective Actions:

Globalization

A preferable solution would be “Globalisation” of the jurisdiction in outer space activities, i.e. A single worldwide IPR legislation for space activities. This could be imagined as a treaty under auspices of the uncoupuos or an extension of the 1967 Outer Space Treaty. This could be an international board of arbitration, similar to that which is already operated under the auspices of WIPO. This board could be empowered to arbitrate on matters such as space patent validity and compatibility with international law, alleged infringement, fair and reasonable conditions of licensing to third parties, etc.

The National Space Programme Of India

The launch of Sputnik in 1957 marked the beginning of space age and space race throughout the world. India, after its independence in 1947, focused on development of indigenous technology in construction, launch and operation of satellites. In 1961, space activities started under the Department of Atomic Energy (DAE) and continued under Indian National Committee for Space Research (INCOSPAR), constituted in 1962, with the launch of sounding rockets from Thumba Equatorial Rocket Launching Station (TERLS). The Indian Space Research Organization (ISRO) was created in 1969, continues under the Space Commission (SC) and is currently under the Department of Space (DOS), created in 1972. Other national level committees on space matters include: INSAT Coordination Committee (ICC); the Planning Committee on Natural Resources Management System (PCNNRMS); and the Advisory Committee on Space Sciences (ADCOS). [1] The DOS acts as an arm of the SC and ISRO implements the national space program. Antrix Corporation Limited, a company under DOS was started in 1992 for the

[1] Fergusson, James & Stephen James. 2007. Report on Canada, National Security and Outer Space. Canadian Defence & Foreign Affairs Institute, Calgary.http://www.cdfai.org/PDF/CanadaNationalSecurityandOuterSpace.pdf.

marketing of products and services of ISRO.

Charter of Indian Space Research Organization (ISRO) ISRO implements the following programs of the Department of Space (DOS) with the objective of promoting and developing application of space science and space technology in India:

I. Launch Vehicle program having indigenous capability for launching spacecrafts

II. INSAT Program for telecommunications, broadcasting, meteorology, development of education etc;

III. Remote Sensing Program for application of satellite imagery for developmental purposes;

IV. Research and Development in Space Sciences and Technology for national development.

Services provided by ISRO under DOS include:

a) Providing national space infrastructure for the telecommunication needs of the country;

b) Providing satellite services required for weather forecasting, monitoring etc.;

c) Providing satellite imagery required for the developmental and security needs of the country;

d) Providing satellite imagery and specific products and services required for application of space science and technology for developmental purposes to the Central Government, State Governments, Quasi Governmental Organizations, NGOs and the private sector; and

e) Promoting Research & Development in space sciences and technology.

India's vision has always been to possess autonomous space capability. At present, the country designs, develops, builds, launches and operates its indigenous launch vehicles and all classes of satellites for applications in the communication, remote sensing and scientific fields. India has two major operational satellite systems. They are (a) the Indian National Satellite system (INSAT), used for telecommunications, television broadcasting and meteorological services, and (b) the Indian Remote Sensing Satellite system (IRS), used to monitor and manage natural resources, as well as other earth observation applications. India "has the world's largest constellation of civilian remote sensing satellites."[2] This constellation includes IRS-1B, IRS-P2, IRS-1C, IRS-P3, IRS-1D, Oceansat-1, Resourcesat- 1, Cartosat-1, Cartosat-2 and Technology Experiment Satellite (TES) remote sensing satellites that "provide data in a variety of spatial, spectral and temporal resolutions," meeting India's needs for many applications.[3] There are two series of operational launch vehicles: the Polar Satellite Launch Vehicle (PSLV), used primarily for launching remote sensing/scientific experimental satellites and payloads of up to 1,600 kilograms into polar or low Earth orbits. Secondly, India has developed a Geosynchronous Satellite Launch Vehicle (GSLV) capable of putting 2,200-kilogramme satellites into space.

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[2] Gordon, Michael R. & David S. Cloud. 2007. US knew of China's missile test, but kept silent. New York Times, 23 April. Salloum, Anthony. 2007. Canada badly needs a national space policy. Embassy. OPED, 20 June. http://www.embassymag.ca.□

[3] Gordon, Michael R. & David S. Cloud. 2007. US knew of China's missile test, but kept silent. New York Times, 23 April. Salloum, Anthony. 2007. Canada badly needs a national space policy. Embassy. OPED, 20 June. http://www.embassymag.ca.□

International cooperation has been the hallmark of the Indian space program. ISRO has signed over 25 agreements dealing with various areas of space technologies and services.[4]

International Treaties In Space

After the launch of Sputnik, the necessity of outer space law to regulate outer space activities developed within the United Nations (UN) and India always attached utmost importance to every international approach associated with peaceful uses of outer space. In 1958, India became a member of the ad hoc committee constituted by General Assembly for Peaceful Uses of Outer Space and continues[5] to play an active role in UN Committee on the Peaceful Uses of Outer Space (COPUOS) and its Subcommittees[6], the only international forum for the development of international space law. The five international treaties and agreements, associated with international space law, adopted by General Assembly for which India is a party / signatory are: "Outer Space Treaty"[7], 19677, "Rescue Agreement", 19688, "Liability Convention", 19729, "Registration Convention", 197610, "Moon Agreement", 1984.

India is also a party to the other international agreements relating to activities in outer space: "Nuclear Test Ban Treaty", 196312 "International Telecommunications Satellite Organization" (ITSO), 1973, "International Mobile Satellite Organization" (IMSO) and "Intersputnik", 1971. India also has co-operative agreements with: US, ESA, France, Canada[8], Israel, Brazil, Venezuela, Indonesia, Maldives and Mongolia.

Policy Agenda And Space Activity Of Canada

Canada established a single governmental entity, the Canadian Space Agency (CSA), to carry out space research and development within a coherent Canadian space program. In 1994, the Government of Canada adopted the Space Policy Framework in order to guide the implementation of the Canadian space program. This Framework considers space as an area of strategic importance to Canada, particularly for its transition to a knowledge-based economy, and to the social, scientific, security and foreign policy objectives.

Canada's niche world-class expertise in the space sector lies in two fields: Earth Observation (EO or remote sensing) and space robotics. Canada has also been a world leader in the field of space robotics since the development of Canadarm-1, the tremendously successful and efficient robotics arm installed

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[4] US Dept. of State. 2007. Narrative to the Outer Space Treaty. http://www.state.gov/t/ac/trt/5181.htm#treaty

[5] West, Jessica, ed. 2007. Space Security 2007. SPACE SECURITY.ORG. http://www.spacesecurity.org/publications.htm. http://adsabs.harvard.edu/full/1995ESASP.378..141S

[6] "Boeing and India's premier space agency to make satellites," 21 May 2008 http://www.spacedaily.com/2004/040622102033.odq96mo6.html

[7] "NASA and India Sign Agreement For Future Cooperation" NASA Release: 08-033. May6, 2008. http://www.nasa.gov/home/hqnews/2008/feb/HQ_08033_India- agreement.html.

[8] "Canada's International Policy Statement." July 15 2007. http://www.international.gc.ca/index.aspx?lang=fr/IPS/IPS-commerce03-en.asp

on NASA's space shuttles.

Since 1991, the CSA's two goals for its Space Station Office have been:

a. to enhance Canada's ability to operate in space and to exploit space by facilitating participation in the ISS by Canadian industries, governments, and universities,

b. to maximize social and economic advantages to Canadians by promoting the commercialization of ISS technologies.

To effectively carry out all space activities, access to and use of space transportation and launch capabilities is of paramount importance. However, from the beginning of Canadian space activities, Canada had decided not to develop its own launch vehicle and has opted to rely mostly on the launch services of its close allies. International space cooperation and partnership has been the cornerstone of Canadian space activities and space policy. Therefore, the Canadian government should consider space cooperation with India as a means not only to supplement its space activities but also to expand general economic ties between the two countries.

Focus: Indo-Canadian Cooperation

Both India and Canada are space-faring nations actively involved in the exploration and use of outer space toward scientific and commercial ends, each country should derive optimum scientific and economic benefits from their space activities through bilateral cooperation. Although both countries' space program has a different focus, the paper demonstrates that they could be complementary and beneficial to each other. For instance, whereas Canada has developed very highly advanced technology in the field of earth observation (remote sensing), and also has access to the International Space Station (ISS) for microgravity and other research purposes, it is lacking in the area of indigenous launch services. India, on the other hand, has been able to develop and continually advance an array of indigenous launch vehicles and is currently able to offer world-class reliable and cost effective launch services. India has also developed a very high level of expertise in the processing and distribution of remote sensing data.

However, India lacks access to the ISS for microgravity research and human activities in space.

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. India has become a new member of the elite club of space-faring nations. Canada's space capabilities are undoubtedly world-class. In order to explore the possibilities for bilateral cooperation between India and Canada (specifically their respective space agencies) and the opportunities for their respective space industries in three key areas of space activities -- satellite remote sensing data collection, processing, and distribution; microgravity research on board the ISS; and launch services). This paper provides brief descriptions of the national policies and space programs of countries, their strengths and needs for cooperation, and the challenges to such cooperation.

India Canada Science And Technology Cooperation: Policies And Facts

The policy agendas of both India and Canada rest on the premise of seeking strategic partners that can appropriately help build and further their economic future through the development of the skills of their people and corporations. The environment created by India's persisting market liberalization and prioritized infrastructure development initiatives have provided an improved setting for the Canadian private sector to compete in an increasingly dynamic market. Thus, the presence of a vibrant Indo-Canadian community in Canada providing entrepreneurial skills and scientific and educational links would help both countries enhance their efforts to cultivate meaningful linkages in all sectors, including science and technology.

India and Canada agreed, in 2003, to accord "priority to an enhanced policy dialogue and strengthened

bilateral cooperation in science and technology, research and development, and the environment."[9] An important step in facilitating science and technology-related linkages was the completion of the Science and Technology Agreement signed in 2005.[10]This Agreement hopes to assist the development of science and technology partnerships and collaborative research among business, academic, and government researchers. In the space sector, India (ISRO) and Canada (CSA) signed an interagency Memorandum of Understanding (MOU) in 2003, which provides for space cooperation. The MOU is meant to "foster the study of cooperative programs in satellite communications and satellite remote sensing as well as [encourage] cooperation in the field of exploration and use of space by the private sector and academia in both countries."[11]

Indian Space Ties With U.S.A. and Indo-Us-Canadian Space Relations

India has strong and active bilateral space cooperation with several other countries, the most important of which are the Russia Federation, the USA, and a number of European countries. India-US ties have primarily paralleled the nature and scope of their general political and strategic relations. India's strategic proximity to the Soviet Union, tactical policy of non-alignment, and independence in nuclear capability determined the nature of India-US space relations. India and the US are establishing never-before-seen close relations in all areas of significant importance, i.e. trade, military cooperation, nuclear technology and space technology. The two countries have committed themselves to moving forward with agreements that would allow the launch of US satellites and satellites containing US components and technology by Indian space launch vehicles.

Two memoranda of understanding for space cooperation were signed between ISRO and the American National Aeronautics and Space Administration (NASA), under which NASA's Miniature Synthetic Aperture Radar Instrument and Moon Mineralogy Mapper (M3) Instrument would be carried aboard ISRO's Chandrayaan-1 lunar mission. On February 1, 2008, both NASA and ISRO signed a framework agreement in order to continue and expand their space related cooperation[12]. This renewed cooperation between India and the US may be expected to have positive implications for India-Canada space cooperation, particularly if the US allows India to launch American satellites and Canadian satellites carrying American technology.

ISRO is actively expanding its international cooperation and business activities both with public sector enterprises and private corporations in Europe. ISRO entered into

a. an agreement with EADS-Astrium of Paris to jointly build communication satellites;

b. a commercial contract for the launch of the 360 kg Italian satellite AGILE as the primary

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[9] "India-Canada Joint Statement", High Commission of India, Press Release, January 18, 2005, 22 May 2008. http://www.hciottawa.ca/news/pr/pr-050216.html

[10] India-Canada Joint Statement

[11] "Canadian Space Agency and India's Space Research Organization Strengthen International Space Cooperation", Press Release, Canadian Space Agency. 4 May 2008. http://www.space.gc.ca/asc/eng/media/news_releases/2003/0327.asp

[12] "NASA and India Sign Agreement For Future Cooperation" NASA Release: 08-033. 6 May 2008. http://www.nasa.gov/home/hqnews/2008/feb/HQ_08033_India-agreement.html

payload with India's PSLV-C8 launch vehicle;

c. an agreement with EUMETSAT for using meteorological data from its METEOSAT-5 in exchange for weather pictures collected by INSAT;

d. an MOU with the French National Space Centre (CNES) for the purpose of developing and implementing the Megha- Tropiques project; and

e. an agreement in June 2005 with ESA for including in Chandrayaan-1 mission three European instruments.

These examples of India's recent and active space cooperation with the US and Europe leave Canada far behind. Thus, it is in Canada's interest to look at India's space capabilities more seriously and to devise policies, regulatory mechanisms, and programs that would benefit the Canadian space program and industry. Under appropriate framework bilateral agreements with India on economic, nuclear and space technologies, Canada should allow Canadian satellites to be transferred to and launched by India.

Canada needs a country-specific (i.e. India) and sector-specific (i.e. Space) public policy regarding Canada's engagement in the Asia Pacific region. In this regard, it will be prudent for Canada to initiate the negotiation of an intergovernmental framework agreement with India replacing the 2003 interagency space-related MOU. The agreement should contain:-

a. general principles and modalities of space cooperation,

b. a list of specific projects to be jointly undertaken by both the countries,

c. the mechanisms for implementation of these projects by identified public and private entities and academic institutions,

d. a provision for speedy compliance with, or exemption from, regulatory controls under the Canadian Export and Import Permits Act and the Remote Sensing Space Systems Act as well as similar regulatory constraints in India,

e. a provision for easy exchange of space scientists and technical personnel, and

f. a procedure for monitoring progress and further consultation.

CONCLUSION

i. IPR Issues In Space Activities:

World Economic Development: Aid or Impediment? IPR can aid if it contributes to promote the progress of Outer Space Activities. Monopolistic behavior must be avoided! Appropriate legislation should be initiated in timely manner. Patents on orbits which are subsequently not used are worse than ITU frequency allocations, which unused become available. Someone else's IPR is always a barrier to overcome somehow. UN resolutions require national legislation to have any effect.

ii. Comparative Study Of Indian, U.S.A. and Canadian Space Laws

The US and Europe, with their well focused, carefully planned and sufficiently financed programs, have been pursuing much more active and significant space collaboration with India in order to supplement their own space activities by reducing their costs and taking advantage of the Indian expertise and facilities. Both the US and Europe work with India through the US-India Joint Working Group on Civil Space Cooperation and the EC-India Joint Commission respectively.

Pursuant to the proposed framework agreement, an India-Canada Joint Working Group should be established for regular discussions regarding collaboration in the public and private space sectors. In addition, joint seminars and workshops for the exploration of possible targeted collaborations might also prove useful in making the respective parties aware of each other's technological strengths and opportunities. In this regard, the Canadian private enterprises should be allowed to participate in the suggested India-Canada Joint Working Group. They should be encouraged and supported to act as the implementers of some projects pre-determined under the proposed framework agreement.

The proposed India-Canada Joint Working Group should have the task of examining all barriers and suggesting means to resolve them for enhanced India-Canada space cooperation. Indo-Canadian space partnership could promote their presence in the commercial space field by fostering competitiveness among their respective private companies in the global space market, which has already become a US$250 billion industry. Moreover, space being a highly visible sector would help build closer strategic relations between these two nations, and consequently, bring broader business cooperation and economic benefits to their respective peoples.
