

# 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.<sup>1</sup> Even the competition between two companies starts.<sup>2</sup>

### **Space Tourism –Basic Concept**

“Space tourism” has been defined as “any commercial activity offering customers direct or indirect experience with space travel”.<sup>3</sup> 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....”<sup>4</sup>

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.<sup>5</sup>

### **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<sup>6</sup> (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<sup>7</sup> concerning the ISS with effect against third parties.

#### **4. Outer Space**

A significant provision is Art. VIII of the Outer Space Treaty, 1967<sup>8</sup> 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<sup>9</sup> (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<sup>10</sup> 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.<sup>11</sup> 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<sup>12</sup> 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.<sup>13</sup> 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..."<sup>14</sup>

The most significant requirements for the licensing of any space activity carrying space flight participants include the following<sup>15</sup>:

- (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<sup>16</sup> and national space laws. However, the Registration Convention does have deficiencies in light of a marked decrease in the registration of space objects.<sup>17</sup>

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.”<sup>18</sup>

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.<sup>19</sup>

### **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.<sup>20</sup> The terms “astronauts,”<sup>21</sup> “personnel of a spacecraft,”<sup>22</sup> and “envoy of mankind,”<sup>23</sup> 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<sup>24</sup>. 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’<sup>25</sup>

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.<sup>26</sup> 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).<sup>27</sup> 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.<sup>28</sup>

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.<sup>29</sup> 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".<sup>30</sup>

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.<sup>31</sup>

### **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.<sup>32</sup> 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.<sup>33</sup>

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.<sup>34</sup> 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<sup>35</sup> 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.<sup>36</sup>

Most importantly, the Liability Convention is effectively an elaboration of Article VII of the Outer Space Treaty<sup>37</sup> and is based on the premise of state liability.<sup>38</sup> 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.<sup>39</sup>

The Liability Convention, though not referring anywhere explicitly to the concept, only deals with third-party liability.<sup>40</sup> 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.<sup>41</sup> 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.<sup>42</sup>

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,<sup>43</sup> 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.<sup>44</sup> 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.<sup>45</sup>

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 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, authorisation 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.<sup>46</sup> 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.<sup>47</sup> 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.<sup>48</sup> Extending good wishes to Virgin Galactic, the statement coming from one of the top officials of Aviation Ministry "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."<sup>49</sup> 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<sup>50</sup> 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.<sup>51</sup>

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 focus 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.<sup>52</sup> A detailed project report on the over all aspects of space tourism were prepared.<sup>53</sup>

### **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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37. Outer Space Treaty, art. VII reads in full: "Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, 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, including the Moon and other celestial bodies."
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