

SPACE TOURISM: FUTURE OF LEGAL FRAMEWORK?

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ABSTRACT

With rapid upcoming technologies in the field of space, a vision or rather a concept has been crystallized. Space tourism is the new born vision, with the underlying motto of commercializing space. Although in its formative years in India, the possibility of having this vision turned into reality has been recognized by the ISRO. While the potential project looks promising, a lot of homework remains to be done, as the concept is still not envisaged in the institutional and legal framework in the country. In a country like ours which is still in the developing stage in the field of space technology, even if it seems to be an achievable challenge, the big question remains, if it is a pragmatic option? As establishing the industry would cost crores and being a luxurious activity, it would mean only for the few in this highly populated country. At the same time the brighter aspect of this promising project cannot be overlooked, if achieved it will be a huge milestone for the country, forming a formidable entity of its' own in the international space sector. The paper is an attempt to examine the prospects of having this facility in the country. As policies and legal challenges are numerous, the process is tenuous. In this context, it is necessary to understand the requirements of enabling legal, infrastructural and technological framework. Also, the role of private players is of paramount significance and cannot be ignored, if the promising project is to be accomplished. Since there also exists an anti-space tourism perspective, for it ought to be for a certain class of the country, combined with some other aspects which mould this perspective is dealt in the paper. The project has its own implications ranging from economical to environmental. Space being universal, legal obligations need to be followed, as international treaties and conventions play an active role. Thus, the paper on the whole examines the prospects, policy and legal challenges, requirements, anti-perspective towards the industry on the basis of current status of the system, followed by a look at the desired legal structure, the infrastructural setup and the role of private and international players in the accomplishment of the project.

UNDERSTANDING THE CONTEXT

It is easy for space tourism enthusiasts to get carried away and go overboard in extolling the prospects of establish space tourism industry. It is tempting to claim that establishing such an industry is easy, but the task at hand is not easy. For, to establish such an industry there are certain policies to be laid down, with respect to the present condition to fulfil the needs of such a industry.

Having such facility clearly can be of substantial benefit to an economy. But it is not a "tension-free"; and to claim otherwise is to "over-sell" this tourism facility, which surely is not ascertainable at a time when it is in its formative years. At the same time, however, it should not be "under-sold" either; it is surely no less if no more than any other space-programme that is presently in India's bag.

When American businessman Dennis Tito became history's first space tourist, paying his own way to the International Space Station aboard a Russian Soyuz spacecraftⁱ, it only fuelled this vision towards reality.

Technically, space tourism can be defined as "any commercial activity offering customers direct or indirect experience with space travel."ⁱⁱ While a space tourist can be defined as "someone who tours or travels into, to, or through space or to a celestial body for pleasure and/or recreation".ⁱⁱⁱ Space travels are of two types: Orbital and Sub-orbital flights. Certainly, commercial orbital and sub-orbital space tourism includes a plethora of activities ranging from parabolic and suborbital flights that expose flight participants to short periods of micro-gravity, to longer-duration sojourns aboard orbital facilities such as the International Space Station (ISS).

Looking at India's progress in the field of space technology, in the recent years, it has moved considerably up the ladder; with success in projects like Chandrayaan programme. With reliability on technology in this field, the country has wonderful opportunity of embarking into the era of space tourism. Also significant financial allocations^{iv} in The Union Budget 2012-13, which is very essential for a huge industry like this, and for that matter for past 45 years, it only eases the job of establishing such an industry.

Also what cannot ruled out, is the very important role, that of private enterprises, since space tourism is very new to India. Again, the role of legal policies and instruments which play an important role determine to a very extent, establishment of space industry in India. Since India is party to legal instruments, it is important to cross all legal hurdles or it will become

problematic to have the facility in India. But legal challenges are not just alone. A whole new set of policies are required not just confined to legal, but dealing with different pre-required pillars of the industry. Policies include different requisites for such space tourism programme.

PROSPECTS AND POTENTIAL GROWTH: IS IT VIABLE FOR INDIA?

The important segments/elements of the space tourism industry are the passengers, the infrastructure and manufacturers, and the space travel service operators and agencies. Fulfilling these pre-requisites is the first cursor for the establishment of the space-tourism industry. So, if this industry has to be established in India, we need to analyze these pre-requisites to judge the current scenario.

Since space travels cost huge, only a certain class can afford such a facility. So, in a country like India only a minute fraction of the population can afford it^v. So, at the threshold this many Indians can afford such facility, but then what is important is how many are interested in taking such flight viewing the risks involved and huge investment. There needs to be an adequate demand from the customers, to satisfy the demand-supply equilibrium in the initial phase. Also, the initial phase is certainly going to charge exorbitant prices from the customers, to kick-off the services. Customers are mostly reluctant to pay such an enormous amount to undertake this flight, mainly due to its higher price.^{vi} The price cut is expected to take place only in later phases, after some revenue is earned.

If a sustainable space tour market could be set up, even at a later stage there would be fair chances for increase in demand. Otherwise, this "price gap" must be bridged or the general public will have to accept that a self-sustained market will never show up.

The question is again, is it viable for India? If the industry is to be established in the country, the requirements need to be fulfilled. Following are the basic requirements of a space-tourism industry: -

- i. **Space Vehicle-** India does not have its own space vehicle which is capable for a space activity like this, so it is left with three options of which it can work upon. The three options available are:^{vii}

- (a) Provision of the service by a foreign operator-Since in India there is no operator at present offering services of space tourism, one easy option is to initiate the service with the help of a foreign operator. Already many operators are willing to start this facility.^{viii}
- (b) Provision of the service by an Indian company with foreign built vehicles- This option will require to cross some legal hurdles and meet some regulatory obligations as some required approvals deemed important in usage or the acquisition of the space vehicle need to be obtained for regulation and permits for operation; and,
- (c) The possibility of developing a vehicle in India by independent means or through a joint venture with an international entity having the expertise and experience in this field- Already, ISRO has its eye on the prospect of space tourism. Although it is another fact, that something substantive is yet to be done in furtherance to this vision. But certainly with recent successful missions embarked by ISRO, it looks possible to carry out this project. The work will become only easier if it gets into a joint venture with a higher experienced agency which possesses the requisite expertise. This will also ensure speedier development of the project.

The first option looks as the most practical option for India for obvious reasons that India is not much developed on this front of space technology and is relatively practical to achieve keeping in mind the present situation.

ii. Infrastructure

There is no infrastructure as such in India which will facilitate space tourism activities. The basic requirements of a space travel are: (i) Space Port (ii) Ground infrastructure and (iii) Medical facilities. At present, there is clear lack of requisite infrastructure in the country and lot remains to be done. Since infrastructure is the very fundamental component for development of a space tourism industry, adequate attention is required in this sector.

CHALLENGES UPFRONT AND FUTURE?

Despite the success of the Tito flight^{ix} and the likelihood that several other space tourists will follow Tito to the ISS aboard the Russian Soyuz- essentially the same rocket that carried Yuri Gagarin to orbit 40 years earlier^x, there is no cost-effective space vehicle that can safely transport visitors to and from orbit.^{xi} The Soyuz can only accommodate one passenger and two crew members; it does not have the capacity to play a significant role in the development of space tourism other than to show the world that demand for such tourism indeed exists, even at prices of \$20 million per trip.^{xii} This factor alone then becomes enough to discard the viability of having this facility when one tries to access its probability and when India is dependent on others for such vehicles, it only becomes more problematic for it.

Secondly, people generally tend to see space related to communication purposes only, and view it as cyber space. The very notion of space being used for commercial luxurious purpose is not a popular view among people. Awareness regarding the same is very important, if it is to be started as a commercial industry. Even if awareness is raised about such an industry, travel costs of such flights only negates such awareness.

Thirdly, in establishing a commercial industry like this, state cannot simply ignore the green factor involved. Space travels have an effect on environment. In a study released in October 2010, climate scientists concluded that as few as 1,000 rocket launches per year would cause worldwide climate change.^{xiii} As the world continues to step into space even as the rise of a commercial space industry threatens our own planet's climate. The carbon dioxide emissions from an orbital trip to the ISS on a Soyuz launcher have been estimated to be 143 tonnes per passenger.^{xiv} Current space and environmental law only tangentially relate to the problem of climate change caused by space tourism.^{xv}

Fourthly and most importantly the financing of space travels and establishment of the industry remains a huge challenge. In the case of OECD, its space agencies have spent approximately \$1 trillion since 1961, but without reducing the cost of getting to space at all. Hence, the first obstacle for starting commercial space transportation service is the requirement of a transportation system which will enable the functioning of such a service. Initiating space tourism as a venture which first requires development of a specially assigned passenger transportation system appears to be highly unfeasible.^{xvi} Indian can play an important role in the development of low-cost space tourism based on its affordable space technologies. ISRO

was allocated a budget of \$1.27 billion for 2009-2010.^{xvii} A 38 percent increase over last year — under the budget approved Feb. 26 by India's Parliament.^{xviii} In the present year too, The Department of Space of which ISRO is the primary research and development arm, has gained a substantive financial allocation in the Union Budget 2012-13^{xix}. While the estimated operating cost for such space flight is US\$ 600,000 per launch.^{xx} So certainly with fat budget allocations and invention of reduction cost in such travels can immensely improve the chances of space tourism in India.^{xxi}

Fifthly, there is need of enough entrepreneurial interest to kick start luxurious commercial activity like space tourism. Since, such an activity requires huge investments, it is out of reach of many entrepreneurs, and only those possessing enough wealth along with the spirit of adventure can jump into the sector of space tourism. With promising returns especially being circumstantial as it heavily depends on how the actual demand combined with other forces comes out for such activity. Also, when huge returns are not expected in short time, it only dilutes the entrepreneurial interest. However, a positive step can be taken by the Indian Government in this direction, if it agrees to lessen the burden of taxes or waives it, at least in the initial few years of the project.

NEED FOR COHERENT LEGAL FRAMEWORK?

There is ambiguity over the very fundamental definition of space in legal terms, as there is yet no clear definition of outer space and there is uncertainty regarding the demarcation as to where the outer space begins. Since, space tourism activities include the use of an aircraft and/or spacecraft, as a result of which a variety of legal issues arises. So relevant air and space laws apply in case of such activities depending upon its nature and purpose. The two legal regimes have historically evolved independently from each other and accordingly show some major differences.^{xxii} As the Outer Space activities continue to develop, the ambiguity regarding the indefiniteness over the distinct outer space demarcation, it becomes all the more important for practical reasons why a clear legal distinction between “commercial aviation flights” and “commercial space flights”^{xxiii} should be properly determined.

Without governmental support, an appropriate regulatory regime and organisational framework (i.e., regulatory body or authority), even the most innovative of ideas rarely develop to become

commercially exploitable.^{xxiv} But again that being said if we observe the present Indian scenario, the Indian Government has not framed any specific domestic laws pertaining to space. Since the international law of outer space negates any claim of sovereignty, it becomes imperative on the part of the legislature to enact domestic laws in this particular sector. This is clearly stated in Article II of the Outer Space Treaty.^{xxv}

However as stated above there is no substantive step taken by the Government of India to work on the India's international treaties obligations related to space. Thus, despite increasingly opening space activities to the private sector, commercial enterprises continue to remain subject to the guidelines and procedures occasionally issued by DOS and such other relevant orders as are, or may be issued, by other relevant government departments or ministries.^{xxvi} To implement international treaty obligations at the domestic level is very much necessary and required when a new industry like this is to be established. The prime objective for the use of outer space has always been to achieve socio-economic development objectives as expressed in the Citizen's Charter issued by the Department of Space.^{xxvii}

The commercialisation of space launch services raises two categories of legal issues: (i) the first consists of treaty obligations arising out international space treaties that can only be given effect if the Parliament enacts specific national laws, and (ii) legal issues that inevitably arise when the private sector participates in the commercial space sector to meet the ever increasing demand for space enabled applications from domestic and international markets.^{xxviii}

Now, it becomes important to look at the requirements of the law which are required for establishment of a space travel industry: -

- i. ***International Obligations-*** By virtue of Article 1 of the Convention on International Civil Aviation to which India is a party each State possesses complete and exclusive sovereignty over its territory, including the superjacent airspace. This is also evident from its presence in customary international law.^{xxix} Thus, it becomes imperative on the part of the State to take appropriate permission from the State over which's territory or airspace its aircraft or an object passes. Here, it becomes important to throw light on another important issue of delimitation of Airspace and Outer Space.

At present there is no clear physical line determining the end of Airspace and beginning of Outer Space. However, generally the area above 110km is regarded as part of the Outer Space. While, the status of the zone between 80 km and 110 km is highly

controversial.^{xxx} Thus, it is very important to establish a clear demarcation between the Outer and the Airspace. Also the absence of any customary or conventional international law permitting free passage of space objects through the Airspace over the territory of a foreign State during their ascent and descent trajectories stresses on getting the required permission from the States over which their space objects is passing. Also in the present scenario in the absence of clear demarcation, the issue arises as to what laws should apply to space tourism? Since relevant law applies depending upon the jurisdiction and liability, it becomes important to identify *what law applies where*. However, the most appropriate approach seems to be the application of space law to the entire journey on the basis of the proposed function of the spacecraft carrying tourists- that is, the intention that it involves flight in outer space.^{xxxii} Again it depends on what type of model, aircraft is built. Suppose it is developed on the lines of *SpaceShipOne*^{xxxiii} model. Then, certainly air law applies to the aircraft used both before and after separation. But then the question arises whether the space vehicle is part of the aircraft or an aircraft itself before and after the separation. Going by the definition of Chicago Convention, Aircrafts are defined as "all machines which can derive support in the atmosphere from the reactions of the air."^{xxxiiii} While one proposal is that the aircraft and the attached space vehicle should be considered an "aircraft" until separation and air law should apply both to the aircraft and the space vehicle before separation.^{xxxv} And after separation from the aircraft, space law should apply to the suborbital vehicle. The reason is that the vehicle clearly has the objective of reaching outer space, which is evident from the fact that such flights are often advertised as commercial flights or space travel. Although such issues will be settled only when the space industry is established and necessary domestic legislation work has been laid down.

- ii. ***International responsibility and liability for National Space Activities-*** Being a party to 1967 Outer Space Treaty, India along with other parties is internationally responsible for the space activities of both their public and private entities. Also the parties have to ensure, that any space activities even facilitated by non-governmental entities have to be carried out in conformity with the provisions of the Outer Space Treaty as they are obliged to do so under the Treaty. So, in order to meet with the international obligations,

harmonization at the domestic level becomes very important. It is because of its importance only that the U.S. and some European countries have already initiated the process of drafting and adopting such harmonized safety standards. Since uniformity of technical standards and procedures for space travel vehicles and spaceports will be imperative for the success of the space tourism industry, it will be in the interest of all those countries, including India, to strive to achieve such uniformity through international bodies like the International Civil Aviation Organisation (ICAO), which has extensive expertise and experience in setting technical standards and procedures for civil aviation.^{xxxv} Also since India has ratified both the 1972 Liability Convention and the Outer Space Treaty, being a state it will be held liable internationally in case of any contravention of any of the norms of such convention or treaty, which causes damage or injury caused by spacecraft.

iii. ***Absence of National legislation-*** At present there is no domestic legislation pertaining to space activities. It indeed becomes a serious concern, if it is to be carried out in India. Since India is a party to international agreement, it has to meet the obligations, for which it will have to enact specific laws addressing to space activities and fill the lacunae. Going by the current scenario, there is only single legislation pertaining to aircrafts, Indian Aircraft Act of 1934. But again the issue comes whether it will suffice for space activities? The answer is No. One solution to it is that it can be amended in accordance with the required regulatory mechanism or an exclusive new legislation can be enacted to regulate and conduct such commercial activities like space tourism. While, the three essential characteristics of State responsibility are as follows:^{xxxvi}

- (a) The existence of an international legal obligation in force between the States concerned.
- (b) Occurrence of an act or omission, which violates that obligation and which is imputable to the State responsible.
- (c) The unlawful act or omission must have resulted in loss or damage. Treaties relating to outer space have also certain special provisions on state liability. Article VII of the Outer Space Treaty imposes liability for damage on each state party that launches or procures the launching of an object into outer space and also launched.

Article 51 of the Constitution of India speaks of promotion of international peace and security and lays down as India's objective under this article in the international sphere and provides

the basis for the domestic implementation of international treaty obligations^{xxxvii} and it is through this article that it derives obligations arising from the international space treaties.

The new laws to be enacted should deal with all the relevant aspects of space travel including: compulsory registration of spacecraft; nationality; marking; fitness of spacecraft; air worthiness/space worthiness; medical standards; licensing of space crew and safety precautions for launching; liability; and, technical standards.

While Article 253 of the Indian Constitution empowers Parliament to make any law applicable to the whole or any part of the territory of India for implementing international treaties, agreements and conventions.^{xxxviii}

CONCLUSION

After an analysis of the different facets of having space tourism in India, the author feels that having this facility is very much possible in the country with rising technology and recent success in different projects by the ISRO. Although it will take some time to have this facility in reality as a lot of work remains to be done. Infrastructure and legal hurdles pose a huge challenge before the state. Financial allocations are again one major issue, since the investment has to be huge considering the international experience in the sector. But the author strongly feels at the current point of time, starting such a luxurious commercial activity out of financial allocations of the Union Budget would be unjust to the majority of the society as it is of negligible significance to them. Also, there is much to be achieved in the space sector, where India still lags behind the other developed nations. Although the author feels that starting such a facility would certainly enhance its position in the international space sector. If financial allocations are adequate, legal requirements and most importantly the technological and infrastructural required at its place, India in coming years can certainly embark into this era of space technology i.e. space tourism.

ENDNOTES

- ⁱ Retrieved 12 September 2019 from <http://www.space.com/11492-space-tourism-pioneer-dennis-tito.html>
- ⁱⁱ Hobe, S. & Cloppenburg, J. (2004). Towards a New aerospace Convention? Selected Legal Issues of "Space Tourism". In *Proceedings Of The Forty-Seventh Colloquium On The Law Of Outer Space*, (377,377).
- ⁱⁱⁱ O'Brien, Z. N. (2004). "Liability for indistry, Loss or Damage to the Space Tourist", In *Proceedings Of The Forty-Seventh Colloquium On The Law Of Outer Space*. (377, 377).
- ^{iv} The Union Budget 2012-13, presented in Parliament, The Budget proposals for the Department of Space have been formulated under the frame work of Decade Profile 2010-20 and proposals for Twelfth Five Year plan (2012-17). The BE 2012-13 for Department of Space stands at ` 6715.00 crores comprising of ` 5615.00 crores Plan outlay and ` 1100.00 crores Non-plan outlay. The outlay has been arrived at taking into account the Programmatic targets set for 2012-13.
- ^v As according to the 2008 Capgemini & Merrill Lynch Annual World Wealth Report, there are 84,000 Indians with disposable net worth greater than US\$ 1 million.
- ^{vi} Since there is only one research on this aspect of space tourism by the UPES team in India. The research revealed: Overall, this analysis revealed that although 25% of respondents were interested in participating in a space tourism trip even after hearing the flipside description of such travel, none of the survey respondents were willing to pay the current price charged for a suborbital trip.
- ^{vii} University of Petroleum and Energy Studies, Dehradun. (2010). *Space Tourism in India*. A Report Of An Interdisciplinary Research Study By The University Of Petroleum And Energy Studies, Dehradun. (pp. 20).
- ^{viii} Virgin Galactic is one such operator which is keen in broadening its travel services base, this is also evident from the fact that Spizo Travels is functioning in the country-which is a dedicated marketing wing for India for this purpose.
- ^{ix} The Tito flight definitely left some positive vibes following its completion. Before the Tito flight, space tourism was never contemplated by the International Space Partners. Atleast now it is considered within the practical realm.
- ^x Collins, P. (2003). *Growing Popular Interest in Space Tourism: Challenge and Opportunity for Space Agencies*. IAF paper no. IAC-03-LBN.1.08. Retrieved from [http://www.spacefuture.com/archive/growing popular interest in space tourism challenge and opportunity for space agencies.shtml](http://www.spacefuture.com/archive/growing%20popular%20interest%20in%20space%20tourism%20challenge%20and%20opportunity%20for%20space%20agencies.shtml)
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- ^{xii} Ibid.
- ^{xiii} Mann, A. (2010). Nature News. *Space Tourism to Accelerate Climate Change* (Oct. 22, 2010). Retrieved from <http://www.nature.com/news/2010/101022/full/news.2010.558.html>.
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- ^{xviii} Retrieved 24th August 2019 from <http://www.space.com/8043-india-boosts-space-budget.html>.
- ^{xix} The Union Budget 2012-13, presented in Parliament, The Budget proposals for the Department of Space have been formulated under the frame work of Decade Profile 2010-20 and proposals for Twelfth Five Year plan (2012-17). The BE 2012-13 for Department of Space stands at ` 6715.00 crores comprising of ` 5615.00 crores Plan outlay and ` 1100.00 crores Non-plan outlay. The outlay has been arrived at taking into account the Programmatic targets set for 2012-13.
- ^{xx} Mirchandani, R. (2008). BBC News. "Branson unveils space tourism jet". 28 July 2008. Retrieved from <http://news.bbc.co.uk/2/hi/science/nature/7529978.stm>.
- ^{xxi} By the year 2020, it is expected that Virgin Galactic would lower its operating and marketing costs by a further 25% from US\$ 0.09 million to US\$0.06 million/launch and US\$ 1.35 million to US\$0.09 million/year by 2030.

- ^{xxii}Hobe,S. (2007).*Legal Aspects of Space Tourism*.86 Neb. L. Rev. (2007) Retrieved from <http://digitalcommons.unl.edu/nlr/vol86/iss2/6> 440
- ^{xxiii}Rankin, R. Thomas. (2003). Note. *Space Tourism: Pack, Ugly T-Shirts, and the Law in Outer Space*. (2003) 36 Suffolk U L Rev 695. (pp. 697).
- ^{xxiv} University Of Petroleum and Energy Studies, Dehradun. (2010). *Space Tourism in India*. A Report Of An Interdisciplinary Research Study By The University Of Petroleum And Energy Studies, Dehradun. (pp. 35).
- ^{xxv} Article II, Outer Space Treaty- “Outer space...is not subject to national appropriation by claim of sovereignty , by means of use or occupation, or by any other means”.
- ^{xxvi}B., Bhatt, S. (Ed.) *Space Law In the Era of Commercialisation*. (2010). (pp. 193).
- ^{xxvii}ISRO. (2008). *The Citizens’ Charter*. Retrieved from <http://www.isro.gov.in/rep2008/citizens.htm>
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- ^{xxxvi} B., Bhatt, S. (Ed.) *Space Law In the Era of Commercialisation*. (2010). (pp. 133).
- ^{xxxvii} Constitution of India, Part IV, Directive Principles of State Policy: “Article 51. Policy of international peace and security: The State shall endeavour to: (a) promote international peace and security; (b) maintain just and honourable relations between nations; (c) foster respect for international law and treaty obligations in the dealings of organized peoples with one another; and (d) encourage settlement of international disputes by arbitration.”
- ^{xxxviii} Article 253 states: Notwithstanding anything in the foregoing provisions of this Chapter, Parliament has power to make any law for the whole or any part of the territory of India for implementing any treaty, agreement or convention with any other country or countries or any decision made at any international conference, association or other body.