

SPACE TOURISM AND PERMANENT HUMAN SETTLEMENT: THE LEGAL AND REGULATORY ISSUES

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As humankind continues its advance beyond the final frontier, with decreasing costs in space transportation, space tourism and permanent settlement in space will soon become a reality. As with any other human endeavour, the law is either overly well prepared, or is grossly unprepared. The question to be explored with this paper is, simply put, is the law ready for space tourism and settlement?

Prospects of Space Tourism

The existing space businesses have become commonly acceptable by the general public. More than ten million people yearly visit a space museum, a space camp, a rocket launch-recovery site and government space R&D centers. This tourism alone generates revenues estimated at approximate \$1 billion per year. The space travel and tourism business is not only emerging, it is one that already exists. It is therefore important to review the trends in the development of this industry.

The travel and tourism business is the largest in the world. For example, in the U.S. alone, the general estimate is more than \$400 billion per year. As the space travel and tourism business becomes more mature, it is inevitable that this development will soon attract a significant portion of the tourism dollar. In fact, governmental and private organizations like the Space Travel and Tourism Division of the STA, the Space Tourism Society, Space Adventures Inc, Spacetopia Inc, Zegrahm Space Voyages Inc have all been founded to realize it. Further, Robert Bigelow and Richard Branson have found Bigelow Aerospace and Virgin Galactic Airways for the same purpose.

There have also been increasing opportunities to consider the feasibility of space tourism at international conferences or workshops such as IAF Congress, the STA Conference, the 2nd International Symposium on Space Tourism, the UK-Japan Space Tourism Workshops, 22nd International Symposium on Space Technology and Science, and others. In

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the proceedings of the 2nd UK-Japan Workshop in 1999, it was concluded “with a high probability [that] there will be a substantial business in space tourism in the first quarter of the next century”.

Market Research and Studies

In the 1980s, the market research for space travel and tourism had been considered in many papers. However, the first actual market research was done by the Japanese Rocket Society in Japan in 1993. The rate of positive people was about 70% who want to travel to space, and almost 50% people would agree with the air ticket equivalent to 3 months' pay. Other surveys have been conducted in Canada, Austria and U.S. with similar results. Even now, the work to identify the size and extent of this space tourism market has been continued with great vigour by the Space Travel and Tourism Enabling Committees at Space Transportation Association (STA). Although in deed, it is necessary to find the source of the funds required for a credible survey or the potential size of the market¹.

Feasibility Studies in Japan

The feasibility studies of space travel and tourism have been conducted actively in Japan, United Kingdom, Germany and the United States.

In Japan, the Japanese Rocket Society has encouraged the conduct of broad space tourism studies with three ad-hoc research committees. In the Commercial Space Activities Legislation Research Committee, the work was to research the important conditions applicable to the legislation required for commercial space tourism activities. As a result of the work, a paper on some aspects of the “Space Navigation Law” is presented which can establish means to ensure the safety of space vehicles, to prevent damage due to their operation

and to maintain order between enterprises utilizing space vehicles.² As the existing aviation law of Japan stipulates that the ICAO should be respected in its processes, standards, methods and procedures, it was pointed out that such an international institution as “International Space Flight Organization”, which is currently under consideration of the FAA, is eventually needed.

Feasibility Studies in the U.S.

If space transportation safety and reliability could be sharply increased, and per passenger costs could be reduced substantially, general public space travel and tourism have the potential to become a large market. In 1994, the six major U.S. aerospace firms concluded this in their Commercial Space Transportation Study (CSTS).³ Further, the Institute of Electrical and Electronic Engineers has conducted the national study entitled “What the United States Must Do To Realize The Economic Promise Of Space”.

In addition to these studies conducted by private entities, an initiating study has been conducted by NASA and STA under the “Space Act Agreement”⁴ during 1996-1997. The National Public Space Travel and Tourism Study Steering Group which was formed in the Fall of 1996 for the NASA-STA study concluded that private, high priced “adventure” trips to space with greater than today's commercial airline risk could become possible in the next few years. Tourism on a much larger scale with lower-priced orbital operations can then commence in the decade thereafter.

However, for this to become reality, a number of psychological, technological, operational and institutional inhibitions must be settled. The space tourism will become successful civil space business-program and can be capitalized on human space-flight public expenditures.

In this study, the novel ideas emerged that a lottery and an auction have the possibility to break through the financial problem. They would be conducted only twice each year, with a lottery and auction for Shuttle trips and again for combined Shuttle-Space Station trips. After the market has been sufficiently gauged and the demand ascertained, this can then be conducted by private entities.

This "lottery" concept is not without precedent. For example, the Department of State's Immigration and Naturalization Service conducts an international visa lottery. Closer to space, the Federal Communications Commission (FCC) has auctioned off use of portions of the electromagnetic spectrum.⁵ Space tourism may, therefore, become a reality much sooner than most people would imagine.

Application of Space Law to Tourism

To state the obvious, there are four important international agreements that relate to activities in space, including tourism. They are the Outer Space Treaty, the Liability Convention, the Rescue Agreement and the Registration Convention. By tourism, we are referring to the concept of space travel in a spacecraft through sub-orbital or orbital space rather than the concept of having hotels or colonies in orbit or on the Moon. Those concepts we refer to as settlement.

Outer Space Treaty

Under the Outer Space Treaty, the states are required to take responsibility for its space activities.⁶ Further, they are also required to undertake the authorisation and continual supervision of non-state space activities.⁷ In cases of state-run space tourism ventures it is a particularly simple one, but in the case of privately-run space tourism it would be a case of determining which ones are the "appropriate States".

Although the Treaty itself does not provide much guidance, the writings over the past decades on the subject would tend to indicate that the appropriate state(s) would be the ones in which the space tourism enterprise would be based. Simplistically put, a Japanese-owned space tourism venture would make Japan the "appropriate state", regardless of its structure and the extent of private or foreign ownership.

Liability Convention and Related Issues

As with any other space object, the Liability Convention would apply to any spacecraft that is launched from the surface of the Earth into sub-orbital or orbital space. This means that the liability for any damage incurred by third parties rests squarely on the "launching States". "Launching states" is defined as those that procured the launch and those from whose territory or facility the vehicle is launched.⁸

With this reasoning, any damage caused by the spacecraft to third states in the ground, in the air or in space as a result of collisions is simple enough. Turning to the issue of liability to persons at the "spaceports", it is clear law that the "launching states" do not owe a liability under the Convention to "invitees" at the launch because the "invitees" would have consented to the risk of the launch.

In any event, since the "invitee" would be within the territory of a launching state, the liability would be a domestic one subject to the regulation of local statutes and relevant tort principles. Without the exhaustion of local remedies, France, for example, cannot sue Panama if a French tourist was injured in an accident at the Panama Canal.⁹

In the case of passengers, it may be more relevant to consider that, as the state of registry under the Registration Convention applies its jurisdiction to the

spacecraft, any claims for damage incurred by the passenger would be pursued within that state of jurisdiction.

Further, there is no reason why the principles of aviation law, as governed under the relevant conventions, would not apply to the spacecraft. As a result, the liability to a passenger would be limited by operation of the conventions. This is because the spacecraft would be travelling through airspace for most of its journal and, in any case, this may be the only benefit resulting from the uncertainty in the delimitation of airspace and outer space.

If aviation law can indeed apply to space tourism relating to liability to passengers, then this would overcome the problem of the lack of liability to a launching state's own nationals under the Liability Convention. If aviation law cannot apply to space tourism, then a similar limited-liability régime with consistent application to all passengers should be adopted.

Registration Convention

The function of the Registration Convention is to provide a centralised means of identifying a state as having jurisdiction over a space object.¹⁰ This is similar to shipping law, where registration with a state merely indicates that the law of the flag applies to the ship. This does not mean that the shipowner must be of the state of registry nor does it imply that the liability would be limited to that state.

In the case of spacecrafts, the same parallels can be drawn. A Japanese-owned space tourism venture can have a spacecraft registered under any state, even a "flag-of-convenience" as in maritime shipping. This does not remove the liability of the Japanese company, or Japan itself upon exhaustion of local remedies, in cases of damage caused to innocent third states.

Rescue Agreement

The Rescue Agreement imposes two general obligations on states. First, a state is required to render any assistance to astronauts, the "envoys of mankind", should they require it in space or upon re-entry on Earth. Second, a state is obliged to inform the "launching states" and the Secretary-General of the United Nations if it discovered that a space object has returned to Earth and, if requested, take practical steps to recover and return the space object to the launching states.¹¹

This is similar to situations on the high seas, where a ship would be expected to be a good Samaritan and render assistance to other vessels in need. Spacecrafts would therefore be obliged under the Rescue Agreement to go to the aid of other vessels, to rescue passengers in need or to assist in the evacuation of the International Space Station, should the need arises.

Permanent Human Settlement

The idea of settling and colonising the final frontier is not new, as the numerous science fiction novels involving such a concept would suggest. However, the legal issues relating to human settlement in space have no ready-made solutions available. It has been suggested that, in addition to the commonly resolved issues relating to liability and jurisdiction, the further issues that needs to be tackled include:

- the regulation of the settlement of the colonists;
- the creation of justice based on international law and the settlement of disputes;
- ensuring that the space settlements are not used for non-peaceful purposes.¹²

Regulation of Settlement

According to the Outer Space Treaty, celestial bodies are not subject to national appropriation by any means. Since intergovernmental organisations base their legal authority on agreements between states, an international organisation cannot do what states cannot do. As a matter of principle, a private citizen or corporation also cannot do what the state that it belongs to cannot do.

The first issue that becomes clear apparent is the fact that there is no basis to protect any property rights in the real estate that an adventurous space colonist may wish to "acquire". Of course, once a settlement is built, it becomes an "installation" just like any other, but the Outer Space Treaty provides that anyone has the right to reasonably access any installation.

These two principles, taken together, produces two bizarre outcomes. First, any colonist must theoretically make their home available to anyone who decides to pay them the honour of a visit, invited or otherwise. Second, should our adventurous pioneers also become enterprising or home-sick at the same time, they cannot sell their settlement because they never owned it: *nemo dat quod non habet*.

In practical terms, this means that anyone has the right to build a settlement on the Moon or in orbit and live in it, but one cannot dispose of that property or settlement to anyone else. As a result, it would be virtually impossible to provide a coordinated way of settling a particular celestial body without a very high degree of cooperation and compliance from the enterprising colonists.

Creation of Law

It has been pointed out that a distinction should be drawn between settlement on a space station or the Moon, with a clear intention to return to Earth, or a creation of an international settlement on another planet, such as Mars.¹³ In the case of an orbital station or one on the Moon, the time in transit between the stations and Earth is a matter of days. As a result, there is not a significant degree of difficulty in the state of registry exercising its jurisdiction and enforcing its laws.

In the case of Mars, the situation is somewhat different. Travelling between Earth and Mars can take months, if not a year or more. The exercise of jurisdiction and control over such a settlement by the state of registry can take years. In the Draft Convention on Manned Space Flight, it was suggested that a flight commander for the mission would assert sole authority throughout the flight.¹⁴ Slowly, the law for the colony, either through the authority of the commander or by majority decision-making of the colonists once arrived.¹⁵

Peaceful Uses of Settlements

The Outer Space Treaty and the Moon Agreement both imposes obligations on states to ensure that space is used exclusively for peaceful purposes. This in effect means that the carriage of any weapons into space or the production of weapons in space would be contrary to international law. Clearly, the treaties intends for disputes in space to be resolved on Earth and by peaceful means.

The colonists must not resort to military force in resolving disputes between themselves and between them and parties on Earth. However, the prevention of military activities in space by the colonists themselves would, in practice, need to be self-regulating and self-policing.

Self-Determination?

As any settlement in space must be international in character, it is unlikely that, in the scenario described above, the colonies would eventually develop laws, customs and cultures that are substantially different to those on Earth. Considering that the state of registry is likely only to be a flag of convenience, it would eventually become absurd to continue to refer to a settlement in space as a "colony". After all, such a "colony" would be thousands of miles away from the "motherland" and bears no resemblance to it.

This creates a situation, as envisioned above in the discussion on peaceful uses of space, where the colonists may undertake acts or omissions that are contrary to principles of international law. It would be absurd to attempt to impose any liability for loss or damage incurred as a result of this contravention on the state of registry, even though by being the state of registry it has in essence consented to such an operation.

Further, the settlement may satisfy all customary legal requirements for self-determination. They may well develop into a distinct people with its own laws, customs and perhaps even language (Esperanto, perhaps?). Since our pioneers on the final frontier are equally entitled to their right of self-determination as anyone else on Earth, it would appear unjust for such a settlement not to be given the right to nationhood, with recognition by other states on Earth and even admission to the United Nations.

Conclusions

When the treaties and conventions were drafted, adopted, signed and ratified by the countries on Earth, there was little anticipation of the pace of humankind's advance into space. That was a situation

of the law being grossly unprepared for the commercial space age that the human civilisation reside in today.

With the prospect of space tourism and even human settlement in space soon becoming a practical reality, the world faces an opportunity to be well prepared. However, unless there are committed efforts on the part of the international community, our civilisation risks being unprepared again for our next logical small step that will undoubtedly become a giant leap for mankind.

Notes

- ¹ Collins, March 2000, "The Space Tourism Industry in 2030", Proceedings of Space 2000, ASCE, Page 592-603.
- ² Funatsu, April 1999, "Some Aspects of Space Navigation Law", http://www.spacefuture.com/archive/some_aspects_of_space_navigation_law.shtml, pp. 1-2.
- ³ CSTS Alliance, "Commercial Space Transportation Study", Final Report (1994), by Boeing, General Dynamics, Lockheed, Martin Marietta, McDonnell Douglas and Rockwell, sponsored by NASA's Langley Research Center. Sections 3.5.6 "Space Tourism".
- ⁴ The Space Act of 1958 § 203 (c) (5) and (6); 42U.S.C. §2473 (C), as implemented by NASA Management Instruction 1050, s 9A.
- ⁵ O'Neil et al., "General Public Space Travel and Tourism", http://www.spacefuture.com/archive/general_public_space_travel_and_tourism.html (1998), p. 16.
- ⁶ Outer Space Treaty, Article VI.
- ⁷ *Ibid.*
- ⁸ Liability Convention, Article I.
- ⁹ See, for example, *The Ambatielos Arbitration* (1956) 12 R.I.A.A. 83; and Article 22 of the International Law Commission Draft Articles on State Responsibility (1996) G.A.O.R., 51st Sess., Supp. 10, p. 125.
- ¹⁰ Registration Convention, Article II.
- ¹¹ Rescue Agreement, Article 6.
- ¹² Lazarev, "Future Space Cities (International Legal Aspects)" (1980) 5 Ann. Air & Space L. 529.
- ¹³ Fasan, "Human Settlements on Planets: New Stations or New Nations" (1994) 22 J. Space L. 47 at 52.
- ¹⁴ Böckstiegel, Vereshchetin and Gorove, see (1990) 18 J. Space L. 209ff.
- ¹⁵ Fasan, *op. cit.* n. 13, at 53.