

SPACE LAW IN THE 21ST CENTURY

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1. Introduction

It is an honour to address this International Conference on Air and Space Law, organized by the National Law University in Delhi.

In this paper, I will present some current issues of space law in the 21st century. First, I would like to present a brief overview of the history of space law making in the international geopolitical context. I will also recall some of the main principles as elaborated in the framework of the United Nations. After this, I will discuss a number of topics that merit closer attention because they can have significant impact on the future of space law—and the future role of space lawyers.

2. Defining outer space

One of the fundamental questions is where outer space begins. This is an understandable question, however there is no firm answer. The topic has been debated in the UN for several decades, but no agreement has been reached so far. Various approaches and many theories exist and I will not go into those, except to say that with the advent of space tourism, the time may come when we will be in real need of a boundary between airspace and outer space – unless we stick with the ‘functional’ approach, where air law is applied to an entire activity if the aim or function of an activity is aviation-related, and space law if its aim or function is space-related.

There is a major difference in the regimes governing air space and outer space, as the first is subject to sovereignty of the underlying state, whereas in outer space a regime of “freedom” exists (be it with certain limitations, of course...), and no state is allowed to claim sovereignty over outer space or the celestial bodies.¹

Some states have recently enacted legislation proclaiming a boundary at 100 km (e.g. Australia) and this may evolve into an example that states follow, although other states remain convinced that no boundary is necessary (e.g. the USA).

3. UNCOPUOS and some major principles

The space race started around 1957 between the two “super powers”, the USA and the then USSR, as the major ‘players’ in the space arena. This was also

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reflected in the early days of space law making. The UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS), established in 1958 first as an ad hoc and later as a permanent committee of the United Nations, initially had around twenty member states, which enabled the committee to reach consensus relatively easily. This resulted in the adoption of as many as five UN Treaties between 1967 and 1979.²

Since then, the membership has grown to some seventy states, including many more space “haves” but also numerous space “have-nots”, and it has become exponentially more difficult to reach consensus, with the result that no more treaties have been adopted since 1979.³

It is noteworthy that COPUOS has from the start recognised the need to work both in the scientific and technical field and in the legal field, and has therefore created two sub-committees, the Scientific and Technical Subcommittee and the Legal Subcommittee, which both report on the results of their meetings to the full committee.

The first and therefore possibly most important principle of space law is contained in paragraph 1 of Article I of the Outer Space Treaty. It provides that “the exploration and use of outer space [...] shall be carried out for the benefit and in the interests of all countries [...] and shall be the province of all mankind”. Of course the concepts are not clearly defined and can be subject to varying interpretations—but the general idea is clear: use of space should somehow benefit mankind. The second part of Article I however contains an important counterpart to this provision by declaring that outer space is free for exploration and use by all states, without discrimination and on a basis of equality.

The second-most important principle of space law is—no surprise—contained in Article II, which declares that outer space and celestial bodies cannot be subject to appropriation by any means. There is no ‘territorial jurisdiction’ in outer space. This implies that it is forbidden to claim ownership of any part of outer space, and this applies not only to states but also to private entities, contrary to what is sometimes argued, because there is no sovereign authority that has competence to confer titles of ownership.⁴

Some other keywords are, in a nutshell: peaceful uses; cooperation and mutual assistance; state responsibility (also for activities by private enterprises and individuals, which must be authorised and supervised by a state); state liability (again, also for private entities, which is a unique feature in international law); jurisdiction and control by the registration state; applicability of international law and the UN Charter, special regard for the interests of developing countries, avoidance of harmful contamination and consultation.

4. The International Space Station (ISS)

The ISS⁵ is truly the first and foremost example of successful international cooperation. Its financial, technological and legal challenges are enormous and

the solutions adopted are innovative and will certainly set an important example for any future international endeavour.

Its construction began in 1998 and will be completed by late 2011. The station is expected to remain in operation until at least 2015, but this will likely be extended to 2020. An uninterrupted human presence has been present in space since October 2000, thus coming very close to the previous record held by the Russian station Mir (10 years minus 8 days). Since 2009, the number of inhabitants has increased from three to six, which means that two Soyuz capsules are constantly docked to the station to bring the astronauts home in case of an emergency.

The ISS is a joint project between five partners (USA, Europe, Russia, Japan and Canada) and their space agencies (NASA, ESA, RKA, JAXA and CSA). Brazil cooperates with NASA, and others have expressed their interest. The ISS is reportedly the most expensive object ever constructed. It is the size of a football field and can be seen when it passes over our homes each day, at 350 km above our heads. The extensive research laboratories allow for cutting-edge micro-gravity research. Astronauts and cosmonauts of 15 different countries have visited the ISS, including seven tourists. With the ending of the era of the US Space Shuttle, the Russian launcher Soyuz will be the only vehicle capable of transporting humans to the station, but other nations are trying to develop technology to send humans to the station as well.

As for the legal framework, it too is innovative. The five partners signed the Intergovernmental Agreement (IGA) on 28 January 1998. For ESA, ten member states are involved (as this is a so-called 'optional programme'). A second layer of agreements consists of so-called Memoranda of Understanding (MOU), between the five agencies. At the third level, there are bilateral implementation agreements.

One of the questions that arise in terms of legal and policy aspects of this project is whether the ISS model can also serve for future endeavors, such as a mission to the Moon, or even beyond, to Mars. As the other partners become full-fledged players in the space arena, they may want to 'go it alone'.

In any case, it is clear that the experience gained with the ISS adventure will be of huge importance for any future major international cooperation in the conquest of space.

5. Space debris

Space debris consists of objects in orbit around the earth created by humans and that are no longer functional. They include for instance spent rocket stages, defunct satellites, collision fragments, and especially the smaller pieces pose a substantial collision risk; an object as small as a marble can destroy a satellite. There are about 500 objects in outer space that need protection from debris.

The present means of protection of spacecraft can only protect against debris with a diameter lower than 1 cm. Objects have to be larger than 5 cm in diameter in LEO to be tracked, and larger than 50 cm in GSO. Out of the estimated 600,000 objects larger than 1 cm in diameter, only 20,000 are tracked.

It is clear that more accidents will happen and put satellites, large structures like ISS, humans and even the nascent space tourism industry at great risk.

In terms of liability for damage caused by space debris, under the Outer Space Treaty and Liability Convention the launching state is liable for damage caused by its 'space object'; however, a precise definition of the term 'space object' is missing. Is a 'dead' satellite, a malfunctioning satellite or even a paint chip still a space object to which liability attaches? Obviously it is hard to avoid damage if you cannot control the object, but on the other hand it would be undesirable to have numerous objects in space for which no state is liable. Additional questions will be posed in the case where a satellite is sold to a foreign state or a company in another country – it is not clear whether in that case there can or should be a transfer of registration, or even of liability, from one state to another.

The UNCOPUOS has not adopted a new treaty since three decades. It has however made an important step forward when it adopted the UN Space Debris Mitigation Guidelines in 2007, on the basis of guidelines adopted earlier by the IADC.⁶ The UN General Assembly endorsed the UN Space Debris Mitigation Guidelines in January 2008.⁷ The Subcommittee agreed that "Member States, in particular space-faring countries, should pay more attention to the problem of collisions of space objects, including those with nuclear power sources (NPS) on board, with space debris and to other aspects of space debris, as well as its re-entry into the atmosphere".

There are seven guidelines, each of which has its own recommended practices and rationale/justification: (1) Limit debris released during normal operations; (2) Minimise potential for break-ups during operational phases, (3) Limit the probability of accidental collision in orbit, (4) Avoid intentional destruction and other harmful activities, (5) Minimize potential for post-mission break-ups resulting from stored energy, (6) Limit the long-term presence of spacecraft and launch vehicle orbital stages in LEO after the end of their mission, and (7) Limit the long-term interference of spacecraft and launch vehicle orbital stages with GEO region after the end of the mission.

Perhaps the collision between an Iridium satellite and a defunct Cosmos satellite in 2009 will give a new boost to the international community, convincing states of the need for further rules in this field, binding rules, rather than 'mere' guidelines. But although they are voluntary, their adoption by consensus and the adherence by many states can contribute to such rules eventually developing into rules of customary law binding on all parties benefiting from the use of outer space.

6. Exploitation of space resources

Exploitation of lunar resources is the 'next step' in the conquest of space, and mainly the reason why the 1979 Moon Agreement has remained of limited influence. The Moon Agreement is the only of the five UN space treaties that explicitly addresses exploitation, and discussions about the meaning of Article 11, declaring the Moon and its natural resources the 'Common Heritage of Mankind', have sparked heated debate. The Moon Agreement prescribes that an international regime must be set up to govern such exploitation, 'as such exploitation is about to become feasible', and in relation herewith the question of the review of the Agreement was foreseen ten years after its entry into force. The Agreement entered into force in 1984, but no decision about review was taken since—probably because exploitation is still not 'about to become feasible'. There are reports of Helium 3, Titanium, and possibly other resources, but so far no viable business can be expected.

The major challenge in this field is to find the right balance between 'benefit and interests of all countries' as proclaimed in Article I of the Outer Space Treaty, and the equally vital need for return on investment and legal certainty for entrepreneurs—that need has also been explicitly recognised in the 1996 'Space Benefits' Declaration.

Parallels for the regime governing the exploration and exploitation of the Moon can be found in the Law of the Sea (LOS) regime and in the Antarctica regime. The LOS regime also contains the term 'Common Heritage of Mankind' with regard to resources of the deep seabed. Subsequent amendments have attempted to bring the system more in line with political and economic realities, and thus more readily acceptable by all states. As far as the Antarctic regime is concerned, the situation is somewhat different as several states have claimed sovereign rights over the area, which have subsequently been 'frozen' but which are still 'around' (this is not the case for the Celestial Bodies or parts thereof). In 1991 the 'Consultative Parties' (i.e. the most interested parties with regard to these claims) decided to refrain from mining Antarctica and to 'commit themselves to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems and hereby designate Antarctica as a natural reserve, devoted to peace and science'. The mineral resources of Antarctica have not been declared the 'Common Heritage of Mankind'.

In light of this, one may wonder whether it is necessary to 'renegotiate' or otherwise amend the Moon Agreement, in order to establish an 'authority', like in UNCLOS, for example, or to transform it into something more similar to the Antarctic Treaty System. Currently attempts are being undertaken to 'revive' the Moon Agreement. Noteworthy is the 2008 'Joint Statement' in the UNCOPUOS Legal Subcommittee by the states parties, attempting to convince other states to ratify the treaty by highlighting its advantages.

7. Space tourism: aviation or space activity

Very soon we will be confronted with a new activity often referred to as (sub-orbital) 'space tourism'. Is it aviation or space flight, or something new? Are vehicles that will be used aircraft or spacecraft, or something new? Several 'space tourism' ventures are taking shape—somewhat slower than expected at the time of the groundbreaking Ansari X-Prize in 2004, but they are.⁸

One of the interesting questions that arise is whether sub-orbital space tourism will be regarded as an aviation activity or as a space activity, and whether air law or space law applies to it.

As is well known, there are many differences between air law and space law, mainly because air law is based on the complete sovereignty of the state over the airspace above its territory, while space law is based on the principle of freedom of use and exploration, and rules out any claims of sovereignty. The legal regime governing aviation is very detailed, efficient and well defined in terms of liability, registration, jurisdiction, traffic- and transit rights, certification of aircraft and crew, and other matters, so if sub-orbital space tourism were regarded as aviation, there would be no major problems or lack of rules. If however it would be considered as a space activity and would consequently be governed by space law, the legal scenario will be quite different and gaps may exist, because the rules are far less detailed and mostly regulate the relations between States.

The Outer Space Treaty did foresee that private entities would engage in space activities in Art. VI Outer Space Treaty, which makes a State internationally responsible for activities carried out by non-governmental entities, provided that it authorizes and supervises such activities. Yet one of the most essential topics for private operators, namely their exposure to second- or third-party liability is not addressed. The Treaty, as well as the Liability Convention, only addresses liability at the level of the States involved: there is no cap on the liability of operators, and no opportunity for passengers or third parties to present claims for compensation directly to the private operator.

In the United States, a temporary regime has been put in place in order to allow this new industry to make a start. US law addresses space tourism in a set of rules governing private human spaceflight, offering conditions that are less stringent than for classical transport. These rules apply at least until December 2012, but this period may be extended because commercial space tourism has not commenced as early as was expected. The FAA's Office of Commercial Space Transportation (FAA/AST) issues licenses and mostly focuses on public safety and safety of property.⁹

So, it can be seen that under current international or national air or space law there is no definite answer yet about the legal status of suborbital space tourism. On the other hand, it is very clear that space tourism will happen, if we believe market surveys that were carried out and looking at the considerable

waiting lists already in place, full of very rich people who want to experience weightlessness and see the curve of our blue planet from outer space.

8. Private property rights in space

Businesses like 'Lunar Embassy' sell plots on the Moon to interested buyers. They argue that although states are not allowed to appropriate (parts of) outer space, in accordance with Article II of the Outer Space Treaty,¹⁰ this does not bind private citizens, so they can legally sell pieces of moon to private citizens. This argument is without legal ground—of course a citizen, who is a citizen by virtue of the state giving him or her that citizenship, cannot have rights that the state itself does not have—the famous *nemo plus*¹¹ rule applies!

As mentioned above, current attempts to 'revive' the Moon Agreement culminated in the 2008 'Joint Statement' in the UNCOPUOS Legal Subcommittee by the states parties. In that statement, they point out that in conjunction with the OST, the Agreement is helpful for rejecting 'idle claims to property rights' that have surfaced in recent years. Also, the IISL has issued two statements, in 2004 and 2009,¹² about claims to private property rights in space. The 2009 statement says: "International Law establishes a number of unambiguous principles, according to which the exploration and use of outer space, including the Moon and other celestial bodies, is permitted for the benefit of mankind, but any purported attempt to claim ownership of any part of outer space, including the Moon and other celestial bodies, or authorization of such claims by national legislation, is forbidden as following from the explicit prohibition of appropriation, and consequently is prohibited and unlawful."

9. Militarization and weaponization of space: back to where it all started?

Even though a certain limit on the military use of space is contained in the space treaties,¹³ we must observe that this principle is continuously challenged in practice. Who does not recall President Reagan's 1986 plans for a Strategic Defense Initiative (SDI), also known as 'Star Wars'?¹⁴ Can that qualify as 'peaceful use of space'? It does not involve a nuclear weapon or a weapon of mass destruction, although one might argue that a laser beam can cause mass destruction... In any event, SDI never happened (but it did lead to the US withdrawal from the ABM Treaty).

Among the more recent examples, we can refer to the 2007 shutdown of an old weather satellite by China, and the 2008 shutdown by the USA of one of its own satellites that carried a hazardous gas that would not burn up on re-entry and thus pose a threat to health. There has been much debate about whether these were the true reasons behind the shutdown, or whether it was a testing of military capacity to shoot down an object far away in space. Possibly the truth lies somewhere in the middle, as is often the case.¹⁵

China and Russia believe that a new international legal instrument is needed and they promote this in the UN Conference on Disarmament. Their view is that Transparency & CBM can be complementary to a new treaty, as an intermediate measure, but cannot replace a new treaty. The latest effort dates from February 2008, by China and Russia, in the framework of the UN Conference on Disarmament, and is named the Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, Threat of use of Force Against Outer Space Objects (PPWT).¹⁶ So far, it has not gained sufficient support.

Also in this context, the EU Council proposed in 2008 a Draft Code of Conduct for Outer Space Activities.¹⁷ The Code is currently still being worked on. The main objective of the EU CoC is to strengthen the safety, security and predictability of all space activities. Among the "general principles" we find the responsibility of States "to take all the adequate measures to prevent outer space from becoming an area of conflict", but this general statement is not supported by any specific commitments, and the need to prevent space weaponization is mentioned nowhere.

The US opposes the development of new legal regimes or other restrictions that seek to prohibit or limit US access to or use of space.

It is undisputable that satellites are essential for nowadays' military operations (Iraq, Afghanistan, etc.). Space has been, is, and will always remain, an area with so much military interest and involvement that it seems impossible to demilitarise outer space entirely. Efforts to do so are doomed to fail, and have done so until now.

10. Conclusion

The general legal framework for space activities under public international law as contained in the UN treaties is in place, and is sufficiently general and flexible to enable and encourage states to carry out space activities in an orderly manner. It contains the basic provisions that allow parties to address the legal implications of space activities. But it is also clear that the time has come for the international community to agree on the further development of these general principles, starting perhaps with space debris, imminent 'new' uses of space such as space tourism, or some of the 'age-old' issues such as the weaponisation of outer space that will continue to require our attention and vigilance. Whether such rules can be in the form of non-binding guidelines, codes of conduct and the like, or should be embodied in solid legal instruments creating rights and obligations remains to be seen. In any case, a guideline can very well lead to considerable state practice and *opinio iuris* and thereby automatically become binding upon states as rules of customary international law.

Endnotes

1. See also below, where space tourism is discussed.
2. They are: (1) The Outer Space Treaty (1967), the 'Constitution' of space law; (2) the Rescue Agreement (1968), dealing mainly with the legal status of astronauts in case of an accident; (3) the Liability Convention (1972), addressing the question of liability in case of damage caused by a space object; (4) the Registration Convention (1975), creating an obligation to register objects launched into space both with the UN and at the national level; and (5) the Moon Agreement (1979), addressing the legal status of celestial bodies and specifically the exploration and exploitation of natural resources of celestial bodies. The first three treaties were ratified by close to ninety states, the fourth by around fifty and the last only by thirteen states. Since the eighties, several sets of 'Principles' in the form of non-binding UN Resolutions were adopted on several topics. All texts, official titles and sources can be consulted on the useful website of the Office for Outer Space Affairs in Vienna, the UN office supporting the work of COPUOS. See <http://www.oosa.unvienna.org>.
3. This does not mean that COPUOS has lost its relevance; to the contrary. It has been able to adapt to the changing political climate and has recently made some important reforms allowing it to continue making important contributions to the further development of space law, albeit in a different form.
4. The IISL issued a 'Statement' on this topic in 2004 and is finalising a second statement. Shrewd businessmen are selling 'lunar deeds', others claim that the existence of private property rights is a prerequisite for exploitation of lunar resources, but these claims do not hold legal ground.
5. See e.g. <http://www.esa.int/esaHS/iss.html>,
http://www.nasa.gov/mission_pages/station/main/index.html.
6. Interagency Space Debris Coordinating Committee, see <http://www.iadc-online.org/>. For the COPUOS guidelines, see the Report of the Scientific and Technical Subcommittee of 2007, UN doc. A/AC.105/890, chapter V & Annex IV. Note that a European Code of Conduct for Space Debris Mitigation was adopted by ASI, BNSC, CNES, DLR, and ESA, version 2.0 of 14/9/2007.
7. A/RES/62/217, accessible via <http://www.un.org/ga/62/resolutions.shtml>.
8. See a useful overview http://en.wikipedia.org/wiki/List_of_private_spaceflight_companies, and http://en.wikipedia.org/wiki/Space_tourism.

9. See Code of Federal Regulations (CFR), Title 14, Chapter III, esp. Human Space Flight Requirements (HSFR), 14 CFR §460, http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=6a5153b45a2675c8b05adfd8d7195483&c=ecfr&tpl=/ecfrbrowse/Title14/14cfrv4_02.tpl#300. See also Melanie Walker, *Suborbital space tourism flights: an overview of some regulatory issues at the interface of air and space law*, in 33 *Journal of Space Law* (2007), 375.
10. "Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means".
11. *Nemo plus iuris transferre potest quam ipse habeat*; no one can transfer more rights than he himself has.
12. See http://www.iislweb.org/docs/IISL_Outer_Space_Treaty_Statement.pdf and <http://www.iislweb.org/docs/Statement%20BoD.pdf>.
13. Article IV Outer Space Treaty, Article 3 Moon Agreement.
14. See http://en.wikipedia.org/wiki/Strategic_Defense_Initiative.
15. See the interesting article « Sense, nonsense, and pretense about the destruction of USA 193" by J. Oberg, March 2008, at <http://www.thespacereview.com/article/1073/1>.
16. See <http://news.bbc.co.uk/2/hi/europe/7240796.stm>. The Conference on Disarmament (CD) was established in 1979 as the single multilateral disarmament negotiating forum of the international community, see <http://www.unog.ch> under 'disarmament'.
17. Draft Code of Conduct for Outer Space Activities, <http://register.consilium.europa.eu/pdf/en/08/st17/st17175.en08.pdf>