



by **Dario Schor**

The more one learns about the 1967 Outer Space Treaty (OST), the more one can appreciate why it is often referred to as the Magna Carta of Space Law. This short document combines the different ideologies of the 1960s that included the geopolitical hostility from the Cold War and the visionary technological outlooks from the engineering community. It is inspired to some extent by the utopian views of a generation that ushered in principles of human rights, peace, and environmental protection. Since its signing 50 years ago, this unique piece of legislation has provided the foundation for a responsible use of outer space that stimulated historic international collaborations. In this column we reflect back on key developments in space exploration and how they have provided the impetus for expansion of the scope of the treaty. In the next column we cast our gaze forward to the next 50 years.

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ORIGINS OF SPACE LAW

The turn of the 20th century was filled with exciting telecommunication developments and aviation milestones that prompted the establishment of new legal regimes. Marconi's first transatlantic signals paved the way for incorporating radio transceivers in ships for search and rescue operations. The benefits were undisputed, yet they were not formalized until the 1906 International Radiotelegraph Convention defined both the SOS distress signal and the first assignment of frequency bands for different applications [1]. Similarly, advancements in aviation led to the 1944 Convention on International Civil Aviation (aka, the Chicago Convention) governing airspace, establishing requirements for aircraft registration, and defining safety standards [2]. In parallel, rocketry was transitioning from science fiction to reality with

contributions from Kostantin Tsiolkovsky in the USSR, later Robert Goddard in the United States, and others. The combination of new legal frameworks and the emerging field of rocketry gave rise to the first discussions about the laws of outer space.

The early mentions on space law extrapolated on issues from aviation and radio communications as they would apply to the new domain. For example, in 1910, the Belgian lawyer, Emile Laude, posed issues of ownership and frequency allocation as it relates to space activities, and in 1926, the USSR official, V. A. Zarzar, questioned whether the domestic airspace legislation was applicable in outer space [3]. However, the first formal publication on space law is often attributed to the Czechoslovakian lawyer, Vladimir Mandl for his 1932 manuscript "Outer space law: A problem of astronautics" [4] where he described the differences between aviation and space law. Ultimately, all these scholars and others of the time agreed that the sovereign extension of airspace above a nation would not be applicable and new laws were required for outer space.

On October 4, 1957, the USSR launched Sputnik-1 instantly transforming the theory into a very real and serious discussion on the laws of outer space. This battery powered, spherical, low orbiting spacecraft used four antennas to transmit limited telemetry over open frequencies and frighten the public about the potential militarization of space. Wisely, other nations did not object to the spacecraft flying over their territories, and set the precedent differentiating airspace from outer space. Within months, the United States launched Explorer-1 and other nations began experimenting with their own rocket technologies. The US State Department noted the rapid development of outer space and proposed the formation of a United Nations (UN) committee focused on the legal implications of spaceflight [2].

In 1959, the UN General Assembly passed resolution 1348 (XIII) to establish the Committee on the Peaceful Uses of Outer Space (COPUOS) that later became a permanent body. To date, the committee meets annually in Vienna and has grown from the initial 24 member states and become one of the largest committees within the UN with 84 member states represented. Many of the activities are discussed by two subcommittees that focus on the technological and legal developments related to outer space.

In 1963, COPUOS adopted the Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space (aka, the Principles Declaration). However, these resolutions were not binding, so in 1966, instructed by US President Lyndon B. Johnson, Arthur Goldberg, the US Ambassador to the UN, began writing a space treaty. Goldberg based the draft on the Principles Declaration and incorporated language on the peaceful uses of shared territories found in the 1959 Antarctic Treaty. This work culminated in the 1967 "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies" most commonly known as the Outer Space Treaty (OST).

The OST was opened for signatures on January 27, 1967. Parallel signing ceremonies were held in London, Moscow, and in Washington D.C., where Canada was represented by Geoffrey Murray, H. F. Clark, and Albert Ritchie respectively. The treaty entered into force on October 10, 1967 and, as of the writing of this article, the OST has been ratified by 106 nations (including the recent addition of Nicaragua in August 2017) and signed by a further 24 States.

THE OUTER SPACE TREATY

The OST consists of a preamble and 17 articles addressing different areas of space exploration. The remaining part of this section provides an overview of the treaty along with some historical background and examples of how these laws apply in today's space industry.

The preamble to the OST does not set any obligations to the signatories, however, it states the intended vision for interpreting all subsequent statements. The first five statements contain words like 'inspired', 'believing', and 'desiring' to encompass the dreams of peaceful and collaborative uses of

outer space for the benefit of all humankind. Furthermore, it maintains the notion of 'principles' from its earlier document recognizing, as Christopher Johnson, the Space Law Advisor at the Secure World Foundation, describes this "is not a comprehensive nor exhaustive set of exacting rules" [2].

As a binding continuation to the preamble, Article I designates the exploration and use of space as the province of all humankind and states that the use of outer space "shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development." When read in isolation, the article raised concerns that some countries without the ability to develop their own space assets would be getting a free ride. However, the intent is not to force nations to develop missions that have economic and humanitarian benefits for the entire world. Rather, as explained by Goldberg to the US Senate, this article emphasizes that "space shall be free for exploration and use by all states without discrimination of any kind" [5].

Article II prohibits any type of national appropriation, thus assuring to the Space Race adversaries that second place would not need a foreign visa to land on the Moon. By pre-emptively adding a clause before anyone landed on another celestial body, the UN's COPUOS avoided convoluting the text to acknowledge disputes

about territorial claims like those found in the Antarctic Treaty. Hence, it is no wonder why Neil Armstrong's poetic words while descending from the Lunar Module did not focus on an American accomplishment, but rather on "one giant leap for mankind."

In recent years, Article II appeared in the mainstream media for both commercial schemes and legitimate business ventures. A few crafty online entrepreneurs began selling plots of land on the Moon claiming that the OST only applies to states and does inhibit private individuals or corporations from engaging in these activities. It is not worth devoting much time to these scams other than to say they are not supported by the legal community who insists Article II must be read in the context of the full treaty. This includes Article VI, that entrusts all actions performed by individuals or corporations to their respective states. In addition, the national appropriation topic has also been discussed in the context of resource extraction. In many cases, the media extrapolates

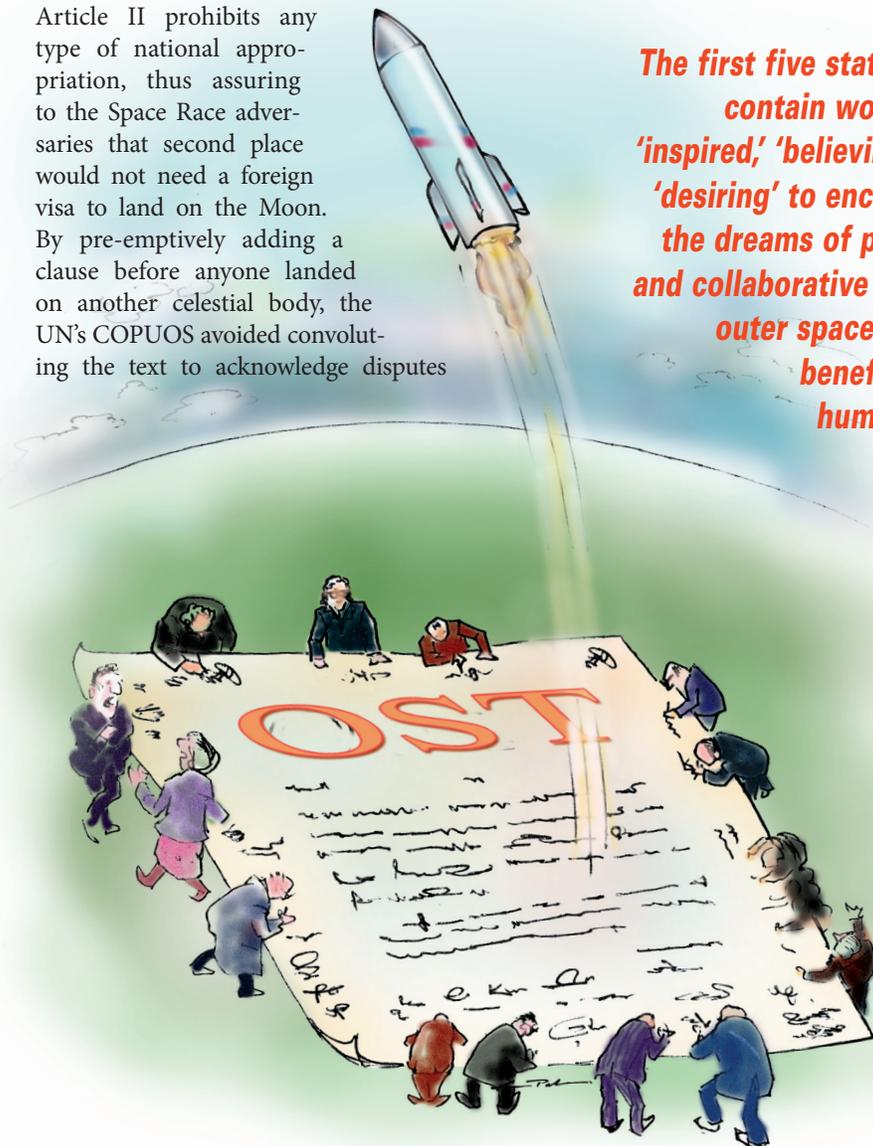
the plans to focus on capturing and mining resources from asteroids. While this may be feasible in a blockbuster movie, it is not realistic following the physics principles of orbital dynamics. As discussed in the next issue, smaller incremental steps starting from in situ resource utilization (ISRU) are more realistic first steps. Hence the reason for the recently approved US and Luxemburg laws related to space mining explicitly stating that they are not claiming ownership of any celestial body, but rather only using the resources.

When one thinks about these contemporary national space laws in the context of the treaty, it is appropriate to remember that "law is not created in a vacuum, not even space law" [6]. This is the essence of Article III that situates the OST within broader international laws; bringing to it broader principles from other treaties, and also defining the scope and overlaps with specialized laws affecting space activities like frequency regulations through the International Telecommunication Union.

On June 20, 1967, the Hon. Paul Hellyer, Minister of National Defence, spoke to Parliament about Canada's intention to ratify the OST. Like many politicians in office at the time, he brushed through most of the treaty and dwelled on the importance of Article IV banning the use of weapons of mass destruction in space [7]. Prime Minister Diefenbaker (then Leader of the Opposition) took this a step further in his remarks referring to the OST as a "treaty for the control of armaments in outer space," thus neglecting all the other articles. However, these comments did not come as a surprise, as earlier in his career he had instituted measures in the event that Canada was attacked by intercontinental ballistic missiles and even built a secret bunker outside of Ottawa (now known as the Diefenbunker Museum) to ensure continuity of government in the event of an attack.

Going back to the treaty, there are two important elements carefully worded in Article IV. First, the text does not demilitarize space, but rather removes the use of certain types of weapons. That was needed because both superpowers wanted to continue using space for reconnaissance and remote sensing to support their military activities. Second, like Johnson says, "this article concerns weapons of 'mass destruction' and it may therefore tacitly permit other types of weapons" [2]. Since it does not define what is allowed, Wong and Fergusson argue that anything can be considered a weapon, as

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“paranoia over space projects can be seen largely as a product of its time” [8]. To illustrate this, they remind us of the opening scene in the 1967 James Bond movie *You Only Live Twice* where a large shuttle-like spacecraft captured an enemy spacecraft in its cargo bay. Thus, if this level of geopolitical animosity had continued during the first tests of Canada’s robotic manipulator, it is possible that “Soviet nightmares [would have] included the space shuttle pulling up next to a critical Soviet satellite, and menacing it with the Canadarm” [8].

In spite of the geopolitical tensions of the Cold War, the space superpowers agreed through Article V of the OST that astronauts were envoys of humanity and nations should make every effort to help each other’s national heroes. Coincidentally, cosmonaut Alexey Leonov was involved with two missions that serve as examples of both the risks and potential mitigation strategies to protect astronauts. After completing the first spacewalk in March 1965, Leonov and his fellow cosmonaut encountered problems detaching the landing module and endured a 46-second delay in their reentry plan. Derailed from the predicted landing site, the cosmonauts ended up in the middle of a forest more than 380 km away. While they were still inside the Soviet Union, the risk of landing and getting captured in enemy territory frightened both nations. Thus, the treaty included a statement ensuring that astronauts would be safely returned to their home nation. Having said that, being lost in a forest for a day is not as bad as potentially being stranded in a capsule in low-Earth-orbit, so further provisions were added to help other nations if their astronauts were in danger. To equip themselves against this unlikely scenario, the US and Soviet Union agreed on a docking interface that would allow their two spacecraft to rescue astronauts marooned in orbit. This system was tested in the Apollo-Soyuz project during Leonov’s second flight in 1975, and even though it was never used for an emergency rescue, it was a historic step towards international collaboration. Furthermore, nations were also required to share information with the UN about hazards to humans health in space to ensure that all current and future astronauts were cared for. The protection of national heroes was so important that in 1968, this article was expanded into its own treaty known as the Rescue Agreement.

At the time the OST was being formalized, private space companies were already investing in communication satellites like

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In 1978 the failed nuclear-powered Kosmos 954 satellite spread radio-active debris over northern Canada. Above, soldiers remove material from snow. Compensation to Canada from the USSR was \$3M.

AT&T’s Telstar-1. Consequently, Article VI was added to ensure these corporations were also following the same principles from the treaty. Per Article VI, each nation is responsible for all space ventures from its citizens. This encourages governments to define policies and laws to license, oversee activities, and ensure that they are in compliance with international laws [4]. As a direct continuation, Article VII makes the launching state liable for any physical damages associated with a space asset.

Acknowledging the possibility of international cooperation for launches, the OST defines a few different categories of launching state that would be liable jointly and severally: (i) the state that launches, (ii) the state that procures the launch, (iii) the state from whose territory the object is launched, and (iv) the state from whose facility the object is launched. Naturally, the OST did not address all the intricate details, so Article VII was expanded in the 1972 Liability Convention. Although there have been a few instances of physical damages, none of them have reached the International Court of Justice. For example, in 1978, the Soviet reconnaissance satellite, Kosmos 954, reentered the atmosphere after a malfunction and scattered radioactive debris over northern Canada. The cleanup effort was dubbed Operation Morning Light. Canada billed the USSR \$6 million for expenses incurred to date with a right to claim for future additional costs, but eventually accepted a \$3 million settlement.

Aside from a few catastrophic failures leading to premature reentries, most non-operational spacecraft become space junk and remain in orbit for a long time. Even though they are not in use, Article VIII states that the “State Party to the Treaty on whose registry an object launched into space is carried” shall retain jurisdiction in perpetuity both in orbit and upon reentry. Hence, in the context of the Cold War, this prevented the Soviet Union from capturing a defunct spacecraft from Americans to reverse engineer the design. Practically, it led to the 1975 Registration Convention dictating that ownership requires countries to register and track space assets. Unfortunately, this limits present day initiatives to address problems with space debris, as prior approval would be required from its rightful nation before an object can be removed from orbit.

Expanding on the idea that space is the province of all humankind, Article IX declares that nations exploring space should (i) be mindful of activities from other nations, (ii) do so while avoiding the harmful contamination of space and other celestial bodies, and also (iii) avoid “adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter.” In essence, the environmental focus aims at “protecting future uses and users of space” through responsible exploration of outer space [2]. That is why, Armstrong, Aldrin, and Collins were in a small quarantine box while greeted by President Nixon following their historic flight. More recently, this is why the Cassini spacecraft plunged into Saturn to prevent contaminating Enceladus and Titan, two of Saturn’s moons. The former has intriguing ice coverage, and the latter pre-biotic chemistry.

The remaining articles are divided into two categories. Articles X through XIII encourage nations to share information regarding their space activities and define visitation rights for each other’s future bases on other celestial bodies. Finally, the remaining four articles of the treaty deal with the diplomatic processes for signing, ratifying, amending, and even withdrawing from the treaty.

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Next issue: The future of Space Law

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