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# Legal Challenges of Space Geopolitics

## INTRODUCTION: THE LEGAL ORDER OF OUTER SPACE (CORPUS JURIS SPATIALIS)

The law on outer space is built on 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* (hereinafter: the OST), which was signed by 132 countries including the permanent members of the United Nations' Security Council together with other (now) major space powers, and on the *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space* of 19 December 1967, (which entered into force on 3 December 1968), the *Convention on International Liability for Damage Caused by Space Objects* of 29 November 1971, (which entered into force on 1 September 1972), the *Convention on Registration of Objects Launched into Outer Space* of 12 November 1974, (entered into force on 15 September 1976) and the *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies* (hereinafter: the Moon Agreement) of 5 December 1979, (which entered into force on 11 July 1984). However, the Moon Agreement has been ratified by only a few states, none of which currently conduct significant space activities.[1] The main principles of the legal order existing in these documents are the free access to outer space, the peaceful purposes of space endeavours, the

[1] Latest accessions: Panama (11 August 2023) and Croatia (13 March 2023); Saudi Arabia had acceded the Agreement on 18 July 2012, but withdrew on 5 January 2023; France and India are signatories but have not so far ratified the Agreement.

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non-appropriation of outer space and celestial bodies, and what the OST calls, in ambiguous and aspirational language,[2] the "Province of All Mankind" (*apanage de l'humanité toute entière,* which in the French version is equally unclear) and the Moon Agreement terms the "Common Heritage of Humanity". As Luca Follis points out:

> "This lofty phrase [Province of All Mankind] speaks to the utopian spirit and idealistic culture that animated the Space Age in the post-war period, even if a lack of consensus over its meaning prefigured the fissures that would develop in the international community during the Moon Treaty negotiations."[3]

This "utopian spirit and idealistic culture" is quite at odds with the current climate in which the major space powers – and more generally most states in the world arena – are openly seeking to maximise their self-interests, regardless of the common good and of the rule of law. With the heightened rivalry between the great powers, the threat of weaponisation and the rush for celestial resources, outer space is now affected by space geopolitics, and has even begun to be regarded as "an independent battlefield".[4]

Of course, this is not exactly a novelty: when the Soviet Union launched Sputnik, Senator Lyndon B. Johnson declared that "whoever controls space controls the world", referring to Mackinder's famous declaration "whoever controls the heartland, will forever seek to dominate the Eurasian landmass and ultimately the world". Indeed, since the beginning of the century, scholars and practitioners have applied geopolitical thinking to outer space.

[2] Blount 2021: 110.
[3] Follis 2018: 185.
[4] Roche 2016: 99.

## SPACE GEOPOLITICS

A concept first invented by the Swedish political scientist Rudolf Kjellen in 1899, geopolitics is considered not to be a formal theory but instead an "attempt to reveal textually and cartographically the complex relationship between geography and politics at a variety of spatial scales from the local to the global".[5] Space geopolitical thought simply adds a new scale to this classical vision.

According to USAF Lieutenant Colonel Martin France, three factors play a major role as regards space power: geography, the character of the population and the character of the government. The proof is that "the two largest economies in the world [i.e. the USA and the European Union] are also the two most robust space powers".[6] In addition, geographical position is crucial to the launch of a satellite because proximity to the equator allows the satellite to be boost eastwards, although geopolitics encompasses more than just geography. Nicolas Peter emphasises that

> "[t]he foundations of space power range from obvious hardware elements (such as launch sites, launch vehicles, telemetry tracking and communications sites, on-orbit satellites, and other spacecraft) to socio-economic elements (such as human capital) through to political and regulatory elements such as the number of seats in international organizations and other relevant bodies".[7]

Nayef Al-Rodhan defines *space power* as

> "the ability of a state to use space to sustain and enhance its seven capacities [...] [social and health, domestic politics, economics, environment, science and human potential, military and security and international diplomacy]. In addition, the governance and sustainability

[5] Hefferman 2000: 28.
[6] France 2000: 239–240.
[7] Peter 2009: 2.

> of state power will need to employ a *symbiotic realism* approach to global relations and a *multi-sum security principle* approach to global security.[8] Ultimately, space will either be safe for everyone or for no one".[9]

Everett C. Dolman proposes an *Astropolitik* model which he defines as a "determinist political theory that manipulates the relationship between state power and outer-space control for the purpose of extending the dominance of a single state over the whole of the Earth".[10] As a result of an anarchical international system and the competition between states, "the reality of confrontation in space politics pervades the reality of the ideal of true cooperation and political unity in space which has never been genuine, and in the near term seems unlikely".[11] All attempts to regulate weapon use in space are merely "a slick diplomatic maneuver" according to Dolman.[12] Dolman argues that as long as the world is not democratic, unilateral hegemony in space will remain the sole means to ensure peace and prosperity for all, given that the "state that dominates space is specifically chosen by the rigors of competition as a politically and morally *superior* nation, culture, and economy".[13] Thus, he proposes that the United States should 1. withdraw from the outer Space Treaty and should abandon the "global commons approach" in favour of "free-market sovereignty in space";[14] 2. deploy a space-based Ballistic Missile Defence system which would enable the military control of low Earth orbit; 3. establish a specialised U.S. space coordination agency.[15]

[8] "In a globalized world, security can no longer be thought of as a zero-sum game involving states alone. Global security, instead, has five dimensions that include human, environmental, national, transnational and transcultural security, and, therefore, global security and the security of any state or culture cannot be achieved without good governance at all levels that guarantees security through justice for all individuals, states and cultures." Al-Rodhan 2007: 133.

[9] Al-Rodhan 2012: 25.

[10] Dolman 2002: 15.

[11] Dolman 2002: 2.

[12] Dolman 2002: 8.

[13] Dolman 2002: 15.

[14] Dolman 2002: 157.

[15] Dolman 2002: 165.

In contrast, Daniel Deudney regards institutionalised cooperation as the most suitable way of promoting peace,[16] and believes in what have been coined the *astropolitics of collaboration*.[17] Jonathan Havercroft and Raymond Duvall argue that the U.S. weaponisation of space would allow the United States to control all states under its hegemony, and lead to the creation of a "space-based empire".[18]

However, the present international *Zeitgeist* is not akin to a single state hegemony, but favours instead a multipolar world, although the danger of such a world lies in the potential "clash of empires" if selfishness takes advantage of common good. It is quite a threatening prospect if we consider that "as long as terrestrial geopolitics is characterized as competitive, and space is considered 'congested, confronted and competitive',[19] self-interest will rule".[20]

## FROM "PROVINCE OF MANKIND" TO A FIELD OF CONFRONTATION

The OST constitutes an agreement to treat outer space in a fundamentally different manner than nearly all other global commons in the last five hundred years. Having long foreseen the dangers of remaking outer space into the next frontier for colonisation, resource extraction, and militarisation, the OST permits only "peaceful use" in the "province of all mankind". The OST prohibits claims of sovereignty *by means of use or appropriation or by any other means*. That is to say that a state cannot plant a flag on a celestial body and call that body its own, regardless of what contemporary would-be colonisers might

[16] Deudney 1983.
[17] Havercroft–Duvall 2009: 48.
[18] Havercroft–Duvall 2009: 57.
[19] United Nations General Assembly 2013b.
[20] Johnson-Freese 2017: 23.

think. The U.S. flag planted on the Moon was a purely symbolic gesture and did not mean that the USA took possession of this celestial body. It was like a flag planted by an alpinist on a foreign mountain, rather than the flag of a colonial military expedition on a so-called *terra nullius* in past centuries.

Thus, space is a shared resource, open to all nations and private companies, and even to rich tourists. However, without proper management, the destruction of space's fragile "ecosystem" is a real possibility.

Collisions between satellites and space debris, exploding rocket fairings and intentional attacks contribute to an eventual "Kessler Syndrome" in space, a hypothetical future where whirling clouds of debris prevent satellites from surviving in orbit.[21] Given that satellites are the privileged instruments of globalisation as vectors of the mastery of information, ensuring military superiority to those who possess these resources, they have also created a certain level of dependency on the part of space actors due to the widespread civilian reliance on positioning, navigation, and timing services and telecommunications, as well as the global banking architecture and economy.[22] Satellites are vulnerable in several ways: due to their ever-changing location, it is impossible for a space actor to ensure constant surveillance, preventing adequate satellite protection; satellites may face, for instance, physical destruction, interference with communications or disorientation, or even cyberattacks leading to their temporary or permanent inoperability. Similarly, the multiplication of space actors – often referred to as the "New Space"[23] – increases the number of these risks and threats. Moreover, as Nicolas Roche points out, the "growing dependence on space (military strategy relies increasingly on space systems) tends to enhance its own vulnerability".[24]

The emergence of space military services, the rapid domestic and transnational growth in the commercial sector, and a general deviation from

[21] La Vone 2014.
[22] Lefebvre 2016.
[23] Jaluzot et al. 2020: 126.
[24] Roche 2016: 104.

an acceptance of space's inherent value as a peaceful domain have conspired to make states fear constraints on their actions in space. Recognising the widespread mistrust among major space powers of constraint, any solution involving the United Nations (UN) that is legally binding would need to be modest, as well as something in the interest of all nations, given that the motto of assisting "humanity to absorb benefits of space assets [...] cannot be achieved by voluntary self-regulation by spacefaring countries for reason of controls on technology transfer or due to domestic compulsions – political, legal, or financial".[25]

Some commentators have suggested that an amendment to the Outer Space Treaty would be the easiest way of safeguarding the orbital environment, and that an easy starting point would be to ban the use of kinetic weapons in space that would create debris.[26] A further step would be for signatories to commit to not developing or testing anti-satellite weapons (ASAT), and a final step would be a commitment to deorbit satellites and spacecraft close to the end of their service life.[27] There are approximately 37,000 pieces of debris larger than a softball in earth orbit, and potentially 1 million larger than a marble.[28] About 50% of all debris in space comes from accidental satellite collision in space, and from two Russian and Chinese ASAT tests.[29] Given that any one of these objects may be travelling in excess of 7 km per second, debris poses an indiscriminate danger to any nation that has or relies upon space-based assets.[30] Since the means exists to reversibly and non-destructively interfere with satellites, or at the very least to destructively target them without generating debris, this proposal would not be too difficult to pass within the UN.[31]

[25] Sachdeva 2017: 37.
[26] Hoffmann 2020: 327–352.
[27] United Nations Secretary-General 2021: 8.
[28] Ligor–Matthews 2022.
[29] Defense Intelligence Agency 2022: 37.
[30] NASA 2021.
[31] United States of America 2021: 2.

## RIVALRY BETWEEN MAIN SPACE POWERS

Russia's military doctrine views space as a warfighting domain, and Russia intends to achieve supremacy in space to win future wars.[32] Likewise, according to a sinologist scholar: "The Chinese military have made no secret of their wish to use space for military purposes."[33] However, the challenge to the legal order of outer space is not confined to the incompatibility between national military doctrines and international norms, but also in states' deeds: in 2017, a Russian satellite, known as *Luch* or *Olymp-K,* came close enough to the jointly operated French–Italian military satellite *Athena-Fidus* to intercept communications.[34]

The past few years in the West have not been totally smooth, either. During Donald Trump's presidency, rhetoric about a U.S. militarisation of space, combined with a sharp decline in engagement with the USA's long-time allies, isolated many long-time American allies, even if U.S. companies and civilian agencies still worked with their counterparts in Europe to maintain long-time ties.[35] Combined with a lack of any known American weaponisation of space, it appears that the militarised language is not as great a cause for concern as was previously believed. American and allied supremacy in space, combined with a free market's informal ties, augmented on the civil government level, such as in the case of the James Webb Space telescope, which 14 separate countries helped to create and the joint NASA–European Space Agency Artemis moon programme all increase the likelihood of the rule of law amenable to the established liberal world order.

Due to U.S. and EU legal restrictions on the exportation of sensitive technology – notably on dual-use goods – and to economic sanctions against Russia following its invasion of Ukraine, Moscow and Beijing cannot embark on the Artemis program. Consequently, an alternative project of a Moon "village" is contemplated by China and Russia. There is a considerable risk that in the near

[32] Johnson-Freese 2017: 21.
[33] Harvey 2019: 503.
[34] Harrison 2020: 17.
[35] Davis Cross 2022: 134–143.

future an Artemis lunar base will face a Sino–Russian one. In such a scenario, confidence-building measures would be required to avoid an "accidental" war. The UN should encourage its member states to adopt behaviour-based transparency and confidence-building measures. Although voluntary, such measures could eventually become the basis of new treaties. Several publications by the Secretary-General contain practical guidelines that the majority of nations are willing to accept, such as the publication of a state's military, civil and scientific space policies. In the event of a potentially concerning situation, where another nation's actions may be misinterpreted, such as the testing of sub-satellites ejected from a "nesting doll", states can refer to the actor's policies to discern whether the intent was peaceful or otherwise. Data sharing that contributes to space situational awareness is already an established practice for many states.[36] Publishing findings on major research and space programs could increase trust in "military and non-military matters", as well as providing opportunities for civil agencies to partner on research projects.[37]

A further step is information exchange between states concerning a satellite's general purpose, as well as sharing details of military and state space expenditure.[38] When a nation conducts a risky manoeuvre with its own satellites that could affect another nation's assets (such as rendezvous and proximity operations on its own assets), they should notify nearby nations which could be affected in case of an accident. More generally, coordination, or at least a forewarning, of space launches will also foster a culture of decency and predictability between the space forces of nations, with the "Hague Code of Conduct against Ballistic Missile Proliferation" being a precedent.[39]

The UN is undoubtedly the most powerful international organisation capable of setting norms or rules of behaviour. If no consensus can be reached within the UN, the North Atlantic Treaty Organization (NATO) is the next international actor that could reliably set norms and precedents amenable to

[36] United Nations General Assembly 2013a: 14.
[37] United Nations General Assembly 2013a: 16.
[38] United Nations General Assembly 2013a: 16.
[39] United Nations General Assembly 2013a: 17.

the liberal West. NATO has different motivations than the UN; namely, as a political-military organisation NATO has a responsibility to protect its Allies from aggression. Preserving space as the "province of all mankind" is therefore not of premier importance to it, and that attitude will inform which norms and rules it would champion. Recognising the realities of increased ASAT weapons by its potential adversaries (China, Russia) and by states outside NATO membership (India), NATO expects to operate in a "disrupted, denied, and degraded environment", which threatens the "national and Euro-Atlantic prosperity, security, and stability".[40] It is for this reason that the Allies agreed at the 2021 Brussels Summit that an attack on military or national architecture could be reason to invoke the collective defence clause, Article 5, a declaration that was added to its 2019 Space Policy.[41]

## MILITARY BUILD-UP OF AERO-SPATIAL FORCES

There is an obvious international tendency towards creating and/or modifying armies to include the space dimension. This underlines the intensification of the phenomenon of "creeping weaponisation" to quote the former French Minister of the Armed Forces.[42] In 2011, Russia created the Aerospace Defence Force, merging its former Space Forces (created in 1992) with the Air Force in order, according to Defence Minister Sergei Shoigu, "to concentrate in a single command all responsibility for formulating military and technical policy for the development of troops dealing with tasks in the aerospace theatre".[43]

In 2015, China created the Strategic Support Force as the component of the People's Liberation Army in charge of space, cyber, electronic and psychological warfare capabilities to protect these new "strategic frontiers".[44] The United

40 NATO 2022.
41 NATO 2022.
42 Parly 2019.
43 Cako 2020: 149–150.
44 Costello–McReynolds 2018: 8.

States followed a different path in 2019 when they created a Space Force that is both independent from the U.S. Air Force and separate from the Cyber Command. The same year, France turned its Joint Space Command into a Space Command *(Commandement de l'Espace),* part of the Air Force which in 2020 was renamed the French Air and Space Force *(Armée de l'Air et de l'Espace).* This was not just a change of name, but the reorganisation of the Space Command was intended to set a more coherent mission for it – all the French military resources for ensuring space situation awareness were already operated by the Air Force, apart from a vessel belonging to the Navy – and to vest in it new powers and to grant the Air and Space Force new *matériel,* notably "watch dog" satellites, i.e. small satellites equipped with non-kinetic defence measures in charge of protecting observation–telecommunication satellites. Last but not least, it also sent a signal to France's "strategic competitors". On 1 April 2021, the United Kingdom also established a Joint Space Command.

## SPACE WEAPONISATION

The militarisation of outer space is generally described as the passive military use of outer space, i.e. activities in which satellites play a non-aggressive role (positioning, reconnaissance or surveillance systems), whereas the weaponisation of outer space is the deployment of offensive weapons which could be part of a direct engagement in warfare (whether they are Earth to Space, Space to Earth or Space to Space weapons).[45]

In a recent development, the definition of weaponisation has evolved slightly, considering the incorporation of defence capabilities into a satellite, thus breaking with its previously primarily offensive nature:[46] some defensive features have been introduced, such as the encryption of messages by navigation

[45] Frigoli 2018: 51.
[46] Lefebvre 2016: 137.

satellites or the presence of on-board cameras on satellites to ensure a degree of self-protection. On-board self-protective weapons and "watchdog" satellites would be the next step.

This issue of offensive nature raises the question of whether the concept of space weaponisation remains compatible with Article IV of the OST on the use of outer space *exclusively for peaceful purposes.* Moreover, space is recognised by public international law to be the *Province of All Mankind,* again emphasising the peaceful use of space. Thus, the very principle of the weaponisation of space does not seem *prima facie* to be compatible with the current international legal framework.

Furthermore, the space environment is characterised by its free accessibility to all nations, as expressed in Article I of the OST. Would not this increasingly routine and minor weaponisation constitute an impediment to this core right of the Space Treaty? Indeed, the offensive function of weaponisation and, thus, dissuasive identity could restrict and constrain open accessibility.

Many states seek to prevent the placement of weapons in space. China, as well as Russia, India and Canada, supported the *Prevention of an Arms Race in Outer Space* initiative during the 1981 Geneva Convention on Disarmament, reaffirming the fundamental principles of the OST and adding a further principle, according to which the weaponisation of space should be prohibited, and favouring the "sanctuarisation" of space. However, the USA opposed this last principle. In February 2008, Russia and China introduced a draft of an agreement on the *Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects,* but it was dismissed by the USA as a "diplomatic ploy", and criticised for its lack of verification measures and the exclusion of ground-based ASAT weapons.[47] For their part, the member states of the European Union (EU) opposed the Sino–Russian initiative, claiming that these proposals were neither clear, nor sufficiently comprehensive.[48]

[47] Mills–Butchard 2021: 13.
[48] Shapira–Baram 2019: 15.

An EU draft of an *International Code of Conduct* for outer space activities was elaborated outside the United Nations but this method – which took eight years – proved to be counter-productive as many countries felt excluded.[49]

If Russia and China were to accept the interdiction of kinetic weapons in space, this would be a productive solution.[50] However, the dual-use nature of space assets for military and civil means would make this proposal difficult to enforce for other scenarios.[51] A satellite equipped with a grabbing arm and a net, used ostensibly for the collection of space debris, could easily be repurposed as an offensive weapon. A better proposal would be putting weapons in space in the first place,[52] otherwise states could not be prevented from arming their space assets in order to exert their inherent right of self-defence, as envisaged in Article 51 of the UN Charter, if need be.

## COMPETITION FOR SPACE RESOURCES

The OST declares space open to all for peaceful exploration and discovery. Commercial enterprises now make up a huge proportion of the actors in space. Governments and militaries have long set the rules and norms in the heavens, but they are no longer the only game in town, and it seems they will never be again. Indeed, a few private companies are significantly more powerful than some nations in terms of their potential space power. Thus, international organisations should involve those non-state actors that wield significant influence in the domain, as well as nascent space powers, in a new space governance system. However, this does not mean that the OST principles should be abandoned. Appropriation by states is prohibited by Article II of the OST, and this principle should remain in force.

[49] Brachet 2016: 6–7.
[50] United Nations General Assembly 2013c: 18.
[51] Davis Cross 2022: 136.
[52] United Nations Secretary-General 2021: 12.

Contrary to the language of the U.S. 2015 *Spurring Private Aerospace Competitiveness and Entrepreneurship Act* (a.k.a. Space Act) signed into law by President Obama, "you cannot claim 'finders keepers' and then set up a mine that pulverizes other worlds into commodities to be sold to the highest bidder, even if you are a U.S. citizen".[53] The Space Act and the Luxembourg's law on spatial activities enable a state to grant exploitation licences for the resources of celestial bodies, but how could they grant to private companies a right to something they do not own? Voices from the Global South stress that:

> "Not only have such claims of possessory rights not been recognised in the past, but there is also global consensus regarding its illegality. It therefore forms a part of customary international law, despite the Moon Agreement not having been widely ratified. In this light, the legalisation of space mining is a sheer violation of the elemental principles of international space law."[54]

Besides, Article VI of the OST extends the responsibilities of launching states to all *national activities,* including those of *non-governmental entities* that *shall require authorisation and continuing supervision by the appropriate state party to the treaty.* Furthermore, launching states are liable for damages caused to other treaty parties and natural or juridical persons belonging to those states. As a young Danish scholar writes: "This provision establishes a much stricter connection between states and activities by private actors that can be attributed to treaty parties than for example the regime of the high seas does."[55] Both U.S. and Luxembourgian laws are silent on the potential environmental implications of private actors' use of space resources, and on how the benefits of the use of space resources by private actors could be *carried out for the benefit and in the interests of all countries* as required by Article I, paragraph I of the OST. Outer

[53] Klinger 2021: 661.
[54] Mallick–Rajagopalan 2019: 12.
[55] Lachmann 2019: 12.

space is a global common "in the sense that the damage or destruction of outer space environment by one will result in the inability to use the environment for all. Therefore, it is in the self-interest of all countries that consider outer space as a 'vital interest' to do all they can do to preserve the environment".[56]

## CONCLUSION

Space is still the final frontier, although it resembles more of a Wild West than an unspoiled Eden. The rules and laws preventing conflict in the heavens have worked so far, but the treaties ratified decades ago are said to no longer reflect the problems and motivations of today.[57] A more "congested, contested, and competitive" space environment increases the probability of accidents in space, including inadvertently offending the sensibilities of another nation in the absence of shared norms, values and laws. A consensus on the ostensible obsolescence of the current outer space legal regime is nevertheless far from being reached. Many scholars – including the present author – and practitioners are still in favour of a "traditionalist" approach: while they do not deny the value of taking into consideration the changes that have affected the outer space ecosystem in the recent years or decades – *inter alia* the huge rise in numbers of states having some space activities and the impressive development of a private sector – they advocate for the durability of the principles of the OST. Those "utopian" and "idealistic" principles are needed more than ever today in face of the *Realpolitik* challenges to the outer space legal order.

[56] Johnson-Freese 2017: 22.
[57] Howell 2017.

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