DRAFT Remarks on Establishing International Norms and Rules for Space Activities

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1 Planned Activities in Outer Space

First we should take a brief survey of the many ambitious and varied activities and programs that are being planned. Interesting developments in space include the continuing widening of the small satellite revolution, where many more actors will be doing many more activities, and more *varied and advanced* activities with smaller and more advanced satellites; their plans include megaconstellations of satellites and small satellite swarms and clusters, providing internet, Earth observation, weather data, Maritime Domain Awareness, and a host of other possibilities.

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In the realm of human spaceflight, there will also be a successor or successors to the International Space Station, and these successors might include the US as a lead partner in one station, while other groups of nations proceed with their own space stations. There are also plans for private commercial space stations, including possibly a wholly commercial space station with microgravity.[1] At the ESA Ministerial last week, they reiterated their plans to progress with a Moon Village.[2] There are also plans for more (and more advanced and diverse) planetary exploration, deep space exploration, and space-based science and development. China has ambitions to send a rover to the far side of the Moon.[3] The United Arab Emirates (UAE) has ambitions for both the Moon and Mars.[4] The Breakthrough Startshot initiative has plans to use an array of over 100 ground-based lasers to accelerate a tiny spacecraft to velocities sufficient to reach another solar system within 100 years of launch.[5] Asgardia announced itself as the first "nation" "in" space.[6] There are serious companies intending to arrive at asteroids and

[1]Axiom Space LLC, led by ex-NASA Mike Suffrendini; *See* Kevin J. Ryan, *Why This Former NASA Exec Is Building a Private Space Station With his new startup Axiom Space*, Inc.com, June 27, 2016; http://www.inc.com/kevin-j-ryan/why-this-former-nasa-manager-is-building-a-private-space-station.html.

[2]

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[4]Talal M. Al Kaissi, *Why Mars? A Perspective From The United Arab Emirates*, Nov. 29, 2016; http://huff.to/2gVAhcH; *See also* http://www.emiratesmarsmission.ae/. Sputniknews, *Fly Me to the Moon: Russia, US Discuss Lunar Station for Mars Mission*, https://sputniknews.com/science/201607211043403847-russia-us-lunar-base-mars/.

[5]Breakthrough Starshot - Concept, https://breakthroughinitiatives.org/Concept/3.

[6]Asgardia, https://asgardia.space/. *See especially* Igor Ashurbeyli's address to Asgardians: "Simultaneously, I would like to ask you to confirm my temporary authority as the Head of Asgardia, so that I can represent the Asgardian Nation in talks with Earth countries and the UN in order to have Asgardia gain recognition as a full independent state and a UN membership." https://asgardia.space/chronicles/

use celestial resources, as well as other companies planning on using lunar resources.[7] Compared to the other realms beyond state sovreignty (international airspace, the high seas, the deep seabed), the present and future of space is very active, complex, and evolving.[8]

2 The Adequacy of International Space Law

With all these intentions and aspirations, can we legitimately state that the existing body of international space law takes any of the following three possibilities 1) positively permits, authorizes, and regulates these activities, or; 2) more modestly, says that they are not explicitedly illegal according to the law; or 3) clearly and explicitly prohibits the activities? I think we cannot reach these conclusions with any real certainty. Completed 50 years ago, the Outer Space Treaty is essentially silent on many of these things. The Outer Space Treaty was created for a geopolitically bipolar world, where the extend of commercial activities was not fully anticipated.[9]

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[7]Companies include Planetary Resources, Deep Space Industries, Moon Express, and (incorporated in the UK, the Asteroid Mining Corporation Limited). *See* Planetary Resources, www.planetaryresources.com/, Deep Space Industries www.deepspaceindustries.com/, Moon Express, http://www.moonexpress.com/, Asteroid Mining Corporation http://www.imxprs.com/free/mitchhs/asteroid-mining-corporation.

[8]These zones can be categorized as either international commons, such as Antartica which is under a treaty system of a limited number of states, or a global commons, such as the high seas and international airspace. Other commons might be considered to include the electromagnetic spectrum and cyberspace.

[9]P.J. Blount, *Renovating Space: The Future of International Space Law*, 40 DEN. J. INTL L. & POLY 515-532, 517, 518, "This treaty though, was designed to suit underlying societal and political realities that shaped the drafters goals. Primary amongst these realities is the treaty was built around a binary world; one dominated by two symmetric yet opposed powers"... "At the end of the day though, the law was

In fact, there is an important concept in international law that many be overlooked, and that is the idea of *silence* in international law.[10] When we perform the positivist inquiring of searching the body of law for relevant, on-point, valid, and applicable law to govern a proposed activity or particular phenomena, it is entirely possible that our positivist inquiry yields no direct returns. Does the Outer Space Treaty, or any of the subsequent treaties on space, directly address and regulate advanced possible space activitites like the capturing of space debris, reusing space debris, using *in situ* resources for air, water, or fuel, or for manufacturing purposes? Or isn't it more accurate to state that space law contains a few provisions which can be applied to these activities in a general sense and that there are some articles, including some due care provisions, as well as relatively clear rules on responsiblity, liability, and registration and jurisdiction and control, which would impact these activities.

Regarding resource use, academics have argued for decades in the scholarly discourse regarding the legality of resource use under Art. II of the Outer Space Treaty, and under the Moon Agreement. The wealth of debate attests clearly to the notion that space law is not clear on these issues, neither clearly authorizing and regulating, nor leaving as merely "not illegal", nor making clearly illegal.

As such, some of these vagaries in space law are due to the drafters and negotiators

crafted around a[n] architecture that did not include a full panoply of non-governmental actors, and has left numerous questions about the obligation that states have to regulate these entities."

[10]Helen Quane, *Silence in International Law*, B. Y. I. L. 2014: "In any legal system there are silences, things the system does not seem to regulate, matters as to which it seems not to speak. This is also, perhaps particularly true of the international legal system"..."It is impossible to legislate for every conceivable circumstance. This is true of all legal systems including the international legal system." http://bybil.oxfordjournals.org/content/84/1/240.

not anticipating these developments. In that sense, these silences would be characterized as inadvertent or unwilled silences, and therefore gaps or lacunæ. Alternatly, are the instances of silence in space law for particular activities that were the result of intentional restraint from the drafters to address proposed activities? Or, were the drafters indifferent to the possible conduct.[11]

2.1 A properly-functioning international regime?

Looking at these activities, which are certainly inspiring and which would generate economic activity and technological advancement, we should also be aware of more troublesome characteristcs of the current situation. As a domain which is outside of state sovereignty, and to which "the exploration and use of" is a shared "global commons," we have both a "tragedy of the commons" situation gradually getting worse, along with a domain that is becoming increasily integrated into domains historically usef for armed conflict.

2.1.1 Space debris

The proliferaton of space debris continues.

[11]Quane (note 9 above) explains three questions to ask regarding silence in international law. The first is whether silence indeed exists, how to characterize that silence (whether mererly a gap, or a gap in the law), then whether the silence is "intentional, inadvertent or simply a reflection of the international legal system's indifference to the conduct in question."(pg.4-5). Silence exists when the lawmakers have neither willed to regulate, nor willed not to regulate. Willed or intentional silences are instances of *non liquet*, and unwilled silences are *lacunæ*.

> The National Research Council of the U.S. National Academics of Sciences published a report in 2011 stating, "[T]he current orbital debris environment has already reached a "tipping point." That is, the amount of debris - in terms of the population of large debris objects, as well as overall mass of debris in orbit - currently in orbit has reached a threshold where it will continually collide with itself, further increasing the population of orbital debris." According to Donald Kessler himself, "The cascade is happening right now [2013] the Kosmos-Iridium collision was the start of the process. It has already begun."[12]

2.1.2 Conflict in space

Additionally, there are many who are very concerned with conflict in outer space, and they have resigned themselves to the inevitability of conflict happening in, from, or across the space domain. Recently, Gen. John Hyten, Lead Strategic Command stated on CNN, said "If you say 'is it inevitable?' then the answer is probably yes."[13]

3 Pathways Forward

Given the issues of space debris and conflict in outer space, it seems incorrect to belive that we have a properly regulated space domain, or that we enjoy a completed and perfected international legal framework. Additonally, in light of the proposed activities, and the vagaries and silence that we find in international law applicable to space, a number of pathways forward exist. Possible responses to silence in international law

[12]Matthew Weinzierl, Angela Acocella, Mayuka Yamazaki, *Astroscale, Space Debris, and Earths Orbital Commons*, Harvard Business School Case Study 9-716-037, Feb. 25, 2016.

[13]CNN Special Report, *War in Space: The Next Battlefield*, Nov. 29, 2016. Regarding conflict: "I think it is an inevitability over time."

falls into a few categories. We may involve the *lotus* or permissive principle of "that which is not prohibited is explicitledy permitted", we can assert that the legal order is, indeed, complete, and we may declare that a true *non liquet* exists and seek to solve it.

3.1 Unilateral developments

Unilateral developments to refine and clarify the rights and obligations of states under space law have taken the form of national space legislation, including legislation consolidating and implementing states obligations for national oversight and authorization pursuant to Article VI of the Outer Space Treaty.

There are over twenty states with national legislation directly regulating national activities.[14] Relative to emerging space activities, the US, Luxembourg, and possibly soon the UAE will have legislation related to celestial resources. But what about all the other proposed activities above? Manufacturing in space? Space debris capture and salvage? On-Orbit servicing? Will states pass legislation authorizing and regulating on these and related emerging activities?

3.2 Multilateral developments

Additionally (or concordantly) to the national measures are multilateral steps, which may take longer to develop, but are certainly happening. We can look to the 2011 Group on Governmental Experts (GGE) report on Transparency and Confidence-building Mea-

[14]United Nations Office for Outer Space Affairs—National Space Law Collection, http://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html.

sures in Space Activities as starting to address some of these emerging issues.[15] Additionally, the Long-Term Sustainability Guidelines, done within the Working Group on Long-Term Sustainability of the Scientific and Technical Subcommittee of the UN Committee on the Peaceful Uses of Outer Space (COPUOS), consolidates already existing best-practices into a non-legally binding set of guidelines which are nearing completion.[16]

Newer developments include the Hague Space Mineral Resource Working Group, which meets in the Netherlands and to which my alma mater, Leiden Universitys International Institute of Air and Space Law (IIASL) is acting as the Secretariat.[17] Some coordination is done through other non-UN mechanisms, such as the Interagency Debris Coordination Committee (IADC) and the International Standards Organization (ISO). So, we can see that multilateral, international discussions are happening.

Next year at the Legal Subcommittee of the UN Committee on the Peaceful Uses of Outer Space (COPUOS), a number of advanced topics and activities will be under discussion. These include single issues and items for discussion "Review and possible revision of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space", "General exchange of information and views on legal mechanisms relating to space debris mitigation measures, taking into account the work of the Scientific and Technical Sub-

[15]Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities, http://www.un.org/ga/search/view_doc.asp?symbol=A/68/189.

[16]United Nations Office for Outer Space Affairs—Long-term Sustainability of Outer Space Activities, http://www.unoosa.org/oosa/en/ourwork/topics/long-term-sustainability-of-outer-space-activities.html.

[17]International Institute of Air and Space Law—The Hague Space Resources Governance Working Group, http://law.leiden.edu/organisation/publiclaw/iiasl/working-group/the-hague-space-resources-governance-working-group.html

committee", "General exchange of information on non-legally binding United Nations instruments on outer space", "General exchange of views on the legal aspects of space traffic management", "General exchange of views on the application of international law to small satellite activities" and "General exchange of views on potential legal models for activities in exploration, exploitation and utilization of space resources."[18]

Additionally, OOSA and the UAE recently held a High-Level forum as a planning and preparatory meeting for UNISPACE+50, and these advanced activities and their adequace under space law will no-doubt continue to be discussed.[19]

3.2.1 Meeting of the States Parties

We should also mention the growth of the Committee on the Peaceful Uses of Outer Space. It is currently at 83 states. There are 104 parties to the Outer Space Treaty. At some point in the future, the COPUOS may constitute a meeting of states parties to the Outer Space Treaty. Such occurrences of meetings of states parties to a treaty is discussed in the Vienna Concention on the Law of Treaties in dealing with the interpretation of treaties. Article 31.3 (a) reads "Any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions;" shall be taken into account in forming an interpretation of the treaties. As of 2016, there are 36 states which are a party to the Outer Space Treaty but who are not members of

[18]Report of the Committee on the Peaceful Uses of Outer Space, A/71/20, June 28, 2016, pg.36, http://www.unoosa.org/oosa/oosadoc/data/documents/2016/a/a7120_0.html.

[19]United Nations Office for Outer Space Affairs—The High Level Forum: Space as a Driver for Socio-Economic Sustainable Development, http://www.unoosa.org/oosa/en/ourwork/hlf/hlf.html.

COPUOS.[20] Additionally, there are 16 states which are member of COPUOS which are not party to the Outer Space Treaty.[21] Consequently, can we envision that ten or fifteen years from now, COPUOS might meet with all parties to the Outer Space Treaty? In the formulation and adoption of its reports, if any concepts are interpretive in nature, overlapping with concepts or ideas informing the rights and obligations of the Outer Space Treaty, those concepts are de-facto binding. They constitute a subsequent agreement by the parties to the treaty. This is a possible scenario where the development, refining, clarifification, expansion, or otherwise elucidation of vague concepts or instances of *non liquet* in the Outer Space Treaty.

3.2.2 Subsequent Treaties?

For the sake of completeness, we know that from the history of space law making, that the 1968 Astronaut Rescue and Return Agreement (ARRA),[22] the 1972 Liability Con-

[20]There are 37 states which are a party to the Outer Space Treaty but which do not attend COPUOS: Afghanistan, Antigua and Barbuda, Bahamas, Bangladesh, Barbados, Cyprus, Democratic People's Republic of Korea (North), Denmark, Dominican Republic, Equatorial Guinea, Estonia, Fiji, Finland, Guinea-Bissau, Iceland, Ireland, Jamaica, Kuwait, Laos, Lithuania, Madagascar, Mali, Mauritius, Myanmar, Nepal, New Zealand, Norway, Papua New Guinea, St. Vincent and the Grenadines, San Marino, Seychelles, Singapore, Togo, Tonga, Uganda, Yemen, and Zambia.

[21]The 16 states which are Member States of COPUOS but which are not party to the Outer Space Treaty are Albania, Armenia, Bolivia, Cameroon, Chad, Columbia, Costa Rica, Ghana, Iran, Jordan, Malaysia, Nicaragua, Oman, Philippines, Senegal, and Sudan.

[22]Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968.

vention (LC),[23] and the 1975 Registration Convention (REG)[24] expand upon provisions of the Outer Space Treaty. The Rescue Agreement and the Liability Convention were even negotiated in a process overlapping with the negotion and drafting of the Outer Space Treaty, and the drafters were well aware of the role these treaties played in expanding and continuing the Outer Space Treaty. The Rescue Agreement expands upon Article V, sentence 1 of the Outer Space Treaty, and the protection given to astronauts as "envoys of mankind." The Liability Convention expands upon Arts. VI and VII of the Outer Space Treaty and it's establishment of international responsibility for national activities in space, and potential international liability for damage to other States Parties to the treaty. The Registration Convention expands upon Article VIII of the Outer Space Treaty and it's right (or obligation) of plancing launched space objects on a national registry, which thereafter confers the right to extend state jurisdictional powers in an extraterritorial fashion over the space objects or personell thereof. The drafters build the Outer Space Treaty as a treaty on principles (the word "principles" is in the very title of the Treaty. As such, we knew that they envisioned subsequent expansion, including expansion taking treaty form. Could we not therefore envision subsequenty treaty negotion to refine and expand other articles of the Outer Space Treaty?

Given the proposed activities above, legal tasks remain. Space debris issues remain. The necessity of a salvage regime, or a method to resolve the fact that space debris remain space objects imputing responsibility and liability even in circumstances when neither the launching state nor the registering state can be identifed.

[23]Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 961 U.N.T.S. 187.

[24]Convention on Registration of Objects Launched in Outer Space, Jan. 14, 1975, 1023 U.N.T.S. 15.