Statement

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Before the

United States Senate
Committee on Commerce, Science and Transportation
Subcommittee on Space, Science and Competitiveness

May 23, 2017 Hearing
On

"Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space."

Mr. Chairman and Members of the Sub-Committee, it is an honor and a pleasure to be here today to share my views on today's hearing topic: "Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space."

This hearing is especially timely. The Outer Space Treaty (OST), or more formally the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, is celebrating its 50th Anniversary this year. Commercial space business plans and activities are increasing rapidly, including plans for new on-orbit activities going beyond traditional remote sensing and communications satellites, such as asteroid mining, lunar or on-orbit research facilities and hotels, and on-orbit satellite servicing. And, at the same time, the U.S. government currently suffers from an on-orbit authorization gap for new activities that go beyond remote sensing and communications – two activities with current licensing regimes administered by NOAA and the FCC, respectively. The authorization gap for new on-orbit activities creates uncertainty for U.S. commercial space businesses and investors, and as activities proceed, may also create compliance problems with U.S. international obligations under the OST. The Executive Branch was able to handle the Moon Express situation under existing authorities given the limited nature of its activities, but authorization of more elaborate activities is likely to require new authorities. In any event, it is in the U.S. national interest and the interest of the U.S. commercial space industry to have a certain and predictable process for authorization established that complies with U.S. international obligations.

The US commercial space industry can flourish under the existing OST. Indeed, the US can establish a licensing or authorization regime for new on-orbit space activities that complies with the OST and still meets the spirit of permissionless innovation, a concept many credit with the growth and success of the Internet economy. I refer the committee to my article *The Contours of Permissionless Innovation in the Outer Space Domain* forthcoming in Vol. 39 of the University of Pennsylvania Journal of International Law (Fall 2017) for a detailed examination of these issues. The article is available publicly now on the Social Science Research Network (SSRN) at http://ssrn.com/abstract=2942526 Today, I wish to highlight important findings from that article but also push further into some of the international and domestic dynamics involved in the today's hearing topic.

Permissionless innovation is rarely, if ever, pure in the sense of the complete absence of government regulation altogether. Instead, the core of a permissionless innovation framework is a default presumption in favor of permission with limited constraints.[1] The OST has very minimal constraints on private space activities – and those minimal constraints can actually help protect US commercial industry from harmful actions of other nations and actors. In short, there

[1] *See* ADAM THIERER, PERMISSIONLESS INNOVATION: THE CONTINUING CASE FOR COMPREHENSIVE TECHNOLOGICAL FREEDOM (2016).

is a basic compatibility between a flourishing and competitive commercial space industry here in the United States and U.S. compliance with our obligations in the OST.

There is no need for the United States to withdraw from or even seek amendment to the OST. There is no need for the United States to abandon long-established and long-agreed upon treaty interpretation rules when interpreting the OST. There is no need to ignore the plain language of Art. VI of the OST – a provision that requires "authorization" and "supervision" of the activities of a country's commercial space actors in order to "assure" their conformity with the provisions of the OST. There is no need to only pay attention to certain OST obligations and ignore others. Undertaking any of the above listed actions will actually undermine US commercial space industry prospects.

The U.S. commercial space industry – including segments involved in new on-orbit activities – relies on global markets for their business case. Partners, investors and customers from abroad are often necessary to the business case.

If the United States does not take the minimal steps necessary to comply with OST Art. VI, US companies engaged in these activities may face foreign retaliation in the form of denying access to customers or partners, and investors from abroad may shy away as well. The United States will also not be able to credibly insist that foreign governments when conducting their space activities not harmfully interfere with U.S. commercial activities. This diminished credibility would put at risk the large and often long-term investments U.S. commercial space companies undertake. If the Congress tasks the Executive Branch with protecting U.S. commercial space actors from foreign interference, it must also task the Executive Branch with considering harmful interference an applicant might cause not only to pre-existing U.S. government operations or other pre-existing U.S. commercial operations, but also harmful interference that might be caused to pre-existing foreign activities.

The United States can and should maintain the continuity of the OST and U.S. leadership in outer space matters. Congress can and should create a certain and predictable domestic authorization framework for new on-orbit commercial space activities that complies with the OST[2] and comports with the spirit of permissionless innovation. The continuity maintained internationally and the (hopefully) soon created predictability and certainty within a U.S. domestic authorization process will yield large benefits to the U.S. commercial space industry. If such a path is followed, the risk of retaliation by foreign governments for failure to abide by the OST and the risk of any last minute stoppage by the Executive Branch of a new on-orbit activity for reasons of international obligation compliance or national security will be greatly reduced or eliminated altogether. Investors in these new space industries will have legal certainty that should help stimulate investment and growth in these industries.

[2] *In accord with* Statement of Dennis J. Burnett, Hearing of House Science Committee Space Subcommittee, March 8, 2017, pp. 8-9.

What the Congress provided for in the Space Resource Exploration and Utilization Act of 2015 (within Public Law 114-90) is a perfect example of maintaining consistency internationally while creating greater certainty and predictability domestically in a fashion that respects U.S. international obligations and dampens negative foreign reactions. The act in Section 402 provides the following:

> A United States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, *including the international obligations of the United States.*[3](emphasis added).

These provisions of U.S. law are fully consistent with at least 35 years of long-standing US policy and legal interpretations dating back to 1979-1980 in statements by Secretary of State Vance and State Department Legal Advisor Owen.[4]

The reference to international obligations in the U.S. statute envisions compliance with Art. VI of the OST and thus provides a further justification for Congress to move forward and fill the existing regulatory gap for new on-orbit activities. Just as importantly Congress included a statement in the law in Section 403 that states:

> It is the sense of Congress that by the enactment of this Act, the United States does not thereby assert sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body.[5]

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[3] *Available at* https://www.congress.gov/114/plaws/publ90/PLAW-114publ90.pdf

[4] *See* Letter from Secretary of State Vance to Sen. Church, Chairman of Senate Foreign Relations Committee, Nov. 28, 1979, *reprinted in* Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Senate Committee on Commerce, Science and Transportation, August 1980, at p. 313 (stating that the Moon Treaty provides no moratorium on exploitation of space resources, that Art. II of the Outer Space Treaty's ban on appropriation only applies to resources in place, and that the Outer Space Treaty and Moon Agreement would allow for ownership of extracted space resources) *; See also* Testimony of State Dept. Legal Advisor Owen in Hearings Before the Subcommittee on Science, Technology and Space of the Senate Committee on Commerce, Science, and Transportation on Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (96th Cong., July 29 & 31, 1980)(both oral and written testimony) at p. 2-19 ("American companies will have a continuing legal right to exploit the Moon's resources…."; "…once [resources] have been extracted from the Moon, ownership can be asserted at that point…"; "exploitation [can] go forward and that one can own what one can remove from the surface or subsurface of a celestial body…the negotiating history [of the Moon Agreement] makes it very clear that that was contemplated by the parties."; "The United States took the position from the outset that such exploitation should be permitted, that such ownership after extraction should be permitted. And that…is an authoritative interpretation …."; "…we have insisted that even after such a regime is established [an international one under the Moon Treaty], the right of unilateral exploitation will continue to be available to those States which choose not to participate in such a regime.")

[5] *Available at* https://www.congress.gov/114/plaws/publ90/PLAW-114publ90.pdf

This statement acknowledges U.S. obligations under the OST Art. II and helps dampen any negative reaction to the codification of long-standing U.S. interpretations of OST regarding property rights in extracted resources.

The important lesson from the Space Resource Exploration and Utilization Act of 2015 is it matters not just what Congress says in a law but how it says it. Congress can provide for consistency internationally while simultaneously creating certainty and predictability domestically -- all to the benefit of U.S. commercial space interests. Referencing international obligations and paying heed to the non-sovereignty obligation in Art. II makes many more countries willing to hop on board or at least not overtly object to the long-standing (and correct) U.S. interpretation that Art. II does not prohibit property rights in extracted resources. Some countries, of course, will continue to oppose the U.S. interpretation for reasons of perceived national interest but that group is smaller and less vocal than would be the case had Congress not mentioned and respected U.S. international obligations in the statutory language of the Space Resource and Utilization Act of 2015.

Imagine if instead the United States took the radical step of withdrawing from the Outer Space Treaty because some countries disagree with the U.S. interpretation regarding Art. II as it relates to ownership rights in extracted resources. Initially, the question would arise whether withdrawing from the OST would actually eliminate the non-sovereignty obligation in any event since many believe the obligation to now apply as a matter of customary international law as well as treaty law. Terminating the treaty obligation would not terminate the customary international law obligation. But setting that issue aside, U.S. termination of the OST would likely prompt other major space powers to withdraw from the OST, and thereby allow any other nation arriving first to the celestial body after the treaty terminations to declare sovereignty over vast swaths of the celestial body, setting up a show down with later arriving U.S. commercial interests. That is not the legal consistency, predictability and certainty that U.S. space interests deserve. Moving forward to the drafting and creation of a U.S. authorization regime for new on-orbit activities, there is similarly a large downside to changing or ignoring long-standing treaty interpretation methods or ignoring some OST provisions altogether.

As described and summarized in the abstract to my *Permissionless Innovation* article forthcoming in the University of Pennsylvania Journal of International Law:

> A permissionless innovation regulatory model… is being explored for adoption in the outer space domain, given the amount of innovation by commercial entities in that sector. However, translation of the model to outer space is complex because permissionless innovation is contextual, and the outer space domain differs from the cyber domain in important respects: First, international obligations require the U.S. government to authorize and supervise commercial space activities. Second, national security concerns are potentially raised by even every day, non-illicit space activities. Third, space business investors actually demand enhanced

regulatory certainty given the risk and often long-time horizons of their investments.

> New on-orbit space activities… currently fall within a regulatory gap—the Executive Branch lacks express Congressional delegation to regulate such activities. This situation may appear to be a victory for proponents of a nearly pure or unadulterated version of permissionless innovation. Indeed, to protect the status quo, permissionless innovation advocates are ignoring long-established and agreed upon rules of treaty interpretation to argue the U.S. government is not under an obligation to authorize and supervise U.S. commercial space companies' activities.
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> The irony is that the current gap actually undermines the benefits of permissionless innovation. The Executive Branch faces a Hobbesian choice of following Congressional intent and standing aside as new on-orbit activities are engaged in or complying with international obligations and addressing potential national security concerns by continuing to leverage existing authorities in an attempt to control new on-orbit activities. U.S. commercial space businesses—the innovators—are left in a similarly difficult situation: facing a risk of foreign government retaliation in event of U.S. government non-compliance with international obligations or being forced to engage in costly and time-consuming litigation if the U.S. government blocks their proposed activity by stretching existing authorities. Fortunately, the U.S. Congress can enact a solution that fills the gap—one that provides compliance with international obligations, protects national security, and affords regulatory certainty for U.S. space businesses while at the same time ensuring that permissionless innovation thinking and espris de corps controls the interagency approval process, including a default presumption in favor of approval.[6]

A Closer Look at Article VI of the OST and Obligations in the OST that Might Minimally Impact US Commercial Actors and Simultaneously Help Protect U.S Commercial Space Businesses

OST Art. VI provides the following:

> States Parties to the Treaty shall bear *international responsibility* for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies *or by non-governmental*

[6] *See* Matthew P. Schaefer, *The Contours of Permissionless Innovation in the Outer Space Domain*, forthcoming in Vol. 39 Univ. of Pennsylvania Journal of International Law (Fall 2017), available currently at http://ssrn.com/abstract=2942526

> *entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty.* The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require *authorization and continuing supervision* by the appropriate State Party to the Treaty . . . .[7] (emphasis added).

The first sentence providing that States Parties bear international responsibility for their non-governmental (commercial) entities' activities is quite unique in international law. Normally, a government is not responsible for purely private conduct in the absence of a strong link such as the government exercising direction or effective control over the private activity. This provision was part of the trade-off in the negotiation of the OST in which the original Soviet proposal was to ban private actors from space altogether. The OST clearly allows for and anticipates commercial space activity but makes State Parties internationally responsible for such activity. The last clause of the first sentence of OST Art. VI also provides that States Parties must assure that national activities (including those by its commercial actors) are carried out in conformity with the OST. The second sentence then requires the appropriate State Party to undertake "authorization and continuing supervision" of its non-governmental (commercial) space activities.

Well-established and long-agreed to treaty interpretation rules are codified in the Vienna Convention on the Law of Treaties (VCLT), Articles 31 and 32.[8] Although the United States is not a party to the VCLT, it has long recognized that it considers itself bound to many of its provisions, including the treaty interpretation rules, as a matter of customary international law.[9] VCLT Art. 31(1) provides the following primary rule of treaty interpretation:

> A treaty shall be interpreted in good faith in accordance with *the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose*. [10] (emphasis added).

Thus, when interpreting what authorization and continuing supervision requires within OST Art. VI, the VCLT mandates looking to the ordinary meaning of those terms in their context and in light of their object and purpose. As written in my *Permissionless Innovation* article:

> The ordinary meaning of authorize is "give official permission or approval to," or "to give official permission for something to happen."[11] The ordinary meaning of

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[7] *Available at http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html*
[8] *See* Vienna Convention on Law of Treaties [hereinafter VCLT], Arts. 31-32, *available at* https://treaties.un.org/doc/publication/unts/volume%201155/volume-1155-i-18232-english.pdf
[9] *See, e.g.*, https://www.state.gov/s/l/treaty/faqs/70139.htm
[10] *See* VCLT, *supra* note 8.
[11] *See* MACMILLAN DICTIONARY, http://www.macmillandictionary.com/us/dictionary/american/authorize (last accessed Feb. 24, 2017).

> supervision is to "monitor," and the ordinary meaning of continuing is "occurring in a cyclical or repetitious pattern."[12] In short, authorize and continuing supervision require some process to "give official permission or approval to," and "monitor" in some "cyclical or repetitious pattern" with at least one purpose of such process to "assure" that commercial actors are complying with OST obligations.[13]

The first sentence of Article VI provides the context to the authorization and continuing supervision obligation. States parties are to authorize and supervise to "assure" conformity by their commercial actors with provisions of the OST. All of this only mandates very light-touch regulation because OST obligations applied to commercial actors are far from onerous as will be displayed below. It is important to realize that those same obligations help to some extent protect U.S. commercial space actors from injurious foreign actions.

The fact that Art. VI is argued to be non-self-executing by many does not change the situation. Whether a treaty is self-executing is an issue of whether the treaty automatically enters the U.S. domestic legal system.[14] The Executive Branch in the prior Administration proposed a Mission Authorization Framework to implement Art. VI. If the Executive Branch believed that Art. VI was self-executing, then it would already maintain domestic authority to authorize on-orbit activities, at least to ensure their compliance with the OST, unless the legislative history to the 1998 space launch amendments indicating Congress did not wish to grant on-orbit authority[15] to the Executive Branch overrode that pre-existing authority.

It is no surprise that there is some debate over whether OST Art. VI or other OST obligations are self-executing. The Senate and other political branches do an excellent job since the Supreme Court's 2008 decision in *Medellin*[16], and even beginning in the decade or two prior to that decision, in expressing their intent on the issue of self-execution in domestic documents connected with treaties, such as in declarations included in Senate Resolutions of Advice and Consent.[17] For many older treaties, such as the OST, Senate and political branch intent is often

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[12] *See* BUSINESS DICTIONARY, http://www.businessdictionary.com/definition/continuing.html (last accessed Feb. 24, 2017).
[13] *See* Schaefer, *supra* note 6.
[14] *See Medellin v. United States,* 552 U.S. 491, 505, fn. 2 (2008)(" The label "self-executing" has on occasion been used to convey different meanings. What we mean by "self-executing" is that the treaty has automatic domestic effect as federal law upon ratification. Conversely, a "non-self-executing" treaty does not by itself give rise to domestically enforceable federal law. Whether such a treaty has domestic effect depends upon implementing legislation passed by Congress.").
[15] *See* H.R. REP. NO. 105-347 (1997).
[16] *See Medellin, 552 U.S. 491 (2008).*
[17] *See, e.g.,* Sen. Ex. Rep. 110-12 (Senate Foreign Relations Committee "included a proposed declaration that states that [the] treaty is self-executing. This declaration is consistent with statements made in the Letters of Submittal from the Secretary of State to the President on each of these instrument and with the historical practice of the committee in approving extradition treaties. Such a statement, while generally included in the documents associated

not so clear in domestic documents concerning the treaty, and that allows room for debate on the topic. But the key point today is that the international obligation created by Art. VI remains regardless of whether it is self-executing and failure to abide by it will risk foreign retaliation undermining the business case of U.S. commercial space companies and risk foreign space activities interfering with U.S. commercial operations.

Congress is in position to implement U.S. obligations under Art. VI by passing legislation creating an authorization framework for new on-orbit activities that "assures" compliance by U.S. commercial space companies with OST provisions. Passing implementing legislation also allows Congress to craft an authorization regime that comports with the spirit of permissionless innovation and mandates that Executive Branch take into account a limited number of other factors beyond OST compliance, such as national security/harmful interference with pre-existing U.S. government and harmful interference with existing U.S. commercial space assets.

Congress has actually directed the Department of Transportation (DOT) in consultation with other agencies to take account foreign policy when granting launch licenses and conducting payload reviews.[18] In fact, Congress was even more specific in directing the DOT to "… carry out this chapter *consistent with an obligation the United States Government assumes in a treaty, convention, or agreement in force* between the Government and the government of a foreign country…." [19] (emphasis added). This Congressional directive allows the Executive Branch in its regulations regarding launch licenses and payload reviews to take account of U.S. international obligations (whether self-executing or not). Congress has directed by legislation the DOT do so. What is creating the regulatory gap and potential future compliance problems with the OST is the legislative history to the 1998 amendments to the U.S. commercial space launch act in which Congress indicated it was not granting *on-orbit authority* to the DOT, rather only adding reentry authority to existing launch authority.

If one goes through the OST to see what obligations implicate commercial actors, one is left with essentially the following checklist[20]:

1) Does the applicant's planned activity claim surface or sub-surface rights on a celestial body or prevent free access to all areas of a celestial body, keeping in mind legitimate rights to be free from harmful interference and legitimate rights to extracted resources? (OST Arts. I, II & IX)

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with treaties submitted to the Senate by the executive branch and in committee reports, has not generally been included in Resolutions of advice and consent. The committee, however, proposes making such a declaration in the Resolution of advice and consent in light of the recent Supreme Court decision, Medellin v. Texas, 128 S.Ct. 1346 (2008), which has highlighted the utility of a clear statement regarding the self-executing nature of treaty provisions).

[18] *See* 51 U.S.C. 50905(b).

[19] *See* 51 U.S.C. 50919(e).

[20] This checklist is drawn from Schaefer, *supra* note 6.

2) Does the applicant's planned activity cause potentially harmful interference with foreign space activities? (OST Art. IX)
3) Does the applicant's planned activity risk harmful contamination of a celestial body with Earthly matter? (OST Art. IX)
4) Is the applicant willing to allow visits, *based on reciprocity*, to its stations and equipment with maximum precautions and conditions to ensure safety and no interference with their operations? (OST Art. XII)
5) Is the applicant respecting ownership rights of a foreign operator's space object? (OST Art. VIII)

One might add as a sixth factor that the applicant is willing to take possible steps to assist astronauts in distress should a need arise, although this is likely to be impossible in most circumstances. The fourth factor is also unlikely to arise in most instances because only a few countries would have the capabilities to even consider a visit, and those countries are unlikely to utilize their limited resources to attempt to visit another country's commercial stations or equipment, particularly when that visitation right is limited by reciprocity, as well as the ability to limit visits for safety and non-interference reasons, and also bounded by budgetary constraints. Moreover, the ordinary meaning of the term visit means something of short duration and that is not extensive or intrusive. Further, an examination of the context and object and purpose of the provision may very well indicate that it was intended to allow verification of arms control provisions of the OST, thus obviating the need for visits to U.S. commercial stations and equipment.

The above list of factors to take into account in ensuring OST compliance is not onerous, particularly when one realizes there is significant flexibility in how to define various terms such as potentially harmful interference and harmful contamination. Moreover, the obligation in Article IX regarding potentially harmful interference is only an obligation to consult in advance but does not prohibit proceeding with the activity. The U.S. commercial space industry will benefit if the U.S. government is able to engage in consultations with foreign governments if a planned activity by a foreign government might cause potentially harmful interference with U.S. commercial activities.

The U.S. government can even have industry involved in setting the standards that define terms such as harmful interference and harmful contamination provided such definitions do not stray from the ordinary meaning of those terms. For example, some worry that COSPARS planetary protection standards developed in a scientific era of space will necessarily apply to U.S. commercial actors and that those standards will impose undue costs and burden on commercial actors. This concern, however, is unjustified[21]:

[21] *See* Schaefer, *supra* note 6.

> …for a number of reasons [COSPARS] standards, created and followed in a science-inspired coalition of governments and scientists, do not create a floor for what constitutes harmful contamination under the OST. The U.S. government recognizes that COSPARS standards do not constitute "subsequent practice establishing the agreement of the parties" under the Vienna Convention on Law of Treaties interpretation rules and thus the U.S. government need not follow these standards in authorizing on-orbit activities. Instead, the U.S. government has the flexibility to set its own planetary protection standards in a commercial environment or follow industry set standards. Congress recently has promoted industry standards over safety matters by requiring periodic reports from the FAA in consultation with industry on such matters every 30 months.[22] Congress could similarly push the FAA to promote industry standards on matters related to ensuring compliance with OST obligations by private parties—specifically non-interference and harmful contamination (planetary protection) standards.

To meet the continuing supervision obligation, the U.S. Congress can simply require licensees to report material changes to operations or business plans as they occur and, in any event, provide a report to the authorizing agency once per year on activities. As the largest user of space, the United States has a significant national interest in maintaining and observing the basic, minimally burdensome rules found in the OST and thus maintaining the credibility and ability to pressure other nations to play by the same basic, minimally burdensome rules.

Failing to Fill the On-Orbit Authorization Gap Not Only Risks Non-Compliance with the OST but Also Creates Regulatory Uncertainty and National Security Risks for Commercial Space Actors

COMSTAC has called for a clear, transparent and predictable framework for authorizing and supervising new on-orbit activities. The industry panel later today will provide an opportunity to hear directly from industry on this matter, but certainty and predictability assist industry in obtaining investment and making efficient use of their resources. Investors are willing to take risk on the success of a technology, but regulatory uncertainty risk they are not particularly keen on assessing or undertaking.

Additionally, there will need to be some acknowledgement of national security concerns (at least to protect important U.S. government space assets) in any on-orbit authorization framework created by Congress. Otherwise, the Executive Branch will always be tempted, even if it requires stretching current authorities, to prevent activities that might cause damage to important national space assets. This is one of the risks created by the current regulatory gap for on-orbit activities, a risk of a last minute blocking of a particular commercial activity. Former Deputy

[22] *See* U.S. Commercial Space Launch Competitiveness Act of 2015, Public Law No. 114-90, § 111(5).

Assistant Secretary of Defense for Space Policy Doug Lovero's testimony in early March 2017[23] before the House Science Committee's Space Subcommittee highlighted that the damage caused by accidents in space is not limited in time or geography given the physics of space. He also noted an occasion where were it not for the voluntary accommodation of a commercial space company to modify its plans, the U.S. government would likely have taken action to prevent or block the commercial company's plans from moving forward due to the risk of damage to an important U.S. government space asset.

Guiding Principles and Concepts for an On-Orbit Authorization Regime that Meets OST Article VI Obligations and Comports with the Spirit of Permissionless Innovation

I would like to offer eight principles for consideration by this Subcommittee and by the Congress as a whole to help ensure the spirit of permissionless innovation pervades the OST-compliant authorization regime it should create for new on-orbit activities[24]:

1. Creating a Default Presumption in Favor of Approval

A default presumption in favor of approval is at the core of permissionless innovation thinking and should be a feature in any on-orbit licensing regime Congress adopts.

2. Limiting the Factors that Can be Considered by the Executive Branch in Making Determinations

Factors for the Executive Branch to consider in authorizing new on orbit activities can be limited to compliance with international obligations, U.S. national security interests (or at least protection of U.S. government space assets), measures to limit space debris, and ensuring the proposed activity does "not result in harmful interference with [already] approved and operating [U.S.] payloads and associated activities."[25] The latter factor is necessary to protect U.S. commercial first movers from interference from U.S. commercial second-movers. Compliance with international obligations only deals with interference between U.S. companies and foreign entities.

There is some concern over abuse of non-interference rights or what may be termed "space squatting." For example, envision a scenario of a company rushing a comparatively low-cost asset to a particularly valuable area of the Moon in order to attempt to cordon off an area

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[23] *See* Statement of Doug Lovero, Hearing of House Science Committee Space Subcommittee, March 8, 2017, at pp. 7-9.

[24] These eight factors are drawn and slightly modified from with shortened analysis from Schaefer, *supra* note 6.

[25] *See* American Space Renaissance Act, HR 4945, § 309(a)(2)(C)(ii). One could also consider a factor that ensures space artifacts are not harmed, such as Tranquility Base, the location on Moon where Neil Armstong's footprints still reside and other similar artifacts. This additional factor would only implicate activities on the Moon in any event.

through creation of a non-interference right. Congress can direct the Executive Branch to look at interference rights in this context with particular caution. Harmful interference is not defined in the OST nor in current domestic legislative proposals so there is flexibility to account for this scenario both internationally and domestically. As elaborated later in this testimony, this is one reason the Executive Branch armed with the ability to account for the economic, technical and diplomatic issues surrounding such scenarios should make these determinations, rather than creating a right of action in US courts for adjudication. This is also another reason that companies should report material changes in operation to the licensing agency as part of that agency's continuing supervision obligation. License conditions can also be utilized by the agency to prevent any attempted "space squatting." It is also important to note that the OST Art. II by prohibiting property rights in the surface or sub-surface of celestial bodies but allowing property rights in extracted resources with a limited non-interference rights for operations actually achieves in broad brush strokes a balance that seeks to avoid "space squatting" possibilities, particularly when one recalls that harmful interference is not defined and in any event really only triggers an advance consultation obligation. In the international context, as cases arise, the U.S. government will be able to address situations of this kind in bilateral negotiations with the relevant country – no major multilateral agreement is need or even wise at this stage.

3. **Enhancing the Default Presumption by Explicitly Declaring U.S. Leadership in Specific New Activities being Contemplated is in the National Security Interest of the United States**

It is hard to contest that it is in the U.S. national security interest to have U.S. companies be the first to engage in new on-orbit activities, such as asteroid or lunar mining and to establish private research labs or hotels in-orbit or on the Moon. Congress can acknowledge and confirm this expressly in the statute to limit national security grounds for denying applications. While on-orbit satellite servicing is a bit more sensitive, it is far better to have U.S. companies be leaders than followers in this industry segment as well.

4. **Granting Lead Interagency Status to An Agency Directed to Promote Industry (& That Has Experience In Licensing and Inter-Agency Coordination)**

If an agency with promotion authority of the industry is given a lead role in an interagency process, then it can help ensure that the benefits of an activity are fully considered as well as potential foreign competition that might seek to benefit from less stringent authorization processes abroad. Additionally, if an agency that has experience in licensing is given the authority this will help reduce transaction costs and avoid possible duplication in processes. For example, the FAA-AST has both promotion authority and experience in licensing and inter-agency coordination in commercial space matters and is likely the best candidate to be the lead

agency for reviewing new on-orbit space activities. If such authority is given to another agency, duplication may be created as FAA-AST will still conduct a payload review, separately or as part of a launch license. Given the State Department's lead role in treaty interpretation and international consultations on space matters, and DOD's knowledge of critical national security space assets, it is important that on-orbit licensing remain an interagency process. Simply adding an on-orbit component to the existing payload review, along with the other suggestions made in these eight principles, may be the least costly and least disruptive solution to solving the on-orbit authorization gap.

5. Establish Deadlines with Executive Branch Notification and Reporting Requirements to Congress

In order to spur timely authorization decisions, the Congress can place significant notification and reporting requirements on the Executive Branch in any delegation of on-orbit authority to the Executive Branch.

6. Consider Establishing an Ombuds as Well as Possible Appeal Avenues to the President or Vice-President in Cases of Denial

I argued in my *Permissionless Innovation* article for consideration of two possible ideas to provide an avenue for a company to seek to overturn a denial of authorization and/or speed along delayed decision-making[26]:

> Congress might … consider creating an ombuds[27] with a top security clearance that is able to intervene in cases in which decisions are delayed or rationales for decisions are not fully explained (or cannot be explained due to lack of proper security clearances by applicant company officials). Executive ombuds take complaints regarding agency action and have been created by statute on numerous occasions by the Congress. In fact, there are so many ombuds that a coalition of federal ombuds has been created.[28] Congress can also add an appeal to a higher authority, such as a Vice-President-led Space Council … or the President, in situations in which the ombuds working with the interagency process and the company has not reached satisfactory resolution.

7. Limit Chances for Regulatory Arbitrage and "Flags of Convenience" to Help Ensure Innovation Occurs in United States

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[26] *See* Schaefer, *supra* note 6.
[27] *See, e.g.*, COALITION OF FED. OMBUDSMAN, http://federalombuds.ed.gov/federalombuds/index.html (last accessed Feb. 24, 2017).
[28] *See id.*

If the Congress limits the factors the Executive Branch may consider in authorizing new on-orbit activities to compliance with international obligations, national security (including protection of U.S. government space assets), mitigation of space debris, and non-interference with other existing U.S. space operators, it is quite unlikely that any regulatory arbitrage or "flag of convenience" situation will arise in which companies move abroad to take advantage of weaker licensing requirements. However, the regulatory uncertainty caused by the gap currently existing due to the lack of an authorization regime for on-orbit activities also risks driving commercial space business overseas as companies potentially look for countries willing to provide a license and certainty for investors. As a further assurance against regulatory arbitrage, the Congress might, if deemed necessary, require the interagency process led by the FAA-AST to consider in its decision making the global nature of the industry and the goal of not placing U.S. commercial space entities at a competitive disadvantage compared to the regulatory frameworks and authorization processes adopted by foreign countries.

8. Have U.S. Government Both Encourage and Give Substantial Deference to Industry Standards

Private standards-setting bodies and self-regulating organizations cannot in themselves be alternatives to an authorize and supervise framework consistent with OST Art. VI because Art. VI requires the government to be the one authorizing and supervising. However, as discussed earlier, there is no prohibition on the U.S. government deferring to industry-set standards and standards of self-regulating organizations (e.g. for what constitutes harmful interference or harmful contamination) in determining whether to authorize an activity.[29]

Two Approaches that Should be Avoided in Authorizing On-Orbit Activities

Finally, I would like to recommend that Congress avoid two approaches in its drafting and construction of an on-orbit authorization regime[30]:

1. Avoid Listing Specific Activities that Require Authorization or Giving Blanket Statutory Authorizations to Certain Activities

Constitutional Due Process and non-delegation principles do not require the Congress to list specific activities that require authorization.[31] Policy reasons also argue against specific listing of activities that require authorization as it is hard to predict which activities will come to market first and non-listed activities will continue to fall in a regulatory gap with all its downsides.[32] Blanket authorization for certain activities will also be difficult as it is often hard to say in advance with no context which activities by their very nature will comply with OST obligations because it often depends on how the activity is conducted. To take an example, lunar beer

[29] *See* Schaefer, *supra* note 6.
[30] *See id.*
[31] *See id.*

brewing is unlikely to cause any problems in terms of OST compliance or national security but it truly depends on how the activity is carried out – if the beer brewer plans to land its facility on-top of or just meters from an existing lunar facility of a foreign country this would raise concerns of harmful interference or if the lunar brewer was planning to use without permission another countries space rover present on the moon to distribute its product to lunar dwellers this would raise concerns of failure to respect ownership interests of foreign space objects. Carve outs for minor or modest or earthly-type activities by humans aboard stations could certainly be explored. For example, it is hard to envision the daily human activity (e.g. brushing teeth) within a space object or facility raising OST or national security concerns or interference concerns with a another space object and thus that could be a carve out.

2. **Avoid Relying on the Common Law of Torts or a Newly Created Federal Statutory Cause of Action for Unreasonable Interference**

The court system will be ill-suited to define the specifics of what harmful or unreasonable interference is in the context of outer space activities whether it is between two U.S. companies or a U.S. company and foreign company. The Executive Branch in consultation with industry (in the cases involving two U.S. companies) or in consultation with foreign governments (in the case of a U.S. company and foreign company's activity potentially clashing) will be the best form of cooperation to work out what is harmful interference as cases arise and to take into account the economic, technology, and diplomatic considerations such issues raise.

It has been an honor and a pleasure to be before this Subcommittee and I look forward to answering your questions.