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Developing Verifiable Norms in Space: Enforcement as Verification, and the Problem of Dual-Use

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What is ViTTa®?

NSI's **Virtual Think Tank (ViTTa®)** provides rapid response to critical information needs by pulsing our global network of subject matter experts (SMEs) to generate a wide range of expert insight. For this SMA Contested Space Operations project, ViTTa was used to address 23 unclassified questions submitted by the Joint Staff and US Air Force project sponsors. The ViTTa team received written and verbal input from over 111 experts from National Security Space, as well as civil, commercial, legal, think tank, and academic communities working space and space policy. Each Space ViTTa report contains two sections: 1) a summary response to the question asked; and 2) the full written and/or transcribed interview input received from each expert contributor organized alphabetically. Biographies for all expert contributors have been collated in a companion document.

[1] For access to the complete corpus of interview transcripts and written subject matter expert responses hosted on our NSI SharePoint site, please contact **gpopp@nsiteam.com**

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Question of Focus

[Q21] What can the US do to best facilitate development of verifiable norms that maintain a peaceful space domain?

Expert Contributors

Major General (USAF ret.) James Armor[2] (Orbital ATK); **Marc Berkowitz** (Lockheed Martin); **Dr. P.J. Blount** (University of Luxembourg); **Dean Cheng** (Heritage Foundation); **Faulconer Consulting Group**; **Joanne Gabrynowicz** (University of Mississippi School of Law); **Harris Corporation**; **Dr. Peter L. Hays** (George Washington University); **Theresa Hitchens** (Center for International and Security Studies at Maryland); **Dr. Moriba Jah** (University of Texas at Austin); **Christopher Johnson** (Secure World Foundation); **Jonty Kasku-Jackson** (National Security Space Institute); **David Koplow** (Georgetown Law); **Dr. George Nield** (Federal Aviation Administration); **Dr. Xavier Pasco** (Fondation pour la Recherche Stratégique Paris, France); **Dr. Luca Rossettini** (D-Orbit, Italy); **Matthew Schaefer and Jack M. Beard** (University of Nebraska College of Law); **Dr. Michael K. Simpson** (Secure World Foundation); **Michael Spies** (United Nations Office of the High Representative for Disarmament Affairs); **Dr. Mark Sundahl** (Cleveland-Marshall College of Law); **ViaSat, Inc.**; **Dr. Frans von der Dunk** (University of Nebraska College of Law); **Dr. Brian Weeden** (Secure World Foundation)

Summary Response

This report describes expert views on the existence and non-existence of space norms and the challenges and opportunities norms represent for peaceful space use. At the broadest level, norms are informal but generally accepted rules of behavior that are recognized and understood by a community,[3] in this case a community of nations. Norms can emerge from either formal or informal channels, as Jonty Kasku-Jackson of the National Security Space Institute argues. Informal means of norm development include persuasion emerging from being a good exemplar of norm-based behavior, such as: the "creation of domestic legislation and regulations that serve as a model for others to adopt, publication and acceptance of academic papers, and shaping the discussion during 'Track 2' (non-governmental, informal, and unofficial) conferences and meetings" (Kasku-Jackson). Formal rule development examples consist of: "negotiation and implementation of binding international treaties, non-binding codes of conduct, United Nations General Assembly Resolutions, and state declaratory policy" (Kasku-Jackson).

The expert contributors generally agree on the need for norms from both informal and formal channels to maintain a peaceful space domain. The most verifiable norms, the contributors emphasize, would generally stem from more formal channels in so far as the US could facilitate norm development by leading in the responsible and transparently measurable use of space, and through the use of treaties.

[2] Armor's personal views, and not those of his organization, are represented in his contributions to this work.

[3] McElreath, R., Boyd, R., & Richerson, P. J. (2003). Shared Norms and the Evolution of Ethnic Markers. *Current Anthropology, 44*(1), 122-129; Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press; and Terry, D. J., & Hogg, M. A. (1996). Group norms and the attitude-behavior relationship: A role for group identification. *Personality and Social Psychology Bulletin, 22*, 776-793.

Are Norms Necessary for a Peaceful Space Domain?

An increasingly large and diverse array of actors, both state and commercial, are actively seeking to exploit and explore the space domain, dramatically shifting the political context of space. The contributors indicate that states newly entering the space domain (India, North Korea, Germany, Australia), competing major powers (US, Russia, China), and commercial actors (SpaceX, Virgin Galactic, many new satellite companies) have different interests and perspectives on space. The diversity of the actors is likely to represent a range of potentially incompatible interests. According to the contributors, it appears that competing major powers are attempting to maintain their advantages within the space domain, new states are seeking affordable and perpetual access to the space domain, and commercial actors are seeking partners and initiatives that will expand the size and profitability of space markets and ventures.

Maintaining a peaceful space domain amidst the growing heterogeneity of interests in space, Dr. P.J. Blount of the University of Luxembourg notes, will require the United States to develop "norms for responsible space activities that help to ensure coordination among all space actors."[4] Norms can function to coordinate a range of interests because norms, as detailed by Kasku-Jackson, "outline good behavior and bad behavior for the [space] community." By identifying problematic areas of space use through active engagement with diverse space actors, the United States can shape a consensus with wide-spread buy-in.

Dean Cheng of the Heritage Foundation concurs that norms are based on shared expectations and that a diverse array of actors in the space domain often lack these critical commonalities. Cheng questions, however, whether United States leadership and engagement with those interests will lead to stable norms that, whether verifiable or not, will help maintain a peaceful domain: Americans "talk about creating norms because we live in a rule of law society governing through mediation, and we believe that the law itself has value, separate from whoever comes before it," but "what is the purpose of these norms and when are these norms supposed to operate?" For Cheng, norms advocates have not fully appreciated that developed and verifiable norms can also be used to entrench competing interests in ways that limit the United States' options. In his words, the United States can "go ahead and create as many [restrictive] norms as possible," our adversaries will sign on to these norms and hold *us* to them. They will make the United States "live by [its] rules," although our adversaries may not abide by them, making these norms "self-straightjacketing."

Achieving Verifiable Norms: Codification, Enforcement, and Measurement

There was disagreement among the contributors on whether norms require formalization (in treaties) to be effectively verifiable. Blount concedes that "norms need not come in the form of a binding treaty," but rather could "come in a variety of mechanisms that solidify what constitutes responsible space activities." Blount's optimism that non-codified norms could still be verifiable and enforceable notwithstanding, most of the contributors feel that formal agreements are the best pathway to verifiable, enforceable norms.[5] The mantra that *verification is enforcement* typifies the views the contributors.[6] Some contributors focus on the potential usefulness of formal agreements versus norms. For instance, David Koplow of Georgetown University emphasizes the usefulness of formal agreements and proposes that they would provide a vehicle for regulating space use. According to Dr. Moriba Jah of

[4] See also the contributions from Kaksu-Jackson; Koplow; Schaefer & Beard; Spies; Sundahl; and von der Dunk.
[5] Kaksu-Jackson; Koplow; Schaefer & Beard; Spies; Sundahl; and von der Dunk.
[6] For a related discussion, see also the NSI Space ViTTa® Q22 report, "Effectiveness of International Agreements in Space"

the University of Texas at Austin, these norms should be "things that promote transparency and are things that are measurable, and not measurable just by one entity but measurable by the community at large."

In fact, many of the contributors stress the need for metrics to verify space use, which, as Marc Berkowitz of Lockheed Martin indicates, would be difficult as it entails the measurement of behavior that may not be obvious, or have clear intent as in dual-use technologies. The contributors also lament that the US does not currently have adequate capabilities to verify actions in space and must invest resources to strengthen verification capabilities, particularly in space situational awareness (SSA) capabilities. As Kaksu-Jackson notes, "SSA is a foundational capability that facilitates attribution of activities in space and therefore supports norm enforcement."[7]

Conclusion

After considering whether norms are necessary for a peaceful space domain, the expert contributors address how enforcement applications of norms could provide an avenue for verification. They generally agree that an increase of diverse actors (global powers, states recently entering the space domain, commercial actors) with diverse interests (domination, deterrence, profit) increases the difficulty in developing shared norms, since norms by definition imply shared values. Given the historic difficulty in achieving effective formal agreements, the contributors share a hope that less formal norms might be an option for regulating a responsible use of space. However, they often fell back upon discussion of the value of formal agreements, exhibiting a bias toward formal rules given their explicitness. Another issue the contributors stress is the need for measurable verification of how space is being used by actors, both to mark norm violations and to support guidelines set forth in formal agreements.

[7] See also the contributions from Armor; Blount; Jah; and Johnson for similar views.

Subject Matter Expert Contributions

Major General (USAF ret.) James B. Armor, Jr.[8]

Staff Vice President, Washington Operations (Orbital ATK)
4 August 2017

WRITTEN RESPONSE

US leadership - Set the example
US leadership - Lead the discussion internationally
US leadership - Encourage commercial space activities

Marc Berkowitz

Vice President, Space Security (Lockheed Martin)
25 August 2017

WRITTEN RESPONSE

The question of norms for space operations for safe, responsible, "peaceful," etc. behaviors should be separated from the concept of verification. Norms are a standard or proper pattern of behavior considered typical or expected of a group. The best way for the US to facilitate such norms is to: (1) determine its national objectives and national security interests regarding space activities; (2) determine what operational practices are essential for national defense and intelligence purposes to achieve those objectives and advance our interests; (3) consult and coordinate the national security position with the civil space sector: (4) consult and coordinate the US Government position with the US commercial space sector; (5) consult and coordinate the US position with allies and international partners; (6) establish precedents and standard operating practices through US, allied, and associated commercial space operations behaviors; (7) use those precedents and practices as the basis for establishing norms and eventually customary international law; (8) take a leadership role in government and commercial international fora to advocate for adoption of those norms; and (9) where it is prudent and necessary to do so, negotiate bilateral and/or multilateral treaties and agreements to codify those desired rule sets.

The question of verification is an entirely different issue. The environmental characteristics of the space domain, including its remoteness, make domain awareness, monitoring compliance of treaty obligations, and attribution of hostile intentions and actions, etc. challenging. Ideally, the US would define norms in ways that enabled rather than challenged the limitations of our means to monitor and verify compliance with tacit understandings and formal agreements. Successive US administrations of both political parties have concluded that space arms control is not in the nation's interest because of problems of definition, commonality between civilian and military technology, information disclosure, verification, and enforcement. Consequently, the ideal approach is for norms to be designed in ways that make it less difficult for space domain awareness, including intelligence, capabilities to distinguish improper from proper behaviors.

[8] Armor's personal views, and not those of his organization, are represented in his contributions to this work.

Dr. P.J. Blount

Postdoctoral Researcher (University of Luxembourg)

7 August 2017

WRITTEN RESPONSE

The uniqueness of the space environment in terms of its physical attributes makes verification in the space domain difficult. Despite the technical advances in space situational awareness, it is still very difficult to verify that a satellite is what a state says it is. Putting the technical feasibility problems aside, a state could verify a satellite's nature by maneuvering another spacecraft into proximity to observe it. Such an activity falls within the bounds of "free access" under the Outer Space Treaty, but it is the type of activity that could make that satellite's operator feel insecure thereby undermining the trust regime created under outer space law. The problem of verification has plagued PAROS. States are likely unwilling to allow onsite verification of space activities, and verification by other means is potentially destabilizing and prohibitively expensive at the moment. In short, there is no easy path the development of verifiable international norms.

Despite the fact that verifiable norms are difficult to attain, it is important to remember that the space law regime does facilitate deterrence, and has for over fifty years kept space conflict free. The limitations, transparency, and accountability regime facilitates communication and coordination among states in their space activities. In light of the difficult nature of verification, the United States should continue to pursue the peaceful uses of outer space by taking part in developing norms for responsible space activities that help to ensure coordination among all space actors. Such norms need not come in the form of a binding treaty, and indeed likely would not be codifiable in a binding instrument in the current geopolitical climate. They could come in a variety of mechanisms that solidify what constitutes responsible space activities. The establishment of such norms is important is light of the responsibility and liability provisions in space law. Space actors that fail to comply with widely accepted rules of behavior could be found at fault for damage they cause. The fact that such non-legally binding norms lack full verification measures should not stand as a barrier to US engagement in their development. Indeed, the US and the US military have historically used rules of the road type agreements, with both allies and adversaries, to increase security by normalizing behavior and enhancing trust.

As an example, one such way that the United States could facilitate the development of such norms would be to lead the international community in the development of a space traffic management regime. DoD currently collects and manages SSA data for the US, and this data is shared with partners pursuant to bilateral agreements. The United States as a leader in SSA, has the opportunity to create, that is remove national security data, an open source version of its SSA data that is available to all states, and encourage other states with SSA data to contribute that data to a global open source pool of data. Such information exchange would serve to better secure all space actors by creating better SSA models and enhance trust among space actors through transparency. Such a system could be the foundation of a coordination system, similar to that of the ITU, through which states could place other states on notice of their future activities. Such coordination could help to alleviate possible congestion and avoid potential conflicts. This strategy would pursue collective security in the space environment without the pursuit of unverifiable legal norms.

This is only an example of such a strategy. There are numerous ways that the US could pursue such rules for responsible space activity using transparency and accountability mechanisms. It is important, though, for all space actors that the United States stays engaged with the global space law and policy regime. The United States is uniquely dependent on space, both militarily and commercially, and this reliance depends on a space environment that is secure, safe, and stable. While the common logic is that space is increasingly congested, contested, and competitive, it would be folly to miscalculate the extent to which engagement with the international community helps to maintain space as a peaceful domain. All space actors have an interest in coordinating activities to avoid interference, and while such coordination does not verifiably maintain space as a peaceful domain, it is a necessary precondition to the establishment of norms that allow the United States to continue its own peaceful uses of outer space.

Dean Cheng

Senior Research Fellow (The Heritage Foundation)
2 August 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: Okay. So, given these levels of ambiguity and uncertainty around who's actually making space policy internationally, and then also the ambiguity surrounding some of the laws, treaties, and agreements that currently govern space, plus some of the ambiguity that is naturally inherent in actual space activity and operation itself, it would seem that developing and solidifying norms is especially important in the space domain. So, I'm wondering, what can the US do to best facilitate the development of verifiable norms that maintain a peaceful space domain?

D. Cheng: Well, first of all, I fundamentally challenge your assumption that we need more norms. Norms are great among people who already think alike. That is a nice lubricant to minimize friction. But, … [speaks in Mandarin Chinese] … norm. So, did you understand any of what I just said?

Interviewer: No.

D. Cheng: Right. Because what I just said in Chinese is, "if I only speak to you in Chinese, how exactly are we going to establish norms?"

So, my point here is that we talk about creating norms because we live in a rule of law society governing through mediation, and we believe that the law itself has value, separate from whoever comes before it. If I am the Chinese, laws and norms and principles and treaties exist, like space and other things, for me to achieve political ends—those ends take precedence, not your norms. So, you can go ahead and create as many norms as possible and you can make them as restrictive as possible, and I will sign on to them and I will try to hold you to them. I will make you live by your rules; you will not make me live by them. And the more restrictive they are, the better they are because you are self-straightjacketing.

So, to begin with, I fundamentally question this constant American reiteration that we need more norms. Now, after that, the question becomes, what is the purpose of these norms and when are these norms supposed to operate? I'm willing to accept that there's certain norms that might be useful in peacetime, because they help establish a baseline and channels of communication that may be able to avoid a crisis. But the farther you go down the road of crisis and conflict, the less positive role norms play.

I mean, as one of foreign diplomat observed about the Chinese: for the Chinese, hotlines only work when they're cold. We have lots of evidence of this in other domains, but not in space—but it doesn't really matter because, as I keep coming back to, we keep sort of saying it's about space, but it's not. Chinese behavior at sea in the South China Sea region, on land with India, on many issues with the Japanese, etc. demonstrates that in a crisis, China doesn't pick up the phone. China just does not abide by norms. For example, "Thou shalt not send troops out 20 miles into your nuclear-armed neighbor's borders," but China doesn't abide by those kinds of norms even though it expects you to abide by them.

So, again, in peacetime, can you create norms? Wonderful. China will sit down and negotiate and have a chance to have a conversation. However, the minute a crisis hits, China won't pick up the phone, and they don't call you, so what exactly are these norms creating?

Interviewer: Okay. So, it sounds like you believe that the establishment of these norms during peacetime then just puts the US at a disadvantage during periods of conflict because on one hand, the US will be

sitting there obeying the norms and following the norms and playing by the rules of the norms, while on the other hand, an actor like China could fully go along with the norms during the peacetime but then just totally disregarding them once things start getting tense?

D. Cheng: Exactly. So, creating norms with France, with Britain, with Japan, that all makes perfect sense. With China? No, not so much.

Certain folks from both the arms control community and … will inevitably say, "Well, look at what happened after the 2007 ASAT test when China was demarched." But my question has always been, "Well, what did happen?" Well, so China hasn't conducted a test like that since. Okay, so, what does that prove? The argument is that we by protesting somehow demonstrated to China and persuaded them not to conduct a destructive ASAT test like the 2007 test. Well, guess what, I personally, Dean Cheng, have not conducted a destructive ASAT test like that since 2007, either. Is that evidence that those demarches have made a difference to me? The assumption is, and this is translated into policy recommendation, that China does not do X after we do Y. So, we have drawn a causal-effect relationship by people who themselves have demonstrated a lack of understanding and knowledge of how China is even governed in the broad name. If I talk to you about the Republic of Great Britain and its presidents, why would you pay any attention to my recommendations about Anglo American security? And yet, we have made the equivalent arguments about China and then we say, "See, this proves that demarches and norms work." That is problematic.

Interviewer: Thank you for running through all of those questions with me. I just have one last general question for you, but before I get to that question I was hoping to open up the floor for anyone else on the line that would like to ask Dean a question.

AAC[9]: Hi Dean, this is Allison. Thank you for speaking with us. I'm wondering, would you concede that norms, at least down the road, can represent an additional cost in the sense of a "should I take this action or not" and "what are the costs and the benefits" kind of calculation?

D. Cheng: Well, that depends on what cost we have demonstrably inflicted in the past. So, if I violate those norms, what is the cost to me? If the answer is, I will be demarched, then the question becomes, why do I care about a demarche? Do I even care about a demarche? If the answer is, we will suspend foreign direct investment in your country, then that may or may not make a difference, but it will be a more demonstrable effect of violating a norm.

AAC: So, basically, you're saying that if you are talking about norm development or international regimes even, that you have the same issues with credibility and demonstration that we typically think about with regards to deterrence?

D. Cheng: Correct. Because norms are part of the pathway towards deterrence. Why do you create norms? You create norms in order to shape everybody's actions and to hopefully prevent (aka deter) bad actions, right? So, it is a very, very polite, evolved version of deterrence.

Now, there are commercial norms (i.e., best practices, etc.), and there you do see direct effects. If you have a very bad launch system that creates lots of debris as your first stage separates, you can persuade people to boycott you. That is a cost of violating the norm. Think about why we don't have dolphin meat anymore in our tuna? Because there was a backlash against that bad practice.

AAC: So, you bring up one of the things that I have been thinking. The military and national security state is a tiny sliver of the space endeavor? I mean, commercial is much larger obviously in

[9] Dr. Allison Astorino-Courtois (NSI)

capitalization, in revenue, and in numbers. So, maybe we are in a position here to enact some of those kinds of costs for norm violation that are similar to creating debris by blowing up your satellites in space.

D. Cheng: Okay, so let's roll with this scenario for a second. Let's say China blows up two satellites next week in an upward trajectory that pollutes the LEO orbit. What is it exactly that commercial space is now going to do to China? We already don't have China doing much in the way of commercial satellite launch—China isn't directly competing with commercial satellite sales. China's commercial space companies are state-owned enterprises, so you can't really affect China's space industries unless you're going to really hurt the overall Chinese economy. So, your threat is very, very hard to enforce, and it automatically goes outside the space domain, unless you're going to start arresting the Chief Executives of China Aerospace Science and Technology Corporation, etc., which, by the way, you have no legal basis for, right? Yeah, sure, they polluted outer space, but that's not against the law—it's a bad thing to do, but it's not against the law.

AAC: Okay. Thank you very much. This has been very helpful because we honestly don't often get to hear this kind of argument.

Faulconer Consulting Group

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15 August 2017

WRITTEN RESPONSE

Propose reasonable enforcement and consequent provisions for the international treaties.

Joanne Gabrynowicz

Professor Emerita (University of Mississippi School of Law)
16 August 2017

INTERVIEW TRANSCRIPT EXCERPT

- Take a leadership role in diplomacy and speak with our space-faring allies
    - Begin to develop a consensus that can be brought to the larger international community as a whole
- The Code of conduct for which failed negotiations were attempted a few years ago in New York provides a potential model
    - It was an attempt to start establishing norms
    - It revealed both existing political will and lack of political will

  - Doesn't think that the US or Russia wanted the Code to happen, each for their own reasons, but that kind of attempt with the right political will is the way to go. It provides an opening.
- If the US leads the initiative, the US will be most associated with those norms and will be the most expected to encourage them. But if a nation like China or Russia wants to disregard these norms in a time of conflict, would this be problematic?
  - If a conflict did break out, it would be part of public international law to address these things
  - Reason why the Outer Space Treaty was established and has worked is that they found something compelling enough for them all to agree to and that became the foundation for everything else (Preventing nuclear war in space)
    - Doesn't know if there is something that can provide a similar compelling motive now

Harris Corporation, LLC

Brigadier General (USAF ret.) Thomas F. Gould
Vice President, Business Development, Air Force Programs

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21 August 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: Moving on to discussing the current ambiguous declaratory policy that the US have. I may be wandering into diplomatic territory here but I'm wondering about revitalizing and reviewing the current policy to make it more robust and current. Would that constitute a direct escalation or present the possibility of being construed of such? Is that something the industry is worried about? The next time the US government decides to review and update their space policy, perhaps it can be again construed as maybe aggressive? So is that a fear or a possibility, is that something the industry is aware of?

T. Gould: I think from an industry perspective, industry would only benefit from that one. But we think it is more of a political and diplomatic discussion…

Dr. Peter L. Hays

Adjunct Professor of Space Policy and International Affairs (George Washington University)
19 July 2017

WRITTEN RESPONSE

My answer to this question is very similar to my answer to the first question: Building on the OST regime, international policy makers should use principles, inter alia, from the laws of armed conflict and anticipatory self-defense to develop response options for aggression in space. I believe this effort should not be initiated first and cannot be completed effectively unless more clarity, consensus, and adherence is achieved regarding foundational concepts and processes in the OST regime. Foundational concepts and processes in the OST regime that lack such clarity include: the concept of "peaceful purposes," processes for state authorization and continuing supervision of

space activities by non-governmental activities, processes for determining liability for damages caused in space, and processes for undertaking or requesting international consultations for potentially harmful interference.

Theresa Hitchens

Senior Research Scholar (Center for International and Security Studies at Maryland)
19 July 2017

WRITTEN RESPONSE

Continue to lead diplomacy. There is little to be gained in fully rejecting the pathway of "strategic restraint" that has been the hallmark of U.S. space policy for 50 years (with some exceptions.) While I understand, and agree with, the need to prepare for the likely eventuality that U.S. satellite systems will be targets in any near-term conflict, I do not believe that there is anything to gain from a public embrace an offensive strategy. This will only lead to an uptick in the emerging space arms race, and create even more instability in strategic relations among Russia, China and the United States, and likely bring in more actors (India, Israel, Japan) that will complicate the situation. A critical need is more bilateral dialogue on space security issues, especially with China. Russia is a hard nut to crack right now, but space has always had a special place in the U.S.-Russia relationship and it would be a shame to see that founder on the current geopolitical ugliness. We further should be trying to urge allies/friends to take leadership where the U.S. cannot because of geopolitical issues. This could include public initiatives to IMPLEMENT the diplomatic initiatives already agreed, such as the GGE TCBMs, and Debris Mitigation Guidelines, measures to improve SSA data sharing, etc.

Dr. Moriba Jah

Associate Professor, Department of Aerospace Engineering and Engineering Mechanics
(University of Texas at Austin)
3 October 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: Do you think international agreements can effectively protect high value space assets in a time of crisis and/or conflict? And, additionally, what are the principles upon which international policy makers should develop response options for aggression in space?

M. Jah: We have UN treaties and the Outer Space Treaty and those kinds of things, which provide the only framework existent with regards to space. I'd say that we should build upon those things that are currently in place.

With respect to the question of, can international agreements effectively protect things, I think the more relevant question is, "What's enforceable?" When you ask, "What's enforceable?", that leads into "What's known?" One of the things that my research group makes as a foundation is, if you want to know it, you have to measure it, and if you want to understand it, you have to predict it. So, there are a lot of people talking about norms of behavior in space, and that we should just create these things, but that just leads me to wonder, "Okay, what are you going to create?" If what you're going to create is not based on empirical data or is not evidence based, then it doesn't make sense. The norms of behavior have to be things that promote transparency and are things that are measurable, and not measurable just by one entity but measurable by the community at large. If these norms are measurable and quantifiable by a global community, then

that becomes the thing that allows for enforcement because it's something that there is actually measurable evidence for—it's not a "he said, she said" situation, but, rather, it's a community that can corroborate or refute any given event and then quantify to some level the harmfulness of that event. So, I think that the way in which we protect ourselves is by knowledge and by making that as ubiquitous as possible.

Interviewer: So, it sounds like any effort to attempt to solidify or build norms should also be accompanied by efforts to increase monitoring, awareness, and transparency of everything that's going on in the space environment, which will allow us to actually be able to credibly show that those norms are being followed, so when the time for enforcement arises, we will be prepared?

M. Jah: Yeah. In fact, I believe that the norms cannot be developed without having that in place.

Interviewer: Is that because of the risk of misinterpretation of action or uncertainty, and to help avoid those "he said, she said" situations?

M. Jah: Yeah, exactly. That's right.

Christopher Johnson

Space Law Advisor (Secure World Foundation)
11 September 2017

WRITTEN RESPONSE

Competent and Trusted Attribution is the single biggest lynchpin of verifiable norms. As such, the US must not just be able to detect actions in space (and affecting space), but have the evidentiary competence so that other actors in space *trust and give credence* to attribution conclusions arrived at by the US government. If the US Government wants to assert that action X took place in outer space, once they have verified it for themselves, how do they then prove to allies and the international community that its conclusions are accurate and unassailably correct? Are there methods and technologies that the USG can demonstrate to trusted actors which will prove that its conclusions are accurate? Should the USG engage with and inquire of other actors as to what would constitute conclusive proof sufficient to them that USG conclusions are accurate and complete? What level of proof do they need to trust the USG's attributions conclusions?

Jonty Kasku-Jackson

Space 300 Geopolitical Lead (National Security Space Institute)
15 August 2017

WRITTEN RESPONSE

What are Norms?

In order to determine the best way to facilitate development of norms, it is essential to understand exactly what norms are and how they come to be. Unlike treaty obligations, which are generally accepted as rules binding on the parties to a treaty, norms are commonly understood to be a standard of appropriate behavior for actors of a given identity or community (Hein and Kohlmorgen, 2009). Essentially, norms outline good behavior and bad behavior for the community. Traditionally norms have been recognized as developing in three stages. First is the generation of the norm where norm entrepreneurs try to convince a critical mass of states to accept a particular

norm. Then comes broad acceptance of the norm where the norm leaders socialize other states to become norm followers. Finally comes internalization where the norm acquires a taken-for-granted quality and is no longer a topic of broad public debate. (Finnemore & Sikkink, 1998). Norms may also develop when relatively few players with a large interest in a particular area of concern determine acceptable behavior (Kasku Jackson, 2016).

The US must also consider what a "peaceful space domain" is as it attempts to facilitate norm development. States have increasingly used space for national-security purposes and routinely and overtly use satellites and space systems in direct support of military operations. US interpretation has been that "peaceful" is "non-aggressive" and that military uses of space are lawful if they do not violate Article 2(4) of the United Nations Charter (which prohibits the threat or use of force) or Article IV of the Outer Space Treaty (which prohibits nuclear weapons or weapons of mass destruction in orbit around the Earth, on the Moon or any celestial body, or in outer space). (Kasku-Jackson & Waldrop, 2009). Furthermore, the US National Space Policy interprets "peaceful purposes" to include national- and homeland-security activities (National Space Policy, 2010). It is essential that any norm the US seeks to develop not negatively impact this definition of "peaceful."

What Norm Development Mechanisms Should the US Pursue?

Norms can be created via formal or informal means. Examples of formal norm development include negotiation and implementation of binding international treaties, non-binding codes of conduct, United Nations General Assembly Resolutions and state declaratory policy. Informal norm development includes creation of domestic legislation and regulations that serve as a model for others to adopt, publication and acceptance of academic papers and shaping the discussion during "Track 2" (non-governmental, informal and unofficial) conferences and meetings. In particular, the US could pursue each of these options as listed below:

Create declaratory policy via an unclassified National Space Policy (NSP): Unclassified declaratory policy provides the international community a clear understanding of US interests in space and the US intent to protect its interests. Although the unclassified current "public-release" NSP communicates enduring principles, there may be a perception that those principles are not the "true" position of the US since the actual policy is classified. Current classified elements of the NSP could be addressed in a classified National Space Strategy. Additionally, the unclassified NSP should be part of a comprehensive strategic communication plan on space that reassures the international community of US good intentions but reminds the community the US will protect its interests.

Develop a Comprehensive Strategic Communications Plan for Space: As well as providing policy guidance to different sectors, official national space policies can provide international strategic communications regarding US desired norms and can assist in the development of norms by publicizing the norm so it can be adopted by others. Additionally, administration speeches and Congressional testimony are also studied by non-US Government players and may send supporting or conflicting messages that may reinforce or undermine norm development. Furthermore, US Government participation at national or international commercial, scientific or academic conferences can facilitate the development of desired norms. That participation should be part of a comprehensive strategic communications plan. Creating a cohesive strategic communication plan would help facilitate the desired norms to the international community for adoption.

Create domestic legislation: The US can create domestic legislation that reflects or creates the norms which others can then follow or adopt. This appears to be what is happening in the area asteroid mining. The US passed the Commercial Space Launch Competitiveness Act in November 2015. This law permits space resources to be appropriated by a US citizen after they are extracted from an asteroid. In July of 2017 Luxemburg adopted a similar domestic law giving companies the right to space resources they extract from asteroids (Space News, 2017). The US is facilitating the norm that, while states cannot appropriate celestial bodies under the Outer Space Treaty (Outer Space Treaty, 1967), private entities can appropriate resources extracted from celestial bodies.

Tap into US, non-government expertise to develop and disseminate norms: Hein and Kohlmorgen (2009) include a role for non-state actors, which can play an important role in the development of norms as they can act to frame the discourse surrounding the issues. The non-state space sector is increasingly participating in international fora

and is able to provide institutional expertise necessary to develop the norms or to understand and disseminate the norms. The US should encourage non-state entities, such as commercial companies and academic institutions to participate in fora that are involved in norm development in areas such as radio frequency interference, debris mitigation and space situational awareness (SSA). As the non-government space sector helps shape the discourse surrounding the issues, acceptable behavior is codified and potential bad actors are essentially put on notice as the norms develop. Additionally, Harrison (2010) notes the non-US Government sector can actually assist in SSA activities and therefore in verification activities, which can help with norm enforcement. Another area where the US could facilitate norm development concerns smallsats/cubesats. The US could formalize and participate in a smallsat forum/working group consisting of international, commercial and academic organizations in order to shape the discussions regarding potential norms. In addition to providing a way to present norms for adoption by the wider community, creating such a forum would create closer ties and informal communication channels within the space community. Those ties and communication channels could be useful when deescalating a crisis. The forum could also provide a mechanism by which the US can promote its desired norms.

Propose bilateral agreements prohibiting specific types of behavior such as kinetically targeting space-based assets: Since negotiating formal agreements provides a mechanism by which the US can propose a particular norm for adoption by another state, the US should pursue bilateral agreements. These bilateral agreements would codify the norms agreed on by the two parties and those norms might be adopted by the larger community. Even if the agreements are not ultimately signed, the US would have been able to facilitate the development, and possibly the adoption of the norm by the wider community. The proposed agreements should be bilateral in order to tailor them to meet the security requirements of each party. Additionally, the existence of the bilateral agreements would also have a calming effect on the international community as it would become clear that the large stake-holders were adopting a particular norm. Like any confidence building measure, this proposed measure requires some level of commitment and trust between the concerned parties. Additional transparency measures for information exchange would be required.

Sign bilateral or limited multilateral agreements with both established and newer space powers to exchange information on the nature of specific space operations activities: This mechanism is intended to provide concerned parties with sufficient information to allow them to more accurately assess whether another state's space operations activities actually pose a threat. Each agreement would have to be tailored to meet the security concerns of each party. Those agreements regarding space activities could easily be part of established security cooperation efforts. The Space Situational Awareness Information Sharing Agreements between the US and 13 other countries, 58 commercial companies and two International Governmental Organizations provide an example of how this type of information sharing norm can be developed. As the US creates SSA sharing agreements between it and others, it facilitates development of the norm that SSA should be shared. This activity also demonstrates US transparency about its space activities and sends the message the US considers other space powers to be valued partners.

Propose a prohibition on targeting space-based Position, Navigation and Timing (PNT) capabilities, during peacetime, crisis or conflict: Since it is critical for the US to retain its ability to use space-based PNT information in support of its military activities, it makes sense for the US facilitate development of a norm that prohibits interference with the satellite and control segments of a space-based PNT system during times of crisis or conflict. Such a proposed norm would not prohibit interference with end-user equipment and would be consistent with the long-established just war principles of proportionality and discrimination. (Kasku-Jackson 2016). This proposed measure requires some level of commitment and trust between the concerned parties and additional transparency measures for information exchange would be required.

Assist emerging space powers with the development of their space programs, to include organizational structure, policy, and technology: When assisting emerging space powers with their space programs, the US can promote its proposed norms via declaratory policy and technology partnerships. The declaratory policies of the US can serve as a model for the emerging power. Within the technology partnerships, the US can encourage the emerging power to adopt the US proposed norm in return for technological assistance and education.

Finally, the US should continue to invest in its space situational awareness (SSA) capabilities since SSA is a foundational capability that facilitates attribution of activities in space and therefore supports norm enforcement. SSA also impacts norm development and verification since the US may choose not to pursue a norm if it is not verifiable.

References

U.S. Commercial Space Launch Competitiveness Act. (2015). Public Law No 114-90; 51 USC 51301-51303. Retrieved from https://www.law.cornell.edu/uscode/text/51/51303

Finnemore, M. & Sikkink, K. (1998). International Norm Dynamics and Political Change. *International Organization, 52*(4), 887-917.

Harrison, R. (2010). *Space and Verification, Volume I: Policy Implications*. Retrieved from https://swfound.org/media/37101/space%20and%20verification%20vol%201%20-%20policy%20implications.pdf

Hein, W. & Kohlmorgen, L. (2009) Transnational Norm-Building in Global Health: The Important Role of Non-State Actors in Post-Westphalian Politics, in S. MacLean et al. (Eds*.) Health for Some, the Political Economy of Global Health Governance*, (pp. 88-89).

Kasku-Jackson, J. (2016) Prohibiting Interference with Space-Based Position, Navigation and Timing. *Strategic Studies Quarterly, 10*(4), 90-122.

Kasku-Jackson, J. & Waldrop E. (2009). Understanding space law, Legal framework for space. In D. Coletta & F. Pilch (Eds.), *Space and Defense Policy* (pp. 64-103).

Foust, J. (2017, July). Luxembourg adopts space resources law. *Space News*. Retrieved from http://spacenews.com/luxembourg-adopts-space-resources-law/

David Koplow

Professor of Law (Georgetown University)
15 August 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: What is the best legal avenue for the US to revitalize discussion on space law and space policy? What is the best opportunity we have to regain the initiative and remain the leader of international space law and maintaining the norms to our advantage?

D. Koplow: There's a couple of different ways to think about regaining the initiative and how the United States might proceed to exercise leadership. One way is to think about the venues, the places where international law is developed and agreed upon. There are multiple different places different places in international law where treaties or other international legal principles have been developed. One is the Conference on Disarmament. Something called the CD. Do you know about the CD or should I tell you a little bit about that?

Interviewer: Please go ahead.

D. Koplow: The CD, the Conference of Disarmament, is a body that has 65 member countries that participate, essentially, in Geneva and it has been the primary venue for the countries to negotiate treaties about weapons. The CD has developed the treaty about chemical weapons and

the treaty about biological weapons and the treaty about non-proliferation of nuclear weapons. It would be the logical place to turn to for the development of a treaty about space weapons. The CD has repeatedly had on its agenda repeatedly had on its agenda the discussion about the possibilities for developing new international law on preventing an arms race in outer space and something of that sort. The difficulty with the CD is that it operates by a very strict rule of consensus, which means that any one country can block anything from happening there, and that power has been exercised by various countries, often by the United States, often it has been Pakistan. The CD has been basically frozen for about 20 years and unable to develop anything having to do with new treaties, having to do with outer space or anything else. One important step if you are thinking about articulating international agreements on weapons in space is to figure out what to do about the CD, whether to prevail upon Pakistan and others to agree to open negotiations in the CD. Or alternatively, to abandon the CD and pursue in some other format because this one is dysfunctional.

That is, I think, a first fundamental procedural question, and it has the diplomatic aspects and strategic aspects on whether abandoning the CD in the long run is a good move for the United States, or a bad move, but that's the traditional place on which they're stuck. Aside from the weapons-related aspects, the other places in outer space… in international law… where outer space is discussed and debated and some of the kinds of principles dealing with congestion might be more appropriately debated and the leading international institution there is the Committee on the Peaceful Uses of Outer Space, which is a United Nations body, and they've done and continue to do, some very productive and useful important work on civil aspects of outer space. COPUOS completely stays away from weapons-related stuff. Anything having to do with debris in outer space or radio frequency interference in outer space, or on the long-term sustainability of operations in outer space, COPUOS is the place to go. They are a regularly functioning body and they have a scientific subcommittee and a legal subcommittee and for some of the issues that you're concerned about, that might be a valuable place to go, but not the weapons-related side. Does that help?

Interviewer: Absolutely. Now there is a big discussion over how to connect the stuff like the Outer Space Treaty and the other bodies of law that you've mentioned to our advantage and to sort of adjust from the present-day situation in space. Keeping in mind that the previous question I just asked you, how would we deal with international actors that can act as obstructionists to any sort of alterations or amendments to a current law that we have?

D. Koplow: From my perspective, the first step is, if the United States wants to exercise leadership, the United States has to exercise leadership. The difficulty here starts with one part of the 2010 Space Policy document, where the Obama administration adopted the posture… you are probably familiar with the 2010 Space Policy which was a revision of the Bush era administration 2006 Space Policy, but even the 2010 Policy, which was generally more international in its orientation, even there, the posture was that the United States would consider ideas for more agreements on outer space, but the United States would not take the initiative or exercise leadership in trying to create that. It seems to me that the first step is to revise that and for the United States to become much more proactive in trying to identify and develop new pieces of international law and then exercise leadership in trying to get the rest of the international community behind the idea that we might promote it. It's not enough to sort of sit back passively and see what ideas others might come up with and respond to those**,** consider those, evaluate those. The United States should be much more volunteering in the leadership role. In the absence of that, others will exercise some leadership. Russia and China have their idea for a proposed treaty that the United States has seriously criticized and lots of others have criticized. I don't think it's going to go anyplace.

But it's hard to beat something with nothing. If the United States doesn't have a counter-proposal, then the Russia-Chinese proposal gets a lot more airtime than it deserves.

Interviewer: Is the best mechanism for leadership is through bodies like the UN and other IGOs, or is it through the commercial sector and other space entities?

D. Koplow: Well, it would be everything. what you need is not just a whole government but a whole of society, or a whole of country approach, but for the development of international law, that's an area where governments take the primary responsibility, and it would be principally the government's diplomatic mechanisms, where the government would take the lead in trying to develop principles for, and then sponsor negotiation of, a new treaty or treaties, and the commercial sector would definitely need to be involved in all of that. That is one of the dramatically important changes in space practice in these last few years, is the much more pronounced role of the private sector—but with negotiating treaties, that's their primary function.

Dr. George Nield

Associate Administrator (Federal Aviation Administration)
1 August 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: So is this another opportunity for the US to take the lead and establish themselves as a leader on this issue?

G. Nield: Actually, it's too late for us to lead. We can try to catch up, and then we can talk about leading. Again, there is a lot of work underway by other countries and we're not playing in it. The folks, of course, who have the experience and expertise in tracking things in space are in the Department of Defense, and they don't necessarily want to share, they do not want to necessarily want to work with other countries. That is not their job really. They're trying to preserve national security, right? They're not really tasked with negotiating and writing standards and regulations. They're not a regulatory agency.

Dr. Xavier Pasco

Director (Fondation pour la Recherche Stratégique Paris)
31 August 2017

WRITTEN RESPONSE

The U.S has already pursued a strategy for sharing SSA data and this has had a positive effect on the management of space systems on the international scene for a long time already. Similarly the signature of bilateral agreements with numerous governments has been important as it engages those nations in the path of collective security.

It is now important to favor the emergence of national, regional SSA systems so that multiplication of such capabilities and their ability to "exchange data" based on such agreements will be a guarantee of an increased political efficiency to collectively "name and shame" any country that would "misbehave" in space.

It can be argued that the time has come to go beyond the sole "technical efficiency" of national systems (even if improvements must be pursued) and build a "politically efficient" network. One of the key aspect for the issuance and the functioning of future international norms will be to make sure that such norms are politically and diplomatically "efficient" i.e. that they will put a real collective pressure on any misconduct. The pressure will be more actionable if it results from the use of a network of systems that would represent a form of international space security community and that would be based on a collection of well-balanced intergovernmental agreements.

Dr. Luca Rossettini

CEO and Founder (D-Orbit)

16 August 2017

WRITTEN RESPONSE

- Act by example: all the government driven space assets under construction, planned or already active in orbit should adopt the more stringent measures described before. For a negligible extra-expenditure today it is possible to install on government satellites (NASA, NOA, DoD especially) special devices that enable a fast, safe, controlled and independent disposal of the satellite at the end-of-mission. The technology is existing – in fact D-Orbit has one satellite in orbit with such a device installed – and there are not excuses anymore to avoid using this or other intelligent and disruptive solutions.
- Leverage the previous "example" setting a rule for US industry and agree with Europe on a common strategy. US + Europe include 80% of the new space business. Japan will immediately follow.
- Enlarge the circle to other nations: India, China, etc.

We shall remember that there are not norms to verify if such regulations have been implemented. Once an object is launched, it is very difficult to demonstrate liability or deliver punishment. These cases have to be analyzed and implemented. A first, easy to implement, solution could be to check the satellite status every year. This is quite a common practice done by satellite operators for the insurance companies, deciding the policies prices based on the risk status of the satellite. If the satellite status is below a certain threshold, the operator is forced to properly dispose of the satellite. Such a simple rule will motivate the whole industry to implement cheap and effective solutions to avoid losing their space asset prematurely.

Matthew Schaefer and Jack M. Beard

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Jack M. Beard
Associate Professor of Law

16 August 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: What international legal codes or norms are needed to govern the increasingly crowded space domain?

J. Beard: Okay, so, I'd like to answer that question in conjunction with another question from your list. The two particular questions are, “what international legal codes or norms are needed to govern the increasingly crowded space domain?” and “what can the US do to best facilitate development of verifiable norms that maintain a peaceful space domain?”

So, what legal codes or norms are needed to govern the increasingly crowded space demand? Matt has just spoken to real efforts to try to reduce the space debris, which could eventually make it impossible to use space.

So, to move on to the security world, what can the US do to best facilitate the development of verifiable norms that maintain a peaceful space domain? Again, I'd like you to look at my article because these are sort of arms control issues. I practiced for 15 years in the Office of General Counsel at DoD, and I was an expert on arms control. As you start talking about what you can do here to create conventions, treaties, or norms to limit or constrain space operations, I have one key principle for you to bear in mind: it is almost impossible to regulate technology in space because it is almost all dual use. In fact, anything that moves in space can hit another object, and thus represent a potential weapon. For example, our space station has always been viewed by the Russians as an evil weapon, a space maneuverable vehicle (SMV). Anything that can maneuver and crash into something else is a weapon. Our other space law professor here, Frans von der Dunk, writes in his space law handbook that just about everything in space has a military application.

So, regulating technology is elusive in space—you can't go up and verify it, and no one is going to let you verify it before it takes off. Seeing what's up there and arguing whether it's a weapon or not, gets to the issue of intent, and there's no defensive or offensive capabilities that can't be merged or confused. So, if you're going to try and regulate space, weapons in space, and military activities in space, then your best bet is going to be regulating conduct, and not technology—you can regulate conduct and verify some conduct, but technology is elusive.

The Russians and Chinese have tabled a proposal right now there called the Prevention of the Placement of Weapons in Space, and it’s the only arms control proposal for space that is currently out. It’s dead on arrival for the United States because it would regulate space activities in a way that can't be verified—as the Russians say, "Well we’ll work that out later." It completely neglects all sorts of terrestrial-based and satellite weapons system.

Anyways, I think the key on this is that you're going to have an incredibly hard time regulating technology, and I speak to that in my article that I’ll send to you.

So, to go back to the question of, what international legal codes or norms are needed to govern the increasingly crowded space demand? A norm, again, if you're going to have a legally binding norm in space, you're going to have to work out a very difficult international agreement regulating conduct in the military sphere. The Chinese are completely uninterested in doing that, so you're left with joining in regimes that don't include our adversaries, which is a loser of the first order.

So, for your question of verifiable norms, I need for you to distinguish between a truly international agreement that is legally binding and includes all these countries, which is so unlikely. Since 1979, and the ill-fated Moon Law Treaty, there have been no legally binding international agreements for outer space.

M. Schaefer: There are some people that say you’re never going to be able to prohibit ASAT weaponry because the incentives for certain countries to create them are always going to be there, but Jack was talking about maybe actions. So, in other words, you might have a ban on testing

ASATs but you can't ban the development of ASAT because you wouldn't ever be able to verify that.

The other thing that creeps in, I guess, that I've heard a little bit of discussion about is, as this gets more into kind of controlling technology—although it leaps into actions as well as technology—it is indiscriminate. So, when you're developing an ASAT, you shouldn't do ones that are going to cause indiscriminate harm—in other words, like the Chinese ASAT test, the kinetic device in 2007, because it created thousands of pieces of debris that are going to last there for decades. Though, that might be captured by test ban anyway, because that's what they were doing—testing an ASAT.

J. Beard: Those are really good points, and I'd like to build on those points Matt's making about ASAT tests. It is probably very much in the interest of the United States of America to agree to some sort of ASAT test ban, at least for destructive ASAT tests that generate debris, because we have no interest in doing that—our weapon systems are developing to disable satellites without creating a debris field. We have no interest in Israel, or Japan, or France, or India conducting any satellite tests that create more debris. It is an area where we could cooperate with the Russians and Chinese if they could agree—we could pick the sort of tests that would be prohibited and the altitudes and so forth. So, that's a possibility. But, here's the problem, right now, no ASAT tests are legal. The ASAT test by the Chinese in 2007 was an extraordinarily bad and unhappy development for everyone in space because of the debris field it generated. Yet, except for Japan, there was no country on Earth that condemned that test as illegal, because they're still preserving their options. So, you have to be careful about what is law and what is not.

So, moving to your question of, what are the principles (e.g., flexible v. controlled response; proportionality, etc.) upon which international policy makers should develop response options for aggression in space? A disproportionate attack is a type of indiscriminate attack that causes more harm to civilian objects than is justified by their concrete and direct military necessities of the attack. And there is a debate right now about whether generating these huge debris fields that threaten all these other satellites in space is a disproportionate attack. Some of my expert friends at the Naval War College and elsewhere would suggest that you have to be talking about loss of human life and so forth for it to be a disproportionate attack. But, I think that the more you study space and things like GPS satellites, the more that you might be able to make an argument that an attack generating huge debris fields might violate the Law of Armed Conflict, but it's a debated issue.

Interviewer: Okay. Great. So, I find it really interesting that on one hand, the space domain is so rapidly evolving, and technology is developing so quickly and more and more actors are getting involved, but, on the other hand, I believe you noted that there have been no new treaties or charters since 1979, I think it was. I find that really interesting. You both clearly emphasized that it is a bad idea to walk away from or reopen the Outer Space Treaty, but, I'm wondering, do you think the current treaties and charters that are currently in place for the space domain are well-suited to handle the rapid evolution and development that is clearly underway in the space domain?

M. Schaefer: I think they largely are. And I think there is a proper approach to take when it comes to legal instruments. First, you have to identify a specific topic of concern. The specific topic, and desired agreement, should be narrowly focused, because I don't think a broad-scoped agreement is going to work. You also have to consider several other factors. Do you want a legally binding agreement or a legally non-binding agreement? Which countries need to be involved or should be involved, and what's the topic? And I think it's the narrow topics that stand some chance.

So, a couple topics that we mentioned. A destructive ASAT testing ban is one. Another is trackability requirements on all satellites, or, if you can't meet the trackability, then you are limited to certain orbits. Another could be something like determining what a dangerous approach would constitute to a satellite. Other ones I could see having a chance would include some of the commercial issues, which I believe overlaps with visits to government facilities and Article 12 of the OST. Once we get US commercial companies up there at research facilities or doing asteroid mining and China, or another country, makes a request, then you would try to do a bilateral agreement with that country saying something like, "No, we're not going to allow tests here. It's commercial. This is really to test weapons to make sure there is no WMD placed on a celestial body."

So, I just see more limited topic scope or limited country scope agreements being sufficient to plug in some of these holes, rather than big broad multilateral treaties, regardless of whether it is reopening an existing one or creating new ones.

J. Beard: Matt is absolutely right about picking a very narrow topic to work on, and then trying to achieve that. I completely agree with that, and would add two other things.

First, let me step back and ask, and you have to do this with respect to the Outer Space Treaty in particular, does the OST serve US interests? Emphatically, yes, it does. We built it for us. And one thing it does, which the US DoD has to have as a matter of policy stated by administration after administration, is that it preserves flexibility for the US in space to navigate, to communicate, and to strike. We have to have that flexibility. An agreement that compromises that flexibility is fundamentally not good for our national security, defense, and intelligence activities. We can agree to specific prohibitions on certain things if we have some sort of ability to rely on other factors, making the other side also not want to do that, so long as we can verify it as well. But, to be talking about large activities or broad programs and so forth, that could restrict US operations in space, and that's just not a good starter.

The second thing Matt mentioned, which is absolutely right, is that you have two ways of doing this: a legally binding approach, or a legally non-binding approach. I cannot emphatically stress how bad the non-binding approach is, because there is no way to ever monitor a non-binding international document because you can't define cheating. If you don't have precise definitions of cheating and a monitoring regime, you can't ever enforce, monitor, or verify when cheating occurs.

So, because there have been no legally binding agreements since 1979, there is an entire industry of bozos, in academia and elsewhere, tracking over to Geneva, New York, and London, to constantly generate these wonderful new non-binding norms for space. These non-binding norms easily represents something that would restrict US national security activity. They never include China, and China is never going to sign on to these things anyways. Even if China did sign off on a non-binding document, if the United States signs it, and Russia and China signs it, they can compete in whatever they want and they don't have any Congress or free press to monitor what they're doing—they can just do whatever they want—while the US on the other hand actually would have to try to comply with the terms of the non-binding document.

Given this, I argue in my article, and no one I've met in any conference can dispute it, that the United States is at a disadvantage in signing these things because people are going to expect the United States to comply with these non-binding principle. For example, China could say to the US, "Hey, why are you building that fancy new military satellite when in fact you're prohibited from doing things like that in this non-binding document. The Chinese and Russians could just laugh because the Chinese space program, and China really is an adversary in space, is one of the most secretive institutions and activities in the world. China only just recently

allowed a camera in to show one of their launches, for the glorious state propaganda—the Chinese have been really nervous about sharing information about their space program.

So, ultimately, it's an inequitable arrangement for the US to sign these non-binding documents. But, it seems that these are all people are talking about at the moment—I guess because it's been so long since a legally binding agreement has been done.

M. Schaefer: Just to add one caveat. Jack is primarily talking from an arms control national security perspective. I think there can be some situations where it works to start with a non-binding code like litigation guidelines, as long as you have a process in place to ensure the national implementation of them. So, there are some situations where soft law can ultimately evolve into legally binding norms, or you get to keep it as a soft law instrument that has an implementation mechanism or a military mechanism to ensure it. But, as Jack has noted, we wouldn't want to do that for arms control and important national security things.

J. Beard: Yes, Matt's caveat is an important one. In other fields of law, like human rights, you'd see that the non-binding, soft law, "let's establish a principle" thing has worked really well. For example, "let's get as many champions as we can to agree that we're not going to torture." That would be a great principle to start with, and then you could start building codes and legally binding documents around this principle that has been agreed on. And in fact, in space law, the Outer Space Treaty started out as UN General Assembly Resolutions and other non-binding statements saying, "Hey, countries shouldn't assert sovereignty over objects in space." And, "Hey, countries should be able to overfly other countries' territory and not violate their territorial sovereignty." So, the Outer Space Treaty started out as non-binding principles that became rules of international law. But, when you start entering into the world of arms control, if you start going down the road of trying to create a norm that you support, but then other actors don't support it, well then you're asking for trouble in the arms control world. But, Matt's caveat is a really important one..

Interviewer: Okay. You provide an interesting perspective on norms. We recently spoke to an expert on China, and he brought up some of the same concerns regarding norms. The argument was that if the US leads the initiative in creating norms, it means that the US is also the actor most bound to those norms. And, in the case of China, during peacetime the Chinese could say, "Yeah, sure those legally non-binding norms are great," but if a conflict were to arise, then the Chinese would likely just completely disregard those norms. Meanwhile, the US would be in a tough spot in a conflict environment and bound to the norms it established, while the Chinese are off doing whatever they want. And that sounds kind of like what you are getting at here as well.

AAC:[10] Hi everybody, I have a question I'd like to present. So, this is a very interesting conversation, but I want to approach it from a slightly different perspective—one of deterrence and deterrent credibility, and the ability to apply deterrence concepts in space. So, from your perspective, I think, it does make sense to take a leadership role in developing these kinds of principles and setting precedents or not setting precedents because it is one other way to basically establish a cost for violating a principle that the rest of the world may have agreed to, right? So, for example, agreeing to passive defense, and agreeing to passive defense only in space. In this example, if you can get the Chinese to agree, then that puts them in the position of being the aggressor if anything is ever done in space. At the same time, if they don't agree, and the rest of the world does agree, then there is an international cost, and an economic cost in some cases, for them. So, first, I'm wondering what you think about this? And, second, what are your thoughts on the effects of precedent setting, as in the US publicly stating that space is a warfighting domain—certainly not international law, but setting a precedent.

[10] Dr. Allison Astorino-Courtois (NSI)

J. Beard: Well, on that last point, we're a free country, we have an open press, our military officers write and argue amongst each other on national public issues, we have military law journals, all of our regulations are open to the public, etc. This, however, is not true for Russia and China. The US Air Force has a mission to defend our assets in space and disable or restrict the other country from operating in space. So, the US Air Force has to have the ability to establish supremacy and it has to control space. The US Air Force just has to do this. So, Air Force regulations talk about offensive space control, and, yes, that offends countries. And generally saying that space is a warfighting domain, offends countries. The reality is, though, that there is no way for the Air Force to plan on protecting the United States without publicly discussing something like, "if there is a war, these are assets that we need to protect and we need to prevent access to from other countries." So, whatever precedents it establishes, or however you want to describe it, and despite the Air Force turning down its rhetoric a little bit, ultimately the Air Force needs to talk about being the master of space or dominating space. That might offend countries, but, at the end of the day, we have to have programs, objectives, and activities that might offend others who are looking for a peaceful use of space. But, you can always tone down the rhetoric, of course.

So, to your first question about setting up norms so that countries who don't participate can be labeled an outsider. Let's just say, for example, that we're talking about a non-aggression pact for space—no country can take the first aggressive move, they can only take defensive moves in response. So, there are a lot of reasons why you might want to have such an initial position. And, in fact, David Koplow (Georgetown) talks about how maybe we can have at least a no first strike or a no first use of any satellite weapons, and there are precedents for that in world history. For example, with biological weapons: yes you can keep on building them, yes you can be prepared to use them, and yes you can have defensive capabilities, but let's at least first agree to not do first strike with these weapons. So, there's something to be said to that. The only problem is if China or Russia doesn't join, and the United States signs up along with some random other countries, then that's great, but if the other side hasn't joined that no first strike proposal or agreement or whatever, it's kind of hard to label them as a violator of it when they can simply say they're not going to join. This then does put you in an awkward position because, as I indicated, you can't distinguish defensive from offensive weapons in space, so when the United States starts building things that have a first strike capability, and people start to question why you are putting things with first strike capability in space, then the Chinese will be sitting on the sidelines, laughing. Some of these proposals just don't work out as well as you'd like to.

Again, there could be limited international agreement to try to get the Chinese to sign up to doing no first strike or first use of these weapons against certain targets in space. Maybe you could limit this to GPS satellites, or something specific, but you'd also have to define what an attack is. Does it include a cyber action that somehow discombobulates or dazzles or otherwise messes up the orbit of one of these satellites? I mean, you have to be very precise about what a first strike is, and that's harder than you might think once you start to get into the details of the ways you can temporarily disable satellites. Though, in theory, a very narrow one like "no first use things" would be something to present to the other side, and if you can get the major players to agree to it, it probably would represent a positive step, if you could define the terms.

Dr. Michael K. Simpson

Executive Director (Secure World Foundation)
23 August 2017

WRITTEN RESPONSE

The Code of Conduct concept holds considerable promise. A broadly adopted Code incorporating best practices would most likely include practices in the area of operations and debris management for example to which the USA has adhered for many years thus giving the US a grounds for approaching states signatories to such a Code to discuss behaviors inconsistent with it as they arise. Inevitably, large spacefaring states would be well advised to provide technical and at times financial assistance to less well developed states to assist them in developing the capacity to comply with best practices. Given how much more dependent on space facilitated technologies we are such a policy constitutes enlightened self-interest.

Michael Spies

Political Affairs Officer, Strategic Planning Unit
(United Nations Office of the High Representative for Disarmament Affairs)
15 August 2017

WRITTEN RESPONSE

United Nations bodies have been working to develop norms, principles, rules, guidelines and other measures with the ultimate aim of maintaining outer space for peaceful purposes and preventing the emergence of an arms race. US leadership and engagement has been an important factor in the development of many of these efforts.

Transparency and confidence-building measures in outer space activities:

The United States actively participated in the group of governmental experts on transparency and confidence-building measures (TCBMs) in outer space activities, which convened from 2012 to 2013 pursuant to General Assembly resolution A/RES/65/68. In its consensus report the group recommended a set of voluntary TCBMs relating to, inter alia, information exchanges on space policy, information exchanges and notifications related to outer space activities, risk reduction notifications and consultative mechanisms. The United States has subsequently co-sponsored, together with China and the Russian Federation, follow up resolutions in the General Assembly which have, inter alia, encouraged Member States to implement the measures to the greatest extent practicable.

At the 2015 substantive session of the United Nations Disarmament Commission, China, the Russian Federation and the United States jointly proposed an agenda item on the preparation of recommendations to promote the practical implementation of transparency and confidence-building measures in outer space activities with the goal of preventing an arms race in outer space (A/CN.10/2016/WP.1). In 2016, the Commission held two informal meetings on the basis of this proposed item. There was wide-spread support for including this item on the agenda for the forthcoming three-year cycle of the Commission (2018–2020). Continued leadership by the three sponsors of A/CN.10/2016/WP.1 will be essential in advancing the implementation of the TCBMs in outer space activities.

Prevention of an arms race in outer space:

Since the 1980s, the Conference on Disarmament has considered possible legally binding measures for the prevention of an arms race in outer space. A central goal under this item has been the achievement of a treaty to

prevent the weaponization of outer space. The Conference annually convened an ad hoc committee under this item between 1985 and 1994.

In 2014, China and the Russian Federation presented at the Conference on Disarmament a revised draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (CD/1985). The United States circulated its analysis of that draft to the Conference (CD/1998**).

The Conference has been unable to commence negotiations on any item since 1999, primary due to a lack of consensus on the pursuit of negotiations on a treaty to ban the production of fissile material for nuclear weapons. In light of this persistent stalemate, States have increasingly sought to advance substantive deliberations and negotiations through the establishment of ad hoc subsidiary organs in the General Assembly.

Guidelines on the long-term sustainability of outer space:

In 2010, the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space established a Working Group on the long-term sustainability of outer space activities. The goal of the working group is to develop voluntary and non-legally binding guidelines on the long-term sustainability of outer space activities for submission to the General Assembly.

In 2016, the working group agreed on an initial set of guidelines (A/AC.105/C.1/L.354). The remaining draft guidelines remain under discussion. A number of these remaining guidelines relate to matters of international security, such as, inter alia: the intentional modification of the natural space environment; ensuring the safety and security of ground-based infrastructure; development of criteria and procedures for active debris removal; and development of procedures and requirements for operations, in extreme cases, resulting in the destruction of in-orbit space objects.

Code of conduct for outer space activities:

In July 2015, the European Union convened a multilateral meeting in New York on an international code of conduct for outer space activities. The European Union first proposed the code in 2008, as a contribution to TCBMs in outer space activities.

At the 2015 meeting, participants discussed possible elements of a code of conduct, including its purpose, scope and general principles, and noted the value that a code could bring to promoting the safety, security and sustainability of outer space activities. Many participants at the meeting considered that the code should be comprehensive and apply both to civil and military outer space activities, and that it should include provisions on the application of the right to self-defence.

At the conclusion of the meeting, the Chair assessed that the most supported way forward would be the pursuit of negotiations within the framework of the United Nations through a mandate of the General Assembly. No further action on the EU proposal has been taken.

Dr. Mark Sundahl

Charles R. Emrick Jr.- Calfee, Halter & Griswold, Professor of Law
Director, Global Space Law Center
(Cleveland-Marshall College of Law, Cleveland State University)
19 July 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: What are the current international agreements, treaties, conventions, etc. governing the use of space, and what specific limitations and constraints are placed on space operations?

M. Sundahl: There are five UN treaties: 1) the Outer Space Treaty, 2) the Rescue and Return Treaty, 3) the Liability Convention, 4) the Registration Convention, and 5) the Moon Agreement.

The Moon Agreement, the fifth one, has not been ratified by any major space powers. For those 13 states that have signed the agreement are subject to some different rules about exploitation of natural resources. That's the core issue there.

But setting the Moon Agreement aside, the Rescue and Return Agreement elaborates on Article V of the Outer Space Treaty regarding the duty to rescue astronauts and return space objects, I think that's not worthy of a lot of discussion from a military perspective, except to say that governments should recognize that these duties apply even in time of war.

The Liability Convention focuses on who is liable if something happens, either on the ground, in the air, or in space. The basic rule regarding liability is that you're strictly liable if your spacecraft destroys anything on the Earth or in air space, and if your spacecraft hits anything in space, then it's a question of fault. That's a big question, what does "fault" mean? I think that's an interesting question. Like when the Chinese blew up their own weather satellite, which created massive clouds of debris that are going to be in orbit for 500 years and may destroy untold numbers of satellites over the 500-year span, are the Chinese at fault? No one has really answered that question. I'd venture to say no even though it was an intentional act.

The Registration Convention is maybe the most used and successful space law convention because it's all about registering your space objects and describing where they're going to be and what they are so that the world can have some kind of space traffic management and be aware of what people are doing at space. On this issue, I would encourage the US government to continue to encourage others to comply with the Registration Convention and provide accurate information about what they're putting into orbit, because this really helps with transparency.

But the big one, the big convention is the Outer Space Treaty. You asked about the constraints on countries. So, the starting point is the free use—that we're allowed to use space freely, and we see that when we fly over other countries with no restrictions. So, what are the restrictions? Well, you can't put weapons of mass destruction in orbit. You can't be militarily aggressive in orbit—you've got to be peaceful, although that includes operations for self-defense. I don't think anyone believes that all weapons are banned from space, but no nuclear weapons, you can't be aggressive, and you have to avoid harmful interference with the activities of other countries and their nationals. That is a rather soft prohibition on interference because all it really requires is that if you are going to harmfully interfere with the operations of others, then the governments have to consult with each other. It doesn't say that interference is outright prohibited, only that there have to be consultations. You have to operate with due regard for the activities of others, and this kind of goes hand-in-hand with avoiding harmful interference. You also have to avoid harmful contamination of outer space and back contamination of the Earth—that's why we clean

and sanitize the spacecraft before they are sent anywhere. That's good too so that we don't introduce Earth bodies and Earth organisms to other celestial bodies. Another restriction is the prohibition of appropriation—you can't go to the moon and plant a flag on it and claim it as the territory of the United States. We did plant a flag there, but we did so explicitly that it was not for any purpose of appropriation, but instead it was just a symbol of peace on our arrival on the moon. So, you can't claim the moon, but can you occupy it? Are there any rights that a private entity or a government can assert over part of a celestial body that is short of appropriation? Could you issue temporary licenses to mining companies to use for part of the celestial body or for the government to mine a celestial body, and therefore exclude others from that mine because it would constitute harmful interference or a lack of due regard? So, is there something short of appropriation that would allow the permanent use of a celestial body? That's kind of an open question. I believe, yes, we can do that, otherwise we should all just pack it and go home if we can't establish a base on the moon.

Another limitation on space activity that comes to mind concerns telecommunications, particularly regarding the use of a certain orbits, geo-synchronous orbits. You need to go through the ITU and FCC to get one of those orbits, which are limited in number to 180 due to a requirement of two degrees of separation between every satellite. The use of frequencies is also regulated by the FCC and the ITU.

So, those are some of the restrictions that come to mind.

Interviewer: So, in terms of constraints, it seems like a big part of that would be building and solidifying norms, particularly as technologies are rapidly developing and more actors are getting access to space and to technologies that can help them get to space or get involved in space. So, I'm wondering, what sort of things can the US do, or what sort of things should the US do, to best facilitate the development of these norms so that we help to maintain a peaceful space domain?

M. Sundahl: I think you put your finger on it. I made a couple of notes before this call, and a large part of it is about exactly that. I think it's important for the government to identify which of these terms, restraints, and legal terms in the treaties present uncertainty that affects our operation in space—where are the problems in the international treaties? We need to Identify those problems, and then become active participants at the United Nations and have discussions at diplomatic levels (i.e., bilateral talks, multi-lateral talks, and be involved in other working groups and other initiatives) that clarify these issues. I think the United States should take the lead because the risk is that if the US doesn't and then is involved in something like asteroid mining and extraction from ice on the Moon, then it runs the risk of being viewed by many around the world as having acted unilaterally by allowing for the ownership of extracted resources.

Currently, the international community is somewhat enflamed, and there are active discussions going on at the UN, but I wouldn't say that the US is necessarily at the lead of those conversations. I think there may have been a miscalculation that critics would not arise. I think America should learn from this and try to take the lead in clarifying these terms for the benefit of everyone.

ViaSat, Inc.

Richard A. VanderMeulen
Vice President of Space and Satellite Broadband

Ken Peterman
President, Government Systems

Shannon O'Meara Smith
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Fred Taylor
Vice President, Space and Cyber Applications

Bruce Cathell
Vice President of Government Operations

21 August 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: Great. It's just opening up a whole new can of worms there. Decreasing uncertainty by having established, I don't want to say norms, but these redlines that you just expanded on. There could be quite a bit of cost to doing that. I'm just wondering if the positive effects it would have on industry is it that needed? Would it be that beneficial? Or is it something that could be put off until a more realistic threat is imminent? If that makes sense.

VanderMeulen: It is clear that the potential for threats is likely imminent; however, to clarify in terms of redline statements; we don't recommend a level of specificity where you'd say if an approach is within 50 kilometers the response should be x, y or z. We are considering behavior, so we think it is better to put norms in terms of behavioral context without actually putting a hard number or metric on behaviors, or actually declaring if you do this we are going to respond with that or not respond. There needs to be flexibility in the range of responses. It leaves you the ability to not be locked into responses.

If you have a flexible response option, then you can control your response as escalatory if necessary, or even de-escalatory. Consider behavior whether announced, planned, or preannounced and ask, "I'm doing these type of missions; therefore do not take this as a hostile event." This changes from norms of behavior to something more in terms of operations; where you can actually have a conversation. We think this will provide an opportunity to have the discussion or conversation asking, "You know, I'm not sure if I like that behavior." Or, "That seems a little bit provocative."

We would therefore take pause and then offer a response from a potential adversary where their behavior has been visible. The same for industry, but right now industry is able to manage and communicate between different satellite service providers in terms of how they maneuver around within the GEO-belt close to each other in terms of the movement and the activities that take place.

Interviewer: Thank you for that clarification. The last question which is the one I just read, so apologize for the mix up here. Second to last sentence of the last paragraph on page 18. I'll read again, the commercial space industry has adopted certain norms of behavior most conducive to successful operations. I would like to ask do you think further guidance is needed, or has the industry by and large been able to achieve this on their own and government should stay out of the way in terms of norms? Or institutions like the SIA are very effective and need more support.

F. Taylor: I was going to say that industry has done a very good job in establishing these norms. While they're not written down, there is some expectation that from an industry standpoint all these satellite operators are operating their satellite servicing a broad set of customers. Their expectation is they will be able to operate and pursue their business interest without interference. If another commercial provider is interfering with their revenue or their business it is the same as if you do things on the ground as if you block access to my business and put a sign up in front of it, that's a reason in which you should be able to respond to that. That response would be move it, or if you don't move it, then you need to pay me damages. All these type of things could be put in place. I think those are pretty well established because they are commonly shared goals. The commonly shared goals in space are to operate freely and operate without interference in order to pursue the mission objectives on the commercial side to pursue their business plan as described.

WRITTEN RESPONSE

The US is a global space leader and the rest of the world looks to us to provide guidance on space norms. First, the US must articulate acceptable behavior necessary for the safety of flight. The space catalog and collision avoidance warnings provided by the Joint Space Operations Center (JSpOC) is an example of US leadership promoting the safe conduct of space operations. Articulating actions and intent is the next step in normalizing space behavior. Similar to air operations filing flight plans and notifications of deviations could be a valuable step towards increased space safety. Self-reporting is important for establishing accountability but adoption of technology, processes and procedures are necessary for verification and attribution. The deployment of more terrestrial and space-based sensors with increased fidelity would be used to verify reported behavior. In addition, localized sensors on key geostationary space platforms could augment situational awareness and safety of flight. Private industry has made significant investment in their systems and would be proponents of measures to maintain peace in space.

Dr. Frans von der Dunk

Professor (University of Nebraska College of Law)
25 July 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: Okay. So, in thinking about space as a global commons, in addition to the laws and rules that are in place, it would seem like a big part of ensuring the access to and the safety of space for everyone would be by building and solidifying norms. So, I'm wondering, what can the US do to best facilitate the development of verifiable norms that maintain a peaceful space domain going forward?

F. von der Dunk: This may sound a bit cheesy, but, ultimately, I think the best thing the US can do is to set a good example for everyone else. Since the Soviet Union fell apart, the US is certainly seen as the sole super power in space, not just in the military context but also in the civil and commercial area. So, everyone looks at the way the United States is going to address these issues.

One of the beauties of the Outer Space Treaty is that it provides for state responsibility and state liability, also for the operations of private operators, which means that, for example, if Boeing launches a satellite and then that satellite comes crashing down in Mexico, it's not Boeing that has to compensate Mexico for any damage caused, it's the United States government that is liable. The beauty of that is that it incentivizes the US government, and other governments in the same position, to make sure that they only allow space activities that are duly licensed and have provisions for liability derogation.

The beauty of that is that you, for example, will most likely prevent something like flags of convenience, which we have struggled with in the laws of sea for many decades. Again, if the United States is the first, for example, to license asteroid mining companies, which it looks like it's going to do pretty soon, then that is the standard that will be set by other actors in legislating nationally and licensing nationally on how to properly balance the benefits of allowing private enterprise to go ahead and the public interest in keeping space a safe, relatively peaceful, and relatively beneficial place to operate.

So, it sounds a bit cheesy, but I think that by pushing that example, the United States climbs the moral high ground and then can also strongly incentivize others to follow suit. Then, of course, this similarly applies if we talk about commercial environments and markets. So, for example, if we talk about space in the context of aviation, the position of incredibly high standards of safety observed in United States and the rest of the Western world then become relevant and forces anyone else to either comply with those high standards or not be allowed into the US market. So, that's the kind of mechanism that might start working in space, at least in the commercial arena. I understand, obviously, that if we talk about the more public side and the maintenance of security and peace in outer space, then it becomes a little bit more tricky—but I still think it can play a major rule in that regard.

Dr. Brian Weeden

Director of Program Planning (Secure World Foundation)
31 July 2017

INTERVIEW TRANSCRIPT EXCERPT

Interviewer: Do you think the international treaties, agreements, laws, etc. that are currently in place to govern space are sufficiently suited to keep pace with an increasingly crowed and rapidly evolving space domain? And, if not, what kinds of international legal codes or norms, or updates and/or ratifications to current laws, are needed to govern this increasingly crowded space domain?

B. Weeden: So, that's kind of a complicated question. I think the existing treaties lay a sufficient framework for international principles. The challenge is that a lot of the principles they established haven't really been further defined over the last 50 years. Take, for example, the peaceful usage question. As I said earlier, we enshrined peaceful uses of outer space in the Outer Space Treaty with definitely some planned of strategic ambiguity incorporated—we, the US, knew that it would include military intelligence activities, and we were okay with kind of making the aggressive stuff off limits, but there are still countries today in the UN COPUOS that will argue that peaceful use means non-military, despite the fact that the military has been involved in space for over 50 years. So, that's one example.

There is a lot of stuff in the liability regime that exists, but it's never been further clarified. So, if you think about it, we have the US Constitution, but we also have dozens and dozens of Supreme Court cases where people have gone to the court to challenge part of the Constitution or to challenge a law based on a premise in the Constitution, and the courts have ruled on how things in the Constitution should be applied and how things should be interpreted. However, there is none of that for the liabilities stuff in space—there is not a single court case in the international courts on liability from a space accident. There have only been two cases that could have been launched: one is the 1979 crash at the Cosmos satellite carrying the nuclear reactor into northern Canada and the second is the 2009 Cosmos collision. In the first case, basically the US and

Canada raised the issue with the Soviets and the Soviets basically paid a few million dollars, but an actual liability claim was never brought within the international organization. In the second case, the US Cosmos collision, basically the US and Russia got together and said, "Hey, I am good. Are you good?" "I am good." "Okay great." And the US and Russia just kind of settled it out of court.

So, we have nothing about how this stuff is applied or defined. I think across the board, that's the biggest challenge that we have with space. It's not that the underlying international treaties are wrong or bad, it's that a lot of stuff these treaties lay out has never been further implemented, either in national law or through actual court decisions and determinations on how they apply.

Another example I will bring up is the asteroid mining space resource use. There's a big debate going on right now. Article 2 of the Outer Space Treaty says that there is no such thing as national appropriation, but there is a significant portion of the lawyers and economists that will say, "I can go out and I can fish the ocean without claiming the ocean as my own territory," and they are basically applying that same analogy to saying, "I can go to the Moon or I can go to an asteroid and I can mine some of it up. I can track water or whatever else and then fly off to go use that water without actually having a title or deed to the asteroids or the Moon." The US has put some of this in national law, and so has Luxemburg, but this is a very active area of debate where, again, there is tension between this broad kind of principle at the top, but no one has ever really clarified it before—there's not a lot of state practice in how to interpret certain things.

So, in my mind, that is the biggest challenge we have in the space world. Again, I think as it becomes more normalized, we are going to find that, because people are going to start doing stuff. There is probably going to be some accidents and some incidents that are going to go to the courts. There are going to be more things regarding the laws on asteroid mining, where countries are going to say, "this how we take the supplies," and other countries may disagree, which will lead to debates and maybe some court cases, and in the end we will probably find out what's going on.

So, as far as what new stuff is needed, I don't really think there is a lot of work needed at the treaty level. I think a lot of the new stuff is more at a much lower level. So, for example, I think of things that exist in other domains that don't exist in space. A perfect example is something in the maritime domain called the Incidents at Sea Agreement, which was signed in the late 1970s between the US and Soviet Union after several incidents where US ships and Soviet ships got in to situations at sea that could have precipitated either a serious accident or collision or triggered some sort of armed conflict. So, the US and Soviet Union came up with this agreement where they outlined how they would maneuver in close quarters with each other and how they would interact on the high seas, and it really kind of helped stifle some of the worst chances for accidents or misperceptions.

We just don't have anything like the Incidents at Sea Agreement for the space domain. This whole category of rendezvous and proximity operations is going to be a huge issue. It's probably one of the biggest issues to deal with in the near term, both because you have commercial companies that are planning things like satellites servicing, satellite refueling, and outer-orbit inspections that are going to involve docking and getting close to other satellites, and then there is the whole national security concern over exactly the same thing. So, for example, when a Chinese satellite is doing stuff in space and perhaps coming close to US satellites, what is the space equivalent of an Incidents at Sea Agreement that is going to kind of give a bright line of "you should do this, this is how you behave responsibly, and this is how we do it normally," and if they deviate from that, it suddenly becomes indications or warning that something is not right. We just don't have anything like that at the moment that I know of in the space world.

Interviewer: Okay. That actually transitions nicely into the final question that I will ask you, which has to do with norms. So, given some of the clear ambiguities regarding the laws in space, and also surrounding some actions and operations in space, it seems that it would be important to develop and solidify norms in addition to the laws. So, what types of things can the US do to best facilitate the development of verifiable norms to sort of maintain peace in the space domain?

B. Weeden: I would, say number one is to actually say, "yeah, we would like some norms." Though, this has sort of not been US policy over the last several years. I say that because it is strongly implied by the 2010 Obama national space policy and it's specifically addressed by the 2011 national security in space strategy, but how that its actually being implemented is unclear even 6-7 years after the fact. And when you do get a normative exercise, such as the European Union's effort to build an international code of conduct, you then have a significant body of people in the US that don't want anything to do with it. Back in 2012-2013, Congress included in one of the NDAAs that within 90 days of the US signing such agreements, you had to have the Secretary of State, Secretary of Defense, DNIs and several others all swear at the Congress that such an agreement would have no impact on US space activities or military space operations, which is absurd if you think about trying to set norms or trying to manage behavior, saying that, "Oh, this has no impact on us." And that was largely because they interpreted, intentionally or unintentionally, the EU effort as stealth arms control, even though it wasn't even close to that, but these are the kind of domestic US politics that create a challenge.

So, I would say the first step would be to just do the homework. There is a huge body of scholarly research on norms of behavior, both in the sociological field as well as the international relations field. So, the space world needs to start by looking at that work to try and figure out how other domains and other fields have successfully fostered or approached the whole idea of norms of behavior. Then, once we have that foundation laid, then we start figuring out, "Okay, this is actually something we need to take seriously," and I think the US should be serious in this because the norms of behavior reinforce our position as the preeminent space actor—norms kind of codify and solidify things as they are, and they kind of hold down sort of the upstart rebels types. So, then we need to figure out, "Okay, if we really do care about this, what specifically are we going to do about it?" and develop a strategy for that. Unfortunately, I haven't really seen this happen yet, despite it ostensibly being part of the US' strategy over the last several years.