



Apollo 16 Hasselblad image of Earth from the moon (NASA)

The Role of Space Norms in Protection and Defense

By Audrey M. Schaffer

As an operator in the space and cyber domains, we must partner to influence norms of behavior that preserve and improve the usefulness of the space and cyberspace domains.

—GENERAL JOHN E. HYTEN, USAF
Commander, U.S. Strategic Command

Over the past decade, the United States has participated in a variety of activities intended to shape international norms for outer space activities. The *Oxford English Dictionary* defines a *norm* as “That which is a model or a pattern; a type, a standard.” In the outer space context, norms have come to mean both “top down” high-level principles intended to inform the development of new international legal regimes and “bottom up” best practice guidelines intended to inform day-to-day operations.¹ Both types of space norms have their value, but the latter have received the most

Audrey M. Schaffer is the Director for Space Strategy and Plans in the Office of the Under Secretary of Defense for Policy.

attention in recent years because of their potential to enhance space safety and sustainability as the number of space actors grows and the nature of space activities changes. Much as roadway traffic rules prevent accidents and reduce congestion, safety-focused “space traffic management” norms, such as limiting debris, avoiding collisions, and sharing space surveillance information, can reduce the likelihood of accidents and protect valuable orbital regimes from the deleterious effects of long-lived space debris. All who operate in space will benefit from a more safe, predictable, and efficient operating environment.

Militaries stand to gain additional unique advantages from widespread adherence to operational space norms. Norms can serve to highlight abnormal behavior, enabling warning of and protection against space threats. Militaries, therefore, should support domestic and international initiatives to shape operational norms of behavior, and they should lend their expertise to norm development efforts. As international space norms take shape, militaries can then analyze abnormal behavior, characterizing those specific behaviors they would consider hostile or aggressive and determining how to respond appropriately in different situations. Militaries may also need to consider whether to evolve operational policies and practices to meet behavioral expectations.

Role of Space Norms in Protection and Defense

Norms are not a panacea for constraining aggressive, hostile, provocative, or otherwise deliberately irresponsible behavior in outer space. Norms may be enough to dissuade a rational actor from routinely engaging in irresponsible acts, but they will not prevent a committed aggressor from deliberately disrupting or denying space services it deems detrimental to its interests. Norms, however, can play a critical role in detecting and responding to potential threats.

Norms enable early detection of potentially hostile actions or intentions in space. If a satellite exhibits behaviors

contrary to operational norms, this is a clear flag to monitor its activities more closely. In times of peace, such activities are likely to be nothing more than an anomaly, which may deserve increased monitoring to preserve spaceflight safety or to mitigate harmful electromagnetic interference. In periods of heightened tensions, norms can form the basis of criteria for early indications and warning of potentially aggressive actions.

To have maximum value in identifying “abnormal” behavior, norms should be widely accepted, such as through voluntary guidelines or international standards. Short of explicit international acceptance, national or allied declaratory policies can communicate those behaviors considered to be a demonstration of hostile intent, shaping tacit understanding of acceptable and unacceptable behaviors. If these agreements and/or communications are clear, and norms are generally observed in times of peace, then we can assume in times of crisis that behavior contrary to norms is most likely a deliberate choice. These assumptions will be a critical input to crisis decision-making and, by extension, may have a significant effect on crisis stability. Both an under-reaction and over-reaction to anomalous behaviors could have serious and unintended consequences for international peace and security.

To the extent that the international community can observe what is happening in space, norms will shape world opinion about these behaviors, branding them as simply irresponsible or something more egregious such as potentially unlawful. This will require, at a minimum, compelling evidence based on space situational awareness information from a trusted source. Confirmation from multiple, independent, international, and/or commercial sources of space situational awareness will have a positive and reinforcing effect on detecting bad behavior in outer space.

Nations may condemn those who choose to engage in behavior contrary to norms. Condemnation, however, is a double-edged sword; a nation cannot take others to task for violating international norms and simultaneously seek to

operate with impunity. At first glance, military space operators may bristle at the implication that norms may constrain their freedom of action in space. Militaries, though, already accept legally binding constraints in all domains. For example, fundamental to the conduct of modern warfare is international humanitarian law (also known as the Law of War or the Law of Armed Conflict),² which seeks to limit the effects of conflict, especially on noncombatants. Militaries around the world translate international humanitarian law into rules of engagement that guide servicemembers.

A future space norms regime could be fashioned similarly to other regimes that govern activities in shared spaces and allow for differences in the application of rules to government or military actors and private actors. For example, Article 3 of the Convention on International Civil Aviation provides that the Convention does not apply to “state” aircraft, though such aircraft are required to exercise due regard for the safety of navigation of civil aviation.³ Article 48 of the Constitution of the International Telecommunication Union likewise provides freedom for military radio installations, but requires them, so far as possible, to observe provisions to prevent harmful interference.⁴ As in these other domains, safety and sustainability focused space norms, while remaining good and responsible practice no matter the situation, need not be strictly adhered to by militaries at all times.

Even if militaries are not expressly required to follow norms, they nonetheless should be prepared to make more deliberate behavioral choices because of how actions inconsistent with norms will be interpreted. This not only requires a strategic and holistic perspective on national security space behaviors, especially in periods of crisis, but also creates opportunities for deliberate signaling. Just as increasing airborne reconnaissance or forward-deploying aircraft carriers can demonstrate interest and stake, so too can maneuvering satellites demonstrate readiness and resolve. Ensuring that the desired signals are received requires significant communication and/or agreement on norms of behavior well in advance of a crisis.



Air Force Chief of Staff General David Goldfein testifies before Senate Armed Services Subcommittee on Strategic Forces, May 17, 2017, as part of examination of military space organization, policy, and programs (U.S. Air Force/Scott M. Ash)

Norms also provide clarity to acquirers, operators, and decisionmakers. Similar to how the Department of Defense (DOD) reviews all new weapons systems to ensure they can be operated in accordance with international law, acquirers and operators could look to space norms for guidance on what capabilities and actions would be permissible and under what circumstances. This ensures resources are not expended on systems that political leaders will not employ and provides guidance for operational planners on how to protect and defend space systems in a manner that will be deemed acceptable in different situations.

Norms—or rather the violation thereof—also enable the creation of thresholds, triggers, and rules of engagement that allow militaries to employ passive or active measures to protect threatened space systems. Norms, ironically, may enhance freedom of action when it is needed most. Because norms support the development of criteria for judging hostile acts or hostile intent in space, they enable actions to be taken in self-defense.

Current State of Space Norms

Today one could argue that there are either few norms or many norms,

depending on the type of norm being described.⁵ The 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the “Outer Space Treaty”) provides a broad legal framework and principles for outer space activities.⁶ Many Cold War arms control treaties contain generic provisions on noninterference with “national technical means,” understood to include space-based reconnaissance and warning satellites.⁷ The 2002 Hague Code of Conduct Against Ballistic Missile Proliferation requires prelaunch notification of space vehicle launches.⁸ None of these commitments, however, contain pragmatic space traffic management norms for day-to-day operations.

Some operational space norms have been codified. For example, the 2007 Space Debris Mitigation Guidelines of the United Nations (UN) Committee on the Peaceful Uses of Outer Space (COPUOS) outline general practices for limiting the creation of long-lived space debris.⁹ The various instruments of the International Telecommunication Union govern spectrum usage and deconfliction, including to and from space.¹⁰ Arguably other norms exist, such as following basic

procedures for launch safety and operator training, as well as implementing more advanced practices like conjunction assessment screening and collaborative collision avoidance. Most of these operational norms, however, are not codified.

The present situation is beginning to change due to the efforts of the Working Group on the Long-Term Sustainability of Outer Space Activities within the Scientific and Technical Subcommittee of UN COPUOS. Since 2009 the working group has been developing best-practice guidelines for the safe and sustainable use of outer space. The group agreed on a first set of 12 guidelines in June of 2016 and is expected to forward a final compendium of guidelines to the UN General Assembly for adoption in the fall of 2018.¹¹ But this effort is largely codifying behaviors already implemented by spacefaring nations.

Catalyzing Space Norm Development

Operators who agree that shared norms of behavior will benefit all can help catalyze their development. A more deliberate approach to sharing and harmonizing best practices may establish operational norms more quickly, yielding benefits in the near term.

Norms will emerge naturally over time. Commercial operators, guided by a desire for a predictable environment, efficient operations, and regulatory stability, will self-organize and/or work with governments to shape pragmatic operational norms.¹² These organic processes, though, may not result in universally accepted norms in time to prevent a catastrophic incident.

Commercial actors should lead activities to shape, in a proactive manner, the development of international space norms. The policies and practices of established operators, developed and refined through decades of experience, should be the baseline for a discussion of routine and responsible behavior. Individual operators almost certainly have documented their standards, procedures, and other rules for operating safely in different situations and orbital regimes. Operators should share these practices

with one another to draw broad guidelines and best practices. As these practices are refined over time and adopted by a larger proportion of those operating in space, they will increasingly be recognized as norms of behavior.

Role of Militaries

Military and other governmental operators should participate in norms development processes because they have decades of space operational experience to bring to bear. Like any operator, militaries and other governmental agencies have policies, procedures, and standards for mitigating risks, whether they be mission, safety, political, or military, that can serve as a starting point for norms development discussions.

In some cases, militaries or governments will have relevant unique operational experience to lend to norm development efforts. Militaries can contribute by making policies publicly available as an input to discussion. For example, DOD Instruction 3100.11, *Management of Laser Illumination of Objects in Space*, describes those practices that DOD follows, and recommends others follow, to minimize the risks from inadvertent laser illumination.¹³ Militaries can also directly leverage their unique expertise to partner with industry in developing standards and norms for specific types of operations. For example, a new program of the Defense Advanced Research Projects Agency intends to foster the development of standards and norms for rendezvous and proximity operations through the creation of a non-governmental consortium.¹⁴ Militaries can likewise be active participants in international negotiation of standards and guidelines relevant to national security activities. For example, DOD has participated in the development of the space surveillance data standards of the Consultative Committee on Space Data Systems and the long-term sustainability guidelines of UN COPUOS.¹⁵

Militaries will benefit by being involved in the norm development process because military activities will, over time, largely follow established norms even if not required to do so. As norms take

shape and the balance of activity in space becomes commercial, rather than government- or defense-oriented, military behaviors will be more easily detected and highlighted (and potentially unsafe) if they do not conform to widespread practices. Militaries, therefore, should participate in norm development processes, both to lend their expertise and to ensure that they can follow emerging norms in their routine operations. Military requirements, however, should not drive the conversation because military operators will always have unique requirements and a need for flexibility in crisis and conflict.

Identifying Operational and Legal Thresholds and Triggers

Once operators collectively establish what normal behavior looks like, militaries should begin to identify which abnormal behaviors they might consider aggressive, hostile, or otherwise provocative. Behavior must always be considered within a geopolitical context, but identifying clear thresholds and triggers for indications and warning and possible defensive responses will ultimately enable protection of critical military space systems.

Developing thresholds should take into account warning and defensive capabilities. For example, if on average militaries around the world were hypothetically only able to distinguish objects 50km apart in geosynchronous orbits, then deliberately bringing a satellite closer than 50km could be considered provocative. Similarly, if space surveillance systems hypothetically require 24 hours to register changes in the orbit of a given object, then maneuvers that would result in dangerously close approaches in less than 24 hours also could be considered provocative.

Legal analysis should be applied to discussions of thresholds and triggers because operational criteria for hostile behavior should be considered in the context of international law. Factors that governments would take into account when determining whether a hostile act or use of force was evidence of an actual or imminent armed attack will be critical

components of crisis decisionmaking. Military lawyers, like operators, must work through different scenarios to explore how to apply to space activities legal principles such as prohibitions on the use of force and the inherent right of self-defense. This legal analysis, as well as legal analysis of the application of international humanitarian law to space activities, must be flowed back into operational rules of engagement. If conflict does extend to space, militaries must understand how to act in accordance with international law.

Guidance on how international law applies to space would be akin to guidance that exists for other domains of warfare. The *San Remo Manual on International Law Applicable to Armed Conflicts at Sea*,¹⁶ *Humanitarian Policy and Conflict Research Manual on International Law Applicable to Air and Missile Warfare*,¹⁷ and *Tallinn Manual 2.0 on the International Law Applicable to Cyber Warfare*¹⁸ each capture military practice and academic theory in the application of international law to conflict in their respective domains. The newly launched *Manual on International Law Applicable to Military Uses of Outer Space* project aims to do the same for space.¹⁹

Operational and legal analysis must be done in concert with allies and partners and eventually be shared more broadly. Allies must have a common view of behaviors they would consider crossing a particular threshold so as to remain unified in crisis and conflict. This view should at least be communicated to non-allied countries, so as not to inadvertently trigger a destabilizing response.

Evolving Military Policies and Practices

As norms emerge, militaries should take stock of their behaviors and determine whether to change policies and practices in light of new international expectations. Conforming military behavior to international norms may require changes to operational tactics, techniques, and procedures in the short term, but it is the only long-term approach. Routinely operating outside of established norms will serve only to highlight military activities rather than

allow them to coexist with growing commercial and other nongovernmental activity in space.

In all likelihood, international norms will drive national security space activities to become increasingly transparent, especially as growing congestion forces more collaborative spaceflight safety practices. Longstanding approaches to protecting sensitive space activities will become obsolete, requiring the national security community to find new ways of maintaining operational security. These changes will present challenges in the short term, but the most capable and innovative actors will find ways to achieve their military objectives in an evolving environment. Those who are able to adapt the most quickly will find that they have the greatest freedom of action.

Conclusion

The time to start developing norms for responsible behavior in outer space is now. In addition to the safety and sustainability benefits that will be enjoyed by all who operate in space, norms will enable the protection and defense of capabilities critical for national security. Militaries, therefore, should strongly support activities to develop international norms, even if they are not primary actors in those processes. As norms emerge for routine operations in space, militaries should then develop criteria, both operational and legal, to determine which abnormal behaviors represent potential threats. Militaries may also need to consider whether their behavior should evolve to conform to widely accepted practices that enhance safety and predictability for all who operate in the domain.

The goal of the United States is to prevent conflict from extending into space; however, we must also be prepared to defend against aggressive acts by others. The criticality of space systems for national security demands that we not only understand how space supports terrestrial military activities, but also recognize when others are deliberately seeking to take those advantages away. Space norms support defense and protection of critical space capabilities. JFQ

Notes

¹ Gregory L. Schulte and Audrey M. Schaffer, "Enhancing Security by Promoting Responsible Behavior in Outer Space," *Strategic Studies Quarterly* 6, no. 1 (Spring 2012), 9–17.

² For more information on the body of law that constitutes international humanitarian law, see International Committee of the Red Cross, "What Is International Humanitarian Law?" available at <<https://www.icrc.org/en/download/file/4541/what-is-ihl-factsheet.pdf>>.

³ "Convention on International Civil Aviation," December 7, 1944, *United Nations Treaty Series* 15 (New York: United Nations, 1948), 298.

⁴ "Constitution and Convention of the International Telecommunication Union," December 12, 1992, *United Nations Treaty Series* 1825 (New York: United Nations, 1998), 362–363.

⁵ Schulte and Schaffer.

⁶ "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies," October 10, 1967, *United Nations Treaty Series* 610 (New York: United Nations, 1970), 205–212.

⁷ For example, in Article V of the Interim Agreement Between the United States of America and the Union of Soviet Socialist Republics on Certain Measures with Respect to the Limitation of Strategic Offensive Arms ("SALT I"), the parties undertake not to interfere with the national technical means of verification of the other party.

⁸ "Hague Code of Conduct Against Ballistic Missile Proliferation," November 22, 2002, available at <http://www.hcoc.at/?tab=what_is_hcoc&page=text_of_the_hcoc>.

⁹ United Nations Office of Outer Space Affairs, *Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space* (Vienna: United Nations, 2010).

¹⁰ In addition to the Constitution and Convention of the International Telecommunication Union, the ITU Radio Regulations, as adopted by successive World Radiocommunications Conferences, contain specific provisions on the assignment, allocation, and use of frequencies, as well as interference and interference monitoring.

¹¹ United Nations General Assembly, 71st Session, Official Record, Supplement 20, *Report of the Committee on the Peaceful Uses of Outer Space, Fifty-ninth Session (8–17 June 2016)*, A/71/20 (New York: United Nations, 2016), 22–25.

¹² For example, the Space Data Association (www.space-data.org/sda/about/sda-overview/), a nonprofit association of satellite operators, requires information-sharing and operational coordination among its members to resolve situations related to spaceflight safety and electromagnetic interference.

¹³ Department of Defense Instruction 3100.11, *Management of Laser Illumination of Objects in Space*, October 24, 2016, available at <www.dtic.mil/whs/directives/corres/pdf/310011_dodi_2016.pdf>.

¹⁴ Defense Advanced Research Projects Agency, "Broad Agency Announcement, Consortium for Execution of Rendezvous and Proximity Operations (CONFERS)," December 20, 2016, available at <www.fbo.gov/utills/view?id=55c9be0d0ca9b1a4a2b134097c21c679>.

¹⁵ For more information on the Consultative Committee on Space Data Systems, see <<https://public.ccsds.org/default.aspx>>.

¹⁶ Louise Doswald-Beck, ed., *San Remo Manual on International Law Applicable to Armed Conflicts at Sea* (Cambridge: Cambridge University Press, 1995).

¹⁷ Program on Humanitarian Policy and Conflict Research (HPCR) at Harvard University, *HPCR Manual on International Law Applicable to Air and Missile Warfare* (Cambridge: Cambridge University Press, 2013).

¹⁸ Michael N. Schmidt, ed., *Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations* (Cambridge: Cambridge University Press, 2017).

¹⁹ For more information on the *Manual on International Law Applicable to Military Uses of Outer Space*, see <www.mcgill.ca/milamos/home>.