Space Policy 33 (2015) 51–55

Contents lists available at ScienceDirect

Space Policy

journal homepage: www.elsevier.com/locate/spacepol

Security in space☆

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ARTICLE INFO

Article history:
Received 28 January 2015
Accepted 11 February 2015
Available online 17 March 2015

Keywords:
Space security
Deterrence
Governance
Code of conduct
Arms control

ABSTRACT

The United States has been engaged in multiple activities to enhance international stability and ensure the sustainability of space activities. This includes multilateral activities within the United Nations such ash the "Group of Government Experts" to study transparency and confidence building measures (TCBMs) for outer space activities. The European Union has been leading talks on a possible international space code of conduct and the United States is supportive of the process. However, European efforts have not been successful in securing support from space powers such as India and Brazil, much less China and Russia. Codes and TCBMs cannot be a substitute for the capabilities necessary to deter potential adversaries and meet U.S. alliance commitments. In fact, the viability of any such codes may rely on the development of deterrence-related capabilities, for example space situational awareness to attribute hostile acts in space. The United States and its allies should take measures to improve the resilience of space systems across the spectrum of conflict. Improving resilience can consist of both "material" and "non-material" solutions. The former include measures such as hardening space and ground systems against physical and cyber attacks. The latter can include development of alternative means of mission performance, such as the use of allied or commercial systems.

An increasing number and diversity of participants, including state as well as non-state actors, characterize global space activities today. The scale and scope of space activities these actors engage in, across civil, commercial, and national security sectors, have also been increasing. Space systems and the services they provide are crucial parts of multiple global infrastructures that provide economic and security benefits as well as create potential vulnerabilities. Damage to space systems may be unintentional (e.g., space weather) as well as intentional, due to hostile action across the spectrum of conflict from cyber attacks to terrorism to nuclear war.

As a leading spacefaring nation and one that is reliant on space capabilities, the United States has been engaged in multiple activities to enhance international stability and to ensure the sustainability of space activities. Some activities are bilateral, such as the long-standing cooperation with Canada in the North American Aerospace Defense Command (NORAD) and some are multilateral such as the International Space Station partnership with European Space Agency member states, Canada, Japan, and Russia. Through the Joint Space Operations Center (JSpOC), the Department of Defense routinely provides "conjunction warnings" (i.e., collision avoidance notifications) of possible orbital collisions to foreign satellite operators. This is more than a public safety measure as avoiding collisions helps preserve the utility of the space environment for U.S. satellites and spacecraft.

There are on-going international studies under the auspices of different UN agencies such as the Committee on the Peaceful Uses of Outer Space (COPUOS). Under the purview of the Scientific and Technical Subcommittee (STSC) of COPUOS, a Working Group on the Long-Term Sustainability of Space Activities (LTSSA), consisting of four expert groups on orbital debris, space weather, regulatory regimes and guidance for new actors, and sustainable space utilization supporting sustainable development on Earth, developed international guidelines for these areas. In addition, the United Nations General Assembly created a Group of Governmental Experts (GGE) to study transparency and confidence measures (TCBMs) for outer space activities. The GGE was created in response to a UN General Assembly resolution adopted in 2011 and after three sessions, submitted its report to the 68th UN General Assembly meeting in 2013. In December 2013, Resolution 68/50 endorsed the GGE's recommendations and recommended its review by all UN organizational entities.

☆ IAF Global Networking Forum Roundtable, 65th International Astronautical Congress, Toronto, Canada, October 2, 2014.

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http://dx.doi.org/10.1016/j.spacepol.2015.02.004
0265-9646/

There is no single international organization for specialized discussion of space security-related matters. Even the term "space security" can have different meanings in different contexts, reflecting the dual-use nature of space capabilities. The COPUOS deals with space activities, including measures to ensure they are safe and sustainable, but the committee does not deal with national or international security matters. The Conference on Disarmament (CD) is the UN forum for international security discussions but it has been deadlocked for years on non-proliferation topics and is not likely to be able to tackle space activities. The UN Disarmament Commission is a third UN organizational entity tasked with addressing disarmament-related issues, but has little to no expertise in space. In addition, the International Telecommunications Union (ITU) is a UN technical agency that plays a central role in the allocation of radio frequency spectrum for space services and orbital locations for geostationary satellites. While instances of intentional as well as unintentional spectrum interference have been steadily occurring, the ITU has limited abilities to intervene save through encouraging direct consultations between the affected parties. Regardless, it worth noting that the UN Secretary General has referred the GGE's report to each of these entities for their consideration.

1. Recent developments

Russia and China proposed a revised version of their draft "Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects" (PPWT) on June 10, 2014, to the United Nations CD. This draft is a slight update to their 2008 proposal. The position of the United States continues to be that the PPWT is fundamentally flawed on multiple grounds. There is no feasible verification regime to monitor the proposed ban on the placement of weapons in space, let alone an agreed-upon definition of what constitutes a "space weapon." the draft does not cover ground-based weapons such as directed energy weapons or direct ascent anti-satellites (ASATs) such as those used by China to destroy one of its aging weather satellites in January 2007. It also does not address the risk posed by orbital debris, the bulk of which are due to past Soviet, Russian, and Chinese activities.

China conducted a non-destructive direct-ascent ASAT flight test on July 23, 2014 using the same missile type that it used in the 2007 ASAT test. Russia is continuing its extensive efforts at developing operational counterspace systems. China and Russia are expected to continue to mature their ASAT programs under the cover of non-destructive missile defense testing. Their military space capabilities pose a growing threat to U.S. and allied space systems, including those required for nuclear deterrence.

The PPWT proposal was made after the European Union (EU) completed their third Open-Ended Consultations for the development of the International Code of Conduct for Outer Space Activities (ICoC) in Luxembourg at the end of May 2014. The ICoC proposes consultative and information-sharing mechanisms to prevent or mitigate harmful interference in space and enhance stability in space. The timing of the new PPWT draft suggests the proposal is not a serious one but an effort to maintain political and diplomatic pressure on the United States within the deadlocked CD and in the court of international opinion.

The topic of an international space code of conduct came up at the 69th meeting of the First Committee of the UN General Assembly in 2014. Russia introduced a resolution endorsing a pledge of "no first placement of weapons in space" as the first step toward a formal treaty. In the future, Russia and China will likely seek to link this pledge to their long-standing PPWT proposal. The viewpoint of the United States is that any space arms control agreement needs to be equitable, effectively verifiable, and enhance the national security of the United States and its allies.[1] It is therefore unlikely to endorse a "no first placement" resolution, as it lacks a definition of exactly what objects would not be placed in space. In addition, other nations might seek "second or third placements" in response to some action, as yet undefined. As with the PPWT, such a resolution lacks the ability to be effectively verified, leaving aside questions of equity and benefit to U.S. and allied security.

2. International space code of conduct

Despite differing viewpoints on weapons in space, there is widespread international concern with the sustainability of space activities among both developing and developed spacefaring states. Orbital debris and radio frequency interference, regardless of origin, are hazards to all space operations. Rather than a "top down" negotiation of a treaty among major space powers, the "bottom up" development of technical best practices to mitigate hazards can be a more effective means of engaging a wider range of space actors. This is the approach taken in the development of orbital debris mitigation guidelines over several years in the UN COPUOS STSC. The guidelines have helped mitigate the creation of new debris but more needs to be done as the growth of debris has only slowed, not reversed. Actual reversal in the numbers and mass debris will likely require "active debris removal" – a topic fraught with a technical, economic, security, and political challenges.[2]

The European Union's ICoC, whose purpose is to "enhance the safety, security, and sustainability of all outer space activities pertaining to space objects, as well as the space environment."[3] The code seeks to establish "transparency and confidence-building measures, with the aim of enhancing mutual understanding and trust, helping both to prevent confrontation, and foster national, regional and global security and stability."[4] Such transparency and confidence-building measures (TCBMs) would be purely voluntary by subscribing states, with no international enforcement mechanism, except the political stigma associated with their intentional violation. Verification of adherence to particular TCBMs would be left to the capabilities of each member.[5] A draft code released by the European Union in October 2010 calls for states to "refrain from the intentional destruction of any on-orbit space object or other activities which may generate long-lived orbital debris" and for signatories to share information on their space policies and practices.[6] An updated version of the EU draft code was released on 31 March 2014 that expanded this language to be more specific, requiring subscribing states to:

[1] The White House, *The National Space Policy of the United States of America*, Office of the Press Secretary, Washington, DC, June 28, 2010.

[2] Objects in space, no matter their condition, remain the property of the launching state, state of registry, or some legal owner. There is no such thing as an abandoned space object or a system of salvage rights. Removal of orbital debris will require the permission of the owner and a means of assessing liability if the removal fails or causes damage to another space object.

[3] European Union, Draft International Code of Conduct for Outer Space Activities, 31 March 2014 version, accessed at: http://www.eeas.europa.eu/non-proliferation-and-disarmament/pdf/space_code_conduct_draft_vers_31-march-2014_en.pdf.

[4] *Ibid*.

[5] For a discussion of criteria for acceptable TCBMs, see Peter Martinez, Richard Crowther, Sergio Marchisio, Gérard Brachet, "Criteria for developing and testing Transparency and Confidence-Building Measures (TCBMs) for outer space activities," *Space Policy*, Volume 30, Issue 2, May 2014, Pages 91–97.

[6] Council of the European Union, "Council Conclusions concerning the revised draft Code of Conduct for Outer Space Activities," Brussels, Belgium, October 11, 2010. Accessed at http://www.consilium.europa.eu/uedocs/cmsUpload/st14455.en10.pdf.