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"The Rocket's Red Glare: China's Ambitions to Dominate Space"

Panel 2: Space as a Contested Domain: Expansion of China's Military and Commercial Space Activities

Hearing Chair Reva Price, commission members, and staff, thank you for the opportunity to speak with you today. I commend the commission for calling a hearing on this critical subject. My testimony today will focus on China's space achievements and diplomacy.

For the last several decades, the United States has been concerned about China's space programs and plans, in a dynamic which often reflects the larger US–China relationship. There is no doubt that the United States and China are engaged in a geopolitically competitive relationship, but there is also no doubt that China is a major space actor across all dimensions of space activity and it cannot be ignored. In an attempt to "constrain" China's space program, the United States has put in place laws and policies that end up harming itself while doing little to impede China's progress in space. While recognizing that China is a competitor, the United States can still benefit from finding ways in which to engage with China to maintain stability in the space domain and to proactively promote responsible space activities.

PARTICIPATION IN INTERNATIONAL FORA AND LEGAL REGIME

China is a signatory to the primary legal documents shoring international governance of space. It became a party of: 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 (Outer Space Treaty) through accession in 1984; the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement) through accession in 1988; the Convention on International Liability for Damage

Caused by Space Objects (Liability Convention) through accession in 1988; and the Convention on Registration of Objects Launched Into Outer Space (the Registration Convention) through accession in 1988.[1]

It ratified the International Telecommunication Constitution and Convention in 1997.[2] China has been a member State of the United Nations' Committee on Peaceful Uses of Outer Space (COPUOS) since 1980.[3] It is also a member of the United Nations' Conference on Disarmament, which currently has 65 member states.[4] And it is a participating state of the Inter-Agency Space Debris Coordination Committee.

China is a participant in the Asia-Pacific Regional Space Agency Forum (APRSAF), which was established in 1993 to "enhance space activities in the Asia-Pacific region."[5] APRSAF holds annual meetings which are jointly organized by Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT), the Japan Aerospace Exploration Agency (JAXA), and the host country organizations.

It is one of the founding members of the Asia-Pacific Space Cooperation Organization (APSCO), which is headquartered in Beijing and started in 2008 as an intergovernmental organization. According to its website, "APSCO provides a cooperative mechanism for developing countries in the region to be able to mainstream peaceful use of space as a drive of development. By resource sharing in space science, space technology and space application, APSCO promotes multilateral cooperation to facilitate capacity building of its Members, including: Bangladesh, China, Iran, Mongolia, Pakistan, Peru, Thailand and Turkey; Signatory State Indonesia, [and] Observer State Mexico."[6]

One of three offices of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) is in Beijing (the other two are in Vienna and Bonn).[7] UN-SPIDER was established in 2006 under the UN Office of Outer Space Affairs (UNOOSA) and aims to help developing countries get access to space technologies in response to disasters.

China is a member of the Group of Earth Observations (GEO), an intergovernmental organization of 117 member states that says it is "dedicated to co-producing user-driven Earth Intelligence solutions." China has described itself as the GEO co-chair representing the Asia-Oceania Group of Earth Observations (AOGEO) and developing countries; in May 2023, the 6th

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[1] "China," *Space Security Portal*, UNIDIR, last reviewed August 2023, https://spacesecurityportal.org/states/china; *Convention on registration of objects launched into outer space*, United Nations General Assembly, Nov. 12, 1974, United Nations Treaty Collection, status as of March 30, 2025, https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXIV-1&chapter=24&Temp=mtdsg3&clang=_en#3.

[2] "China," *Space Security Portal*, ibid.

[3] Ibid.

[4] "Member States and non-member States," United Nations Office for Disarmament Affairs, accessed April 1, 2025, https://disarmament.unoda.org/conference-on-disarmament/member-states/.

[5] "About APRSAF," APRSAF, accessed March 31, 2025, https://www.aprsaf.org/.

[6] "About APSCO," Asia-Pacific Space Cooperation Organization (APSCO), accessed April 1, 2025, http://www.apsco.int/html/comp1/content/WhatisAPSCO/2018-06-06/33-144-1.shtml.

[7] "United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER)," United Nations Office of Outer Space Affairs, 2025, accessed April 1, 2025, https://www.unoosa.org/oosa/en/ourwork/un-spider/index.html.

annual AOGEO workshop, which China co-hosted, was held in Macau, China, with the theme of "Demand-driven Advancements in Earth Observation Technology and Application."[8]

To understand China's approach to space diplomacy, one must first understand the way that the United Nations has set up how the international community discusses space issues. Civil space issues are discussed in Vienna, Austria, at COPUOS, whose secretariat is provided by UNOOSA. Civil space issues are also discussed at the United Nations General Assembly (UNGA) under its Fourth Committee at the UN headquarters in New York, NY. Space security issues are discussed at the Conference of Disarmament in Geneva, Switzerland, as well as at the UNGA's First Committee at the UN headquarters in New York, NY.

CIVIL SPACE DISCUSSIONS

COPUOS meets in Vienna three times a year, roughly two weeks at a time: the Science and Technical Subcommittee (STSC) in February, the Legal Subcommittee (LSC) in March/April, and the Plenary in June. As of February 5, 2025, current membership of COPUOS is now 104 States and 56 permanent observers (including my organization, the Secure World Foundation).

China positions itself as a developing country in multilateral fora and strives to be seen as on the side of the global south and developing countries. And yet, China is a major spacefaring state, a major industrial and economic global superpower, is racing with the United States in a host of technological fields: a very striking dichotomy.

One of COPUOS' biggest accomplishments of recent years is the adoption in June 2019 of 21 voluntary Guidelines for the Long-Term Sustainability of Outer Space Activities (LTS guidelines).[9] This adoption was done via consensus, which meant that all 92 of COPUOS' then member states had to agree. The LTS guidelines were the result of a nearly decade-long process: in 2010, COPUOS established a Working Group on the Long-term Sustainability (LTS) of Outer Space Activities under its STSC, with the Working Group chaired by Peter Martinez (currently Secure World Foundation's executive director).[10] Four expert groups populated by experts nominated by member states were established to consider various aspects of space sustainability and come up with suggested guidelines that the larger Working Group could consider. The guidelines are grouped into four categories: policy and regulatory framework for space activities; safety of space operations; international cooperation, capacity-building, and awareness; and scientific and technical research and development. China contributed experts to all the expert groups and actively participated in the ensuing discussions. At one point in the negotiations, Russian intransigence nearly stopped the entire process. However, China broke

[8] "China," Group of Earth Observations, 2025, accessed March 31, 2025, https://earthobservations.org/partners/member-gov/china; "6th AOGEO Workshop highlights Earth observation innovations in Asia-Oceania," Group of Earth Observations, June 26, 2023, https://earthobservations.org/news/6th-aogeo-workshop-highlights-earth-observation-innovations-asia-oceania.

[9] *Guidelines for the Long-Term Sustainability of Outer Space Activities for the Committee on the Peaceful Uses of Outer Space*, United Nations Office of Outer Space Affairs, 2021, https://www.unoosa.org/documents/pdf/PromotingSpaceSustainability/Publication_Final_English_June2021.pdf,

[10] Peter Martinez, "The development and implementation of international UN guidelines for the long-term sustainability of outer space activities," Secure World Foundation Preprint Series PP 23/05, last update Oct. 30, 2023, https://swfound.org/media/207700/pp23_05_the-development_implementation-of-international-un-guidelines.pdf.

with Russia and reiterated its support of the process, generating enough momentum that the discussions were able to continue and eventually succeed.

Considering China's more recent efforts in civil space diplomacy, it frequently is part of statements at COPUOS that are titled as being those of "the G-77 and China" and in those statements, the representative states refer to themselves as "The Group." At the most recent meeting - STSC, held in February 2025 - this statement noted that in order to meet the objectives of the STSC, "it is important to concentrate our work in areas such as building and promotion of the technological capacities, transfer of technology and equipment favorable for developing countries, prevention and mitigation of natural disasters and scientific technological research in developing countries within the framework of international cooperation."[11] The Group also noted that it "considers it crucial that developing countries are not left behind or unfairly disadvantaged by exploration, exploitation and peaceful uses of outer space. The Group is of the view that space technology applications must translate into concrete benefits for developing countries. In order to achieve this goal, transfer of technology on favorable terms for developing countries, as well as associated capacity-building are of vital importance."[12] Very large constellations are referred to in regards to "the principle of equitable access to outer space, and in particular in the LEO", with no mention of the three very large constellations that China is planning (and, as of August 2024, China has started launching two of the constellations).[13] The Group pointed out "the need for developing countries to have access to technologies, equipment and methodologies for the measurement, monitoring and characterization of space debris and other space objects and calls for increased cooperation in addressing the issue of space debris."[14]

Capacity-building in order to ensure that developing countries have the necessary space subject matter expertise is a theme throughout these sorts of statements. Given how much space services and data are crucial to people globally, this is to be expected, and states are scrambling to develop the expertise to be able to develop space policies that can help spur indigenous space technological development. At the February 2025 meeting of the STSC, for example, it was noted that 60 countries have asked UNOOSA for technical support missions that would work to develop their national capacities. As well, the statement of the G-77 and China at the LSC in April 2024 noted that "capacity building and technical support in space law are fundamental tools that should be enhanced through international cooperation. Therefore, the Group calls for greater support by UNOOSA and Member States to foster both North-South and South-South cooperation to facilitate the sharing of knowledge and expertise in the fields of international space law, space policy, space economy and space diplomacy."[15] It also underlined that "particular attention be given to the interests of developing countries and that the

[11] *Statement of the G-77 and China during the Sixty-Second Session of the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space*, Feb. 3-14, 2025, delivered by H.E. Laura Gil, Ambassador, Permanent Representative of Colombia, https://www.unoosa.org/documents/pdf/copuos/stsc/2025/Statements/2_G77_Statement.pdf.

[12] Ibid.

[13] Ibid.

[14] Ibid.

[15] *Statement of the G-77 and China during the sixty-seventh session of the United Nations Committee on the Peaceful Uses of Outer Space*, June 19-28, 2024, delivered by H.E. Laura Gil, Ambassador, Permanent Representative of Colombia, https://www.g77.org/vienna/wp-content/uploads/2024/06/G77-_-67-COPUOS-2024_all.pdf.

Committee should be strengthened in its role as the main platform for the exchange of information in the field of international cooperation in the exploration and use of outer space."[16]

Interestingly, given that China has a history of allowing for debris from launches to land on neighboring countries downstream and has had the core of its Long March 5B launcher do uncontrolled reentries, as it was not designed to be safely deorbited after launch, the statement included the assertion that "the Group encourages launching states to provide advanced, proper, prompt and adequate notification to other states specially developing countries, located along the drop zones of falling space debris, as applicable, to ensure that they are sufficiently prepared to mitigate and respond to such incidents. It is equally important to strengthen the capacities of developing countries in detecting and responding to falling space debris."[17]

The statement for the LSC announced its support of what eventually became the Action Team on Lunar Activities Consultations (at the June 2024 Plenary) and went on to say that "the discussions of aspects of space resources and any possible outcome must be in line with the principles enshrined in the Outer Space Treaty and other relevant UN treaties, especially the principle of non-appropriation of Outer Space, including the moon and other celestial bodies. The Group is of the view that any approach for the exploration, exploitation, and utilization of space resources should be equitable, constructive, collaborative, consensual, and most of all, does not leave behind or unfairly disadvantage developing countries."[18] Finally, in regards to the role of the commercial sector in space, the Group stated that "the developing countries shall not be excluded from the benefits of space exploration and their rights shall be taken into account in the discussion."[19]

During its national statements at the 2025 STSC, China announced that it is starting a China-Latin America space cooperation forum. It also said that it is improving its debris monitoring capabilities; is researching debris removal technologies and debris-resilient design of satellites; and is formulating national standards and engaging with the International Organization for Standardization (ISO) to align national with international standards. At this meeting of STSC, "Dark and Quiet Skies" (or DQS - the idea that the increasing number of satellites in orbit, particularly due to the rise of very large constellations, are impacting visual and radiofrequency astronomy and the general public) was added to STSC's agenda for the first time; China said that it supported this addition, noted that its astronomical community has developed and implemented standards for DQS, and asserted that governance of large constellations is crucial for the long-term sustainability of space. This is all fairly consistent with China's approach to COPUOS: that it recognizes the importance of and need for space governance, and is working to ensure that its domestic activities meet international norms or standards of behavior.

SPACE SECURITY DISCUSSIONS

The international space treaties do not establish many limitations on the potential weaponization of space. The 1967 Outer Space Treaty (OST) is open enough to allow for the development of counterspace capabilities, facilitating the increase of tensions in space. This has been an issue of concern for the international community for many years, and in 1978, it prompted the

[16] Ibid.
[17] Ibid.
[18] Ibid.
[19] Ibid.

emergence of the notion of a Prevention of an Arms Race in Outer Space (PAROS) during a special session of the UNGA dedicated to disarmament.

In an effort to carry out more specific efforts to keep the space environment peaceful and free of conflict, the UNGA adopted its first two resolutions on PAROS in 1981: one of which focused on negotiating a treaty aimed at banning the placement of any type of space weapons (particularly those that could target objectives on Earth) in order to "prevent the spread of the arms race to outer space," sponsored by the Eastern bloc.[20] The other resolution, sponsored by the Western European and Others Group, called for the Conference on Disarmament to work toward "an effective and verifiable agreement to prohibit anti-satellite systems."[21] These contrasting approaches created a schism in how countries perceived the biggest threats to space security and stability, and hindered political discussions on PAROS over the years. In fact, this division largely continues to this day: Russia and China have argued that deliberately designed weapons placed in outer space pose the biggest threat to space security and have proposed a new treaty banning them, while the United States and its allies believe that the biggest threat to space security are irresponsible actions.

Most developing countries have tended to side with the Russian and Chinese position: that weapons in space were the biggest issue, with the United States being cast as the main protagonist for the weaponization of outer space. Russia and China had the diplomatic upper hand because they had proffered a draft treaty on preventing the placement of weapons in space (even though it is a fairly weak treaty that focuses on a threat that is hard to define and lacks verification) and could portray themselves as at least attempting to help. For many years, the United States opposed the draft Russia-China treaty without offering any alternatives. As a result, the United States often found itself playing diplomatic defense on major votes on space security within the UNGA.

Although PAROS has continued to be a key agenda item of the Conference on Disarmament since 1982, progress has been further hampered by the stagnation of the conference, which must reach consensus on its agenda and has not been able to do so for three decades.

There have been some efforts within the Conference on Disarmament to discuss legally binding approaches to PAROS. In 2008, Russia and China introduced the draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PAROS Treaty).[22] This treaty's article II states that "States Parties

[20] UNGA Res 36/99, UNGAOR, 36th Sess, UN Doc A/RES/36/99, online: https://digitallibrary.un.org/record/27062?ln=en&v=pdf.
[21] UNGA Res 36/97, UNGAOR, 36th Sess, UN Doc A/RES/36/97, art C(4), online: https://undocs.org/en/A/RES/36/97.
[22] Russian Federation and China, Letter dated 2008/02/12 from the Permanent Representative of the Russian Federation and the Permanent Representative of China to the Conference on Disarmament addressed to the Secretary-General of the Conference transmitting the Russian and Chinese texts of the draft "Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT)" introduced by the Russian Federation and China, UN Doc CD/1839 (2008), https://digitallibrary.un.org/ record/633470?ln=en&v=pdf.

undertake not to place in orbit around the Earth any objects carrying any kinds of weapons, not to install such weapons on celestial bodies and not to place such weapons in outer space in any other manner; not to resort to the threat or use of force against outer space objects."[23] Criticized at the time for not having verification mechanisms, Russia and China released an updated version in 2014 that attempted to address those criticisms. While there were several amendments to the original text, the key topic of verification had not been included, with Russia and China stating that it could be negotiated as an additional protocol or some other type of verification mechanism after the treaty entered into force. However, other states did not find that option an appealing one, stating that they could not engage in a treaty when verification of compliance could not be ascertained; in addition, they were still concerned about the nebulousness of defining what a weapon in space would actually entail, as well as the possibility of stockpiling and breakout capabilities. The treaty is still in draft form.

The UNGA regularly establishes subgroups to investigate concerns on issues of interest and to make recommendations to the UN Secretary-General. These have proven helpful in terms of identifying key issues of concern but have not always had success in reaching consensus in their final reports.

One such group on space security issues created by UNGA was the Group of Governmental Experts (GGE) on Transparency and Confidence-Building Measures (TCBMs) in Outer Space Activities, called for in the 2010 UNGA Resolution 65/68. Then UN Secretary-General Ban Ki-moon created the GGE in 2011, and the group met three times from 2012 to 2013. During their discussions, the GGE members examined different categories of TCBMs, implementation and a proposed central point of contact for all space TCBMs. China was a member of this GGE, which was able to reach consensus on its findings and deliver a report to the UN Secretary-General in July 2013.[24]

Four years later, UNGA created another GGE via Resolution 72/250. This time, its mandate was to consider and make recommendations on substantial elements of an international legally binding instrument on PAROS, including, inter alia, on the prevention of the placement of weapons in outer space. Again, a Chinese nominated expert was a member of this group, which met twice — once in 2018 and once in 2019.[25] The members were unable to reach consensus on a final report, so no recommendations were created.

In December 2020, UNGA passed Resolution 75/36, which asked states to submit reports to the UN Secretary-General about the types of threats that they saw, identify behaviors that they thought were responsible or irresponsible, and share what they felt could be further

[23] Ibid.

[24] Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities, UNGAOR, 68th Sess, UN Doc A/68/189, www.unoosa.org/oosa/oosadoc/data/documents/2013/a/a68189_0.html.

[25] Report of the Group of Governmental Experts on further practical measures for the prevention of an arms race in outer space, UNGAOR, 74th Sess, Annex II, Agenda Item 98(c), UN Doc A/74/77 (2019) at 8–9, https://undocs.org/Home/ Mobile?FinalSymbol=A%2F74%2F77.

development and implementation of norms, rules and principles of responsible behavior, as well as how to reduce risks of misunderstanding or miscalculations regarding outer space. Over 30 countries (and some NGOs, including SWF) submitted their thoughts on this. Reading through them, one can see some commonalities emerge: that it is important to act with due regard and to avoid harmful interference; and that there should not be non-cooperative close approaches to other states' spacecraft, nor should states deliberately create long-lived debris.

China's submission focused very heavily on PAROS: "Preventing an arms race in outer space is the precondition for safeguarding outer space security and ensuring peaceful uses of outer space, as well as one of the most prominent and pressing issues for the international community."[26] It outlined efforts that it felt states should undertake to ensure space security: concluding an legally-binding initiative (LBI) "at an early date" on preventing the weaponization of outer space; discussions of transparency and confidence-building measure (TCBMs) could supplement an LBI but cannot replace one; "equal rights of all countries concerning the peaceful uses of outer space should be respected and ensured;" and that different organizations of the United Nations should recognize each other's mandates while space governance discussions are being held.[27] It went on to say that the root cause for the weaponization of space and an arms race in space "is that a certain country sticks to the Cold War mentality, pursues unilateral military and strategic superiority in space and increases its attempts, plans and actions to seek dominance in space," highlighting the United States' description of space as a "warfighting domain," creation of the US Space Force and US Space Command, and "building up of a combat system in outer space" as "a bid to get ready for a space war."[28] The submission discussed vulnerabilities of space systems, due to missile defense, anti-satellite tests, and long-range precision attack systems. Listed as possible threats are the US' X-37B spaceplane, the docking of Mission Extension Vehicle (MEV)-1 with an Intelsat satellite, and the fielding of the Counter Communications System. It called for all countries to "ensure that their space behaviours are in line with international law and the principles governing international relations, which are the basic norms of responsible behaviour" and for the United Nations to create a " a second group of governmental experts or an open-ended working group on the prevention of an arms race in outer space, for which responsible behaviours in outer space could be included as one of the agenda items."[29] It noted that the "equal rights of all countries concerning the peaceful uses of outer space, particularly the interests of developing countries and emerging spacefaring countries, should be respected and ensured."[30] TCBMs listed that could be explored (en route to a LBI) include "no first placement of weapons in outer space; space security dialogue and exchanges on national space strategies, policies and intentions; cooperation on space debris mitigation, space objects collision avoidance, space launching notification and space facility visits; and seeking to reach bilateral or multilateral

[26] *Submission of China Pursuant to United Nations General Assembly Resolution 75/36*, China, for the Open-ended working group on reducing space threats through norms, rules and principles of responsible behaviours, May 13, 2022, https://docs.un.org/en/A/AC.294/2022/WP.9.
[27] Ibid.
[28] Ibid.
[29] Ibid.
[30] ibid.

arrangements."[31] And it asked for states to stop confrontation and interference in space, citing specifically R&D on space-based missile defense interceptors and stopping RPOs or other "space-based tests of technologies that endanger other countries' spacecrafts."[32]

Based on these submissions to UNGA Res. 75/36, the United Kingdom led a coalition of countries in sponsorship of UNGA resolution 76/231, which passed in December 2021, and which created an "Open-ended Working Group (OEWG) on Reducing Space Threats through Norms, Rules, and Principles of Responsible Behaviours." It met for four one-week sessions between May 2022 and August 2023. 70 countries participated in the discussions, plus civil society.

China's ambassador to the CD, Li Song, said at the first meeting of the OEWG in May 2022, "Preventing an arms race in outer space is the key precondition for peace, safety and the sustainable use of outer space" and that "the root cause of such an arms race is that the superpower attempts to dominate outer space."[33] He pointed at an unnamed space power driving this which "pursues a strategy of "space dominance" and declares outer space as a warfighting domain. It also established Space Force and Space Command, and merged commercial space enterprises into their space combat systems."[34] Amb. Li listed several principles that China felt that international discussions on norms of behavior should follow. The first was "safeguarding common and universal security" demonstrated by the superpower through "its commitment of not seeking hegemony and dominance in outer space."[35] The second was "persisting in preventing an arms race in outer space and intensifying the international efforts for the negotiation and conclusion of a legally binding instrument on PAROS;" as part of this, he encouraged countries to support the work of the CD and noted that as the first rotational president of the CD in 2022, "China facilitated the CD in reaching a comprehensive and balanced as well as clear and concise decision that established 5 Subsidiary Bodies. This provided a new platform for the CD to advance substantive work on its agenda items, including on PAROS."[36] Like every Chinese diplomat who speaks at the CD, he brought up the PPWT, saying that "Up to now, this is the only official proposal of a legally instrument on PAROS" and asserting that "Supporting the negotiation on PPWT represents a litmus test for being responsible for space security."[37] He acknowledged the United States' April 2022 unilateral commitment not to conduct destructive direct-ascent anti-satellite (DA-ASAT) missile tests, but decried them as "attempts to expand unilateral military advantages in the name of arms control."[38]

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[31] Ibid.
[32] Ibid.
[33] LI Song, General Remarks by H.E. Amb. LI Song at the First Session of the Open-Ended Working Group on reducing space threats through norms, rules and principles of responsible behaviours, May 2022, https://documents.unoda.org/wp-content/uploads/2022/05/EN-Remarks-by-H.E.-Amb.-LI-Song-at-the-Space-OEWG.pdf.
[34] Ibid.
[35] Ibid.
[36] Ibid.
[37] Ibid.
[38] Ibid.

The third principle listed was that the "equal rights of all countries of the peaceful use of outer space, particularly the interest of developing countries and emerging space-faring countries, should be respected and ensured."[39] Again, we see China working to portray itself as the protector of the global south.

In regards to the role of the commercial sector in military space activities, he said that "commercial space institutions of some states have participated in military space activities on a large scale, which has accelerated arms expansion in outer space and blurred the boundary between military and civil activities," and called for states to fulfill their OST Article VI responsibility to authorize and provide continuing supervision of national activities in space in order "to avoid accidents and unconventional behaviors that may exacerbate confrontations and conflicts in outer space;" as well, he recommended that countries ensure that their commercial actors are thoughtful in their use of spectrum and orbits "so as not to undermine the rights of the developing countries to the peaceful uses of outer space."[40]

In general, China had a large role in the discussions at the OEWG. It pushed very heavily and consistently for the group to include LBIs such as it and Russia's draft PPWT in the discussions. This argument carried weight among much of the G-77, many of whom inherently prefer LBIs for topics of international concern. China did state that norms could be complementary to but should not replace LBIs. Most state participants in the OEWG agreed that international humanitarian law (IHL) / the laws of armed conflict applied to space and should be considered when discussing norms, rules, and principles of responsible behavior there. China was one of a very small handful of countries that argued that IHL should not be part of any discussion of how to prevent an arms race in space, saying that the focus should be on prevention. The other states who also made this argument were Russia, Iran, and Venezuela. China also continued to advocate for developing countries and emerging space actors' unimpeded access to space.

During the discussions, there started to be general convergence on many issue areas, including the importance of avoiding the deliberate creation of debris, the need for rules on actions (such as notifications or consultations) prior to conducting RPOs, and the value of TCBMs. However, the group did not not reach consensus on a final report of recommendations for norms of behavior; a chair's report was created that covered the topics discussed during the sessions.

Another GGE on a legally-binding instrument for the prevention of an arms race in outer space, including the prevention of placement of weapons in outer space, was created in the December 2022 UNGA Resolution 77/250; China was a co-sponsor of this resolution.[41] The 25 member states nominated experts to participate in the GGE; China was one of the member states and

[39] Ibid.
[40] Ibid.
[41] *UNGA Res. 77/250, Further practical measures for the prevention of an arms race in outer space*, UNGA, Dec. 30, 2022, https://docs.un.org/en/A/RES/77/250.

nominated an expert, who actively participated in it.[42] The GGE met once in 2023 and once in 2024, plus had an intersessional meeting to allow non-member states to give input to the process to work toward a consensus report.

The Chinese-nominated expert, Liang Guotao (Director, Arms Control Department of China's Ministry of Foreign Affairs), submitted a working paper to the second and final session, held in August 2024. In it, he iterated that space should be used for peaceful purposes and that "the extension of hostility among countries into outer space should be avoided."[43] He argued that the "goal of outer space arms control could only be achieved through legal means," and that "the existing international law is no longer sufficient to meet the needs of safeguarding outer space security," since it does not prevent the testing, placement, or use of conventional weapons in space, nor does it stop the use of force or threats.[44] Thus, he called for a LBI that would close what he called a "loophole," and said that "Only through legal means can we guarantee sufficient fairness, equal rights and obligations, and undiminished security of all States, which is difficult to achieve under non-binding voluntary norms."[45] Mr. Liang included a list of obligations for such an LBI; besides preventing the placement of weapons in space or the threat or use of force, it should call for compliance with current international law, have states provide continuing supervision of their nongovernmental entities in space, solve disputes peacefully through consultations, and when doing international exchanges and cooperation, "give special consideration to the needs of developing countries, actively provide technical assistance to them and strengthen capacity building."[46] He did list some TCBMs, including publishing information about national space policies, sharing information about activities (like launch plans or orbital parameters), site visits of space launches and facilities, and demonstrations of technological capabilities.

The GGE was able to come to a consensus on a report at its final meeting in August 2024.[47] The report discussed the evolving nature of outer space activities, threats and related capabilities, and noted that "the perception of threats may differ among States."[48] It considered vectors of threats as "Earth-to-space, space-to-Earth, space-to-space and Earth-to-Earth," as

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[42] *Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space,* United Nations Office for Disarmament Affairs, 2023, accessed April 1, 2025, https://meetings.unoda.org/gge-paros/group-of-governmental-experts-on-further-practical-measures-for-the-prevention-of-an-arms-race-in-outer-space-2023.

[43] Liang Guotao, "Working Paper for Group of Governmental Experts on Further Practical Measures for the Prevention of an Arms Race in Outer Space," GE-PAROS/2024/WP.1 – Advance Copy, March 22, 2024, https://docs-library.unoda.org/Group_of_governmental_experts_on_further_practical_measures_for_the_prevention_of_an_arms_race_in_outer_space_-_(2023)/GE.PAROS_.2024.WP_.1....pdf.

[44] Ibid.

[45] Ibid.

[46] Ibid.

[47] *Report of the Group of Governmental Experts on further practical measures for the prevention of an arms race in outer space*, Advance unedited version of the report adopted on Aug.16, 2024,https://docs-library.unoda.org/Group_of_governmental_experts_on_further_practical_measures_for_the_prevention_of_an_arms_race_in_outer_space_-_(2023)/GE-PAROS-2024-CRP.4.pdf.

[48] Ibid.

well as kinetic/non-kinetic and reversible and irreversible effects.[49] It went over historical UN discussions and efforts on space security, then went over the existing normative and legal framework. One point of contention was about IHL in the context of space. Some states felt it applied to outer space and regulated activities by all actors, and that discussing it did not legitimize the use of force. Others felt that it was not appropriate to discuss in the context of PAROS and that "any reaffirmation of the applicability of international humanitarian law to outer space legitimizes the use of force in outer space and an arms race in outer space."[50] This was a position that China has repeatedly held to. In regards to its mandate, the Group agreed that an LBI on PAROS should be: "practical, clear, scientifically and technically accurate, tailored to the specific objective of the measure under consideration and non-discriminatory; consistent with existing international law; and not adversely impact the national security, technological, economic or development interests of its States Parties."[51] The final report is very broad in nature and encompasses a wide range of elements: for example, the section detailing possible TCBMs included 12 different options. Most of the Chinese expert's recommendations were represented in some form in the final report, including a clause specifically on international cooperation and the particular needs of developing countries.

While China and Russia frequently have similar positions in multilateral space security fora - like promoting their draft PPWT, a preference for LBIs, resistance to talking about IHL in regards to space - they do occasionally diverge.

In February 2024, rumors emerged about a new ASAT capability that Russia was reported to be developing. This was later confirmed by USG officials to be a nuclear warhead being developed that would be placed in orbit and then detonate in space, with the ensuing EMP rendering satellites useless. The OST does not have a lot of language about military space capabilities, but its article IV is very clear that weapons of mass destruction (WMD) may not be placed in orbit;[52] if Russia were to put a nuclear weapon in space, that would be contrary to its treaty obligations. In April 2024, the UN Security Council (UNSC) voted on a draft resolution on WMDs in outer space, which was prepared by Japan and the United States and co-sponsored by 65 member states.[53] The UNSC resolution affirmed state parties' obligations to the OST's article IV. In its paragraph 6, it included a call not to develop nuclear weapons or any other kind of WMDs

[49] Ibid.
[50] Ibid.
[51] Ibid.
[52] *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, United Nations General Assembly, 1967, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html.
[53] UNSC, Albania, Antigua and Barbuda, Argentina, Australia, Bahamas, Bangladesh, Belgium, Bosnia and Herzegovina, Bulgaria, Cabo Verde, Canada, Colombia, Costa Rica, Croatia, Cyprus, Czechia, Denmark, Djibouti, Estonia, Finland, France, Georgia, Germany, Greece, Honduras, Hungary, Iceland, Ireland, Israel, Italy, Japan, Kenya, Latvia, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Marshall Islands, Micronesia (Federated States of), Montenegro, Netherlands (Kingdom of the), New Zealand, North Macedonia, Norway, Palau, Panama, Paraguay, Poland, Portugal, Republic of Korea, Republic of Moldova, Romania, San Marino, Singapore, Slovakia, Slovenia, Spain, Sweden, Timor-Leste, Türkiye, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland and United States of America: draft resolution, UN Doc S/2024/302 (2024), https://undocs.org/S/2024/302.

specifically designed to be placed in orbit around the Earth, which does go beyond the limitation established in article IV of the OST. During the negotiations, Russia and China proposed an amendment, calling on all states to prevent the placement of any weapons in space, and to work toward the negotiation of a legally binding agreement on this issue; with a vote of 7 in favor, 7 against, and 1 abstaining, this amendment was not adopted.[54] The resolution overall was eventually vetoed, with a vote of 13 in favor, 1 against (Russia), and 1 abstaining (China).[55] China's vote is interesting because with Russia all but guaranteed to veto the resolution, China could have shown solidarity to Russia and also voted no, without it being the primary spoiler of the vote. Yet it did not.

This resolution resurfaced in the fall of 2024 - first, as a resolution for the United Nations' First Committee to consider, and then the full UNGA. UNGA 79/18, "Weapons of mass destruction in outer space," submitted by Japan, United States, and Argentina, again emphasized the "obligation of all States parties to fully comply with the Outer Space Treaty, including not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction," and urged "Member States, taking into account article IV of the Outer Space Treaty, not to develop nuclear weapons or any other kinds of weapons of mass destruction specifically designed to be placed in orbit around the Earth."[56] It passed with a vote of 167-4-6; once again, Russia voted no on the resolution, while China abstained.[57]

Another place where China and Russia have not been in lock-step is the idea of no first placement of weapons in outer space. Russia announced in October 2004 its pledge that it would not be the first to place weapons in space, and called for other countries to pledge this as well. Thirty-one countries have made this same non-legally binding pledge.[58] This unilateral commitment has been multilateralized: in December 2014, the UNGA adopted Res. 69/32, which encouraged all states (particularly space-faring nations) to make a political commitment not to be the first to place weapons in outer space.[59] Similar resolutions have since been passed annually, with the latest having been adopted in December 2024 (UNGA Res. 79/20).[60]

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[54] UNSC, China and Russian Federation: amendment to the draft resolution contained in document S/2024/302, UN Doc S/2024/323 (2024), https://undocs.org/S/2024/323.
[55] United Nations, "Security Council Fails to Adopt First-Ever Resolution on Arms Race in Outer Space, Due to Negative Vote by Russian Federation." Press release, April 24, 2024, https://press.un.org/en/2024/sc15678.doc.htm.
[56] UNGA Res. 79/18, "Weapons of mass destruction in outer space," Dec. 2, 2024 https://documents.un.org/doc/undoc/gen/n24/389/21/pdf/n2438921.pdf.
[57] "Weapons of mass destruction in outer space : resolution / adopted by the General Assembly," 2024, UN Digital Library, accessed March 31, 2025.
[58] "Multilateral Space Security Initiatives," Secure World Foundation, last updated Nov. 5, 2024, https://swfound.org/multilateral-space-security-initiatives/.
[59] Update author Robert Pemberton, "No First Placement of Weapons in Outer Space (NFP): National pledges and UNGA voting records," Secure World Foundation, last updated Nov. 21, 2024, https://docs.google.com/spreadsheets/d/1e91lEWkTF43k3CG6jQYLoUJeHROY03HAxP-T35eqqnA/edit?gid=1101016345#gid=1101016345.
[60] *No first placement of weapons in outer space : resolution / adopted by the General Assembly*, United Nations General Assembly, Dec. 2, 2024, https://digitallibrary.un.org/record/4068509?ln=en; Belarus, China, Cuba, Egypt, Equatorial Guinea, Eritrea, Kazakhstan, Mali, Nicaragua, Russian Federation, Sri Lanka, Syrian Arab Republic, Uzbekistan, Venezuela (Bolivarian Republic of) and Zimbabwe, *No first*

China has voted yes on this resolution every year and, with the exception of 2021, also was a co-sponsor of it. However, it has not made this no first placement pledge.

SPACE RESOURCES AND EXPLORATION

There are several other issues that shape China's approach to diplomacy and outreach: space resources and exploration, and counterspace capabilities.

International government and commercial interest in lunar presence, exploration, and utilization has increased in recent years. Five countries have successfully landed on the Moon: the United States, Russia, China, India, and Japan; additionally, last year brought about the first successful landing by a commercial actor. As of March 2025, the United States, India, China, and South Korea are operating active lunar missions, and at least nine countries have planned lunar missions over the next decade.[61]

Sustained human presence in space and on the Moon will require the use of resources found in space to support crew life and function. A major focus of near-term lunar exploration will be to verify the extent and usability of these resources. The United States, China, and India all have planned missions that would land near the Moon's south pole because of this interest in possible sources of water. Lunar regolith itself may prove to be useful for building lunar structures and habitats, while other lunar resources may have scientific, exploration, and commercial utility.

In 2022, COPUOS created a working group on the legal aspects of space resource activities, which is set to discuss these topics and provide recommendations in 2027. Furthermore, in June 2024, COPUOS created the Action Team on Lunar Activities Consultations (ATLAC), which is intended to provide consultative mechanism for landing site coordination and lunar dust mitigation, cislunar traffic, space resources, debris mitigation, and protection of sites of significant scientific interest and lunar heritage.

An increased tempo of activity on and around the Moon raises several governance and policy challenges. Measures must be developed to protect that while enabling future activities and use. As more operators function on the surface and in lunar orbit, there is an emerging need to develop space situational awareness (SSA) and space traffic coordination capabilities specifically for cislunar space. It is possible that the Moon may become a place for geopolitical competition, specifically between the United States and China, and military conflict may arise as a result. However, deconfliction of activities is going to be crucial.

Within the US national security space establishment, there are concerns about China's activities and ultimate plans for the Moon. Actions by China in Earth orbit and on land color perceptions of China's goals for and actions on the Moon. China aims to put humans on the surface of the Moon by 2030. In April 2024, the China Manned Space Engineering Office (CMSEO) announced that China remains on track to achieve this goal. In June 2024, China became the first country to bring lunar samples from the far side of the Moon. It has launched two relay

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placement of weapons in outer space : draft resolution, Oct. 17, 2024, https://digitallibrary.un.org/record/4064506?v=pdf.

[61] Clayton Swope and Louis Gleason, "Salmon Swimming Upstream: Charting a Course in Cislunar Space," Center for Strategic and International Studies, October 21, 2024, https://www.csis.org/analysis/salmon-swimming-upstream-charting-course-cislunar-space.

satellites (Queqiao-1 and -2) to be able to communicate with equipment on the far side of the Moon.

Because of these concerns, it is helpful to understand how China thinks about space resources and how it is approaching lunar exploration. It submitted a working paper in March 2024 to the UN COPUOS' Legal Subcommittee about utilizing space resources.[62] It said that the Outer Space Treaty is the cornerstone for existing legal framework on this and that it wanted the COPUOS working group on space resources to work on getting unified interpretation and applications of the OST. China's perspective is that using space resources for scientific missions is within the framework of the OST; as for commercial missions, China is not opposed to them, but would like COPUOS to formally recognize it and discuss it further. It wants the COPUOS working group to develop principles to ensure commercial missions do not negatively impact scientific ones.

The International Lunar Research Station (ILRS) is a lunar exploration initiative led by China and Russia with a series of programs that are working their way up to the operation of a research station by the south pole of the Moon by 2035. In June 2021, China and Russia released the "ILRS Guide for Partnership" that provides details about the program's scientific objectives, mission phases, and guidelines for partnership. It outlines the Joint Working Group that will oversee the legal, scientific, and engineering aspects of ILRS. In 2023, China further described the intended creation of an International Lunar Research Station Cooperation Organization (ILRSCO) that would handle the cooperative aspects of the program.

There is not a separate document spelling out the principles of the ILRS but Chinese officials have included a list of their principles in some presentations.[63] These include: peaceful utilization; extensive consultation, joint contribution and shared benefits; various forms of cooperation; sharing scientific achievements; preserving lunar resources; and establishing a cooperation platform. Given the similarities between the activities planned under the United States' Artemis program and the ILRS (permanent installations, extraction and use of lunar water and mineral resources, and manufacturing on the lunar surface), and that the principles of the United States' Artemis Accords were pulled from the OST, which China has also signed, it is not surprising that there are some overlaps in the two sets of principles for lunar exploration.

The SWF public tracking sheet shows 13 states have signed on to participate in the ILRS: Azerbaijan, Belarus, China, Egypt, Kazakhstan, Nicaragua, Pakistan, Russia, Senegal, Serbia, South Africa, Thailand, and Venezuela.[64]

The Artemis Accords are a set of principles for lunar activities that was initiated by the United States and first announced in October 2020 with the signing by eight initial countries. The Artemis Accords are related to the Artemis program, a NASA-led initiative to return to the Moon

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[62] *Submission by the Delegation of China to the Working Group on Legal Aspects of Space Resource Activities of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space*, March 2024, https://www.unoosa.org/documents/pdf/copuos/lsc/space-resources/LSC2024/English_Chinas_submission_to_the_working_group_on_space_resources.pdf; Andrew Jones, "China outlines position on use of space resources," *SpaceNews*, March 6, 2024, https://spacenews.com/china-outlines-position-on-use-of-space-resources/.

[63] Wang Wei, "International Lunar Research Station," presentation given at "2024 International Workshop on Space Resources: Perspectives for Future Ecosystems," São José dos Campos, Brazil, Nov. 21-22, 2024.

[64] "Lunar Space Cooperation Initiatives," Secure World Foundation, last updated Jan. 23, 2025, https://swfound.org/lunar-space-cooperation-initiatives/.

and establish a permanent human presence there that lays the foundation to further exploration to Mars and beyond. NASA and the US State Department are co-leads for the Artemis Accords.

The relationship between the Artemis Accords and the Artemis program is often misunderstood. The Artemis Accords are a multilateral document in that all signatories sign on to the same document that was jointly negotiated by the eight founding members. Joining the Artemis program involves signing a separate bilateral agreement with NASA that outlines the contributions an Artemis partner will make and the benefits they will get in return.

The first Trump administration initiated the Artemis Accords, a nonbinding political commitment to allow for sustainable space exploration. Through the Accords, the United States seeks to secure commitments from other countries to follow several principles related to lunar (and other space) activities and interpret their implementation in a specific way.

The Artemis Accords build on the principles contained in the OST and apply them to lunar space activities. The Artemis Accords' principles address a range of topics, including transparency, interoperability, release of scientific data, resource utilization, safety zones, and heritage site protection. In 2023, the Artemis Accords partners started a series of working groups to discuss the specifics of how the principles in the Accords will be applied to their future lunar activities.

The SWF public tracking sheet shows that 53 countries have signed on to the Artemis Accords.[65] Only one - Thailand - has signed the Artemis Accords (in December 2024) and also joined the ILRS (April 2024). While it is not prohibited to participate in both efforts - at least on the United States' side; it is unclear what China's view of that is - it seems likely that countries will opt to do one or the other, setting up the possibility of competing lunar governance frameworks. These frameworks could also end up being complementary, depending on how relations between the United States and China evolve and how the separate lunar programs fare.

COUNTERSPACE CAPABILITIES

Much of this section is derived from SWF's annual report that I am the editor of, "Global Counterspace Capabilities: An Open Source Assessment," the 2025 version of which has been released as of this morning.[66]

China appears to be highly motivated to develop counterspace capabilities to bolster its national security. China is beginning to assert its regional political, economic, and military interests more strongly, and sees counterspace capabilities as a key enabler. Much has been written about how reliant the United States is on space capabilities to project global military power, and thus being able to counter US space capabilities is a key element of China's ability to assure its freedom of action and deter potential US military operations in its sphere of influence.

China has a sustained effort to develop a broad range of offensive counterspace capabilities. Over the last decade, China has engaged in multiple tests of technologies and capabilities that either are offensive counterspace weapons or could be used as such. China has also begun

[65] Ibid.

[66] Ed. by Victoria Samson, *Global Counterspace Capabilities: An Open Source Assessment*, Secure World Foundation, April 2025, https://swfound.org/counterspace.

developing the policy, doctrine, and organizational frameworks to support the integration of counterspace capabilities into its military planning and operations. That said, it is unclear whether China intends to offensively use its counterspace capabilities in a future conflict, or whether the goal is to use them as a deterrent against aggression. There is no confirmed public evidence of China actively using counterspace capabilities in current military operations, but operational testing has occurred.

China has conducted multiple tests of technologies for close approach and rendezvous in both LEO and GEO that could lead to a co-orbital ASAT capability. However, the public evidence indicates they have not conducted an actual destructive intercept of a target, and there is no proof that these technologies are definitively being developed for counterspace use as opposed to intelligence gathering or other purposes.

China has at least one, and possibly as many as three, programs underway to develop DA-ASAT capabilities, either as dedicated counterspace systems or as midcourse missile defense systems that could provide counterspace capabilities. China has engaged in multiple, progressive tests of these capabilities since 2005, indicating a serious and sustained organizational effort. Chinese DA-ASAT capability against LEO targets is likely mature and may be operationally fielded on mobile launchers. Chinese DA-ASAT capability against deep space targets (MEO, and GEO) is likely still in the experimental or development phase, and there is not sufficient evidence to conclude whether it will become an operational capability in the near future.

China is likely to have significant EW counterspace capabilities against global navigation satellite systems and satellite communications, although the exact nature is difficult to determine through open sources. Chinese military doctrine places a heavy emphasis on electronic warfare as part of the broader information warfare. While there is significant evidence of Chinese scientific research and development of EW capabilities for counterspace applications and some open-source evidence of Chinese EW counterspace capabilities being deployed, there is no public evidence of their active use in military operations.

China is likely to be developing directed energy weapons for counterspace use, although public details are scarce. There is strong evidence of dedicated research and development and reports of testing at five different locations, but limited details on the operational status and maturity of any fielded capabilities.

China is developing a sophisticated network of ground-based optical telescopes and radars for detecting, tracking, and characterizing space objects. Like the United States and Russia, several of the Chinese SSA radars also serve missile warning functions. While China lacks an extensive network of SSA tracking assets outside its borders, it does have a fleet of tracking ships and is developing relationships with countries that may host future sensors. Since 2010, China has deployed several satellites capable of conducting RPO on orbit, which likely aids in its ability to characterize and collect intelligence on foreign satellites.

Although official Chinese statements on space warfare and weapons have remained consistently aligned to the peaceful purposes of outer space, unofficially they have become more nuanced. China has recently designated space as a military domain, and military writings state that the goal of space warfare and operations is to achieve space superiority using offensive and defensive means in connection with their broader strategic focus on asymmetric cost imposition, access

denial, and information dominance. In 2024, China proceeded to disband its Strategic Support Force in favor of splitting up its responsibilities among three forces and putting renewed efforts into information service.

China's considerable investment in developing and testing counterspace capabilities suggest they see space as a domain for future conflicts, whether or not that is officially stated. That said, it is uncertain whether China would fully utilize its offensive counterspace capabilities in a future conflict or whether the goal is to use them as a deterrent against US aggression. There is no public evidence of China actively using destructive counterspace capabilities in current military operations, although it is likely they are using SSA and electronic warfare in at least some support roles.

CASE STUDY: RPOS BY FIVE SATELLITES

In December 2023, a Long March 11 (CZ-11) launched three satellites from a barge launch pad near Guangdong.[67] The three satellites - Shiyan-24C satellites (SY-24C 01, SY-24C 02, and SY-24C 03) were inserted into a Sun-synchronous orbit inclined at 97.3 degrees (at an altitude of 540 x 553 x 540 km). Their orbit was co-planar with SJ-6 05A and SJ-6 05B, two satellites launched in October 2021, via a Long March 4B (CZ 4B) launch vehicle from the Jiuquan Satellite Launch Center.[68] According to a USSF fact sheet, the five satellites started conducting RPOs from mid-March 2024 through the end of April 2024, at times separated by less than 1 km, and undertaking "two simultaneous proximity events at the same time." In September, SY-24C 02 and SY-24C 03 conducted three separate approaches, again under 1 km, with two being multi-day actions.[69] In December, SY-24C 03 and SJ6 5A came within "tens of meters" of each other five different times and with "associated relative velocities less than 10 cm/s;" this again was a multi-day event.[70] After that, the five satellites maneuvered to maintain a separation of over 100 km.[71] This is the operation that USSF officials have termed "dog-fighting in space."

We have seen Chinese satellites undertake RPOs with each other before but not to that number of satellites. Chinese satellites have approached the satellites of other countries, which we detail fairly extensively in our annual counterspace report. Russian and American satellites also conduct continued proximity operations to their own and to other countries' satellites, which we have documented in our report as well. It is challenging to determine if this Chinese capability of doing repeated, complicated RPOs is something that the United States does not have since we

[67] David Todd, "Two Chinese launches: Long March 11 launches Shiyan-24C trio while Long March 3B puts two Beidou navsats into orbit," *Seradata*, December 26, 2023, https://www.seradata.com/two-chinese-launches-long-march-11-launches-shiyan-24c-trio-while-long-march-3b-puts-two-beidou-navsats-into-orbit/.
[68] "SHIJIAN 6 05A (SJ-6 05A), 49961," *Kayhan Space Satcat*, Accessed February 21, 2025, https://www.satcat.com/sats/49961; "Space Threat Fact Sheet Annex," Headquarters Space Force Intelligence, February 21, 2025, https://nssaspace.org/wp-content/uploads/2025/02/20250221-S2-Space-Threat-Fact-Sheet-Annex-v1-RELEASE.pdf.
[69] "Space Threat Fact Sheet Annex," Headquarters Space Force Intelligence, February 21, 2025, https://nssaspace.org/wp-content/uploads/2025/02/20250221-S2-Space-Threat-Fact-Sheet-Annex-v1-RELEASE.pdf.
[70] Ibid.
[71] Ibid.

are learning about it from US commercial SSA companies, who are generally reluctant to discuss sensitive information about US military satellites.

My organization, the Secure World Foundation, includes RPO activities as a possible co-orbital counterspace capability in our report because the actions undertaken for RPOs are very similar to what would be done for a co-orbital capability. The latter would require getting close to the target satellite before undertaking any actions. However, RPO activities do not automatically equal co-orbital intentions. Proximity to another country's satellite might be sought after in order to listen to what it is listening to, listen to what it is broadcasting, image it, jam its communications, interfere with its optical sensors, release projectiles at a low speed, release projectiles at a high speed - or just do it to see if it can be accomplished.

BALANCING KEEPING THE US' TECH EDGE BUT ALSO ENGAGING WITH CHINA

The United States is in the process of hollowing out its current scientific base by cutting funds for many different kinds of scientific research under the Trump administration's Department of Government Efficiency (DOGE) efforts. This is hobbling the United States' technological edge and, if continued, will have consequences for the United States' scientific and technical base for decades to come. For example, the National Institute of Health has seen its funding drop by over $3 billion since Jan. 20 compared to grants issued during the same timeframe last year.[72] This decline is having consequences all across the United States' scientific research establishment. Over 2500 medical schools, universities, and other research sites in all 50 states receive NIH funding.[73]

This disruption of federal funds to the US scientific research community will have effects on US innovation and competitiveness. There was a reason why the United States opted post-WWII to pour money into scientific research: this was a way to ensure that the United States kept its competitive edge against Cold War rivals. By up-ending this funding model, the United States is opening itself up to being bypassed by institutions supported with much more stable funding sources, such as those being funded by the Chinese government.

The same thing is happening with NASA. There is a lack of clarity about policies and programs, concern about drawing executive attention, loss of personnel through Reductions in Force and other methods being done to encourage a sharp decrease in the number of its employees, and disarray caused by reported plans to move NASA headquarters and distribute staff to other NASA research centers around the country. Federal grants have also been pulled back from existing NASA programs. Casey Dreier of the Planetary Society has been maintaining a spreadsheet of documented cuts, finding as of March 27 that there were at least $48 million in

[72] Dan Diamond and Dan Keating, "Trump promised scientific breakthroughs. Researchers say he's breaking science," *Washington Post*, March 28, 2025, https://www.washingtonpost.com/politics/2025/03/28/trump-administration-science-research-cuts/.
[73] Ibid.

terminated grant awards ($26 million of which had already been paid out).[74] It is unclear the extent of the grant funding reductions, but it all leads to a climate of fear and uncertainty amongst NASA staff and scientists who depend on NASA funding in order to conduct their research. This does not strengthen the US civil space program but rather weakens it. NASA is challenged to focus on its missions while it is undergoing this level of uncertainty. Again, this leaves an opening for China's space program to take advantage of its predictable operating environment to leapfrog the United States' space program.

The Trump administration is using language from a November 2020 change in an Office of Management and Budget (OMB) regulation regarding federal grants. It said that a grant could be pulled if it "no longer effectuates the program goals or agency priorities."[75] In many of the documents released in support of Trump administration cuts, the statement "no longer effectuates agency priorities" is being used to justify the actions being undertaken to eliminate statutory programs.[76]

One real avenue for constructive space engagement between the United States and China is based on the reality that the United States and China will be the main lunar superpowers, and there are significant opportunities for constructive space engagement with China on overlapping challenges. One near-term challenge relates to lunar radiocommunications for position, navigation and timing (PNT).

PNT signals are necessary for the United States' lunar orbital and surface operations. They are fundamental for orbiting, landing, and surface operations. Avoiding signal interference between users of the spectrum used by PNT is critical, so engagement with China to avoid our interference with their signals is tied to the mission assurance of these missions. Likewise, China is keenly interested in their own lunar missions avoiding harmful radio interference. Additionally, PNT signals require standard time models to operate successfully, and are likewise assisted by a standard gravity model of the Moon.

The International Committee on Global Navigation Satellite Systems (ICG), established in 2005 under the umbrella of the United Nations, promotes voluntary cooperation on matters of mutual interest related to civil satellite-based positioning, navigation, timing, and value-added services. Coordination through the ICG on activities in the cislunar environment would assist American lunar ambitions and plans.[77]

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[74] Hannah Richter, "Confusion and worry as DOGE cuts hit NASA: Terminated grants include efforts to get students and underrepresented groups involved in science," *Science,* March 27, 2025, https://www.science.org/content/article/confusion-and-worry-doge-cuts-hit-nasa.
[75] Carolyn Y. Johnson and Joel Achenbach, "These 5 words have killed millions in grants and advanced Trump's agenda," *Washington Post*, March 27, 2025, https://www.washingtonpost.com/science/2025/03/27/trump-federal-grants-research-cuts/
[76] Ibid.
[77] Interagency Operations Advisory Group, Joint ICG-IOAG Multilateral Cislunar PNT Workshop, https://www.ioag.org/SitePages/Cis-Lunar-Workshop.aspx. *See also* United Nations Office for Outer Space Affairs, Workshop on Cislunar Positioning, Navigation, and Timing (PNT), https://www.unoosa.org/oosa/en/ourwork/icg/working-groups/b/CislunarPNT2025.html.

There is one serious speed bump in the way of US-China bilateral space cooperation. In 2011, Congress passed the Wolf Amendment, named after then-Representative Frank Wolf (R-Virg.), who was concerned about China's treatment of religious minorities and possible intellectual property theft via hacking. While it does not officially preclude US–China bilateral cooperation in space, it requires the White House's Office of Science and Technology Policy, NASA, and the National Space Council to obtain certification by the Federal Bureau of Investigation (FBI) that no technical information with economic security or national security implications will be shared with China and that none of the entities involved have human rights violations; in addition, Congress and the FBI must be notified 30 days in advance of the activity. Although there is little evidence that the Wolf Amendment has achieved its goals or affected China's domestic policies, it has given Chinese officials a pretext to deflect criticisms about its lack of transparency or engagement onto the United States.

Both China's increasing deployment of large satellite constellations and its lunar ambitions have raised coordination and safety concerns within industry and other space stakeholders. As US satellite operators deploy and operate their own satellite constellations, the risk of potential collisions with Chinese operators is growing because the Chinese systems deploy through existing constellations and operate in orbits similar to existing systems. Bilateral sharing of information and coordination for basic operational safety is limited, and there is a need to improve engagement around space safety practices. US operators —and those from other partner countries—have established coordination and transparency practices amongst themselves; they are looking for options to exchange information with Chinese operators to do the same and thus formalize norms shaping space safety. On the Moon, concerns about the ability to respond in a timely manner to human safety issues, understanding of intent, and shared hazards of lunar dust, among other concerns, drive perceived need for coordination channels. Interoperability in key infrastructures will be crucial for safety reasons. There is a need for coordination and information exchanges between actors hosting humans on the Moon, which most likely will be the United States and China.

By isolating China from existing multilateral cooperative efforts in space like the ISS, the United States has pushed China to launch its own space station. Furthermore, this forced separation has allowed China to use its space program to create its own relationships with countries the United States has long deprioritized, particularly in Latin America and Africa. This has resulted in soft power advantages for China that have shown benefits in trade and diplomatic discussions

POLICY RECOMMENDATIONS

Working with the Trump administration, Congress should review and revise the implementation of the Wolf Amendment to increase NASA's engagement in space activities with China that support US national interests. Priority areas for engagement include basic space science and research, robotic space exploration, human spaceflight safety, lunar search and rescue, and increased data sharing on space weather and orbital debris.

The United States and China have shared interests in ensuring basic operational safety in the space environment, including both in LEO and in cislunar space (including the lunar surface). Establishing channels for information sharing, PNT compatibility, and promoting space safety practices can act to reduce the potential for misunderstanding that might lead to conflict while promoting stability in the operating domain that will support growth in space activities. This is particularly important in the context of national space traffic management and/or coordination initiatives. Dialogue of this type might be pursued in several ways, including: bilateral government-to-government discussions; informal civil society dialogues; and engagement in multilateral fora such as the Action Team on Lunar Activities Consultation (ATLAC) at UN COPUOS and in the ICG's Working Group on Lunar PNT (WG L).

Congress should work with the Trump administration to fund and carry out studies that systematically document and understand the structure and nature of the Chinese space ecosystem, how the industry is structured, the true relationships between the central government, the state-owned enterprises, and the private companies, the role of the provincial governments, how private capital operates in the Chinese space sector and how all of this relates to the space program priorities of the Chinese government. This will help increase understanding of the Chinese space sector. As well, an incredible amount of information exists regarding Chinese commercial space, and conversations with individuals in China reveal a great deal. More effort is required to collect and distill this information to better inform practitioners, policymakers, and investors. Congress should support increased USG efforts to produce and make accessible official translation of Chinese primary documents.

US government officials should refer to space as an "operational" domain rather than a "warfighting" domain. By referring to space as a "warfighting" domain, the United States has handed China an easy diplomatic win by allowing its diplomats and government officials to use that phrasing as evidence that the United States is the one increasing tensions and weaponizing space. Referring to space as an operational domain would be an acknowledgment of how the military needs to continue to operate in and through space, would be in line with how others refer to it (including NATO), but would not hamper US diplomatic efforts required to meet national security space concerns and goals.

Congress should support efforts by the United States to work with other countries to establish common understandings for what is considered responsible behavior in space, particularly for military activities that could cause misperceptions or increase tensions, such as rendezvous and proximity operations in orbit. The United States should use space situational awareness in order to help verify such actions.

The United States should continue to actively pursue the development of norms of responsible behavior and provide leadership in the development of international consensus standards and best practices to enhance the security, safety, and sustainability of space activities through engagement with the appropriate international and multilateral fora. One of the norms the United

States should continue to promote is the decision not to conduct destructive DA-ASAT missile tests.

Congress should support the continuation of the Artemis Accords in order for the United States to harness its leadership in space exploration to preserve the stability, safety, and security of the space environment and to support multilateral efforts to improve cooperative space governance. Given the increasing number and diversity of spacefaring nations, international cooperation is becoming ever more important to preserve the stability, safety, and security of the space environment. The Artemis Accords provide a valuable opportunity to use space exploration as a tool of diplomacy in support of the United States' objectives to promote the rule of law in space to ensure the safety, stability, and security of space activities. It also provides an opportunity to engage new, nontraditional partners in emerging space countries who are eager to be programmatically involved in the Artemis program. In this regard, the United States should continue to seek new signatories for the Artemis Accords and provide more tangible ways to link Accords signatories to Artemis Program participation as a way of solidifying partnership relationships and benefits.