



Dynamics of Disruption

Formulating policy pathways:
Navigating geopolitical tensions in space



Abstract

The article, “Formulating policy pathways: Navigating geopolitical tensions in space,” discusses the increased importance of space in geopolitical strategies due to technological advancements and the rise of the commercial space industry. The piece highlights the potential use of space for militaristic purposes, as shown by recent actions from Russia and debates between major Space Powers. Further, commercial space activities are now entwined with geopolitical interests, affecting the operations of multinational companies. The article then suggests strategic routes: updating regulations around technology exports, establishing international norms, enhancing space traffic monitoring, and fostering alliances between Space Powers. The US-Australia partnership is given as an example of how interdependence can help maintain peace and encourage responsible behavior in space.



Peace has reigned in space for about 60 years, and this has enabled a global commercial space industry to blossom”

While space was theoretically weaponized during the Cold War era, the commercial industry was not a consideration. The US conducted a nuclear test in space¹ and the Soviet Union developed space-based weaponry in the early years of the Cold War’s Space Race.² But after the Outer Space Treaty was signed, there was a cessation of hostilities for a long period of time.

Peace has reigned in space for about 60 years, and this has enabled a global commercial space industry to blossom and develop a host of applications that benefit billions of people on Earth. But that peace can no longer be taken for granted as the Space Powers exchange escalating rhetoric about the militarization of space. This comes as the Russian invasion of Ukraine has demonstrated the value and scope of space imaging, sensing, and communications in conflict zones.

Before the recent reveal of a potential Russian space weapon with nuclear components, representatives of the US have raised concerns about Russia and China weaponizing space.³ China has responded in kind, accusing the US of looking for cover in order to justify its own weaponization of space.⁴ Russia, alternatively, has openly contemplated targeting US commercial space systems in response to its role in providing the Ukrainian military with communications and surveillance data.⁵

This isn’t the only instance of terrestrial geopolitics creeping into commercial space. When Russia invaded Ukraine, it effectively seized 36 One Web satellites that had been launching from Kazakhstan. That launch facility is no longer available to commercial operators doing business in the west. Furthermore, Russia’s launch components, once a prominent feature of western launch vehicles, have been phased out. Meanwhile, in Taiwan, it appears there may be a geopolitical issue brewing regarding Starlink connectivity being withheld from the island.

These considerations may continue to creep upwards in orbit as international norms in space are debated. The US-led Artemis Accords, which is nonbinding, sets forth principles

for the civil exploration of space and explicitly recognizes the importance of Space Commerce.⁶

In parallel,⁷ China and Russia have launched an initiative to jointly develop an International Lunar Research Station (ILRS) and have invited all nations to join. While not quite a statement of principles, the ILRS has similarly aspirational statements about the peaceful exploration and use of space for all humankind.⁸

There are currently 36 signatories to the Artemis Accords and 8 to the ILRS.⁹ There is no country signed on to both, although there are western nongovernmental organizations supporting the ILRS. How these parallel affiliations will develop, and their impact on commercial space operations has yet to be seen. But it's not difficult to envision a future in space with parallel, mutually exclusive norms of operation that could complicate the provision of global space services.

Current risks

New intertwining of commercial space and geopolitical struggles will enhance risks to commercial operators and some of these risks are already coming to bear for satellite operators.

Cybersecurity and threat

Cybersecurity presents a significant challenge for satellite services, particularly concerning the threat of network hacking or unauthorized usage. Such cyber threats can compromise the integrity and reliability of these satellite networks. The current geopolitical conflict involving the Russian invasion of Ukraine underscores these risks. Notably, it has highlighted the potential vulnerabilities faced by commercial satellite operators amid geopolitical crises. Early in its invasion, Russia hacked Viasat Earth stations to disrupt communications in Ukraine.¹⁰ More recently, there have been reports that Russian services are coopting and accessing the Starlink to benefit from the large constellation's connectivity that is intended to assist Ukrainian troops.¹¹

Conceptually, these issues are not new. ISIS reportedly relied on satellite connectivity during its reign of terror.¹² But the sophistication of the disruptive parties and the scale of the potential impact have, much like the current geopolitical crises facing the globe today, scaled up significantly since a decade ago.

Orbital strikes

The threat of strikes on orbital targets is, fortunately, hypothetical at this time. However, there are clear indications that at least some of the Space Powers have¹³ or are¹⁴ developing¹⁵ satellites that can attack or disable other, on-orbit satellites.



There is a need for enhanced regulation as it has not kept pace with the exploration and exploitation of space and its resources. Better governance will ensure that increasing levels of space innovation can be achieved in a sustainable manner, as well as potentially preventing potential conflicts in space which threaten otherwise peaceful activity."

Grant McDonald,
Global Aerospace and Defense Leader, KPMG

As commercial companies continue to develop new and innovative rendezvous and proximity operations, where commercial spacecraft are designed to service or monitor other in-orbit space craft, it is easy to see how these systems could trigger a miscommunication between the Space Powers because of the potentially offensive capabilities of such systems.

Obstruction and interference

National deterrence, interference, and obstruction often arise from strategic geopolitical conflicts, working as tools to inhibit rival nations from making substantial advancements in their geopolitical standing. A relevant parallel may be found in efforts to stymie nuclear programs of certain nations.¹⁶

To date, there are no readily obvious attempts to sabotage commercial space systems due to geopolitical concerns.¹⁷ However, there are a host of possibilities that could arise. The history of the five successful anti-satellite (ASAT) tests and operations have demonstrated that even the destruction of a friendly satellite could lead to the destruction of other satellites or rendering parts of LEO uninhabitable for all spacecraft. Other traditional methods of sabotage, either on the ground or in space, remain theoretical harms that could arise as the geopolitical stakes rise in space.



The nature of space has always been global. And as we enter a new period of geopolitical competition across the world, space has become a key component of that competition. While commercial space has benefited greatly from the needs of its government customers, its role in supporting government actions threatens to entangle commercial space into this competition. This paper proposes potential strategies for commercial operators to mitigate the impact of these risks.”

Will Lewis,
Director, ACSP



Not all the recent developments have trended in a negative direction. In 2019, on the heels of India’s ASAT test, it was unclear what direction India would go as a nascent Space Power. However, its test had a relatively modest impact on the space environment,¹⁸ and in the aftermath of that test, India has ascended to new civil and commercial heights in space.

India’s future in space is promising with a growing commercial sector¹⁹ and unparalleled human capital.²⁰ It has signed the Artemis Accords but possesses the resources to chart its own path going forward, and that path has appeared to be entirely peaceful in the wake of its ASAT test. What we can learn from India’s ASAT test is that if a country is given the opportunity to benefit from space, it will eventually take steps to preserve it.

Securing supply chains and infrastructures

Vulnerabilities in launch, communication, and sensing capabilities—Supply chain issues can create vulnerabilities in terms of successfully deploying space missions in a timely manner. Some powers, such as Europe, are still adapting their launch capabilities to a less-integrated global economy. Changes in the availability of materials or components can create difficulty in sourcing technical solutions and can raise the cost of designing and building spacecraft.²¹

While some terrestrial hardware has been compromised, communications from satellite networks tend to be secure. But existing space communications infrastructure can be targeted, as many systems have widespread earth station networks that would be difficult to secure worldwide. This would be a space analog to what already occurs in the terrestrial network when fiber cables are sabotaged.²²

Satellite networks are also susceptible to jamming by generating a competing signal that interferes with the satellites ability to receive communications.²³ Non-geostationary (NGSO) systems that are essential for communications and imaging can be particularly susceptible to would-be jammers.²⁴ Interfering with satellite signals can not only disrupt communications or the transmission of images from space in conflict zones but also broadly disrupt applications that many take for granted such as Global Navigation Satellite Systems (GNSS), such as GPS.²⁵

Public and private sector reliance on space assets

Satellite and space services feature prominently in everyday life. People frequently search for directions, counting on the location data from the GPS and Galileo GNSS systems. Weather satellites are the source of the majority of our weather prediction capability and have demonstrated repeatedly that they offer significant benefits in terms of lives and property damage for the modern world.²⁶



Similarly, satellite broadband connectivity is a growing segment of space, with a number of geostationary orbit (GSO) and NGSO systems offering connectivity directly to millions of consumers across the world.

Each of these services is present in the daily lives of massive and growing segments of the population and offer significant public benefits. And the space systems that provide these services are vulnerable to jamming²⁷ and physical threats. Potential geopolitical disruptions to these services would be felt by populations far removed from conflict zones or the space operations centers of commercial operators.

To maintain momentum in commercial space, governments and companies must find ways to mitigate these disruptions. For example, enabling technical standardization through liberalized rules for space technology exchanges between aligned countries could help reduce delays and minimize cost increases. Space is global, far beyond the Space Powers, and the ability to standardize technical interfaces and equipment globally could foster a more resilient supply chain.

Another mechanism for limiting disruptions to space infrastructure is to develop stable and open communication protocols for public and private commercial stakeholders. Government intelligence agencies often collect information related to threats to commercial stakeholders, including those in space. And commercial operators are best suited to monitor the health of their systems networks. Developing standard protocols for public and private stakeholders to communicate with one another on a regular basis and in the event of a potential crisis, which is already done for possible on-orbit conjunction events,²⁸ could help mitigate some perpetual resiliency issues the commercial space industry may face due to continuing geopolitical disruption.

Automation and other innovations to reduce disruption

Automation could potentially help reduce the disruption of geopolitical events. Automated communication providing regular updates, for example, could ensure that critical and time-sensitive information is distributed in a timely manner. Information about potential adversarial actions or ongoing network breaches could help foster joint public-private response to future geopolitical disruptions.

Another potential mechanism to reduce the impact of earthly events on space would be to develop an international institution for managing space. Such an institution must be seen as neutral in order to obtain global buy-in. For example, the International Telecommunications Union (ITU) has been enabling the coordinated use of radio frequencies internationally by satellite systems for decades. The ITU is respected by its member states, including the parties to the Artemis Accords and the ILRS, and a similar organization for space operational norms could help achieve stability in the face of growing geopolitical unrest.

“As the boundaries of geopolitical influences and commercial aspirations extend to space, the need for a unified global approach in policymaking becomes paramount. The success from alliances and collaborations in space showcases a valuable path forward, emphasizing that joint strategic action is pivotal in navigating this rapidly evolving landscape and safeguarding commercial interests.”

Brian Miske,
National Ignition Leader, KPMG

Policy pathways to mitigate risks

Update export controls and technology transfer restrictions

The US has already recognized the value of information and technology sharing as a means for effective space diplomacy. It must ensure that its export controls permit commercial operators to transfer relevant technology. A lack of flexibility in the application of International Traffic in Arms Regulations (ITAR), for example, could further limit the exchange of critical space safety technology between the US and its allies.

The US has previously recognized this principle and loosened ITAR restrictions on space technologies.²⁹ However, it has been a decade since these changes were made, and the US should continue to ensure that its export regulations continue to permit information and technology that will facilitate global investment in the peaceful use of space.

Many companies that establish in US allied and partner nations prioritize a US presence, with the compelling pull of capital and customer base, though are concerned about how this may limit their future customer base, ownership structure, and supply chain. International capabilities will be fundamental to the ongoing success of the US space sector, and diversified supply chains only enhance the redundancy and resilience of the US industrial base. While positive signs have come from Technology Safeguard Agreements, and expansion of the US Defense Industrial Base, better mechanisms are required to facilitate this inclusion while maintaining sovereignty.

Develop international norms of behavior and consequences for violations

Space has long required some level of peaceful collaboration among nations. Beyond the oft referenced and little applied Outer Space Treaty, the use of radio frequency in spectrum is debated internationally through the International Telecommunications Union (ITU). Spectrum use norms are established and generally accepted.³⁰ There is nothing like the ITU internationally yet, for normalizing operations and behaviors in space.

The global community should consider establishing something like the ITU that can set norms outside of the two developing Space Power poles of the US and China. In the event that this cannot be achieved, the US and China must strive to find common ground on certain norms of behavior in space. This can be accomplished through direct negotiation or either commercial or neutral government intermediaries and then encourage their various allied coalitions to adopt those norms as well.



Trade and launch sanctions may help encourage many smaller space actors to abide by international norms. Space Powers will likely operate on their own terms and in their own interests, but countries without sovereign launch capabilities may be more susceptible to international influence and pressure. If China, the US, Europe, India, and Japan jointly agree to not launch actors that engage in certain activities on-orbit, it would severely curtail the options for reliable launch services.

Increase space traffic monitoring and attribution capabilities

There are mechanisms to avoid risks as the density of deployment grows. Certain technologies will be essential for the continued safe deployment of commercial space systems, particularly in lower Earth orbit.³¹ As discussed below, new radar and sensing capabilities are being used to make space safer for civil and commercial use and also to secure a commitment from other countries to the continued peaceful use of space. However, stringent export controls could pose an obstacle to this “diplomacy through technology” approach, and governments should take steps to review and update export regulations that may stymie the export of these technologies to like-minded countries.



The ability to share time-sensitive information quickly and seamlessly will also be essential for the safe management of space traffic that is managed by different nation-states. The US has laid the groundwork for sharing information regarding potential conjunction events.

As noted above, the Space Powers continue to enhance space situational awareness (SSA) capabilities while the commercial sector is starting to offer supplemental SSA services and capabilities. However, the US is leading a diplomatic effort to make its SSA data available to countries with low to moderate footprints in space as a means toward building norms around sharing SSA data and taking collaborative efforts to avoid collisions between space objects. These sharing efforts will both enhance the quality of SSA³² and help build the foundation for establishing some operational norms outside of the typical terrestrial alliances that shape geopolitics on Earth. They may, however, alienate China and Russia if the international “norm” for SSA is perceived to be US led.

Foster interdependence through alliances

The US relationship with Australia is an example of how the Space Powers can encourage other space stakeholders to operate according to international norms of responsible behavior. The US and Australia have long had a collaborative relationship, and that extends into space. As a result of this relationship, both the US and Australia have benefited while creating a unified front on space policy.

The Australian relationship is unique, but the underlying philosophy of operating in a collaborative manner in terms of space capabilities as a best practice can be replicated globally.

The US and Australia entered into an agreement to allow US rockets to launch from Australia.³³ Such a move allows for the export of typically controlled technology to facilitate Australian growth in space as well as new commercial opportunities for US launch vendors. On the flip side of this relationship, the US is establishing a deep space SSA network to monitor Cislunar space.³⁴ Australia is one of the countries that will house one of the three deep space radars that will monitor this area of space. This capability will be far more advantageous to the US than Australia in the short term, but it gives Australia incentive to responsibly operate in space.³⁵

Conclusion

The ongoing tension between major Space Powers has brought into focus the geopolitical influences on commercial space operations and the potential threat of militarization of space. In this evolving landscape, the article suggests strategic responses such as updating controls on technology exports, establishing international norms of behavior, boosting space traffic monitoring, and fostering alliances between Space Powers. The unique yet replicable alliance between the US and Australia, for example, underscores the value of codependent collaborations in space. To navigate the new space landscape and safeguard commercial interests, proactive policymaking through a united, global approach becomes more essential than ever.

References

1. <https://www.smithsonianmag.com/history/going-nuclear-over-the-pacific-24428997/>.
2. <https://www.airandspaceforces.com/article/0605fobs/>.
3. <https://www.airandspaceforces.com/new-spoc-commander-threats-russia-china-space/>.
4. https://www.business-standard.com/world-news/china-accuses-us-of-exaggerating-threat-in-space-to-boost-forces-124012700676_1.html.
5. <https://www.reuters.com/world/russia-says-vests-commercial-satellites-could-be-targets-2022-10-27/>.
6. <https://www.nasa.gov/wp-content/uploads/2022/11/Artemis-Accords-signed-13Oct2020.pdf?emrc=653a00>.
7. The ILRS was announced in March 2021, five months after the Artemis Accords were adopted by the initial signatories.
8. <https://www.cnsa.gov.cn/n6758823/n6758838/c6811372/content.html>.
9. <https://spacenews.com/china-adds-belarus-as-partner-for-ilrs-moon-base/>.
10. <https://www.csoonline.com/article/649714/incident-response-lessons-learned-from-the-russian-attack-on-viasat.html>.
11. [https://www.reuters.com/world/europe/russia-using-thousands-spacex-starlink-terminals-ukraine-wsj-says-2024-02-15/#:~:text=Feb%2015%20\(Reuters\)%20%2D%20Russian,an%20interview%20published%20on%20Thursday](https://www.reuters.com/world/europe/russia-using-thousands-spacex-starlink-terminals-ukraine-wsj-says-2024-02-15/#:~:text=Feb%2015%20(Reuters)%20%2D%20Russian,an%20interview%20published%20on%20Thursday).
12. <https://www.reuters.com/article/us-mideast-crisis-iraq-internet-insight-idUSKCN0VD0LM/>.
13. <https://www.businessinsider.com/russia-satellite-luch-olymp-moved-close-eutelsat-report-spy-defense-2023-10#:~:text=Russia%20moved%20one%20of%20its,to%20spy%20on%20it%3A%20report&text=Russia%20moved%20close%20to%20a,that%20has%20prompted%20security%20concerns>.
14. <https://breakingdefense.com/2024/01/take-down-space-force-targeting-unit-develops-strike-options-for-joint-force/#:~:text=The%20Space%20Force's%2075th%20ISR,DeAnna%20Burt>.
15. <https://spacenews.com/space-force-we-expect-to-see-interfering-blinding-of-satellites-during-conflict/>.
16. <https://www.csoonline.com/article/562691/stuxnet-explained-the-first-known-cyberweapon.html>.
17. Though NASA was hacked shortly before it launched the Galileo spacecraft: https://www.realclearscience.com/blog/2019/01/12/when_nasa_got_wanked.html.
18. <https://carnegieendowment.org/2019/04/15/india-s-asat-test-incomplete-success-pub-78884>.
19. <https://www.nytimes.com/2023/07/04/business/india-space-startups.html>.
20. <https://www.worldometers.info/world-population/india-population/>.
21. <https://fedscoop.com/nasa-artemis-program-supply-chain-oig-report/>.
22. <https://www.brusselstimes.com/311704/fibre-optic-cable-sabotage-causes-global-internet-slowdown>.
23. <https://breakingdefense.com/2022/03/satellite-jamming-normal-by-militaries-during-conflict-not-peace-time-state-dept-official/>.
24. <https://ieeexplore.ieee.org/document/9473519>.
25. <https://www.passengerterminaltoday.com/news/security/easa-and-iatato-counter-safety-threat-from-gnss-spoofing-and-jamming.html>.
26. <https://www.stmweather.com/blog/how-weather-satellites-save-lives>.
27. <https://www.space.com/gps-signal-jamming-explainer-russia-ukraine-invasion>.
28. https://www.space-track.org/documents/SFS_Handbook_For_Operators_V1.7.pdf.
29. <https://www.federalregister.gov/documents/2014/05/13/2014-10806/amendment-to-the-international-traffic-in-arms-regulations-revision-of-ammunitions-list-category-xv>.
30. <https://www.itu.int/en/mediacentre/backgrounders/Pages/itu-r-managing-the-radio-frequency-spectrum-for-the-world.aspx#:~:text=The%20foundation%20of%20international%20frequency,different%20services%2C%20including%20space%20services>.
31. <https://technology.nasa.gov/patent/TOP2-294>.
32. <https://breakingdefense.com/2023/09/commerce-study-highlights-benefits-challenges-for-allied-space-surveillance-cooperation/>.
33. <https://spacenews.com/new-agreement-enables-u-s-launches-from-australian-spaceports/#:~:text=The%20US%20State%20Department%20announced,facilities%20while%20protecting%20sensitive%20technologies>.
34. <https://www.airandspaceforces.com/us-uk-australia-agree-new-space-tracking-system/>.
35. <https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/25/fact-sheet-delivering-on-the-next-generation-of-innovation-and-partnership-with-australia/>.

Authors



Jacob Hacker

Head of Strategy and Enablement, KPMG
jhacker1@kpmg.com.au



Will Lewis

Director
ACSP
will@acsp.space



Brian Miske

National Ignition Leader,
KPMG
bmiske@kpmg.com



Grant McDonald

Global Aerospace and Defense
Leader, KPMG
grantmcdonald@kpmg.bb

Contributor

Learn about us:



[kpmg.com](https://www.kpmg.com)

The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavor to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act upon such information without appropriate professional advice after a thorough examination of the particular situation.

© 2024 KPMG LLP, a Delaware limited liability partnership and a member firm of the KPMG global organization of independent member firms affiliated with KPMG International Limited, a private English company limited by guarantee. All rights reserved. The KPMG name and logo are trademarks used under license by the independent member firms of the KPMG global organization. USCS014478_1B.