Space in the US-Japan Bilateral Relationship & the Recommendations of the US-Japan Space Forum

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Emergence of Space as an Essential Domain

We live in an era of rapid technological change. A child born today will never know a world where a phone was attached to a cord, renting a movie required leaving the house, and you had to stop to ask for directions. Technological change and disruption to the established patterns of human activity is not new (think farming, wheels, guns, industrial automation, etc.), and it can be debated whether ours is an era of *unprecedented* technological disruption. But, at least emotionally, having put a man on the Moon, this era feels unique. With the first Moon landing in the 1960s as a prologue, we suddenly find ourselves in a reality in which rockets can fly into space — and then safely back to Earth; tickets are selling for holiday cruises in space; and investors are — right now — putting money into ventures that will mine asteroids, create artificial shooting stars, and send your cremated remains into space.

We have seen this moment coming. Science fiction writers and government planners have long been busy imagining the potential and pitfalls of the space age. But now we're here, in the middle of a modern disruption that is opening space as a practical domain for human activity. It is already somewhere between difficult and impossible to call mom, listen to Justin Bieber, navigate your car, pay the utility bill, predict the next storm, provide electricity, fly airplanes, protect borders, maintain peace, and wage war — without space. Space is no longer a novelty and the exclusive domain of deep-pocketed governments. Space has already become an essential domain for modern human activity, and the tools of life that utilize space have become critical infrastructure.

Space in the US-Japan Alliance

Eight years after Neil Armstrong took his first step on the Moon, Senator Mike Mansfield was sent by President Jimmy Carter to become US ambassador to Japan. Ambassador Mansfield famously declared the US-Japan Alliance the "most important bilateral relationship in the world, bar none". As the world was emerging from the Cold War, the United States and Japan were uniquely positioned — as a function of our economic strength, military power, geography, and shared commitment to democracy and civil liberties — as the anchor of global liberal democracy. That was true then, and Mansfield was prescient enough that, were he alive today, he would not be surprised that it remains true today. Russia, China, and North Korea continue to threaten the established liberal world order, and the US-Japan alliance is arguably the most important tool for protecting it. One thing that has changed, however, is the nature of the threats. No longer are threats limited to tanks, battleships, and missiles. As space has expanded into the human experience as an essential domain, so has the attractiveness of our space assets as a target for American and Japanese competitors.

The US-Japan alliance continues to guard against traditional threats — Chinese incursions into Japanese waters and the threat of missiles from North Korea, for example. However, since it has become virtually impossible to detect and thwart such threats, let alone respond to them, without our satellites and ground stations, the alliance is now squarely focused on space threats such as anti-satellite weaponry, and satellite meddling such as cyberattacks, jamming, and spoofing. Reflecting the importance and potential vulnerabilities of our use of space, the official framework for US-Japan defense cooperation (commonly known as the "Joint Defense Guidelines") was recently updated to introduce and highlight space, along with cyber space, as a critical strategic area for cooperation between the two allies.

Space is not, of course, the exclusive domain of defense agencies. Space is cross-cutting and important enough to enough stakeholders that it spans government agencies with functions as diverse as defense, foreign affairs, transportation, commerce, communications, environmental protection, and weather monitoring. So important and administratively diffuse are our space interests that, as of this year, both the US and Japanese governments now have executive branch offices (namely the Committee on National Space Policy in the Japanese Cabinet and the National Space Council in the White House) solely dedicated to the task of organizing space policy across the panoply of stakeholders in the two governments.

Photo: Maureen and Mike Mansfield Foundation

The US-Japan Space Forum discusses its findings with members of the Japanese Diet, March 2017.

As an analogue at the bilateral level, in 2013 the US and Japan established a US-Japan Comprehensive Dialogue on Space (the "Comprehensive Dialogue" for short). With space having emerged as a core focus of the military partnership, the Comprehensive Dialogue further elevates space to a level of attention in the broader bilateral relationship afforded to few other subjects beyond the more general "economics" (which is the ostensible focus of the so-called Aso-Pence dialogue). In other words, space is neither a novelty, nor of nebulous (pardon the pun) interest. Space is at the core of the most important bilateral relationship in the world.

Photo: Maureen and Mike Mansfield Foundation

The US-Japan Space Forum meets for an internal discussion in Seattle, March 2016.

Mansfield Foundation US-Japan Space Forum

The elevation of space in the bilateral relationship reflects the expanding importance of space to our national interests. But the increased attention and coordination at the government level does not fully capture the extent and nature of the changes. Notably, in both the US and Japan, the private sector is at the center of the innovation in space activities, and the private sector has traditionally been a central player in our national space activities. Traditionally, Boeing, Lockheed, Northrop Grumman, and Raytheon on the US side, and IHI, MELCO, MHI, and NEC in Japan have been primary providers of satellites and rockets in service of government contracts. Numerous other component suppliers participate in both activities, creating industrial activity in a field that, because of its high degree of sensitivity, specialization, cost, and risk, is almost entirely dependent on demand from within the government. The government, in turn, depends on the companies and the intellectual property that they create, which has come to define a critical pillar of our national space capabilities.

However, a feature of the current phase of technological disruption is the expansion of technical capabilities, miniaturization, and lower costs that are unlocking new activities, and enabling new actors beyond the traditional government domain. Companies like Astroscale, Axelspace, PD Aerospace, and ispace in Japan and BlackSky, EarthNow, and Firefly in the US are reinventing possibilities for space transportation, Earth imaging, use of extra-terrestrial resources, and the cleanup of space-junk. These changes are redefining the meaning of "national" space capabilities, and they are straining the existing legal and regulatory framework for launching and maintaining space assets. This puts our governments in a tricky spot. We need to maintain appropriately attentive and thoughtful regulation of an industry that is, by nature, involved in activities that often hold significant risks to national security and public safety. At the same time, our ability to maintain our competitive edge in space — in large part in service of our national security and public safety — depends on a regulatory environment that is light and nimble enough to allow our space industries to grow and innovate. Under-regulate and risk mishandling of sensitive technologies and data or creation of public safety hazards. Over-regulate and risk offshoring the very companies that may define the future and competitive edge of American and Japanese space capabilities. In short, the rapid democratization and decentralization of space activities means that our ability to maintain a competitive edge in space is increasingly a question of how well our governments are able to understand and respond to the needs of the private sector.

For all of these reasons, in 2014 the Maureen and Mike Mansfield Foundation, the University of Washington, and the Japan-US-Friendship Commission teamed together to create a forum for non-government players to have a voice in the current US-Japan space policy discourse. The result of this effort is the US-Japan Space Forum, a standing committee of roughly 20 space experts drawn from not only government officials and experts who are directly involved with the Comprehensive Dialogue but also some of the Japanese and American academic and private sector voices who are leaders in the traditional and emerging space industry activities.

Having met once or twice annually each year since the Comprehensive Dialogue was created, the US-Japan Space Forum has drafted (and continues to update) a framework for forward-looking bilateral space policy. The forum's framework in many ways reflects the findings of the Comprehensive Dialogue (which are publically summarized in joint statements published on the websites of the Japanese Foreign Ministry and US Department of State). However, the forum highlights ways to align bilateral government imperatives with the need to maintain the competitive edge of the Japanese and American space industries, while fostering the innovation and entrepreneurialism that is increasingly defining our national space capabilities.

US-Japan Space Forum's Framework for Bilateral Space Cooperation

Below are the US-Japan Space Forum's recommendations, constituting a framework for bilateral space cooperation. The group recognizes that, due to the technical nature of space activities and partly due to the mystique that surrounds them, part of the challenge

in promoting a sound and practical approach to space activities is to bring the subject into the context of real-life, practical concerns. Therefore, this framework advocates not only policies, missions, and technologies that the forum considers to be the most valuable and opportune for collaboration, but also a general underlying philosophy.

Philosophy

US and Japan as Equal Partners: Define the meaning and responsibilities associated with the US and Japan moving forward with the aspiration of creating a more equal partnership in space. Cognizant of budget disparities and constitutional requirements (e.g. Japanese limitations on collective self-defense measures in response to space threats), work to minimize structural imbalances and improve the coordination of responsibilities between the two nations.

Politics and Public Relations: Inform citizenry about the broad benefits of space activities, including, but not limited to, Earth observation and exploration of the Moon and our solar system. Earth observation has become integral not only to national security, but also to telecommunications, disaster management and response, navigation, mapping and imaging, and weather prediction and climate analysis. Beyond-Earth observation missions such as lunar exploration, and missions to Mars, asteroids, and beyond hold great promise for energy security, biomedical research, mining, manufacturing, etc.

Photo: Maureen and Mike Mansfield Foundation

"U.S.-JAPAN SPACE FORUM: Recommendations for the Japan-U.S. Comprehensive Dialogue on Space", July 2016

"All of Society" Approach: Pursue a holistic approach among national security, commercial, and scientific space sectors. All sectors are crucial to achieving robust space capabilities and technological advancement.

International Norms and Practices: Even in the absence of international consensus, move forward bilaterally, and multilaterally where possible, with proposals for norms, practices, and codes of conduct that advance the stable, sustainable, peaceful use of space by all humanity.

Policies

Resiliency of Space Assets: Develop multiple approaches to the resilience of space assets to include specific agreements and joint statements between the US and Japan. Prioritize expanding interoperability and resilience in the following areas:

- space-based positioning, navigation, and timing
- enhanced awareness of potentially damaging space objects and debris
- the use of space for understanding and monitoring the maritime domain
- research and development of space technologies
- shared use of each other's rockets to expand options and opportunities to place assets in space (i.e. hosted payloads)

Ensure Industrial Capacity, Technical Capability, and Human Capital: Integrate the private sector into planning and definition of system requirements at an early stage. Pilot projects could help provide direction and stability of purpose to our private sectors. Promote a strong talent and human capital pipeline in both countries by investing in Science Technology Engineering and Math (STEM) educational programs which include a focus on disciplines relevant to space. Expanding educational exchanges and sharing best practices in education and training would be an important complement to this effort.

Align and Leverage Regulatory Reforms to Enhance Cooperation and Competitiveness: Continue efforts to harmonize standards for handling sensitive information, including penalties for unauthorized disclosure of classified data. Take advantage of recent reforms in US export controls to improve interoperability on space-based communications, global positioning, earth observation, etc.

Facilitate Industrial Collaboration and Interoperability: Enable balanced industrial collaboration between the US and Japan. The goal is to support both nations' industrial bases while simultaneously reducing schedule and technical risks, as well as costs, especially in the area of government and national security space programs.

Specific measures include:

- Consistent with WTO obligations and other trade agreements, establish harmonization committees addressing Japanese and US industry procurement and development standards. The pharmaceutical industry's practice provides a useful example.
- Provide stronger links between national objectives and civil research and development capabilities through establishment and funding of a framework for bilateral research and development that opens competitive bidding to Japanese and American firms (using European Union framework programs as a possible model).
- Support legislation allowing for increased collaboration at the component and subsystem levels, as well as ensuring sound competition between American and Japanese companies.

Open-Door Government Procurement: The US Department of Defense (DOD), the Japanese Ministry of Defense (MOD) and the Japanese Ministry of Economy, Trade and Industry (METI) should build upon the June 16, 2016 Reciprocal Defense Procurement Memorandum of Understanding by continuing to expand opportunities for integrating Japanese and American space technologies and equipment. Established government-to-government relationships offer an expedient way for US and Japanese space businesses to expand collaboration. The MOD and DOD should harmonize military procurement specifications or create a mechanism recognizing each other's systems. This will encourage off-the-shelf components, reducing costs and improving reliability.

Encourage Regional Centers of Excellence (COE) in Space: "Innovation Ecosystems" exist in both Japan and the US — locales marked by the nexus of a skilled workforce, access to higher education, a concentration of high-tech industries (including information technology, robotics, etc.), and venture capital. Seattle is one such example of a space research and development hub in the US. As each country has its own methodology in creating such regional COEs, Tokyo and Washington should identify opportunities to integrate regional centers of the US and Japanese space industries into national-level initiatives, and to facilitate commercial, R&D, and educational engagement between them.

Missions and Technologies

Space Situational Awareness (SSA): Mitigate the risk of collisions with objects and debris in space — manmade or otherwise — that can otherwise imperil space assets and activities. Continue to enhance Japanese interoperability with American systems that are designed to locate and identify the space objects and debris, and move toward two-way data-sharing through proper networks. Gather and utilize unclassified data while working towards full cooperation and use of classified data. Encourage the development of small, light-weight, low-power technologies to allow small satellites to broadcast their identities and precise locations, with the goal of making universal self-identification and GPS-quality location broadcasts feasible.

Maritime Domain Awareness (MDA): The ability to accurately understand the identity, location, and purposes of oceangoing vessels has emerged as a high priority topic for both nations' national security and commercial sectors. In October 2015, Japan took an important step by adopting a national MDA concept paper that clarifies its approach to wide-area maritime surveillance and the challenges it faces incorporating space and terrestrial assets into its MDA architecture. The following steps could enhance their capacity in this area:

- Deepen discussions between Japanese and American defense industry organizations and governments to clarify essential requirements for MDA, associated systems, roles and responsibilities of each country to reach common understanding.
- Extend existing US information-sharing policy regarding maritime data to include Japan.
- Consider establishing a Japanese body to promote regional coordination and information-sharing among Asia-Pacific nations' maritime forces (law enforcement, and relevant regulatory entities).
- Offer opportunities for Japan to build a foundation of knowledge and experience through maritime exercises, operational experimentation, and demonstrations involving the use of space for MDA.

Small Satellites and Big Data: As data collection in both the civil and commercial sectors expands rapidly, the US and Japan should establish norms and practices in managing data, seeking to set global standards with respect to intellectual property and privacy.

Japanese Role at the Joint Space Operations Center (JSpOC): Invite participation from Japan's Ministry of Defense in the Joint Space Operations Center to enhance operational compatibility consistent with the US-Japan Mutual Defense Treaty.

GPS & QZSS: Continue to work towards greater interoperability and cooperation on GPS and QZSS, improving resiliency of these systems and thereby strengthening the tangible partnership in space between the US and Japan.

International Space Station (ISS): Japan and the US have agreed to continue providing funding for the ISS through 2024. Building on the Japan-US Open Platform Partnership Program (OP3), the two countries should examine the benefits of the ISS. Increasing industry involvement with the ISS could help strengthen the industrial base

and enable creative new uses for the ISS in space exploration, perhaps to include sustaining the program past 2024 under private management.

Earth Observation: Earth observation missions — an area where Japan and the US have long collaborated — are collecting data from space that is vital to our understanding of our planet and its future. For instance, NOAA scientists use data collected from JAXA's Global Change Observation Mission satellites to help forecast severe storms, monitor the decline of arctic sea ice, and predict the onset of El Nino and other climate phenomena. Furthermore, NASA and JAXA launched the Global Precipitation Measurement (GPM) Core Observatory on Feb. 27, 2014. Consistent with a holistic, "all of society" approach to utilizing space, the allies should build on the success of projects such as JAXA's Global Change Observation Mission, providing significant and lasting benefits to scientists in both countries and around the world.

Space Exploration: Consider collaboration on Lunar and Mars exploration, NASA's Orion project, as well as other scientific missions in space. Large-scale space exploration missions serve to bolster technological, policy, and legal capacity for broader bilateral and multilateral efforts. Emphasis should be placed on advancing key technologies, such as space solar power systems (SSPS), both to support space exploration and, potentially, to provide a zero-carbon alternative energy source on Earth. Japan has world-leading SSPS technologies. Cooperation on SSPS projects would inspire the public and generate creative solutions for addressing global challenges such as climate change.

Action Items for the Comprehensive Dialogue on Space

Track 1.5 - Comprehensive Dialogue on Space: Include the private sector in the Comprehensive Dialogue on Space to promote communication and more efficient planning concerning government contracts. Create a session for government agencies to report requirements and intentions to industry contractors and trade associations.

Critical Infrastructure Definition: Classify space assets and architecture as National Critical Infrastructure, reflecting the profound importance of these assets to our national interests. Take care to structure such protection to permit innovation in technology and business models and not obstruct market-driven progress.

Collective Self-Defense in Space: Ensure the Treaty of Mutual Cooperation and Security between the US and Japan applies in the event of a hostile attack on US or Japanese space assets. Host exercises to clarify the definition and approaches to self-defense in space in the context of the current political and technological environment. Close loopholes and remove barriers to the application of collective self-defense principles to space activities.

Direct Legislative Exchange: Create a US-Japan space standing caucus comprised of members of the Diet of Japan and the US Congress. Elected leaders should increase their dialogue and strengthen cooperation on space issues, thereby improving transparency and promoting equality of the partnership.

Space Activity & Remote Sensing Data Laws: In 2017, Japan made important progress in enabling private sector engagement and investment in remote sensing by enhancing its Space Activity & Remote Sensing Data Laws with practical-level detail and specificity regarding implementation and incentives. Japan continues to take proactive steps to promote technological innovation and global market expansion in the remote sensing and data business. The US has a similar opportunity to update and streamline its own regulatory and licensing regime, based on a forward-looking assessment of the globally competitive remote sensing marketplace. Both governments should facilitate industrial cooperation through the creation of a Japanese comprehensive data policy addressing dual-use technologies and capabilities. An effective fast-track arrangement for licensing overseas commercial remote sensing business, focusing first on cooperative initiatives in areas such as disaster mitigation and MDA, could contribute to the global competitiveness of Japanese and American remote sensing firms.

Private Sector Partnership for Space Debris Removal: To address a potentially serious threat to the security of both nations' space assets, the US and Japan should work to establish an international norm to minimize the creation of new orbital debris and to reduce existing debris. The allies should cooperate on a *civil* space orbital debris removal mission, recognizing that this issue has both national security and commercial implications. Such a mission would enhance the robustness of civil space cooperation between the US and Japan.

The US-Japan Space Forum continues to meet, having most recently assembled in January 2018 in order to communicate with members of the space team of President Donald Trump's administration. Fuller information on the forum, including a list of members and the 2016 version of the publication, which is the basis for the above text, can be found on the Maureen and Mike Mansfield Foundation website at www.mansfieldfdn.org. JS

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