THE HENRY M. JACKSON SCHOOL OF INTERNATIONAL STUDIES

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# TASK FORCE

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# Japan's Space Diplomacy

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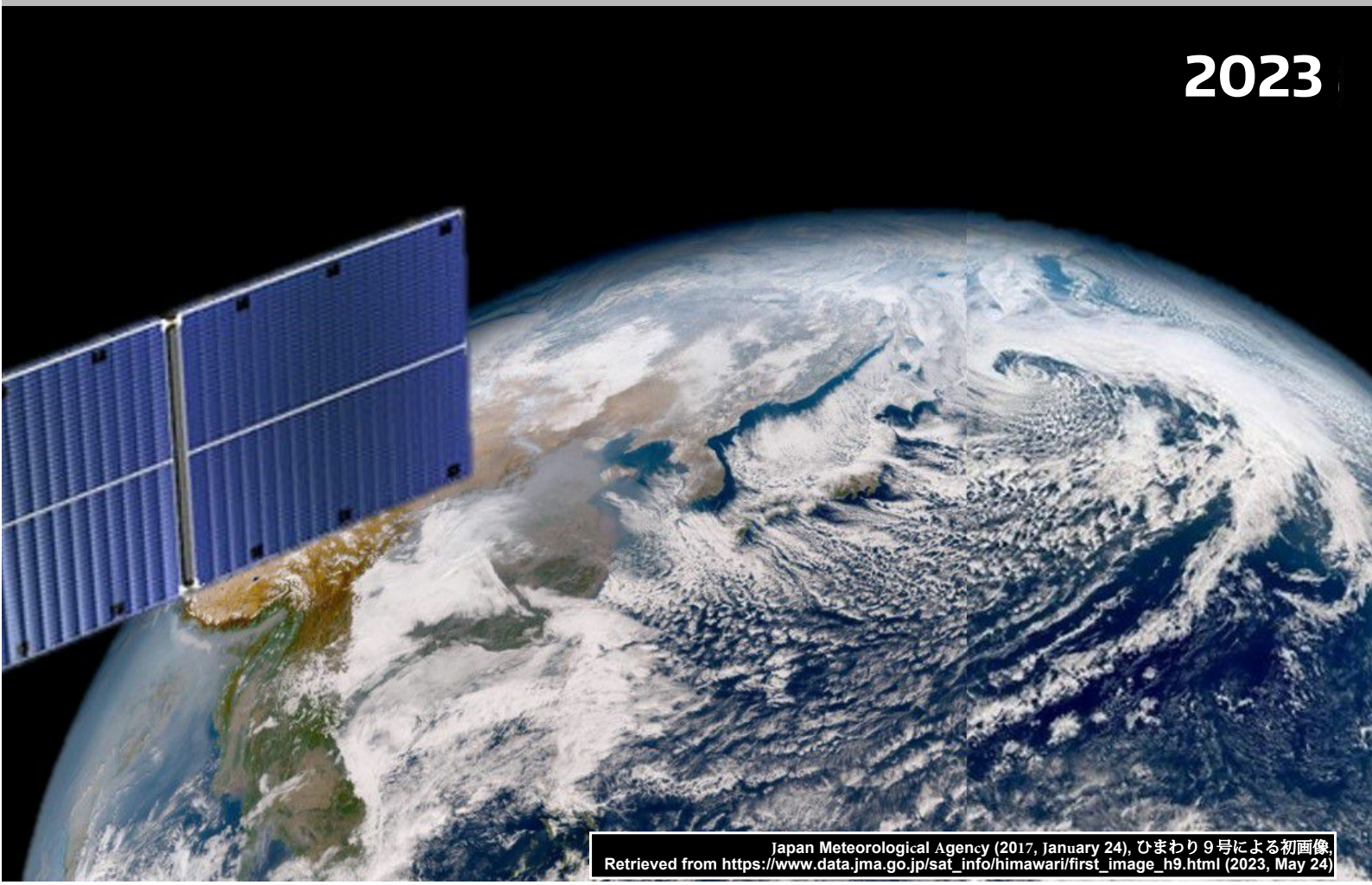

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# Japan Space Diplomacy

Task Force Report, Spring 2023


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# Abbreviations

| | |
|---|---|
| APSCO | Asia-Pacific Space Cooperation Organization |
| APRSAF | Asia-Pacific Regional Space Agency Forum |
| APEC | Asia Pacific Economic Cooperation |
| ASAT | Anti-Satellite Technology |
| ASEAN | Association of Southeast Asian Nations |
| BRI | Belt and Road Initiative |
| BSL | Basic Space Law of 2008 (Japan) |
| CISL | China Insititute of Space Law |
| CNSA | China National Space Agency |
| DPR | Dual-frequency Precipitation Radar |
| EEZ | Exclusive Economic Zone |
| ESA | European Space Agency |
| GEO | Group on Earth Observations |
| GMS | Geostationary Meteorological Satellite |
| GPS | Global Positioning System |
| ISTAR | Intelligence, surveillance, target acquisition, and reconnaissance |
| ISS | International Space Station |

| | |
|---|---|
| JAI | Japan Aerospace Industry |
| JAXA | Japan Aerospace Exploration Agency |
| JMSDF | Japan Maritime Self-Defense Force |
| JSS | Japan Space Systems |
| KARI | Korean Aerospace Research Institute |
| LEO | Low Earth Orbit |
| METI | Ministry of Economy, Trade and Industry (Japan) |
| MEXT | Ministry of Education, Culture, Sports, Science and Technology (Japan) |
| MOF | Ministry of Finance (Japan) |
| MOFA | Ministry of Foreign Affairs (Japan) |
| NASA | National Aeronautics and Space Administration |
| NAOJ | National Astronomical Observatory of Japan |
| NSLI | National Space Legislation Initiative |
| OEWG | Open-Ended Working Group |
| PQI | Partnership for Quality Infrastructure |
| QUAD | Quadrilateral Security Dialogue |
| QZO | Quasi-Zenith Satellite Orbit |
| QZSS | Quasi-Zenith Satellite System |

| | |
|---|---|
| RESTEC | Remote Sensing Technology Center of Japan |
| RPO | Rendezvous Proximity Operation |
| SCO | Shanghai Cooperation Organization |
| SSA | Space Situational Awareness |
| UNGA | United Nations General Assembly |
| UNCOPUOS | United Nations Committee on the Peaceful Uses of Outer Space |
| UNIDIR | United Nations Institute for Disarmament Research |
| WMO | World Meteorological Organization |

# Executive Summary

- Dual-use technology and longstanding tensions in the space realm both work to divide East Asian nations and hinder formal collaboration.
- Japan regards space as a prospect for better economic prosperity, disaster management, and national security.
- Due to space's many benefits, Japan must not regard it as the next battleground, but rather use space diplomacy as a vehicle to better relations with its neighbors, especially China and South Korea.
- Considering the current changing political context, organizations and capabilities that Japan can leverage in its space diplomacy, we can assume that now is an ideal time for them to start diplomatic conversations toward further regional collaboration in the space domain.
- We propose that Japan uses its current space capabilities as building blocks to grow more formal communication regarding space in East Asia. Three major policy areas that can be built upon are information exchange, data flows, and regional rulemaking. We hope that through smaller efforts, more long-term goals can be achieved in easing concerns between Japan, China and South Korea.

# Table of Contents

# Introduction

This report assesses the prospects for Japan to utilize its space capabilities to improve formal diplomatic relations with its East Asian neighbors, China and South Korea. In the modern age, space has the potential to bring about economic, scientific, and industrial prosperity for Japan.[1] At the same time, Japan faces two especially difficult challenges in forging space diplomacy. First, Japan has thorny relations with its neighbors, stemming from dual-use space technology and longstanding tensions. Second, these factors complicate opportunities for formal space-centered collaboration at a regional level.

Recognizing that diplomacy can have an independent impact on international outcomes,[2] our report will explain where and how Japan can lead diplomatic initiatives in the space domain to enhance regional collaboration and thereby create a more peaceful and prosperous East Asia. In this report, we define space diplomacy as the use of communication, persuasion, and bargaining by actors within established or emerging contexts, national capabilities, institutions, or venues, leading to cooperative or conflicting outcomes on a specific space matter.[3]

**Road Map to the Remainder of the Report**

Section 1 will explain Japan's national interests regarding space. The current domestic problems Japan faces include economic stagnation, frequency of natural disasters, and threats of neighboring states. To combat these dangers, Japan explicitly focuses its space policy goals on economic growth, disaster management, and national security, all of which are indispensable for prosperity and safety. Japan invests substantial funds in the space industry with the intent of

[1] Cross et Pekkanen 2023.
[2] *Ibid*.
[3] *Ibid*.

increasing competition and stimulating the space economy through private companies. Additionally, Japan utilizes remote sensing space technology for disaster management, considering the Asia-Pacific region's tendency for earthquakes, typhoons, volcanic eruptions, and other natural disasters. Moreover, the space domain serves as a critical infrastructure for Japan's national security.

Section 2 will underline issues regarding space that contribute to and stem from mutual mistrust in East Asia. The militarization of the space realm occurs on many levels, from powerful nations' development and use of anti-satellite technology to the dual-use nature of nearly all space technology, heightening tension between nations. Strained relations are even more prominent in East Asia, where Japan, China and South Korea all have longstanding political conflicts concerning territorial disputes, historical controversies, and alliances. Regional concerns are problematic not only because they increase the chance of a military space conflict, but also because they create obstacles to furthering collaboration in the space domain.

Section 3 will discuss where and how Japan can seek to lead diplomatic initiatives to enhance regional collaboration by using its capabilities as building blocks for space diplomacy. As discussed in the previous section, dual-use technology and longstanding tensions in the space realm both work to divide East Asian nations. That said, given the current changing political atmosphere, there is an opening for Japan to leverage its organizations and technology to bolster diplomatic efforts. We can assume that now is an ideal time for Japan to start diplomatic conversations toward further regional collaboration in the space domain.

Section 4 discusses policies in three major areas ranging from information exchange and free data flow to regional rulemaking, aiming at easing the East Asian regional divide. These policies focus on promoting transparency and confidence-building through smaller collaborative

efforts of technology/education transfer, satellite data sharing, and opinion exchange on space law and policy. Ultimately and ambitiously, we hope to see the “spillover” of that collaboration to other, more formal areas which will eventually result in the realization of a peaceful and stable East Asia.

# 1. Space Domain as a Strategic Priority

This section explains why Japan needs to ensure the safety and sustainability of outer space through regional collaboration. We begin by identifying how the space domain serves to improve Japan's national interests expressed in three fundamental policy goals, which were officially expressed in Japan's 2008 Basic Space Law (BSL), the foundation of Japan's space strategy. BSL Article 3 and Article 4 state as follows:

> Article 3 (Improvement of the Lives of the Citizenry, etc.)
>
> Space Development and Use shall be carried out in order to improve the lives of the citizenry; to ensure a safe and secure society; to ***mitigate disasters, poverty and various other threats to the survival and lives of humankind***; to ensure international peace and security; and to ***increase the national security of Japan***.
>
> Article 4 (Advancement of Industries)
>
> Space Development and Use shall be carried out in order to strengthen the technical capabilities and international competitiveness of the space industry and other industries of Japan, ***thereby contributing to the advancement of the industries of Japan***, by the positive and systematic promotion of Space Development and Use as well as smooth privatization of the results of the research and development with regard to Space Development and Use[4]

[4] JAXA 2008, emphasis added.

The BSL stipulates that the space domain shall serve for its **economic growth**, **disaster management**, and **national security**. Based on the articles of the BSL, the Cabinet Office released the Outline of the Basic Plan on Space Policy of 2020. It also identifies those three policy goals as being directly linked to Japan's national interests.[5]

These objectives closely correlate with the current domestic obstacles Japan faces. First, economic instability caused by slow economic growth is a major issue in Japan. The damages of natural disasters are another concern for the destruction they create in human activity and public infrastructure. In addition to natural disasters, another concern arises from Japan's location; a security issue caused by neighboring states such as Russia, China, and North Korea's militarization efforts. Therefore, the government sees the development of its domestic space industry and space technological capabilities as an opportunity to strengthen Japan's overall stability.

## Prospects for Economic Growth

By expanding the integration of space, Japan aims to use space infrastructure to enhance economic growth. Japan experienced a period of rapid economic growth from the mid-1980s to the early 1990s; however, this was eventually followed by a burst of economic bubbles, which resulted in the deterioration of economic stability; an economic collapse still influential today.[6] Despite the Bank of Japan's method of monetary easing by purchasing private and public securities to stimulate domestic businesses in 2013, public consumption and productivity levels

[5] Cabinet Office 2020.
[6] Ono 2019.

have not responded.[7] This highlights the insufficiency of the current domestic market. Thus, Japan needs a new catalyst for economic improvement.

The mobilization and expansion of the space industry has been regarded as a solution. In accordance with the concerning economic situation, the Japanese government projects to expand the space market to stimulate the entire economy, as the improvement of Japan's domestic space industry will increase productivity as well as the consumption rate. To facilitate the development of the space industry, the government has focused on four different areas, including downstream businesses for commercial use, upstream businesses for manufacturing all industrial equipment, overseas businesses for expansion, and space businesses.

First, Japan has pointed out the critical need to promote further commercial use of satellite data and eased access. Data collected from outer space has the potential to become an indispensable part of data infrastructure, which benefits even sectors that are not directly related to space.[8] It also enables international connectivity when using a smart device.[9] With more smart technologies, satellite information attracts various international industries and consumers reliant on satellite data. Through satellite data consumption, Japan's economy will flourish providing the baseline for economic prosperity.

Second, regarding upstream businesses, the government aims to generate revenue through domestic manufacturing of space-industrial equipment. In fact, the Japanese government has already invested a total of 5 trillion yen, accumulating to $37 billion after 10 years of Japan's state-led stimulation of the spacecraft industry.[10] Japan's future economic goals focus particularly on space-related businesses as they aim to raise 2,400 billion yen, approximately $17

[7] *Ibid*.
[8] Aliberti et. al., 2020.
[9] Reim, 2023.
[10] Aliberti et. al., 2020.

billion, by 2030.[11] The government also supports new entrants by promoting procurement plans and subsidies to reduce the private sector's financial burden in the manufacturing industry. With the help of the state, the private sector will have ease entering the market, generating momentum in the economy.

Third, Japan also attempts to improve its space industry through international engagements.[12] Cooperation with growing overseas markets provides more opportunities to space companies in Japan, expanding the domestic space industry significantly in scale. For example, promotion of package sales comprising launch services, satellite systems, and training to newly emerging states increases cooperation and Japan's economic gains. Countries involved in this service trade are Vietnam, United Arab Emirates, Turkey and more.

Fourth, Japan tries to improve its space business capabilities in the Asia-Pacific area.[13] For instance, a space business contest initiated by the Cabinet Office of Japan in 2019 called S-Booster focused to promote mutual benefits in the Asia-Oceania regions through the utilization of Japan's space assets and collaboration.[14] Moreover, Japan Aerospace Exploration Agency (JAXA), has promoted community involvement through a project called Task Force on Space System Overseas Development to promote the cooperative networks and electronic reference stations in the Asia-Pacific region.[15] Through these programs, Japan expands its market capabilities beyond its national borders.

As such, Japan sees great economic interests in the space domain, planning to overcome demand and consumption stagnations in the domestic market using the space industry. Thus, the

[11] *Ibid.*
[12] *Ibid.*
[13] *Ibid.*
[14] *Ibid.*
[15] *Ibid.*

peaceful use of space is of immense importance for future commercial activities. While the expansion and promotion of the space industry grant economic prosperity, technological advancements also aid in tackling disaster management.

## Possibilities in Disaster Management

Due to Japan being located on the "Pacific Ring of Fire," its vulnerability to natural disasters endangers the safety of residents. Earthquakes and typhoons are reported as major causes of missing and killed people as well as destroyed facilities; data from the Japanese government reports that natural disasters caused 2,060 people to go missing or be killed from 2012 to 2020.[16] Japan has foreseen potential capabilities in weather satellites to prepare for significant weather changes that may become disastrous. In a disaster management-led effort, Japan has successfully developed and launched weather satellites to monitor and prevent natural disasters. The three key abilities in disaster management are accurately forecasting the weather, preventing damage, and responding to a disaster to minimize casualties.

To accurately forecast the weather, Japan developed technologies that detect any abnormal weather patterns particularly relating to water. Because Japan is an archipelago, water is crucial in weather predictions and precipitation patterns.[17] An example of weather forecasting technology is the Dual-frequency Precipitation Radar (DPR), which JAXA has jointly developed with NASA. According to JAXA, DPR can "measure the distribution of rain in a 3D model," depicting areas of impact.[18] Using this technology cooperatively, Japan and the international

[16] Statista "Japan: Natural Disasters Fatalities."
[17] JAXA "Global Precipitation Measurement/Dual-Frequency Precipitation Radar (GPM/DPR)."
[18] *Ibid.*

community can increase the probability of preventing torrential rains and know when to use disaster prevention protocols in case of an emergency.

Japan's technological capabilities include detecting possible destruction after a natural disaster, as one disaster can create consequential damages. An earthquake eruption may cause ripple effects, resulting in landslides. Through satellite technology provided by JAXA, the government can generate countermeasures for future risks followed by an earthquake. The Hokkaido government has used DAICHI-2, a satellite technology that monitors damaged areas and measures their probability of evolving into landslides to warn communities that have potential risk and advise evacuation accordingly.

Japan's response capabilities highlight the use of remote sensing technology to effectively respond to natural disasters after impact. The ability to respond quickly is just as important as predicting natural disasters. By using DAICHI-2's remote sensing radar, one can accurately observe land deformities and the health of forests around the area of a natural disaster. This data can be used to generate specific maps which aid in identifying areas that are in urgent need. In the case of Palu, Indonesia, in 2018 a massive earthquake caused immense damage and floods that wiped out villages.[19] DAICHI-2 was used to gather crucial information to accurately predict surface shifts and decay faction landslides. Through data retrieved from DAICHI-2, government officials gained information regarding liquefication, the process of sandy soil behaving like a liquid due to a strong shift in the ground. With this information, the government created countermeasures to prevent consequential calamities. Using the remote sensing satellite, the government was able to effectively calculate the areas where liquefaction and land deformities were severe.

[19] eoPortal 2012 "ALOS-2 (Advanced Land Observing Satellite-2) / Daichi-2."

In sum, the space domain is essential for Japan's disaster management. Satellites in outer space monitor weather patterns that may cause human casualties and destruction of infrastructure. Hence, the proper and safe functioning of satellites is critical particularly for Japan, where numerous and devastating natural disasters occur almost every year.

## Capabilities in National Security

The utilization of space provides a promising opportunity regarding Japan's security concerns created by nations such as North Korea, Russia, and China. Along with anti-satellite weapons (ASAT), China's industrial policy and interests in the integration of North Korea and Taiwan also pose risks to Japan's security.[20] North Korea's effort in developing nuclear missile capabilities is another source of national security concern.

While Japan has historically maintained a purely pacifist and defensive stance on its security policy, recent developments suggest a proactive approach to defense strategies. For example, Admiral Ryo Sakai, the chief of staff of the Japan Maritime Self-Defense (JMSDF), highlighted the urgency for surveillance and response during his press conference on April 4th, 2023. Japan seeks to leverage the space domain for national security through four key fields of defense capabilities, including (1) Stand-Off Defense Capabilities, (2) Integrated Air and Missile Defense Capabilities, (3) Cross Domain Operation Capabilities, (4) Command and Control/Intelligence-Related Functions, which all relate to the use of satellites and space information sharing. The following information heavily relies on the Japanese Ministry of Defense.[21]

[20] The Japan Forum on International Relation 2018 "U.S.-JAPAN JOINT POLICY REPORT."
[21] MOD 2023.

(1) Stand-Off Defense Capabilities enhance interceptive attacks from a distance to ensure Japan's safety. By collecting target data from satellites, Japan can analyze the retrieved information and conduct defense operations using combat drones. These capabilities have become a priority for Japan's national security due to an increase in the militarization efforts of Russia, China, and North Korea. The reinforcement of stand-off defense capabilities such as the development and production of the Type-12 surface-to-ship missile and the introduction of Hyper Velocity Gliding Projectile has aided Japan in accurately combatting existing threats.

(2) Integrated Air and Missile Defense Capabilities respond to airborne threats detected by Japan's or its allies' satellites and provide warnings and allocation of interception weapons. Because missile technology has become harder to track and detect, Japan has decided to improve effective response networking as well as detecting and tracking missiles, enhancing interception capabilities. Projects that strengthen sensor networks have increased the competence of surveillance in the southwestern region of Japan. Moreover, the development in control radars and strengthening interception assets such as the development of the HGV response have aided Japan in attacks using missiles that fly at hypersonic speeds.

(3) Cross-Domain Operation Capabilities highlight the use of space resources, particularly information gathering through satellites, and encompasses the intersection of the space domain, cyber domain, and electromagnetic spectrum domain. High-speed processing technology used with operation and transmission technology provides optical imagery in real-time, enhancing cross-domain operation capabilities significantly. Effective uses of high-speed processing technology provide information to enhance security measures in

all three domains. The information derived from low earth orbit communication satellites strengthens resilience as it highlights the utility services provided through optical communications among integrated technological devices. As technology is embedded into society, the importance of the space domain has set new standards as it directly correlates to individuals' daily lives and security.

(4) Command and Control/Intelligence-Related Functions aid in gathering valuable information on military trends through satellite data. The advancement in satellite technology has enhanced the sharing of information in real-time, creating sufficient information collection for a resilient network. The capabilities of command-and-control functions include gathering, analyzing, and disseminating intelligence. The Japanese government utilizes Artificial Intelligence (AI) to further develop its information gathering capabilities. In complex and rapidly changing combat situations, AI has been efficiently guiding commanders to better assess situations as they unfold.

Japan’s utilization of space technologies for defensive purposes guarantees its security as well as the stability of the international community. However, problems arise from the militarization of the space domain, especially the longstanding East Asian divide and the absence of sufficient communication among Japan, China, and South Korea.

# 2. Causes and Consequences of Mutual Mistrust

This section will scrutinize the context of Japan's space diplomacy and elaborate the underlying problem we are dealing with in this report. First, factors contributing to mutual mistrust between Japan, China and South Korea include the militarization of the space realm and longstanding geopolitical tensions in East Asia. Second, the tension-fueled East Asian divide is problematic not only because it increases the chance for military conflicts involving outer space, but also because it creates obstacles to further collaboration in the space domain.

## Factors Creating Challenges in the Space Domain

We will begin with the causes behind mutual mistrust and lay out two major contributors: the militarization of the space domain and longstanding tension between East Asian states. The militarization of the space realm takes place on many levels, from powerful nations' development and use of anti-satellite technology to the dual-use nature of nearly all space technology. This worsens international tensions, as it is unclear whether a state is developing its space industry for civil or military purposes. Mistrust is even more prominent in East Asia, where Japan, China and South Korea all have longstanding political tensions concerning territorial disputes, historical controversies, and political alliances.

### *Militarization of the Space Realm*

Space and war have been intertwined since the space race of the Cold War between the Soviet Union and the United States. Now, as democratization of the space domain has launched satellites from 86 countries into orbit,[22] many governments are worried about the militarization

[22] Koop 2022.

of the space domain. Despite the space industry becoming increasingly privatized, some of the world's most powerful nations are financing the development of space weaponry, including anti-satellite technology. These are weapons that can destroy satellites due to their kinetic and non-kinetic capabilities.[23] In January 2007, China launched a satellite destruction test using an ASAT ballistic missile, setting the global stage of space warfare.[24] Today, China, Russia, the United States, and India have successfully displayed their ASAT capability.[25] Not only do ASAT weapons create space debris,[26] but they also expose vulnerabilities in the political space system, putting pressure on governments to develop their own anti-satellite technology. The rise of ASAT has created a national security issue, and deepened tension between nations.

This issue is further complicated by the dual-use nature of approximately 95% of space technologies.[27] In other words, almost all space technology has both military and civil capabilities. Rockets, for example, are normally pointed skyward and export humans and equipment to outer space. Yet, once rockets are equipped with bombs or nuclear weapons and pointed toward land, they become disastrous missiles.[28] Another example is Rendezvous and Proximity-Operations (RPO) technology. RPO is a spacecraft intentionally maneuvered to dock or operate close to a target space object. RPOs provide key foundations for space activities ranging from on-orbit servicing and refueling, docking with space stations for human spaceflight to active debris removal.[29] At the same time, several states have displayed concern about RPO technology because it can also serve ASAT operations.[30] A satellite with RPO capabilities may

[23] Slapakova et al. 2022.
[24] Nagashima 2020.
[25] Rajagopalan 2022.
[26] Nagashima 2020.
[27] Johnson-Freese, 2007.
[28] Whitman Cobb 2021.
[29] Johnson 2020.
[30] United Nations Office for Disarmament Affairs 2022 "Conference on Disarmament."

physically collide or detonate near another satellite or maneuver near enough to interfere with the target's electronics and communications.[31]

Even satellites are regarded as being dual-use in nature. Remote sensing satellites can monitor forest fires, or they can relay ISTAR (intelligence, surveillance, target acquisition, and reconnaissance) data to their respective government for intelligence or defense purposes.[32] As such, the complicated nature of space technology creates a situation where many states anxiously express that "there are challenges regarding defining the term 'weapon' in outer space due to its dual use nature and its verification."[33] In the end, countries that have not yet developed ASAT weapons can still use their space technology offensively due to its dual-use capability.

Furthermore, dual-use technology is difficult to defend against. Dual-use technology is easier to use than respond to, and accurate attribution is nearly impossible with non-kinetic attacks.[34] Therefore, the offensive nature of dual-use technology is invulnerable to typical military responses such as deterrence, defense and reprisal. All space-faring countries, including Japan, have a dual-use structure for their space industries. Japan's dual-use structure is laid out in Figure 1. The domination of dual-use technology in the space industry coupled with the emerging trend of ASAT weaponry perpetuates and worsens mutual mistrust between states in general.

[31] Todd Harrison et al. 2019.
[32] Pillai 2016.
[33] United Nations Office for Disarmament Affairs 2022 "Conference on Disarmament."
[34] Harris 2016.

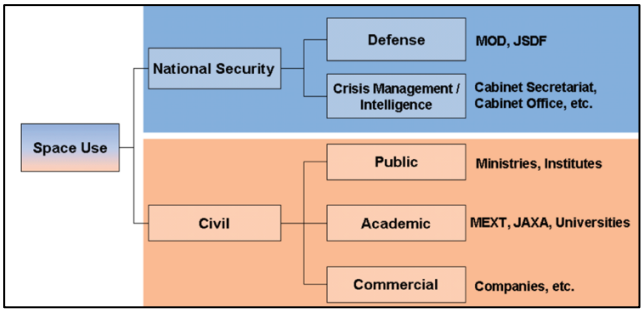


*Figure 1 - [Dual Use Space Technology]*

*Source: Otani et al. 2012.*

## *Longstanding Tensions in East Asia*

In the East Asian regional context, the longstanding rivalries between Japan, South Korea and China also exacerbate the mutual mistrust. The most visible tension in East Asia is between Japan and China due to historical and territorial disputes and the current alliance structure. The relationship between Japan and South Korea has also been volatile throughout the postwar era due to historical and territorial disputes, although the extent of the tension is less harsh than that of Japan and China.

### *Japan-China Divide*

There are several reasons for the division between Japan and China. First, Japan and China have many historical disputes, especially surrounding World War II. One example is the dispute over the Nanjing Massacre of 1937. While most of the international community recognizes the massacre as a historical fact, there are still politicians and groups in Japan who deny or downplay the extent of the atrocities committed. As Chinese Foreign Ministry spokesperson Hong Lei said in a statement after prime minister Abe Shinzo's visit to the Yasukuni shrine in 2013, "China reiterates that only by Japan earnestly and squarely facing,

deeply reflecting upon its history of invasion and clearly distancing itself from militarism, can China-Japan relations realize healthy and stable development."[35] Outside of war atrocities, there are also territorial disputes over the Senkaku/Diaoyu Islands, located Northeast of Taiwan and historically claimed by both nations. From 2012 to the present, this matter has escalated into a crisis with both Japan and China sending naval vessels and aircraft to patrol the waters around the islands.[36]

Second, along with historical and territorial disputes, the existence of a power divide between Japan and China exemplifies the perpetuation of longstanding tension in East Asia. This power divide creates different Asian blocs that act as regional alliances formed based on common economic, political, or security interests. China is aligned with North Korea, Pakistan, and Russia whereas Japan is aligned with South Korea and India. This Japan-China divide leads to conflict and division regarding security and development projects.

Third, China and Japan are on opposing sides in the security domain. Japan has been the United States' ally in various realms since World War II, especially regarding the security realm. The Treaty of Mutual Cooperation and Security between Japan and the United States of America characterizes their historically strong and solid tie in the postwar period. In fact, Japan and the U.S. have no official discrepancies in assessing threats.[37] In other words, they have always shared their security and defense strategies. Now, China is the strongest geopolitical and economic competitor against the United States. The Japan-US alliance structure negatively

[35] Sieg 2014.
[36] Wan 2021.
[37] Pekkanen 2023a.

affects the Japan-China relationship. As the competition between China and the U.S. intensifies, the regional situation will become more tense.

Fourth, the China-Japan divide includes their competing infrastructure development programs. In 2013, China began the Belt and Road Initiative (BRI), a massive infrastructure development project that aims to connect Asia, Europe, and Africa. To counter China's initiative and maintain leadership in the region, in 2015, Japan also developed its own infrastructure development initiative named Partnership for Quality Infrastructure (PQI), which promotes high-quality infrastructure that adheres to environmental and social standards. The competition and diplomatic animosity between China and Japan peaked when ASEAN countries such as Malaysia, Indonesia, and Thailand signed on to the BRI's railway construction agreement instead of with Japan, with the Japanese accusing the Chinese of overpromising costs and timelines to win the bid.

Current geopolitical tension also creates a pessimistic outlook for future Japan-China cooperation. For instance, in 2021 the Japan Air Self-Defense Force aircraft scrambled 1,004 times, 722 of which were in response to Chinese aircraft.[38] This number of scrambles was the second highest since the measures against airspace incursions began in 1958. In response, the Ministry of Foreign Affairs of Japan (MOFA) criticized a series of aggressive actions taken by China as "its own assertions that are inconsistent with the existing international order" and that its unilateral attempt to change the status quo gives rise to strong concerns over the security of the region and the international community, including Japan.[39] Against this backdrop, Japan and China may well suspect that any space objects launched from either side, even if for civil

[38] MOD 2022.
[39] MOFA 2022.

purposes, would be used to attack or damage the properties, territory and people of the other in the future.

*Japan-South Korea Rivalry*

History shows that the relationship between Japan and South Korea has also been volatile throughout the postwar era.[40] First, persistent historical grievances, particularly related to Japan's colonial occupation of Korea between 1910 and 1945, continue to resurface as obstacles to fostering mutually beneficial political cooperation between the two countries.[41] For example, during World War II, the Japanese military established a system of "comfort stations" where women, many of whom were Korean, were forced to provide sexual services to Japanese soldiers. This issue has been a major source of tension between Japan and South Korea, as many view Japan's actions as a war crime and have called for apologies and compensation. A second source of conflict is territorial. Between Japan and South Korea, there are disputes over the Takeshima/Dokdo islands, which are in the Sea of Japan/East Sea and have been historically claimed by both nations. This longstanding issue has also escalated into diplomatic and economic conflicts several times in history.[42]

Although the extent of hostility is less harsh between Japan and South Korea when compared to Japan-China relations, these nations have still shared an unstable relationship in recent decades, dependent on either country's elected government's political leanings. For example, former South Korean president Moon Jae-in considered Japan to be an "assailant," and believed that the government was not showing enough remorse for its colonial occupation of

[40] Sakaki & Nishino 2018.
[41] *Ibid*.
[42] *Ibid*.

Korea during World War II.[43] During Moon's presidency, Japan-South Korea relations were very tense, as discussions surrounding human rights violations during World War II and appropriate reparations persisted.[44] These grievances culminated in 2019, when the South Korean government announced it would terminate an intelligence-sharing agreement with Japan, citing concerns over Japan's handling of World War II violations.[45]

One might contend that the 2022 political transition to Yoon Suk-yeol, the incumbent president of South Korea, bodes well for the future Japan-South Korea relationship due to his orientation toward the trilateral partnership with the U.S. and Japan.[46] Nevertheless, given the volatile domestic political situation of South Korea as the approval rating of the president (58.4%) in January of 2023 shows[47], we cannot deny the possibility that an administration unfriendly to Japan will rise again. In that case, these unsettled issues have the potential to grow into greater conflicts in the years ahead.

## Consequences Arising from Concerns in the Space Domain

As discussed above, dual-use technology complicates relations, and longstanding historical and territorial issues do not always remain in the past. In addition, differing organization affiliations and regional competition continue to divide East Asia. All these factors result in volatile relations which persist into modern-day diplomacy, competition, and power

[43] Sotetsu 2019.
[44] Park 2023.
[45] Kim, 2019.
[46] Rozman 2023.
[47] Yonhap 2023.

dynamics. Additionally, these tensions create challenges and limitations concerning future collaboration, especially in the space domain.

### *Potential Source of Greater Tensions and Military Conflicts*

One consequence of mutual mistrust is a modern space arms race. When one country strengthens its military capabilities, whether for defensive or offensive purposes, another country may perceive this as a threat and consequently feels compelled to enhance its own armament.[48] This is especially true for the relationship between Japan and China. As mentioned previously, China's initial ASAT test in 2007 drove Japan to realize the importance of stronger defense capability in outer space. As China militarizes, Japan further develops its own space technologies to bolster national security, leading to competition and brinksmanship between the two nations. From China's perspective, the fact that Japan is a close ally of the U.S. is enough reason to be suspicious about Japan's space activity.

A space arms race is undesirable because it has the potential to cause kinetic military conflicts. It is generally believed that states in arms races have a higher chance of going into war. One study shows that arms races escalated into war in 23 out of 28 cases of war.[49] Thus, most of the cases of arms race in this study resulted in a disastrous outcome, reflecting the dangerous nature of arms races.

Geopolitical tensions may also contribute to misunderstandings of intent. Suppose a space object of one country accidentally hits a satellite of another country. In this case, even if the country contends that it was just an accident and there was no vicious intention, mutual

[48] Whitman Cobb 2021.
[49] Wallace 1979.

mistrust will likely prevent the other country from responding positively. This miscommunication might lead to greater tensions between those two countries and even result in military conflicts. A similar incident could occur between East Asian countries.

In sum, if states do not take any action to improve relations, the security environment surrounding outer space will become at risk of worsening. Fortunately, there have not been any military conflicts in outer space. However, should one happen, it would prove detrimental to Japan's national interests.

### *Obstacles to Further Collaboration*

Mutual mistrust also limits the prospect of further collaboration in the space domain among East Asian states. We can see a clear example in the case of two international space institutions: Japan-led Asia-Pacific Regional Space Agency Forum (APRSAF) and China-led Asia-Pacific Space Cooperation Organization (APSCO). The space organizations APRSAF and APSCO focus on satellite launching in the Asia Pacific region. The presence of two separate institutions represents the fact that Japan and China are inclined to take different methods due to regional tensions.[50] Moreover, although the two organizations have similar interests in space exploration, satellite communication, and space education, there is still no region-wide collaboration.[51] It seems that Japan, China, and South Korea are often wary of cooperating with one another on space-related issues and may view such collaboration as a potential threat to their own national interests.

To sum up, the current regional situation is challenging. The combination of regional longstanding tension and the dual-use nature of space technology both work to complicate East

[50] Pekkanen 2020.
[51] *Ibid*.

Asian relations. Mutual mistrust needs to be tackled immediately as it has the risk of developing into military conflicts. However, rising tensions contribute to a lack of formal communication between Japan, China and South Korea, despite the existence of two regional space institutions. This lack of collaboration and coordination could hinder the development of the space industry in the region and limit potential benefits that could be gained through joint efforts.

# 3: Openings for Japan's Space Diplomacy Initiatives

Space diplomacy refers to the use of communication, persuasion, and bargaining by actors within established or emerging contexts, national capabilities, institutions, or venues, leading to cooperative or conflicting outcomes on a specific space matter. This section discusses how Japan can seek to lead diplomatic initiatives to enhance regional collaboration by assessing the current context. As discussed earlier, dual-use technology and longstanding tensions in the space realm both work to divide East Asian nations. That said, considering existing assets and changing contexts that Japan can leverage, we can assume that now is an ideal time for the government to start diplomatic conversations toward furthering regional collaboration in the space domain.

Figure 2 shows how potential building blocks will enable Japan's space diplomacy. First, Japan's technological capabilities related to the space domain act as strong intellectual assets for regional collaboration. Second, Japan leads APRSAF, an international space dialogue forum, which provides a place for persuasion and bargaining. Third, the current changing political situation offers a new opportunity to initiate space diplomacy.

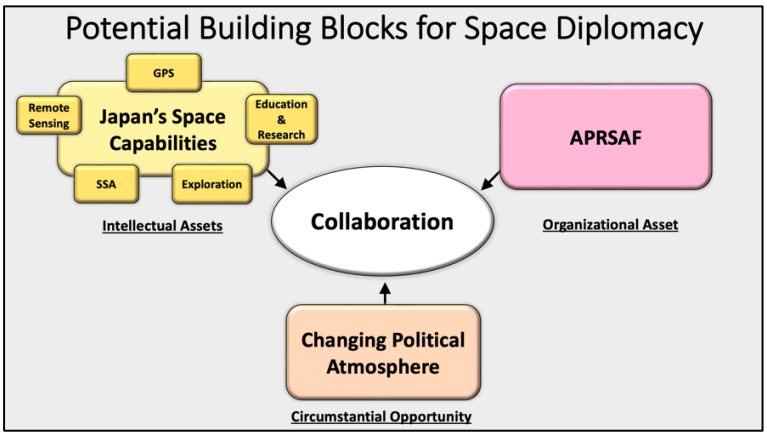


*Figure 2 - [Potential Building Blocks for Space Diplomacy]*

*Source: Authors*

## Japan's Space Capabilities: Intellectual Assets

Japan will be able to build collaboration upon advancements in its technology. Since the launch of Japan's first satellite in the 1970s, the nation has maintained the competitiveness of its space technologies. Extending into the modern day, Japan continues to actively expand its capabilities in space. The following examples are space-related capabilities that Japan has advantages in.

### *Global Positioning System (GPS)*

One of Japan's key projects is the Quasi-Zenith Satellite System (QZSS), which is a constellation of four satellites that provide positioning, navigation, and timing services.[52] Due to issues such as the small number of satellites in vision, services provided by Japan's previous GPS system were not always stable. QZSS plays a complementing role with the American GPS, ensuring enough satellites for stable, high-precision positioning.[53] Because of its function, it is often referred to as the "Japanese GPS."[54] The QZSS also has a secondary mission of enhancing Japan's space situational awareness and providing data for space-based surveillance and reconnaissance.[55] Thanks to the quasi-zenith satellite orbit (QZO) in which the QZSS satellites are running, as seen in Figure 3, these satellites can provide services for the vast area of the Asia-Pacific region as well as Japan.[56]

[52] Quasi-Zenith Satellite System (QZSS) "Overview of the Quasi-Zenith Satellite System (QZSS)."
[53] *Ibid*.
[54] *Ibid*.
[55] Maizland and Cheng 2021;
[56] Quasi-Zenith Satellite System (QZSS) "Overview of the Quasi-Zenith Satellite System (QZSS)."

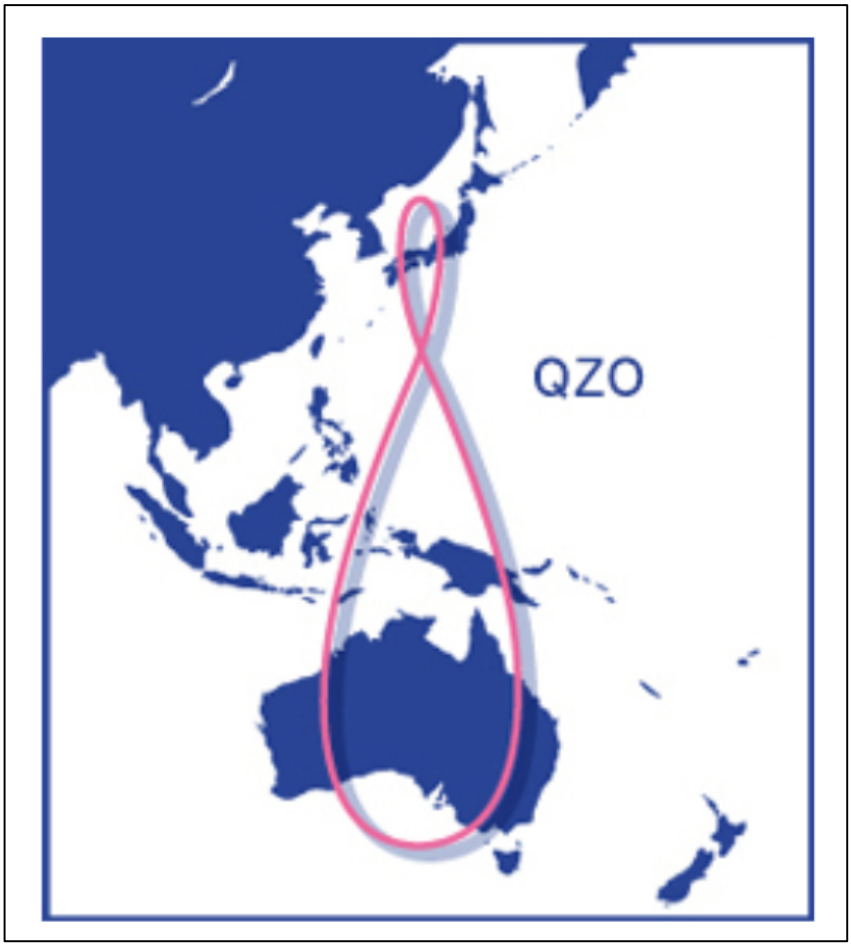


*Figure 3 - [QZO]*

*Source: Cabinet Office, Government of Japan "What Is the Quasi-Zenith Satellite System?".*

### *Remote Sensing*

Japan has developed advanced remote sensing (satellite imaging) technology, which includes high-resolution cameras and hyperspectral sensors. This technology has been used in various applications, such as monitoring natural disasters, tracking climate change, and supporting precision agriculture.

For instance, weather forecasting is one of the benefits provided by remote sensing technology. After the first launch of the Japanese Geostationary Meteorological Satellite (GMS)

also known as “HIMAWARI”, a weather satellite, nine more consecutive launches occurred; they have provided valuable information to the World Meteorological Organization (WMO).[57] The key function of the GMS is to monitor atmospheric phenomena continuously and uniformly over areas where surface-based observation is difficult such as seas, deserts, and mountains.[58] Through use of the GMS, Japan was able to accurately predict weather forecasts, monitor climate changes, and reduce disaster risks. Japan also has provided valuable information retrieved from HIMAWARI to other East Asian nations.

Remote sensing missions have also been crucial in resource surveying and monitoring disaster conditions and assessment. The advanced Land Observing Satellite-2 “DAICHI-2” was launched in May 2014. It has provided crucial data regarding mapping, regional observation, disaster condition assessment, and resource exploration. The DAICHI-2 was used to confirm changes in topography before and after the 2014 eruption near the summit of Mount Ontake.[59] Using these advanced technologies, Japan can manage radical weather changes and better prepare for natural disasters with the information retrieved. This remote sensing technology also provides benefits to other East Asian countries through collaborative efforts.

*Space Situational Awareness (SSA) System*

Japan is also developing a new surveillance capability. This capability is a network of optical telescopes and radar systems that can detect and track potential threats in outer space.[60] In 2019, Japan's Ministry of Defense established a new division called the Space Operations Squadron, which is responsible for monitoring and defending against potential threats to the country's space assets. The squadron is part of Japan's Air Self-Defense Force and is

[57] JAXA “Geostationary Meteorological Satellite ‘Himawari’ (GMS).”
[58] WMO OSCAR  |  Details for Satellite Programme: Himawari 1st generation (GMS) “Oscar.”
[59] SJAC 2023.
[60] Cabinet Secretariat Japan 2022.

headquartered at the Fuchu Air Base in Tokyo. The Space Operations Squadron is equipped with advanced surveillance and reconnaissance capabilities, including ground-based radar systems and optical telescopes. It works closely with Japan's space agency JAXA to monitor and track the country's satellites and other space assets, including space debris. Since the near-Earth space environment is becoming more congested year by year, and because an increasing number of countries are interested in developing their own space industries, this technology will also become a powerful diplomatic tool.

### *Space Exploration*

Japan has also been actively involved in developing a range of scientific instruments for exploration in outer space. Hayabusa, a probe to verify the ability of acquired technology to archive future full-scale "sample return missions", completed remote-sensing and geometrical measurements of Itokawa, and made two landings in November to collect a sample from Itokawa.[61] The ASTRO-H satellite, developed by JAXA in collaboration with NASA and other international partners, was launched in 2016 to study black holes and celestial objects.[62] Science yields "a nonideological environment for the participation and free exchange of ideas between people, regardless of cultural, national or religious backgrounds".[63] Thus, Japan should take advantage of its scientific capabilities to foster collaboration.

### *Institutes for Space Education and Research*

Regarding space education, there are several universities with prestigious space science programs in Japan. According to the 2022-2023 U.S. News & World Report's Best Global

[61] ISAS "Hayabusa: Spacecraft."
[62] ISAS "Hitomi: Spacecraft."
[63] The Royal Society 2010.

Universities rankings, 3 Japanese universities placed in the top 100 for space science in the world; University of Tokyo (No.9); Nagoya University (No.77); and Kyoto University (No.84).[64] Japan also has competent space research institutes; Japan Aerospace Exploration Agency (JAXA); National Astronomical Observatory of Japan (NAOJ); Japan Space Systems (JSS); and the Remote Sensing Technology Center of Japan (RESTEC). The knowledge and technology that Japan has accumulated will work in favor of Japan's diplomatic initiatives.

In sum, because Japan has advanced space capabilities, the nation can take on a leadership role regarding space collaboration. At the same time, the policies where East Asian countries can realize collaboration will be areas based on Japan's existing assets.

## APRSAF: Organizational Asset

Japan's space organizations provide a place for persuasion and bargaining. As briefly mentioned earlier, Japan leads the Asia-Pacific Regional Space Agency Forum (APRSAF), the largest space-related conference in the Asia-Pacific region. APRSAF focuses on international cooperation regarding space activities in concrete terms.[65] JAXA and MEXT are two Japanese agencies that fall under APRSAF, which are committed to disaster cooperation, information sharing, and climate efforts. Japan's space agency, JAXA, is actively engaged in developing innovative technologies to mitigate the impact of natural disasters in the region. Ministry of Education, Culture, Sports, Science and Technology (MEXT) is also working to enhance

[64] U.S. News & World Report 2023.
[65] APRSAF "About Aprsaf."

regional cooperation concerning disaster reduction and management, reflecting Japan's commitment to addressing shared challenges.

As previously discussed, dual-use technology and longstanding tensions in the space realm both work to divide East Asian nations, and result in a lack of formal cooperation between these nations. However, the claim that there is no cooperation going on between East Asian nations is false. Japan, China and South Korea are already interacting with each other via JAXA's Sentinel Asia data gathering program, which provides remote sensing satellite data and imagery to manage and prevent disasters.[66] All of these countries combine their satellite data to cooperatively prevent disasters in the region. Despite China's presence in the Sentinel Asia program, the nation is not a formal member of APRSAF.

As for South Korea, the nation is an active member of APRSAF and has been collaborating with Japan in the space domain since 2006 when the Korean Aerospace Research Institute (KARI) and JAXA signed an agreement on cooperation in the aerospace field. Later in 2009, South Korea launched the multi-purpose satellite KOMPSAT-3 with the help of Japan's H-IIA Launch Vehicle.[67] Through their presence in APRSAF, Japan and South Korea have already largely worked together in the space domain, especially when compared to Japan and China. These countries can continue to cooperate through further education/technology transfer, disaster reduction and data flows.

As such, Japan, China and South Korea are already cooperating on an informal level regarding space. This fact shows how APRSAF has acted as an organizational asset for

[66] Kaku et. al., 2013.
[67] Kim "JAXA | Korea's Growing Space Program Working with JAXA."

international space cooperation, persuasion and bargaining. In the future, Japanese diplomats can utilize APRSAF to build more formal cooperation between nations.

## Changing Political Atmosphere: Circumstantial Opportunity

The current changing political situation reveals a new circumstantial opportunity for initiating closer relations among East Asian countries. The resurgence in shuttle diplomacy, or when two nations' leaders hold regular mutual visits,[68] marks the end of an extended period of absent senior-level communication between Japan, China and South Korea. This new collaboration between leaders bodes well for future political relations.

On Japanese Prime Minister Kishida's first day in office, Xi Jinping gave him a brief, congratulatory call. They were scheduled to meet in August 2022 on the margins of an ASEAN meeting; although this meeting was canceled due to controversies surrounding Taiwan. The two leaders finally met on November 17th, 2022, preceding the Asia Pacific Economic Partnership (APEC) leaders' forum.[69] This long-awaited meeting followed an extended period of absent senior-level communications between Beijing and Tokyo, marking a change in formal political relations between the two.

When Kishida met Yoon in Seoul in March 2023, it was the first bilateral meeting between a Japanese leader and a South Korean leader in over 12 years.[70] Their meeting aimed at bettering Japan-South Korea ties after they hit an extremely low point in 2018, due to grievances stemming from World War II, as discussed in section 2. This meeting shows how senior-level

[68] Johnson, 2023.
[69] Johnstone, 2022.
[70] Johnson, 2023.

communications are improving between Japan and South Korea, as well as general international relations.

In sum, the current political atmosphere can help Japan foster diplomatic communications with China and South Korea. While this resurgence of shuttle diplomacy has only occurred over the past couple of years, it shows that the leaders of Japan, China and South Korea are willing to work together. Kishida's ability and eagerness to communicate with neighboring leaders bodes well for Japan’s improvement of its space diplomacy.

# 4. Policy Recommendations

As previously established, even though the militarization of space and longstanding tensions have led to heightened mutual mistrust among East Asian countries, Japan can pursue further regional collaboration by leveraging existing capabilities, institutions and contexts. Nevertheless, it is necessary to begin collaboration through an incremental process, as it is impossible to solve all historical, geopolitical, and security problems immediately due to East Asian nations' diverging security and economic interests. Therefore, the strategy Japan should take is to mitigate mutual mistrust by building collaboration from targeted areas where the interests of all nations align, along with the utilization of the existing international frameworks – APRSAF.

We propose that Japan advances its space diplomacy in three areas as shown in Figure 4. The first is to promote information and education exchange through universities and think tanks via technology/education transfer. The second is to facilitate free data flows between major East Asian space-faring countries to mitigate mutual trust. The third is to engage in international rulemaking through an intergovernmental dialogue framework. We begin with incremental, short-term policies and then move into more long-term "spillover" policies.

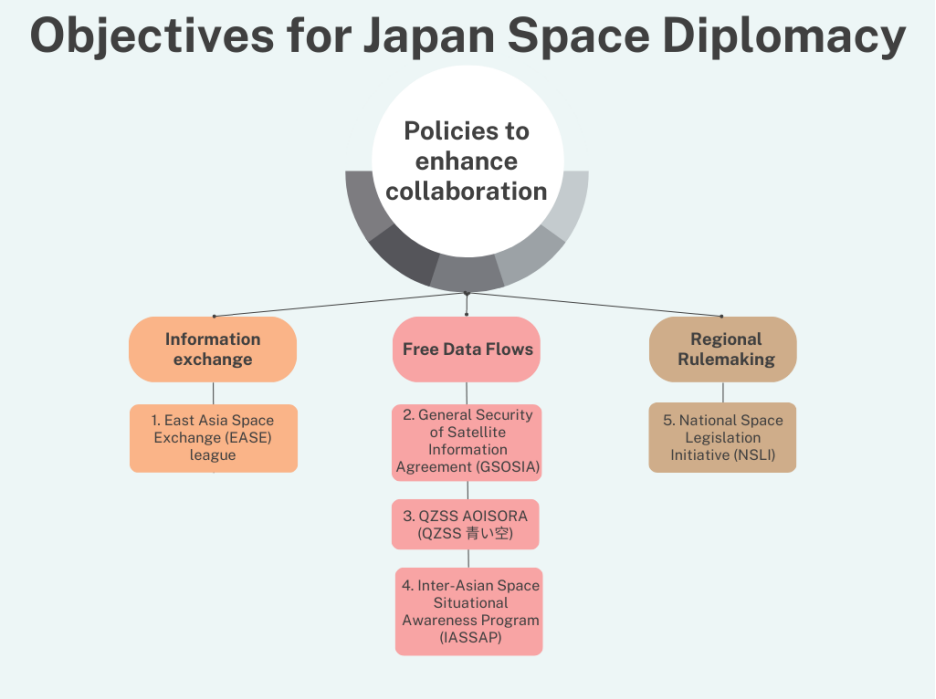


*Figure 4 - [Positioning Japan Internationally]*

*Source: Authors*

## Information Exchange

The first area where Japan, China and South Korea could collaborate to ease mutual mistrust is information transfer, through the efforts of each respective country's universities and think tanks. East Asian countries' governments can combine resources via academic institutions to exchange space education and technology, helping propel the East Asian region's space industries forward, while also easing tension between nations. Japan and South Korea have already experienced a long history of technology transfer- especially in the manufacturing sector- beginning in the 1960s and extending into the early 21st century[71], which helped the two countries to build closer diplomatic relations while simultaneously aiding South Korea in the

[71] Castley 2006.

advancement of their economic industries. Information exchange regarding space can promote better diplomatic relations and improve space technology and education. Therefore, information exchange acts as a short-term policy area to begin easing tensions between Japan, China and South Korea.

1. **We propose the creation of the East Asia Space Exchange (EASE), an informal league that Northeast and Southeast Asian nations can join, hosted trilaterally by Japan, China and South Korea's ministries of education. Nations that have joined the league can engage in information and education exchange with other enrolled countries, through combined efforts of universities and think tanks.**

The league aims at promoting bilateral and multilateral exchange agreements regarding technology or student exchange, research, and academic programs. These agreements will be met through an annual informal mutual dialogue meeting provided by the league, which will facilitate negotiations and the exchange of information. Each year, the country hosting the league will switch between Japan, China and South Korea. Through this forum, enrolled nations' ministries of education can discuss international student exchange for those studying space-related subjects, joint-university projects or research on space technology, class curriculums, scholarships, and many more topics. Funding will come from enrolled nations' ministries of education, which will be given the opportunity to offer money for scholarships for foreign students to invite them to their universities through the league, the amount depending on the will of the participating government. Funding for each year will be decided at the annual EASE forum.

Through enrolled countries' combined efforts, this league will help bolster each country's own space industry and propel the entire region forward in terms of space technology and education. The EASE league can improve space programs at Japan's major universities and

better Japan's space technology, while also creating a positive diplomatic relationship with its neighbors, especially China and South Korea. The league can also work to align Japan, China and South Korea's mutual interest in development projects in Southeast Asia, as Southeast Asian countries are allowed to join and engage in information exchange with Northeast Asian countries. The EASE league can be one of the first steps forward in easing mistrust between East Asian nations through a symbiotic relationship.

However, the EASE league relies on each country's will to join, and as it is informal countries can join and leave at any time. Therefore, it is unstable, and may not function depending on other nations' priority of technology and education exchange. At the same time, we believe this will not pose too much of a risk for the EASE league's success. As mentioned earlier, there are precedents of Japan, China and South Korea being involved in a joint space project, such as Sentinel Asia. Both the EASE league and Sentinel Asia share the concept of exchanging information regarding space technology, which allows us to be optimistic regarding the likelihood of EASE's success.

## Free Data Flow

By combining data with its neighbors, Japan can optimize its technologies and strategies, especially in disaster management. As established in section 1, Japan is vulnerable to natural disasters, therefore it is vital that Japan can analyze as much satellite data as possible to respond and prevent disasters effectively. In this regard, achieving an ease of international data flow is quite important. Free data flows benefit all contributing parties, as each nation gains shared data. Ultimately, it is crucial that international cooperation is achieved regarding free data flow among

states to optimize joint efforts in disaster management and poverty analysis. Japan will propose the two following policies:

2. **We propose the establishment of the General Security of Satellite Information Agreement (GSOSIA), an agreement aimed at providing and sharing satellite data while assuring that the data will not be leaked to the third-party state. A meeting among the representatives of member states will be held annually, with the purpose of negotiating for the provisions of certain data, etc.**

In modern times, satellite data is essential for infrastructure, however it also has the potential to be used for militaristic purposes. Dual-use technology causes mistrust, resulting in hesitation among states concerning the provision of satellite data among countries, especially from fear of their data being transferred to undesired third parties. Therefore, Japan will create GSOSIA, where participating members are able to exchange satellite data with other members and request data from other members but are allowed to not disclose any of their data to other members.

This agreement aims to act as a matching platform for those seeking data and those who are willing to provide data. This agreement also works to assure data providers that their data will not be shared with undesirable third parties. Achieving this agreement creates opportunities in many fields. As for the government, being able to collect satellite data from multiple sources results in more accurate data, which allows them to create improved strategies for disaster management and poverty analysis. As for private companies, they could use GSOSIA as a means to build a business and a reputation for being a trustable data provider, and the data receiver could make use of the data for building new business models. Data providers are required to own

a satellite that is registered in the United Nations Office for Outerspace Affairs and must receive a license from their country's governments to become a provider.

This agreement, most importantly, will allow every member state to share their satellite data without fear of exploitation by other states or individuals, easing data transfer and fostering symbiotic relationships between states. In addition, this agreement will make it easier for governments, NGOs, universities, research institutes, and many others to get access to data, as the states who have joined will be able to allow their universities, corporations, and other data holders to share data upon request. This will simplify the process of requesting data. It will also act as an opportunity for businesses and researchers to advance themselves, and to overall create better international relations for Japan and its neighboring countries.

However, this agreement heavily relies on the data provider's willingness to provide their data to other countries, so it is critical that negotiations take place on a scheduled basis to reach an equilibrium between data provider and data receiver. We plan to overcome this issue by setting up a quota for each participant for a set amount of data provision or financial contribution. There is an increasing incentive for data as a product in the global market, therefore imposing a minimum amount of contribution as an obligation should not be a reason that other states might step away.

3. **We propose the creation of QZSS Asia Oceania International Satellite-Positioning Optimizing Regional Agreement (QZSS AOISORA) or Blue Sky Agreement (AOISORA=青い空=Blue Sky), a multilateral agreement between Japan and other Asian/Oceanian states to provide them with an improved and accurate satellite positioning system through Quasi-Zenith Satellite System.**

This agreement aims to provide members with an enhanced positioning system, which could be used for any location, but especially for urban areas surrounded by buildings that block radio waves emitted by GPS satellites. This allows the member states who have problems with traffic congestion (which is the bulk of developing states in Asia) to get rid of their traffic problems, contributing to less air pollution. This allows Japan to contribute to Asian countries' development, but also solves domestic environmental problems as well.

The advanced positioning system, which will allow for smarter and smoother navigation, will improve road infrastructure throughout Asia. As of today, many countries are experiencing increased air pollution caused by traffic congestion. With a better navigation system which analyzes the location of a person or a car and calculates the best route depending on the number of other cars on the roads, the QZSS allows for incredibly accurate navigation, reducing driving time, lessening air pollution, and preserving gas. In addition, a better road system will allow better and more effective transportation, aiding the economic sector due to lower transportation costs.

The Blue Sky Agreement might not be able to immediately incorporate China, a country that has its own positioning system called Compass (*Beidou* in Chinese), which began to operate in 2021. However, at least South Korea will participate because it does not have its own positioning system. Furthermore, this agreement will become a useful stepping stone for future cooperation between Japan and China in the positioning and navigation domain. Such cooperation will help build an optimal positioning system for the entire Asia-Pacific region, enhancing confidence-building among Asian countries.

4. **We propose the establishment of the Inter-Asian Space Situational Awareness Program (IASSAP), a combined data provision forum where participating Asian countries could**

**obtain space situational awareness data which is vital for the protection from extraterrestrial objects falling on their countries and satellite collision prevention. This data will be made available via the IASSAP forum, for the governments of the participating countries.**

The forum can be a great opportunity for Japan, China and South Korea to disclose their SSA programs to increase transparency amidst mutual tensions, allowing for the three countries to achieve cooperation in the space domain. In addition, the forum will be able to provide data that covers a potential blind spot concerning individual SSA systems, as shown in Figure 5. Monitoring space from not just one but multiple angles is helpful to widen the observing area, decreasing probability of errors, such as not being able to detect a threat in time. This forum allows for the sharing of SSA systems and data, allowing countries to make more accurate observations and predictions about the movement or trajectory of threats, as seen in Figure 6. By combining resources, member countries can better protect themselves and their satellites from potential threats.

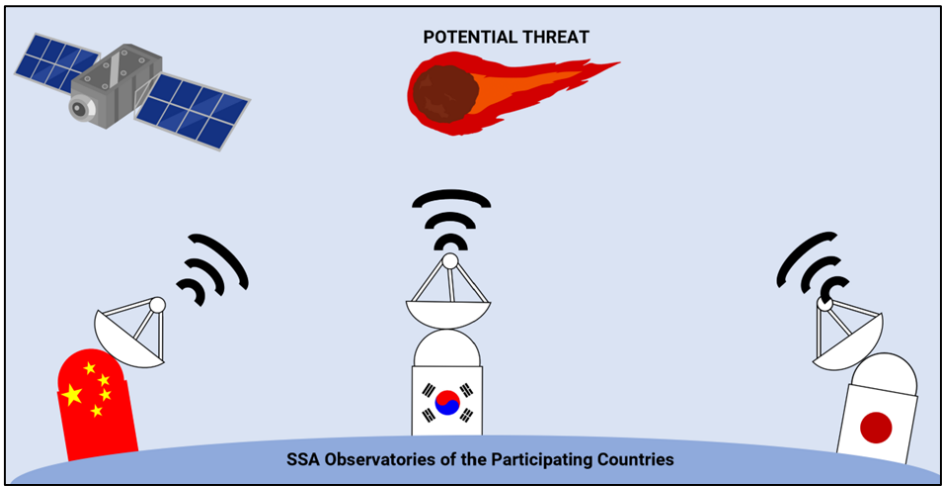


*Figure 5 - [How Multiple SSA Observe a Potential Threat]*

*Source: Authors*

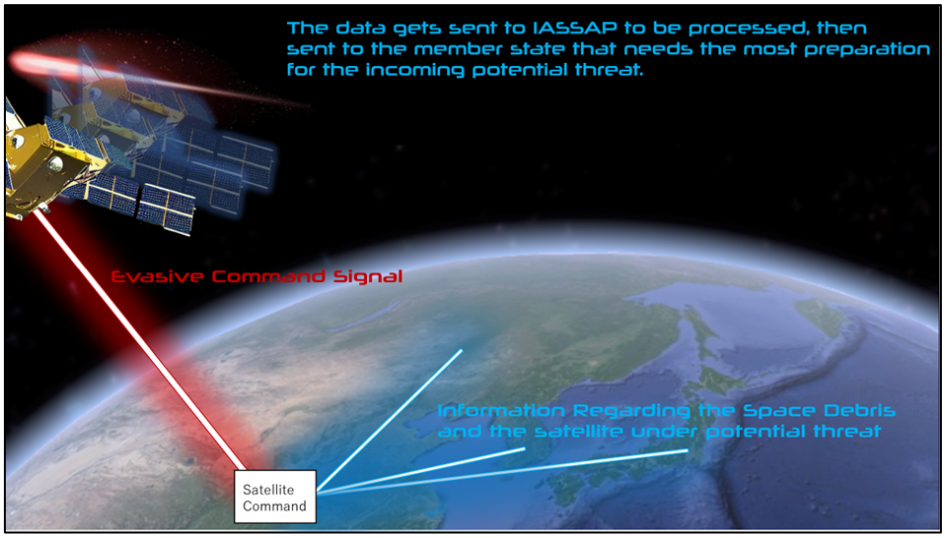


*Figure 6 - [How IASSAP Works]*

*Source: Authors*

An issue in the feasibility of this policy is that Japan and the U.S have already reached an agreement on a joint SSA program. In 2013, they signed the Agreement Memorandum of Understanding for Sharing the Space Situational Awareness Services and Information for Safety of Space, which aims at more effective sharing of information on the orbits of space objects.[72] Thus, it is possible that the U.S. is worried about their SSA information leaking to countries that do not have sound relations with the U.S., and vice versa. Japan must reassure all participating countries that careful attention will be paid to the information obtained through this cooperation.

## Regional Engagement in International Rulemaking

The third area where Japan and China could collaborate to ease mutual mistrust is building capacity in the field of space law and policy. In terms of Japan, looking closely at the

[72] U.S. Department of State 2020.

Outline of the Basic Plan on Space Policy in 2020, the Japanese government positions engagement in international rulemaking as one of its goals to ensure space security.[73]

As part of the effort to achieve this goal, APRSAF has led the National Space Legislation Initiative (NSLI), a study group among the space law/policy practitioners in Asia-Pacific countries.[74] The objectives of this initiative are "to promote information sharing and mutual learning on the practices and examples of national space legislation and/or policies in the Asia-Pacific Region" and "to enhance the Asia-Pacific countries' capacity to draft and implement their national space legislation and/or policies *in accordance with international norms*."[75] The second phase of the term will be ending in 2023. As of 2022, NSLI consists of 12 countries, Australia, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, *South Korea*, Singapore, Thailand, Turkey, and Viet Nam.[76] They are now working to prepare and submit a report on national space legislations of NSLI members to the UNCOPUOUS Legal Subcommittee.[77] By hosting this initiative through APRSAF, Japan has been contributing to the spread of international space norms by promoting mutual understanding of national laws and regulations among space-related actors in the Asia-Pacific region.

China also seems interested in building capacity in the field of national space law and policy in accordance with international law. APSCO has been leading Space Law & Policy workshops/forums/conferences since 2009. One of the main objectives of this initiative is to "promote the spirit of co-operation at regional and inter-regional level as enshrined in the United Nations treaties on outer space, principles, resolutions, and other instruments of international

[73] Cabiet Office 2020.
[74] APRSAF "Initiatives."
[75] *Ibid*., emphasis added.
[76] *Ibid*.
[77] *Ibid*.

space law."[78] The member states learn from each other's experiences, create a collective understanding on the legal and policy challenges confronting the outer-space environment, and provide a chance to share current national space laws, new national space legislation, and development in space policies.[79]

As former rule-making initiatives show, enhancing space policy and law capacity is a field where the interests of Japan, China and South Korea converge.

5. **We propose enhancing the role of NSLI by inviting China/APSCO, extending and renewing NSLI's term for its third term. This will be an intergovernmental dialogue framework aiming at creating more substantial norms, rules and principles of responsible behavior in outer space. Specifically, states can inform each other of the status of their national space legislation and policies, express legal and policy challenges/concerns, and share their understanding on how to interpret and apply existing international space law.**

Sharing norms, rules and principles of responsible behavior is beneficial in the following 4 ways, according to a paper submitted to the United Nations General Assembly (UNGA) by the Open-Ended Working Group (OEWG) in the United Nations Institutions for Disarmament Research (UNIDIR). Firstly, non-legally binding mechanisms can enhance transparency and confidence-building, thereby reducing tensions among actors and creating a milder climate for further dialogue and the establishment of a common understanding. Secondly, building confidence and transparency reduces the chance of misperception, miscommunication, and misunderstanding, which can lead to escalation and even military conflict. Thirdly, the

[78] APSCO "APSCO Space Law and Policy Forum."
[79] *Ibid*.

establishment of norms, rules and principles of behavior generates expectations of behavior and serves as indicators of intent. Finally, the norms, rules and principles of behavior pave the way for the success of future mechanisms. All these advantages will aid in mitigating mutual mistrust.

Regarding feasibility, we admit the possibility that China would not accept the invitation to join NSLI. The fact that China leads another regional space organization shows that China also wants to play an active role in facilitating regional cooperation. Thus, China may not be content with following a Japan-led initiative. In this case, we suggest that Japan propose a new dialogue framework jointly held by APRSAF and APSCO, whose function will be the same as NSLI. At any rate, we emphasize the significance of maintaining regional engagement.

## Closing Statement: Prospects for Future Collaboration

Now is an ideal time for the government to start diplomatic conversations toward furthering regional collaboration in the space domain. We propose policies in three major areas ranging from information exchange and free data flow to regional rulemaking, aiming at easing the East Asian regional divide. We suggest; the creation of East Asia Space Exchange (EASE); General Security of Satellite Information Agreement (GSOSIA); QZSS Asia Oceania International Satellite-Positioning Optimizing Regional Agreement (QZSS AOISORA) or Blue Sky Agreement (AOISORA=青い空=Blue Sky); Inter-Asian Space Situational Awareness Program (IASSAP); and the utilization of NSLI.

Ultimately and ambitiously, we hope to see the "spillover" of that collaboration to other, more formal areas which will eventually result in the realization of a peaceful and stable East Asia. For example, as a long-term goal set for 2050, we also suggest that Japan take into consideration the inauguration of Inter-Asian Space Station (IASS), an LEO space station that will be built by international commercial companies and funded by space agencies such as JAXA. Given longstanding tensions in the East Asia region, it is hard to believe this will be achieved anytime in the near future. Nevertheless, hopefully all small regional collaboration efforts that we have proposed will come together to create the IASS program, which could become the symbol of peace and international cooperation for East Asia.

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