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***JAPAN'S GRADUAL SHIFT  
TOWARD SPACE SECURITY***

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## Summary

Japan's recent announcement that it is establishing its own military space unit has put its national security space efforts under the spotlight. This announcement may have seemed surprising given Japan's policies up until 2008 prohibited its Ministry of Defense from owning satellites and permitted using space only for nonmilitary purposes. Japan's 2008 Basic Space Law, which allowed the Ministry of Defense to own satellites, is often seen as a trigger for its activity in defense space. However, this shift actually began earlier: Japanese policy decisions have pushed gradually toward space security since at least the 1980s. Debates in Japan on the use of space focus on how far and fast this shift should take place, including what the relationship should be between civil and military space; whether the goal for its military space activities should be to complement U.S. systems or develop independent capabilities; and which counterspace capabilities, if any, Japan should pursue. Understanding Japan's trajectory toward a focus on security in space not only sheds light on an important U.S. ally but also points where Japan's space activity is headed. This shift did not begin suddenly, nor will it end precipitously, but it will likely continue, gradually, in the decades to come.

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### Introduction

The U.S.-Japanese alliance has been the bedrock of U.S. security policy in East Asia for over half a century. The strength of this long-running partnership is reflected not just in its longevity but also in current military deployments: more U.S. service members are deployed in Japan than any other country. The two countries have recently pushed for Japan playing a larger role in the military alliance, which will likely depend in part on the investments it makes and the capabilities it develops in the coming years. As such, understanding Japan's plan in this realm is critical for understanding the role that it will play in the security partnership, including in the space domain.

Japan is one of the most mature spacefaring nations in the world. It had the fifth largest space budget in 2018 and had the fourth most satellites in orbit as of 2019.<sup>1,2</sup> The country is one of five that has its own position, navigation, and timing satellites—the crème de la crème of space capabilities—and one of six, plus the European Space Agency, that can independently launch into higher orbits.<sup>3</sup> (Japan will also be the first country to send yakitori to its astronauts, as is being reported in the Japanese press.)<sup>4</sup>

Much of the recent attention on Japan's space activity centers on its national security efforts. In February 2020, Japan launched a reconnaissance

satellite into orbit and in January 2020 announced plans for establishing its own military space unit.<sup>5,6</sup> Prime Minister Shinzo Abe has even noted that the Air Self-Defense Force may evolve into the Air and Space Self-Defense Force.<sup>7</sup> Japan's 2018 *National Defense Program Guidelines* names "acquiring and strengthening capabilities in the space, cyber, and electromagnetic domains"<sup>8</sup> as its top priority.

This focus on security in space may come as a surprise given Japan's policies up until a little over a decade ago, which prohibited its Ministry of Defense from owning satellites and took the position of using space only for nonmilitary purposes. Japan's 2008 Basic Space Law, which changed the nation's policy to allow the Ministry of Defense to own satellites, is often seen as a trigger for its activity in defense space. However, this shift began earlier: Japanese policy decisions have pushed slowly and gradually toward space security since at least the 1980s. This slow ascent is reflected not just in the history of its security space activity but also in current debates within the Japanese space community. These debates center on incremental changes and focus less on whether Japan should shift its focus toward security and more on how far and fast this shift should take place. This important ally's gradual push toward defense space will likely continue in the decades to come, a trajectory the U.S. space and security communities should take note of.

The research for this paper included a literature review and interviews with experts on Japan's space program. The experts included current and former officials in the Japanese space agencies—specifically, the Cabinet Office, the Ministry of Foreign Affairs, Japan Aerospace Exploration Agency (JAXA), and the Ministry of Defense—plus Japanese space industry, academia, think tanks, and the U.S. government.

## Conventional Wisdom on the 2008 Basic Space Law

In 2008, Japan passed the Basic Space Law, formally changing how Japan viewed space. Many observers argue that this change, prompted by security shocks from North Korea and China in 2006 and 2007, ushered in an era of military space activity that did not exist beforehand.

For almost 40 years, Japan held the position that its space activity was to be nonmilitary. In 1969, the Japanese parliament, the Diet, passed the Peaceful Purposes Resolution, which excluded military space activity in response to the 1967 United Nations (UN) Outer Space Treaty.<sup>9</sup> The treaty notes the "use of outer space for peaceful purposes," but Japan's interpretation was unique among the signatories of the treaty.<sup>10</sup> Most countries, including the United States, held that the agreement allowed military space activity as long as it was nonaggressive.<sup>11,12</sup>

The Peaceful Purposes Resolution fit within broader constraints, including Japan's pacifistic constitution. Article 9 of the country's postwar 1946 constitution, which is still in effect, renounces the threat or use of force and war as a sovereign right of the nation.<sup>13</sup> Japan had taken other steps to limit its militarization, such as its defense spending. From the early 1950s to the beginning of the 1960s, Japan reduced its defense expenditures from a little over two percent of gross domestic product (GDP) to below one percent. Japan continued to keep its defense expenditures below one percent through the 1960s and 1970s, even instituting a policy in 1976 that limited defense spending to one percent of its gross national product (GNP).<sup>14,15,16</sup>

The Basic Space Law in 2008 formally changed this interpretation. The new law took two significant steps in advancing military space. First, the law gave the Strategic Headquarters for Space Policy—which

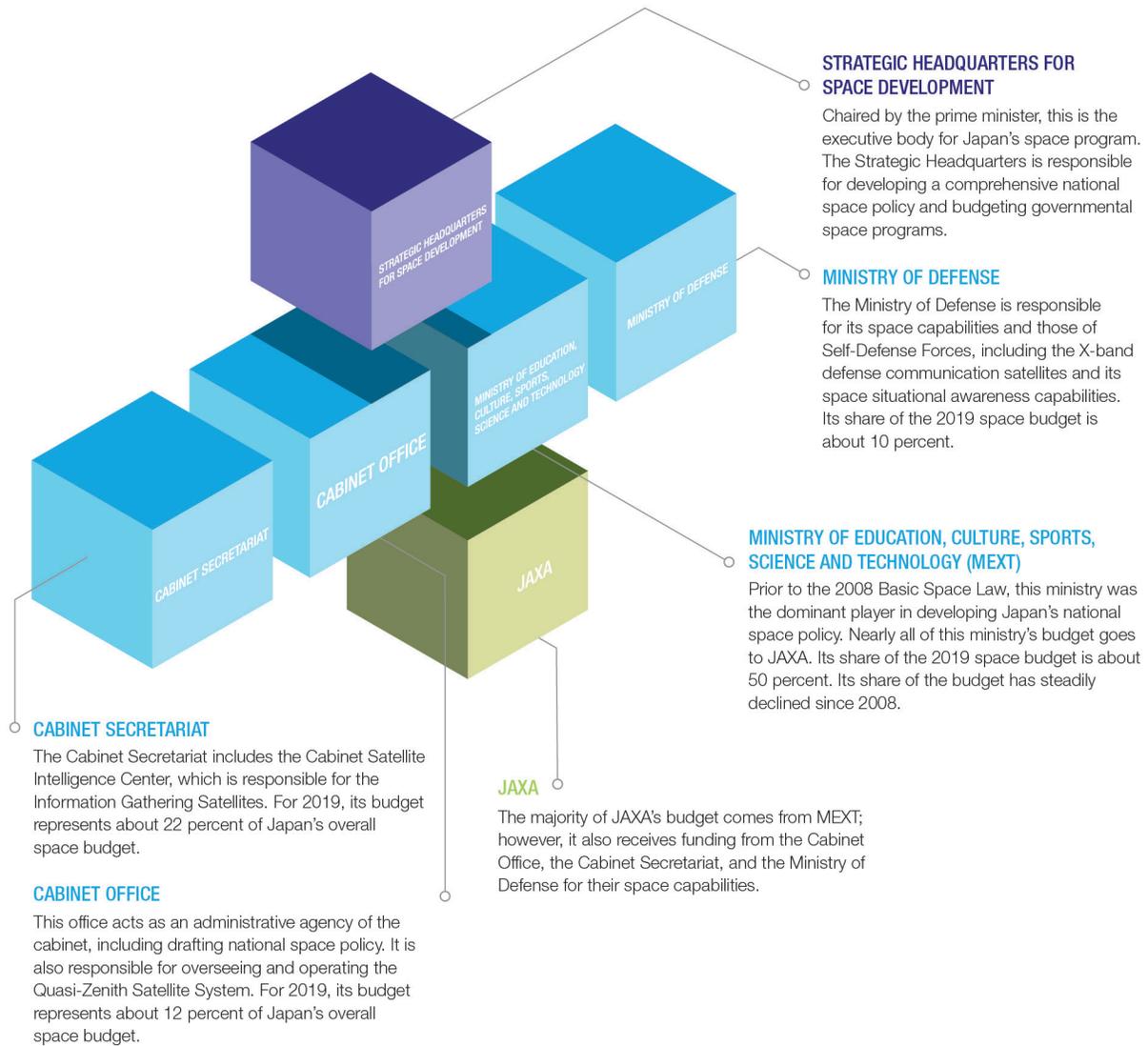
is chaired by the prime minister and includes members of the Japanese cabinet—responsibility for formulating Japanese space policy. This organizational reform centralized Japan’s space policymaking. Prior to the law, the space agencies were controlled by the science and technology bureau of the government. Second, the law allowed for military space capabilities if they were “nonaggressive,” which accorded with how other spacefaring nations interpreted the Outer Space Treaty. It also acknowledged that Japan needed to begin using space for national security purposes. According to an unofficial translation, the law asserts: “The State shall take necessary measures to promote space development and use to ensure international peace and security as well as to contribute to the national security of Japan.”<sup>17</sup>

Building on the 2008 law, the Strategic Headquarters for Space Policy established the 2009 *Basic Plan for Space Policy*. This plan defined the role that outer space should play in Japan’s

overarching security posture, and noted that, while Japan had been extremely limited in the use of outer space for national security purposes, other countries had developed and deployed a variety of national security-related satellites designed to gather data and detect ballistic missile launches.<sup>18,19</sup> The document goes on to say that given the change in domestic law, Japan would move ahead with a number of research and development projects focused on increasing its capability to improve national security information gathering and enhance “warning and surveillance activities in light of the international situation, especially the circumstances in North East Asia.”<sup>20</sup> This included investments in reconnaissance satellites, secure satellite communications, and a positioning, navigation, and timing satellite system.<sup>21</sup>

Table 1 lists the major defense space capabilities in Japan, and Figure 1 lists the key governmental space players.

Table 1: Major Defense Space Capabilities in Japan	
	<b>Reconnaissance Satellites:</b> After launching its first two Information Gathering Satellites in 2003, one for optical imagery and another for radar imagery, Japan achieved a four-satellite constellation for Information Gathering Satellites in 2007. Its most recent space implementation plan specifies that Japan is aiming to expand its network of reconnaissance satellites in the next few years. <sup>22</sup>
	<b>Position, Navigation, and Timing:</b> Since 2018, Japan has operated a four-satellite navigation system called the Quasi-Zenith Satellite System. <sup>23</sup> Japan launched the first of these satellites in 2010. <sup>24</sup> This regional system leverages GPS and gives added precision for Japan. As indicated in its implementation plan, Japan will add three satellites to its constellation in 2023. <sup>25</sup>
	<b>Satellite Communications:</b> Japan is pursuing a three-satellite X-band defense communications system to enhance command and control and the communications capabilities of its Self-Defense Forces. The Ministry of Defense has launched two of these satellites. Based on its implementation plan, the Ministry of Defense—which will own the satellites—is planning to operate the network beginning in 2022. <sup>26</sup>
	<b>Space Situational Awareness:</b> Japan is pursuing a deep-space radar system and command and control center to be operational in 2024, which will be led by the Ministry of Defense. Japan’s defense guidance notes that the Self-Defense Forces, with related ministries and agencies, will develop space-based optical telescopes and space situational awareness laser-ranging devices for the system. <sup>27</sup>



Other ministries and agencies receive space funding in Japan, including the Ministry of Internal Affairs; Ministry of Land, Infrastructure, Transport, and Tourism; Ministry of the Environment; Ministry of Economy, Trade and Industry; National Police Agency; Ministry of Agriculture, Forestry and Fisheries; and Ministry of Foreign Affairs. However, for 2019, none of these agencies or ministries received over 3 percent of the overall space budget.

**Figure 1: Key governmental space players.**<sup>28,29</sup>

After passing the *Basic Plan for Space Policy*, Japan also removed restrictions on JAXA cooperating with the Ministry of Defense and took steps to encourage such cooperation. JAXA, the preeminent space agency in Japan, historically could not engage in dual-use and defense-related activities. Formed in

2003 as a merger of three organizations focused on outer space exploration, JAXA is designated as the country's core agency for supporting the government's aerospace development and utilization and can conduct research and development and operations. According to the

experts we met with, JAXA is where the government's space expertise resides. The initial law governing the agency restricted it from military space programs; in 2012, the Japanese government passed legislation to remove this restriction so that JAXA could contribute to dual-use programs and collaborate with the Ministry of Defense.<sup>30</sup> One Japanese official we met with called the 2012 legislation, "the most important development in Japan's transition toward military space."<sup>31</sup> JAXA's subsequent guidance stresses its role in promoting security in space. In 2015, JAXA's mid-to-long-term objectives were revised with a section called, "Ensuring National Security and Helping Make Society a Safe and Secure One," noting that the agency would be helping develop satellites to attain national security goals and increase the resiliency of space systems.<sup>32</sup> JAXA's 2018-2024 mid-term plan lists ensuring national security and realizing a secure and safe society as its top priorities, above JAXA's traditional interests of scientific research and space exploration.<sup>33</sup>

Japan's recent strategic documents underscore this attention on military space.<sup>34</sup> Its 2015 *Basic Plan for Space Policy* places "ensuring space security" as its first goal. It states, "In fostering the development and utilization of outer space along with the maintenance and advancement of related technologies, the government of Japan will allocate its budgets with clear priority so as to serve our national security interests in the mid-term to long-term."<sup>35</sup> Its subsequent implementation plan details 53 initiatives, about half of which pertain to security in space.<sup>36</sup> Both the 2014 and 2019 Defense of Japan white papers devote an entire section to the development and use of space for defense purposes.<sup>37,38</sup> The word "space" shows up 35 times in the 2018 *National Defense Program Guidelines* in contrast with the prior 2013 program guidelines, which cited "space" 10 times. In August 2018, in an advisory meeting on security and defense capabilities, Prime Minister Abe stated, "We are not able to protect Japan from the range of threats if we

are thinking only through the conventional lens of the ground, maritime, and air defense categories. We need to identify an ideal form of defense capabilities that is truly needed to protect Japan, rather than developing them along the current path."<sup>39</sup>

The 2008 Basic Space Law is widely viewed as the impetus for the Japanese military space activity over the last 12 years. As noted by Yasuhito Fukushima, a senior research fellow in the National Institute for Defense Studies in Japan, "The enactment of the Basic Space Law in 2008 was widely recognized as a turning point in Japan's use of space for defense purposes."<sup>40</sup> Frank Jannuzi, president and CEO of the Maureen and Mike Mansfield Foundation, which organizes a U.S.-Japan space forum, noted that prior to the events in 2008 and 2009, a 40-year seal had existed that had "isolated Japan's space program from national security."<sup>41</sup>

Acute security threats, according to this view, sparked this sudden change in Japan's philosophy. In July 2006, North Korea fired seven ballistic missiles into the Sea of Japan. In response, Japan called for an immediate UN Security Council meeting in which it proposed a resolution to impose economic and diplomatic sanctions against North Korea.<sup>42</sup> Six months later, in January 2007, China tested an anti-satellite weapon, destroying one of its defunct weather satellites and producing a significant amount of debris that still remains in low Earth orbit. The test provoked international outcry and drew critical responses from Japanese leadership, including from Prime Minister Abe. He suggested that the test may have violated the 1967 UN Outer Space Treaty because the treaty features a clause that has been interpreted as requiring signatories to refrain from littering outer space with debris.<sup>43</sup> More worryingly, the test signaled China's ability to degrade and destroy satellite systems.

As a result of these security threats, including to Japan's space-based assets, this perspective asserts

that Japan had little choice but to reverse its long-standing position, pass the 2008 Basic Space Law, and invest heavily in military space capabilities. A 2014 foreign policy assessment produced by the Stratfor firm reflects this view: “In 2008, following China's kinetic anti-satellite test, Japan adopted its Basic Space Law regarding operations in space to allow for space defense.”<sup>44</sup>

### **The Long History of Japan's Military Space Activity**

Although compelling, this consensus view that the 2008 Basic Space Law, driven by acute security threats, triggered Japanese space security activity mischaracterizes the true arc of Japan's shift toward military space. Paul Kallender and Christopher Hughes summarize the common perception that, up until 2008, Japan's space activity remained non-security oriented: “...for over 40 years since 1969 and the National Diet (Peaceful Purposes Resolution), space policy has been paraded as a paragon of self-imposed restraints on remilitarization.” They continue, “Japan, the consensus asserts, stands as a non-security related and normative exception to regional and global trends for the militarization of space.”<sup>45</sup> This consensus view misses that Japan had been engaging in military and space security activities well before 2008. The Basic Space Law was extremely important but did not represent an abrupt change. Rather, Japan had been taking small steps toward military space before 2008 and has been taking small steps since. In fact, Japan's military forces began using space services at least as long ago as the 1980s, and Japan launched its own reconnaissance satellites in 2003. The heightened security threats—while clearly a factor—were not the only the cause for Japan's subsequent evolution.

Despite the 1969 Peaceful Purposes Resolution remaining intact, Japanese leadership made a series of decisions that had the cumulative effect of blurring the distinction between nonmilitary and

military space and attenuating the policy restrictions that had impeded greater investments in military space technologies and systems.

Figure 2 shows a timeline of important events in Japan's shift toward military space.

### ***Procurement of Satellite Services for the Military***

While Japan's military was formally proscribed from controlling satellites before 2008, it had been using services from satellites since the mid-1980s. The Japanese government started buying imagery from the U.S. LANDSAT satellites in 1984 and from French SPOT satellites in 1987 for multiple actors in the Japanese government, including the Japanese Defense Agency, the predecessor to the Ministry of Defense.<sup>46</sup> The Yasuhiro Nakasone administration defended its military's use of satellite imagery as being consistent with the 1969 resolution. As explained by Japanese space scholar Setsuko Aoki, “In 1985, a unified governmental view was issued that interpreted the ‘nonmilitary’ principle as permitting the use of satellites so long as these satellites were widely used in everyday civil life.”<sup>47</sup> The Japanese military could use satellite technologies that were readily available on the commercial or civilian side. This position, called the “generalization theory,” revealed that Japan's opposition to military space applications was becoming more lenient.<sup>48</sup>

### ***Development of Government Reconnaissance Satellites***

In 1998, the Keizo Obuchi administration determined to develop and deploy government-owned and operated reconnaissance satellites called Information Gathering Satellites.<sup>49</sup> This marked the first time in which Japan acquired satellites that would have a direct military application. Although the satellites also had civilian purposes—such as monitoring natural disasters and weather patterns—



**Figure 2: Important events in Japan's shift toward military space.**

developing reconnaissance satellites signaled yet another significant step in the country's shift toward military space.<sup>50</sup>

The program was tailored to be consistent with the 1985 generalization theory. The satellites would not use higher-resolution surveillance technology than was available commercially.<sup>51</sup> The first two satellites were launched in March 2003, the same month that the Cabinet Satellite Intelligence Center was set up to oversee the reconnaissance satellites.<sup>52</sup> Because the new center was not part of the defense agency but part of the Cabinet Secretariat, the oversight stayed within the parameters of the 1969 resolution.

With the launch of the Information Gathering Satellites, Japan could now buy satellite services for its military or acquire its own satellites to use for security purposes as long as it met two conditions: (1) the technologies were no more sophisticated than what was available commercially, and (2) the satellites were not owned and operated by the Japanese Self-Defense Forces. Although it comported with the 1985 policy—and thereby also with the 1969 resolution—the launch of these government-owned satellites again softened the lines between military and nonmilitary space applications.<sup>53</sup> From 2003 through 2007, Japan launched more Information Gathering Satellites to achieve a four-satellite constellation.<sup>54</sup>

### **Role of Security Threats in Driving Policy Changes**

Although the 2006 North Korea missile tests and the 2007 Chinese anti-satellite test were acute prompts to action, they were not the full story. Scholars have discussed that relations between China and Japan deteriorated in the decade after the mid-1990s, partly due to China's increasing militarization.<sup>55</sup> And North Korea's missile test was not unprecedented: it had conducted successful tests in 1993 and in 1998. In particular, the 1998 test—in which North Korea launched a two-stage Taepodong ballistic missile over Japan—created political shockwaves among the Japanese. The test

made it clear that North Korea had the capability to hit targets almost anywhere in Japan. At the time, a spokesperson for the Japanese Foreign Ministry said, “We are seriously concerned about this because the deployment of missiles by North Korea does affect Japanese security and it also affects peace and stability in Northeast Asia. It also is of serious global concern, in terms of the proliferation of weapons of mass destruction.”<sup>56</sup> The North Korean missile tests contributed not just to Japan acquiring its own reconnaissance satellites but also ballistic missile defenses, which the Japanese government decided to adopt in 2003.<sup>57</sup>

The evolving security environment is not the only factor explaining Japan’s shift toward military space. As Saadia Pekkanen and Paul Kallender argue in their 2008 book, *In Defense of Japan*, the Japanese industry pushed diligently for decades for the government to invest in indigenous defense space technologies. Without investment in defense and dual-use space technologies and capabilities, it would have been difficult to establish a robust private sector. The book highlights the lobbying activities of the Japanese defense industry that contributed to Japan’s space militarization. Regarding the Information Gathering Satellites, the authors detail the momentum in Japan for reconnaissance satellites before the Taepodong launch. They note that by the 1990s, Japanese business interests had mapped out architectures for reconnaissance satellites; in 1993, a defense advisory panel recommended that Japan develop its own satellite-based reconnaissance system; in 1994, Japan’s defense agency issued findings that reconnaissance satellites were a logical progression of Japan’s space activities; and in 1997, the government conducted feasibility studies for such a system.<sup>58</sup> Andrew L. Oros also details the influence of Japanese industry in the government’s decision to acquire the intelligence satellites: “Although news reports of the time frequently stated that the idea of Japan owning multi-purpose satellites emerged after

the Taepodong incident, this claim patently is false. Major Japanese defense producers—namely MELCO, NEC, and Toshiba—had sought for years to secure government support for national satellite development in a variety of forms.”<sup>59</sup>

Passage of the 2008 Basic Space Law was also a gradual undertaking. Pekkanen and Kallender point to Japanese business lobbying efforts from 2003 to 2007 to revise the 1969 resolution, including in drafting proposals for a basic space law in 2004.<sup>60</sup> The economic argument of the necessity of investment in defense space technologies for a functional private sector resonated with political leadership. Takeo Kawamura, the former education, science and technology minister, who played a leadership role in drawing up legislation allowing for military use of space, said in 2007, “If the current state of affairs is left unattended, Japan is doomed to be outdone by China and India and fall into the ranks of underdeveloped countries as far as the space industry is concerned.”<sup>61</sup> “Slowly but surely,” Pekkanen and Kallender conclude, “Japanese space industry made its mark felt on the contents and directions of Japan’s space technology, policy, and laws.”<sup>62</sup>

### **Passage of 2008 Law**

Although the 2008 Basic Space Law was clearly important—it helped spur investment and accelerate development for new capabilities—it was less an inflection point than a dot on an existing trajectory, a trajectory that began at least two decades earlier.<sup>63</sup> In the years between the Peaceful Purposes Resolution and the Basic Space Law, the lines between military and nonmilitary space had become blurry. Said prominent Japanese scholar Setsuko Aoki in 2008: “The history of Japan’s space policy has been characterized by the efforts to clearly demarcate the military and non-military use of outer space which came to be more and more difficult as the time went by.”<sup>64</sup>

## Current Debates

Current debates in Japanese space policy circles also reflect Japan's gradual shift toward more focus on security in space. These debates include what the relationship should be between civil and military space; whether the goal for its military space activities should be to complement U.S. systems or to develop independent capabilities; and which counterspace capabilities, if any, should it pursue. These debates are narrow. They center on gradual changes: they do not question whether to expand military space capabilities, just how to go about it.

### *JAXA's Role in Military Space*

The first debate centers on what roles and relationships the space agencies should have, both civil and defense, for military space activity. As Japan has pushed toward military space, its Ministry of Defense has assumed more space responsibilities but has not yet developed sufficient internal expertise to carry them out. Accordingly, the ministry has recently been leveraging JAXA. However, as some of the experts we spoke with noted, there remain some questions and resistance in the Japanese space community regarding whether heightened collaboration between civil and military space efforts is desirable and what exactly it should entail.

JAXA principally engages in military space in two ways. First, the agency contracts directly with the Cabinet Office and Cabinet Secretariat for Japan's navigation satellites (QZSS) and the Information Gathering Satellites. Second, the agency collaborates with the Ministry of Defense on defense programs on an ad-hoc basis at the ministry's request. This includes educating and training military personnel and providing engineering and technical support. Experts estimated that about 300 members of the 1,500-person organization work on military space issues.<sup>65</sup>

The experts we spoke with were split on whether they were supportive or wary of JAXA taking a

more active role in military space. Some advocated that JAXA developing close partnerships with the Ministry of Defense would be the best way to accelerate military space capabilities, noting that JAXA's research and development capacity and rich history in space activity could enable the government to more effectively pursue military space applications and systems. Others, while not disputing that point, told us they were reticent about JAXA straying too far into defense. They argued that the lines between defense and civilian or commercial research and development should be starker. In lieu of collaborating more extensively with civilian or commercial entities, the Ministry of Defense—in this view—should look to other countries, such as the United States for technical expertise. Some suggested as another alternative that the contingent within JAXA that works on military space issues could break off from the agency.<sup>66</sup>

Some of the experts told us that JAXA writ large has not been entirely supportive of collaborating with its Ministry of Defense counterparts. Taro Sato, a lieutenant colonel in the Air Self-Defense Forces who is currently a fellow at the Stimson Center, told us, “There are challenges that need to be overcome between [the Ministry of Defense] and JAXA, including organizational culture. This is similar to other countries with scientific exploration and national security space agencies.”<sup>67</sup> However, this collaboration reportedly has been improving. Susumu Yoshitomi, the head of the Japan Space Forum, told us, “There has been resistance within JAXA to working on security space but recently there has been cooperation between JAXA and [the Ministry of Defense].”<sup>68</sup> Several experts attributed the improving collaboration, in part, to Hiroshi Yamakawa, the current president of JAXA—appointed in April 2018—who previously served in the Strategic Headquarters for Space Policy and who has emphasized the importance of space security.<sup>69,70</sup>

Whether or not they support such heightened collaboration, the interviewees largely agreed that JAXA will continue to work closely with the Ministry of Defense for at least the next several years because of the ministry's lack of expertise. The ministry is charged with developing a space situational awareness system and a protected communications satellite network, among other initiatives. Some experts told us that there are about 10 officials in the Ministry of Defense who have experience and expertise in space; others said there are about 50. Regardless, the Ministry of Defense has an insufficient number of experts to carry out its responsibilities without JAXA.<sup>71</sup>

As an example of the necessity of such collaboration, some of the experts pointed to the Ministry of Defense's development of its space situational awareness system. Currently, JAXA operates its civilian-oriented space situational awareness system, observing its low Earth orbit satellites with radar and its geosynchronous orbit (GEO) satellites with optical telescopes.<sup>72</sup> Experts told us that the Ministry of Defense will eventually manage Japan's overall system, the mission of which will be to observe space objects, maintain a space object catalog, conduct analysis, and warn satellite operators of potential risks.<sup>73</sup> This will be a complex undertaking. The defense system will include a command and control site and a deep-space radar that will be able to look up to GEO.<sup>74</sup> Given the counterspace threats in GEO from potential adversaries, Japan's system could be invaluable.<sup>75</sup> As opposed to optical telescopes—the most common type of system used for GEO observations—a deep-space radar can track objects through all weather conditions, day and night, and potentially offers better spatial resolution and characterization of objects. Such a system is also technically complicated. Among the tradeoffs with deep-space radars—including cost, power, and data processing—is the narrow beam, which, in some cases, requires a cue from other sensors in the network to direct the system. One expert told us that

Japan's command and control center should compile and integrate existing academic, commercial, and military data for the deep-space radar system to operate more effectively.<sup>76</sup> As experts noted, given the Ministry of Defense's limited experience in such operations, it will likely need to lean heavily on JAXA, other countries, and the United States. As Susumu Yoshitomi of the Japan Space Forum told us, “[The Ministry of Defense] does not have any history for [space situational awareness] so they need JAXA's assistance.”<sup>77</sup>

The experts also differed on whether they saw JAXA's engagement in military space activity as temporary or permanent. A current government official told us, “I don't think JAXA's cooperation with [the Ministry of Defense] is temporary.” He added, “JAXA has incentives to continue to work on security issues.” He noted that JAXA's expertise will be critical in other areas where the Ministry of Defense could focus. “We have been researching using small satellites for defense purposes, especially for remote sensing. JAXA has lots of expertise with small satellites. This could be an area where JAXA and [the Ministry of Defense] could cooperate in the future.”<sup>78</sup> Japan's most recent space policy plan lists operationally responsive small satellites and launch systems for such satellites as security priorities.<sup>79</sup> Other experts noted that once the ministry has its own indigenous research and development capabilities, JAXA may return to its earlier focus on science and exploration. One expert said, “I think JAXA's involvement with military space is temporary. Once the [Ministry of Defense] has its own cadre of space experts, JAXA may go back to its prior mission.”<sup>80</sup>

### ***Allied or Independent Capabilities***

The second debate focuses on the types of military space capabilities Japan has been developing. As Japan has embraced security in space over time, the country has pursued defense space systems that either complement U.S. capabilities—such as the

deep-space radar—or are independent of U.S. systems, such as its Information Gathering Satellites. This duality is also reflected in Japanese defense objectives, which emphasize both enhancing the ability of the U.S.-Japanese alliance and developing more autonomous defense systems.<sup>81</sup> According to the experts we met with, Japan is still debating whether it should be developing independent systems, systems that complement U.S. capabilities, or both.

The two countries enjoy an effective military space partnership. In July 2019, the two governments held their sixth meeting of their “comprehensive dialogue on space.” The statement on the dialogue says that the two sides renewed their commitment to expand bilateral cooperation in space security, space situational awareness, and global navigation satellite systems, among other areas.<sup>82</sup> The 2015 bilateral U.S.-Japan defense cooperation guidelines say that the two governments will cooperate to address threats in the space domain, and the two countries have had a space situational awareness sharing agreement in place since 2013.<sup>83</sup> In recent years, Japanese military forces have taken U.S. Air Force space operations courses, including courses in space situational awareness and orbital mechanics, and have participated in space security exercises and wargames, such as the situational awareness exercise called *Global Sentinel* and the space wargames at Schriever Air Force Base.<sup>84</sup> The Air Force is also placing some of its sensor payloads on the next round of Japan’s navigation satellites. The launching of those satellites, planned for 2023, will mark the first time the United States has put operational national security payloads on a foreign satellite and launcher.<sup>85</sup> Japan’s decisions on which capabilities it pursues in the future will not likely change the strength of its military space cooperation with the United States.

Prioritizing nationally independent capabilities will, however, drive different investments rather than prioritizing advancing collective allied capabilities.

In its shift toward military space, Japan has done some of both. Experts we met with told us this question is a central debate in the Japanese space policy community. “In Tokyo, the leadership is still debating whether the primary goal of our space systems is to expand U.S. capabilities or develop our own independent systems,” said Masashi Murano of the Hudson Institute. “Some Japanese politicians argue that we cannot rely on the United States forever and advocate that Japan acquire its own early warning satellites instead of relying on U.S. early warning satellites.”<sup>86</sup> Other experts also brought up early warning as an area that Japanese leadership is debating. One official told us, “Early warning capability is a discussion. The Ministry of Defense does not want it because they have collaboration with the United States, so the Ministry of Defense wants more space situational awareness investment. Some politicians, on the other hand, have been pushing our developing an early warning or partial early warning satellite system.”<sup>87</sup>

The space situational awareness capability notwithstanding, Japan has historically moved toward more independent systems for its military space capabilities. Japan’s Information Gathering Satellites is one example. Rather than simply purchasing imagery from U.S. satellites, Japan made the decision that it needed its own imagery, partly based on a belief that the country should not be dependent on foreign systems.<sup>88</sup> Former JAXA President Shuichiro Yamanouchi said in 2003 of the reconnaissance satellite program that Japan sought “information independence.”<sup>89</sup> As another example, Japan spent years developing its own independent space launch vehicles in lieu of relying on U.S. rockets.<sup>90</sup> Even Japan’s navigation satellites, QZSS, are becoming more independent. This four-satellite regional system currently relies on GPS; however, once it adds three more satellites—scheduled for 2023—it will be able to operate independently of GPS.<sup>91</sup> The systems will still use GPS but will be able to operate on a regional basis in the absence of GPS or other global navigation satellite systems.

A potential implication of Japan developing more independent capabilities would be movement toward more independence in its foreign policy decisions. As Pekkanen and Kallender write, “The U.S. needs to factor in the possibility that, as Japan reinforces its military operations...it can afford to be more assertive politically and it may well seek more autonomy within the alliance.”<sup>92</sup> This reflects other sentiments in Japan concerned with the permanency of the U.S. commitment to Japan’s defense. A recent commentary in *The Japan Times* makes a related point: “...the gradual erosion of U.S. primacy and fluidity in the regional security architecture is making Japan weigh the depth of American commitment to Japan’s security. In some quarters, this is also leading to arguments in favor of Japan becoming more self-reliant in terms of security.”<sup>93,94</sup>

Although the experts we met acknowledged that some in Japan push for more self-reliance in its foreign policy, they told us that this is a minority view and is not a factor in Japan’s decisions over its military space capabilities. Crucially, these experts pointed out that although Japan has moved toward more independent military systems, these systems are still designed to be interoperable with U.S. capabilities. Peter Marquez, who served as the Director of Space Policy for presidents George W. Bush and Barack Obama, said, “I wouldn’t call Japan’s systems independent, even if they have some autonomous capabilities. From a strategic perspective, Japan is not going to build anything to pull away from the United States. The capabilities are going to be compatible, interoperable, and/or complementary with U.S. systems.”<sup>95</sup> Frank Jannuzi of the Maureen and Mike Mansfield Foundation reiterated this point, saying that, wherever possible, “[Japan’s] indigenous systems will be designed to be interoperable with U.S. hardware and software, providing welcome redundancy in core mission areas and thereby contributing to the resilience of the alliance’s space assets.”<sup>96</sup> Said Yasuhito Fukushima of the National Institute for Defense

Studies in Japan, “Japan’s security space activities are premised on cooperation with the United States.”<sup>97</sup>

Japan’s defense satellite communications represent an area in which the nation has pursued capabilities that are compatible with U.S. systems. Japan is developing a three-satellite protected military communications network using the X-band frequency. Two satellites are in orbit, the third is scheduled to be launched in 2022.<sup>98</sup> One of the advantages for Japan in using that frequency is interoperability with infrastructure and equipment for other X-band satellite networks. Among many countries, the U.S. government uses X-band. The U.S. Wideband Global Satellite Communications System and Defense Satellite Communications System are both X-band satellite networks.<sup>99,100</sup> Accordingly, Japan could use some U.S. ground infrastructure and equipment for its satellite system and the United States could likely use the ground infrastructure and equipment that Japan is building for its X-band satellite systems. The preponderance of that frequency also translates to a tradeoff. Just as equipment and infrastructure are common for X-band, so are enemy jammers. According to experts we have met with, Japan and the United States have discussed Japan using the U.S. defense satellite communications system called *advanced extremely high frequency* (AEHF), which uses a more protected frequency band and could lead to more integration between the two countries’ defense satellite networks.<sup>101,102</sup>

Although consequential, this debate is narrower than it seems. Rather than signaling independence from the United States, Japan’s ambitions for its space capabilities—both independent and supplementary systems—are to enhance cooperation. Japan scholar Jennifer Lind’s insight on Japan’s broader security reforms in 2016 is useful for considering the country’s defense space activity today: “The recent security reforms represent continuity, rather than change, in a pattern

in which Japan relies upon the United States for its security but contributes more to the alliance when its security environment worsens.”<sup>103</sup>

### Counterspace

The third debate centers on whether to pursue counterspace capabilities. The 2018 *National Defense Program Guidelines* signaled an important development in Japan’s role as a military space nation. Although Japan has been developing military space capabilities, these have not ostensibly been designed to disrupt or attack other nations’ space assets. This changed with the 2018 guidelines, which was the first Japanese government document to call out a need for counterspace systems. Specifically, the guidelines say that the Self-Defense Forces will work to strengthen capabilities, including the “capability to disrupt opponent’s command, control, communications, and information.”<sup>104</sup> A current official confirmed that this capability was first introduced in the 2018 guidelines.<sup>105</sup>

Experts told us that *National Defense Program Guidelines* referred to jamming technologies that the Ministry of Defense is considering acquiring.<sup>106</sup> Advocates for jamming capabilities pointed to the threat of China and noted that such systems could be defensive. One expert told us that jamming is “essential” for Japan, given potential counterspace threats.<sup>107</sup> One industry official told us that the Japanese defense industry is already developing such capabilities.<sup>108</sup> However, other experts told us that whether the Ministry of Defense will adopt such a system is not yet settled. Peter Marquez, former Director of Space Policy, told us, “Jamming capabilities may be under discussion in Japan but the country is not developing such systems at this time. Despite its inclusion in the *National Defense Program Guidelines*, counterspace capabilities are not being developed by Japan. If they were to

develop a communications jammer, it is not integrated into a counterspace strategy, which does not exist in Japan.” Such capabilities would be “premature,” Marquez told us.<sup>109</sup>

What is most striking about the Japanese counterspace discussion is what it does not include. The experts we met with largely agreed that Japan would not develop kinetic space weapons, such as on-orbit anti-satellite assets. One expert told us, “The debate about counterspace is on jamming. We aren’t debating kinetic anti-satellite capabilities or other kinetic capabilities, but even jamming is seen by some as offensive. Jamming can be seen by others as self-defense and an evolution of our military space developments.”<sup>110</sup>

One potential shift in Japan’s counterspace capabilities could be Japan revising its pacifist Constitution. Revising Article 9 reportedly remains a top priority for Prime Minister Abe.<sup>111</sup> Any constitutional amendment requires approval by two-thirds of both houses of the Diet and a majority in a national referendum. However, even if successful, according to the experts we spoke with, this would have little impact on Japan’s counterspace ambitions. One official told us, “Revising Article 9 will not affect counterspace. It will affect the ability of our maritime and ground forces to operate abroad—and could push us to expand our defense communications satellites—but it won’t drive us to develop counterspace weapons. No one is arguing for that.”<sup>112</sup>

The parameters of this debate, like the others discussed, are narrow. The debate is about whether to develop some incremental capabilities, not to develop kinetic or strike space capabilities. Japanese military space efforts are expanding, but they are doing so incrementally, not rapidly.

## Conclusion

When examining the future role of Japan in military space partnerships, U.S. foreign policy and space communities should consider how its history and debate on security in space can foreshadow where its military space activity is likely headed. The potential that Japan could bring to space partnerships is enormous. This is an ally that has one of the biggest space budgets and is renowned for technological prowess—the country that brought us the bullet train. But the limitations should be understood too. The U.S. policy community should appreciate Japan’s gradual shift toward military space and gauge their expectations accordingly. With threats from an assertive China and a bellicose North Korea, this alliance is as important as ever. The 2018 *National Defense Strategy* says that U.S. alliances and partnerships provide a “durable, asymmetric strategic advantage that no competitor or rival can match.”<sup>113</sup> It is good to have friends—and the better we know them, the better we can partner with them.

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## References

- <sup>1</sup> Simon Seminari, “Global government space budgets continues multiyear rebound,” *SpaceNews*. November 2, 2019. <https://spacenews.com/op-ed-global-government-space-budgets-continues-multiyear-rebound/>.
- <sup>2</sup> Union of Concerned Scientists Satellite Database. Union of Concerned Scientists. <http://ucsusa.org/org>. Data updated as of December 19, 2019.
- <sup>3</sup> China, India, Japan, Russia, the United States, and the European Space Agency operate their own navigation satellites. China, India, Japan, Russia, South Korea, and the United States have independent space launch capabilities to reach Medium-Earth Orbit and Geosynchronous Orbit. “Competing in Space,” National Air & Space Intelligence Center, December 2018. <https://media.defense.gov/2019/Jan/16/2002080386/-1/-1/1/190115-F-NV711-0002.PDF>
- <sup>4</sup> “Giant leap for yakitori: Canned chicken dish receives Japanese Space Food certification,” *Japan Times*, November 27, 2019, <https://www.japantimes.co.jp/news/2019/11/27/national/yakitori-go-canned-chicken-receives-japanese-space-food-certification/#.XlbYqsJYbkA>.
- <sup>5</sup> William Graham, “H-IIA conducts IGS Optical 7 launch,” *NASASpaceflight.com*, February 8, 2020. <https://www.nasaspaceflight.com/2020/02/h-ii-a-igs-optical-7-launch/>
- <sup>6</sup> Mari Yamaguchi, “Japan reveals plan for space defense unit,” *The Associated Press*. January 21, 2020. <https://www.defensenews.com/space/2020/01/21/japan-reveals-plan-for-space-defense-unit/>
- <sup>7</sup> “Abe says Japan’s ASDF may evolve into ‘air and space’ defense force,” *Japan Times*, September 17, 2019, <https://www.japantimes.co.jp/news/2019/09/17/national/politics-diplomacy/abe-says-japans-asdf-may-evolve-air-space-defense-force/#.Xlbdi8JYbkA>
- <sup>8</sup> “National Defense Program Guidelines for FY 2019 and beyond,” Ministry of Defense, December 18, 2018, [https://www.mod.go.jp/j/approach/agenda/guideline/2019/pdf/20181218\\_e.pdf](https://www.mod.go.jp/j/approach/agenda/guideline/2019/pdf/20181218_e.pdf).
- <sup>9</sup> Scott Pace, “U.S.-Japan Space Security Cooperation” in Schrogl KU, Hays PL, Robinson J, Moura D, Giannopapa C (Eds) *Handbook of Space Security, Policies, Applications and Programs*. Springer, New York, 2015, pages 337-354, <https://link.springer.com/content/pdf/10.1007%2F978-1-4614-2029-3>.
- <sup>10</sup> United Nations Office for Outer Space Affairs. 2222 (XXI). Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html>.
- <sup>11</sup> Pace, “U.S.-Japan Space Security Cooperation,” 337-354.
- <sup>12</sup> Saadia M. Pekkanen and Paul Kallender-Umezu, “In Defense of Japan: From the Market to the Military in Space Policy,” Stanford University Press, Stanford, California: 2010, page 32.
- <sup>13</sup> Sayuri Umeda, “Japan: Article 9 of the Constitution,” Library of Congress, February 2006. <https://www.loc.gov/law/help/japan-constitution/article9.php>
- <sup>14</sup> This policy was dropped by Nakasone in January 1987, and was combined with the statement that Japan will remain a “peace-loving nation.” “The fundamental defense concept of Japan under its Peace Constitution is to maintain an exclusively defensive posture and not to become a military power that presents a threat to other nations.”
- <sup>15</sup> “SIPRI Military Expenditure Database,” Stockholm International Peace Research Institute, <https://www.sipri.org/databases/milex>. Accessed on February 3, 2020.
- <sup>16</sup> Crystal Pryor and Tom Le, “Looking Beyond 1 Percent: Japan’s Security Expenditures,” *The Diplomat*, April 3, 2018. <https://thediplomat.com/2018/04/looking-beyond-1-percent-japans-security-expenditures/>
- <sup>17</sup> No official English translation of the 2008 Basic Space Law exists. However, a decent unofficial translation can to be found at <http://stage.tksc.jaxa.jp/spacelaw/country/japan/27A-1.E.pdf>. Additionally, a useful briefing on the law provided by the Japanese government to the United Nations Committee of the Peaceful Use of Outer Space, Legal Subcommittee in 2009 can be found at <http://www.unoosa.org/pdf/pres/lsc2009/pres-09.pdf>
- <sup>18</sup> Crystal Pryor, “Strategic Imperatives for US-Japan Outer Space Cooperation,” *Asia Pacific Bulletin*, December 7, 2012, <https://www.eastwestcenter.org/publications/strategic-imperatives-us%E2%80%93japan-outer-space-cooperation>.
- <sup>19</sup> “Basic Plan for Space Policy,” Japan Strategic Headquarters for Space Policy, June 2, 2009, pages

- 10-11,  
[https://www8.cao.go.jp/space/pdf/basic\\_plan.pdf](https://www8.cao.go.jp/space/pdf/basic_plan.pdf)
- <sup>20</sup> Ibid.
- <sup>21</sup> Ibid., 75.
- <sup>22</sup> “Implementation Plan of the Basic Plan on Space Policy,” Japan Cabinet Office, December 12, 2017, section 4,  
<https://www8.cao.go.jp/space/english/basicplan/basicplan.html>.
- <sup>23</sup> “What is the Quasi-Zenith Satellite System,” Cabinet Office, National Space Policy Secretariat. Accessed on February 3, 2020.  
[https://qzss.go.jp/en/overview/services/sv02\\_why.html](https://qzss.go.jp/en/overview/services/sv02_why.html)
- <sup>24</sup> William Graham, “Japan’s H-2A conducts QZSS-4 Launch,” NASA Spaceflight.com, October 9, 2017,  
<https://www.nasa.gov/spaceflight/2017/10/japans-h-2a-rocket-qzss-4-launch/>.
- <sup>25</sup> “Implementation Plan,” section 1.
- <sup>26</sup> “Implementation Plan,” section 15.
- <sup>27</sup> “Japan Space Policy and Organization,” Japan Ministry of Defense. October 2019 (hardcopy). “Medium Term Defense Program,” Ministry of Defense, December 18, 2018, page 7,  
[https://www.mod.go.jp/e/d\\_act/d\\_policy/national.html](https://www.mod.go.jp/e/d_act/d_policy/national.html).
- <sup>28</sup> “Space Related Budgets,” Japan Cabinet Office, (not translated),  
<https://www8.cao.go.jp/space/budget/yosan.html>. Accessed on November 24, 2019.
- <sup>29</sup> Takuya Wakimoto, “Issues & Insights Vol. 19, WP3 – A Guide to Japan’s Space Policy Formulation: Structures, Roles and Strategies of Ministries and Agencies for Space,” Pacific Forum, April 11, 2019.  
<https://www.pacforum.org/analysis/issues-insights-vol-19-wp3-%E2%80%93-guide-japans-space-policy-formulation-structures-roles>
- <sup>30</sup> Pace, “U.S.-Japan Space Security Cooperation,” 337-354.
- <sup>31</sup> Personal communication, November 2019.
- <sup>32</sup> Wakimoto, “A Guide to Japan’s Space Policy Formulation.”
- <sup>33</sup> JAXA overview (hardcopy). October 2019.
- <sup>34</sup> “Japan defense budget hits new high with focus on space, cyberspace,” *Kyodo News*, December 20, 2019.  
<https://english.kyodonews.net/news/2019/12/c26eecef0bde-japan-defense-budget-hits-new-high-with-focus-on-space-cyberspace.html>
- <sup>35</sup> “New Basic Plan on Space Policy,” January 16, 2015, pages 1, 4-5.  
[https://aerospace.org/sites/default/files/policy\\_archives/Japan%20Basic%20Plan%20Jan15.pdf](https://aerospace.org/sites/default/files/policy_archives/Japan%20Basic%20Plan%20Jan15.pdf)
- <sup>36</sup> “Implementation Plan.”
- <sup>37</sup> “Defense of Japan 2014,” Ministry of Defense, January 2014.  
[https://www.mod.go.jp/e/publ/w\\_paper/2014.html](https://www.mod.go.jp/e/publ/w_paper/2014.html)
- <sup>38</sup> “Defense of Japan 2019,” Ministry of Defense, January 2019.  
[https://www.mod.go.jp/e/publ/w\\_paper/](https://www.mod.go.jp/e/publ/w_paper/)
- <sup>39</sup> Koichi Isobe, “Operational Aspects of Japan’s 2018 NDPG,” *The New National Defense Program Guidelines: Aligning U.S. and Japanese Defense Strategies*, edited by James L. Schoff and Sayuri Romei, Sasakawa USA, 2019.  
[https://www.pacforum.org/sites/default/files/issuesinights\\_Vol19WP3\\_0.pdf](https://www.pacforum.org/sites/default/files/issuesinights_Vol19WP3_0.pdf)
- <sup>40</sup> Yasuhito Fukushima, “Japan’s Use of Space for Defense Purposes —Continuity and Change Before and After the Enactment of the Basic Space Law” National Institute of Defense Studies, March 2017.  
[http://www.nids.mod.go.jp/english/publication/briefing/pdf/2017/briefing\\_e201703.pdf](http://www.nids.mod.go.jp/english/publication/briefing/pdf/2017/briefing_e201703.pdf)
- <sup>41</sup> Personal communication, interview with Frank Jannuzi, February 5, 2020.
- <sup>42</sup> Manuel Manriquez, “Japan’s Space law Revision: the Next Step Toward Re-Militarization?” Nuclear Threat Initiative, January 1, 2008.  
<https://www.nti.org/analysis/articles/japans-space-law-revision/>
- <sup>43</sup> Ibid.
- <sup>44</sup> “Japan Enhances its Space Defenses, Stratfor Global Intelligence, August 6, 2014. <https://us4.campaign-archive.com/?u=74786417f9554984d314d06bd&id=ee131435f6&e=504e299f50>
- <sup>45</sup> Paul Kallender and Christopher Hughes, “Hiding in Plain Sight? Japan’s Militarization of Space and Challenges to the Yoshida Doctrine,” *Asian Security*, 15:2, 180-204, March 5, 2018.
- <sup>46</sup> Saadia M. Pekkanen and Paul Kallender-Umezu, “In Defense of Japan: From the Market to the Military in Space Policy,” Stanford University Press, Stanford, California: 2010, pages 143-144.
- <sup>47</sup> Setsuko Aoki, “Introduction to the Japanese Basic Space Law of 2008 / Überblick über das Japanische Weltraumbasisgesetz 2008 / Introduction à la Loi (de Base) Spatiale 2008 Japonaise,” *Zeitschrift für Luft- und Weltraumrecht - German Journal of Air and Space Law* 57, no. 4 (2008): 585-589.
- <sup>48</sup> Manriquez, “Japan’s Space law Revision.”
- <sup>49</sup> Andrew L. Oros, “Explaining Japan’s Tortured Course to Surveillance Satellites,” *Review of Policy Research* 24(1):29-48, January 2007.
- <sup>50</sup> Ibid.

- <sup>51</sup> Aoki, “Introduction to the Japanese Basic Space Law,” 585-589.
- <sup>52</sup> Manriquez, “Japan’s Space law Revision.”
- <sup>53</sup> Ibid.
- <sup>54</sup> Ibid.
- <sup>55</sup> Richard C. Bush, “China-Japan Tensions, 1995-2006 Why They Happened, What To Do,” Brookings Institution. Policy Paper Number 16, June 2009. [https://www.brookings.edu/wp-content/uploads/2016/06/06\\_china\\_japan\\_bush.pdf](https://www.brookings.edu/wp-content/uploads/2016/06/06_china_japan_bush.pdf)
- <sup>56</sup> Manriquez, “Japan’s Space law Revision”
- <sup>57</sup> Pace, “U.S.-Japan Space Security Cooperation,” 337-354.
- <sup>58</sup> Pekkanen and Kallender-Umezu, “In Defense of Japan,” 145.
- <sup>59</sup> Oros, “Explaining Japan’s Tortured Course to Surveillance Satellites,” 29-48.
- <sup>60</sup> Pekkanen and Kallender-Umezu, “In Defense of Japan,” 46-53.
- <sup>61</sup> Taisei Hoyama and Noriyasu Sato, “Chasing dream of ‘space superpower,’” *Nikkei Weekly*, October 1, 2007.
- <sup>62</sup> Pekkanen and Kallender-Umezu, “In Defense of Japan,” 53.
- <sup>63</sup> In addition to the purchase of satellite imagery for the military and development of its own reconnaissance satellites, Japan’s commitment to navigation satellites (called QZSS) represents another example of the country engaging in military space activity before the Basic Space Law. Although Japan did not launch its first navigation satellite until after passage of the law in 2010, the Japanese government conceived the program and committed funding to it in years prior to the law. Paul Kallender, “Japan’s New Dual Use Space Policy,” IFRI Center for Asian Studies, November 2016. [https://www.ifri.org/sites/default/files/atoms/files/japan\\_space\\_policy\\_kallender.pdf](https://www.ifri.org/sites/default/files/atoms/files/japan_space_policy_kallender.pdf)
- <sup>64</sup> Aoki, “Introduction to the Japanese Basic Space Law,” 585-589.
- <sup>65</sup> Personal communication, January 2020.
- <sup>66</sup> Personal communication, October 2019-January 2020.
- <sup>67</sup> Personal communication, interview with Taro Sato, January 31, 2020.
- <sup>68</sup> Personal communication, interview with Susumu Yoshitomi, January 14, 2020.
- <sup>69</sup> Personal communication, October 2019-March 2020.
- <sup>70</sup> Dr. Hiroshi Yamakawa, 36th Space Symposium. <https://www.spacesymposium.org/speaker/dr-hiroshi-yamakawa/>
- <sup>71</sup> Personal communication, December 2019-January 2020.
- <sup>72</sup> Yu Takeuchi, “Law and policy for space situational awareness toward Space Traffic Management – A Japanese perspective,” *Journal of Space Safety Engineering*, Volume 6, Issue 2, June 2019, Pages 130-137.
- <sup>73</sup> Personal communication, December 2019-February 2020.
- <sup>74</sup> “Japan Space Policy and Organization,” Japan Ministry of Defense. October 2019 (hardcopy).
- <sup>75</sup> For example, a 2019 DIA report says “China probably intends to pursue additional ASAT weapons capable of destroying satellites up to GEO.” “Challenges to Security in Space,” Defense Intelligence Agency, January 2019, [https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Space\\_Threat\\_V14\\_020119\\_sm.pdf](https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Space_Threat_V14_020119_sm.pdf).
- <sup>76</sup> Personal communication, December 2019-February 2020.
- <sup>77</sup> Personal communication, interview with Susumu Yoshitomi, January 14, 2020.
- <sup>78</sup> Personal communication, January 2020.
- <sup>79</sup> “Implementation Plan,” section 6.
- <sup>80</sup> Personal communication, January 2020.
- <sup>81</sup> “Japan Space Policy and Organization.”
- <sup>82</sup> “Joint Statement on the Sixth Meeting of the U.S.-Japan Comprehensive Dialogue on Space,” U.S. Department of State, July 24, 2019. <https://www.state.gov/joint-statement-on-the-sixth-meeting-of-the-u-s-japan-comprehensive-dialogue-on-space/>
- <sup>83</sup> “The Guidelines for U.S.-Japan Defense Cooperation,” Department of Defense, April 27, 2015, [https://archive.defense.gov/pubs/20150427\\_--GUIDELINES\\_FOR\\_US-JAPAN\\_DEFENSE\\_COOPERATION.pdf](https://archive.defense.gov/pubs/20150427_--GUIDELINES_FOR_US-JAPAN_DEFENSE_COOPERATION.pdf)
- “Joint Statement – The First Meeting of the Japan-U.S. Comprehensive Dialogue on Space,” Japan Ministry of Foreign Affairs, March 11, 2013. <https://www.mofa.go.jp/files/000001829.pdf>
- <sup>84</sup> Personal communication, December 2019-January 2020.
- <sup>85</sup> Paul McLeary and Theresa Hitchens, “US, Japan To Ink Hosted Payload Pact to Monitor Sats,” *Breaking Defense*, August 5, 2019. US, Japan To Ink Hosted Payload Pact to Monitor Sats
- <sup>86</sup> Personal communication, interview with Masashi Murano, January 13, 2020.
- <sup>87</sup> Personal communication, January 2020.

- <sup>88</sup> Pekkanen and Kallender-Umezu, “In Defense of Japan,” 143-144.
- <sup>89</sup> Manriquez, “Japan’s Space Law Revision”
- <sup>90</sup> Pekkanen and Kallender-Umezu, “In Defense of Japan,” 95-130.
- <sup>91</sup> “Implementation Plan,” section 1.
- <sup>92</sup> Pekkanen and Kallender-Umezu, “In Defense of Japan,” 249.
- <sup>93</sup> Titli Basu, “In an uncertain East Asia, Japan's security choices face balancing act between U.S. and neighbors,” *The Japan Times*, January 22, 2020. <https://www.japantimes.co.jp/news/2020/01/22/national/politics-diplomacy/japan-security-east-asia/#.XinIoWRKhaQ>
- <sup>94</sup> Lully Miura, “What’s behind Japan’s political stability?” *The Japan Times*, September 27, 2019. <https://www.japantimes.co.jp/opinion/2019/09/27/commentary/japan-commentary/whats-behind-japans-political-stability/#.XinIAWRKhaQ>
- <sup>95</sup> Personal communication, interview with Peter Marquez, January 22, 2020.
- <sup>96</sup> Personal communication, interview with Frank Jannuzi, February 5, 2020.
- <sup>97</sup> Personal communication, interview with Yasuhito Fukushima, January 26, 2020.
- <sup>98</sup> “Implementation Plan,” section 15.
- <sup>99</sup> “Wideband Global SATCOM Satellite,” U.S. Air Force, November 23, 2015. <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104512/wideband-global-satcom-satellite/>.
- <sup>100</sup> “Defense Satellite Communications System,” U.S. Air Force, November 23, 2015. <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104555/defense-satellite-communications-system/>
- <sup>101</sup> Personal communication, December 2019-January 2020.
- <sup>102</sup> The two countries are also discussing partnering on space situational awareness and navigation, according to experts we met with. For space situational awareness, Japan’s data will likely feed into the U.S. space surveillance network. For their navigation satellites, the countries have also discussed Japan launching protected and jam-resistant GPS payloads (called *M-Code signals*) on future Japanese satellites. Personal communication, October 2019-January 2020.
- <sup>103</sup> Jennifer Lind, “Japan’s Security Evolution,” CATO Institute, Policy Analysis No. 788, February 25, 2016. <https://www.cato.org/publications/policy-analysis/japans-security-evolution>
- <sup>104</sup> “National Defense Program Guidelines for FY 2019.”
- <sup>105</sup> Personal communication, January 2020.
- <sup>106</sup> Personal communication, October 2019-January 2020.
- <sup>107</sup> Personal communication, October 2019.
- <sup>108</sup> Personal communication, February 2020.
- <sup>109</sup> Personal communication, interview with Peter Marquez, January 22, 2020.
- <sup>110</sup> Personal communication, December 2019.
- <sup>111</sup> Isabel Reynolds and Emi Nobuhiro, “Japan’s Abe Resumes Constitution Quest to Burnish Legacy,” *Bloomberg*, January 19, 2020. <https://www.bloomberg.com/news/articles/2020-01-19/japan-s-abe-resumes-constitution-quest-in-bid-to-burnish-legacy>
- <sup>112</sup> Personal communication, January 2020.
- <sup>113</sup> “2018 National Defense Strategy,” Department of Defense, October 8, 2018, page 8, <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>

