Japan and South Korea Briefings for NPEC Wargame

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Japan

Capabilities

Japan is one of the most mature space nations in the world. It has the fifth largest space budget and the fourth most satellites in orbit.[iii] The country is one of five that has its own position, navigation, and timing satellites, and of one of six, plus the European Space Agency, that can independently launch into higher orbits.[iii] Japan also has its own reconnaissance satellites and is developing its own defense satellite communications system and a deep-space radar.[iv]

Table 1: Major Defense Space Capabilities in Japan

	**Reconnaissance Satellites:** 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.[22]
	**Position, Navigation, and Timing:** Since 2018, Japan has operated a four-satellite navigation system called the Quasi-Zenith Satellite System.[23] Japan launched the first of these satellites in 2010.[24] 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.[25]
	**Satellite Communications:** 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.[26]
	**Space Situational Awareness:** 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.[27]

(Source: Aerospace Corporation, [Japan's Gradual Shift Toward Space Security | The Aerospace Corporation])

Timeline of Japan's Defense Space Activity

(Source: Aerospace Corporation, [Japan's Gradual Shift Toward Space Security | The Aerospace Corporation])

Japan's recent guidance also suggests interest in developing missile warning satellites and a jamming capability.

On June 30, Japan's Cabinet approved the newest version of the country's national space policy. Revised for the first time in five years, it says that, in cooperation with the United States, Japan will study small-satellite constellations with infrared sensors for missile warning. Studying missile warning satellites fits within a flurry of recent missile and missile defense activity in Japan, but it also reflects long-term trends. The country has been on a gradual shift toward space security since the 1980s, when Japan first started acquiring imagery for its military. Studying missile warning comports with long-standing concerns over missile threats.[v]

The 2018 National Defense Program Guidelines 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." Experts told us that National Defense Program Guidelines referred to jamming technologies that the Ministry of Defense is considering acquiring.[vi]

Defense Space Relationship with the U.S.

The United States and Japan have a robust defense space relationship. In July 2019, the two governments held their sixth meeting of their "comprehensive dialogue on space."[vii] 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. 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. In

recent years, Japanese military forces have taken U.S. Space 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. The Space 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 foreign launcher.[viii1]

South Korea

Current Capabilities

South Korea is also one of the biggest space nations in the world. Among the 10 biggest spenders in space, South Korea has its own military communications satellites, earth observation satellites, and indigenous launch capability. Like Japan, it is one of six nations—plus the European Space Agency—that can independently launch into high orbits.

South Korea also has ambitious plans for their defense space activity, to include:

- Developing their own positioning, navigation, and timing satellites (the Korean Positioning Satellite System to be fielded in 2034)
- Pursuing reconnaissance satellites
- Considering early warning capabilities
- Planning more investment in space situational awareness

The country has also prioritized lunar exploration with plans to launch its own orbiter in 2022 and land on the Moon by 2030.[ix]

Economic indicators also suggest South Korea's role in space will continue to grow. It is not only one of the biggest economies in the world, but its economy is growing at a high rate relative to other countries with high GDP. Among the countries with the top 15 highest GDPs, only India has a higher rate of growth in GDP than South Korea.[x]

Defense Space Relationship with the U.S.

South Korea occupies an interesting position because it not only has deep relationships with the United States but also with China, their biggest economic partner, and Russia, who has assisted South Korea with their ballistic missile and space launch vehicle programs. And Russia and China are actively looking for space partners too.

With respect to the United States:

- South Korea has an agreement with U.S. Space Command for both countries to share their space situational awareness data.
- As of the last few years, South Korea has been participating in U.S.-hosted space situational awareness exercises, like Global Sentinel.

- South Korea and the United States have a cooperative space work group to discuss areas of defense space collaboration.

In March 2021, the national security advisors in Japan, the United States, and South Korea held trilateral dialogues. Future dialogues could cover space security issues; however, it is unclear the nations have had trilateral defense space discussions.

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[i] 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/

[ii] Union of Concerned Scientists Satellite Database. Union of Concerned Scientists. http://ucsusa.org/org. Data updated as of December 19, 2019.

[iii] China, India, Japan, Russia, the United States, and the European Space Agency operate their own navigation satellites. China, India, Iran, Japan, Russia, and South Korea 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

[iv] Robert S. Wilson, "Japan's Gradual Shift Toward Space Security," *The Aerospace Corporation*, May 4, 2020, Japan's Gradual Shift Toward Space Security | The Aerospace Corporation.

[v] "Japan's studying missile warning fits within long-term trends," Sam Wilson, *Kyodo News*, August 28, 2020, https://english.kyodonews.net/news/2020/08/abe7a2722247-opinion-japans-studying-missile-warning-fits-within-long-term-trends.html.

[vi] "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

[vii] "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-sixthmeeting-of-the-u-s-japan-comprehensive-dialogueon-space/

[viii] Robert S. Wilson, "Japan's Gradual Shift Toward Space Security," *The Aerospace Corporation*, May 4, 2020, Japan's Gradual Shift Toward Space Security | The Aerospace Corporation.

[ix] "South Korea's Space Program: Activities and Ambitions," Hyoung Joon An, chapter in *Asia in Space: The Race to the Final Frontier*, The National Bureau of Asian Research, April 24, 2020. https://www.nbr.org/publication/asia-in-space-the-race-to-the-final-frontier/

[x] Data from the World Bank. https://data.worldbank.org/indicator/ny.gdp.mktp.cd?view=map.