

South Korea's space program and its implications

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Abstract

This paper seeks to highlight the ramifications of South Korea's recent space endeavors concerning the ROK-US alliance and its relations with China. To do so, first, it will review the history of South Korea's space program and discuss factors that helped advance or slow down the development of South Korea's space program. Then, it will take a close look at the changing nature of the ROK-US alliance concerning the domain of outer space and the effect of these changes on regional security including South Korea's relations with China.

Keywords: *International Security, Space Program, South Korea, ROK-US Alliance*

Nuri, the Korean Satellite Launch Vehicle II, which was built by the Korea Aerospace Research Institute (KARI) in collaboration with local companies, took off from the Naro Space Center in Goheung on October 21, 2021. The three-stage rocket, which carried a 1.5-ton dummy payload, reached space 434 miles above the Earth but failed to put the dummy satellite into orbit.¹⁾ Had Nuri successfully put the dummy satellite in orbit, South Korea would have been the seventh country with the technology to build a space launch vehicle that could carry a satellite weighing more than 1 ton after Russia, the United States, France, China, Japan, and India.²⁾ It would have given the country more confidence in achieving other ambitious goals such as building 6G networks and spy satellites and beginning lunar adventures.³⁾

This is not the first time South Korea's rocket launch has failed. Its carrier rocket, which used engines developed by Russia, failed to reach orbit in 2009 and 2010, although its third attempt in 2013 successfully had a two-stage Naro space vehicle place STSAT-2C into low Earth orbit.⁴⁾ In the history of space launch programs, failures on the first try are common. In the 1950s when the United States strived to keep up with the Soviet Union that just successfully launched its first satellite, Sputnik 1, it experienced many failures before successfully sending Explorer 1 to space.⁵⁾ The Nuri carrier rocket failed to send a dummy satellite into orbit. However, it should be noted that all three stages of the liquid-fueled rocket worked, although the third stage of the rocket "burned out sooner than planned" and thus did not give "the test satellite enough speed to stabilize and stay in orbit."⁶⁾ Nonetheless, the October 21 rocket launch is a remarkable step forward for South Korea as a spacefaring country; it signifies the grand entry of South Korea into the exclusive Space Club.

The October 21 launch is among a series of recent developments that indicates South Korea's growing interest in and determination on expanding its space

1) Sang-hun Choe, "South Korea's First Homemade Rocket Lifts Off but Is 'One Step Short,'" *New York Times*, October 21, 2021, available at <https://www.nytimes.com/2021/10/21/world/asia/south-korea-rocket.html>; Yoonjung Seo, Gawon Bae, and Jessie Yeung, "South Korea fails to put dummy satellite into orbit," *CNN*, October 21, 2021, available at <https://www.cnn.com/2021/10/21/asia/south-korea-nuri-rocket-launch-intl-hnk-scn/index.html>

2) Seo, Bae, and Yeung, "South Korea fails to put dummy satellite into orbit."

3) Josh Smith, "From spy satellites to mobile networks, S.Korea pins space hopes on new rocket," *Reuters*, October 14, 2021, available at <https://www.reuters.com/world/asia-pacific/spy-satellites-mobile-networks-skorea-hopes-new-rocket-gets-space-programme-off-2021-10-15/>

4) Seo, Bae, and Yeung, "South Korea fails to put dummy satellite into orbit"; Bloomberg, "South Korea seeks to move up its spot in global space race," *Bloomberg*, July 15, 2021, available at <https://www.bloomberg.com/news/articles/2021-07-14/south-korea-seeks-to-move-up-its-spot-in-global-space-race>

5) James Clay Moltz, "The KSLV I Launch and South Korea's Space Strategy," Council on Foreign Relations, October 17, 2012, available at <https://www.cfr.org/report/kslv-i-launch-and-south-koreas-space-strategy>

6) Choe, "South Korea's First Homemade Rocket Lifts Off but Is 'One Step Short.'"

program. In the late February of 2021, the Republic of Korea (ROK) government allocated about \$553.1M to space programs that would involve 16 government bodies. Several weeks later, South Korean President Moon Jae-in announced that the country planned to send its own moon lander with its own launch vehicle by 2030. Moon's May visit to Washington concluded with the termination of the bilateral missile guidelines that had restricted ROK's missile capability. A few days after the Biden-Moon meeting, by signing the Artemis Accords on stewardship of the moon, South Korea became the tenth member of NASA's moon-exploration coalition, the Artemis program.

This paper seeks to highlight the ramifications of South Korea's recent space endeavors concerning the ROK-US alliance and its relations with China. To do so, first, it will review the history of South Korea's space program and identify factors that helped advance or slow down the development of the country's space program. Then, it will take a close look at the changing nature of the ROK-US alliance concerning the area of outer space and the effect of these changes on regional security including South Korea's relations with China.

South Korea's Space Program

Since its first satellite in 1992, KITSat-1 (Korean Institute of Technology Satellite), which was launched from Guiana, South Korea has launched 37 satellites into orbit.⁷⁾ In 2013, it was able to launch its first carrier rocket to space with an engine developed by Russian. Although the "wholly Korean-made launch rocket" Nuri failed to send its dummy satellite into orbit,⁸⁾ given how late South Korea's space program began and under what restrictions it had operated, its progress is commendable.

It was only about thirty years ago in 1989 when South Korea established the KARI that has played a pivotal role in leading the country's space program to where it is now. At the outset, collaborating mainly with Britain and the United States, KARI focused its efforts on developing satellites, hoping to acquire technology to develop its own spacecraft in near future.⁹⁾ While making progress on building satellites, in the 1990s, KARI became interested in rockets and developed solid-fueled boosters that reached the 180-kilometer altitude; however, due to the missile guidelines that were agreed on between Seoul and Washington in 1979, KARI's efforts to build carrier rockets came to a halt.¹⁰⁾

7) Hyoung Joon An, "South Korea's Space Program: Activities and Ambitions," *Asia Policy*, Vol. 15, No. 2, (2020) p. 34.

8) Ibid.

9) Moltz, "The KSLV I Launch and South Korea's Space Strategy."

In an effort to acquire technology to build a booster, South Korea signed up to be a member of the Missile Technology Control Regime (MTCR) in 2001. Yet, failure of negotiation with the United States turned South Korea to Russia as a provider of a booster in 2004. Although the first two attempts to send a satellite into orbit in 2009 and 2010 were not successful, South Korea's collaboration with Russia resulted in its first satellite STSAT-2C, a 100-kilogram research satellite, placed by its own launch vehicle (2013) and its first Korean astronaut into space in 2008.¹¹⁾

Another milestone was made on March 26, 2015, when South Korea launched the KOMPSAT-3A (Arirang-3A) from the Yasny launch base in Russia. Arirang-3A, which would monitor the Korean peninsula regardless of the weather condition, was the first satellite developed by private sectors that KARI shared its technology with.¹²⁾ South Korea's first military communications satellite was carried by a Falcon 9 rocket of SpaceX and launched from the Kennedy Space Center in Florida, U.S.A., in July 2020.¹³⁾ On May 26, 2021, by signing the Artemis Accords, South Korea became the tenth country that joined the NASA-led Artemis lunar exploration program.¹⁴⁾ The recent removal of the 42-year-old missile guidelines that had restricted the distance, payload size, and fuel type of South Korea's ballistic missiles will only accelerate the expansion of South Korea's space programs¹⁵⁾ and encourage the private sector's involvement in space projects.¹⁶⁾

Proactive governmental policies

All these signs of progress would not have been possible had there not been the South Korean government's proactive space policies. Behind remarkable progress in South Korea's space programs was a series of governmental policies that

10) Ibid.

11) Moltz, "The KSLV I Launch and South Korea's Space Strategy"; Bloomberg, "South Korea seeks to move up its spot in global space race."

12) Tae-jun Kang, "South Korea's Quest to Be a Major Space Power," *The Diplomat*, March 27, 2015, available at <https://thediplomat.com/2015/03/south-koreas-quest-to-be-a-major-space-power/>

13) (Smith, "From spy satellites to mobile networks, S.Korea pins space hopes on new rocket"; Ankit Panda, "Solid Ambitions: The U.S.–South Korea Missile Guidelines and Space Launchers," Carnegie Endowment for International Peace, August 25, 2020, available at <https://carnegieendowment.org/2020/08/25/solid-ambitions-u.s.-south-korea-missile-guidelines-and-space-launchers-pub-82557>

14) Si-soo Park, "With Artemis Accords on the table, South Korea, U.S. to widen cooperation in space exploration, security," *Spacenews*, May 25, 2021c, available at <https://spacenews.com/with-artemis-accords-a-done-deal-south-korea-u-s-to-widen-cooperation-in-space-exploration-security/>

15) Troy Stangarone, "South Korea Moves Closer to Launching Its First Lunar Orbiter." *The Diplomat*, September 4, 2021, available at <https://thediplomat.com/2021/09/south-korea-moves-closer-to-launching-its-first-lunar-orbiter/>

16) Bloomberg, "South Korea seeks to move up its spot in global space race."

facilitated space programs. In the 1970s, the government recognized the potential economic and security benefits of the space program, but it was not until the 1980s when it released the 1985 “Long-Term Plan for the Development of Science and Technology toward the 2000s”; passed the Aerospace Industry Development and Promotion Act of 1987, which allocated a significant amount of budget to space programs and provided legal frameworks for the KARI; and finally established KARI in 1989.¹⁷⁾ In 1996, Seoul announced the “National Space Development Plan” that proposed the sequential steps the country would need to take to acquire independent space capability and join the Space Club.¹⁸⁾ The National Space Development plan identified two main areas South Korea should focus on the development of satellites and indigenous launch capability.¹⁹⁾ This plan was revised in the subsequent years with minor changes to extend the goals and elaborate on the programs. The “First Basic Plan on Mid-to-Long-Term National Space Development” of 1996 aimed to place South Korea among the top ten spacefaring countries and launch KSLV-1 carrying an indigenously developed satellite.²⁰⁾ The Space Development Promotion Act, which was passed in 2005, required the government to devise a basic program every five years that would promote space development and manage space objects.²¹⁾ The 2007 Basic Space Development Promotion Plan extended the development goals of the National Space Development until 2016.²²⁾ In February 2018, South Korea announced the “Third Basic Plan for 2018-2022” that sought to execute space development that would improve public safety and quality of life.²³⁾

Since space projects cost significantly more than any other government project, all these government plans and initiatives came with a hefty price tag. The recent Nuri launch cost around US\$1.8B. Since 1996 when the National Space Development Plan was released, the budget allocated to the space program has increased gradually from US\$58M to US\$593M (2017), a 922% increase in real terms.²⁴⁾ A huge jump observed in the 2006 budget, from US\$186M to US\$331M,

17) An, “South Korea's Space Program: Activities and Ambitions,” pp. 34-35.

18) Stephanie Wan, “U.S. – South Korean Space Cooperation: A background on South Korea’s space program, America’s geopolitical influences, and future areas for strategic collaboration,” The Secure World Foundation, September 2010, p. 4, available at https://swfound.org/media/205872/us-korean_space_cooperation_final_sept_2010.pdf

19) Ibid.

20) An, “South Korea's Space Program: Activities and Ambitions,” p. 35.

21) Wan, “U.S. – South Korean Space Cooperation: A background on South Korea’s space program, America’s geopolitical influences, and future areas for strategic collaboration,” p. 4.

22) Ibid.

23) An, “South Korea's Space Program: Activities and Ambitions,” p. 35.

24) Sandra Erwin, “Pentagon report: China amassing arsenal of anti-satellite weapons,” *Spacenews*, September 1, 2020, available at <https://spacenews.com/pentagon-report-china-amassing-arsenal-of-anti-satellite-weapons/>

could be explained by the 2005 Space Development Promotion Act. In 2021, South Korea announced it would spend US\$553.1M on space programs²⁵⁾ and pledged US\$1.4B to space activities over the next 10 years.²⁶⁾ Although these figures appear significant, they are not so when compared to Japan's budget of US\$4.14B in the fiscal year 2021, which increased by 23.1% from the fiscal year 2020,²⁷⁾ and India's budget of US\$17.5B in the fiscal year 2020.²⁸⁾ Put it differently, South Korea's space budget as a share of GDP in 2017 was 0.039% while India's and China's were 0.062% and 0.08%, respectively. To be competitive with other Asian spacefaring countries, South Korea will need to allocate more resources to space projects and programs.²⁹⁾

The 1979 Bilateral Missile Guidelines

South Korea is in a position to play catch-up due to a security concern that has plagued the peninsula. Inherently, space launch technologies are dual-use;³⁰⁾ it means space objects that are placed in space for economic purposes could be also used for military purposes. More importantly, in the case of South Korea, in the name of preventing a potential arms race with North Korea, the 1979 bilateral agreement between Seoul and Washington was signed to limit South Korea's missile development,³¹⁾ although South Korea needs to expand its military capability due to North Korea's unceasing threats.³²⁾ The 1979 missile guidelines limited a ballistic missile's payload size to 500 kilograms and its range to 300 kilometers and allowed

25) Si-soo Park, "South Korea to spend \$553 million on space projects in 2021," *Spacenews*, February 25, 2021a, available at <https://spacenews.com/south-korea-to-spend-553-million-on-space-projects-in-2021/>

26) Josh Smith and Sangmi Cha, "S.Korea's launch of space rocket boosts its homegrown contractors," *Reuters*, October 20, 2021, available at <https://www.reuters.com/world/asia-pacific/skoreas-launch-space-rocket-boosts-its-homegrown-contractors-2021-10-21/>

27) Si-soo Park, "Japan budgets a record \$4.14 billion for space activities," *Spacenews*, March 9, 2021b, available at <https://spacenews.com/japan-budgets-a-record-4-14-billion-for-space-activities/>

28) Si-soo Park, "US, South Korea agree to enhance security cooperation in outer space," *Spacenews*, August 30, 2021d, available at <https://spacenews.com/us-south-korea-agree-to-enhance-security-cooperation-in-outer-space/>

29) Moltz, "The KSLV I Launch and South Korea's Space Strategy."

30) Smith, "From spy satellites to mobile networks, S.Korea pins space hopes on new rocket"; Kelsey Davenport, "South Korea to Pursue Military Satellites," *Arms Control Today*, September, 2020, available at armscontrol.org/act/2020-09/news/south-korea-pursue-military-satellites

31) Wan, "U.S. – South Korean Space Cooperation: A background on South Korea's space program, America's geopolitical influences, and future areas for strategic collaboration," p. 13.

32) Sarah Jeong, "South Korea's Defense Capabilities and Acquisition Programs," Wilson Center, August 31, 2021, available at <https://www.wilsoncenter.org/blog-post/south-koreas-defense-capabilities-and-acquisition-programs>

the country to use liquid fuels only for a missile. A 2012 revision to the original agreement changed the range of a ballistic missile to 800 kilometers and the limit on the payload was eliminated in 2017.³³⁾ In 2020, the two countries agreed to allow South Korea to build solid-fueled rockets for space activities.³⁴⁾ Finally, the bilateral missile guidelines were terminated in May 2021. To South Korea's space industry, termination of the missile guidelines meant unrestricted development of space carriers; that is, they are allowed to develop carrier rockets with any range and payload size and any type of fuel that would work best for their space activities. On May 21, 2021, Chung Sye-Kyun, Prime Minister of South Korea, declared on Twitter that with the removal of the missile guidelines, South Korea has achieved "secure complete missile sovereignty [for the first time] in 42 years."³⁵⁾ On June 9, 2021, Lim Hye-sook, Science and ICT (Information and Communication Technology) Minister, announced that South Korea would launch and place 110 dual-use satellites including reconnaissance (military purposes), communication satellites (6G broadband internet), and observation satellites (weather conditions).³⁶⁾

The ROK-US Alliance

The ROK-US alliance was formed in October 1953 as one of the Cold War tools to help achieve regional security. For South Korea, North Korea posed a threat to its survival while the United States regarded the spread of Communism as a threat to the existing world order.³⁷⁾ The end of the Cold War changed the strategic importance of the alliance. Although a constant threat from North Korea continued for South Korea, the grave threat the United States once considered during the Cold War no longer existed. Washington had other security concerns that its alliance partners were not interested in being dragged into as they did not consider them an immediate threat to their security.³⁸⁾ Both Washington and its alliance partners felt the need to redefine the nature of its alliances and saw the benefits of expanding its alliance to the domains such as "counterterrorism, maritime security, space, pandemics, post-conflict stabilization and reconstruction,

33) Davenport, "South Korea to Pursue Military Satellites."

34) Choe, "South Korea's First Homemade Rocket Lifts Off but Is 'One Step Short.'"

35) Sang-Min Kim, "U.S. Lifts Missile Limits on South Korea," *Arms Control Association*, June 2021, available at <https://www.armscontrol.org/act/2021-06/news/us-lifts-missile-limits-south-korea>

36) Brian Kim, "With restrictions lifted, South Korea launches \$13B space power scheme," *Defense news*, September 6, 2021, available at <https://www.defensenews.com/space/2021/09/06/with-restrictions-lifted-south-korea-launches-13b-space-power-scheme/>

37) Scott Snyder, *The US-South Korea Alliance: Meeting New Security Challenges* (Boulder, CO: Lynne Rienner Publishers, 2012).

38) Ibid.

peacekeeping, overseas development assistance, nonproliferation, and climate change.”³⁹⁾ In the case of the ROK-US alliance, its scope could be expanded to encompass issues such as nontraditional and global security challenges. Among a number of issues, this paper will focus on space cooperation between South Korea and the United States as an extension of the ROK-US alliance and discuss what it entails.

Space programs and achievements signify military capability, economic security, and national prestige.⁴⁰⁾ South Korea was primarily motivated to acquire space technology and develop space programs by its need for national security and self-defense among others. However, the bilateral missile agreement of 1979 had put restrictions on the types of missiles that South Korea could develop. Throughout the years, Washington expressed its concerns even about South Korea’s civilian space projects that such technology could be used to build military missiles.⁴¹⁾ The still-classified bilateral missile agreement has been revised for the missile range (from 180km to 300km in 2001; from 300km to 800km in 2012), the payload (up to 500kg in 2012; elimination of the payload limit in 2017), and the type of fuel (solid-fueled motors allowed in 2020).⁴²⁾ Termination of the 1979 missile guidelines was significant not only symbolically (“missile sovereignty”) but also practically because it allowed South Korea to develop its own launch vehicle with confidential payloads, which means the purpose of space objects could be kept confidential.⁴³⁾ It also facilitated constructive space cooperation between South Korea and the United States.

Seoul and Washington established a Space Policy Dialogue in 2015 to discuss civil space issues.⁴⁴⁾ More recently, in the August 27 agreement of 2021, South Korea’s Air Force and the U.S. Space Force agreed to form a consultative body that would facilitate cooperation between the two countries on space policy and missile defense and to host joint military drills led by the U.S. Space Force to “bolster U.S. defense capabilities in outer space.”⁴⁵⁾ The agreement indicates not only both countries’ desire to strengthen their cooperation in the domain of outer space but also their determination to maintain peace and stability in outer space

39) Ibid.

40) An, “South Korea's Space Program: Activities and Ambitions,” p. 41.

41) Tae-Hyung Kim, “South Korea’s space policy and its national security implications.” *The Korean Journal of Defense Analysis*, Vol. 22, No. 4 (2010), p. 521.

42) Panda, “Solid Ambitions: The U.S.–South Korea Missile Guidelines and Space Launchers”; Kim, “U.S. Lifts Missile Limits on South Korea.”

43) Seo, Bae, and Yeung, “South Korea fails to put dummy satellite into orbit.”

44) Stangarone, “South Korea Moves Closer to Launching Its First Lunar Orbiter.”

45) Panda, “Solid Ambitions: The U.S.–South Korea Missile Guidelines and Space Launchers”; Park, “We go together’: US Space Force chief seeks deeper space cooperation with South Korea.”; Stangarone, “South Korea Moves Closer to Launching Its First Lunar Orbiter.”

that has been increasingly contested in recent years.⁴⁶⁾ In his video message on October 18, at the 22nd International Aerospace Symposium hosted by the ROK Air Force, Chief of U.S. Space Force General John W. “Jay” Raymond expressed “hope for deepening cooperation with South Korea military.”⁴⁷⁾

These developments confirm that South Korea takes its space cooperation as a matter of national security. South Korea’s Air Force Chief of Staff General Park In-ho said “Space is no longer a mere area of curiosity; rather, it has now become a key domain for our national security, and only rigorous preparation will ensure our survival in the future space environment.”⁴⁸⁾ Lee Chang-yoon, head officer of the Space, Nuclear and Big Science Policy Bureau at the Ministry of Science and ICT, shared such a sentiment by expressing that “Space is something we should approach with a national strategy because it’s not something only about science and technology.”⁴⁹⁾ The ROK’s Air Force has been divided into two combat units: an air and space combat research group; this reorganization helps coordinate between ROK’s Air Force and the U.S. Space Force.⁵⁰⁾

To the United States, not cooperating with South Korea was risky. Not only does South Korea play a vital role in East Asian security but also not cooperating with South Korea may turn South Korea to Russia and enhance its political and economic relations with Russia as it happened in the 2000s when Russia helped South Korea launch its first satellite placed by its own launch vehicle. Thus, Washington was well aware that if it did not cooperate with South Korea in the space program, the latter’s ties to Russia would be strengthened and its influence in the East Asian region would be minimized.⁵¹⁾ Put it differently, if the scope of the ROK-US alliance was not expanded to encompass the space domain, Washington understood that the ROK-US alliance would only be weakened. Thus, space cooperation served as an opportunity to strengthen the ROK-US alliance particularly as tensions between the regional powers and the United States grew. In the fourth ROK-US Space Policy Dialogue that was held in Washington, D.C., on August 10, 2021, the two countries pledged to strengthen their space cooperation at all levels - civil, governmental, and military; take joint action against emerging threats in space; construct multilateral norms, rules, and

46) Park, “We go together’: US Space Force chief seeks deeper space cooperation with South Korea.”

47) Ibid.

48) Ibid.

49) Park, “With Artemis Accords on the table, South Korea, U.S. to widen cooperation in space exploration, security.”

50) Sukjoon Yoon, “Like It or Not, the South Korea-US Alliance is Changing,” *The Diplomat*, August 27, 2021c, available at <https://thediplomat.com/2021/08/like-it-or-not-the-south-korea-us-alliance-is-changing/>

51) Wan, “U.S. – South Korean Space Cooperation: A background on South Korea’s space program, America’s geopolitical influences, and future areas for strategic collaboration,” p. 15.

principles; and collaborate in the field of Space Situational Awareness (SSA).⁵²⁾

In the May summit of 2021 between Biden and Moon, while emphasizing their shared common democratic values and their long-lived alliance, both parties agreed to deepen cooperation in other domains in an interconnected world.⁵³⁾ One of the highlighted agendas was space-based technological cooperation that aimed to prepare both countries to confront emerging threats.⁵⁴⁾ Two days after the Moon-Biden summit, U.S. Space Command's commander, General James Dickinson (US Army), met with South Korea's Defense Minister Suh Wook to reaffirm their commitment to take joint actions against security threats in space.⁵⁵⁾ They also reaffirmed that both countries were committed to "ensure a safe space environment and to advance the [South Korea-U.S.] alliance."⁵⁶⁾

From the U.S. point of view, trilateral cooperation between the United States, South Korea, and Japan on space activities would be beneficial to establish norms and principles of responsible behavior in outer space and consolidate its space leadership against emerging threats.⁵⁷⁾ If one considers that Japan and South Korea were the two first countries whose leaders were invited to the White House since Biden's presidency began, it appears that Washington hoped to form trilateral cooperation with Japan and South Korea and mobilize the countries in the Indo-Pacific region to contain China.⁵⁸⁾ The NASA-led Artemis program that included Seoul and Tokyo seemed to be developed as a way for Washington to reclaim the U.S. leadership position in outer space against China whose presence has been growing rapidly in recent years. It may be possible that Washington agreed to terminate the 1979 bilateral missile agreement in order to facilitate South Korea's space technology development that could contribute to U.S. command of

52) Ministry of Foreign Affairs of the Republic of Korea, "4th ROK-US Space policy Dialogue held in Washington, D.C. on August 10, 2021," August 12, 2021, available at https://www.mofa.go.kr/eng/brd/m_5676/view.do?seq=321800

53) The White House, "FACT SHEET: United States – Republic of Korea Partnership," The White House, May 21, 2021b, available at <https://www.whitehouse.gov/briefing-room/statements-releases/2021/05/21/fact-sheet-united-states-republic-of-korea-partnership/>

54) The White House, "U.S.-ROK Leaders' Joint Statement," The White House, May 21, 2021a, available at <https://www.whitehouse.gov/briefing-room/statements-releases/2021/05/21/u-s-rok-leaders-joint-statement/>; Sukjoon Yoon, "As the Dust Settles, How Healthy is the ROK-US Alliance?" 38North, June 11, 2021b, available at <https://www.38north.org/2021/06/as-the-dust-settles-how-healthy-is-the-rok-us-alliance/>

55) Park, "With Artemis Accords on the table, South Korea, U.S. to widen cooperation in space exploration, security."

56) Ibid.

57) Wan, "U.S. – South Korean Space Cooperation: A background on South Korea's space program, America's geopolitical influences, and future areas for strategic collaboration," pp. 17-18.

58) Sukjoon Yoon, "How the Biden-Moon Summit Reset the South Korea-US Alliance," *The Diplomat*, May 28, 2021a, available at <https://thediplomat.com/2021/05/how-the-biden-moon-summit-reset-the-south-korea-us-alliance/>

space.

However, it is not likely that South Korea will turn back on China. Seoul attended the May summit of 2021 in the hope that it would resolve the differences with Washington in their approach to the North Korea issues; yet Washington's focus appeared to be on developing a network that would effectively contain China.⁵⁹⁾ Although South Korea joined Japan and nine other countries in the Artemis Accords, it is very unlikely that South Korea would agree to form trilateral security cooperation with Japan and the United States in the area of outer space.⁶⁰⁾ For the past four years, the Moon administration has carefully resisted the U.S. proposals that would isolate China including forming trilateral relations with the United States and Japan and the Quadrilateral Security Dialogue (QUAD) with the United States, Japan, India, and Australia.⁶¹⁾ Considering China's influence over North Korea, South Korea is unlikely to take the side of the United States against China, as long as North Korea poses a threat to the country.⁶²⁾ These suggestions were implicitly or explicitly discussed during the May summit in conjunction with space programs, yet it is doubtful that South Korea would succumb to the U.S. proposals.

Space Race between China and the United States

South Korea's space cooperation with the United States may cause friction with China as there appears to be a fierce space race between the United States and China. China possesses the second largest number of satellites in orbit, which add to its comprehensive space capabilities along with "direct ascent kinetic kill vehicles (KKVs), directed energy, electronic warfare, cyber, and co-orbital satellite systems."⁶³⁾ Space programs and activities are considered crucial elements to China's political, economic, and military power.⁶⁴⁾ The Chinese Communist Party (CCP) considers its space program as one of the enforcers that help the country become rich, strong, and proud.⁶⁵⁾ Nonetheless, China's space program is primarily motivated by its focus on

59) Yoon, "As the Dust Settles, How Healthy is the ROK-US Alliance?"

60) Yoon, "Like It or Not, the South Korea-US Alliance Is Changing."

61) Yoon, "As the Dust Settles, How Healthy is the ROK-US Alliance?"

62) Ibid.

63) Kevin Pollpeter, Timothy Ditter, Anthony Miller, and Brian Waidelich, *China's Space Narrative: Examining The Portrayal Of The Us-China Space Relationship In Chinese Sources And Its Implications For The United States* (Montgomery, AL: The China Aerospace Studies Institute, 2020), p. 7.

64) Ibid.

65) Pollpeter, Ditter, Miller, and Waidelich, *China's Space Narrative: Examining The Portrayal Of The Us-China Space Relationship In Chinese Sources And Its Implications For The United States*, p. 8.

national security, which will remain as the primary motivation behind its space policies.⁶⁶⁾ China learned of the vital utility of space capabilities during the Gulf War, which was dubbed the First Space War, where positioning and accurate surveillance from satellites in outer space assisted the U.S. military operations and ultimately contributed to its victory.⁶⁷⁾ Space technologies were also effectively used in the wars in Afghanistan and Iraq.⁶⁸⁾ Thus, since then, China has invested a considerable amount of its resources in developing military space technology.⁶⁹⁾ According to the U.S. Department of Defense report on September 1, 2020, China continued to improve its ASAT (Anti-Satellite Weapons) technology that could destroy space objects in low and high orbits.⁷⁰⁾ Since the United States relies heavily on space technology for its military operations, China's ASAT could be detrimental to the U.S. military capability in its future military operations.⁷¹⁾ Beijing's technology such as "kinetic and non-kinetic counterspace capabilities" will certainly threaten U.S. space assets and military efficacy by denying its access to space.⁷²⁾ Should Washington fail to maintain its dominance in its space technology and capabilities, its military capabilities and efficacy on Earth would also be significantly undermined.⁷³⁾ Moreover, Beijing's expanding space program seems to pose a strategic threat to Washington's effort to maintain its operation in the Indo-Pacific region.⁷⁴⁾

To Washington, the space domain has always been directly related to national security. The Basic Aerospace Doctrine of the United States Air Forces that was published in 1982 emphasized maintaining the U.S. dominance in outer space and the current U.S. military joint doctrine stresses that "space capabilities have proven to be a significant force multiplier for the U.S. military's joint operations. Therefore, current U.S. military operations always integrate and count on space power as both an enabler and a force multiplier."⁷⁵⁾ On the civilian side, the 1999 report written by Secretary of Defense William Cohen stressed that the United States should be able to

66) Pollpeter, Ditter, Miller, and Waidelich, *China's Space Narrative: Examining The Portrayal Of The Us-China Space Relationship In Chinese Sources And Its Implications For The United States*, p. 8.

67) Kim, "South Korea's space policy and its national security implications," p. 516.

68) Ibid.

69) Kim, "South Korea's space policy and its national security implications," p. 517.

70) Erwin, "Pentagon report: China amassing arsenal of anti-satellite weapons."

71) Kim, "South Korea's space policy and its national security implications," p. 518.

72) Mark Stokes, Gabriel Alvarado, Emily Weinstein, and Ian Easton, "China's Space and Counterspace Capabilities and Activities," Project 2049 Institute, March 30, 2020, p. 3, available at https://www.uscc.gov/sites/default/files/2020-05/China_Space_and_Counterspace_Activities.pdf

73) Ibid.

74) Stokes, Alvarado, Weinstein, and Easton. 2020. "China's Space and Counterspace Capabilities and Activities," p. 3.

75) (T. Kim 2010, 517)

access outer space freely and limit the adversary's access to it if necessary.⁷⁶⁾ Washington withdrew from the Anti-Ballistic Missile treaty in 2001 to pursue space-based weapon systems including anti-ballistic missile defense and anti-satellite systems.⁷⁷⁾ The 2006 U.S. National Space Policy reaffirmed the United States' desire to enjoy unlimited access to space with no restrictions and maintain its control over outer space.⁷⁸⁾ In recent years, former U.S. Vice President Mike Pence stated that "the United States and China are in a new space race 'with even higher stakes' than the space race between the United States and the Soviet Union, and that China has an 'ambition to seize the lunar strategic high ground and become the world's preeminent spacefaring nation.'" ⁷⁹⁾

Both China and the United States accuse the other party of growing their ability to deny the other's access to space while pointing at the establishment of the other's specialized forces, the U.S. Space Force and the Strategic Force.⁸⁰⁾ These perceptions both parties have of the other party's intention and behavior create a security dilemma in space between them, accelerating arms races and tensions and ultimately leading to instability, which may present an advantage of striking first/preemption.⁸¹⁾ From China's point of view, a first strike would catch the United States by surprise and thus overcome its inferiority by "delaying its entry and keeping it away from the conflict zone" while by striking first, the United States would be able to disable China's ability to "locate, track, and target U.S. bases and naval ships" in order to operate its force around the conflict zone.⁸²⁾

In the domain of diplomacy, through its space program and cooperation, China will seek to establish and consolidate its standing as a benevolent hegemon that serves developing countries.⁸³⁾ Such an effort was already displayed when Beijing announced in March 2021 that it would build the International Lunar Research Station with Russia for all other countries to use. It may also lead an initiative of establishing international space governance with support from developing countries with which it would share its space technology, closely working with the United

76) Ibid.

77) Ibid.

78) Ibid.

79) Pollpeter, Ditter, Miller, and Waidelich, *China's Space Narrative: Examining The Portrayal Of The Us-China Space Relationship In Chinese Sources And Its Implications For The United States*, p. 7.

80) Pollpeter, Ditter, Miller, and Waidelich, *China's Space Narrative: Examining The Portrayal Of The Us-China Space Relationship In Chinese Sources And Its Implications For The United States*, p. 74)

81) Ibid.

82) Ibid.

83) Pollpeter, Ditter, Miller, and Waidelich, *China's Space Narrative: Examining The Portrayal Of The Us-China Space Relationship In Chinese Sources And Its Implications For The United States*, p. 71.

Nations.⁸⁴⁾ Thus, China's space program should not concern only international economy or security, but the world order. China's space activities for military, commercial, and diplomatic purposes will continue to be expanded and China will seek to help establish new norms and principles in space and consolidate international space governance, ultimately reshaping the world order.⁸⁵⁾ In other words, using its space program, China may demonstrate leadership and modify and establish the norms and principles that will ultimately shape a new world order.⁸⁶⁾ Thus, it is understandable that Washington views Beijing "as a revisionist power that is antithetical to U.S. values and interests."⁸⁷⁾

South Korea navigating between China and the United States

China's rise in many domains including economy, military, and space has become a destabilizing factor in the region as well as the world. The US-China relations that were once considered cooperative are now described as competitive that Washington considers Beijing as a revisionist power opposing Washington's values and interests.⁸⁸⁾ Tensions between them have been palpably displayed over the issues such as "territorial disputes in the South and East China Seas; Chinese cyberwarfare to destabilize the US and other liberal democracies; authoritarian attempts to crack down on dissent in Hong Kong or to brutally repress the ethnic and religious identities of local communities in Xinjiang and Tibet; and competition for dominance in the high technology sector and in space exploration."⁸⁹⁾ As the competitive nature of US-China relations continues, Washington's status as a hegemon has been challenged and undermined, which prompted it to mobilize its allies against Beijing by expanding and redefining the scope of its alliance with its partners.⁹⁰⁾ South Korea, which needs to maintain its mutually beneficial economic

84) Ibid.

85) Pollpeter, Ditter, Miller, and Waidelich, *China's Space Narrative: Examining The Portrayal Of The Us-China Space Relationship In Chinese Sources And Its Implications For The United States*, p. 8, p. 71.

86) Nilsson-Wright, John, and Yu Jie, *South Korean Foreign Policy Innovation amid Sino-US Rivalry: Strategic Partnerships and Managed Ambiguity*, Asia-Pacific Programme (London, UK: Chatham House: 2021), p. 3.

87) Pollpeter, Ditter, Miller, and Waidelich, *China's Space Narrative: Examining The Portrayal Of The Us-China Space Relationship In Chinese Sources And Its Implications For The United States*, p. 7.

88) Ibid.

89) Peter Martin, "Biden's Asia Czar Says Era of Engagement with China Is Over," *Bloomberg*, May 26, 2021, available at <https://www.bloomberg.com/news/articles/2021-05-26/biden-s-asia-czar-says-era-of-engagement-with-xi-s-china-is-over?sref=EWvigevl>; Nilsson-Wright and Jie. *South Korean Foreign Policy Innovation amid Sino-US Rivalry: Strategic Partnerships and Managed Ambiguity*, p. 3.

and security relationships with China and the United States, respectively,⁹¹⁾ finds itself in a situation at times where it has to choose one side over the other. Nowadays, its foreign policy's main concern appears to be to carefully navigate between China and the United States without provoking either party.⁹²⁾ The Moon administration's recent New Southern Policy Dialogue demonstrates Seoul's effort to support Washington's Free and Open Indo-Pacific Strategy while avoiding any further security cooperation in order to deepen its dialogue with Beijing to promote peace with Pyongyang.⁹³⁾ Other examples of such efforts include "the issue of ballistic missile defense and Terminal High Altitude Area Defense (THAAD) deployment; engagement with the DPRK and facilitating diplomatic dialogue between Washington and Pyongyang; and the development of Seoul's New Southern Policy and closer ties with the Association of Southeast Asian Nations (ASEAN) as a means of avoiding explicit involvement in Washington's Free and Open Indo-Pacific strategy."⁹⁴⁾ However, growing tensions between the United States and China in outer space would force South Korea to walk a tightrope between the two space powers.

Conclusion

Some experts expressed that a race in space weaponization between the United States and China had already begun.⁹⁵⁾ In March 2019, U.S. former Vice President Mike Pence stressed that the space race with China carries "even higher stakes" than the one between the United States and the Soviet Union during the Cold War. Alienated from the Artemis program, in March 2021, China and Russia announced that they would collaborate on their first space project that would be to build a lunar research station, the International Lunar Research Station, on the surface and/or orbit of the Moon. They also added that the research station would be available for other countries to use,⁹⁶⁾ which could boost their status as dominant players in space. In

90) Martin, "Biden's Asia Czar Says Era of Engagement with China Is Over."

91) Nilsson-Wright and Jie. *South Korean Foreign Policy Innovation amid Sino-US Rivalry: Strategic Partnerships and Managed Ambiguity*, p. 3.

92) Nilsson-Wright and Jie. *South Korean Foreign Policy Innovation amid Sino-US Rivalry: Strategic Partnerships and Managed Ambiguity*, p. 15; Yoon, "Like It or Not, the South Korea-US Alliance is Changing."

93) Nilsson-Wright and Jie. *South Korean Foreign Policy Innovation amid Sino-US Rivalry: Strategic Partnerships and Managed Ambiguity*, p. 2, p. 27.

94) Nilsson-Wright and Jie. *South Korean Foreign Policy Innovation amid Sino-US Rivalry: Strategic Partnerships and Managed Ambiguity*, p. 5.

95) Kim, "South Korea's space policy and its national security implications," p. 518.

96) Scott Neuman, "China, Russia Announce Plan to Build Moon Research Station," *NPR*, March 10, 2021, available at <https://www.npr.org/2021/03/10/975579975/china-russia-announce-plan->

May 2021, South Korea signed into the Artemis Accords, joining nine other countries in the program and having the ROK military cooperate with the U.S. Space Force in outer space.⁹⁷⁾

In the new space era, South Korea's most challenging task seems to be navigating between China and the United States.⁹⁸⁾ Although former U.S. Secretary of Defense Mark Esper firmly proposed that Australia, Japan, and South Korea should host the U.S. hypersonic weapons to deter China's threats,⁹⁹⁾ South Korea is unlikely to approve any more installation of Washington's THAAD (Terminal High Altitude Area Defense) systems or any other missiles on its soil and participate in the U.S. missile Defense Agency's (MDA) regional missile defense system, which would create friction with China. However, it remains to be seen how South Korea's close cooperation with the United States in the domain of outer space that has become increasingly militarized would affect the nature of its relations with China. The Moon-Biden summit helped expand the scope of the ROK-US alliance not only to encompass outer space but also to involve South Korea in "the U.S. Indo-Pacific Strategy, a thinly-veiled project to contain China."¹⁰⁰⁾ The statement released right after the summit indicates that South Korea stands with the United States in dealing with the issues over the South China Sea and Taiwan Strait.¹⁰¹⁾ Likewise, it remains to be seen how South Korea could avoid a situation pertaining to outer space where it is forced to take a strong stand over issues that are sensitive to China. To diffuse the situation where South Korea needs to walk a tightrope between China and the United States, South Korea could extend its networks of space cooperation to include Southeast Asian countries such as India. By bringing more stakeholders to its space programs, Seoul could not only avoid a situation where it has to choose between China and the United States but also would be presented with more opportunities to acquire space technology and grow its space programs.

[Received: November 30, 2021; Revised: December 10, 2021; Accepted: December 20, 2021]

to-build-moon-research-station

97) Yoon, "Like It or Not, the South Korea-US Alliance is Changing."

98) Ibid.

99) Ibid.

100) Ibid.

101) Ibid.

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