SSPC Issue Brief

BEYOND CHINA: EXPLORING ASIA'S EMERGENCE IN SPACE

AJEY LELE

May 22, 2023

Technology plays a significant role in the Great Power dynamics, acting as a common thread that binds States' economic and military capabilities in the region. The focus in Asia is on various technologies, including nuclear, space, robotics, and green technologies. Space technology, in particular, is advancing rapidly globally, and Asian states are keen to derive benefits from it for national growth. The outer space domain is becoming increasingly important in the region's economic and military aspects. This Issue Brief aims to assess the space race among Asian powers, exploring the geoeconomics, geopolitical, and geostrategic dimensions behind the initiation of space programs in various Asian states and understanding the concept of a space race among them. It focuses on assessing Category-2 and Category-3 space programs; therefore, no direct assessment of China's space program is conducted.

sspc

The 21st century is known as the Asian Century. The terminology 'Rise of Asia' is mostly viewed synonymously with the 'Rise of China'. However, other Asian states are also contributing to shaping this rise. Over the past two decades, Asian countries have experienced impressive economic and technological growth. Despite the global financial crisis in the mid-2000s, Asia has managed to revive itself, albeit with limited impact. Asia's strategic importance is increasingly recognized by major powers worldwide, mainly as it has emerged as one of the most attractive markets for the West. The overall economic growth and global market creation by Asian states are shifting the balance of power towards Asia, with expectations that this growth will eventually translate into influence.

Technology plays a significant role in such power dynamics, acting as a common thread that binds states' economic and military capabilities in the region. The focus in Asia is on various technologies, including nuclear, space, robotics, and green technologies. Space technology, in particular, is advancing rapidly globally, and Asian states are keen to derive benefits from it for national growth. The outer space domain is becoming increasingly important in the region's economic and military aspects. Some states have decades of experience in investing and innovating in space, while others are new entrants. Space technology investments have social, scientific, and strategic implications, with the economic dimension becoming more prominent recently. Broadly, this Issue Brief aims to understand Asia's response to the space epoch in the context of regional power politics.

Globally, based on financial investments, technological expertise, and successful programs, the US, Russia, China, and the European Space Agency (ESA) can be considered "Category One" space powers. "Category Two" spacefaring states include Japan, India, and Israel. Among the remaining spacefaring states, both Koreas and Iran fall into the "Category Three" designation. The "Category Four" could be states like Pakistan, Malaysia, Vietnam, and Indonesia. The Issue Brief aims to assess the space race among Asian powers, exploring the geoeconomics, geopolitical, and geostrategic dimensions behind the initiation of space programs in various Asian states and understanding the concept of a space race among them. It focuses on assessing Category-2 and Category-3 space programs; therefore, no direct assessment of China's space program is conducted.

This Issue Brief focuses on assessing Category-2 (Japan, India, Israel) and Category-3 (South Korea, North Korea and Iran) space programs.

Space Canvas of Asian States

It should be noted that non-spacefaring states in the Asian region have varying investments in space. Some of these states play a significant role in shaping the geopolitics of the region, and this paper will make passing references to them. Considering the geographical, historical, military, and geopolitical realities, the Asian region can be broadly subdivided into three parts:

- East Asia: Japan, North Korea, and South Korea
- South Asia: India
- Middle East: Israel and Iran

JAPAN. Since its inception, one of Japan's major policy objectives has been the promotion of scientific research and technological innovation, with space playing an important role in this overall objective. Japan became a spacefaring state in 1980, and its space program has evolved significantly over the years. Initially, Japan's program was mainly civilian in nature, with multiple agencies responsible for space activities. However, in 2003, the Japan Aerospace Exploration Agency (JAXA) was established as the primary agency. This consolidation of agencies into a single entity was done owing to the spiteful experience of having multiple agencies working on the same agenda.

Due to regional geostrategic compulsions, Japan was forced to look at their investments in the space domain beyond civilian needs. Japan's decision to acquire ballistic missile defense capabilities was influenced by North Korea's Taepodong-1 ballistic missile test in August 1998. Collaborating with the United States, Japan started designing and developing a missile defense system. In December 2003, the Japanese government officially lifted the ban on the military use of space, recognizing North Korea's continued missile and nuclear agenda.[1] The Basic Space Law was enacted on August 27, 2008, allowing Japan's government to use space for defense purposes.[2]

Due to regional geostrategic compulsions, Japan was forced to look at their investments in the space domain beyond civilian needs.

Japan has established a radar and optical spy satellite program called IGS, with approximately 15 such satellites launched to date. The country has also developed two reliable launch vehicles, H-II A and H-II B, capable of launching payloads of around 18,000 kg to Low Earth Orbit (LEO) and 8,000 kilograms to Geosynchronous Transfer Orbit (GTO). Japan has had mixed success in lunar missions, with partial success in missions such as Hiten (1993) and SELENE (2007). A recent mission (private agencies were involved) to the Moon in collaboration with the United Arab Emirates (UAE) experienced partial success, as the lander module failed to put a rover on the Moon's surface in April 2023. However, despite this setback, the firm proposes to continue with its two other outstanding unmanned lunar missions, scheduled for take-off in 2024 and 2025[3]. Japan's future proposals include a mission to Mars scheduled for the 2024/25 period.

Japan operates a regional space navigational system called the Japanese Quasi-Zenith Satellite System (QZSS), and in 2020, they entered into a formal treaty arrangement for human exploration in space with the United States.

NORTH KOREA. North Korea is known as the world's most militarized, inaccessible, and harshly governed communist state. For over two decades, it has been pushing its missile and nuclear agenda to threaten South Korea, Japan, and the US. The Korean Committee of Space

---

1 Masako Toki, "Japan's Evolving Security Policies: Along Came North", *Nuclear Threat Initiative*, Jun 3, 2009, https://www.nti.org/analysis/articles/japans-evolving-security-policies/

2 "Basic Space Law (Law No.43 of 2008), Japan, https://stage.tksc.jaxa.jp/spacelaw/country/japan/27A-1.E.pdf

3 "Japanese startup fails in historic bid to put private lunar lander on moon", *Japan Times*, April 26, 2023 https://www.japantimes.co.jp/news/2023/04/26/national/science-health/ispace-moon-lost-signal/

Technology (KCST) was established in the 1980s and is responsible for research, satellite manufacturing, launching, and managing the country's rocket launch sites.

Although the North Korean authorities claimed a successful launch of the first North Korean artificial satellite, Kwangmyongsong-1 (Brightstar-1), on September 4, 1998, experts believe this mission was unsuccessful. North Korea succeeded in putting a satellite into orbit on its fourth attempt on December 1, 2012, which made them eligible to be considered a spacefaring state. In 2016, they successfully launched Kwangmyongsong-4 into Low Earth Orbit (LEO) with a payload of approximately 200 kg. Currently, the country is preparing to launch a spy satellite in the near future. The leadership believes that multiple spy satellites are necessary to enhance their intelligence capabilities and enable the nation to use pre-emptive military force if the situation demands.

In 2017, North Korea announced a five-year plan to conquer space, including the development of a satellite communication system by June 2019. However, it appears that the planned activities are not progressing as scheduled. The political leadership has also announced their intention to place the country's flag on the Moon within a decade. However, the state has yet to develop a powerful rocket capable of escaping Earth's orbit.

North Korean state media announced on April 19, 2023, that the country has built its first spy satellite and is preparing it for launch. The state leadership feels that Korea would require multiple spy satellites to bolster their intelligence capabilities, and such investment would enable the nation to use pre-emptive military force when the situation demands.[4]

North Korea is known as the world's most militarized, inaccessible, and harshly governed communist state. For over two decades, it has been pushing its missile and nuclear agenda to threaten South Korea, Japan, and the US.

SOUTH KOREA. South Korea started its space activities relatively late compared to other important regional space actors in the late 1980s. Despite being proficient in electronics and other technology domains, it took South Korea a significant amount of time to develop an independent capability to reach space. In August 1989, the Satellite Technology Research Centre (SaTReC) was established, and the Korean Aerospace Research Institute (KARI) was created as South Korea's national space agency within three months.[5]

The first South Korean satellite, Kitsat-1, was launched on August 10, 1992, aboard an Ariane launcher with satellite manufacturing facilitated by Surrey Systems. South Korea's first indigenously produced satellite, KOMPSAT-1, was launched in 1999 using a Russian-produced rocket.[6]

[4] Brett Tingley, "North Korea readying launch of nation's 1st spy satellite: report", *Space.com*, April 19, 2023, https://www.space.com/north-korea-launch-1st-spy-satellite

[5] Ajey Lele, *Asian Space Race: Rhetoric or Reality?* Springer, New Delhi, 2012.

[6] Kari Lipschutz, "Global Insider: South Korea's Space Program", *World Politics Review*, June 29, 2010, https://www.worldpoliticsreview.com/global-insider-south-koreas-space-program/

Developing an indigenous rocket launcher system proved challenging for South Korean agencies, with some failures observed in 2009 and 2010. It was not until October 2021 that South Korea succeeded when the first test launch of its domestically built rocket reached the desired orbit. Before that, in 2013, South Korea conducted a successful launch using a rocket jointly developed with Russia.

South Korea has major plans for the future, including launching surveillance, navigation, and landing a lunar probe using their rocket by 2030. The program also potentially involves military satellites. In October 2022, with assistance from SpaceX, South Korea launched its first lunar mission called Danuri. In November 2022, South Korea announced its plan to launch a mission to Mars before 2046 as part of its new space mission roadmap. They aim to develop an engine for a launch vehicle capable of reaching the Moon within the next five years. They plan to start mining lunar resources by 2032 and eventually land on Mars in 2045, coinciding with the country's 100th anniversary of independence from Japanese colonial occupation.

INDIA. India became a spacefaring nation in 1980 with the establishment of the Indian Space Research Organisation (ISRO) in 1969. ISRO is known for its frugal engineering and cost-effective missions. Despite initial criticism in the 1960s about investing in space technology instead of addressing poverty, India's political leaders believed in the importance of technological development for the country's progress, including space technology.

Despite initial criticism in the 1960s about investing in space technology instead of addressing poverty, India's political leaders believed in the importance of technological development for the country's progress, including space technology.

Between 1970 and 1990, ISRO focused on consolidating its space program through satellite and launch vehicle development. The Polar Satellite Launch Vehicle (PSLV), introduced in 1993/94, marked a significant milestone for ISRO and has been used for various missions, including the Moon mission in 2008 and the Mars mission in 2013/14. India's third mission to Moon is expected to happen around June/July 2023.

India has achieved self-sufficiency in developing and launching satellites for remote sensing, weather, and Earth observation in Low Earth Orbit (LEO). It also has an operational regional space navigation system called NAVIC. Due to nuclear policies, India faced challenges in acquiring cryogenic engine technology for launching heavy satellites in geostationary orbit, but ISRO mastered the technology over time. India can now launch satellites weighing up to 4 tons into geostationary orbit and is working on increasing the Geosynchronous Satellite Launch Vehicle (GSLV) capacity to 8 tons. ISRO is developing a semi-cryogenic engine that could boost its capabilities towards launching 8 to 10-ton satellites into the geostationary orbit.

India is keen on developing its space economy and involving the private industry. The Indian armed forces also benefit from space technologies, with dedicated satellites launched for the navy and air force. In 2019, India conducted an anti-satellite (ASAT) test.

ISRAEL. Israel's interest in developing its space program can be traced back to the peace treaty signed with Egypt in 1979, as they sought technological capabilities to verify compliance. The National Committee of Space Research (NCSR) was established in the 1960s by the Israeli Academy of Sciences and Humanities. Israel became a spacefaring nation in 1988 with the launch of the Ofeq-1 reconnaissance satellite using its launcher called Shavit. The Israel Space Agency (ISA) was formed in 1983, and since then, Israel has launched around twelve satellites in the Ofeq reconnaissance satellite series.

Israel's space industry is vibrant, focusing on communication services and remote sensing. The country is known for developing high-quality sensors for satellite systems. Their moon program involves significant private-sector involvement. While the lander crashed on the Moon's surface in April 2019, Israel successfully achieved lunar orbit insertion, making it the seventh country to have a spacecraft orbit the Moon.

The US agency NASA is expected to launch around 2026, Israel's first space telescope mission. The system is known as the Ultraviolet Transient Astronomy Satellite (ULTRASAT), which would be an ultraviolet observatory with a large field of view for investigating the secrets of short-duration events in the universe, such as supernova explosions and mergers of neutron stars. NASA is also associated with the scientific aspects of this mission.[7]

Iran's space program has often been seen as a cover for developing long-range missile technology, similar to North Korea.

IRAN. Iran has been developing space technology since the late 1950s, with interests in technology and arms control issues related to space sciences and technologies. The Iranian Space Agency and the Supreme Space Council were established in late 2003, and Iran became a spacefaring nation in 2008. However, Iran's space program has often been seen as a cover for developing long-range missile technology, similar to North Korea.[8] Nevertheless, Iran is genuinely interested in developing its own space program.

Currently, Iran has three operational satellites and has sent animals into space. The country has ambitions for a human spaceflight program, the establishment of a space station, and missions to the Moon. However, financial and technological constraints may delay the fulfilment of these ambitions. Iran has formalised a 10-year space program adopted by the country's Supreme Space Council on Jan. 7, 2023. Here, the aim is to make the country emerge as a leading regional power in space technology and satellite launch. They have already signed an agreement with Russia for cooperation between their space industries.[9]

[7] "NASA to Launch Israel's First Space Telescope," *NASA*, February 21, 2023, https://www.nasa.gov/feature/nasa-to-launch-israel-s-first-space-telescope

[8] John Krzyzaniak, "Explainer - Iran's Space Program-Part-1", *The Iran Primer* (USIP Blog), August 09, 2022, https://iranprimer.usip.org/blog/2022/jun/03/explainer-irans-space-program

[9] Vali Kaleji, "Why Iran-Russia space collaboration is reaching new heights", *Amwaj Media*, February 26, 2023, https://amwaj.media/article/why-iran-russia-space-collaboration-is-reaching-new-heights

Examining the Space Race

In the realm of international politics, the space race is often seen as a competition among nation-states, particularly during the Cold War era, which witnessed an intense arms race. However, in present-day geopolitics, the concept of the space race is more about one-upmanship, demonstrating strategic capabilities, and asserting power rather than a classical arms race. It is crucial to avoid solely viewing the space race through the lens of an arms race globally and in the Asian context.

The global space race began with the launch of the first satellites by the Soviet Union in 1957, which prompted a response from the United States with its satellite launch in 1958. This race was primarily driven by technological competition between the two power blocs. The race reached a significant milestone with Yuri Gagarin's human-crewed spaceflight in 1961, followed by the United States' successful manned visit to the Moon in 1969. Roland Regan's conceptualisation of missile defence in 1983, when he delivered his famous speech on Strategic Defence Initiative (SDI), made people think about the possibilities of space weaponization. Subsequently, China's anti-satellite test in 2007 changed the entire space discourse from the domain of competition/one-upmanship to the emergence of space as a new domain for warfare.[10]

Before discussing the space race in the Asian context, it is important to acknowledge the strategic investments made by several states in the region. China's role in this regard is significant, although it is not the focus of this discussion. China has nuclear weapons and a formidable missile force with advanced missile defense systems and anti-satellite (ASAT) capabilities. Conversely, India lacks a counterspace program but has made considerable progress in the missile domain. North Korea is a nuclear power with a major missile program, while Japan and South Korea possess missile defense capabilities. Iran has invested in various missile systems, and Israel, though not a spacefaring state, is known for its achievements in the missile and missile defense fields. Despite not being a spacefaring state, Pakistan has expertise in missile technology and receives significant support from China.

Regional rivalries in the area include Iran-Israel, India-Pakistan, North Korea-South Korea, and North Korea-Japan conflicts. Differences also exist between Japan and South Korea. Regarding space, two crucial intergovernmental organizations operate in the region: the Asia-Pacific Space Cooperation Organization (APSCO), headquartered in Beijing, with Asian members including Bangladesh, Pakistan, and Thailand, and the Asia-Pacific Regional Space Agency Forum (APRSAF), primarily driven by Japan, with India and South Korea as members, among others.

Japan, India, and South Korea hold the key to a cooperative security environment in Asia. As power dynamics shift in the region, India's rise, Israel's assertive foreign policy, and Japan's increasing divergence from the United States on certain issues are notable. Japan and India have ambitious space programs, but it is more likely that they will cooperate rather than engage in direct competition. They may, however, compete for commercial contracts in the space industry.

South Korea is ambitious but will require time to develop its space architecture to the level of Japan and India. Collaboration with these states is expected. Additionally, South Korea may benefit

[10] "China Anti-Satellite Test Sparks Space Junk Outcry", *AFP/Space Wars*, January 19, 2007, https://www.spacewar.com/reports/China_Anti_Satellite_Test_Sparks_Space_Junk_Outcry_999.html

from assistance from the United States to leapfrog in the space domain. Aware of its strengths and limitations, Israel primarily focuses on Low Earth Orbit (LEO) in terms of technology and missions. Israel will likely continue its business policies and encourage private industry to undertake missions to the Moon and Mars. While competition may exist among Japan, India, Israel, and South Korea for commercial contracts, they are more likely to work on their technological strengths, engage with each other, and accommodate each other's interests.

The India-Pakistan case is unique, as two adversarial nuclear-armed states share a border. Pakistan, not a spacefaring state, has limited investments in the space domain but possesses expertise in missile technology and receives significant support from China. It is possible that Pakistan could develop a counterspace program to balance India's capabilities, leading to a different kind of space race between the two countries.

The situation with North Korea is peculiar. South Korea experienced a significant loss of face when North Korea became a spacefaring nation ahead of them. South Korea is now in the final stages of developing its spy satellite program and is expected to make efforts to outshine North Korea's space program. Japan, facing an increasing threat from North Korea, is likely to push for a more robust military space program. Both South Korea and Japan understand that challenging North Korea's nuclear deterrence through nuclear means is not feasible, so they may seek to outmanoeuvre North Korea in the space domain, particularly by investing significantly in space capabilities to reduce North Korea's potency in projectile technologies.

The space programs of Iran and North Korea are often viewed as covers for developing long-range missile technology. However, it is essential to recognize that these states have specific agendas for space exploration and should not be underestimated regarding their capabilities in space and missiles. For Iran, space and missile capabilities are integral to establishing a structure for nuclear warfare. In addition to its nuclear programs, Iran has invested in these domains concurrently. Talks on the Joint Comprehensive Plan of Action (JCPOA) between P5+1+EU and Iran, aimed at ensuring the peaceful nature of Iran's nuclear program, have not yielded significant progress.[11] Consequently, there is a significant trust deficit between Israel and Iran. In the space domain, Israel aims to increase its capabilities and develop a counterspace program to pose a threat to Iran's space assets.

Several countries in the region are investing in lunar and Mars exploration programs. Israel, the UAE, Japan, and South Korea participate in the NASA-led Artemis Program for manned lunar exploration. However, some of these states also have individual plans for their own programs. India, too, has expressed interest in this field, while Japan has already achieved successful missions to asteroids. Deep space missions provide opportunities for technological development and testing, commercial benefits, the race for planetary resources, and expressions of soft power and nationalism. It is expected that these states may compete in the realm of deep space exploration.

The space domain and the prospects of a "space race" in the Asian region should be viewed within the context of regional strategic fault lines and economic interests. Currently, more attention needs

[11] "Seventh round of Iran nuclear talks continue in Vienna", *Xinhua*, December 10, 2021, http://www.china.org.cn/world/Off_the_Wire/2021-12/10/content_77921565.htm

to be given to North Korea's and Iran's space programs, as they have the potential to become unpredictable.

CONCLUSION

In conclusion, the competition among Asian states in the space race is expected to intensify in the future, with significant implications for geopolitics and geoeconomics. The increasing number of countries entering the space arena will elevate the importance of space activities in areas such as national security, technological innovation, and economic development.

China is one state in the region whose philosophy and geopolitical ambitions are much different than others. The region has few states which significant political uncertainties, while few states have major economic challenges. But broadly, there exists a possibility for various states to engage in enhanced cooperation and collaboration. Joint space exploration missions and sharing space technologies could foster regional stability and contribute to economic growth. The states in the region need to realise that engaging in an unnecessary space race is not in their interest. If countries perceive space as a zero-sum game and strive for dominance to gain strategic advantages, it could trigger an unsettling arms race in space.

On a broader geopolitical scale, the success of some Asian countries in space (not considering China) has the potential to challenge the long-standing dominance of Western space powers like the United States, Russia, and Europe. However, it is important for states like Japan and South Korea to follow an independent space agenda while continue cooperating with the US. Any shift in the balance of power (to a limited extent) could reshape global space activities, altering the distribution of benefits and risks associated with space exploration and utilization.

By fostering collaborative efforts, sharing resources, and maintaining open communication channels, Asian countries can maximize the positive impacts of their space programs while minimizing the potential for conflict. Ultimately, a responsible and coordinated approach will be crucial for achieving the full potential of space exploration and reaping the benefits for humanity.

Group Captain (Retd) AJEY V LELE (PhD) is Consultant at the Manohar Parrikar Institute for Defence Studies & Analyses (MP-IDSA), New Delhi.

The views expressed in this article are personal.

The Society for the Study of Peace and Conflict (SSPC) is an independent, non-profit, nonpartisan research organization based in New Delhi, dedicated to conduct rigorous and comprehensive research, and work towards disseminating information through commentaries and analyses on a broad spectrum of issues relating to peace, conflict and human development. SSPC has been registered under the Societies Registration Act (XXI) of 1860. The SSPC came into being as a platform to exchange ideas, to undertake quality research, and to ensure a fruitful dialogue.

Published by:
Society for the Study of Peace and Conflict.
Post Box: 10560,
JNU Old Campus, New Delhi-110067.
Website: www.sspconline.org
https://www.facebook.com/sspconline
https://twitter.com/sspconline

We welcome your feedback. Email your comments at "sspconline@gmail.com"

Designed and typeset by Excel Solutions