What China Wants in Outer Space

By Namrata Goswami

Astronauts salute after returning to earth in the re-entry capsule of China's Shenzhou-10 spacecraft in north China's Inner Mongolia Autonomous Region, June 26, 2013. Reuters

Beijing has made it clear that its ambitions for China's space program are an integral part of its long-term vision for national rejuvenation. In his 2017 address to the Chinese Communist Party's nineteenth National Congress, President Xi Jinping said that the Chinese space program will play a critical role in elevating the country to a "fully developed, rich, and powerful nation" by 2049—the year the People's Republic of China celebrates its one-hundredth anniversary.

For China, investing in outer space goes beyond simply achieving prestige and reputation—as opposed to the "flags and footprints"-based moon race between the United States and the Soviet Union during the Cold War. Instead, China aims to establish a permanent space presence, which would offer long-term economic benefits. The global space economy today is worth $350 billion, but is predicted to grow to $2.7 trillion by 2040. The economic returns from future mining of space-based resources like titanium, platinum, water-ice, thorium, and iron-ore far exceed the trillion-dollar mark.

Consequently, the Chinese are working to establish a base on the moon with the industrial capacity to build spacecrafts using lunar resources. This would drastically reduce the cost of interplanetary travel. A lunar base would serve the distinctive purpose of providing a testing ground for human space settlement, and building capacity for China's long-term space ambitions.

Beijing's Lunar Dreams

Following the landing of *Chang'e 4* (China's fourth lunar exploration mission) on the far side of the moon on January 3, the China National Space Administration (CNSA) announced follow-on missions to augment the state's space capacity. By this year's end, China will launch *Chang'e 5* to bring lunar samples back to Earth, followed by *Chang'e 6* (2024) to bring samples specifically from the moon's south pole. *Chang'e 7* (2030) will survey the south pole's composition and *Chang'e 8* (2035) will test key technologies like 3D printing to lay the groundwork for the construction of a research station. The moon not only strengthens China's space-faring capacities but also has resources like iron-ore and water that can be utilized for space-based manufacturing. Meanwhile, a lunar base offers some short-term strategic dominance in cislunar space (the area between the Earth and the moon).

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Another of China's major space ambitions is its investment in Space-Based Solar Power (SBSP) to build a space solar station thirty-six thousand kilometers above Earth. Some Chinese leaders stress that dwindling fossil fuel resources on Earth will make solar energy the most important future energy source. China started construction on the world's first SBSP experimental plant in Chongqing earlier this year. If successful, the technology would allow China to fully power its lunar base and augment space mining operations.

Space mining involves developing technologies to harvest resources from asteroids and the moon—a highly lucrative prospect. For instance, a single asteroid called 2011 UW158, which passed by Earth in 2015, was estimated to contain 5 trillion dollars' worth of platinum. While still roughly a decade off, space mining is fast becoming a reality. Countries like the United States and Luxembourg have already passed legislation enabling private companies to begin exploration and operations.

Competing with India

Will China's ambitious space program result in competition with other space powers in its own neighborhood, particularly India? Quite possibly. New Delhi has an advanced space program, having successfully sent a probe to Mars (Mangalyaan) on its first attempt. India's *Chandrayaan-2* will attempt to land this year near the lunar south pole, with instruments that will probe for water and ice and study minerals.

India and China have both made use of their space programs to offer services to countries in their strategic neighborhoods. At the 18th South Asian Association for Regional Cooperation (SAARC) summit held in Kathmandu in 2014, Indian Prime Minister Narendra Modi announced his country's plan to launch a SAARC satellite (later named South Asia satellite) offering communication services free of charge to SAARC nations (excluding Pakistan, who opted out). In May 2017, the Indian Space Research Organization (ISRO) made good on Prime Minister Modi's promise, launching the 2230-kg GSAT-9 South Asia satellite. The impact of New Delhi's outer space diplomacy was felt immediately, with SAARC leaders Ashraf Ghani (Afghanistan); Sheikh Hasina (Bangladesh); Tshering Tobgay (Bhutan); Abdulla Yameen (Maldives); Pushpa Kamal Dahal (Nepal); and Maithripala Sirisena (Sri Lanka) joining in by video conference to watch the launch with Modi.

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In its 2016 policy paper on space, China stated that "we plan to start providing basic services to countries along the Silk Road Economic Belt and twenty-first century Maritime Silk Road in 2018 [to] form a network consisting of thirty-five satellites for global services by 2020."

As part of its Belt and Road Initiative (BRI), Wu Yanhua, deputy head of CNSA, announced in September 2018 the development of the BRI Space Information Corridor, aimed at the Association of Southeast Asian Nations for the efficient sharing of satellite-based information. China has already helped both Pakistan and Sri Lanka launch communication satellites. China's BRI, backed by its enormous economic clout, thus poses an alternative to India's space diplomacy.

While India has not committed the resources that China has to develop its space information corridor as part of the BRI, it has resisted the Belt and Road and its associated space corridor and launched alternative regional mechanisms, such as the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation. Consequently, the outer space domain is starting to get competitive, diplomatically, technologically, and even militarily.

In 2015, China established the Strategic Support Force (SSF) to restructure its military space capacities. The SSF aims to establish a permanent cislunar presence, engage in "area denial of space" to adversaries, jam foreign satellites, and project military power in space. China demonstrated its ability to do so during its 2007 Anti-Satellite Test.

In 2018, India launched its own dedicated military space satellite, the GSAT-7. Director-General of the Indian Army's Perspective Planning Lieutenant General PM Bali said at the time that "there is a need for a dedicated military

space program with adequate resources at its disposal because of the changing realities in our neighborhood."

The reality of China's increasing military presence in India's neighborhood, including assertive territorial claims, is a case in point. In an effort to bulk up its own arsenal, India recently tested an anti-satellite weapon, code-named *Mission Shakti*, on March 27. The weapon, built by India's Defense Research and Development Organization, intercepted and destroyed one of its own satellites. According to the Ministry of Foreign Affairs, the test was conducted to show India's capacity to intercept and destroy adversary satellites if the need arises.

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Both China and India's dependence on satellite-based services has only grown over the years. India's anti-satellite test clearly indicates that China's increasing military presence has motivated New Delhi to develop competitive space capabilities. India knowingly risked international criticism and loss of reputation with its test. This tells us that under the Modi government, national security has trumped international reputation.

The State of Play

For the time being, however, New Delhi remains focused on traditional satellite launch capabilities to service its population and additional space-science missions, with some initiatives to counter China, while Beijing is focused on building its long-term space presence and space industrialization. However, that may change. Influential Indian scientists, like Dr. Sivathanu Pillai, have identified the moon as a future resource base, while India's former president and nuclear scientist APJ Abdul Kalam was a great supporter of space-based solar power. And undoubtedly, India's *Chandrayaan-2* will be searching for lunar resources when it makes landfall this year.

As of now, China is the first Asian nation, from a policy perspective, to orient its lunar mission toward the future determinants of international power. In the next five to ten years, China has the edge on space resources, given that its programs for SBSP, asteroid mining, and lunar presence were announced decades ago, and we are starting to witness the fruits of those years of commitment. It will be hard to play catch-up in the subsequent ten to twenty years once China establishes a permanent presence in space and controls access to key areas from here to the moon.

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INTERVIEW

Getting Back on Keel

By Sean David Hobbs