PACNET

STRENGTHENING THE US-INDIA PARTNERSHIP THROUGH SPACE

BY KATHERINE E. MELBOURNE

Katherine E. Melbourne *(katherine.e.melbourne@aero.org) is a national security policy analyst at The Aerospace Corporation's Center for Space Policy and Strategy. Her experience in the space industry includes systems engineering, astrophysics research, and international relations. She will receive her master's degree in aerospace engineering from the University of Colorado Boulder in May 2025.*

The following analysis was made possible through the support of the Hindu American Foundation. For part one in the series click here.

On Feb. 13, less than a month into his second term, President Trump met with Prime Minister Modi to reaffirm the strategic importance of US-India relations. Defense and technology have long been central to cooperation between India and the US, and this theme continued with the official visit. The leaders named space as a focus in the context of cross-domain military cooperation, development of defense-focused technologies, and joint civil and commercial space exploration. As the relationship between the US and India grows stronger, space can provide avenues to gain momentum on existing goals and establish new partnerships between the two countries that can extend through this presidential administration and beyond.

Assessing the US and India's individual potential in space

The US has global influence in space, spurred by NASA's long history of human spaceflight, space science, and deep-space exploration successes. Space has been essential to US national security for decades as well, and the US is entering a new era of space security with the US Space Force recently celebrating its five-year anniversary as a branch of the military. The US commercial space sector is thriving and has expanded into capability areas that used to be limited to the government.

India joins the US among an elite group of space powers with a regional PNT system, on-orbit docking capabilities, and a legacy of orbital launch and satellite development efforts. India is also one of the few countries to have demonstrated an anti-satellite (ASAT) weapon. The Indian Space Research Organization (ISRO), India's national space agency for research and development, has ambitious plans for civil space exploration and aims to accomplish these bold goals through incremental milestones. The Chandrayaan lunar sample and return mission targeted for 2028 necessitated the demonstration of on-orbit docking that was successfully completed by ISRO's Space Docking Experiment in January 2025. ISRO also leads the Ganganyaan program to send humans to space on a rocket built and launched by India. The program anticipated uncrewed test flights in 2025 before its first crewed flight in 2026, with both serving as steppingstones toward an orbital station by 2035 and a crewed lunar landing by 2040.

Over the last decade, India has been transitioning from nearly exclusively government-led space technology development to innovation led by the private sector. By 2030, the value of India's space sector is projected to grow to $77 billion, nearly six times its valuation today. Since the creation of the Indian National Space Promotion and Authorization Center (IN-SPACe) in 2020, ISRO has had a formal mechanism to support India's domestic private space industry and facilitate commercialization of government space technologies. National regulations have also supported the domestic space industry's growth with the Indian Space Policy released in 2023 and the easing of foreign direct investment restrictions in 2024. The government must invest in training a workforce to keep pace with accelerated growth of the industry. It will also be critical to reflect on what projects are more appropriate to remain government-led and which are more suited to private industry leadership.

Previewing the partnership through the end of the decade

Looking ahead through the end of the decade, US-India relations in space are poised to build on an existing foundation while taking advantage of each country's strengths as two of the world's leading space powers. In national security, US-India bilateral cooperation began formally in 2005 and in recent years has expanded to space. In February 2025, India was one of 25 nations to participate in US Space Command's Global Sentinel exercise, designed to share techniques and best practices for space domain awareness and to improve coordinated responses to threats.

Private industry plays a major role in this national security relationship. As part of the India-US Defense Acceleration Ecosystem (INDUS-X), the two countries are funding joint challenges for companies to propose technological solutions for space defense missions, including space domain awareness and space-based intelligence, surveillance, and reconnaissance. INDUS-X was established in June 2023 to form relationships in technology and defense across both country's governments, private sectors, and academia through research investments, academic training, and support for start-ups. INDUS Innovation, the evolution of INDUS-X created under the Trump administration, will continue offering similar opportunities to the space industry.

The US Space Force has also made strategic investments that leverage India's strength in imaging technology. In an effort to develop more advanced sensors and create resilient supply chains, the Space Force is working with the Indian government to build a factory that produces semiconductors for these sensors. In 2023, the Space Force also awarded their first non-US Cooperative Research and Development Agreements with two Indian companies that specialize in space domain awareness software and imaging sensors. These mutually beneficial investments are likely to remain a trend over the next few years.

Civil space will also benefit from the commercial sector's growth with expanded options for suppliers and manufacturers, but joint government-led projects will remain a key component of US-India space collaboration. Former President Biden and Prime Minister Modi agreed to train Indian astronauts at NASA in June 2023, and that agreement is coming to fruition with the February 2025 announcement of the first Indian astronaut to travel to the ISS. Astronaut Shubhanshu Shukla will pilot Axiom Mission 4, a mission currently targeting launch in 2025. This year will also see the launch of the NASA-ISRO Synthetic Aperture Radar (NISAR) mission. The US and India each provided one SAR payload to study ecosystems, Earth deformation, and cryospheric science through extremely high-resolution Earth observations. And in June 2023, India became the 27th country to sign NASA's Artemis Accords, an indicator that India and the US will continue working together on norms of responsible behavior in space.

Opportunities to enhance cooperation

In addition to advancing these ongoing programs, the US and India can take additional steps to fortify their relationship and make progress on their mutual goals in space over the next four years and after. First, the experienced US private space sector is in a unique position to support India's rapidly growing commercial space industry, and India's cost-effective manufacturing of satellite parts and components is attractive for US companies. In addition to INDUS Innovation, to facilitate connections between foreign companies, the US and India should establish a commercial space working group, following through on a suggestion made in a meeting between former President Biden and Prime Minister Modi at the 2023 G20 Summit. Maintaining an open dialogue at a consistent cadence, with government support, will allow companies to form relationships more efficiently.

Human spaceflight, now a common occurrence for the US commercial sector and a top priority for ISRO, is also an area ripe for the continuation of US-India partnership, even beyond the planned decommissioning of the ISS. Together, the US and India completed a Strategic Framework for Human Spaceflight Cooperation in 2024, which provides a roadmap for engineering interoperability as well as a new plan for astronaut training. Prime Minister Modi and President Trump expressed their intention to continue sharing expertise in human spaceflight, but interoperability—particularly in crew habitat and life support system designs – should

continue to be a focus as well. And as both countries turn toward crewed Mars missions in the long-term future, they should consider opportunities for joint research on bioastronautics to ensure crew safety while tackling the complexities of human space travel.

While US-India bilateral relations are important, there is value in strengthening multilateral relationships that include both countries as well. This includes focusing on space through the Quadrilateral Security Dialogue ("Quad") that includes Japan and Australia as well as the US and India. Space has been included in talks between Quad leaders previously, resulting in a Space Cooperation Working Group established in 2021. Quad countries have strong bilateral relationships in space with each other, but this multilateral partnership provides a unique opportunity to enhance security through space. A natural way to achieve this is through streamlining processes for space domain awareness data sharing within the Quad. Momentum has already picked up for this as the US and India signed a bilateral space situational awareness agreement in 2022. The Quad should also continue to share Earth observation data to forecast extreme weather events and focus on developing norms for space traffic coordination. Multilateral coordination can improve data quality and timeliness and can eventually make it easier to establish consensus on space norms and standards with a broader global audience.

Space offers plentiful opportunities to strengthen US-India strategic alignment, and an emphasis on collaborating through commercial partnerships, human spaceflight, and existing multilateral relationships will balance near-term gains with progress toward each country's long-term visions.

PacNet commentaries and responses represent the views of the respective authors. Alternative viewpoints are always welcomed and encouraged.