Centre for Air Power Studies

Centre for Air Power Studies ISSUE BRIEF

26/23

15 December 2023

MILITARISATION OF INDIAN SPACE SECTOR: A GROWING NECESSITY

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The recent developments point to the militarisation of the space sector in India, with 'space' as a domain being potentially used for defending Indian military interests during future wars.

In October 2023, the United States Air Force Research Laboratory announced new Cooperative Research and Development Agreements (CRADAs)[1] between the United States Space Force and an Indian start-up,114AI, that builds dual-use software for space domain awareness.[2] This news came close on the heels of the successive India-U.S. joint statements 'welcoming the launch of dialogues in new defence domains including space and Artificial Intelligence (AI), to enhance capability building, knowledge and expertise'.[3] For instance, India and the United States had 'reaffirmed their commitment to deepen and diversify the India-U.S. Major Defence Partnership through expanded cooperation in new and emerging domains such as space and AI, and accelerated defence industrial collaboration.'[4]

These developments also closely followed the inclusion of 'planetary defence' as a subject of deliberation within the U.S.-India Civil Space Joint Working Group. This working group is led by the U.S. led National Aeronautics Space Administration (NASA)[5] and the India-led Indian Space Research Organisation (ISRO). Additionally, India was included within the multilateral Space Mission Planning Advisory Group (SMPAG) —a specialised working group of the United Nations (UN) that engages in threat mitigation from Near Earth Objects (NEO)[6] that can potentially harm critical infrastructure and the International Asteroid Warning Network (IAWN).[7]

These developments emerged at a time when the top leadership of the Indian Armed

Forces —the Indian Chief of Defense Staff (CDS) General Anil Chauhan[8] and the Indian Air Force (IAF) Chief V.R. Chaudhari— have overtly spoken about the weaponisation[9] /militarisation of the Indian space sector[10] with the protection of Indian space-based assets in Low Earth Orbits (LEO) and Geosynchronous Orbit (GEO) becoming crucial for India's defence and security.[11]

The presence of dedicated dual-use Indian satellites in space to enhance India's C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) capabilities, such as the GSAT series (including the navy's GSAT-7 Rukmini satellite), HySIS and Microsat, RISAT-2 with an Israeli synthetic aperture radar and CARTOSAT 2A for the Indian military, have given further credence to the idea of militarisation of the space sector.

The developments point to the militarisation of the space sector in India, with 'space' as a domain being potentially used for defending Indian military interests during future wars. It also demonstrates the growing convergence between India and the United States on the 'militarisation of the space sector' as both sides broaden and deepen the scope of mutual defence cooperation between them. It shows how Indian hesitation in acknowledging the militarisation of non-traditional sectors within the existing strategic discourse is now slowly waning — as India is adopting a robust stance towards potential militarisation of the space sector.

Militarisation of Indian Space Sector

India has traditionally utilised the domain of space for civilian purposes through its ISRO-led space programme which has witnessed unprecedented success with its space exploration programmes. For instance, the Mangalyaan (Mars Orbiter Mission) saw India become only the fourth nation to explore the red planet, Mars.[12] The Chandrayaan mission series led to the discovery of water molecules on the moon[13] and India emerging as the first nation in the world to land on the lunar South Pole.[14] The Aditya L1 mission has enabled India to conduct a heliographic study of the sun.[15] These programmes have also enabled India to engage in human spaceflight programmes, with an Indian astronaut making it to space in 1984.[16]

However, after the Chinese conducted their Anti-Satellite Weapons Test (ASAT) test in 2007[17] and India followed suit with its own ASAT test in 2019, the militarisation of the Indian space sector became inevitable as 'India neutralised a satellite in space with its anti-satellite missile'.[18] Similarly, the inauguration of Indian Defense Space Agency (DSA) and Defense Space Research Organisation (DSRO) — agencies that are tasked with the creation of specialised space warfare systems and technologies — gave an impetus to the proposed militarisation.[19]

In addition, the presence of dedicated dual-use Indian satellites in space to enhance

India's C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) capabilities, such as the GSAT series (including the navy's GSAT-7 Rukmini satellite), HySIS and Microsat, RISAT-2 with an Israeli synthetic aperture radar and CARTOSAT 2A for the Indian military, have given further credence to the idea of militarisation of the space sector.[20]

India-US Partnership & Space Sector

The domain of space has received much attention[21] within the framework of the larger India-U.S. bilateral partnership.[22]

While India-U.S. Joint Civil Cooperation is dominating the general public discourse on space with the launch of NASA-ISRO Synthetic Aperture Radar (NISAR), collaborative space programmes and the human spaceflight programme Gaganyaan all scheduled for launch in 2024[23] — the military component of space is also slowly coming to receive attention.[24]

In 2022, the U.S. Department of Defense had announced the commencement of 'new defence space exchanges between the U.S. Space Command' after the signing of the Space Situational Agreement (SSA) between India and the United States.[25] The SSA agreement has augmented mutual satellite protection in space and led to the establishment of the Directorate of Space Situational Awareness and Management (DSSAM) in India for improved operational effectiveness.[26] Similarly, the launch of the Network for Space Object Tracking and Analysis (NETRA), a dedicated control centre for broadening and deepening the bandwidth of SSA in partnership with the United States' Combined Space Operation Centre (CSpOC) at the Vandenberg Air Force Base in California, has also given a fillip to the India-U.S. space partnership.[27]

In June 2023, India also signed the Artemis Accords as it agreed to 'a set of principles guiding space exploration among nations' furthering space cooperation with the United States and its allies.[28] While the accords do not overtly mention military cooperation, India's entry into the elite grouping will enable it to have greater access to dual-use technologies within the space sector in the future. India will have the benefit of being 'inside the tent' as opposed to outside it — at a time when India has struggled to be a part of key export control regimes, for instance, those concerning nuclear energy.[29] Finally, as a member of the Artemis Accords, India will have a 'bigger choice in determining new rules of the road for lunar exploration' in the years to come.[30]

With India acquiring the MQ 9B sky and sea drones from the United States to increase its operational flexibility and Intelligence, Surveillance and Reconnaissance (ISR) capabilities, India will be able to better counter the Chinese threat along the India-China border[31] Similarly, by acquiring congressional consent for the acquisition of the GE-jet engines, India will be able to set a precedent for more viable technology

transfers. These acquisitions will also enable the overt militarisation of the space sector as India prepares to secure all the warfare domains from potential adversaries.[32]

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Fetishisation of Space & Private Sector

With space emerging as a major pivot of the initiative on critical and emerging technologies (iCET) and becoming a fetishised commodity[33] within the rubric of the India-U.S. Defense Acceleration Ecosystem (INDUS-X) — a platform generated to enable robust private sector investment within sectors engaging with dual-use technologies — the militarisation of the sector continues to be inevitable through robust public-private sector engagement.

Leading Indian start-ups are engaged in harnessing dual-use technologies within the domain of space, especially in diverse areas like remote sensing, earth observation, position, navigation and satellite communication. For instance, an Indian start-up, Pixxel Technologies, has won a contract with the United States' National Reconnaissance Organisation (NRO) to supply hyperspectral imagery to the organisation.[34] Similarly, 'GalaxEye' has started manufacturing synthetic aperture radars that can assist in all-weather imaging without facing hurdles that single sensor satellites presently face.[35]

Finally, the Indian satellite communication sector has opened up to private stakeholders, with Indian telecom conglomerate Airtel slated to bring satellite broadband services to India.[36] Although leading private companies are working in the field of the military satellite communications sector, supporting the creation of 'turnkey satellite navigation systems',[37] the opening of the satellite communications sector to private stakeholders could enable more robust engagement with the Indian military wings. This could enable the provision of high-speed satellite broadband connectivity to the Indian armed forces.

Countering China: Building Cross Domain Awareness & Diplomatic Partnerships

In order to provide clarity on Indian objectives within the spatial domain, India should come out with its own military space policy at the earliest. While the Indian Space Policy 2023[38] provides a roadmap for the use of space for civilian purposes, it does not provide any clear direction on the use of space for military purposes. The existing space policy encourages the 'participation of the private sector in the entire

value chain of the Space economy, including in the creation of space and ground-based assets' — it does not explicitly differentiate on the constitution of these assets.[39]

The Indian Air Force could potentially have a designated aerospace command or should be formally designated as the Indian Air and Space Force to coordinate operations between space commands of different friendly states like France and the United States.

Similarly, the Indian Air Force (IAF) could potentially have a designated aerospace command[40] or should be formally designated as the Indian Air and Space Force to coordinate operations between space commands of different friendly states like France and the United States.[41] The establishment of a dedicated space command will also enable India to counter China in the space domain — since the latter has now established a dedicated Space Systems Department (SSD) often referred to as the Aerospace Force within the People Liberation Army's Strategic Support Force (PLA-SSF).

With the perceptible China threat becoming a cause of concern for both India and the United States, greater convergence between these two states on space along with other existing warfare domains such as air, maritime and land may be given priority. In fact, cross-domain awareness (CDA) could enable greater interoperability and information sharing between the different forces. As China has come to employ 'Multi-domain precision warfare' (MPDW) to identify vulnerabilities in operational systems and then subdue existing systems through 'precision strikes' conducted by combined joint forces, states attempting to manage the China threat must engage in CDA operations to counter the Chinese forces.[42] For instance, with quantum computing coming to the fore, a convergence of the maritime and spatial domain may entail greater collaboration between India and the United States — as India attempts to ameliorate its C4ISR abilities in the years to come.

Similarly, India must use satellite communications more effectively for civilian and military purposes interchangeably as China has already started constructing 'a space infrastructure system that would integrate communications with navigation and positioning and remote sensing' through its national satellite mega constellation project named "Guowang". The Chinese mega constellation project is being designed to compete with United States' Starlink and SpaceX and other LEO mega- constellations. However, Guowang's launch could have ramifications for India's security infrastructure. It will potentially position China as a provider of global public goods, giving it an upper hand in satellite communications. This, in turn, could make China a 'provider of military and government communications that will be hard to degrade.'[43] In fact, India should be cognisant of the speed at which China is expanding its dual-use infrastructure.

As the Indian government aspires to build more LEO and Middle Earth Orbit

satellites (MEO) satellites to augment satellite communication on Indian shores, these satellites may potentially have dual-use components and will require protection from destructive attacks. Hence, India will potentially deploy more kinetic energy weapons (KEWs) and space-borne directed energy weapons (DEWs) to defend its space-based assets. With the Indian navy developing an 'anti-drone system that can detect and micro-jam drones and use a laser-based kill mechanism to terminate targets' — India is slowly and steadily comprehending the value associated with the use of space for military purposes.[44] Similarly, products of classified programmes like KALI (Kilo Ampere Linear Injector) and DURGA (Directionally Unrestricted Ray-Gun Array) in addition to other programmes will see development[45], enabling India's rise as an air and space power with substantial counterforce and counter value attack capabilities.

Conclusion

As the nature of warfare undergoes a transformational shift, the militarisation of the domain of space is also inevitable. Hence, India must shed its inherent hesitation and openly support the militarisation of the space sector to secure the spatial frontier against potential adversaries.

Since space has grown as a major area of civilian cooperation between India and the United States due to growing convergences between the two states on the 'China question' — India must further enhance the scope of the space partnership with the United States and include a tangible military component — so that India can proactively manage or contain the perceptible Chinese threat.

Finally, India must employ a combination of tools and tactics to counter the Chinese threat by setting up its own specialised aerospace command after its Air Force is designated as the 'Air and Space Force'. It must also build its weapons toolkit within the domain of space to counter the growing Chinese challenge within the domain of space.

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