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Synergies in Space: The Case for an Indian Aerospace Command

Dr. Rajeswari Pillai Rajagopalan

Introduction

The Indian Armed Forces have been mulling over the establishment of an aerospace command for close to a decade now. Over those years, international circumstances and geopolitics relating to outer space have changed, making it imperative for India to make decisions now. Though outer space is part of the global commons, it is increasingly getting appropriated and fenced as powerful States are seen seeking to monopolise space.

The growing advanced military space capabilities of some nations, which include the development of their anti-satellite missile capabilities, are also a worrying trend. With much of outer space having been utilised by a small number of great powers and the increasing presence of non-state players in the recent years, even a nominal increase in terms of space activity by some developing countries is leading to issues related to overcrowding and access. In order to protect its interests, India must institutionalise its own strengths in the form of an Aerospace Command.

While all the three services are becoming increasingly reliant on outer space assets, the Indian Air Force (IAF) has taken the lead, at least going by open sources. Back in 2003, Indian Air Force Chief Air Marshal S Krishnaswamy had already articulated the need for an aerospace command: “Any country on the fringe of space technology like India has to work towards such a command as advanced countries are already moving towards laser weapon platforms in space and killer satellites.”

Some years after that, in 2006, the IAF established a Directorate of Aerospace in Thiruvananthapuram in South India, which can be referred to as the initial avatar of the Indian

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aerospace command. What was visualised was a separate command with communications, navigation and surveillance as major functionalities. The directorate was headed by an Air Commodore-rank officer who reported to the Vice Chief's office through the Directorate of Concepts and Doctrines at Air Headquarters. The government, however, refused to take decisive action over the additional expenditure involved. It also feared that India might be accused of militarising outer space.

India has come a long way since then. The government clearly recognises the need to have a tri-service space command, particularly given the changing regional and global dynamics of security.

In June 2008, Defence Minister A. K. Antony announced the setting up of an Integrated Space Cell under the aegis of the HQ Integrated Defence Staff. Outlining the background to the project, the minister said: "Although we want to utilize space for peaceful purposes and remain committed to our policy of non-weaponisation of space, offensive counter space systems like anti-satellite weaponry, new classes of heavy-lift and small boosters and an improved array of Military Space Systems have emerged in our neighbourhood." Antony articulated the need for the cell which will operate as an integrating window between the military, the Department of Space, and the Indian Space Research Organisation (ISRO).

The debate surrounding the creation of an aerospace command began to gather greater momentum in the aftermath of the Chinese anti-satellite (ASAT) test in 2007. Two weeks after the test, then Indian Air Force Chief Air Marshal S. P. Tyagi publicly raised the issue, stating thus: "As the reach of the Indian Air Force is expanding it has become extremely important that we exploit space and for it you need space assets. We are an aerospace power having trans-oceanic reach. We have started training a core group of people for the 'aerospace command'."

Former Indian President and eminent scientist, Dr. A. P. J. Abdul Kalam, in March 2007 outlined the force multiplier aspects of outer space assets. He said: "I visualize the Indian Air Force of the year 2025 to be based on our Scientific and Technological Competence in the development of communication satellites, high precision resource mapping satellites, missile systems, unmanned super-sonic aerial vehicles and electronics and communication systems. This capability will enable the Air Force to succeed in the electronically controlled warfare in the midst of space encounters, deep-sea encounters, and ballistic missiles encounters." He emphasised the greater relevance of air and space power in future warfare. The idea behind an aerospace command is to integrate all the different capabilities and functions that exist today, particularly the military aspects of outer space.

Logic of an Aerospace Command

The logic behind the creation of a joint aerospace command in the case of India is abundantly clear. First, as India's requirements for space increase, it becomes more important for the country to have a single agency that will coordinate such different activities. Second, the presence of a single entity will also allow India to better promote its national interests in outer space as this becomes increasingly

crowded and contested. India's security interests are now more than merely maintaining territorial integrity; today those interests go beyond its borders. Accordingly, India's armed forces have to be far more agile and dynamic with an ability to constantly understand, appreciate and respond to emerging situations. The need to be ever vigilant to the rapidly changing security environment in Asia cannot be underestimated.

India's Dual-Use or Military Satellites

Dual-Use and Military Satellites	Details	Functions and Utilities
Cartosat-2A	Launched in April 2008, Cartosat-2A is the thirteenth satellite in the family of India's Remote Sensing (IRS) series and third in the Cartosat series. Using a panchromatic camera, it captures imageries with a spatial resolution better than 1m and swath of 9.6 km.	Used for cartographic applications like mapping, urban and rural infrastructure development and management, as well as application in Land Information (LIS) and Geographical Information System (GIS).
Radar Imaging Satellite (RISAT)-1	A state-of-the-art Microwave Remote Sensing Satellite using a Synthetic Aperture Radar (SAR) and operating in C-band, RISAT-1 enables imaging of the surface features during both day and night under all weather conditions. The satellite was launched in April 2012.	Provides cloud penetration and day-night imaging capability. The unique characteristics of C-band Synthetic Aperture Radar enable applications in agriculture, particularly paddy monitoring in kharif season and management of natural disasters like floods and cyclones. Although RISAT-1 was not designed as a surveillance satellite, its utility in the areas of passive military applications including surveillance is significant.
Radar Imaging Satellite (RISAT)-2	India's Israel-built RISAT-2, using X-band synthetic aperture radar was tested in April 2009. Its particular significance is its ability to take images under all weather conditions as well as day and night, enabling India to have a constant eye on activities and developments on its border areas.	Huge utilities in the area of flood, agriculture, cyclone and disaster management. However, RISAT-2 is primarily developed for surveillance and defence purposes, including tracking of hostile ships at sea.
Technology Experiment Satellite (TES)	Launched in October 2001, TES is an experimental satellite to demonstrate and validate the technologies like altitude and orbit control system, high-torque reaction wheels, new reaction control system, light-weight spacecraft structure, solid state recorder, X-band phased array antenna, improved satellite positioning system, miniaturised TTC and power systems and, two-mirror-on-axis camera optics. TES also carried a panchromatic camera for remote sensing experiments.	The launch of the TES has made India the second country in the world after the US to commercially offer images with one-metre resolution. Used for remote sensing of civilian areas, mapping industry, and geographical information services.
GSAT-7	India's first dedicated military satellite, GSAT-7, using the European Space Consortium Arianespace's Ariane-5 VA 21, was launched in August 2013. The satellite will provide India with UHF, S-band, C-band, and Ku band relay capacity over the Indian landmass and surrounding seas.	This advanced communication satellite addresses many of the deficiencies faced by the Indian Navy in terms of both line of sight and ionospheric effects. Providing maritime communication to the Indian Navy, this satellite is important from maritime security and surveillance points of view in addition to overall strengthening of India's MDA (Maritime Domain Awareness) abilities.
Indian Regional Navigation Satellite System (IRNSS)	The first satellite of the seven-satellite constellation, using a XL-size Polar Satellite Launch Vehicle (PSLV)-C22, was launched on July 1, 2013. The Indian system is intended as an independent regional system providing "position accuracy better than 10m over India and the region extending about 1500 kms around India."	Using two microwave frequency bands, L5 and S, IRNSS will relay information 24x7 for two types of services: Standard Positioning Service (SPS) for general use and Restricted Service (RS) meant for special authorised users-military and other government actors. IRNSS is particularly significant given the growing importance of location precision technologies in the military arena.

Even as India has maintained the rhetoric of peaceful uses of outer space, the military utilities of outer space are growing. At present, out of the country's 25 satellites, six are dual-use or military ones, with utilities across passive military applications including surveillance, communications, and navigation.

However, with the changing nature of warfare, it has become necessary to leverage space capabilities for full-fledged military operations as witnessed in the US operations in the two Iraq wars and Afghanistan. India cannot remain on the sidelines, as many other countries including potential adversaries move ahead, utilising space for military purposes. China, for example, has learnt a great deal from the US experience and accordingly streamlined its capabilities under the PLA. We can also learn from the experiences of other powers that have made such attempts before.

Aerospace Commands in Other Countries

Many other powers have gone about establishing space commands given the increasing military nature of utilities of the space domain. The United States Space Command (USSPACECOM) is one of the earliest space commands, established in 1985 as a Unified Combatant Command of the US Department of Defense.

The Command was established acknowledging the greater utility of space assets in military operations and therefore the need to institutionalise it under one head. Military utility for passive applications such as intelligence, surveillance, reconnaissance, and navigation, has been widely prevalent and the potential for space assets for utility in active military operations is rising. The USSPACECOM was established with a view to coordinate and strengthen several different space utilities, including launching of satellites and other high-value payloads, enhanced communications, intelligence, missile warning, and navigation.

Even though a Russian Space Command, as part of the Russian Aerospace Defence Forces, was born only in December 2011, Moscow had set up the Russian Space Forces way back in 1992. The new command, as in the case of the US, is tasked with important space utilities in functions such as missile warning, space surveillance, and control of military satellites.

France, too, has a similar institution called the Joint Space Command, established in 2010. It has roles and functions that are similar to those of its counterparts, including tracking and directing space utilities in six key programmes: earth observation; signals intelligence; space situational awareness; missile warning; military satellite telecommunications; and space-based navigation. The idea of the Command was also to establish a single window for contact with international partners on all the key programme areas.

One of the justifications for France's space command was that while the country had a fairly well-established military space programme, particularly satellite communications and optical surveillance capability, there was a lack of a clear chain of command to get these space assets to be used for

tactical operations. Thus like the other two, coordination was the primary problem that France faced, and it is an issue that India faces, too.

Looking at the experience of these three powers, a joint space command has been of great utility in giving a sharper focus, particularly to military space activities, in coordinating with international partners in identifying the challenges and finding solutions, and lastly in seeking better financial allocations and human resources. In most cases, it is the air force that has taken the lead despite the fact that it is a tri-service command with utilities across army, navy and air force.

India's own space command should have a similar outlook, with the IAF shepherding the command and also similar functionalities: stepping up watch on India's immediate and extended neighbourhood regions and developing better situational awareness across land, maritime and air domains, easing integration of outer space assets across the three services while restricting the destructive abilities of hostile forces that might target India's outer space assets, and bringing about better integration among India's multiple space-related stakeholders including the ISRO, the Defence Research and Development Organisation (DRDO), the Ministry of Defence, the Ministry of External Affairs, and the Department of Space.

At a functional level, India's aerospace command could also be responsible for India's evolving missile defence programme, providing missile launch warnings, managing a range of high-end satellites with military utilities, among others. While ISRO has been so far managing India's satellites, having a military command responsible for military satellites as well as the dual-use satellites with military implications will free up the ISRO and enable it to focus on more scientific and developmental missions.

India already has much of the hardware needed to effect these capabilities; bringing it all under a single military command will be significant. India's all-weather and day and night satellites, with synthetic aperture radars such as the RISAT-1, RISAT-2 and the maritime communication satellite such as the GSAT-7, already implement many of these military functions.

It is important to ensure that while the Air Force may take a lead in shaping the command and its activities, the burden and assets for the joint command be shared among all the services equally. The burden should not be placed on the Air Force alone, making the command potentially a non-starter. Moreover, the command should not be seen as a supporting, auxiliary unit but a full-fledged command with utilities across the spectrum.

Conclusion

While India has the software in terms of its technological capabilities, it lacks the institutional architecture in the form of an aerospace command. Given the centrality of space assets across domains—socio-economic and development, weather monitoring, intelligence, surveillance, and navigation—India has to coordinate the functions of these different compartments for greater clarity

and better allocation of resources, both human and financial. In addition to greater efficiency, an Aerospace Command is also needed because of the manner in which other powers are using outer space and its potentially dangerous consequences for India.

ABOUT THE AUTHOR

Rajeswari Pillai Rajagopalan is a Senior Fellow at the Observer Research Foundation in New Delhi. She served in India's National Security Council Secretariat from 2003 to 2007.



Observer Research Foundation,
20, Rouse Avenue, New Delhi-110 002
Phone: +91-11-43520020 Fax: +91-11-43520003
www.orfonline.org email: orf@orfonline.org