



Centre for Air Power Studies

Seminar Report

3rd CAPS Annual Space Security Dialogue

(Organized by Centre for Air Power Studies on 04th December 2024 at Conference Hall, Air Force Auditorium, Subroto Park, New Delhi)

Centre for Air Power Studies (CAPS) organised the 3rd Annual Space Security Dialogue on “*Addressing the Present and Future Military Challenges in Space*”. The seminar involved distinguished participants from the military, government, industry and think tanks. In the seminar spanning half a day, various aspects from security to sustainability were discussed. The discussions also underlined the need for the development of a space ecosystem as a part of the aim of being a space economy.

The Vice Chief of the Air Staff, IAF, Air Marshal SP Dharkar, PVSM AVSM, inaugurated the seminar. He was also the founding director of the Defence Space Agency.

Welcome Address by DG, CAPS

In his welcome remarks, Air Vice Marshal Anil Golani (Retd), Director General, CAPS observed that the space domain is becoming increasingly contested, congested and competitive as a *sine qua non*. Militarisation of the space domain has been in existence ever since technology enabled its conquest. He spoke of the dangers felt while testing weapons of mass destruction in the early years after nuclear weapons were first used during the world war. He spoke of the remarkable resilience of the Outer Space Treaty of 1967 that has been accepted with 113 countries being a party to the treaty and another 23 having signed but not ratified it. However, he also cautioned that the treaty is largely silent or ambiguous on newly developed space activities such as lunar and asteroid mining. He spoke of the challenges in the space domain, which was originally envisaged as a global commons to be utilised for the common good of mankind now being usurped by nations to gain control and deny its use to adversaries. He drew a parallel to this to the contest in the air domain in conventional conflicts. He mentioned that it is almost impossible for mankind to function and survive if the usage of this domain is denied to its people today. He traced the origins of the annual space dialogue which is a key pillar to address these challenges by



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bringing together all the stakeholders under a single roof for stimulating discussions.

Inaugural Address by the VCAS, IAF

In the inaugural address, Air Marshal SP Dharkar PVSM AVSM introduced the event by stating that the outcome of wars would be determined by what militaries will increasingly do in the space domain. Space is the youngest military domain. Any object in space is a weapon of its own due to its relative velocities. Due to the proliferation of dual-use tech and the entry of private players, there is an expanding influence on human life.

This has attracted increased funding for military-grade space technologies and commercial ventures in space which has led to space becoming the ground for a contest. He further stated that everything related to space is influenced by cyber and cyber is influenced by space. With the threat to undersea cables, there is likely to be increased contest in space in orbital slots, bandwidth etc. Thus there is no choice to be left behind. He further spoke of using friendships with like-minded countries to grow.

The inaugural address culminated with the release of the book, "*Beyond the Blue Yonder: A Curated Anthology of Writings on Space.*"

Session-I

The first session was focussed on '**Challenges in Developing a Credible Military Space Capability**'. It was chaired by Air Chief Marshal RKS Bhadauria PVSM AVSM VM (Retd) Former Chief of the Air Staff, IAF. He expressed that while the civil segment of Indian space programmes had made impressive progress, the military segment is grim. He further added that the Indian military has not adequately demanded from the industry and has not exploited the capabilities to the fullest.



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Speaker-I. The first speaker, Shri Rakesh Sood, former Ambassador, went back in time to bring to the attention of the audience the fact that operations in Space commenced with militarisation. He brought to the notice of the audience the positive impact of space exploration that led to the ban on nuclear testing in space. He then spoke of the efforts of Dr Satish Dhawan and Dr Sarabhai in building the Indian space ecosystem. However, he was also worried about the reduced relevance of India's workhorse, the PSLV commenting that it is no longer financially competitive and multiple cheaper options are available globally. He further explained the scale of this issue when he said, that ISRO on average does five to six launches a year while SpaceX does one launch every three days. He expressed his concern that a single person, Chairman ISRO, donning multiple hats has potential conflicts of interest in the structure. He proposed the need for a Space Activities Bill to give clarity in the long term and ensure sustained growth. He also suggested that the military reach out to the industry, modify defence procurement practices and hand-hold deserving entities to deliver the desired results.

Speaker-II. Air Vice Marshal Rahul Bhasin VM ACAS (Ops) Space, Air HQ (VB) who spoke next explained the opportunities in near-space and the need to guard the territorial sovereignty there. He also encouraged the leadership at the national level to build niche capability and participate in Space Situational Awareness initiatives. He listed the proliferation of space technologies and the presence of non-state actors and grey zone activities as concerning challenges. He also touched upon the need for organisation, training and human resource development to support these expanding requirements in space. He summed up his arguments by saying, "*The outcome of future wars would be on the side that has unrestricted access to space*".

Speaker-III. Brig G Manoj Brig SFE, Defence Space Agency highlighted the threats from both natural and accidental causes in space and the need to build resilience. He argued that the side that has space superiority would have decisive asymmetry. He



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listed the challenges in the Indian military space ecosystem and encouraged cyber hardening of space networks.

Discussions. The floor was then opened for the audience. Former Air Chief, Air Chief Marshal VR Chaudhari commented that the world is progressing towards self-driving satellites, Geo stationary SAR satellites and the like. Thus, small changes to our aims and actions won't meet the demands of the day. He urged everyone to think and dream big. Dr Ranjana Kaul observed that there is an institutional disconnect between the decision-makers and the ground realities. She urged the decision-makers to catch up on the fundamentals of space. She advocated the role of the military as an independent government entity during the drafting of the Space Bill.

Session-II

The second session on '**Adapting and Exploiting Commercial Space Capabilities to Meet Military Requirements**' was chaired by Air Vice Marshal Sanjay Bhatnagar VM VSM (Retd), Distinguished Fellow, CAPS. He spoke of the government's aim for India to capture 8% of the global space economy. He further spoke of the interaction of the military and the think tanks including foreign ones as a vector in the right direction.

Speaker-I. Air Vice Marshal **Rajiva Ranjan** VM (Retd), Former ACIDS (ICT), HQ IDS said that all three services are bullish on space. He listed nuclear propulsion, deep space communication, reusability in space and space rescue vehicles as areas where research needs to proceed. He further stated that there is a distinct first-mover advantage in space. He proposed the creation of a Space Foundation. He said Production Linked Incentive (PLI) scheme is not the appropriate tool for Research and Development and urged innovators and users to put their heads together. He encouraged a wholesome development and urged the creation of centres for excellence



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in space. He concluded by stating the requirement of a change of mindset as the first step.

Speaker-II. Dr Chaitanya Giri, Fellow, Centre for Security, Strategy and Technology, Observer Research Foundation spoke of Talent as the most important ingredient for innovation. He questioned the rationale of India's share of 8% of the global space economy as the study that brought out the figure lacked the necessary details. He listed the lack of commercial viability amongst space start-ups as the leading cause of failure of the start-ups. He also highlighted the risks associated with the bankruptcy of deep tech start-ups in space when they are purchased by sources that aren't desirable. He mentioned that currently start-ups are largely funded by FIIs and there is a need to change this situation by using DIIs in the interest of national security. He also discussed that the start-up ecosystem is focused more on propulsion and less on payload and thus encouraged more development in areas like sensor development, MASINT etc. He then spoke of the impact of the AI revolution in space and raised the question as to how AI-ready we are. He expanded on the need for new programming languages to ensure AI safety to avoid non-kinetic damage in space. He further advocated the need to safeguard research by the startups and proposed training in research security as an option.

Speaker-III. Wg Cdr Satyam Kushwaha (Retd), Founder Director, Indian Space Association (ISpA) gave a quick overview of the efforts behind opening up the space sector. He spoke of the need to collectively work towards countering asymmetry and thereafter proceeding to reverse it. He opined that since ISRO had a monopoly in space and exercised tight control in space, the sensor ecosystem never progressed in India. He expressed the need for armed forces to be part of the highest decision-making body. He also agreed that the triple hatting of Chairman ISRO is a significant hurdle to progress and reforms in the space sector. He encouraged the development of new business models that can put money back into the system. He expressed the need to



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be 'business-wise' for space to be self-sustaining. He also spoke of the need for reforms in bank lending practices for the space sector and encouraged armed forces to bear the risks and invest. He also proposed that the armed forces open their areas and testing facilities to promote testing to safeguard the test data. He also made a case for the development of Indian Military Space Standards.

Speaker-IV. Mr Anil Prakash, Director General of the SatCom Industry Association (SIA) voiced the need for the industry to work hard with the military to build faith and reliability. He explained that private participation in space has been there since the beginning with over 80% of manufacturing in the private sector. He discussed the need to develop human resources in this sector and suggested programmes to recruit veterans. He expressed concerns about the gap between the education and skills demanded in the industry. He spoke of the ongoing proposals to expand NavIC services to Australia. He also spoke on the need to manage spectrum usage to balance between terrestrial communication needs and space. He encouraged the pursuit of space diplomacy as space is a domain with haves and have-nots and there is scope for cooperation.

Discussions. The session had a limited window for the audience to interact. Wg Cdr Senthil enquired about talent retention plans in the space sector in the country. The session was invigorating.

Session-III

The final session was on '**Readiness for Future Space Endeavours**' chaired by Dr Ranjana Kaul, a legal expert on space, and a Partner at Dua Associates. She made a quick comment that there is a need for the government to recognise that the military is an independent Govt actor in space.



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Speaker-I. Air Cmde Ashish Baduni VSM, Air Cmde (Space Control), Defence Space Agency spoke first and expressed the need to secure our interests in space. He spoke of unidentified threats and a related need to build redundancies. He suggested the option of building cooperation-based dependencies.

Speaker-II. Dr Ajey Vishwanath Lele, Deputy Director General, MP-IDSA gave live examples to explain the relevance of Space Weather activities. He recounted the 2022 incident of a single weather event that destroyed 40 satellites of Starlink. He explained the dangers of the effects of solar storms on activities on the ground like civil aviation, communication, banking etc. He also mentioned that Space Meteorology is a sub-part of Space Situational Awareness and thus a need to design the system accordingly. He emphasised that space weather activities are of the type of low probability and high impact events. He concluded his arguments by saying that the increasing human reliance on space for day-to-day functioning is increasing the exposure to such events and there is a need to be prepared.

Speaker-III. Ms. Harini Madhusudan, Doctoral Scholar at National Institute of Advanced Studies spoke of building sustainability in space at every step. She further dissected sustainability into sustaining outer space geography, resources and human presence. She listed the conservation of rare earth, and avoiding contamination of space environment as some of the requirements. She advocated the need for a circular economy approach to space. She also explained the need to explore technical solutions like autonomous collision avoidance in Starlink satellites. She expressed hope that since the activities in space have been carried out by a handful of countries, the responsibility to fix any damage also lies with them.

Speaker-IV. Gp Capt T H Anand Rao (Retd) Senior Fellow, CAPS spoke about the impact of orbital crowding as a factor compromising safety. He expressed concern with the expanding number of satellite constellations and suggested a consortium approach



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to constellations. He proposed addressing the regulatory inadequacies in managing orbital crowding due to LEO constellations as a more efficient process rather than dealing with the disastrous effects of the mega-constellations. He advocated that a sharing model could be implemented using a few constellations that could be treated as a common global resource akin to the undersea submarine cables to reduce orbital crowding. On resilience, he spoke of the designers' dilemma in achieving a compromise between satellite hardening and satellite survival during re-entry. He proposed the adoption of the Space Sustainability Rating concept introduced by the World Economic Forum.

Discussions. The session closed without any discussions due to time constraints.

Closing Remarks

The third edition of the Space Security Dialogue ended with Air Vice Marshal Anil Golani (Retd), Director General, CAPS summarising the important points that emerged during the space dialogue and thanking all the panellists, participants and the organising team. He concluded by saying there is a need to know where we are, to know where to go and how to go.