



Centre for Air Power Studies

Event Report

CAPS Annual Space Security Dialogue

Security in the Changing Space environment

(Organised by Centre for Air Power Studies on 26 May 2022 at Air Force Auditorium, Subroto Park, New Delhi)

Centre for Air Power Studies (CAPS) conducted the inaugural CAPS Annual Space Security Dialogue on “**Security in the Changing Space Environment**” on 26th May 2022. The objective of this seminar, which is henceforth proposed to be an annual event, was to reflect upon the increasing salience of space, the challenges posed by strategic competition between nations and its impact on national security.

The seminar featured distinguished speakers including eminent veterans, serving senior officers, members of strategic think tanks and representatives from the industry. During the course of the proceedings, the participants deliberated on the current and future developments in space and their relevance in conduct of military operations. Geo political, economic and technological dimensions of the space domain were also comprehensively discussed.

In his welcome remarks **Air Marshal Anil Chopra** PVSM AVSM VM VSM (Retd), DG CAPS gave an overview of the space domain and highlighted the increasing importance of space in every segment of human life. Air Marshal Chopra also elaborated on the significance of space in our national security calculus and hoped that this seminar would emerge as a flagship event in future. He also underlined the efforts being made by India to enhance the space capabilities, though China and USA remain way ahead of other countries in this regard. Finally, he thanked the Vice Chief of Air Staff Air Marshal Sandeep Singh PVSM AVSM VM ADC and other serving and retired senior officers for being in attendance.

Vice Chief of Air Staff, Air Marshal **Sandeep Singh** PVSM AVSM VM ADC, delivered the inaugural address and emphasised that the space security construct transcends military use. He also brought out the emergence of new war fighting concepts such as Multi domain operations (MDO) that include the space and cyber domain apart from the traditional realms of land, air and maritime domains. He opined that the Space assets are inherently joint capability assets and must be utilised in most efficient fashion especially for data sharing and analysis. He added that India is a late entrant in the



Centre for Air Power Studies

military use of space but the creation of Defence Space Agency (DSA) with dedicated space satellites has been a positive development. He stressed on the need for formulating a national strategy for space and the requirement of synergy between all stakeholders. He underlined the need to enhance cooperation with friendly nations through space dialogues, and MoUs on Space Situational Awareness (SSA)

SESSION-I

Session-I on the theme "**Space and the Indian Armed Forces**" was chaired by Lt Gen **Raj Shukla**, PVSM YSM SM (Retired), Former GOC-in-C, Army Training Command. The three member panel deliberated on utilisation of space by the Armed Forces. The chair while opening the proceedings pointed out that the space competition has moved into a new paradigm and there is an increasing salience of space in strategic, economic and military domain. He pointed out that the Chinese have shown their prowess in space while India needs to do much more. We may in fact be one paradigm behind as the military deliverables by ISRO and DRDO have not been as effective. India must therefore work on embracing the private sector and speeding up the collective civil-military fusion as is being done by powers like the USA and China.

Air Vice Marshal **M Ranade**, AVSM VM ACAS (Ops) Space, Air HQ (VB) while presenting his views on "**IAF's Vision for Utilisation of the Space Domain**" enumerated that the IAF vision is to fully integrate air and space capabilities and develop a seamless continuum and persistent presence in space. The highlights of his presentation were as under:-

- He covered the origins of military use of space and brought out that the space resources are primarily utilised for Comn, ISR, PNT and meteorology. A dedicated satellite for Comn GSAT-7 is in operation from 2019 and another upgraded satellite has already been planned. He informed that a Technology Demonstrator Satellite for ELINT "Kautilya" has also been launched by DRDO.
- He envisioned that the way ahead includes provisioning of small satellite constellations in LEO for ISR and Satcom with adequate redundancy and restitution. Armed forces would also need the integration of aero-space assets in network centric envt along with AI Based solutions in ISR and SSA. The future also demands that all sensors and shooters be equipped with multi GNSS PNT (Positioning, Navigation and Timing) solution. Comprehensive Space surveillance network for seamless coverage, customised training on space



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related activities, quick response mechanisms such as launch on demand and air launched satellites will further enhance the space capabilities. The requirement of ground stations in friendly foreign countries and development of defensive and offensive capabilities, both in kinetic and non-kinetic domain, was also highlighted.

- AVM Ranade concluded by saying that Space Domain provides numerous opportunities and there is a need to explore and exploit the potential available with all stakeholders. A holistic and unified approach would ensure synergy and optimisation of resources

Cmde **MP Rajesh Nair**, Cmde (NSO) gave his views on '**Indian Navy's Utilisation of the Space Domain & Vision for the Future**'. He argued that the Space is a contested, congested and competitive domain and highlighted the following points:

- He dwelled on peculiarities of the maritime environment and reiterated that the high volume of traffic has made traditional methods of vigilance inadequate. Maritime Domain Awareness is therefore challenging due to the complexities of detection identification and tracking. Space surveillance will complement the existing procedures and enhance MDA.
- Satcom evolution in IN has been gradual and terrestrial and satcom networks have been integrated through the Rukmini nav satcom networks. Satcom is considered a critical enabler of network centric operations. GSAT 7 R launched in due course will improve capacities and capabilities. Global trends in Satcom provide tremendous opportunities for naval space vision as per the Network centric operations(NCO) road map.
- IOR remains the primary area of interest for IN. The space based maritime surveillance requirements include the capabilities for persistent surveillance. Initial detection through wide swathe satellites, confirmation through fine resolution i.e EO ISR pay load and real time data transfer and fusion.
- He projected the future requirements in accordance with the technological advancements that include capabilities for sea based launches, build strategy for MEO and LEO with integrated EO and hyperspectral pay loads. It is also essential that geographic dispersed ground stations along with data relay satellites are established. He also stressed on the space cyber security challenges due to proliferation of network connectivity and interdependence of applications and advocated the adoption of zero trust architecture approach. He concluded by emphasising the need to create credible ISR



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assets for comprehensive MDA and increasing the integration of space capabilities into military operations

Air Vice Marshal **DV Khot** AVSM VM Director General, Defence Space Agency was the third speaker and he shared the "**Perspectives on India's Military Space Utilisation**". The main aspects of his presentation were as under:-

- He highlighted the emerging trends in space and brought out the increasing number of launches as seen in 135 space launches in 2021. This is largely being driven by private players and commerce. There are various types of transformational technologies being injected in space such as multiple GNSS options, proximity ops, Inter satellite links, autonomous satellite control etc.
- He also brought out the trends in warfare wherein instruments such as space dual use technology and cyber tools have become weapons of choice. He emphasised that space offers ambiguity and deniability and enables hybrid and grey zone warfare. Since Space is the ultimate high ground and inherently attractive, technology denial regime is a norm and has become an ideal instrument of domination. He also postulated that in the domain of space, decisive military asymmetry is possible though the considerations of orbit, payload and budgetary allocation become paramount.
- During the presentation, he also gave an insight into presently available and future technologies such as RPO and robotics, earth observation technology, ASAT etc., and emphasised that they are being weaved into our projections. The reorganisation of space bodies by nations like France, Australia and US reaffirms their focus on streamlining mil space activities. India saw a slow and late start (post Kargil) but since then decisive corrective steps have been initiated. India is now ranked in the top six cryogenic clubs with 70 odd active satellites although there is still a capability gap vis a vis adversaries.
- He gave out the charter of DSA which includes the command and control of defence space units. The focus areas of DSA include acquisition of SSA and building credible deterrence. In his view, the key enablers for future will be adequate funding, Key technologies, reduction of vulnerabilities, fused civil mil hr model and ability to absorb technology

SESSION-II

Session II on the theme "**Space Technology and Challenges in the Space Domain**" was chaired by Air Marshal **Rajesh Kumar** PVSM AVSM VM (Retd), Former



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Commander-in-Chief, Strategic Forces Command. He began the session by stressing that the way we use space for military purposes will depend on technology available. He added that Space tech has two trends ie privatisation and militarisation of space. China and Russia pose a challenge to the US in militarisation of space and they are rapidly developing counter space capabilities.

The first speaker for this session, Gp Capt TH **Anand Rao**, Senior Fellow, CAPS presented his views on "**SSA Challenges in Space Operations**". He highlighted that SSA is a formidable challenge because of the congestion caused due to a large number of objects moving around in space.

- He gave out the scope of SSA ops which include observation, monitoring, tracking and analysis. He also deliberated upon the number of agencies which are involved in SSA such as CSpOC, European Space Agency , Russian and Chinese SSA networks and other private and organizational entities like SDA and ISON .
- The threats and hazards in space can be classified into natural, accidental and intentional while the emerging challenges include the handling of debris and congestion in useful orbits.
- He concluded by highlighting the primary concerns of SSA viz the limitations in sensor tech, overcoming the civil mil divide while the main challenges as per him are organisational and financial.

Col **Gurpreet Singh Bajwa**, Senior Fellow, Centre for Land Warfare Studies, talked about the "**Lessons from the Ukraine Conflict in the Space Domain**". He emphasised that the lessons learnt from the Ukraine conflict in the space domain need adequate development of space based warfare.

- The speaker brought out that the Ukraine conflict has shown that achieving surprise during military operations will be very difficult. Also, the weaponization of space is a reality and there is a requirement for making new space operations rules.
- He also demonstrated the role played by private actors in monitoring the troops movement and providing satellite imagery during the conflict and added that we will have to factor this in our future conflicts.

Wing Commander **Satyam Kushwaha** (Retd), Director Indian Space Association was the final speaker of the session. He discussed the connection of "**Industry and Military Space Technologies**" and explained the role of the Indian Space Association. Following points were brought out in his presentation:-

- The growing capabilities of our adversaries in space are threatening our ability to protect India's national interests and fight future conflicts.



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There is a need to build a comprehensive and resilient space force in India.

- He stressed on the need for transition of the Indian space sector from ISRO centric model to a “community driven competitive industrial ecosystem”. He gave out the achievements of some of the private players including L & T, ADTL, Agnikul, Map My India etc . In his view, the enterprise in the Indian space ecosystem needs much more support and hand holding. An Institutionalised coordination framework is required to deal with the current and future strategic environment.
- In conclusion, he gave a sectoral overview of the space and covered the peculiarities of Remote sensing sector (including Space based earth observation, Geo intelligence and Centralised data warehousing with rule access), Space transportation (comprising of SSLVs, Sea launch reusable rockets propulsion system etc), SSA (including PNT, Navic enabled services etc), Engineering and infrastructure Manufacturing and Space comn sectors .

SESSION-III

The third session on the theme "**Dynamics of Space Security**" was chaired by Air Vice Marshal **Anil Golani** (Retd), Additional Director General, CAPS. At the outset, he underlined the importance of space as seen by an exponential increase in launches. He also highlighted that each country wants to harness space domain since the capability to launch and manufacture satellites places the nation on a high table. USA and China have given impetus to their respective space programmes and made it a doctrinal part of their mil strategy.

Air Mshl (Dr) **M Matheswaran** AVSM VM (Retd) Founder Chairman & President, The Peninsula Foundation, Chennai. spoke about "**Harnessing Space for National Security**". He highlighted that Satellite spy war is the new way and the commercial entities played an enormous role in supplying intelligence. The harnessing of space is primarily for Info dominance, deter war, space mining and PNT. He felt that the space is critical as it impacts state power and enables global and modern economy

- He brought out the determinants of space competition including rise in deep space exploration, reduction in launch cost, rise of commercial and private



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players. As per him, the Geopolitics of space will centre around rivalries between Artemis accords 2020 and moon entrepreneurship law 2015.

- He undertook a policy analysis of India's space capabilities and emphasised the need to place security in the right perspective. He postulated that India needs to address security and development needs separately, and play a pivotal role in global policy and international collaboration.
- He highlighted the increasing capabilities of China including the rapid growth in ISR capabilities. This growth is driven by PLA civil – military fusion and accelerated research in tech and deep space. The Security and future economic activities in cis lunar space will increase and breakthrough technologies like 3D printing will play a major role.

Dr. **Manoj Joshi**, Distinguished Fellow, Observer Research Foundation (ORF) talked about the "**Geopolitics of Space: The Case of China**". He defined geopolitics and explained how geography affects national imperatives. He argued that space is a place of geopolitical competition and nations see space as an arena of economic and military opportunities.

- He explained that the Indian space program originated from development needs unlike some other countries. Geopolitics has now become astro politics and space activities are ultimately about how countries seek to extend their influence. Geopolitics of space is not very different from geopolitics of earth implying intense power struggle and dominance.
- He covered the Chinese space programme and noted that domestic politics is important in China. Space progress is related to international prestige and nationalist narrative of China and adds to its Global image and soft power. Space is used by China as a diplomatic tool and is being developed with close linkages to the military. Taiwan contingency is a key driver of mil capabilities and space assets for China.
- He highlighted that the rising collaboration with Russia should be a key concern. China has developed significant capabilities in SSA, ISR, navigation and counter space activities. He also brought out that the geopolitics of outer space is not constrained by geography but limits are placed by technology. Chinese ability has reduced in recent years although they have significant technological achievements.

The final speaker of this session was Dr **Ranjana Kaul**, Partner, Dua Associates Law Office, who shared her views about "**Legal Challenges with the Emerging Space**



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Technologies". She highlighted that there are a large number of treaties existing but not adhered to and therefore the Challenge is : how to regulate use of space technologies. She also made the following points “-

- She gave out the various treaties and regulations governing space. In her view, the Outer space treaty is inadequate and rests on two pillars of peaceful purposes and principle of non-appropriation. The ambiguous nature of treaties such as Artemis Accords might lead to warfare through legal frameworks
- She gave out the demarcation between air space, near space and outer space and the conduct of AIS and earth orbit support operations.

The seminar was concluded with the closing remarks by **Air Marshal Anil Chopra** PVSM AVSM VM VSM (Retd) Director General, CAPS. Summing up the deliberations of the day, he highlighted that India must continue to invest in building space capabilities and armed forces should integrate it in their doctrinal and operational philosophy.

He conveyed his gratitude to all the participants for their valuable insights and active participation. In the end he thanked ADG, CAPS and the entire team for their efforts in smooth conduct of the event .