



Centre for Air Power Studies

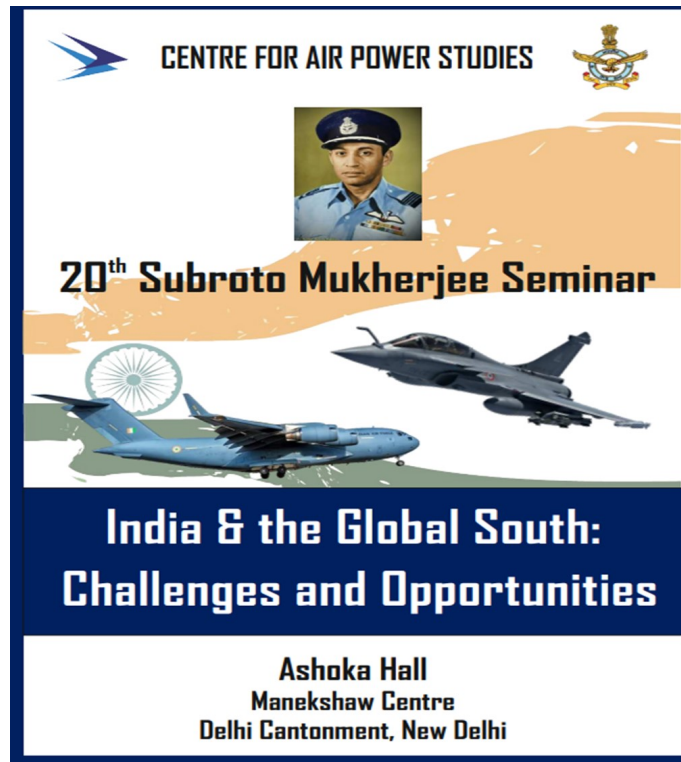
REPORT

20TH SUBROTO MUKERJEE SEMINAR

ON

INDIA & THE GLOBAL SOUTH: CHALLENGES AND OPPORTUNITIES

FRIDAY, 22 DECEMBER 2023



The Centre for Air Power Studies (CAPS) hosted an international seminar on 22 December 2023, as part of the Annual Subroto Mukerjee Seminar series. The seminar commenced with a tribute to the late Chief of the Indian Air Force (IAF), Air Marshal Subroto Mukerjee. As the First Chief of the Air Staff, he enjoyed a distinguished career adorned with numerous honours until his untimely demise in 1960. The focus of this year's event was to delve into the challenges and opportunities that India encounters in its interactions with the Global South.

Air Chief Marshal Air Chief Marshal V R Chaudhari, PVSM, AVSM, VM, ADC, Chief of the Air Staff (CAS), inaugurated the seminar. Opening remarks were given by Air Marshal Anil Chopra, PVSM, AVSM, VM, VSM (Retd), Director General, CAPS. Both expressed appreciation to the seminar's distinguished panellists, participants, and veterans.

In his welcome address, Air Marshal Anil Chopra began by recounting the acts of valour of the late Air Marshal Subroto Mukerjee, who served as the Commander-in-Chief of the Indian Air Force from 01 April 1954 to 31 March 1955. Subsequently, he continued as the Chief of the Air Staff from 01 April 1955 to 08 November 1960, marking a total tenure of six years and 221 days—the longest by any service chief.

Air Marshal Chopra highlighted that the seminar on 'India and Global South: Challenges and Opportunities' is a flagship event within one of the four verticals at CAPS. India, emerging as

a global power, currently holds the fifth-largest economy and is projected to become the third-largest Air Force by 2027, alongside being the fourth most powerful military force. He emphasised that India's Direct Benefit Transfer and Digital Payment Schemes are receiving global acclaim. As the de facto leader of the Global South, India is attracting global attention for investment and partnerships.

The prolonged conflict in Ukraine has significantly shifted the trajectory of global security, particularly in Europe. Attention has refocused on West Asia since the Hamas-Israel conflict, impacting military supply-chain dynamics for India. Security concerns are notably centred on China's ascent as a global power. China aims to establish a unipolar Asia, asserting dominance and becoming an equal pole with the USA in a bipolar world, ultimately challenging the existing order and positioning itself as the preeminent global power.

The Indo-Pacific is emerging as a new arena for international geopolitics and strategy, leading to transformations in regional power structures. These developments have implications for India's security, necessitating a deliberate approach. Air Marshal Chopra reiterated External Affairs Minister Dr Jaishankar's stance on plurilateralism, emphasising its role in promoting regionalism.

He concluded by underscoring that the future of conflict will be shaped by a high degree of artificial intelligence-supported autonomy, multi-domain operations, global reach, long-range sensors and weapons, hypersonic platforms and munitions, unmanned systems (including kamikaze drones), manned-unmanned teaming, actions in space, cyber and electronic warfare, among other factors.

In his inaugural address, **Air Chief Marshal VR Chaudhari** underscored the pivotal role of air power and the Indian Air Force's (IAF) contribution as a catalyst for progress. He stressed that air power, being a crucial component of national strength, holds considerable influence as a symbol of national might and a vehicle for fostering peace and cooperation.

The Chief of Air Staff (CAS) highlighted the IAF's role in advancing strategic alliances and furthering the collective objectives of the Global South. He drew attention to the increased engagement of the IAF in frequent training exercises with friendly nations, resulting in the exchange of optimal operational and maintenance methods. The CAS acknowledged the critical importance of Indian Military Advisory Teams and courses under the Indian Technical and Economic Cooperation Programme, fostering collaboration by training over 200,000 officials in both civil and defence sectors. Over the past nine years, India has demonstrated its commitment to capacity building by training more than 5,000 foreign trainees from the Global South through the IAF.

Additionally, the CAS commended indigenous aerospace platforms such as the Light Combat Aircraft (LCA), Light Combat Helicopter (LCH), Akash missile systems, and radars. These platforms offer competitive and reliable options to air forces in the Global South, thereby enhancing India's economic and technical prowess.

Highlighting the international involvement of the IAF in Humanitarian Assistance and Disaster Relief (HADR) missions, the CAS noted that these efforts have significantly elevated India's leadership position in the Global South. Discussing global geopolitical developments, he remarked on the evolving international relations landscape, with emerging actors increasingly challenging established power structures. The Chief of Air Staff expressed concerns about the looming risk of a global conflict driven by ideological differences, limited resources, and climate

change. These challenges have led to interconnected issues such as economic inequality and resource exploitation. He pointed out that "black swan" events, highly disruptive occurrences like COVID-19 and on-going global wars, have further exacerbated the situation.

Air Chief Marshal VR Chaudhari, Chief of Air Staff, also released two books on the occasion. The book titled ***Indian Air Power: Contemporary and Future Dynamics*** authored by Air Marshal D Choudhury, PVSM, AVSM, VM, VSM (Retd), and ***Aeroengine Fundamentals and Landscape in India: A Way Forward*** authored by Air Vice Marshal Suresh Singh, AVSM, VSM (Retd).

Besides the inaugural session, the seminar was divided into two sessions: **India & The Global South** and **Contours of Present & Future Conflicts**.

SESSION-I **INDIA & THE GLOBAL SOUTH**

Chair: **Sri Rakesh Sood**, Former Permanent Representative of India to the Conference on Disarmament and former Special Envoy of PM on Non-Proliferation & Disarmament

The focus of the initial session revolved around "India & The Global South," with Shri Rakesh Sood, Former Permanent Representative of India to the Conference on Disarmament and former Special Envoy of the Prime Minister on Non-Proliferation & Disarmament, presiding as the chair. He underscored the diverse nature of the term, emphasising its varied connotations rooted in political, economic, and geographical contexts.

India & China: Competition, Conflict & Co-operation – Way Forward

Ashok K. Kantha, Hon. Fellow/former Director, Institute of Chinese Studies & Distinguished Fellow, VIF.

China's current demeanour is marked by an inward focus, aggressiveness coupled with a sense of nervousness, ambition intertwined with paranoia, and an aspiration to achieve ambitious goals. Strategic thinkers in China acknowledge an overreach geopolitically and advocate a change in course. The on-going economic downturn is perceived as systematic, structural, and long-term, prompting significant shifts in China's relations with developed nations.

There is scant evidence of China making efforts to engage with India, illustrated by Chinese President Xi Jinping's absence from the G-20 and the lack of a Chinese Ambassador to India. The Chinese strategic community perceives India through the lens of strategic competition with the US, concluding that the US has enlisted India in its Indo-Pacific Strategy to counter China's rise. This perspective influences China's collaboration with India on Global South issues. Regarding the border issue, China rejects the notion that normal India-China interactions hinge on the resolution of border status.

China has escalated infrastructure development near Indian borders, encompassing railway lines, airports, and highways. Given China's inclination to extend its 'grey zone' efforts beyond the eastern region, India must be prepared.

In bilateral relations, India is advised to exercise 'strategic patience' to uphold its position at the Line of Actual Control (LAC). Enhancing deterrence, strengthening capabilities, and fostering dialogue are imperative. India should engage in more profound and rigorous strategic conversations at both diplomatic and political levels alongside striving for normalcy.

Structural obstacles persist in bilateral ties, with China seeking a hierarchical structure where it emerges as the dominant power, while India envisions a multipolar world. Disparities in bilateral issues hinder collaborative efforts between India and China on various challenges in the Global South. The speaker concluded by characterising the Global South as a 'zone of competition' rather than collaboration between India and China.

Island Nations in the IOR and India's Voice for the Global South

Ms Radhey Tambi, Research Associate Centre for Air Power Studies, New Delhi, India.

During her presentation, the speaker aimed to address the undermentioned three main questions. What precisely constitutes the Global South? Why is the Indian Ocean Region (IOR) directing attention towards island states among the diverse nations in Latin America, Africa, and Asia that form the Global South? Additionally, how should we define our neighbourhood and India's associations with island nations? The speaker underscored the Indian Ocean's significance in reshaping the contours of the global order, particularly in commerce, technology, and investment. Encompassing East Africa, West Asia, Southeast Asia, and portions of Australia in a semi-circular arc, the Indian Ocean is the world's third-largest ocean, replete with islands and crucial chokepoints. During the presentation, the under mentioned key points were highlighted.

Western Indian Ocean islands grapple with internal political challenges and external obstacles such as drug smuggling, terrorism, Exclusive Economic Zone and marine environment preservation, and illicit, unreported, and unregulated fishing. Given the limited financial resources for social welfare in these island nations, India's involvement in enhancing the capacity and competence of its allies in the same periphery is regarded as constructive.

In the realm of diplomacy, New Delhi's diplomatic depth is evident in the style, symbolism, and substance of high-level visits to and from the Vanilla Islands in the Western Indian Ocean (WIO). The Indian government launched the Information Fusion Centre–Indian Ocean Region (IFC-IOR) in 2018 to address challenges like piracy, drug smuggling, and human trafficking, utilising information from coastal radar networks extending to centres in Mumbai and Kochi. Mauritius and Seychelles are included in the coastal surveillance radar network.

Regarding military cooperation, the speaker highlighted various security engagements through mini-lateral, multilateral, and plurilateral cooperation. Notably, in 2018, India and Madagascar conducted the first-ever combined patrolling of the Malagasy Exclusive Economic Zone (EEZ) and Passage Exercise (PASSEX) involving INS Shardul and the Malagasy Naval ship 'Trozona.' Mauritius, often referred to as Mini India, with over 60% of the population of Indian origin, stands out as one of Africa's major importers of Indian weaponry.

Economic cooperation was emphasised, with a focus on initiatives such as a line of credit to boost rice output in Madagascar, training programs, investments in oil and gas industries, telecommunications, healthcare, food processing projects, agricultural mechanisation, and the signing of a Comprehensive Economic Cooperation and Partnership Agreement.

Regional Alliances: Challenges & Opportunities

Shri Pankaj Saran, Former Deputy National Security Adviser (SA), National Security Council Secretariat.

In his initial remarks, Ambassador Pankaj Saran underscored the significance of nomenclature, particularly in the context of diplomatic and foreign policy lexicon. He emphasised the evolving nature of relations and relationships, highlighting the strategic depth conveyed by diverse terminologies such as alliance, association, conclave, commission, and community. Each of these terms, according to Saran, encapsulates distinct strategic nuances.

A thought-provoking aspect of his discourse was the exploration of the rationale behind employing different terminologies. Ambassador Saran delved into the crucial role of alliances in the contemporary geopolitical landscape, articulating the determinants of such arrangements and the driving forces behind them. Drawing on the example of the United States within NATO the relevance of the word “organisation”, he also discerned the impact of a state's strength on shaping these alliances.

Additionally, he elucidated the covert and overt aims and objectives of these arrangements, citing examples like use of Alliance in the International Solar Alliance (ISA) and use of Coalition in Coalition for Disaster and Resilient Infrastructure (CDRI) as initiatives originating from India, geared towards fostering issue-based cooperation.

Shifting the focus to multilateral and minilateral initiatives, Ambassador Saran underscored their substantial influence in shaping bilateral relations. He illustrated this point through the example of RIC (Russia, India, and China) where nothing is attached except the names of countries, where each country pursued distinct objectives, one on one or to influence the third. He further examined the cases of SAARC and BBIN, portraying the former as a failure and the latter as a success in regional cooperation and integration due to the way it is supposed to function.

Looking ahead, Ambassador Saran expressed scepticism about the anticipated fruition of initiatives such as INSTC, BIMSTEC, and IBSA, while questioning the achievements of BRICS and SCO. Concluding his remarks, he advocated for a proactive and flexible approach, stressing the need for use of specific words to resonate with the contemporary context. He reiterated the imperative for India's strategic identity to exert influence across sub regional, regional, and global cooperation endeavours.

SESSION II

CONTOURS OF PRESENT & FUTURE CONFLICTS

Chair: Air Vice Marshal Anil Golani (Retd), Additional Director General, CAPS

Air Vice Marshal Anil Golani elucidated the theme of military engagement with countries in the global south and the challenges posed by emerging non-traditional security threats. Emphasising the significance of hard power, he prompted the audience to reflect on the effectiveness of diplomacy and whether it is yielding tangible benefits.

Employment of Air Power: Russia-Ukraine, Israel-Hamsa and the Lessons for IAF

Group Captain Sartaj Sehgal, Station Commander, Air Force Station, Naliya.

The presentation delved into the pivotal developments in two conflicts, offering insights into strategic and tactical lessons applicable to India. Prior to examining the specifics, the

presenter provided context on how India should approach the current conflict, juxtaposing it against two scenarios—one involving a near-peer adversary and another with a stronger opponent. The necessity of considering India's national strength and international influence in decision-making, impacting military preparedness, was underscored.

The speaker then shifted focus to the background of the Hamas-Israel conflict in West Asia, categorising the conflicts into a state-vs-state war (Ukraine and Russia) labelled as a prolonged war, and a non-state-vs-state conflict (Israel and Hamas), representing two ends of a spectrum. Israel's strategies, driven by an existential threat perspective, were contrasted with Ukraine's fight for survival and Russia's pursuit of reviving great power status.

In addressing the dynamics of prolonged wars, the speaker highlighted the role of air power, emphasising logistics, attrition, and deployment considerations. The evolution of the Israel-Hamas conflict and the strategic use of air power against asymmetric threats were discussed. Historical contexts of Israel's air power utilisation in 2006, 2009, and 2014, particularly in urban warfare, were explored, with attention drawn to missing aspects like restraint and proportionality in achieving maximalist objectives.

The key takeaways, stressed the importance of a joint approach, shaping operations, the leading edge of air power, and incorporating emerging technologies like AI-enabled targeting. The dilemma between costly defence and cheap offense, along with time-sensitive and mission-sensitive targeting, was emphasised. Network-enabled capability and lessons from Israel's use of systems like the Iron Dome and those by Hamas were highlighted for consideration by the Indian Air Force (IAF).

Regarding Ukraine and Russia, strategies such as unrestricted warfare, full-scale war, and multiple parallel attacks, as well as concepts like CsOG and MDO, were discussed. Operational and tactical insights included Russia's initial failure, the significance of air and land operations, and information dominance encompassing space, psychological operations, and information warfare. Notably, the importance of time-sensitive versus target-sensitive targeting was emphasised, with critical information infrastructure protection highlighted for maintaining operational tempo.

In conclusion, it highlighted the survival in a dense air defence environment, the relevance of low observable aircraft, precision weapons, targeting philosophy, SSM deployment, and the challenges and opportunities presented by low-cost drones and unmanned platforms. Training in integrated environments, capacity building for rapid manpower deployment during wars, and the need for quality manpower were emphasised as vital considerations.

AI and Ethics in Warfare

Ms Shimona Mohan, Junior Fellow, Observer Research Foundation.

The address was structured into three distinct sections. Initially, it provided insights into the essence of military AI, India's endeavours in this domain, and the development of its military architecture. The second segment focused on ethical frameworks and responsible practices applicable to military AI applications. It concluded by offering an overview of the global discourse on ethical and responsible AI and India's stance in response.

Concerning the definition of military AI, the speaker noted the pervasive nature of AI across various sectors, including defence services. However, it highlighted that the absence of a

consolidated definition or characterisation of military AI until recently. The evolution from being intertwined with concepts like cybersecurity to a standalone concept, particularly in the context of lethal autonomous weapon systems, autonomous drones, and data processing, was emphasised. The expanding applications of military AI now encompass data poisoning, deep fake misinformation, disinformation, and psychological operations through social media, blurring the lines between civilian and military AI.

Regarding India's involvement in military AI, the speaker acknowledged the country's earnest commitment, citing the establishment of a multi-stakeholder task force in 2018. The task force, led by N. Chandrasekaran, resulted in the formation of the Defence AI Council and the Defence AI Project Agency, akin to the U.S. DARPA. An AI roadmap, featuring 17 Defence-specific projects, was unveiled during the first-ever AI in Defence symposium, showcasing products such as AI-based drones, cognitive radars, unmanned vehicles, and predictive systems.

However, it was pointed out that a mixed approach model in India's Defence AI, lacking a centralised apex body. Major players include the Central Government, the Ministry of Defence (MOD), public sector units (PSUs), services, and industry stakeholders, with start-ups contributing significantly. The Tri-services have established an AI subcommittee and joint working group, each service focusing on specific AI applications tailored to their needs.

In the realm of ethical and responsible military AI, the speaker discussed the global push for responsible innovation ecosystems. Responsible AI (R-AI), characterised by ethical, fair, explainable, and trustworthy AI systems, gained importance. The speaker highlighted the need for policy alignment to improve interoperability and raised questions about deploying R-AI in offensive combat operations, emphasising the risks associated with biased and unsuitable information processing in AI-based weapons systems.

The operationalisation of responsible and ethical AI was explored, focusing on addressing gaps related to misrepresentative data sets, unsupervised algorithms, and human factors. It was emphasised that investments in representative data sets, explainable AI systems, and comprehensive training throughout the life cycle of AI systems.

In the global context, the speaker highlighted the ongoing discussions at the UN on lethal autonomous weapons systems and the recent momentum in responsible AI in the military conversations. India's participation in the Responsible AI in the Military dialogue in 2023 was noted, where a joint call of action was endorsed by many countries, though India chose not to endorse it. This indicated a nuanced approach of India, aligning security policies with its considerations rather than majoritarian alliances. Despite this, India has actively engaged in responsible AI for civilian applications, as evidenced by reports from NITI Aayog and initiatives by industry bodies like NASCOM.

The speaker concluded by emphasising the evolving nature of this space and the crucial role that tech hubs like India will play a major role in shaping the future discourse on responsible and ethical military AI.

The Salience of Space in Future Conflicts

Air Vice Marshal Rajiva Ranjan VM, ACAS (Ops) Space.

The speaker addressed the significance of space in future conflicts, acknowledging the challenges in accurately forecasting conflict outcomes despite the vast resources of the US

military. Drawing on historical perspectives, the speaker emphasised the complexity of predicting future conflicts, noting the uncertainties and fog surrounding lessons from the past.

Clausewitz's comparison of war characterisation with Chamberlain's points was highlighted, emphasising the difficulty in predicting the outcomes of war due to chances and probabilities. The speaker argued for a focus on the relative strength of warfare types through algebra to ensure adaptability and potential victory or stalemate.

The evolving nature of technology and operational concepts in space, cyberspace, electronic, and cognitive domains was discussed, with a focus on the challenges and unanswered questions in these areas. The speaker emphasised the impact of geopolitical dynamics on technology and the need for a comprehensive understanding.

The historical journey of space exploration, from the Battle of Midway leading to the birth of the USAF in 1947 to the initiation of space power in the Gulf War in 1991, was outlined. The speaker underscored the critical role of air and space mastery in achieving victory in many wars and operations.

The onset of the second space age, marked by increased diversity and participation from commercial entities, was highlighted. The shift towards more dangerous and disruptive capabilities in this age, including orbital maintenance, manufacturing, and space traffic management, was discussed.

Examining adversary space capabilities, the focus was on China's strategic deterrence system, space superiority, counter-space efforts, and investments in space exploration. The 2019 defence white paper emphasised China's commitment to safeguarding interests in outer space, electronic warfare, and cyberspace.

The speaker emphasised the unique perspective of those in the space domain, describing it as beyond threat and challenge, offering abundant opportunities. The increasing exploitation of space in operations, making it a common enabler, was highlighted, with 90% of the UK's military operations linked to space.

Four principles – scale, scope, speed, and survivability – were proposed as essential for countering adversaries and building capabilities in space. The speaker outlined the fundamental principles, doctrinal beliefs, and grand strategy for space warfare, drawing parallels with warfare in other domains.

Space operations were categorised into four verticals: space support, space force enhancement, space control, and space force application. The need for defensive actions, regular training, and adherence to principles was stressed to protect capabilities in the space domain.

The speaker discussed India's journey in developing space capabilities, including the creation of the Defence Space Agency (DSA) in 2019. However, challenges in resource allocation for space, space diplomacy, and cooperation with the global south were also acknowledged.

In conclusion, the speaker anticipated the rising influence of space power in modern warfare, evolving into combat space or aerospace. The merging of airpower and space capabilities, seamless movement across orbits, and the potential for cosmic borders were discussed as future developments. The speaker also highlighted the importance of space diplomacy and the need for

collaboration with the global south for mutual growth and security. Complex landscape of military AI while adhering to ethical and responsible practices.

The Indian Landscape: Supply Chains and their Primacy in Future Critical Technologies

Col Anurag Awasthi (Retd) Vice President, India Electronics and Semiconductors Association (IESA)

The speaker delved into the significance of semiconductors, dubbing them as the new oil, elucidating the nature of critical technology and its far-reaching impact, from safety razors to space shuttles. The speaker contended that previous discussions on various technologies, how they materialise and take root. Providing a historical perspective on semiconductors, the speaker argued that we have not missed the bus in catching up with global advancements. Semiconductors, including Bipolar Complementary Metal-Oxide-Semiconductor (BCPs) and transistors, emerged as early as the 1960s, with the Fair Child Corporation from the United States making significant strides it did not take off ultimately due to pricing issues. Despite challenges, the semiconductor laboratory in Mohali was established in 1983 and has endured, with Taiwan Semiconductor Manufacturing Company (TSMC), a global semiconductor giant, emerging in 1987. The trajectory of this stalled in 1991 when the economy opened and we were getting a chip from China or any other country in the world for two rupees reducing economic logic of internal development till the next resurgence which happened post-Covid.

The speaker emphasised the geopolitical nature of technology, asserting that technology is inherently political. Analysing the semiconductor supply chains on a world map, the speaker highlighted a troika comprising equipment, materials (minerals, gases, and chemicals), and services (testing, packaging, etc.). The geopolitical construct revealed a concentration of equipment production and intellectual property rights (IPR) in the US, while materials were sourced from various regions globally, and core manufacturing predominantly resided in Asia. the issues come at time of conflicts for e.g. the Ukraine conflict where Russia provide 40% of Palladium and Ukraine 70% of Neon in the global markets along with trouble in Israel and Gaza which seems a recipe for disaster to supply chain. Most of the critical electronics in an automobile today are chip-driven also impacting defence and space sectors, example being a javelin missile fired on a T-72s and each javelin having more than 200 chips and all being manufactured in Taiwan.

Addressing supply chain issues, the speaker outlined the seven aspects that supply chains encompass, underscoring the importance of the new national logistics policy. Examining the Indian landscape, the speaker commended the establishment of the India Semiconductor Mission and the issuance of production-linked incentives as ground-breaking policy initiatives. However, the speaker acknowledged the challenge of balancing industry expertise and government scale in order to foster a conducive environment. Historically these critical technologies which have a very large scope of failure and work on low percentage of profit thus requiring to be intubated by public money the world over. The same is required to supported in India also.

Highlighting key challenges, the speaker stressed the imperative of skilling, identifying it as a critical factor against monopolisation and weaponisation. Warehousing and the vital role of the MSME sector, deemed the backbone of the future, were also underscored. The speaker emphasised the transformation of today's start-ups into tomorrow's major industries will ensure that major share of the global pie coming to India post 2030. Concluding, the speaker advocated for the convergence of technologies related to Electronics and Semiconductors across various sectors like automobile Defence, Aerospace, telecommunication, or even toys, under a single

agency to monitor and coordinate these efforts, given the inter-ministerial nature of technological advancements being intertwined with geopolitics.
