



Delhi Defence Dialogue

ADAPTIVE DEFENCE NAVIGATING THE CHANGING LANDSCAPE OF MODERN WARFARE

(12-13 November 2024)

Manohar Parrikar Institute for Defence
Studies and Analyses
New Delhi

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ABOUT MP-IDSA

The Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA) is a nonpartisan, autonomous body dedicated to objective research and policy relevant studies on all aspects of defence, security and international relations. Since its inception, MP-IDSA has served as a forum to debate important aspects of national and international security. Its mission is to generate and disseminate knowledge on defence and security-related issues.

MP-IDSA was established as a registered society in New Delhi on November 11, 1965. Over the last fifty-plus years, MP-IDSA has played a crucial role in shaping India's foreign and security policies, including with respect to nuclear weapons, military expenditure, and conventional and non-conventional threats to India.

MP-IDSA has a well-qualified multi-disciplinary research faculty drawn from academia, defence forces and the civil services, and which represent a diversity of views. Research at the Institute is driven by a comprehensive agenda and by the need to provide impartial analyses and policy recommendations. MP-IDSA journals, monographs, briefs and books are the principal mediums through which the analyses and policy recommendations are disseminated.

Research Centres

- East Asia
- West Asia
- South Asia
- Military Affairs
- Internal Security

- Europe and Eurasia
- Counter Terrorism
- North America & Strategic Technologies
- Non-Traditional Security
- Nuclear and Arms Control
- Southeast Asia and Oceania
- Defence Economics and Industry
- Africa, Latin America, Caribbean & UN

ABOUT DELHI DEFENCE DIALOGUE

The Delhi Defence Dialogue (DDD), instituted by the Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA), is a premier platform for addressing the multifaceted challenges of defence and security, in India. The inaugural edition of DDD is scheduled on 12-13 November 2024.

In an era defined by geopolitical uncertainty and rapid technological advancement, the landscape of warfare and aspects that facilitate and sustain countries at war are undergoing profound transformations. Traditional notions of war are being reshaped by emerging technologies and evolving strategic partnerships and by constantly shifting organisational dynamics within the armed forces, resulting in newer doctrines and concept of operations. The DDD is envisioned to be a platform to deliberate the complexities of modern defence landscape and intricate layers of contemporary warfare with the aim to formulate strategic approaches that address the challenges of the of security in the evolving Asian and larger global security environment.

The DDD aims to delve into critical topics affecting military security, including the emerging threats, evolving character of warfare, supply chain management issues and the role of technology in modern warfare. Issues such as bilateral and multilateral security cooperation, geopolitical shifts, the impact of non-traditional security threats, among others, will find a place on this platform. By fostering an inclusive environment for policymakers, military experts, and scholars the DDD seeks to generate innovative ideas and collaborative strategies to enhance India's defence posture. Emphasising a comprehensive approach, participants will explore how countries can navigate their defence challenges

while promoting stability in the Indo-Pacific region and beyond.

The DDD aspires to contribute to India's strategic vision, emphasising a comprehensive approach and facilitating informed discussions that contribute to regional and international security. Through robust exchanges of ideas, MP-IDSA aims to forge a resilient framework for India's defence strategy, ensuring that it is prepared to meet both current and future challenges in an interconnected world in close concert with partner nations.

CONCEPT NOTE

In an era defined by geopolitical uncertainty and rapid technological advancement, the landscape of warfare and those aspects that facilitate and sustain countries at war, viz., defence industrial complex and resilience of supply chains are undergoing profound transformations. Traditional notions of war are being reshaped by emerging technologies and evolving strategic partnerships and by constantly shifting organisational dynamics within the armed forces resulting in newer doctrines and concept of operations. Against this backdrop, the inaugural edition of the Delhi Defence Dialogue (DDD), being hosted by the Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA) aims to gain deeper insights into the complexities of modern defence landscape and intricate layers of contemporary warfare with the aim to formulate strategic approaches that address the challenges of the of India's security in the evolving Asian and larger global security environment.

The post-Cold War era which began in the early 1990s with a vision for global peace is nearing its end. Today, the geostrategic landscape is marred by wars, regional conflicts, and terrorism hotspots. The world today countenances the highest numbers of military conflicts and flashpoints since the Cold War, casting an adverse impact on international relations in every continent. Europe is experiencing one of the most devastating wars in a very long time, with no end in sight. The brutal Israel-Hamas war is driving further instability in West Asia with the potential to create a deeper wedge between various adversarial powers and among security partners. The threat of the war in West Asia expanding remains real, with actors such as the Hezbollah in Lebanon and the Houthis in Yemen joining the fray with potent low-cost weapons and innovative battlefield practices. East Asia, even though not

at war, has its share of geopolitical challenges occasioned by China's assertive behaviour, with grave consequences to world peace and stability.

The US exit from Afghanistan signalled a turning point in the US led Global War on Terror (GWOT), from direct intervention to the use of high-tech stand-off capabilities to counter terrorism. The emergence of a large scale, protracted conventional war in Europe today involves state actors as in the ongoing Russia-Ukraine war. In West Asia, the conflict involves the Israel Defence Forces (IDF) and a radical organisation cum quasi-state actor Hamas. The involvement of non-state and quasi-state belligerents has introduced unprecedented levels of complexity especially when the latter possess territory and command influence in the local populace with seamless transitions between combatants and civilians. The Armenia-Azerbaijan War also holds significant lessons for militaries around the world, especially the effective use of armed drones, which are now *de rigueur* in terms of their widespread deployment from the battlefields in Ukraine to the Houthi dominated waterways of the Red Sea. Such reorientation is forcing militaries everywhere to reassess priorities and strategies, particularly from counter-terrorism focussed operations to conventional wars. During this period India has witnessed a considerable decline in terrorism related incidents in the union territory of Jammu & Kashmir. In light of China's aggressive posture, India has renewed focus on building conventional capabilities especially in the aftermath of the military standoff with China since 2020.

At its core, the Delhi Defence Dialogue will seek to examine the changing character of warfare across all the four domains - air and aerospace, land, maritime and cyberspace. Each domain presents unique opportunities and challenges, necessitating a nuanced understanding of strategic imperatives and operational dynamics. By delving into these domains, The Delhi Defence Dialogue will seek

to elucidate the evolving contours of contemporary warfare and identify strategies that will guide future approaches to national security.

It is likely that conventional wars in the future may be fought on a greater scale, higher intensity and across a wider geography when compared to most of the recent conflicts and terrorism related operations. They may involve state and quasi-state actors. They will require unprecedented mobilisation of resources, large-scale manoeuvres involving infantry and armoured formations, employment of missiles and emerging and disruptive technologies as well as the use of space-based assets. The military strikes will blur the distinction between civilian and military targets and test the resilience of the national economy, society and military. The prolonged wars, made worse by the inability of a divided UN Security Council to reach consensus on issues of war and peace, will place a premium on the country's defence preparedness, especially in terms of the resilience of its defence industrial base (DIB), research and development (R&D), the innovation ecosystem, and, resolute political will.

The emergence of a new kind of conventional war does not settle the challenges posed by other forms of warfare, for e.g., multi-domain warfare, irregular, grey zone, and hybrid wars. Nuclear, biological, and chemical (NBC) weapons continue to pose significant threats to global security and stability due to their potential for mass destruction, indiscriminate impact, and ability to cause widespread fear and disruption. Each category of weapons of mass destruction (WMD) presents unique risks and challenges. Sub-conventional and WMD threats will continue to remain potent challenges and will require continued fulsome attention of the political, military and scientific leadership.

However, the evolution in warfare is not limited to technological advancements alone. Organisational structures

and operational frameworks within armed forces also play a pivotal role in shaping military effectiveness. The Delhi Defence Dialogue will seek to explore the organisational challenges faced by the armed forces. The creation of joint structures and war fighting doctrines involving the three services, integrating the services with various departments of the ministry of defence and other branches of the government are among the key considerations in optimising military effectiveness. The perennial debate about striking the right balance between the need to introduce and absorb emerging and disruptive technologies and right-size the armed forces underscores the importance of adequate budgetary allocation. By analysing these organisational dynamics, the Delhi Defence Dialogue will aim to garner insights into optimising the capabilities of the armed forces to deal with contemporary exigencies and to remain in readiness for the battlefield of the future.

Conventional and other forms of wars involve a complex operational environment and are fought over land, sea, air, and cyber domains. Each domain has its own unique challenges and provides opportunities in the pursuit of military objectives. A session is devoted to the deliberation of the operational and administrative challenges faced by the three services in the contemporary environment and to dwell on the power and employment of information to disrupt, confuse, agitate, and radicalise both the armed forces and people.

The impact of rapidly evolving technologies on modern warfare cannot be underestimated. The combined power of computers, data and connectivity is shaping the contours of the battlefield today. In the information age the perception of the world is being manipulated at an extraordinary pace and in previously unimaginable ways, including through misinformation that blurs the distinction between fact, opinion and fiction. Smart phones, internet and social media are connecting people where opinions

matter more than well-researched understanding of various issues. Unverifiable assertions are attracting the attention of 'true believers', sceptics and conspiracy theorists, and, in the times to come, the issue will become even more complex with the maturing of Artificial Intelligence (AI). Today information is not an enabler but an instrument of power to be used at strategic, operational, and tactical levels of warfare to dominate the adversary. If used in a coherent and planned manner, information warfare can generate potent advantages over the adversary through its mass effect, especially in building national consensus.

Emerging and disruptive technologies are revolutionising modern-day warfare. Artificial intelligence and cyber issues, missiles and air defence systems, unmanned systems and dual-use systems are among the disruptive technologies transforming modern-day warfare. They have the potential to shape the future of warfighting. These technologies provide unparalleled and unique capabilities while presenting new challenges in terms of operational vulnerabilities and ethical dilemmas. Through a comprehensive examination of these issues, it is intended to decipher their strategic implications and explore their potential employment in operations.

The recent wars have many lessons for policy-makers and the military leadership. There is a tendency to excessively focus on cutting-edge technology for force generation to offset the reduction in budgets for recruitment, training and maintaining human resources. The dialogue would attempt to find a balance on these divergent requirements to optimise the required capabilities.

In addition to organisational reforms and absorption of emerging and disruptive technologies, strategic partnerships play a decisive role in reinforcing national security and shaping defence strategies. India has many strategic partners and collaborates on various defence

related issues with the United States, Russia, France, Australia, Japan, South Korea and Israel, among others. Assessing the nuances of these partnerships is essential for bolstering diplomatic relations and enhancing the security posture of the country. Strategic partnerships between countries play a vital role in reinforcing national security and shaping defence strategies by enhancing military capabilities, extending geographic reach, promoting intelligence sharing and coordination, facilitating technology transfer and collaboration, providing diplomatic and political support, generating economic and trade benefits, and, enabling effective crisis response and humanitarian assistance operations.

Overall, while strategic partnerships offer opportunities for enhanced security and cooperation, they are also vulnerable to a range of factors that can negatively impact their effectiveness. Factors that require the constant attention of policy-makers include the shifting geopolitical dynamics, divergent national interests, historical baggage and trust deficit, economic disparities, and power asymmetries, legal and political constraints about episodic incidents and external pressures and interference, among others. These can impact adversely on the best of strategic partnerships, and in turn, can cast a shadow on high-tech cooperation in defence technologies and procurements. Overcoming these challenges requires sustained diplomatic engagement, mutual trust-building, and a shared commitment to addressing common security threats and challenges in a rapidly evolving global landscape.

By forging strong partnerships with like-minded countries, nations can enhance their security, resilience, and ability to address the complex and evolving challenges of the 21st century. A session is devoted to analyse various facets of defence diplomacy with India's strategic partners with an aim to identify opportunities for fostering greater cooperation and synergy in defence-related issues.

The recent wars are providing countries with fresh concepts and new logic to bring about a transformation in their armed forces and defence industrial base. Parties involved in protracted wars are heavily reliant on foreign sources for supply of war-related equipment and stores. Russia, for instance, is hemmed in due to the sanctions imposed by the US and its allies and partners. It is under these conditions that belligerents are constrained to endure with war. This holds lessons for other countries with regards to self-reliance in defence production and supply chain management.

New and emerging technologies and material resources are closely guarded by those who possess them. As a result, there will always be a certain level of dependency on other countries. One way of obviating such challenges involves defence industrial collaboration with trusted partners. Industrial collaborative frameworks across diverse regions serve as a pivot in fortifying national security capacities. From East Asia to West Asia, and from Southeast Asia to Africa, Europe and the United States, collaborative endeavours in defence production are instrumental in enhancing indigenous defence capabilities and fostering technological self-reliance. These are essential in order to make India's defence industrial base, particularly indigenous products, a part of global supply chains. By examining the challenges and opportunities inherent in such collaborations, the Delhi Defence Dialogue would seek to foster a discourse that transcends geographical boundaries and promotes mutual security interests.

The session dedicated to defence industry will study the challenges of protracted wars coupled with the threat of sanctions regimes. Attempts will be made to find solutions arising out of such challenges for all three services.

The defence research and development (R&D) and innovation ecosystem has multiple stakeholders such as higher-education institutions, research and development

organisations, funding agencies, regulatory bodies, business enterprises, three services. The last session of the Delhi Defence Dialogue is devoted to understanding the existing ecosystem, policies, regulations and trade agreements and attempt at policy recommendations that will advance the cause of domestic R&D capacity building and strengthen the inter-linkages between various stakeholders at the national, the subnational and the sectoral levels.

Given this background, the sessions in the Delhi Defence Dialogue seek to address the following research questions:

- How is the character of modern warfare evolving and what is its impact on the doctrines and operations of the armed forces?
- What are the organisational challenges faced by the armed forces in furtherance of politico-military objectives of wars and operations?
- How are the domains of war being impacted by the changing character of warfare?
- How is technology impacting the preparation and execution of war?
- How can strategic partnerships promote India's defence security?
- How can India become Atmanirbhar or self-reliant in defence?
- How can Indian entities create intellectual property for global requirements through indigenous research and development?

PROGRAMME

Day One: Tuesday, 12 November 2024

0830-0900: Registration

0900-0945: Inaugural Session

Opening Remarks by Amb Sujan R Chinoy,
Director General, MP-IDSA, New Delhi, India

Special Address by Shri Rajnath Singh,
Hon'ble Defence Minister, Government of
India and President, MP-IDSA, New Delhi,
India

Vote of Thanks by Col Rajneesh Singh,
PhD (Retd), Research Fellow, MP-IDSA,
New Delhi, India

0945-1015: Tea

**1015-1130: Session - I: Full Spectrum Threats - Challenges
of Changing Character of Warfare**

Chair: **Amb Sujan R Chinoy**, Director General,
MP-IDSA, New Delhi, India

Speakers: **Col Rajneesh Singh, PhD (Retd)**, Research
Fellow, MP-IDSA, New Delhi, India, on
*Conventional Wars Reassessed: In Times of
Great Power Competition and New Age
Technologies*

Prof Sascha Dov Bachmann, University of
Canberra on *Hybrid Warfare, Grey Zone
and Multi Domain Warfare (Online)*

Mr Riccardo Valle, Director of Research,
The Khorasan Diary on *From Territory to
External Operations to Statecraft to Adaptability:
Main Trends in Jihadist Militancy*

Amb D B Venkatesh Varma,
on *Non-Conventional Threats: WMD*

1130-1300: Session - II : Organisational Agility - Meeting the Challenges of Modern Wars

Chair: **Major General BK Sharma (Retd),** Director General, United Service Institution of India

Speakers: **Air Marshal Rajeev Sachdeva, PhD (Retd),** Former Deputy Chief of Integrated Defence Staff, HQ IDS on *Organisational Agility: Jointness a Necessity for Modern Warfare*

Col Vivek Chadha (Retd), Senior Fellow, MP-IDS on *Framework for Enhancing Jointness in the Armed Forces*

Lt Gen Rajeev Sabherwal (Retd), Former Signal Officer-in Chief, Indian Army on *Size vs Technology in Modern Armies: A Dance for Agility*

Lt Gen Samir Gupta (Retd), Former Director General, Financial Planning, Indian Army on *Resourcing For Military Capability Development and Effectiveness*

1300-1400: Lunch

1400-1530: Session - III : Navigating Domains of Wars - Addressing Operational and Administrative Challenges

Chair: **Air Marshal Anil Chopra (Retd),** Former Director General, Centre for Air Power Studies

Speakers: **VAdm S N Ghormade (Retd),** Former Vice Chief of the Naval Staff, Indian Navy on *Adaptive Defence: Addressing Operational and Administrative Challenges in Maritime Warfare*

Dr Sanu Kainikara, Adjunct Professor in the School of Humanities and Social Sciences at the University of New South Wales on *Air Power Dynamics in Modern Warfare*

Prof Pascal Vennesson, Senior Fellow and Head of Research at the RSIS, Nanyang Technological University, Singapore on *When Generals Matter: Strategic Intuition and Military Effectiveness in Land Warfare*

Lt Gen Subrata Saha, PhD (Retd), Former Deputy Chief of Army Staff and Member NSAB, on *Information Warfare: Key Determinant in Grey Zone and Essential Component in all Domains of Warfare*

1530-1545: Tea

1545-1700: Session - IV : Age of Disruption - Transformative Technologies in Modern Wars

Chair: **Prof K VijayRaghavan**, Former Principal Scientific Adviser to the Government of India

Speakers: **Dr Rain Liivoja**, Professor and Deputy Dean (Research) at the University of Queensland Law School on *Law and Ethics in the Governance of Autonomous and AI-enabled Weapon Systems*

Col Artsrun Hovhannisyan, Head of the Command and Staff Faculty at the Vazgen Sargsyan Military University on *Autonomous, Robotic Systems in the Transformation of Modern Warfare*

Dr Uzi Rubin, Senior Researcher in the Begin Sadat Centre for Strategic Studies on *The Evolving Air and Missile Threat: Defender's Perspective*

Prof Manindra Agrawal, Director IIT Kanpur on *Network Centric Warfare*

1900-2015: Fireside Chat with General Anil Chauhan, CDS

2015: Dinner

Day Two: Wednesday, 13 November 2024

0930-1000: Tea

1000-1130: Session - V : Strategic Partnerships - Enhancing National Security Through Collaboration

Chair: **Amb Ashok Sajjanhar**, Member Executive Council, MP-IDSA, New Delhi, India

Speakers: **Mr Derek Grossman**, Senior Defence Analyst, RAND Corporation on *Nothing is Guaranteed: Considering the Future of US-India Strategic Partnership*

Dr Andrey Kortunov, Academic Director of the Russian International Affairs Council on *Collective Security in (Eur)Asia: Views from Moscow and from New Delhi*

Dr Frédéric Grare, Senior Research Fellow, ANU National Security College on *Enhancing National Security through Collaboration: The EU-India Strategic Partnership*

Dr Oshrit Birvadker, Senior Research Fellow at the Jerusalem Institute for Strategy and Security (JISS) in Israel on *The Changing Trends in India-Israel Defence Equation: The Iron Swords War*

1130-1315: Session - VI : Policy Perspectives - Advancing Domestic R&D Capacity in Defence

Chair: **Dr G Satheesh Reddy (Retd)**, President Aeronautical Society of India, Former Chairman DRDO

Speakers: **Gp Capt R K Narang, PhD (Retd)**, Senior Fellow, MP-IDSA on *Perspectives: Advancing Domestic R&D Capacity in Defence, Particularly in the Area of Government Capacities and Initiatives*

Brig Ashis Bhattacharyya (Retd), Principal Advisor at Confederation of Indian Industry on *Private Defence Industry R&D in Defence Sector*

Dr Nabanita Radhakrishnan, Former Director General, DRDO (SAM & R&M) on *Advancing Domestic R&D Capacity in Defence: Role of Academia*

Prof Tai Ming Cheung, Director, University of California Institute on Global Conflict and Cooperation on *How China's Defence Science, Technology, and Industrial Eco-System Balances Between Absorption and Self-Reliance*

Mr Jayant Patil, Director and Senior Executive Vice President for L&T's Defence Business on *Navigating Protracted Wars and Sanctions - Mitigating Risks in Defence Resource Management (Production)*

1315-1415: Lunch

1415-1630: Session - VII : Protracted Wars and Sanctions - Mitigating Risks in Defence Resource Management

Chair: **ACM R K S Bhadauria (Retd)**, Former Chief of the Air Staff

Speakers: **Maj Gen Abhay Dayal**, Additional Director General Acquisition Technical (Army) on *Navigating Protracted Wars and Sanctions: Mitigating Risks in Defence Resource Management*

Mr Rajinder Bhatia, President, Society of Indian Defence Manufacturers (SIDM) on *Defence Production and R&D in India: Adapting to Externalities*

Mr Amit Cowshish, Former Financial Advisor (Acquisitions) in the Ministry of Defence on *Collaboration with Foreign Partners for Self-Reliance*

Lt Gen Oue Sadamasa (Retd), Senior Fellow
at the Sasakawa Peace Foundation, on *Logistics
in the Times of Protracted Conventional Wars Under
the Shadow of Sanctions and Export Control
Regimes: Japan's Perspective* (Online)

Mr S P Shukla, Chairman, Mahindra
Aerospace and Defence on *Indigenous
Industrial Eco-Systems: The 5th Pillar of Defence*

Ms Vrinda Kapoor, CEO, 3rdiTech on *Critical
Technology as the New Diplomatic Currency*

**1630-1700: Concluding Session - Summing Up & Key
Takeaways**

Vote of Thanks: Col Rajneesh Singh, PhD (Retd)
(Conference Coordinator)

Profiles of Participants
&
Abstracts

Special Address

SHRI RAJNATH SINGH

Hon'ble Defence Minister,
Government of India and
President, MP-IDSA, New Delhi, India



Shri Rajnath Singh is the Defence Minister of India. He was elected as the President of MP-IDSA during the 52nd Annual General Meeting (AGM) held on 08 August, 2019 and re-elected during the 54th AGM held on 06th October, 2021. He completed his MSc Physics from Gorakhpur University UP. He worked as a lecturer of Physics at K.B. Post-Graduate College Mirzapur, UP. He became the RSS karyavah (General Secretary) of Mirzapur city in 1972. He also remained the organisational secretary of ABVP Gorakhpur division from 1969 to 1971. He entered politics in 1974 and in 1977, he was elected as an MLA in the Uttar Pradesh Assembly. He was elected MLC for Uttar Pradesh Legislative Council in 1988 and became Education Minister in 1991. During his tenure as Education Minister in UP, he established some landmarks by introducing the Anti-Copying Act and Vedic Mathematics in the syllabus. He became a member of the Rajya Sabha in 1994. On November 22, 1999, he became Union Surface Transport Minister. During this period he got the opportunity to initiate the NHDP (National Highway Development Programme), a dream project of Shri Atal Bihari Vajpayee.

On October 28, 2000, he became Chief Minister of UP and was twice elected as MLA from Haidargarh constituency in Barabanki. On May 24, 2003, he became Union Minister of Agriculture and subsequently for Food Processing. During this period he initiated a few epoch-making projects

like Kisan Call Centre and Farm Income Insurance Scheme. He also embarked on 'Bharat Suraksha Yatra' which covered several States taking up the cause of increasing terrorist activities and threats to internal security. He laid emphasis on issues of public interest like spiralling prices of essential commodities, farmers' grievances and other national issues. He has also written a book on Unemployment its Reasons and Remedies. He became the BJP National President on December 31, 2005, a post he held till December 19, 2009. In May 2009, he was elected MP from Ghaziabad in Uttar Pradesh. On May 26, 2014, Shri Rajnath Singh took oath as the Union Minister of India and worked as Union Minister for Home Affairs till 30 May 2019. On May 31, 2019, Shri Rajnath Singh was allocated the portfolio of Union Minister for the Ministry of Defence.

Opening Remarks and Chair

AMB SUJAN R CHINYOY

Director General,
MP-IDSA, New Delhi, India



Since 2019, Ambassador Sujan R Chinoy has served as Director General of the Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA) in New Delhi. A seasoned diplomat with a career spanning 1981-2018, Amb Chinoy has held key positions including Ambassador to Japan and Mexico, and Consul General in Shanghai and Sydney. His areas of expertise are China, East Asia, and politico-security issues. Notably, he led India's negotiations on confidence-building measures with China on the boundary dispute from 1996-2000.

From 2008 to 2012, Amb Chinoy played a pivotal role at the National Security Council Secretariat (NSCS). He shaped both internal and external security policies, fostering crucial dialogues with international counterparts, particularly in the Indo-Pacific region. Over four decades in public service, Amb Chinoy has tackled a wide range of issues – political, security, defense, technological, trade, and economic. His diverse Foreign Service career included postings at the UN (New York), Beijing, Hong Kong, and Riyadh. He was the Chair of the Think20 engagement group for India's G20 Presidency, a member of the DRDO Review Committee. Amb Chinoy actively contributes to journals and publications and lectures internationally on a variety of issues. He has recently authored two books *World Upside Down: India Recalibrates Its Geopolitics* (Harper Collins) and *Global Tumult: India as a Pole Star* (Rupa).

Special Session *Fireside Chat with CDS*

GENERAL ANIL CHAUHAN

Chief of Defence Staff, India



General Anil Chauhan PVSM, UYSM, AVSM, SM, VSM is an alumnus of the National Defence Academy, Khadakwasala. He was commissioned into the Sixth Battalion, the Eleventh Gorkha Rifles in Jun 1981, from IMA, Dehradun. The officer has vast experience in operations across a wide spectrum of conflict and terrain profiles. He commanded an Infantry Battalion, along the Line of Control in Jammu & Kashmir, a Mountain Brigade in Manipur, an Infantry Division in the Kashmir Valley and a Corps in the North East. The General was General Officer Commanding-in-Chief, Eastern Command from 01 Sep 2019 to 31 May 2021. Post his retirement from active military service, the General served as a Military Adviser to the National Security Council Secretariat (NSCS) from 20 Oct 2021 to 29 Sep 2022. General Chauhan's staff and instructional assignments include, Instructional tenure at HQ IMTRAT, Bhutan, Military Observer on a UN Mission to Angola, General Staff Officer 1(Operations) of the Mountain Division, Director, Perspective & Planning (TAS) at Army HQ, Chief of Staff, HQ 15 Corps and Director General of Discipline Ceremonial & Welfare. He was the Director General of Military Operations during the Balakot Air Strike. General Anil Chauhan is a graduate of the Defence Services Staff College, Wellington, the Higher Command and National Defence College courses. The officer, during the span of over 40 years of uniformed

service has been decorated for distinguished service with the PVSM, UYSM, AVSM, SM & VSM. Academically inclined, the General has authored two books namely 'Aftermath of a Nuclear Attack' & 'History of 11 Gorkha Rifles Regimental Centre' and has supervised the writing of History of 19 Inf Div. Currently he is working on a book on the Military Geography of Indian Northern Borders. He was awarded M. Phil in Defence Studies from Madras University in 2012. The General officer assumed the appointment of the Chief of Defence Staff on 30 Sep 2022.

COL RAJNEESH SINGH, PhD (RETD)

Research Fellow,
MP-IDSA, New Delhi, India



Col Rajneesh Singh, PhD (Retd) was commissioned in the Infantry in December 1989 and has varied operational, staff and instructional experience. He has commanded a Rashtriya Rifles company and battalion in Jammu and Kashmir. He has been a military observer in Congo for a year. His staff experience includes tenure in the Military Operations Directorate and in Military Secretary's Branch. The officer has also been an instructor at the NDA, Khadakwasla and at DSSC, Wellington. During his service Col Rajneesh Singh (Retd) pursued PhD at the JNU, New Delhi and was awarded doctorate in 2019. Post superannuation from the army, the officer was a Consultant for the Ministry of Defence for over a year before joining Manohar Parrikar Institute for Defence Studies and Analyses in January 2023 (MP-IDSA). He is presently a Research Fellow at the Defence Economics and Industry Centre. Col Singh's areas of research include higher defence management and military studies. His current area of research focusses on self-reliance in defence production.

CONVENTIONAL WARS REASSESSED: IN TIMES OF GREAT POWER COMPETITION AND NEW AGE TECHNOLOGIES

Rajneesh Singh

Despite being the home to 1.9 billion or nearly one quarter of the global population, South Asia region that comprises eight contiguous countries only has 4.2 percent share in global GDP of USD 103.86 trillion in current prices (WB, 2022). South Asia is one of the economically least integrated regions of the world as manifested, among others, in the meager volume of intraregional trade which accounts for barely 5 percent of the region's total trade.

Such a poor economic standing and equally tardy pace of regional economic integration can be directly attributable to two parallel paradigms of geopolitics. First, within the region, long-standing political tensions between member states of SAARC have severely constrained the flow of investment, trade, people and know-how. As a result, establishing an effective and sustainable regional supply chain has increasingly proving to be a Sisyphean ambition. Two, China's ascent as a global economic powerhouse and its influence strategy in neighboring regions significantly impact South Asia's economic integration dynamics.

As the geopolitics and economic integration are almost axiomatically considered intertwined, this brief exploratory paper, mainly from the vantage point of Nepal, tries to capture the developments towards regional economic integration in South Asia and the potential impacts of the emerging geopolitical and geoeconomic dynamics within the region. The paper will also look into the geopolitical forces influencing the regional economic activities and their outcomes, from within and outside of SAARC region.

PROF SASCHA DOV BACHMANN

Professor at Canberra Law School
University of Canberra, Australia



Prof Sascha Dov Bachmann is an international scholar and former Lieutenant Colonel (GER A Res) with extensive operational experience in the Balkans and as an exchange officer with the US Marines. Over the past two decades, he has held diverse roles across the US, the Middle East, South Africa, and various European countries. Since September 2019, Prof Bachmann has been a member of Canberra Law School. Prior to this, he was an Associate Professor at Bournemouth University and the University of Lincoln, following his tenure as a Senior Lecturer at the University of Portsmouth. In 2016, he was appointed (eo) Docent (Reader) in War Studies at the Swedish Defence University, and in subsequent years, held positions as (Professorial) Research Fellow at CEMIS, Stellenbosch University, and Research Fellow at The Security Institute for Governance and Leadership in Africa.

Educated at LMU München (Germany), Stellenbosch and University of Johannesburg (South Africa), and the University of Portsmouth (UK). Prof Bachmann has done extensive work on contemporary Security Challenges such as Hybrid Warfare, Information Operations, Lawfare, Cyber-enhanced Hybrid Warfare, and International Criminal Justice. He actively contributes to NATO's Legal Advisor Web (LAWFAS) as a Fellow of NATO SHAPE.

HYBRID WARFARE, GREY ZONE AND MULTI DOMAIN WARFARE

Sascha Dov Bachmann

The utility of Hybrid Warfare and Grey Zone operations have been successfully demonstrated across multiple conflicts for the last two decades. Russia successfully applied its own version of Hybrid Warfare in the annexation of Crimea in 2014 and the then ensuing low intensity warfare in Eastern Europe. By utilising a full mix of DIMEFIL methods it quite successfully kept Western Europe out of the Ukraine conflict from 2014 until 2022. Once the conflict became a full war with Russia's invasion of Ukraine in February 2022, Russia did also show quite apt examples of using Hybrid Warfare and Grey zone operations in support of its otherwise rather unsuccessful conventional combat operations. Moving away from Europe and to other theatres of conflict we can see China successfully using its own brand of such warfare, namely unrestricted warfare and three warfares, against its adversaries in the region. From Philippines and other South China Sea states to India, instances of China using a combination of grey zone and hybrid warfare operations are many. In addition, Australia as the US and the West's traditional ally has been the target of many such operations by the Chinese Communist Party (CCP). From trade extortion, disinformation to law fare there were many such examples. My presentation will explain the nature and origin of Hybrid Warfare, Grey Zone operations and their role within the context of multi domain operations both as suis generis as well as force multiplier.

RICCARDO VALLE

Director of Research, The Khorasan
Diary, Italy



Riccardo Valle is the Director of Research at The Khorasan Diary, a news and research platform. He specialises in militancy, security, and politics within the Afghanistan and Pakistan region, with a particular emphasis on global and local jihadist movements. He is currently based in Islamabad, Pakistan. Valle's career is marked by a series of pivotal roles. Previously, he held positions such as Project Manager for Special Eurasia in Italy, overseeing a terrorism desk focused on monitoring armed militant activities across the Eurasian region. He also served as Department Director for Analytica for Intelligence and Security Studies, where he led research efforts on terrorism and managed team operations. Valle holds a Master's degree in Diplomacy and International Cooperation Studies from the Università degli Studi di Trieste, where he graduated Cum Laude. His thesis was "Violent Islamism across the Af-Pak region: the origins of the Islamic State Khorasan Province and its implications for local militant groups". Fluent in English, French and Urdu languages, Valle's expertise is complemented by his proficiency in conducting comprehensive research and strategic analysis.

FROM TERRITORY TO EXTERNAL OPERATIONS TO STATECRAFT TO ADAPTABILITY: MAIN TRENDS IN JIHADIST MILITANCY

Riccardo Valle

August 15, 2021 marked a watershed moment in the history of militancy in the South Asian region, as a non-state actor achieved victory after a two-decade against a national government supported by a superpower and the international community in general. The long trajectory of the Afghan Taliban combines both armed struggle as well as backdoor diplomacy, which carved the necessary space for the Islamic Emirate to return to power. It also drastically changed the geopolitical and security environment in the region, forcing other non-state actors operating in the larger area to reassess their strategy and tactics. Among these, the local Islamic State's branch, Islamic State Khorasan (ISKP), as well as its linked franchises, Islamic State Pakistan and Islamic State Hind (ISKP and ISHP), radically mutated its approach *vis-à-vis* the new regime in Kabul. As a consequence, ISKP changed its tactics, including target selection, warfare, and propaganda narratives in order to face the pressure exercised by the Afghan Taliban. It also led the organisation to strengthen its international reach both in terms of narratives as well as involvement in external plots. The paper will present a detailed analysis of the gradual shifts in ISKP and its branches after August 2021, while assessing its current threat and possible developments.

AMB D B VENKATESH VARMA

Former Ambassador to Spain and Russia



Amb D B Venkatesh Varma served in the Indian Foreign Service from 1988 to 2021. During his diplomatic career, he worked in the Office of the External Affairs Minister and in the Prime Minister's Office. He served as India's Ambassador to Conference on Disarmament in Geneva, to the Kingdom of Spain and to the Russian Federation, until October 2021. Amb Varma has vast experience in India's Security and Defence policies and served as Joint Secretary in charge of Disarmament and International Security in the Ministry of External Affairs. He was the first Recipient of the S K Singh Award for Excellence in the Indian Foreign Service in 2011 for his contribution to the negotiations of the Civil Nuclear Initiative. Amb Varma is a Distinguished Fellow at the VIF New Delhi, visiting Professor at SIS JNU, NIAS Bangalore, Kautilya School of Public Policy, and Associate Fellow at the Geneva Centre for Security Policy. He is a member of the UN Secretary General's Advisory Board on Disarmament Matters.

NON-CONVENTIONAL THREATS: WMD

D B Venkatesh Varma

The Ukraine conflict is reflective of the intense geopolitical competition between the big powers - Russia and the United States, the changing nature of warfare, the role of technology and the evolving nature of doctrine and strategy. It also offers lessons for militaries all over the world. Unlike in the Cold war period, conventional escalation is occurring despite presence of nuclear weapons thus eroding its core deterrent value. This may have serious consequences for escalation dynamics and doctrinal planning for all nuclear powers. Its negative demonstrative effect on countries like Pakistan, China or DPRK may increase nuclear risks in the coming years. Continuing Bio and Chemical weapon threats and the impact of new technologies such as AI are emerging game changers. It is important to study these developments to see how best our forces can adjust to the new battlefield environments as also India's response at international forums to address these security challenges.

Chair

MAJ GEN BK SHARMA (RETD)

Director General,
USI, New Delhi, India



Maj Gen BK Sharma, AVSM, SM and Bar was commissioned in the SIKH LIGHT Infantry Regiment in 1976 and superannuated in 2012. He is the Director General of United Service Institution of India (USI). He was conferred three military awards by the President of India for rendering exceptional distinguished national service and for displaying courage. Besides, Maj Gen Sharma was conferred national award for nation building by the Confederation of Educational Excellence of India in 2017 and has tenanted prestigious assignments in India, including command of a mountain division on China border. He has also represented his country at the UN as Military Observer in Central America and has been India's Defence Attaché in Central Asia. Maj Gen Sharma specialises in Strategic Net Assessment methodology, Scenario Building and Strategic Gaming and has contributed extensively to this field through his writings and lectures. Maj Gen Sharma edits the prestigious USI Strategic Year Book. He has lectured at various prestigious military establishments, policy think tanks and universities in India and abroad. Maj Gen Sharma regularly participates in Track-2 Level dialogues.

**AIR MARSHAL RAJEEV SACHDEVA,
PHD (RETD)**



Former Deputy Chief of Integrated
Defence Staff,
HQ IDS, New Delhi, India

Air Marshal Rajeev Sachdeva AVSM, PhD (Retd) had a distinguished career in the Indian Air Force (IAF), culminating in his role as Deputy Chief of Integrated Defence Staff and Additional Secretary (Air) at the Defence Ministry under the first Chief of Defence Staff. Air Marshal Sachdeva is alumnus of prestigious institutions such as FIS, CDM, and NDC. A Cat 'A' Qualified Flying Instructor, he has logged over 7,200 hours on various transport and trainer aircraft. He is a Certified 'A' Project Manager and holds a Doctorate in Business Management. Air Marshal Sachdeva also holds important positions in various prestigious institutions across the country. He is a Distinguished Fellow at USI and CAPS. His previous leadership roles included commanding An-32 Squadron, CI at Fixed Wing Training Faculty, Centre Director (Aviation) NTRO and SASO, HQ SAC. He has co-authored DAP-2020 and established key verticals like the Defence Space Agency, Defence Cyber Agency and Special Operations Division as DCIDS (Ops) in 2018. A recipient of the Ati Vishist Seva Medal in 2016, he is currently engaged in a project under USI titled 'Decision Making Tool for The Theatre Commander'. Air Marshal Sachdeva has also contributed to numerous academic publications and lectures across military and civil institutions.

ORGANISATIONAL AGILITY: JOINTNESS A NECESSITY FOR MODERN WARFARE

Rajeev Sachdeva

The creation of the post of the Chief of Defence Staff (CDS) and the Department of Military Affairs (DMA) was a historical moment for the Indian Armed Forces and has infused the military into National Security Mechanism. The Government of India, as of 1 January 2020, carved out the Allocation of Business (AOB) Rules for the Secretary DMA, directly tasking the CDS to restructure the military organisation and create theatre commands. On 15 August 2019, the Hon'ble PM said, "World is changing today, as also the scope and nature of war. It is becoming technology driven...India too should not have fragmented approach. Our entire military power will have to work in unison and move forward." "There should be good coordination and it should be relevant with the hope and aspirations of our people." This can only happen firstly, with the whole of nation approach and secondly if the three services converge on the drawing board and create an interoperable environment, have a seamless connectivity, write a joint perspective plan and create a joint capability. Also aspects like Cyber, Mobility, Space, Logistics, Communication, Networking, Training (Common), Maintenance, Intelligence and Surveillance (Satellites / UAS), among others need to be integrated. The CDS and the three Services have identified all the aspects of Jointness and Integration and are taking steps to think together, plan together, train together and finally fight together.

COL VIVEK CHADHA (RETD)

Senior Fellow,
MP-IDSA, New Delhi, India



Col Vivek Chadha (Retd), served in the Indian Army for 22 years prior to taking premature retirement to pursue research. He joined the Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA) in November 2011 and is a Senior Fellow at the Military Affairs Centre. Col Chadha's areas of research include counter terrorism and military studies. His single author books on counter terrorism include *Low Intensity Conflicts in India: An Analysis*; *Lifeblood of Terrorism: Countering Terrorism Finance and Company Commander in Low Intensity Conflicts*. His single author books on military subjects include, *Even if Ain't Broke Yet, Do Fix It: Enhancing Effectiveness Through Military Change*; *Kargil: Past Perfect, Future Uncertain*; *CDS and Beyond: Integration of the Indian Armed Forces*. He has also written the book, *Indo-US Relations: From Divergence to Convergence*. His current area of research focuses on the strategic lessons of the Mahabharata. He was part of the team that wrote the Indian Army's first Sub Conventional Doctrine in 2006. Col Chadha is on the Editorial Committee of the *Journal of Defence Studies*, published by MP-IDSA.

FRAMEWORK FOR ENHANCING JOINTNESS IN THE ARMED FORCES

Vivek Chadha

There has been a longstanding debate over attempts to enhance jointness within the armed forces. The experience of militaries worldwide suggests that the process is more complex than merely creating integrated structures. This paper focuses on India as a case study for analysing jointness based on previous wars and the record of jointness therein. Consequently, a framework will be discussed for enhancing jointness based on the lessons from the country's military engagements.

LT GEN RAJEEV SABHERWAL (RETD)

Former Signal Officer-in Chief, Indian Army,
New Delhi, India



Lt Gen Rajeev Sabherwal, PVSM, AVSM, VSM (Retd), is a distinguished veteran of the Indian Army with over four decades of service. Commissioned in December 1981 from NDA, Khadakwasla, and IMA, Dehradun, he has served in numerous operational roles, specialising in both conventional and counter-terrorism operations. His illustrious career includes commanding the Military College of Telecommunications Engineering, Mhow, and significant staff appointments, culminating as the Signal Officer-in-Chief. Lt Gen Sabherwal is renowned for his leadership in modern communication battlespace strategies, driving policy and doctrine formulations. A graduate of DSSC, Wellington, Higher Command, Mhow and NDC, New Delhi, he champions Net Centric Capabilities and Information Warfare, steering transformative changes across the spectrum of conflict. Currently a 'Distinguished Fellow' at CLAWS and holding the Chief of Army Staff Chair of Excellence, he continues to influence military thought through lectures and writings. Beyond his military achievements, Lt Gen Sabherwal is an avid technologist, known for integrating disruptive technologies into military operations. Adding to his impressive repertoire, Lt Gen Sabherwal has recently authored an insightful book titled "Disrupt or Get Disrupted - Exploitation of Disruptive Technologies by the Indian Armed Forces."

SIZE VS TECHNOLOGY IN MODERN ARMIES: A DANCE FOR AGILITY

Rajeev Sabherwal

With modern warfare evolving rapidly due to technological advancements and a shifting global security environment, the Indian military faces critical decisions regarding its military capabilities. This paper critically examines the ongoing debate on the optimal approach to structure the Indian Armed Forces, focusing on the balance between a technology-centric and size-centric approach. The study contrasts the benefits and limitations of both approaches: the technology-centric strategy, which emphasises cutting-edge innovations, and the size-centric strategy, which relies on traditional manpower and larger force structures. By analysing lessons learned from other nations that have faced similar strategic choices, the paper offers a comparative perspective on how these differing strategies have impacted military effectiveness globally. The findings underscore the importance of not exclusively favouring one approach over the other but rather adopting a balanced strategy that integrates advanced technology with adequate force size. This balance is crucial for ensuring that the Indian Armed Forces remain versatile, resilient, and capable of addressing a wide range of threats. The paper concludes with strategic recommendations for achieving this balance, aligning India's military capabilities with its broader national security objectives, and drawing on the experiences of other nations to implement these decisions.

LT GEN SAMIR GUPTA (RETD)

Former DG Financial Planning,
Army HQ, Sena Bhawan, New Delhi,
India



Lt Gen Samir Gupta, PVSM, VSM (Retd), an alumnus of the Indian Military Academy, was commissioned into the Regiment of Artillery in June 1986. He is a graduate of the National Defence College, Higher Defence Management Course, Defence Services Staff Course and the Long Gunnery Staff Course. He has held key command and staff appointments that include Director General Financial Planning of the Indian Army, GOC of an Artillery Division, Commander of the Kargil Artillery Brigade and a Composite Artillery Brigade and Brigadier Artillery Equipment tasked with Capital Procurement and sustenance of equipment of the artillery. He has had six tenures in J&K including Siachen Glacier and in intense Counter Insurgency operations. He was elected as a Colonel Commandant of the Regiment of Artillery in December 2021 and held the appointment till superannuation in August 2024. He is the recipient of two Presidential awards, the Param Vishisht Seva Medal, awarded in 2024 and the Vishisht Seva Medal, awarded in 2021.

RESOURCING FOR MILITARY CAPABILITY DEVELOPMENT AND EFFECTIVENESS

Samir Gupta

Debate has been generated on the pace of growth of the Defence Budget and surrender of capital funds by the MoD in recent years. However, resourcing of the Capital Budget should not be viewed in isolation as the primary driver of modernisation and improvement of military effectiveness. While it is a fact that a lot has been and is being done to improve military capabilities, there is a need to identify measures to further strengthen and improve overall efficacy of available resources. The economic development of a country has a direct impact on a host of factors that impact military effectiveness directly or indirectly and contribute to a nation's military might. However, attention to detail with an aim to fine tune the interplay between these and nurturing of the indigenous ecosystem is required to synergise the output. This in turn would act as a force multiplier to maximise output in the form of military effectiveness. There is also a need to rethink the application of funds to enhance our ability to sustain the armed forces in a possible protracted war. The need of the hour is to adopt a holistic approach across ministries, break barriers and artificial boundaries as also develop mental and organisational agility to ensure appropriate funding and policy facilitation. The overarching aim should be to identify and open up bottlenecks in development of the desired qualitative edge and military effectiveness essential for security and self-reliance.

Chair

AIR MARSHAL ANIL CHOPRA (RETD)

Former Director General,
CAPS, New Delhi, India



Air Marshal Anil Chopra (Retd), is an A QFI, test pilot, and a pioneer of Mirage-2000 fleet, who has commanded a Mirage Squadron and the Aircraft and Systems Testing Establishment (ASTE) of the Indian Air Force (IAF). Air Marshal Chopra was the team leader of MiG-21 Upgrade (Bison) project in Russia for four years. He commanded operational airbases in both Western and Eastern sectors. He was AOC J&K, ACAS (Inspections) and retired as Air Officer-in-charge Personnel (AOP). He was also a member of the Armed Forces Tribunal, and member of the Executive Council of Jawaharlal Nehru University (JNU) for two years. An avid writer and author, he has published over 800 articles on strategy, defence and Aerospace, and authored 8 books. Air Marshal Chopra runs a website that is primarily focused on educating on air power and strategic issues.

VADM S N GHORMADE (RETD)

Former Vice Chief of Naval Staff,
Indian Navy



VAdm S N Ghormade PVSM, AVSM, NM (Retd), is the former Vice Chief of the Naval Staff, Indian Navy. He has contributed significantly towards creating a combat ready, credible, capable, cohesive and future proof Navy through impetus on innovation, indigenisation, integrated planning, adopting emerging technologies and financial prudence. VAdm Ghormade has also exhibited transformative leadership to bring impactful and sustainable changes while shouldering various challenging responsibilities including Operations, Strategic Communication, Energy Security, Planning, Acquisitions, Training, Human Resource Development, Finance and Jointness at Integrated Defence Staff and Ministry of External affairs. He was selected as member of the high level DRDO Review Committee for creating a National Defence R&D ecosystem. Presently, he is member of National Advisory Council of Indian Space Association. VAdm Ghormade is regularly invited to deliver motivational talks at various academic and intellectual forums.

ADAPTIVE DEFENCE: ADDRESSING OPERATIONAL AND ADMINISTRATIVE CHALLENGES IN MARITIME WARFARE

S N Ghormade

The character of modern warfare is evolving through technological advancements, hybrid threats, and complex geopolitical dynamics, necessitating a continuous shift in military doctrines and operations. Armed forces face organisational challenges, including the need for inter-service coordination and adaptive strategies to achieve politico-military objectives. As warfare increasingly spans multiple domains, particularly maritime, the integration of advanced technologies and cyber capabilities reshapes operational frameworks and power dynamics at sea. Although, technology significantly influences both the preparation and execution of military operations, enhancing capabilities while introducing new vulnerabilities, Innovative means and actions in Strategy and Tactics continue to play an important role in maritime warfare. Strategic partnerships are vital for India's defence security, enabling access to advanced technologies and collaborative training. To achieve Atmanirbharta, India must focus on strengthening indigenous defence manufacturing and fostering innovation in research and development. By prioritising home-grown solutions, Indian entities can create intellectual property that addresses global defence needs, positioning India as a key player in the international defence landscape. Ultimately, an Adaptive defence strategy that embraces technological, organisational, Innovative and collaborative advancements is essential for addressing the challenges of maritime warfare in the modern era and bring in the necessary agility and responsiveness.

DR SANU KAINIKARA

Adjunct Professor, UNSW, Australia



Dr Sanu Kainikara, is a former Indian Air Force (IAF) fighter pilot. Following his 21 years of military service, he spent four years as a senior analyst with a US Training Team, focusing on military strategy, before relocating to Australia. There, he served as a consultant to the Air Operations Division of the Defence Science and Technology Group and lectured in Aerospace Engineering at RMIT University, Melbourne (1998-2001). Transitioning to the Australian Public Service, Prof Kainikara assumed the role of Air Power Strategist for the Royal Australian Air Force (RAAF) from 2002 to 2020. He is renowned as an author of 26 books spanning national security, military strategy, air power, international politics, and Indian history, alongside numerous peer-reviewed articles and chapters in prestigious publications. Currently, Prof Kainikara holds the position of Adjunct Professor in the School of Humanities and Social Sciences at the University of New South Wales (UNSW). He also serves as the inaugural Distinguished Fellow at the Institute for Regional Security, Canberra, and as a Distinguished Fellow of the Centre for Air Power Studies, New Delhi. He holds a PhD in International Politics from the University of Adelaide.

AIR POWER DYNAMICS IN MODERN WARFARE

Sanu Kainikara

Air power has been a manifest part of warfare for the past century, playing an exponentially increasing role in the projection of national power. Considering air power as an element of national power, there are two unchanging facts: first, control of the air is still a prerequisite for freedom of operations in all other domains; and second, air power still delivers focused, precision strike more optimally than any other capability. Factors that affect the character of air warfare are mainly rooted in technology. Air power was born of technology and continues to be at the acme of force application because of technology. The dynamics at the operational level is one of adapting to emerging technologies, evolving tactics to optimise their employment and to counter opposition, especially if control of the air is contested. At the strategic level, the changing characteristics of warfare challenges existing organisational structures. All air forces, perhaps other than the USAF, face challenges of command and control of air assets. The integration of air power and its unique qualities into a seamless entity with the other major domain capabilities continue to be a vexed question with no clear answer. The economics of scale then becomes a major deciding factor in ensuring air power can be provided the necessary independence to ensure its undiluted effectiveness.

PROF PASCAL VENNESSON

Senior Fellow and Head of Research
RSIS, NTU, Singapore



Prof Pascal Vennesson is Senior Fellow and Head of Research at the S Rajaratnam School of International Studies (RSIS), Nanyang Technological University, Singapore and Professor of Political Science at Paris-Panthéon-Assas University (on leave). He is the recipient of the prestigious Morris Janowitz Career Achievement Award from the Inter-University Seminar on Armed Forces and Society. Prof Vennesson's research and teaching lie at the intersection of the fields of international relations and strategic studies. His recent research focuses on the conditions under which military leaders' expert intuition in command decisions increases or decreases military effectiveness. He lectures at the Goh Keng Swee Command and Staff College the premier education institution of the Singapore Armed Forces. An award-winning teacher, he has supervised or co-supervised more than twenty-five PhD dissertations. Prof Vennesson was a Post-Doctoral Fellow at Stanford University's Center for International Security and Arms Control, at Ohio State University's Mershon Center and a *Centre National de la Recherche Scientifique* (National Center for Scientific Research) Fellow at Harvard Kennedy School's Belfer Center for Science and International Affairs. Prof Vennesson received his MA from the University Paris I Panthéon-Sorbonne and his Ph.D. from *Sciences-Po* Paris.

WHEN GENERALS MATTER: STRATEGIC INTUITION AND MILITARY EFFECTIVENESS IN LAND WARFARE

Pascal Vennesson

In some cases, generals make fast yet sensible operational decisions that help increase military effectiveness. In others, however, they misjudge the odds and make the wrong choices. Why? Generalship is a core dimension of land warfare but its relative importance for military effectiveness is theoretically contested and empirically unresolved. In fact, cognitive psychologists themselves disagree about whether expert intuition should be trusted. The heuristics and biases research tradition, initiated by Daniel Kahneman and Amos Tversky, commonly favours a skeptical attitude toward expert judgment. By contrast, the naturalistic decision-making research tradition, advanced notably by Gary Klein, offers a generally encouraging picture of expert performance. Building upon key insights from the cognitive psychology of expert intuition, I set out the strategic intuition theory of military effectiveness. The theory highlights three conditions for generals' expert intuition to increase military effectiveness: their situationally relevant experience, the stability of central features of their operational environment (enemy and geography) and their opportunity to adapt to that operational environment through learning and innovation. I provide a preliminary empirical assessment of the theory by examining key command decisions in land warfare during World War II and the Russia-Ukraine War.

LT GEN SUBRATA SAHA, PHD (RETD)

Adviser, Defence and Aerospace,
Deloitte, India



Lt Gen Subrata Saha, PVSM, UYSM, YSM, VSM, PhD (Retd) is the former Deputy Chief of Army Staff and member of the National Security Advisory Board (NSAB). He is currently Adviser 'Defense and Aerospace' with Deloitte India. Post retirement Lt Gen Saha was appointed as the Founding Director General of the SIDM. Following which he was nominated as member of NSAB for two consecutive terms. He was also the Chairman of the Committee for Corporatisation of the Ordnance Factories in India in 2020, Chairman of the Committee for Defence Quality Assurance Reforms in 2022 and member of the Committee for Review of the DRDO in 2023-24. During his illustrious career in the Army, he was the General Officer Commanding 15 Corps in Kashmir in 2014-15. He also served as Addl Director General Military Operations in 2013-2014, besides holding assignments in Counter Insurgency/Terrorism in Assam and Punjab, and Siachen Glacier in 1986. Lt Gen Saha served as the Deputy Regional Commander in United Nations Mission in Angola in 1996-97. As the Deputy Chief of Army Staff of India from 2015-2017, he led an unprecedented technological collaboration drive involving the Indian Army, Industry, Academia, and the DRDO. Lt Gen Saha created the Army Design Bureau in 2016.

INFORMATION WARFARE: KEY DETERMINANT IN GREY ZONE AND ESSENTIAL COMPONENT IN ALL DOMAINS OF WARFARE

Subrata Saha

Information Warfare (IW) is non-kinetic warfare, aimed at distorting facts, distracting from the main issue, and dismaying the target. IW is the key determinant in grey-zone warfare, and an essential component of all domains of warfare. India's two adversaries China and Pakistan have tenaciously employed IW tactics. Armies around the world are recalibrating to fight information wars. Besides integrating IW with warfare doctrine, the US has taken a step back from direct intervention and is opting for use of high-tech stand-off capabilities and promoting its military wherewithal in distant battlefields. Success of this policy and marketing these capabilities require widespread dissemination of information and building narratives. Direct private sector involvement in the battlefield in near space operations, ISR, drone warfare etc. has connected hype and intense marketing. China's civil-military fusion is proactively developing IW related technologies. Smart phones and the social media manipulate opinion faster than the human ability to rationalise. This is best exemplified in the ongoing Israel-Hamas war. Government processes particularly in democracies like India have fundamental regulations and structures, that make it difficult to keep pace with technology, deviousness, survival instincts and rapid decision-making of the non-state and autocratic regimes. National strategy, organisational structures, intelligence capabilities and operational framework for information warfare needs rapid reforms to be able to leverage the vast domestic potential.

Chair

PROF K VIJAYRAGHAVAN

Former Principal Scientific Adviser,
Government of India



Prof K VijayRaghavan is a distinguished scientist and former Principal Scientific Adviser to the Government of India, serving from 2018 to 2022. He holds a Bachelor of Technology degree in Chemical Engineering from IIT Kanpur and completed his PhD in Molecular Biology at the Tata Institute of Fundamental Research in 1983. His academic career includes positions as a Research Fellow and Senior Research Fellow at the California Institute of Technology from 1984 to 1988, after which he joined the Tata Institute of Fundamental Research as a Reader. He played a pivotal role in establishing the National Centre for Biological Sciences (NCBS) in Bengaluru in 1992 and has conducted significant research on the principles and mechanisms governing the nervous system and muscles during development, particularly in relation to locomotory behaviours. Prof VijayRaghavan has also served as the Director of NCBS and is currently an Emeritus Professor there. Additionally, he served as the Secretary of the Department of Biotechnology (DBT) in the Government of India from 2013 to 2018. Prof VijayRaghavan was the Chair of the High-Level DRDO Review Committee in 2023.

DR RAIN LIIVOJA

Professor & Deputy Dean (Research)
University of Queensland Law School,
Australia



Dr Rain Liivoja is a Professor and Deputy Dean (Research) at the University of Queensland Law School. He is also a Senior Fellow with the Lieber Institute for Law and Land Warfare at the United States Military Academy at West Point, and an expert adviser to the Global Commission on Responsible Artificial Intelligence in the Military Domain. Prof Rain's research focuses on the legal challenges associated with military applications of science and technology, and his broader research interests include the law of armed conflict, human rights law, the law of treaties and comparative military law. He is the author of *Criminal Jurisdiction over Armed Forces Abroad* (Cambridge University Press 2017), and a co-editor of four books, most recently *Autonomous Cyber Capabilities under International Law* (NATO Cooperative Cyber Defence Centre of Excellence 2021). He is a Co-Editor-in-Chief of the *Journal of International Humanitarian Legal Studies* (Brill/Nijhoff). Before joining the University of Queensland, Prof Rain held academic appointments at the Universities of Melbourne, Helsinki and Tartu. He has served on governmental delegations to multilateral meetings on humanitarian law and arms control.

LAW AND ETHICS IN THE GOVERNANCE OF AUTONOMOUS AND AI-ENABLED WEAPON SYSTEMS

Rain Liivoja

Technologically advanced armed forces are rapidly fielding autonomous and AI-enabled systems. Uncertainties around the regulation of such systems, however, have preoccupied the international community for many years. The need for new governance frameworks for autonomous weapon systems has been debated for a decade under the auspices of the Convention for Certain Conventional Weapons and, more recently, the United Nations General Assembly. In recent years, a somewhat separate discussion has turned to the responsible use of military artificial intelligence more broadly. In various fora, States have identified a range of relevant normative issues and articulated several ethical principles. This presentation gives a brief overview of autonomous and AI-enabled weapon technologies and the disparate governance debates that surround them. It then focuses on the rather confusing relationship between ethics and law in this context. Not only is the need for ethical compliance sometimes identified as a legal requirement, but legal compliance is sometimes mentioned as one of the ethical principles. This presentation considers to what extent the proposed ethical principles reflect, or derive from, existing law, and to what extent they might be able to guide new international law.

COL ARTSRUN HOVHANNISYAN

Head of Command and Staff Institute,
Vazgen Sargsyan Military University,
Armenia



Col Artsrun Hovhannisyán, an esteemed figure in Armenian military circles, has a career spanning diverse roles within the Ministry of Defense (MoD). Col Hovhannisyán commanded platoons and companies from 2001 to 2012. He also served as a military expert at the Institute of Political Research of Armenia's President's Staff from 2010-2011 and as Press Secretary of the MoD from 2012 to 2020. He has received prestigious state awards for combat service. Educated at the prestigious Military Academy named after V Sargsyan, Col Hovhannisyán studied history at the International Scientific-Educational Center of the National Academy of Sciences (NAS) from 2010 to 2012. His academic achievements culminated in 2014 with the title of candidate of history from the Institute of History at NAS. Since 2023, he has been serving as the Head of the Command and Staff Institute at the Military Academy named after V Sargsyan. Col Hovhannisyán continues to contribute significantly to military education and strategic thinking. He is fluent in Armenian, English, and Russian, and has authored numerous monographs on military history and strategy.

AUTONOMOUS, ROBOTIC SYSTEMS IN THE TRANSFORMATION OF MODERN WARFARE

Artsrun Hovhannisyan

The transformation of modern warfare is taking place before our eyes. Today, profound changes in military science and technological developments are manifesting in conflicts both large and small. Post-Cold War technologies, such as the first generations of precision weapons guided solely by satellite systems, face significant challenges today as they can be easily suppressed by Remote Early Weapon (REW) means. New technologies are advancing rapidly. Unmanned Aerial Vehicles (UAVs) are among these revolutionary solutions; they rival cruise missiles in range, are cost-effective, and often compact. First Person View (FPV) drones already complement many anti-tank systems. While aerial unmanned systems have already proven their effectiveness and potential, ground robotic systems are relatively new in military affairs. They are just beginning to define their role but hold considerable promise. Ground robotic autonomous systems can fundamentally change ground combat dynamics, enabling faster action with fewer casualties. These concepts require further refinement and development, but we believe they hold significant promise. Integrating robotic systems of all sizes and clearly defining human roles in these matters will be a critical agenda item in future warfare.

DR UZI RUBIN

Senior Researcher,
Begin-Sadat Center for Strategic Studies
and JISS, Israel



Dr Uzi Rubin is the founder and the first Director of the Israel Missile Defense Organization (IMDO) within the Israel Ministry of Defense (MoD). In this pivotal role, he initiated and managed Israel's comprehensive effort to develop, produce, and deploy its first national missile defence system, the Arrow missile defence system. Graduating with a Master's in Aeronautical Engineering from Rensselaer Polytechnic Institute in 1969, Dr Rubin went on to lead significant programmes at Israel Aerospace Industries and the Israel MoD. During his tenure as a visiting scholar at the Stanford Center for International Security and Arms Control in 1990, he directed a seminal study on missile proliferation. He was part of the Israel National Security Council from 1999 to 2001, where he served as senior director for proliferation and technology. He received the prestigious Israel Defense Prize in 1996 and 2003, as well as the MDA David Israel Prize in 2000 for his outstanding achievements in missile defence. After retiring from government service in 2002, he pursued further academic endeavours, earning his PhD in political science from Bar Ilan University in 2019. Currently, Dr Rubin is a Senior Researcher at the Begin-Sadat Center for Strategic Studies and the Jerusalem Institute for Strategic Studies (JISS), where he extensively publishes on national security matters.

THE EVOLVING AIR AND MISSILE THREAT: DEFENDER'S PERSPECTIVE

Uzi Rubin

Until the second half of the 19th century, war was fought in two dimensions. The invention of flying machines added a third dimension, and introduced the air threats – which in turn triggered the development of air based and ground based air defences. Vertical threats became even more complex once the ballistic missile was invented. This in turn triggered the development of ballistic missile defences. Later on, the march of technology created the precision unmanned jet aircraft, alias the cruise missile. Almost simultaneously, the operational requirement for low cost, survivable “beyond the hill” reconnaissance systems brought forth the relatively cheap, low and slow Uncrewed Air Vehicles (UAV). Each of these four families of weapons: Manned aircraft, ballistic missiles, cruise missiles and UAVs required tailored defensive systems which have been developed over time. Nowadays, though, the distinction between those four domains is fast blurring out. Instead of the four well delineated domains, the defender is now facing a continuum of threats from low and slow to high and fast. The classic air and missile defence systems are inadequate against the new aggressor technologies. There are several avenues to be explored, the main one being overturning the cost exchange ratio at the margin: Make the cost of defence lower than the cost of offence. Overturning the cost exchange ratio is a major technical challenge, and the defenders are not there yet.

PROF MANINDRA AGRAWAL

Director, IIT Kanpur, India



Prof Manindra Agrawal is Director of Indian Institute of Technology Kanpur. Prof Agrawal's primary interests are Complexity theory, Computational Number theory, and Cybersecurity. For his outstanding contributions in the field of mathematics, Prof Agrawal received Shanti Swarup Bhatnagar Award in Mathematical Sciences (2003), and the first Infosys Mathematics Prize (2008). He has also received many prestigious international awards, including the Gödel Prize (2006), the Fulkerson Prize (2006), the TWAS Prize (2010), and the Humboldt Prize (2011). He is a Fellow of US National Academy of Sciences, The World Academy of Sciences, and all Indian Academies of Sciences and Engineering. In 2013, the Government of India honoured him with Padma Shri for his outstanding contribution to the Indian science.

NETWORK CENTRIC WARFARE

Manindra Agrawal

Network-centric warfare (NCW) references operational concepts that may be brought to fruition by the intelligent application of modern information and communication technologies (ICT) to combat operations. First demonstrated by the US military during Operation Desert Storm, and ever since increasingly used in all major conflicts of the 21st century, successful network-centric operations demonstrate skilful establishment and dynamic interplay between four networked grids; an information grid, a sensor grid, an engagement grid and a communication grid. The Americans have incorporated network-centric concepts into their military doctrine organically over decades of incremental progress and experimentation. Of more pressing relevance for India, the Chinese PLA has adopted the net-centric view of warfare wholesale, going so far as to explicitly revise their official statement of military strategy to prioritise “winning informationised local wars.” While the exact time course of the informationisation of the PLA is difficult to ascertain with public domain information, it is entirely realistic to expect the PLA in 2040 to be able to mount multi-domain operations of the sophistication of the 2003 Iraq invasion at our northern borders. Our defence forces need to adopt network-centric concepts to reach a highly functional state over the next decade or so.

Chair

AMB ASHOK SAJJANHAR

Member, Executive Council,
MP-IDSA, New Delhi, India



Amb Ashok Sajjanhar has worked for the Indian Foreign Service for over three decades. He was the ambassador of India to Kazakhstan, Sweden and Latvia and has worked in diplomatic positions in Washington DC, Brussels, Moscow, Geneva, Tehran Dhaka and Bangkok. He negotiated for India in the Uruguay Round of Multilateral Trade Negotiations for India-EU, India-ASEAN and the India-Thailand Free Trade Agreement. He has worked as the head of National Foundation for Communal Harmony. He is currently the president of Institute of Global Studies in New Delhi. Amb Sajjanhar regularly writes and speaks on issues relating to international relations and Indian foreign policy.

MR DEREK GROSSMAN

Senior Defence Analyst, RAND, USA



Mr Derek Grossman is a senior defence analyst at the RAND Corporation focused on a range of national security policy and Indo-Pacific security issues. He closely tracks intensifying US-China competition throughout the region, including the Northeast, Southeast, South, and Central Asia as well as Oceania. Grossman is widely quoted by media regionally and globally. He has published dozens of commentaries and journal articles, including for *Asia Policy*, *Foreign Policy*, *International Security*, *Nikkei Asia*, *Strategic Studies Quarterly*, *Studies in Intelligence*, *The Diplomat*, *The Hill*, *War on the Rocks*, and *World Politics Review*. Before RAND, Grossman served over a decade in the Intelligence Community, where he served as the daily intelligence briefer to the director of the Defence Intelligence Agency and to the assistant secretary of defence for Asian & Pacific Security Affairs. He also served at the National Security Agency and worked at the CIA on the President's Daily Brief staff. Grossman is an adjunct professor at the University of Southern California. He holds a Masters from Georgetown University in US national security policy and a Bachelors from the University of Michigan in political science and Asian studies.

NOTHING IS GUARANTEED: CONSIDERING THE FUTURE OF US-INDIA STRATEGIC PARTNERSHIP

Derek Grossman

Throughout most of the Cold War, US-India ties were strained due to the latter's preference for engaging with the Soviet Union, New Delhi's perception that America did little to support India in 1962 during its border war against China, and Washington's support of Islamabad in the 1971 India-Pakistan conflict. Nevertheless, the thrust of the relationship over the last two decades has been overwhelmingly positive, especially since India's pledge to support US counterterrorism efforts post-9/11, and Washington's engineering of a unique and unprecedented deal in 2005 to provide New Delhi with nuclear trade despite it not being a signatory to the nuclear non-proliferation treaty (NPT) regime. These key moments planted seeds of trust that have since blossomed into an incredibly successful partnership for both nations. But there are good reasons to worry that lingering challenges in relations could severely disrupt the US-India partnership, or, in the extreme, end it. While this is unlikely, particularly when considering how much the partnership has already overcome since the end of the Cold War and in light of China's rising challenge to the international rules-based order, it certainly is not an impossibility either.

DR ANDREY KORTUNOV

Academic Director of the RIAC, Russia



Dr Andrey Kortunov graduated from the Moscow State Institute of International Relations (MGIMO) in 1979. He completed his postgraduate studies at the Institute for U.S. and Canada Studies of the USSR Academy of Sciences in 1982 and holds a PhD in History. From 1982 to 1995, Dr Kortunov held various positions at the Institute for US and Canada Studies, including the position of Deputy Director. He has taught at universities around the world, including the University of California, Berkeley. Additionally, he has led several public organizations involved in higher education, social sciences, and social development. Since 2011 till 2023, Dr Kortunov was the Director General of RIAC. He is a member of expert and supervisory committees and boards of trustees of several Russian and international organizations. His academic interests include contemporary international relations and Russian foreign policy.

COLLECTIVE SECURITY IN (EUR) ASIA: VIEWS FROM MOSCOW AND FROM NEW DELHI

Andrey Kortunov

The author tries to compare the Russian and the Indian contemporary approaches to the concept of collective security in Asia keeping in mind not only common or converging, but also overlapping and clearly divergent views coming from Moscow and from New Delhi. In particular, the paper addresses how in Russia and in India they define national threat perceptions, potential participants to the Asian security system, its geographical scope, the preferred legal arrangements for the system and interconnections between security and development. The author concludes that existing differences in Russian and Indian approaches to continental security, as important as they are, should not prevent the two nations from working together in both bilateral and multilateral formats on many practical security matters in Asia. The two nations can learn a lot from each other. Russia can share with India its diverse experience in global politics, including in such critical areas as strategic stability, arms control and international crisis management in remote parts of the world, while India can offer Russia its experience in building a friendly neighbourhood, in well-calibrated “zone-balancing” and, above all, in exercising appropriate “strategic patience” when dealing with existential security challenges.

DR FRÉDÉRIC GRARE

Senior Research Fellow,
ANU, National Security College
Canberra, Australia



Dr Frédéric Grare is Senior Research Fellow at the National Security College in Canberra. He is also Associate Senior Policy Fellow at the European Council on Foreign Relations (ECFR) and Non-resident Senior Fellow at the Carnegie Endowment for International Peace. Previously he has worked as a policy officer at the Centre for Analysis, Planning and Strategy of the French Ministry of Europe and Foreign Affairs. Dr Grare was also the Head of the Asia Bureau of the Directorate for Strategic Affairs of the French Ministry of Defence, and Director of the South Asia Program at the Carnegie Endowment for International Peace in Washington. Dr Grare's research focuses on South Asia foreign and security policy as well as the Indo-Pacific. His last book, *The Indian Ocean as a New Political and Security Region*, co-written with Jean-Loup Samaan, was published in 2022.

ENHANCING NATIONAL SECURITY THROUGH COLLABORATION: THE EU-INDIA STRATEGIC PARTNERSHIP

Frédéric Grare

The strategic partnership between the European Union (EU) and India is almost as old as the millennium. But if it dates back to the Hague Summit in 2004, it took a long time for the partnership to include a significant security dimension. Individual EU member states did cooperate with India in defence production and exercised with its armed forces. But even when involved in the same theatres, like in Afghanistan, EU member states and India hardly consulted each other, even less coordinated their activities. The EU was – and to some extent still is – seen in India as a supranational organisation that is struggling to form a common front on military and defence activities. The situation is evolving today for two reasons: the weaponisation of all activities by China, blurring the lines between traditional and non-traditional threats, the consequent emergence of grey zones; EU's willingness to address these issues and the elaboration of an EU Indo-Pacific strategy. EU's intent to focus on non-traditional and hybrid threats, much more in line with the capacities it is capable of, and willing to devote, to the Indo-Pacific opens potentially a vast field of cooperation in a space none of the two entities have the capacities to act alone.

DR OSHRIT BIRVADKER

Senior Research Fellow,
JISS, Israel



Dr Oshrit Birvadker is a Senior Research Fellow at the Jerusalem Institute for Strategy and Security (JISS) in Israel. Dr Birvadker specializes in India-Middle Eastern geopolitics, security policy, and intelligence analysis. She earned her Ph.D. in Middle Eastern Studies from Bar-Ilan University, where her dissertation focused on the evolving dynamics of Saudi Arabia and India relations. She has received several awards for her pioneering work, including an award from the Israel Academy of Science and Humanities. Dr Birvadker serves as a consultant to several ministries and defence organisations. She is a frequent commentator in Israeli and international media, including Haaretz Israel Hayom and the Jerusalem Post. Dr Birvadker's investigative work on the Indian Jewish diaspora's struggle against discrimination in the early 1950s garnered global acclaim, including from politicians, scholars, and activists. Dr Birvadker is a business development expert who helps companies gain access to the Asian markets. She is also the founder of the social activism project 'Mantra' that focuses on empowering Indian migrant women in the periphery of Israel.

THE CHANGING TRENDS IN INDIA-ISRAEL DEFENCE EQUATION: THE IRON SWORDS WAR

Oshrit Biroadker

Since October 7, Israel has encountered significant delays in arms shipments and has faced the looming threat of an arms embargo from Western countries, marking a notable shift in international support. Even the United States, Israel's principal ally, has leveraged military aid as a policy tool, raising concerns within Israel regarding its reliance on American military assistance and the consequences for its national autonomy. The conditional nature of this aid has brought into question Israel's capacity to maintain an independent foreign policy, complicating its ability to address emerging security threats. Given these challenges, India's growing ambitions and capabilities in the defence sector present a strategic alternative to Israel's traditional dependence on Western arms, offering a potential counterbalance in a time of geopolitical uncertainty. This article explores the imperative for Israel to build new supply chains with India, spanning from essential munitions like dumb bombs to advanced guided weaponry, to enhance its military self-sufficiency.

Chair

DR G SATHEESH REDDY

President, Aeronautical Society of India,
Former Chairman, DRDO, India



Dr G Satheesh Reddy, is a renowned defence and aerospace scientist, acclaimed for his significant contributions to Defence R&D and technology leadership spanning several decades. Early in his career as Project Director, he developed India's first guided bomb paving way for indigenous development of long range smart precision weapons. Dr Reddy spearheaded the development of advanced avionics as Director, Research Centre Imarat (RCI) and headed Dr APJ Abdul Kalam Missile Complex as Director General, Missiles and Strategic Systems. During his illustrious career, he held many prestigious appointments in Government of India as the Secretary of Department of Defence R&D, Chairman, DRDO, Director General, Aeronautical Development Agency (ADA) & the Scientific Adviser to Raksha Mantri. He is presently the President of Aeronautical Society of India, a leading professional body in the field of aeronautics, aviation and aerospace, founded in 1948 in India. His notable contributions for development of Hypersonic technology demonstrator vehicle, a series of new generation long and short range missiles, Air Independent Propulsion for submarines, Advanced Towed Artillery Gun System (ATAGS), Drone & Anti-drone systems, Light Weight Tanks and Precision Guided Munitions among many others have been transformative for enhancing the defence capabilities of India.

GP CAPT R K NARANG, PhD (RETD)

Senior Fellow, MP-IDSA,
New Delhi, India



Gp Capt Rajiv Kumar Narang, VM, PhD (Retd), is Senior Fellow in Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA). He is former Indian Air Force (IAF) helicopter pilot, qualified Flight Safety and Accident Investigator, holder of Commercial Helicopter Pilot Licence (CHPL), alumnus of Defence Services Staff College, India and PhD in International Relations. He authored a book titled “India’s Quest for UAVs and Challenges”, HQ IDS-SIDM report titled “A Roadmap for India Becoming Atmanirbhar in Counter Drone Technologies/ Systems” in 2022 and research papers on aviation, drones, Make in India and Self-Reliance. He was a member of Drone Working Sub Group, Department of Industry and Internal Trade (DPIIT) in 2020-21, High Power Steering Committees (HPSC) of Innovation for Defence Excellence (iDEX) in 2021-22 and Study Group on Drones set up by NSCS in 2022-23 and participated in track-1.5 and track-2 dialogues.

**PERSPECTIVES: ADVANCING DOMESTIC R&D
CAPACITY IN DEFENCE, PARTICULARLY IN THE AREA
OF GOVERNMENT CAPACITIES AND INITIATIVES**

R K Narang

The nature of war is changing with low cost drones, cyber, big data, AI and other emerging technologies. The democratisation of drone technology and easy availability of commercial drones that can be used by terrorists, criminals, and military alike has led to their rapid proliferation. While on the other hand, vulnerabilities of supply chains has created new challenges. The rapid adoption of drones by the defence forces has created the necessity of their integration in national airspace for peace time and in combat airspace during the war. The detection of small slow and low flying low radar cross section rogue drones in the congested airspace environment is becoming a big challenge. The development of swarm drones is adding to challenges. The existing air defence systems are expensive and relatively ineffective against small drones, which has made air defence expensive. The developments in counter drone technologies is being met with further advancements in drone technologies. The disruptions of supply chains during recent wars has added to complexities. The need for developing innovative low cost solutions requires significant focus on Research and Development. The government entities need to work with private sector as well as establish collaborations with friendly countries to address the complex challenges posed by new and emerging technologies.

BRIG ASHIS BHATTACHARYYA (RETD)

Principal Adviser to CII,
India



Brig Ashis Bhattacharyya (Retd) joined Confederation of Indian Industry (CII) as Senior Adviser after retiring from the Army in 2017. He is also a member of Society of Indian Def Manufacturers (SIDM) where he has worked extensively towards Indigenisation and R&D leading to unparalleled outcomes towards self-reliance in Defence Industry. He has also worked very closely with industry associations of US, UK, France, Israel Japan, Korea, South Africa, Bangladesh, Bhutan, and Nepal to promote defence exports and exchange of technology. In Jan 2022, Brig Bhattacharyya sidestepped to CII Central organisation as Principal Adviser to head of a region (NE & UTs). With effect from June 2024, he has been assigned as Principal Adviser to SIDM, in addition to his duties in NE and UTs. During his 33 years career in the Armoured Corps, he commanded an Armoured Squadron/ Regiment/ Brigade and was the Deputy GOC of an Armoured Division. His job also included Steering Developmental Projects with DRDO and Private Industry, overseeing Defence Capital Procurement cases, HR Policy formulation and UN Peacekeeping operations (Lebanon). He was also a Faculty member at the College of Defence Management teaching Decision Sciences and was HOD of Project Management.

PRIVATE DEFENCE INDUSTRY R&D IN DEFENCE SECTOR

Ashis Bhattacharyya

This seminar paper explores the crucial role of private sector participation in defence Research and Development (R&D) in India, comparing it with global benchmarks. While India is the fourth-largest defence spender globally, its investment in R&D remains low at 0.64 percent of GDP, significantly below global leaders like the U.S. and South Korea. Private sector contribution to defence R&D in India is limited, with an R&D intensity of 1.2 percent compared to the global average of 3.4 percent. The paper examines the public sector's dominance, particularly through the Defence Research and Development Organisation (DRDO) and Defence Public Sector Undertakings (DPSUs), alongside the growing involvement of private firms through initiatives like Make in India, iDEX, and the Technology Development Fund.

The 25 percent reservation of the defence R&D budget for private industry has opened opportunities for start-ups and MSMEs. However it still needs to be operationalised. The paper further highlights challenges such as bureaucratic delays, low intellectual property generation, and limited collaboration between academia and industry. The paper recommends enhancing tax incentives, improving industry-academia collaboration, fostering a skilled workforce, and streamlining procurement processes to accelerate innovation and self-reliance in defence. With sustained effort, India can build a robust defence R&D ecosystem, reducing its reliance on imports and strengthening its national security.

DR NABANITA RADHAKRISHNAN

Former DG (SAM & R&M),
DRDO,
India



Dr Nabanita Radhakrishnan is a distinguished scientist with a remarkable career spanning over three decades. Her tenure at the DRDO was marked by significant contributions to strategic planning, project management, and resource allocation. As Director General of Systems Analysis & Modeling and Director General of Resources & Management, Dr Radhakrishnan, oversaw the development of innovative policies, streamlined project execution processes, and ensured efficient utilization of resources. Her initiatives led to enhanced efficiency and effectiveness within the organisation. One of Dr Radhakrishnan's notable achievements was the introduction of a nationwide video conferencing system which went on to become the backbone of online interactions even today. She also ensured implementation of a DRDO wide Quality Reliability & Safety policy and has driven the concept of Systems Analysis approach in the organisation's projects & programmes. Dr Radhakrishnan has a strong academic background in electronics and communication engineering and has made significant contributions to various research projects, including the Light Combat Aircraft (LCA) Tejas program. Throughout her career, Dr Radhakrishnan has demonstrated exceptional leadership, strategic thinking, and a commitment to excellence.

ADVANCING DOMESTIC R&D CAPACITY IN DEFENCE: ROLE OF ACADEMIA

Nabanita Radhakrishnan

A nation's military prowess is based largely on its capability to develop and exploit systems & products, both defensive and offensive. There are two main ways to acquire these i.e either buy outright from friendly nations or develop these products in house within the country. It is today widely accepted that the first recourse to acquiring military equipment should ideally be through indigenous development. The paper takes a look at the evolution of a military product, the players involved in development at various Technology Readiness Levels(TRL) and focuses in greater depth at the bottom of the TRL chart i.e. the creators of basic Research, the foundation for R&D. Ideally, this role is reserved for academic institutions. The paper also takes a comparative outlook at Defence-Academia linkages in a select few countries viz, US, UK, Israel and China and it is noted that academic centres of higher learning in Science & Engineering have always been contributors to a nation's Defence capability in various forms starting from basic research right up to development of weapons systems in certain countries. The paper examines the role played by academia both abroad and in India, and concludes with recommendations to enrich the eco-system in India through defined roles and processes.

PROF TAI MING CHEUNG

Professor, Director,
University of California,
Institute on Global Conflict and
Cooperation, USA



Prof Tai Ming Cheung is director of the University of California-wide Institute on Global Conflict and Cooperation, and a professor in the School of Global Policy and Strategy at the University of California, San Diego. His areas of research focus include China's efforts to become a world-class science and technology power, and the relationship between geo-economics, innovation, and national security. His latest book is *Innovate to Dominate: The Rise of the Chinese Techno-Security State* (Cornell University Press, August 2022). Dr Cheung has a PhD in War Studies from King's College, London.

HOW CHINA'S DEFENCE SCIENCE, TECHNOLOGY, AND INDUSTRIAL ECO-SYSTEM BALANCES BETWEEN ABSORPTION AND SELF-RELIANCE

Tai Ming Cheung

The robust advancement of the Chinese defence science, technology, and industrial (DSTI) system in the 21st century reflects the pursuit of a development model that is based on two different but complementary approaches. The first is the absorption model that has been the principal driver behind China's efforts to catch up with the world's leading defence powers by bringing in foreign technology and knowledge by whatever means is necessary to produce re-engineered domestic products. As China begins to challenge for global defence technological leadership from the United States and other major powers, the second self-reliant original innovation model is becoming a more important player, especially in new and emerging technological domains. The transition from an absorption-led to a self-reliant innovation-led model is the central task currently facing the Chinese DSTI eco-system and over the next 1-2 decades. This will require major adjustments to how the DSTI system is organised and operates.

MR JAYANT PATIL

Director & Senior Executive,
Vice President,
L&T Defence Business on Defence
Production



Mr J D Patil served on the Board of L&T as a Whole Time Director Defence & Smart Technologies and is currently member of the Executive Council of Management of L&T and Adviser to the Chairman & Managing Director for L&T's Precision Engineering and Systems & New Age Smart Technology businesses. He has a rich, more than four-decade long career in L&T, and has been instrumental in growing the nascent Technology and Product Development Group of L&T's corporate R&D with a focus on top end inter-disciplinary Product Development. Mr Patil spearheaded the L&T's foray in the Defence sector since the inception of this segment in L&T in mid-eighties. Over the years, under his leadership, L&T built a portfolio of indigenous, in-house products, systems, technologies and platforms both on its own and by teaming up with DRDO and with the Indian Armed Forces, and is today engaged in design-to-delivery of solutions across its chosen Defence segments. He also oversaw evolution of L&T's Space businesses as the longest and most mature industry partner of ISRO. Besides being Adviser to L&T's CMD, Mr Patil is the Chairman of the Board of Directors of L&T MBDA Missile Systems Limited and Board Member of L&T Semiconductor Technologies. He is Founder Chairperson of Indian Space Association (ISpA).

NAVIGATING PROTRACTED WARS AND SANCTIONS - MITIGATING RISKS IN DEFENCE RESOURCE MANAGEMENT (PRODUCTION)

Jayant Patil

GoI is committed to build robust domestic defence industry, hence many of the initiatives viz. reforms in DPP, TDF, iDEX/ Prime, Swavalamban, ADITI Scheme, have been path-breaking in concept and approach, there have been gaps in implementation. It is important to take stock of how these and other reforms have performed. As many other conceptualised reforms through papers are yet to be implemented such as DPEPP; Professionalising Acquisition; Reforms in EXIM; Implementation of PMU; DGQA Reforms to name major ones. The moot point that remains is after all the policy reforms and Government's positive intent, why India continues to be among the largest importers of Defence hardware. Sustenance of domestic defence ecosystem is the key with dependable supply chains with ability to scale at short notice, using innovative thinking, modularity in design, engineering & production and achieve building the Military Industrial Ecosystem. Adaptation of CMF Model by GoI from developed nations as recommended by multiple expert committees in past. However, it remains to be embraced through overly focus on "one-time Procurement" of matured products and platforms leaving little room for development through continued innovation and celebrating early successes in various small initiatives, most without ability to scale. Towards building self-reliance and sustenance for protracted war situations, we need to review current models, draw conclusions, institute innovative models to embrace industry for building capabilities by leveraging dual use technologies.

Chair

ACM R K S BHADAURIA (RETD)

Former Chief of Air Staff,
India



Air Chief Marshal Rakesh Kumar Singh Bhadauria PVSM, AVSM, VM, ADC(Retd) served as the Chief of the Air Staff from 2019 to 2021. An alumnus of the prestigious National Defence Academy, he graduated from the Air Force Academy with the coveted 'Sword of Honour' and was commissioned in the fighter stream of Indian Air Force (IAF) on 15 June 1980. He has over 4270 hours of experience on twenty seven types of fighters as well as transport aircraft and holds the unique distinction of being an Experimental Test Pilot, a Cat 'A' Qualified Flying Instructor and a Pilot Attack Instructor. He completed his Masters in Defence Studies from Command and Staff College, Bangladesh. During his illustrious career, spanning almost four decades, the Air Chief Marshal has held a number of significant field and staff appointments including Command of a front line Jaguar Squadron, Command of a premier Air Force Station in South-Western sector, as well as Project Director of National Flight Test Centre on Tejas Light Combat Aircraft (LCA) project. In recognition of his meritorious service Air Chief Marshal Bhadauria was awarded the Vayu Sena Medal in 2002, Ati Vishist Seva Medal in 2013 and Param Vishist Seva Medal in 2018. He was appointed as Principal Honorary ADC to the President of India on 01 October 2019.

MAJ GEN ABHAY DAYAL

Additional Director General Acquisition
(Tech),
Indian Army,
MoD, India



Maj Gen Abhay Dayal, VSM is the Additional Director General Acquisition Technical (Army) and an alumnus of Indian Military Academy, Dehradun. The General Officer has had an excellent professional career and has qualified on the prestigious Army courses of 'Long Gunnery Staff Course' at School of Artillery, Deolali, 'Defence Services Staff Course' at Defence Services Staff College, Wellington, 'Higher Defence Management Course' at College of Defence Management, Secunderabad and 'National Security and Strategic Studies Course' at National Defence College, New Delhi. His career highlights include command of a Medium Artillery Regiment equipped with Bofors Guns, a Mountain Artillery Brigade in the Eastern Sector, an Infantry Brigade in the Western Sector and an elite Mountain Strike Infantry Division in the Eastern Sector. His staff assignments include tenures as a Brigade Major of a Mountain Brigade, United Nations Military Observer in Democratic Republic of Congo, Colonel General Staff of a RAPID division in the Western Sector. He is currently holding the prestigious appointment of ADG Acq Tech (Army), MoD, dealing with Capital Acquisition Cases of weapons and equipment for the Indian Army. For his distinguished service, he has been awarded Vishisht Seva Medal by the President of India and General Officer Commanding in Chief Commendation of Central Command and Western Command, twice.

NAVIGATING PROTRACTED WARS AND SANCTIONS: MITIGATING RISKS IN DEFENCE RESOURCE MANAGEMENT

Abhay Dayal

The capacity of a state to wage war for a prolonged period of time depends upon the economic and military might at its disposal. The two main on-going conflicts presently viz the Russia- Ukraine and Israel- Hamas wars have dispelled the belief that in an increasingly globalised and inter-dependent world, only 'short, intense wars' would be likely. Considering India's geopolitical environment, a realistic assessment of its capability to undertake conventional military operations, below the nuclear threshold, over a protracted period thus merits closer examination. The paper aims to analyse both, the direct as well as indirect impact of India, any of its defence suppliers being involved in a conflict or being subjected to sanctions. It attempts to identify the supply chain issues being faced by India with regard to fully integrated defence systems as well as sub- components and spares, in light of the two main conflicts mentioned above. Lessons about the need for indigenising defence R&D as well as production have also been drawn with an effort to arrive at practical and implementable steps required to be taken for the same. With India still topping the list of arms importers in the world, a two pronged approach of mitigation measures needed to be implemented at international level as well as domestically, have been suggested.

MR RAJINDER S BHATIA

President, SIDM,
Chairman, KSSL,
India



Mr Rajinder Singh Bhatia is an Army Veteran and a prominent Defence Industry leader in India with over 50 years of experience. He is currently President of the Society of Indian Defence Manufacturers (SIDM), which is the leading voice of the Indian defence industry. He is the Chairman of Kalyani Strategic Systems Limited (KSSL, a Defence Business Subsidiary of Bharat Forge Limited) at Kalyani Group. He is also the Chairman of Kalyani Rafael Advanced Systems (KRAS, a joint venture between Rafael and KSSL). Under him, Kalyani Group has been at the forefront of the Atmanirbhar Bharat effort while forging partnerships with major Indian and foreign OEMs, and is today at the forefront of the Defence & Aerospace landscape in India. He has been a key member of the strategic policy initiatives and government taskforces for Defence & Aerospace. He has featured in '50 Manufacturing Innovative Leaders' and was awarded 'Best CEO of the Year' for 'Excellence and Leadership in Innovation' at the Golden Star Awards in Oct 2021.

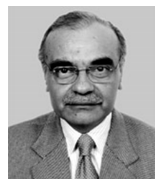
DEFENCE PRODUCTION AND R&D IN INDIA: ADAPTING TO EXTERNALITIES

Rajinder Singh Bhatia

The Indian defence industry has witnessed a steady stream of policy reforms to help 'level the playing field' for private defence manufacturers in the country. These reforms have helped increase the contribution of private industry to the country's overall defence production. In fact, the share of private industry's contribution to defence exports from India stood at 60 per cent, while that of the public sector was 40 per cent. Demonstrating that private defence manufacturers can add significant value and spearhead defence exports from India. Despite such domestic improvements, the global security and economic environment has been rife with conflict and protectionism. This has led to increased military spends across the world, and the global defence industry has shifted into high gear as a result. However, defence production, both global and domestic, are susceptible to externalities like wars, low intensity conflicts, and more frequently used sanctions regimes. These externalities can disrupt supply chains, hinder defence exports, and impede innovation as well as research and development in defence. This paper focuses on identifying the impact that protracted wars and sanctions regimes have on defence production, and the role that the Indian defence industrial sector has to play in this changing landscape of modern warfare.

MR AMIT COWSHISH

Former Financial Adviser (Acquisitions)
MoD,
India



Mr Amit Cowshish is an Indian Defence Accounts Service (1977) officer. He retired as Additional Controller General of Defence Accounts in 2012. He also served on deputation with the Ministry of Defence (MoD) in various capacities (1983-86 and 2005-12) and the Central Vigilance Commission (1991-96) as Commissioner for Departmental Inquiries. While on deputation to MoD, Mr Cowshish dealt with the financial aspects of capital and revenue procurement, defence planning, and budget. He has been a member of many committees set up by the MoD, including the one constituted in 2016 to suggest the modality of setting up a Defence Capability Acquisition Organisation. He attended the National Security & Strategic Studies course at the National Defence College at New Delhi in 2000 and the Advanced Programme in Public Administration at the Indian Institute of Public Administration, also at New Delhi, in 1997. Mr Cowshish has been a Distinguished Fellow at the Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA) and Vivekananda International Foundation. He holds MA and M Phil degrees in Political Science from Jawaharlal Nehru University, New Delhi, and an LL B degree from Delhi University. He has been working as a Partner with Dua Associates, Advocates and Solicitors, since January 2013.

COLLABORATION WITH FOREIGN PARTNERS FOR SELF-RELIANCE

Amit Cowshish

The geopolitics of the emerging multipolar world has exacerbated India's strategic vulnerability. Russia's protracted involvement with Ukraine and the spectre of sanctions by the US and some of its NATO allies for continued dealings with Russia threaten India's traditional and emerging sources of supply of military hardware and technology. The strategic autonomy India aspires for requires self-reliance in developing critical technologies that constitute the core of military capabilities its armed forces need. India has done well in some areas, like the missile technology, while some others like jet engine technology continue to cause concern. This is where the Make in India initiative was expected to fit in, but it is focussed more on local production of equipment and less on developing critical and futuristic technologies. This policy needs to be revisited to see if structural, procedural, budgetary, and attitudinal reforms are required to mitigate the risks of critical dependence on foreign sources of supply. This is not to suggest preclusion of foreign collaboration, but the efficacy of the current practice of seeking transfer of technology while buying military equipment as the primary means of achieving self-reliance, and the advantage of running disjointed schemes for technology development, need to be reassessed.

LT GEN OUE SADAMASA (RETD)

Senior Fellow,
Sasakawa Peace Foundation,
Japan



Lt Gen Oue entered the Japan Air Self-Defence Force (JASDF) as a graduate of the National Defence Academy in 1982. Throughout his military career, he had been involved with policy development and program promotion, as well as budget request regarding BMD, F-35 introduction, Joint Staff reorganisation and more. Upon promotion to Lieutenant General he assumed the position of Commandant of the Air Staff College, followed by Commander of the Northern Air Defence Command. He retired in August 2017 as a Commander of Air Materiel Command, responsible for logistic operations of all Air Self Defence Force activities. Lt Gen Oue earned his Master of Public Administration from J. F. Kennedy School of Government, Harvard University in 1997, and Master of National Security Strategy from the National War College, National Defence University of the US in 2002. Between July 2019 and June 2021, he served at the Harvard Asia Center as a Senior Fellow. Lt Gen Oue has been a senior fellow at the Sasakawa Peace Foundation since September 2024. He also serves as a special policy adviser to the Minister of Defence since December 2023.

**LOGISTICS IN THE TIMES OF PROTRACTED
CONVENTIONAL WARS UNDER THE SHADOW
OF SANCTIONS AND EXPORT CONTROL
REGIMES: JAPAN'S PERSPECTIVE**

Oue Sadamasa

Facing with worsening security environment, Japan adopted three new Security Documents in December 2022, which transformed its defence posture from exclusively defence oriented to offensive posture, possessing counter-strike capability. The documents also emphasise strengthening of Japanese defence industry as inseparable defence capability, while exploring a way to revise arms export policy. Galvanized by logistic demand in Russo-Ukraine War, the Japanese Ministry of Defence decided to invest 18 trillion JPY for enhancing sustainment and resilience for the next five-year Plan, supported by doubled defence budget. In parallel with these domestic defence initiatives, Japan moved forward to reinforce Japan-US alliance by declaring the unity of response to Russia's aggression through financial sanctions, export controls, and other steps. It also established a new framework, DICAS, to expedite bilateral logistic cooperation. While Japan and the US officially agree to mutually complement supply chain to meet surging demand in wartime, how private sectors who might have conflict of interests each other would respond to this objective remains to be seen. With these recent developments, I will argue how to realize resilient logistic supply chain to support possible war in the future, and propose to revise Japan's arms export policy to adapt to the reality, expand logistic cooperation among QUAD, and encourage Japanese defence industry to collaborate with foreign partners.

MR S P SHUKLA

Chairman Mahindra Aerospace &
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Mr Shriprakash Shukla is a nationally recognised industry leader who combines the best of academic excellence (IIT BHU & IIM Ahmedabad) along with a stellar career in establishing emerging high tech sectors of our economy. He has chaired the Boards of several companies of the Mahindra Group engaged in Defence, Aerospace and Agri sectors. He is also Chairman of CIE Automotive India Ltd. Mr Shukla has been at the forefront in contributing to Atmanirbhar Bharat in defence through development of multiple indigenous defence technologies. Under his leadership, Armoured Specialist Vehicles were developed for the first time in India. These vehicles are now being delivered to Indian Army. He also led Mahindra Defence to achieve the distinction of becoming the first company in private sector to export weather radars and build Airport Surveillance Radars for Navy. Under his guidance, the company also developed the indigenous torpedo launchers and anti-torpedo defence systems. Mr Shukla also oversaw the development of a 10-seater turboprop aircraft. He is the Immediate Past President of Society of Indian Defence Manufacturers. He has also served as Chairman of FICCI National Committee on Defence and Aerospace. Mr Shukla was also a member of high-level DRDO Review Committee.

INDIGENOUS INDUSTRIAL ECO-SYSTEMS: THE 5TH PILLAR OF DEFENCE

Shriprakash Shukla

The objective of the paper is to highlight the inevitable strategic necessity of creating a vibrant domestic industry that will harness all R&D, Innovation and manufacturing resources available in India. I propose to call it the 5th Pillar of Indian Defence. The four others are Land, Sea, Air and Strategic Forces. A nation's defence industry eco-system is a good measure of its real military capability and a vibrant Industrial Eco-System is a critical part of National Security Policy. Self-reliance in Defence is a core attribute that a nation must aim to achieve. In all major countries, including permanent members of the United Nations Security Council, a high level of self-reliance in indigenous defence capability gets clearly highlighted. Evidently, major powers cannot depend upon imports to sustain their defence effort and it requires decades of investment in R&D and Industry. In every conflict in past few decades, it is clearly illustrated that future of battle space will be shaped by technology. Be it the precision strike capability, smart munitions, UAVs, swarm drones, AI enabled decision support systems or space capabilities – Technology is the major enabler and differentiator.

Ms VRINDA KAPOOR

CEO, 3rdiTech,
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Ms Vrinda Kapoor is the co-founder and CEO of 3rdiTech. As one of the first Indian Semiconductor fabless companies, 3rdiTech is a part of India's Semiconductor Mission with products being purchased by Indian Air Force, Indian Army, Indian Navy and other security forces in India. 3rdiTech is also the only Indian Company to be selling products directly to the US Army, the first ever in Asia Pacific. In addition, the company has a strong strategic partnership with US Defence Prime, General Atomics and has executed the US Space Force's first international CRADA. In 2019, Ms Kapoor was presented with an Award of Excellence from the Indian Army for improving the operational and technological capabilities of the Indian Army by the late General Bipin Rawat. In June 2023, she was the only Indian woman and Deep Tech Startup founder to accompany Prime Minister Modi to the CEO Round table held at the White House

CRITICAL TECHNOLOGY AS THE NEW DIPLOMATIC CURRENCY

Vrinda Kapoor

Critical technologies are the new diplomatic currency of our era. And also an area where India has not previously placed much emphasis on. As a nation we are a net importer of most of the critical hardware required for our military and national security requirements - leaving us vulnerable to war, sanctions, and other events of geopolitical turmoil. What will it take for us to develop these critical technologies as a nation? We will need to transition from a merely a manufacturing mind set which can absorb technology transfers to a knowledge mind set where we can absorb technology and upgrade it independently. How can we create the right incentives and disruption in our ecosystem to make that shift? What kind of policies will it take and can existing policy frameworks support that transition?

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Col Rajneesh Singh, PhD (Retd) was commissioned in the Infantry in December 1989 and has varied operational, staff and instructional experience. He has commanded a Rashtriya Rifles company and battalion in Jammu and Kashmir. He has been a military observer in Congo for a year. His staff experience includes tenure in the Military Operations Directorate and in Military Secretary's Branch. The officer has also been an instructor at the NDA, Khadakwasla and at DSSC, Wellington. During his service Col Rajneesh Singh (Retd) pursued PhD at the JNU, New Delhi and was awarded doctorate in 2019. Post superannuation from the army, the officer was a Consultant for the Ministry of Defence for over a year before joining Manohar Parrikar Institute for Defence Studies and Analyses in January 2023 (MP-IDSA). He is presently a Research Fellow at the Defence Economics and Industry Centre. Col Singh's areas of research include higher defence management and military studies. His current area of research focusses on self-reliance in defence production.

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