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PRINCIPAL CONTENTS

Vol CLV OCTOBER-DECEMBER 2025 No 642

USI Latest Publications: 2024-2025

Pub Code	Type	Title of Publication and Author	Price '₹'	Year
Adm-1/ 2025	Book	MODERN CONFLICTS AND CHANGING CHARACTER OF WARFARE: IMPLICATIONS FOR INDIA edited by Maj Gen Sanjeev Chowdhry (Retd), Col Deepak Kumar, Ms Komal Chaudhary, Mr Vinayak Sharma and Ms Richa Sharma **M/s Pentagon Press**	2025	995
R-121/2025	Book	CIVIL-MILITARY FUSION AS A METRIC OF NATIONAL POWER AND COMPREHENSIVE SECURITY by Lt Gen Raj Shukla, PVSM, YSM, SM (Retd) **M/s Pentagon Press**	2025	695
Adm-UNPK/ 2025	Book	75 YEARS OF INDIA'S CONTRIBUTION TO UN PEACEKEEPING by Maj Gen PK Goswami, VSM (Retd) **M/s Pentagon Press**	2025	895
(National Security Paper (M-9/ 2025) *	Monograph	WHOLE-OF-GOVERNMENT APPROACH TO NATIONAL SECURITY by Lt Gen AK Singh, PVSM, AVSM, SM, VSM (Retd) and Maj Gen Jagatbir Singh, VSM (Retd) **USI of India**	2025	395
M-8/ 2025	Monograph	THE EASTERN SECTOR OF INDIA-CHINA BORDER: CHINESE ARGUMENTS, PROBABALITIES AND POSSIBILITES OF RESOLUTION by Dr Geeta Kochhar and Mr Ritesh Kumar **USI of India**	2025	395
OP-7/ 2025*	Occasional Paper	OPERATION SINDOOR: A BENCHMARK IN INDIA'S MODERN MILITARY DOCTRINE by Brig PP Singh, AVSM, VSM (Retd) **USI of India**	2025	250
OP-6/ 2025*	Occasional Paper	BATTLEFIELD SYMPOSIUM HAJI PIR VALOUR: BEYOND THE PASS COMMEMORATING DIAMOND JUBILEE OF VICTORY AT HAJI PIR by Maj Gen PK Goswami, VSM (Retd), Brig (Dr) Rajat Mohan Bhatt and Col Vikas Kumar, SM **USI of India**	2025	250
OP-5/ 2025*	Occasional Paper	OPERATION SINDOOR AND REBALANCING THE DEFENCE BUDGET by Lt Gen KK Aggarwal, AVSM, SM, VSM (Retd) **USI of India**	2025	250
OP-4/ 2025*	Occasional Paper	UNVEILING CHINA'S GLOBAL HUMAN INTELLIGENCE STRATEGY THROUGH THE EVOLVING GLOBAL CIVILIZATION INITIATIVE by Col (Dr) DCS Mayal (Retd) **USI of India**	2025	250
OP-3/ 2025*	Occasional Paper	ARTIFICIAL INTELLIGENCE AND GOVERNANCE: SHRI ABHAY TRIPATHI MEMORIAL LECTURE by Shri S Krishnan, IAS, Secretary Ministry of Electronics and Information Technology **USI of India**	2025	250
CMHCS-14		HONOURS AND AWARDS OF THE INDIAN ARMED FORCES by Dr Amlesh Kumar Mishra **M/s Pentagon Press**	1995	2025
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CMHCS-12	Book	FORGOTTEN: HISTORY OF HONG KONG SINGAPORE ROYAL ARTILLERY by Col Mandeep Singh (Retd) **M/s Pentagon Press**	995	2025
OP-2/ 2025*		WEAPONISING PERCEPTION : COGNITIVE WARFARE AN INTEGRAL PART OF MULTI-DOMAIN OPERATIONS by Maj Gen Jagatbir Singh, VSM (Retd) **USI of India**	Nil	2025
OP-1/2025*	Occasional Paper	MANIPUR QUAGMIRE by Col Sachin Mahadik **USI of India**	Nil	2025
CMHCS-11	Book	BECAUSE OF THIS: A HISTORY OF THE INDO-PAK AIR WAR OF DECEMBER-1971 by Air Mshl Vikram Singh (Retd) **M/s Pentagon Press**	7,995	2025
M-7/2025*		INTERNATIONAL DAY OF UN PEACEKEEPERS 29TH MAY : 75 YEARS OF INDIAN CONTRIBUTION TO UN PEACEKEEPING By Maj Gen PK Goswami, VSM (Retd)	395	2025
M-6/2025*		PAKISTAN ARMY'S STRATEGIC CULTURE : IMPLICATIONS AND THREAT ASSESSMENT By Sanjay Kannoth,VSM	395	2025
M-5/ 2025*		INFORMATION AND CYBER IN NON-KINETIC WARFARE : COUNTER STRATEGIES by Lt Gen DP Pandey,PVSM,UYSM,AVSM,VSM (Retd) **USI of India**	Nil	2025
M-4/2025 (UN Forum 2024)	Monograph	USI ANNUAL UN FORUM 2024—CHANGING CHARACTER OF CONFLICTS—CHALLENGES TO PEACE OPERATIONS AND INTERNATIONAL HUMANITARIAN LAW; edited by Maj Gen PK Goswami, VSM (Retd), Maj Gen (Dr) AK Bardalai, VSM (Retd) and Col KK Sharma (Retd) **M/s Manohar Publishers & Distributors**	350	2025
M-3/2025	Monograph	DRONES AND VIOLENT NON-STATE ACTORS: THE MANKIND'S QUEST FOR VIOLENCE by Maj Gen Anil Kumar Mehra, AVSM, VSM (Retd) **M/s Manohar Publishers & Distributors**	350	2025
M-2/2025	Monograph	CHINA'S STRATEGIC CULTURE AND ITS IMPACT ON THE PEOPLE'S LIBERATION ARMY by Brig Sanjay Kannoth, VSM **M/s Manohar Publishers & Distributors**	250	2025
M-1/ 2025	Monograph	COMPREHENSIVE STRATEGIC DETERRENCE TO MEET INDIA'S FUTURE CHALLENGES by Brig (Dr) Rajeev Bhutani (Retd) **M/s Manohar Publishers & Distributors**	250	2025

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United Service Institution of India

For

the furtherance of interest and knowledge in the art, science, and literature of national security in general and of the defence services in particular

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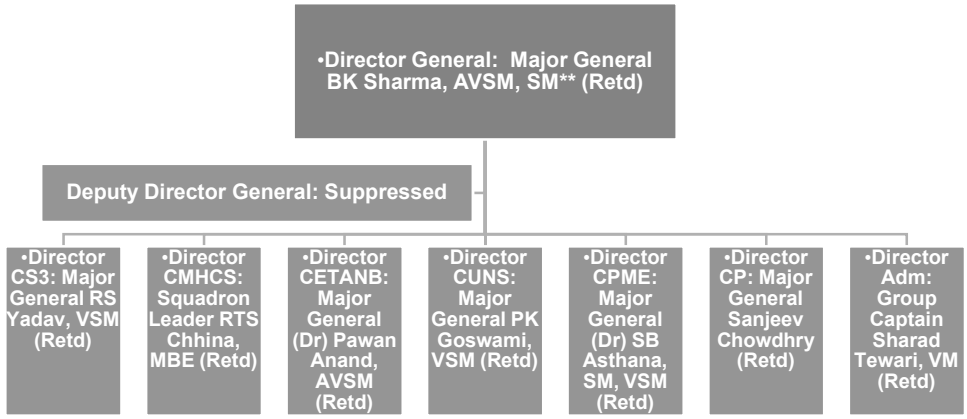
USI Verticals



Auditorium/Seminar Room Rates w.e.f. 01 Apr 2022

	Capacity	Full Day up to 8 hours	Half Day up to 4 hours	Additional per hour	Additional for Sat/Sun/ Holidays	Security Deposit
Audi	300	₹40,000/-	₹25,000/-	₹4,000/-	₹4,000/-	₹5,000/-
SR-1	70	₹25,000/-	₹15,000/-	₹3,000/-	₹3,000/-	₹3,000/-
SR-2	20	₹15,000/-	₹ 8,000/-	₹2,500/-	₹2,500/-	₹1,500/-
SR-3	16	₹10,000/-	₹ 4,000/-	₹1,500/-	₹1,500/-	₹1,500/-
Banquet Hall Pavilion	₹15,000/- per day					

Notes:

1. 18% GST extra.
2. Armed Forces will be given a 10% discount.

Rate of Subscription for USI Journal

The USI Journal has been digitised and is accessible at www.usiofindia.org. The dispatch of hard copies to members has been discontinued; however, Formation Headquarters, Units, Messes, Libraries, and individuals can subscribe to the USI Journal at the rates indicated below:

- Single copy - ₹300/- plus ₹80/- postal/packing charges
- Yearly subscription - ₹1,100/- plus ₹320/- postal packing charges (four issues)
- Overseas annual subscription (By Air Mail) – GBP 50 or USD 80
- There is no life time subscription, however, 20 years subscription can be subscribed for ₹ 20,000/- including postal charges.

Courses Run by the USI of India: Centre for Professional Military Education (CPME)

1. The USI conducts USI DSSC Aspire- One and Two Course and correspondence courses for Defence Services Staff College (DSSC)- Army, Navy, and Air Force (IAF) and Defence Services Technical Staff Course (DSTSC) – Army Entrance Examinations and Promotion Examinations Parts B and D.

2. The Courses have been remodelled to make it more interactive, and the admission procedure has been simplified to make it user-friendly.

3. Membership of the USI is mandatory to join any correspondence course and Aspire One and Two.

4. Schedule of Correspondence Courses 2026.

5. Course Schedules:

Course	Commencement of Course	Date of Exam	Cost All Subjects	Cost per Subject
DSSC (Army)	Second Week of Nov 2025 **Registration open for 2026**	Sep 2026	₹9,000/-	Tactics B - ₹3,000/ Current Affairs and Military History – ₹2,000/- (each) Science and Military Technology – ₹1,500/- Tactics A – ₹1,300/- Administration and Military Law – ₹1,200/-
DSSC (Navy)	Second Week of Jan 2026 **Registration open for 2026**	Jul 2026	-	Paper 1 – ₹3,000/- (Current Affairs, Military/Naval History and Maritime Strategy)
DSSC (IAF)	Second Week of Dec 2025 **Registration open for 2026**	Jul 2026	-	Correspondence Course • Military History – ₹3,000/- • Current Affairs – ₹3,000/- Online Course • Current Affairs – ₹4,000/- • Refer to Prospectus available on the USI website for other details
Part B	Second Week of Jan 2026 **Registration open for 2026**	Jun to Jul 2026	₹3,000/-	Tactics, Current Affairs and Military History – ₹1,000/- Administration and Military law – ₹800/-
Part D	First Week of Apr 2026 **Registration open for 2026**	Oct 2026	₹4,000/-	Tactics, Current Affairs and Military History – ₹1,500/- Administration and Military law – ₹1,000/-

6. **Contact Programs**. Three contact programs for DSSC/DSTSC (Army)-2025 have been planned. Dates are: CP-I 15-20 Jun 2026, CP-II 29 Jun to 04 Jul 2026, and CP-III 13 to 18 Jul 2026. Separate test papers will be set for each programme. Fees - ₹7,000/- per contact programme and ₹3,500/- only for material of each contact program.

7. **USI Aspire One** from 01-13 Dec 2025 for all subjects with sample paper will be conducted online. **USI Aspire Two** from 04-16 May 2026 for four subjects i.e., Current Affairs (CA), Military History, Science, and Military Technology and Tactics – B with mock test will be conducted online. These aspects are also applicable for IAF officers for CA (leg only).

8. Correspondence courses for Special to Corps subjects are not conducted.

9. **Mode of Payment**. Multicity cheque or bank draft payable at New Delhi in favour of Director General USI of India or Net Banking/UPI QR code. Bank details are available on website.

10. **Contact address** : Rao Tula Ram Marg (Opposite Signals Enclave), Post Bag No. 8, Vasant Vihar PO, New Delhi-110057

11. **Email/Website** : dircourses@usiofindia.org/www.usiofindia.org

12. **Visiting hours** : 10:00 AM to 12:30 PM, 02:00 PM to 04:00 PM Monday to Friday

13. **Telephones** : Dir CPME – 2086-2325, CPME 2086-2318 or 2086-2321 Extn 207, 208, and 210

14. **Prospectus and Form**: Available on Website and from CPME.

Membership Fees

	Entrance	Subscription	Total
Life Membership (20 years)			
Armed Forces	₹4,000/-	₹10,000/-	₹14,000/-
Civilian	₹4,000/-	₹14,000/-	₹18,000/-
Ordinary Membership$			
Armed Forces	₹1,000/-	₹4,000/-	₹5,000/-
Civilian	₹1,000/-	₹5,000/-	₹6,000/-
Associate Membership$	₹3,000/-	₹7,000/-	₹10,000/-
Course Membership*	₹900/-	₹600/-	₹1,500/-
See USI website : www.usiofindia.org for complete details and form			

$(For 3 years commencing 01 Jan)

*(one year for one course only but applicable for all courses in that year)

Articles for USI Journal

Style Sheet

The United Service Institution of India (USI) Journal invites original and unpublished research articles on subjects related to national security, defence, and military history. Articles should not exceed 3,000 words and must be submitted as a Word document via email to direditorial@usiofindia.org. Each submission should include an abstract amounting to no more than 10 per cent of the article length. The article must be organised in group and paragraph headings and include an Introduction and Conclusion. The author must certify that the article has not been published or submitted elsewhere. The Director, Centre for Publications, reserves the right to edit the manuscript.

All references should be provided as endnotes with complete bibliographic details; a separate bibliography is optional. Articles must be typed in Arial, font size 12, and use English (UK)/English (India). Symbols such as %, &, etc., should be avoided unless essential. Dates should follow the format 24 Jun 2020, and all abbreviations must be spelled out at first use. The endnotes must follow the format of Chicago Manual style. Other details are given at https://usiofindia.org/publications.php?category=7.

Submissions must be accompanied by the author's full name, postal address, and a short curriculum vitae of four to five sentences. Serving officers are required to follow relevant publication regulations prior to submission.

On publication, contributors will receive a copy of the journal, three offprints, and a suitable honorarium.

Additions to the USI Library for the Quarter Ending Dec 2025

During this period, a total of **55** new books have been added. Details of the new books are available on the USI Website.

Research Projects

Members interested in undertaking research projects may submit research proposals to the USI (CS3/CMHCS). At present, 11 Chairs of Excellence have been instituted in CS3; namely, the Field Marshal KM Cariappa Chair, Admiral RD Katari Chair, Air Marshal Subroto Mukherjee Chair, Professor DS Kothari Chair, Ministry of External Affairs Chair, Flying Officer Amandeep Singh Gill Chair, General Bipin Rawat Chair, Lieutenant General PS Bhagat Chair, Bhawanipur Education Society College Chair, Assam Rifles Chair, Abhay Tripathi Chair, and Gandhi Mandela Chair. There are three Chairs in CMHCS; namely, the Maharana Pratap Chair, the Chhatrapati Shivaji Chair, and the USI-War Wounded Foundation Chair. Copies of the Rules for Award of Fellowship Grants and Conduct of Research are available on the USI Website.

Rate Card–Advertisements in Journal

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Four Consecutive Full Pages	₹8,000/-	₹44,000/-
Half Page	₹1,500/-	₹12,000/-
Four Consecutive Half Pages	₹5,000/-	₹44,000/-

New USI Members

During the period Oct-Dec 2025, 18 registered as new Life Members; 01 has renewed Ordinary Membership, and 160 registered as new Ordinary Members.

Course Members

During Oct-Dec 2025, 80 Officers registered for Course Membership.

USI Residency: Special Packages for Officers on Temporary Duty

Generals and equivalent: Apartment Stay

Room rent	₹9,375/- spouse stay is inclusive
Food bill	₹1,500/- spouse meals are inclusive

Brigadiers, Colonels, Lieutenant Colonels, and Equivalent: Deluxe Room

Room rent	₹5,625/- spouse stay is inclusive
Food bill	₹1,250/- spouse meals are inclusive

Majors and Captains: Standard Single Room

Room rent	₹2,813/- on single occupancy basis
Food bills	₹1,125/-

Inclusions are:

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- Lunch from specially curated menu.
- Dinner from specially curated menu.
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- Mineral water 01 bottle per day.
- Tea/Coffee Makers in room with replenishments.
- Wi-fi connectivity in rooms.
- Access to in-house gym.
- Temporary membership fee.
- No charges for local calls.
- All Applicable Taxes.

Contact details

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For Reservations, Please Call: +91-9999-889-180/81/89/94/95

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October to December 2025

From the Desk of Director General

As this year closes, I bring to an end my formal association with the United Service Institution of India (USI), after nearly fourteen years of service—seven as Director (Research) and six as Director General. It has been a long and instructive journey, one that allowed me to work closely with colleagues across generations, disciplines, and the Services. I leave with a sense of gratitude for the cooperation I received and for the opportunity to serve an Institution whose relevance has always rested on continuity, professionalism, and restraint.

As I demit office, it is my privilege to welcome Vice Admiral Sanjay J Singh, SYSM, PVSM, AVSM, NM, PhD (Retd) as the incoming Director General of the USI. I request all members and stakeholders to extend to him the same trust and cooperation that have sustained this Institution over the decades. Leadership at the USI is less about personal imprint and more about stewardship, and I am confident that this tradition will continue under his dynamic leadership.

The year 2025 was one of consolidation rather than expansion. Financial sustainability remained a central concern. After sustained engagement spanning nearly a decade, the USI was included in the process for fund allocation from the Ministry of Defence. In parallel, voluntary contributions from members, enhanced membership engagement, rentals, sponsored studies, and commissioned projects collectively contributed to partial financial stabilisation, achieved without compromising the Institution's independence or academic integrity. The USI maintains momentum across its core responsibilities—research, professional military education, military heritage, strategic studies, United Nations (UN) studies, emerging technologies, publications and digital outreach. Throughout the year, the Institution continued to provide a professional space for dialogue among military leaders, policymakers, diplomats, scholars, and practitioners, anchored in objective analysis and skill enhancement.

Internally, the year was used to strengthen systems that often remain unnoticed but are essential for institutional health. Considerable attention was also devoted to preserving institutional memory. Foundational registration records were retrieved and consolidated from Chandigarh and London, restoring archival

continuity and strengthening the historical documentation of the Institution's origins and legal standing. The seminar halls and auditorium were upgraded with improved audio-visual and information technology facilities. Additional research spaces, porta-cabins, and storage facilities were created, and long-pending campus repairs were addressed. Cybersecurity measures were strengthened, and a digital finance management platform was introduced to improve transparency and administrative discipline. The membership process too has been digitised. A new, more dynamic and mobile-friendly website has been created, and all social media handles have been made fully functional.

Attention was also given to governance. Council elections for the 2026-28 tenure were conducted through a hybrid voting system – resulting in greater member participation. The selection of the new Director General was carried out strictly in accordance with the Institution's bye-laws, ensuring a thorough selection. The Prevention of Sexual Harassment policy was implemented, and an Internal Complaints Committee was constituted, reinforcing standards of conduct fundamental to any professional organisation. Another significant endeavour has been to secure corporate social responsibility projects to promote cybersecurity awareness and investment literacy within the armed forces and student community.

The USI's programme calendar during the year reflected continuity in purpose. The Memorial lectures, the MacGregor Memorial Medal ceremony, essay competitions, joint publications with military training institutions, the Combined Operational Review and Evaluation (CORE) Programme, and the Annual UN Forum were conducted as scheduled. Seminars and workshops addressed contemporary security issues, while scenario-based exercises and strategic simulations were organised for the Services, government departments, and foreign service officers. The Institution has acquired niche projects on digitisation of military history records, *Atmanirbhar* (Self-reliant) projects, global consultancy scan and strategic studies. USI's global footprints expanded in terms of exchange of delegations and signing of Memoranda of Understanding.

Commemorative activities included the Diamond Jubilee of the 1965 Indo-Pak War, the Third Indian Military Heritage Festival and military art exhibitions. These engagements sought to connect

military history with current strategic thinking and wider public understanding. The USI also remained engaged internationally through participation in conferences and Track 1.5 dialogues, offering Indian perspectives in diverse settings.

During the year, the USI was visited by senior political, military, and diplomatic leadership, including the Hon'ble *Raksha Mantri,* Hon'ble *Raksha Rajya Mantri,* State Governors, a Chief Minister, the Chief of Defence Staff, Service Chiefs, senior civil servants, and diplomats. Their engagement reflected institutional continuity rather than occasion-driven interaction.

The USI's Centres continued to function as the backbone of the Institution. Publications, military history, strategic studies and simulation, professional military education, and emerging technologies were pursued in parallel, each contributing within its mandate. While the scale of activity varied, the emphasis remained on relevance, quality, and institutional credibility.

The wider strategic environment in 2025 remained unsettled, shaped by ongoing conflicts, technological competition, and economic pressures. At the same time, India continued to advance its efforts towards self-reliance and capability development. In such an environment, institutions like USI matter not for immediacy, but for continuity—providing space for reflection, informed debate, and professional education over time. To this end, informed debates via the series titled the Global Heatmap and Strategic Dialogues were carried out on the USI's YouTube channel.

On a personal note, I thank the members of the USI for their association and support, including contributions to the Institution's financial corpus, which remain essential for its functioning. I also encourage readers to engage with the USI's publications, website, and digital initiatives, which seek to make serious strategic discussion accessible to a wider audience.

As I step away from this office, I do so with confidence in the Institution's foundations and in those who will carry its work forward. I am grateful for the trust placed in me over the years and for the opportunity to serve.

With warm regards,

Major General BK Sharma, AVSM, SM (Retd)**
Director General

From the Desk of the Director, Center for Publications

It is a privilege to present the final edition of the Journal of the United Service Institution of India (USI) for the year 2025. This issue brings together a coherent and well-balanced set of articles that examine the evolving character of conflict, operational practice, strategic thought, and emerging challenges in national and international security.

In the lead article, titled 'Macro View of Operations in Jammu and Kashmir and the Sialkot Sector' by Lieutenant General Satish Nambiar, PVSM,VSM,AVSM,VrC, Padma Bhushan (Retd), offers a macro-level operational analysis of the 1965 Indo-Pakistan War in Jammu and Kashmir and the Sialkot sector, highlighting leadership decisions, operational constraints, and institutional learning. Complementing this historical perspective, Lieutenant General DP Pandey, PVSM, UYSM, AVSM, VSM (Retd) gave his view on 'Operation Sindoor: Air Power as Enforcer of National Will', in which he examines air power as an instrument for enforcing national will, demonstrating how calibrated air campaigns, clear political intent, and joint integration shape outcomes in contemporary limited conflicts.

In the third article titled, 'Enhancing Efficacy of Peacekeeping Operations in an Uncertain Future', Major General Alok Deb, SM, VSM (Retd), critically assesses the future relevance of United Nations peacekeeping in an era marked by hybrid warfare, contested mandates, and diminishing consent, advocating a shift towards smaller and more focused missions. In a related operational context, Major General Jagatbir Singh, VSM (Retd), in his article titled 'Air Littoral: The New Sub-domain that Demands a Fresh Look at Verticality' argues for recognising the air littoral as a distinct sub-domain of warfare, emphasising doctrinal clarity and decentralised control to counter persistent low-altitude threats.

Mrs Kanika Sharma, PhD and Wing Commander UC Jha, PhD (Retd) in their article 'Super Soldiers' examines the concept of human enhancement and its implications for international humanitarian law and military ethics. In the sixth 'article titled 'Short

Recoil System for Artillery Systems and its Application in the Indian Army', Brigadier Mandeep Singh (Retd) analyses soft recoil systems for artillery, highlighting how technological innovation can enhance mobility, survivability, and operational tempo in high-threat environments.

Brigadier Nishit Ranjan in his contribution titled 'India's Northeast Region and its Significance as India's Gateway to Southeast Asia', explores India's Northeast Region as a strategic gateway to Southeast Asia, linking connectivity and security to the success of the Act East Policy. In the subsequent article, 'India-Malaysia Defence Diplomacy: An Analysis', Mr PJ Khache, PhD analyses India-Malaysia defence diplomacy, underscoring converging interests in maritime security and strategic balance in the Pacific.

In the ninth contribution—'Metal Minds and Machine Soldiers: Warfare Reimagined Beyond the Human Edge'— Colonel Vikas Yadav (Retd) evaluates the transformative impact of artificial intelligence and autonomous systems on future warfare, raising concerns related to accountability, escalation, and ethical governance. This is followed by an article titled 'KĀmandakanĪtisĀra: Decoding Ancient Indian Army Formations' by Ms Manashi Ghosh, which revisits ancient Indian military thought through the *KĀmandakanĪtisĀra* (The Essence of Statecraft by Kâmandaka), offering enduring insights into organisation, strategy, and statecraft.

Professor Raman D Surie in the eleventh submission titled 'Heritage Conservation and the Indian Armed Forces' addresses the need for systematic heritage conservation within the armed forces, advocating a professional and institutionalised approach to preserving both tangible and intangible military heritage. The remaining contributions include an illustrated discussion on principles of war by Brigadier SK Sinha (Retd) from the USI archives titled 'PRINCIPLES OF WAR: Illustrated from Indian Campaigns' and an examination of future joint operations in the aerospace domain by Wing Commander Vikas Kalyani, runner-up of the USI–Chief of Air Staff Essay Competition. Together, these articles reinforce the growing emphasis on jointness, multi-domain operations, and preparedness for future conflict.

Taken together, the articles in this issue provide a balanced and forward-looking examination of war, peace, and security.

The edition concludes with three review articles and one short book review. The review, by Major General Jagatbir Singh, VSM (Retd), assesses the book *75 Years of India's Contribution to United Nations Peacekeeping* by Major General PK Goswami, VSM (Retd), highlighting how India's professionalism and values have shaped peacekeeping practice and reinforced its standing as a trusted United Nations contributor. The second review examines *Underworld Tyranny: The Traffickers' Reign Unveiled,* edited by Major Namrata Dhasmana (Retd), and reviewed by Commander Saurav Mohanty, which analyses the nexus between trafficking, organised crime, and weak governance, underscoring the need for ethical leadership, institutional coordination, and international cooperation.

The next review examines the book Braving the Odds: My Journey in Olive Green, by Brigadier Jitendra Kumar Tomar, VrC reviewed by Mr Gaurav Kumar, It offers a precise, unsentimental account of leadership and teamwork during the 1971 Battle of Balnoi, while also tracing his broader career and lifelong commitment to the Indian Army, making it a valuable leadership and military history work.

In the final contribution by Mr Neelotpal Mishra, dis who reviews the book, *Russia–Ukraine War: Strategic Conundrum* by Bharti Das and Uday Pratap Singh offers an India-anchored yet globally informed analysis of the conflict and its strategic implications.

The Editorial Board hopes that this edition will stimulate informed debate, enrich professional military education, and contribute meaningfully to India's strategic discourse.

We welcome your feedback and suggestions.

Happy Reading!

Major General Sanjeev Chowdhry (Retd)
Director, Centre for Publications

Macro View of Operations in Jammu and Kashmir and the Sialkot Sector

Lieutenant General Satish Nambiar, PVSM, AVSM, VrC, Padma Bhushan (Retd)[@]

Abstract

This article provides a macro-level analysis of military operations conducted in Jammu and Kashmir and in the Sialkot sector during the 1965 Indo-Pakistan War. It chronicles the aftermath of Pakistan's infiltration attempt under Operation Gibraltar, India's counter-offensives in the Kishanganga–Tithwal and Hajipir sectors, and Pakistan's subsequent launch of Operation Grand Slam in the Chhamb region. The narrative highlights the challenges faced by Indian formations, the leadership decisions taken under pressure, and the attrition endured during intense armoured and infantry engagements. It further examines India's counter-thrusts in the Lahore and Sialkot sectors, culminating in the major tank battles at Phillaura and Chawinda. Drawing on first-hand staff perspectives, the article evaluates operational planning, leadership performance, and the overall strategic outcomes. While the war did not yield an outright victory, it restored the Indian Army's confidence and laid the foundation for future operational successes.

[@]**Lieutenant General Satish Nambiar, PVSM, AVSM, VrC, Padma Bhushan (Retd)** served with distinction from his commissioning in 1957 through the 1965 and 1971 wars, later holding senior appointments including Director General of Military Operations and Deputy Chief of the Army Staff. A pioneer of India's mechanised forces, he raised and commanded the first mechanised brigade and later a division. Internationally, he was the first Force Commander and Head of Mission of United Nations (UN) Protection Force in the former Yugoslavia. As Director General (then known as Director) of the United Service Institution of India (USI) (1996–2008), he advised Sri Lanka on its peace process and contributed to high-level UN and global security initiatives. He was awarded the Padma Bhushan in 2009.

The article is based on the personal experience of the author. It is the transcript of the lecture taken by the author on 12 Sep 2025 during the event 'Echoes of Bravery: Courage Beyond Compare', held at the USI.

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Introduction

The 1965 Indo-Pakistan War was marked by a sequence of audacious offensives, hard-fought defensive battles, and leadership decisions taken under extreme tactical pressure. This article, a transcript of the lecture delivered by Lieutenant General Satish Nambiar (Retd) at the United Service Institution of India, provides an insightful, experience-based overview of key operations in Jammu and Kashmir (J&K) and the Sialkot sector. It examines the build-up to the conflict, the unfolding of Pakistan's Operations Gibraltar and Grand Slam, India's counter-measures, and the conduct of major battles that shaped the campaign's outcome.

Collapse of Pakistani Infiltration and Indian Counter-Moves

By 21 Aug 1965, the Pakistani infiltration had been crushed and the last remnants of the *Khaled Force*, the most stubborn force, had retreated suffering heavy casualties. After conducting mopping-up operations for a few days, the Western Army Commander at the time, General Harbaksh Singh—known for being a no-nonsense and aggressive leader with very high expectations of his subordinate commanders, perhaps at times excessively so—decided to complete some unfinished business from 1948. Encouraged by the success of his counter-infiltration campaign, he pushed for two major offensives to seal J&K from further infiltration.

Operations in the Kishanganga–Tithwal Sector

The General first turned his attention to the Kishanganga–Tithwal sector area where, as a brigade commander in 1948, he had notched up significant successes that could not be consolidated, at that time, in terms of territorial gains. 2 RAJPUT, 3/8 GORKHAS, and 1 SIKH captured four significant heights in the sector, which overlooked the Muzzafarabad–Kel Road that linked the Western areas in Pakistan-occupied Kashmir with the northern areas. After a series of tough battles extending for almost a month, this operation formally got over on 20 Sep 1965 with the capture of two heights overlooking the vital Mirpur bridge over the River Kishenganga.

Capture of Hajipir Pass and the Strategic Bulge Operations

The second offensive was concentrated in the strategic bulge between Uri and Poonch, with the intention of capturing the Hajipir Pass and several surrounding heights. The task was assigned to 68 Infantry Brigade under Brigadier ZC Bakshi, along with 1 Para. Between 29 and 31 Aug 1965, Hajipir Pass and seven additional posts in the strategic bulge were captured after fierce fighting. The exploits of Major Ranjit Singh Dayal, a company commander with 1 PARA during the assault on Hajipir Pass, are the stuff of legend; he was awarded the Maha Vir Chakra (MVC) for the same.

Pakistan's Operation Grand Slam: Conception and Opening Blows

If Operation Gibraltar had gone as per plan, the nail in India's coffin would have been Operation Grand Slam, planned to be a swift and surgical armour, it led thrust into the Chhamb bulge for the capture of the vital town of Akhnur. Major General Akhtar Hussein Malik, General Officer Commanding of Pakistan's 12 Infantry Division, the architect of both Operations Gibraltar and Grand Slam, had cleverly woven in an artillery plan to provide overwhelming support to the southern thrust lines of the offensive. The prelude to this plan was to cause heavy attrition to the lone artillery regiment that supported India's Akhnur-based 191 (Independent) Infantry Brigade, which was supported by only a single squadron of light AMX-13 tanks. In the event, as the unsuspecting batteries of the Indian Army's 14 Field Regiment celebrated Independence Day on 15 Aug, they were struck at multiple locations by well-directed and concentrated fire from Akhtar Malik's artillery brigade because of which the regiment was crippled with the loss of about half of its guns and considerable ammunition stockpiles. Worse still, the Brigade Commander, Brigadier Masters was killed during one of the bombardments. Though General Harbaksh speedily replaced the loss with a battery of medium guns, and moved Brigadier Manmohan Singh post-haste from the Miransahib-based 162 Infantry Brigade to assume command of 191 (Independent) Infantry Brigade, damage had been done. The Akhnur sector was in considerable disarray. Pakistan had scored a significant preliminary success, thanks to the superior use of its artillery, before the battle had even begun.

Launch of Operation Grand Slam and India's Defensive Battles

While the Indian Army was hunting out infiltrators and initiating action to effect the Poonch-Uri link up—notwithstanding the failure of Gibraltar, and given the fact that the Pakistan Army had suffered significant losses in the Tithwal, Uri, and Kargil sectors—Mohammed Ayub Khan, the then-Pakistan' President, no doubt prodded by his Foreign Minister Zulfikar Ali Bhutto and some sections of the Pakistani military leadership, decided to launch Operation Grand Slam anyway. On 01 Sep 1965, well before the crack of dawn, the hamlets around the Indian border town of Chhamb awoke to the rumbling of Patton tanks and a thundering artillery barrage from 105 and 155 mm guns. Pakistan had launched Operation Grand Slam with almost three brigades supported by two regiments of armour and an entire artillery brigade comprising all elements, including large number of field and medium artillery guns, gun locating regiments, and an air defence regiment. From accounts available, it appears that by about 1100 hours, faced with the ominous prospect of being overrun by the enemy, Brigadier Manmohan Singh, the Indian Brigade Commander, asked for air support to check the enemy's advance. Why it took almost five hours after sunrise to do so is inexplicable; and even more so is the fact that it took another six hours for the first Indian Air Force aircraft to arrive on the scene. Despite being taken by surprise, bearing the brunt of the Pakistani artillery bombardment and armoured attacks, units of 191 (Independent) Infantry Brigade, like 3 MAHAR and 15 KUMAON acquitted themselves admirably under adverse conditions. For his grit and bravery in a defensive battle under trying conditions, Lieutenant Colonel GS Sangha of 3 MAHAR was awarded the MVC. As all three battalions of the Brigade and the lone squadron of AMX tanks withdrew, first to Jaurian by early morning on 02 Sep, and then to Akhnur by the same evening, they caused significant attrition to the advancing Pakistani Army. Inexplicably, as it seemed at the time, though Pakistani forces had crossed the Munnawar Wali Tawi during the night of 01/02 Sep, they delayed resuming advance till 03 Sep.

Indian Reorganisation and Defence of Akhnur

This provided the breather for the Indian forces to reorganise. 10 Infantry Division was made responsible for the sector with two additional infantry brigades (28 and 41). While 191 Infantry Brigade

was tasked to organise defences at Akhnur, 41 Infantry Brigade was tasked to take up defences around Jaurian. This it successfully did till it withdrew on the night of 04/05 Sep, apparently due to overwhelming Pakistani pressure. But it had achieved its purpose by allowing 28 Infantry Brigade to be inducted into a delaying position at the Fatwal Ridge, thus, further ensuring adequate time for the preparation of defences at Akhnur. The squadron of 20 Lancers, under the intrepid leadership of Major Bhaskar Roy, did a great job and was acknowledged by the award of the MVC.

Pakistani Loss of Momentum and Shift of Strategic Balance

While the Pakistani offensive caught the Indian Army by surprise, it seemed there was also some disarray within the Pakistani senior leadership over the depth to which the offensive was sustainable. The delay in exploiting the surprise gained on the launch of operations, and crossing of the Munnawar Wali Tawi, was possibly occasioned by the change in command on the Pakistani side with Akhtar Hussein Malik being replaced by Yahya Khan on 02 Sep. By the time the Pakistanis resumed the offensive and reached the forward defences around Akhnur on 06 Sep, they had run out of steam and were decisively beaten back. By late evening on 06 Sep, seeing the writing on the wall, Pakistani forces started moving much of their armour and artillery out of the Chhamb sector to deal with an Indian counteroffensive that was under way in the Lahore and Sialkot sectors, leaving just about enough forces in Chhamb to blunt any Indian counterattack. The Indian forces in the sector, having stalled the Pakistani offensive and recovered balance, then launched operations to evict the Pakistanis but with limited success, before the ceasefire came into effect.

Fighting Continues After Ceasefire in the Northern Sectors

Notwithstanding the ceasefire, the Chhamb, and adjoining sectors to the North, were the scenes of some intense battles to beat back Pakistani forays as also to retake positions that had been lost. A few significant ones were for the capture of Point 3776 in the Chhamb sector, for Observation Post Hill in Mendhar, and for the destruction of Shakot and Jura bridges in the Kishanganga sector. Such operations carried on till almost the end of Oct 1965.

India's Opening of International Border: Lahore and Sialkot Offensives

The success achieved by Pakistan in its surprise offensive in the Chhamb sector and her refusal to implement the United Nations Security Council's call for an immediate ceasefire prodded Prime Minister Lal Bahadur Shastri and the Government of India into clearing the launch of operations by the Indian Armed Forces against Pakistan across the international border at places of their own choosing. The move was not anticipated by the Pakistani leadership, who believed that the Indian political leadership would not have the political gumption. India had planned simultaneous thrusts in the Lahore and Sialkot sectors, as also further south in the deserts as a response to Pakistan's Chhamb offensive. The operations in the Lahore sector were launched before first light on 06 Sep.

Build-up for the Sialkot Sector Battle

Operations in the Sialkot sector, to be undertaken by 1 Corps under Lieutenant General PO Dunn, needed to be staggered to enable the forces to get into position in the Jammu-Samba area, and in the event, were launched just before midnight of 07 Sep. Though impressive in terms of the number of formations under command, the 'Strike' Corps was in fact an ad-hoc arrangement put together hurriedly for the operation. The Corps Headquarters itself had commenced raising only in May 1965; 6 Mountain Division was a two-brigade formation raised in Mar 1963 for operational tasks on the Uttar Pradesh-Tibet border, and was neither equipped nor trained for operations in the plains; 14 Infantry Division was under raising and had done no training as a formation; 1 Armoured Division (whose equipment state left much to be desired) and the Jammu-based 26 Infantry Division were the only cohesive formations, though they had never trained together. 1 Corps, therefore, had neither trained for, nor even war-gamed the operational contingencies together. This was done by the General Singh shortly after the arrival of the formations in operations and a couple of days before they were launched into operations.

Inside View from Corps-Level Planning and Execution

As a young General Staff Officer-3 (Operations) on the staff of Headquarters 26 Infantry Division, the author, who was privileged to accompany the General Officer Commanding, Major General ML Thapan to the preparatory planning meetings, and later to the formations and units in battle, witnessed what transpired at that time, both at the planning stages and in execution at various times. In retrospect, with the benefit of years of experience to follow, the author can state quite unequivocally that, under the circumstances, what was achieved by the formations and units of 1 Corps was quite incredible. Obviously, much more could have been achieved had there been better training, planning, coordination, and so on, including exploitation of the initial successes.

The Tank Battles of Phillaura and Chawinda

Most military historians and analysts are unanimous about one feature of the battles in the Sialkot sector; the largest tank battles were fought here at Phillaura and Chawinda as both armies hammered at each other for control over a few hundred square kilometres of Pakistani territory. Sialkot (though only about 14 kms from the nearest point on the border) was always going to be an objective too far for India's strike corps, considering the strength of the opposing forces.

Armoured Action and Heroism at Phillaura

26 Infantry Division and 6 Mountain Division, which crossed the International Border just before midnight on 07 Sep in areas Bajragarhi and Unchewains and Charwa and Maharajke respectively, made slow progress in establishing a foothold across the International Border from 08 to 10 Sep. Even so, 1 Armoured Division was launched to exploit the limited space, and breakthrough towards Phillaura and Chawinda as initial objectives. On 11 Sep, even though 1 Armoured Division achieved initial success at Phillaura and managed to destroy many Patton tanks in what were bruising tank battles of fire and attrition, progress on the ground was slow. Two of the commanding officers of the tank regiments, Lieutenant Colonel MMS Bakshi of 4 Horse (with whom the author had the honour of working with in later years) and Lieutenant Colonel Ardeshir B Tarapore of 17 HORSE, performed

admirably, knocking out several Pattons themselves. Colonel Bakshi was awarded the MVC for gallantry, while Lieutenant Colonel Tarapore would go on to blaze a trail of glory in the battle for Chawinda. Having secured Phillaura, 1 Corps made the same mistake that the Pakistanis made at the Munnawar Wali Tawi in the Chhamb Sector; they paused to regroup before attempting to take Chawinda.

Chawinda: A Corps-Level Deadlock

As it turned out, 14 Infantry Division ran into tough opposition and by the time the Corps gathered itself for assaults on Chawinda and Zafarwal, the battle in the Sialkot sector turned into a corps versus corps battle with near parity in all respects. The much-heralded strike corps offensive had fizzled out; the element of surprise having been lost. Holding battles were being fought in adjoining sectors with very little prospects of any significant territorial gain, and Chawinda was a 'Do or Die' situation for Pakistan. The battle see-sawed for over six days, with division-sized forces jostling for control of a few villages, tactically important crossroads, and other key ground. The pattern of battle was predictable and involved armoured led thrusts with infantry following; counterattacks and periods of lull in the battle, wherein, both sides licked their wounds, took stock of their losses, and waited for a moment of operational brilliance or folly that never came. These were the battles in which numerous commanding officers lost their lives, foremost amongst them was one of the heroes of the battle of Phillaura, Lieutenant Colonel Tarapore, Commanding Officer of Poona Horse. He went down in the battle for Chawinda with his guns firing despite being wounded and refusing to abandon his crippled Centurion tank. For his sustained heroism, he was awarded the Param Vir Chakra.

Outcome of the War and Strategic Legacy

By 19 Sep, 1 Corps had given up hopes of capturing Chawinda, leaving the Western Army Commander despondent and rueing the lost opportunities. Though the outcome of the 1965 War cannot, therefore, be considered an outright victory for the Indian Armed Forces, it went a long way in restoring the pride, confidence, and self-esteem of the forces that had taken a battering in 1962. It also restored the image of the forces in the eyes of the public. Therefore, the Indian Army units responded with added

determination to the provocations along the ceasefire line in J&K in later years, at Nathu La in 1967, in securing the outstanding victory in 1971, at Sumdorong Chu in 1987, and, more recently, during the Kargil operations.

The Enduring Role of Junior Leadership and the Indian Soldier

The performance of the junior leadership was outstanding, as always. It is a measure of the commitment and dedication of the junior leaders that the officer to rank and file casualty ratio during the 1965 War was 1:14 against a rank structure ratio of 1:60.

The war proved (if such proof is necessary) that it will always be the man behind the weapon that matters and not so much the weapon system itself. The Indian Army jawans proved their mettle once again.

Conclusion

Although the 1965 War did not produce a decisive military victory for India, it revitalised the army's confidence and restored national pride after 1962. The exceptional courage of the junior leadership, reflected in the aforementioned officer-to-rank casualty demonstrated the enduring importance of the soldier behind the weapon. The battles in J&K and Sialkot showcased immense grit, resilience, and the ability of Indian formations to stabilise, counterattack, and hold ground under severe pressure. These operations—especially the iconic engagements at Hajipir, Phillaura, and Chawinda—stand as a testimony to the Indian Army's professionalism and determination.

Operation Sindoor: Air Power as Enforcer of National Will

Lieutenant General DP Pandey, PVSM, UYSM, AVSM, VSM (Retd)[@]

Abstract

Air power remains the central instrument for enforcing national will in the contemporary security environment, and the same has been illustrated by three high profile 2025 campaigns i.e., Operation Sindoor (India-Pakistan), Operation Rising Lion (Israel-Iran), and Operation Midnight Hammer (United States' support for Israel). Against recent debates about the primacy of unmanned systems, the timely political will, precise intelligence, and integrated joint operations restored the air force's primacy through speed, reach, visibility, precision, and escalation control. Focusing on Operation Sindoor, a calibrated four-night Indian air campaign in response to the Pahalgam terror attack, the objectives were met through a range of factors that were considered deliberately such as targeting choices, execution, and effects: destruction of terrorist infrastructure and strategic assets, minimal collateral damage, rapid psychological shock to Pakistan's military and political leadership, effective deterrence, and favourable domestic and international messaging. The five facets of air power utility (decisiveness, precision, deterrence, joint integration, and political signalling), when backed

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[@]**Lieutenant General DP Pandey, PVSM, UYSM, AVSM, VSM (Retd)**, was commissioned into 9 SIKH LIGHT INFANTRY and built a distinguished career across high-altitude, counter-insurgency, and conventional operations. He participated in Operation Vijay (Kargil), commanded his unit in Siachen and Eastern Ladakh, led the Rashtriya Rifles and a Counter Insurgency Force in Kashmir, and later commanded the Chinar Corps. His key appointments included the inaugural Director General Territorial Army and Commandant, Army War College. An alumnus of Defence Services Staff College, National War College (US), and National Defence college, he is recognised for expertise in training, leadership, and operational art. He is an elected Council Member at the United Service Institution of India and is also the subject of a book (*Soldiering with Passion*) and the author of *Reflections on Strategy*.

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by clear political intent and interoperable capabilities, can achieve tactical, operational, and strategic goals while avoiding a full scale war. As defence reforms are undergoing in the Indian military, continued investment in intelligence, surveillance, and reconnaissance, precision munitions, air defence, joint theatre commands, and clear rules of engagement to preserve air power's role in future limited and strategic conflicts is an imperative.

Introduction

A supposed obituary of the Indian Air Force (IAF) was written in the 2020s with the emergence of overwhelming eminence of drones as an arbiter in conflicts and wars between two nations, and even in extensive usage by non-state actors. During the Second Nagorno-Karabakh War of 2020, Azerbaijan virtually dominated and annihilated the Armenian Armed Forces through extensive use of drones, bringing to an end a long-drawn conflict in the region. Similarly, Ukraine has been able to stave off the strong Russian Air Force aggression, denying comprehensive success for more than three years, exploiting the drones of various types, sizes, and payloads. The air forces in each of these conflicts were grounded in a literal sense. Retired Army Lieutenant General David Barno and Nora Bensahel have quoted in *Air and Space Magazine*, "Drones have displaced manned aircraft and are now threatening the US Air Force's relevance with 'An Almost-existential' crisis".[1] The same article further contests the viewpoint as short-sighted and argues that "The biggest lesson from the Russia-Ukraine War is not how small Unmanned Aerial Vehicles (UAV) are reshaping air warfare, but rather how they are reshaping ground combat".[2] Clearly discussion and debates on the relevance of air forces is raging even in the most powerful military in the world.

One of the most transformative defence reforms were announced in the Indian military history from the ramparts of the Red Fort on 15 Aug 2019 by Prime Minister Narendra Modi for creation of the Department of Military Affairs and the post of Chief of Defence Staff.[3] Furthermore, directions were given for jointness and integration of the three services, a presumed outcome of which was the structuring of the tri-services into theatre commands.[4] Since then, a few major technological shocks have disrupted the

way wars will be fought and compelled the military world into evolving new doctrinal precepts. The warfighting methods have changed and in the context of age-old platform and anti-platform competition, the autonomous systems have been discussed animatedly, polarising the experts in two distinct camps; the technology loners and the human-centric war fighters. Air force has landed right in centre of this debate with Unmanned Aerial Systems dominating the air domain. It is imperative that before doctrinal shifts take place, the centrality of air force is appreciated through the context of recent conflicts. As the ongoing defence reforms are pursued in the right earnest, the importance of air power must be understood.

Three events in 2025 brought the air force back as the key enforcer of the national will. The Israeli domination of Iranian airspace during Operation Rising Lion, wherein, the entire air defence systems, most of the ballistic missile systems, the critical infrastructures of the nuclear program, and military command and control were decapacitated.[5] The operation, launched on 13 Jun 2025 and lasting for 12 days, displayed the will of the Israeli establishment being enforced through its air force. The show of force transited through more than 1,500 kms to Iran with no shared land borders. The second event was Operation Midnight Hammer by the United States (US) Air Force launched on 21 Jun 2025 in support of Israel.[6] The American air power was projected through continents and over oceans, flying for more than 18 hours one way, involving more than 125 aircraft, resulting in the remnants of the Iranian nuclear ambition being bombed out. There may be varying intelligence inputs on the damages caused but the escalating conflict between Iran and Israel was brought to closure within 12 days by an overnight strike by the US. These were possible only through the application of the instrument of air power.

The third and the most significant event was Operation Sindoor, wherein, through application of air power, the escalating situation between India and Pakistan was brought to a sudden end. The Indian Air Force applied it sparingly, for less than 30 mins each, two times over the course of an 88-hour military exchange as punishment for the Pakistani establishment-orchestrated terror attack in Pahalgam, compelling the Pakistan military to kneel down and seek surrender.[7]

Air Force as an Important Element of National Will

National will flows out through the instruments of power (diplomatic, informational, economic, and military) to protect interests both within the country and outside. While each element has an important role to play and is mutually congruent, the salience of military power is undeniable. In the military spectrum, the air power allows a nation to project its will across the world because of its speed, reach, visibility, precision, and flexibility. In addition to its relevance in national security through air warfare and strategic deterrence, the air power has vital contributions towards managing natural disaster consequences. For interventions in international efforts towards peace and stability and across the spectrum employment, the air power is the central force to project strength. The capacity to respond with speed and for extended ranges makes air power indispensable to a nation's defence and sovereignty.

While Operations Rising Lion and Midnight Hammer showcased the flexibility and reach of air power against a nation state, Operation Sindoor was representative of an entire-spectrum operation, ranging from counter terrorism to conventional military force application, impacting the national consciousness of the target country through a visible domination and destruction, thus, breaking the will of a nuclear power within days. In two strikes—three days apart—on night of 06/07 May and 09/10 May 2025, the military and political objectives were achieved with minimum collateral, sending a message worldwide of national moral standing and geopolitical autonomy.

Context of Operation Sindoor

In a terror incident at the beautiful tourist destination of Pahalgam in Jammu and Kashmir, 26 innocent male civilians, mostly tourists, were killed on 22 Apr 2025.[8] The brutal killings, after deliberate segregation based on religion in front of the young children and wives, had obvious emotional backlash from the domestic population and worldwide condemnation.

This barbaric act of such a scale, since the Pulwama terror attack of 2019, warranted suitable muscular response. It was evidenced that after surgical strikes post the Uri attack in 2016, there was a period of peace till the Pulwama incident. Same was

the case with peace after the Balakot Strike post Pulawama on 14 Feb 2019, wherein, the IAF set new parameters for response by transgressing the Line of Control (LoC) and bombing terror camps across the International Border for the first time since 1971. Following this, there was a period of peace for six years. After due considerations, Operation Sindoor, named as mark of respect and response for the women widowed in the Pahalgam terror attack, was launched on the night of 06/07 May 2025.

Objectives

The political direction was unambiguous. The armed forces were given a clear directive: respond as deemed necessary. Air Chief Marshal AP Singh, the Air Force Chief, later confirmed "The presence of political will" and "No restrictions were put on us... If there were any constraints, they were self-made...".[9] Political leadership, cognisant of the strategic vision of *Viksit Bharat 2047* (Developed India 2047), would surely avoid escalation to war and, hence, escalation control was an imperative. Therefore, the military objectives were set for retaliatory strikes to punish terrorists and for the destruction of terror infrastructure. It was also important to signal to the Pakistani establishment that hosting of the latter will have retribution in Pakistan as well and will not be limited to Pakistan-occupied Kashmir (PoK). The most important messaging was to the international community that had failed to rein in Pakistan from launching terror attacks. It clarified that Bharat will take decisions of military response without adopting the dossier system of providing proof of complicity.

Operation Sindoor was against the terror network and was not territorial.[10] It was non-escalatory and with minimal collateral. Nine terror camps and headquarters were selected for retribution. Two targets, in-depth and of immense significance, were allotted to the air force, both in Pakistan's Punjab. Bahawalpur, the headquarters of Jaish-e-Mohammad, was in a depth of more than 80 kms, out of the range of the Indian Army weapon systems. Muridke, the second target and the headquarters of Lashkar-e-Taiba, responsible for the Pahalgam attack, was ensconced in the safety accorded due to the proximity to Lahore. In any case, a belief that Punjab region (Pakistan) will never emerge in the crosshairs of the Indian Armed Forces till conventional war breakout had allowed these terror networks to prosper and operate with impunity.

Indian Air Force Delivers Justice for Pahalgam Victims

On 06/07 May 2025, as part of the integrated plan to punish the terror networks in Pakistan and PoK, nine targets were reduced to dust. The psychological impact of the bombing by precision systems of the IAF shook the confidence of the Pakistani military and political leadership. The terrorists felt the heat and death due to the strikes led by the air force. So did the military and political hierarchy of Pakistan. The recordings of the bombings, fires, and eventually the destroyed buildings, followed by much publicised funeral prayers of the terrorist leaders, shook the entire country. The senior Pakistani military leadership were compelled to be publicly present for the burials of the terrorist leaders, exposing the deep-rooted connections of the terror network with Pakistani military to the world.

The Long Arm of Justice Bombs out the Confidence

Once the Pakistan Army decided to become proxy of the terror networks as a signature act of brotherhood after the nine terror targets were blown out of the ground, the Indian military objectives shifted to escalation control through shock effect. The ceasefire violations and the attempts to strike through missiles and drones by the Pakistan military changed the scope of Operation Sindoor. The targeting of innocent civilians living along the LoC and International Border had to be responded firmly.[11] While the effective targeting by the Indian Army delivered punishment to its Pakistani counterpart, the air force was tasked to shock the bravado out of the rogue Generals and propped-up politicians.

Eleven targets, well inside of Pakistan covering the entire frontage from North to South were carefully identified, selected and targeted on the night of 09/10 May 2025. These were strategic targets hosting strategic assets well in-depth, away from the ranges of the Indian Army. The long arm of justice was delivered by the Indian Air Force; in 25 minutes, the sky warriors bombed out any remnants of confidence of the Pakistani leadership. Pakistan kneeled and keeled over.

While the claims of the Americans in brokering the ceasefire or pause in Operation Sindoor will continue to be debated forever, the role of the air force as the enforcer of the national will was affirmed emphatically. The interests of the defence industry of the

world in the centrality of the air force were resurrected. Operations Rising Lion and Midnight Hammer followed thereafter to seal the confidence.

Air Power in Enforcing National Will

There are convincing arguments in favour of the air force with respect to its capabilities to enforce the national will. From the prism of Operation Sindoor, a few facets that emerge distinctively.

Firstly, the speed, reach, and surprise with which the targets were destroyed deep inside the Pakistani territory, covering the entire length and breadth, in less than 30 mins twice in a four-day period. The speed of the direction of attacks and delivery of range of ordinance with significant destruction capabilities took the Pakistanis with shock and surprise, breaking their will to continue with escalation. It was a decisive application of force.

Secondly, the exploitation of precision-guided munitions to avoid collateral damage and targeting the terror infrastructure in the first night and the military targets on the second night allowed the Indian military the high moral ground while applying the full force of kinetic punishment. The political messaging was clear; the retaliation is forceful but not reckless. The escalation control was in the hands of the Indian military by isolating the Pakistani population from the military and terror network.

Thirdly, the focus is on imposing deterrence. The application of the air force to strike deep and with speed signals that there is no place to hide for the terror network and the hand that facilitates terror. Most important was the political will to use the air force. While Balakot could have been an aberration, the application of the air force again is an indication of resolve of the political dispensation. It states without ambiguity that 'There is no limit' to political will and national resolve to punish the truant nation or terror organisations.

Fourthly, it projects an image of jointmanship, integration, and synergy amongst various dimensions of military power and the other elements of national power. The application of air force warrants immense synergy amongst the forces in field. It has to be integrated with all elements of the army, electronic warfare, and communication systems. At the national level, the integration with other elements of power is imperative to justify, the *jus ad*

bellum (Justified War), to the world and the domestic audience in case of escalation or even otherwise. The employment of the air force in the manner it was done during Operation Sindoor reflected confidence in operational integration at multiple levels.

Fifthly and lastly, the political legitimacy and international signalling are the central arguments for the application of air force. The visible usage of air power has a salutary effect domestically. The recordings of the targets getting hit and the satellite imageries of the runways and command and control destroyed continues to be celebrated along all platforms, legacy media, and social media. Internationally, the signalling was obvious. India is willing to go all alone but will retaliate to each and every provocation. The message is not only for terror attacks but also to similar aggravations by others.

Analysis of the Utility of the Air Power to Enforce National Will During Operation Sindoor

Firstly, the political and military objectives in Operation Sindoor were achieved in terms of destruction of the terror headquarters, launch pads, and training establishments comprehensively on the first night. The Indian response to the Pahalgam attack shocked the adversary on the first day itself and brought them to surrender on the fourth because strikes were across a wide territory, rapid and strategic. The deterrence message had succeeded and the popular desire of India for retaliation fulfilled.

Secondly, the escalation control was well under the grip of the Indian Armed Forces. The precision strikes deep into the territory of Pakistan caused damages to military and terror infrastructure deep and yet avoided targeting Pakistani civilian population or military force broadly, thereby, seeking to avoid a full-scale war.

Thirdly, informational elements succeeded with the visible application of the air power uplifting the morale of the domestic population, followed with satellite imageries and video evidence of the extensive damages in Pakistan empowered the leadership to frame public perception and positive national narrative.

Fourthly, the international impact and reactions were positive with respect to the muscular response to terror and its supporter. The legitimacy of the military action was justified with avoidance of the collaterals.

Operations Rising Lion, Midnight Hammer and Sindoor—Air Power Projections of 2025

Applied in different geographies, the three operations within weeks of each other have resurrected the relevance of air power as enforcer of the national power. The naysayers had already cast the last stone on the relevance of the air force in the light of dismal performances in the ongoing Russia-Ukraine conflict due to heavily contested airspace and domination of the drone warfare. However, the successful application of air force, particularly in Operation Sindoor, has revived the interests of defence experts, particularly when Pakistan was well-provided with drones by Türkiye and China and had a very credible and hardened air defence wall.

Operation Rising Lion, launched by Israel within a month of Operation Sindoor, added weight to the argument towards the relevance of the air force. Israel was able swiftly traverse a distance of 1,500 kms across the airspace of different countries to degrade the Iranian nuclear program over 12 days. Neither land nor naval components were involved. The launch of the Operation Midnight Hammer by the US on the night of 21/22 Jun 2025 reinforced the importance of air power in the modern-day warfighting milieu as the enforcer of the national will, as an escalating conflict was brought to closure within days. The assertions of those pitching for the drones at the cost of the air force were laid bare.

Air Power in the Indian Context

The terrain, the complexities, and the ranges for application ensures salience of the air power in the Indian context. Operation Sindoor demonstrated that air power is a potent instrument for enforcing national will, enabling swift, precise strikes, and sending deterrent signals. It can achieve political legitimacy and be integrated with broader force capabilities. In Operation Sindoor, air power was central to India, achieving its political aim (retaliation for cross border terror), operational aim (destroying terror camps), and strategic aim (demonstrating resolve and deterrence), while maintaining escalation control.

While limitations exist, in this case, air power largely delivered. The combination of political will, good intelligence, precise targeting, and integrated force structure maximised its effectiveness and minimised downsides. For future operations, Indian doctrine should

continue to invest in air defence, intelligence, surveillance, and reconnaissance, joint commands, precision weapons, rules of engagement, and political clarity. In a volatile region, air power will continue to be central in enforcing national will but must be used carefully, in coordination, with awareness of costs and risks.

Operation Sindoor is an example of modern limited counterterror operations crossing borders. It shows how air power can be used not only for defence or war, but as a tool of punitive, deterrent foreign policy. Even though, it may shift norms in South Asia on what is an acceptable response, raising the bar for neighbouring states that tolerate or facilitate terrorism, but yet it must be applied offensively.

Conclusion

Application and unleashing of the air power is a national statement, an intent to project power beyond the national boundaries to achieve strategic interests. Beyond the glamour of a fighter aircraft streaming across the blue sky, unleashing destruction on an unsuspecting enemy from a standoff distance, the comprehensiveness of the air power must be understood. The air domain transcends the other two (land and water) not only in the reach, ferocity, and speed, but also allows for an overwatch. If applied effectively, the employment of the forces on the land and sea maybe avoided or the friction reduced. As seen in the recent engagements across the world, the application of air power can be an instigator for conflict, such as the air attack on Kabul by the Pakistan Air Force or to ensure compliance by Pakistan after the strikes of 09/10 May 2025 by the IAF.

In the Indian context, the air force has finally come out of age, both militarily and politically. While the western powers understood the relevance of air power, the same is now being appreciated in the context of the Indian subcontinent, thereby, shifting its posture from defensive to offensive. With the application of air power pre-emptively for punitive actions and war-closure enforcement force, the unleashing of the air force is now becoming a national statement. It is, therefore, imperative that the ongoing defence reforms exploit the air force as an important element of national power.

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Enhancing Efficacy of Peacekeeping Operations in an Uncertain Future

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Abstract

The article analyses the changing character of warfare and its profound implications for United Nations (UN) peacekeeping in an increasingly fragmented and technology-driven conflict environment. It situates contemporary conflicts—ranging from Ukraine and Gaza to Sudan and parts of Asia and Africa—within the context of 5th Generation Warfare, marked by kinetic and non-kinetic non-contact operations, blurred civilian–combatant distinctions, and multi-domain battlespaces. Against this backdrop, the article traces the evolution of the UN's peace and security mandate from its founding in 1945 through key milestones such as 'An Agenda for Peace' and the '2005 World Summit Outcome'. It highlights growing constraints on UN peacekeeping, including declining budgets, contested mandates, lack of consent, and the disruptive impact of new technologies and non-state actors. Drawing on historical cases and recent analyses, the article argues for a recalibration of future UN missions toward smaller, focused mandates emphasising monitoring, peacebuilding, and consent-based engagement. It concludes by examining implications for India, advocating a diversified, whole-of-government contribution model aligned with India's humanitarian strengths.

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Introduction

2025 is ending on a despondent note. Despite occasional flickers of hope that arise with attempts at brokering peace, the war of attrition in Ukraine drags on. A tenuous ceasefire in Gaza remains at risk, with Hamas and Israel retaliating against each other over infringements. In Sudan, the paramilitary Rapid Support Forces stand accused of genocide with the massacre of civilians in El Fasher in Darfur state[1], and the United Nations (UN) is calling for the establishment of a humanitarian corridor in that area for movement of refugees and aid.[2] Elsewhere, conflicts continue to rage across portions of Asia (including West Asia) and Africa.

Today's conflicts are witnessing the impact of new technologies, coupled with newer methods of warfighting, especially in the zone of kinetic non-contact and non-kinetic-non-contact systems. These have resulted in increased lethality and destructive power, even as lines between combatant and non-combatant, military, and civilian targets have blurred. With the emergence of new concepts like cognitive, hybrid, and grey-zone warfare, traditional notions of victory and how it is to be achieved have been turned on their heads. Multi-domain operations (or all domain operations) have similarly expanded the battlespace. Overall, war and warfare have acquired new and more dangerous dimensions. If World War II epitomised 3rd generation warfare, the battlefield of the mid-21st Century witnessed warfare in its 5th generation.

The United Nations' Evolving Concept of Preserving World Peace

The UN was founded in 1945. This new organisation, successor to the short-lived League of Nations, came about at the end of the deadliest war in human history. The focus of the UN on the imperative of preventing war and preserving world peace is illustrated in the first sentence at the beginning of the Preamble to its Charter. It reads, "We, the Peoples of the UN, determined to save succeeding generations from the scourge of war, which twice in our lifetime has brought untold sorrow to mankind…".[3] This focus on maintaining peace finds expression multiple times in the Charter—Chapter I (Purpose and Principles); Chapter V (The Security Council); Chapter VI (Pacific Settlement of Disputes); Chapter VII (Action with Respect to Threats to the Peace, Breaches of the Peace, and Acts of Aggression); Chapter VIII (Regional

Arrangements); and Chapter XVII (Transitional Security Arrangements)—altogether six chapters out of a total of 17.[4]

In 1945, maintaining peace and security appears to have been the *raison d'etre* of the UN and its 51 member states. As the membership gradually increased (from 51 to 113 by 1963, and then to 189 by 2000[5]), with many newly independent states joining the world body, issues concerning the economic and social well-being of such nations impoverished by decades of colonial rule (restricted initially to Chapter IX titled International Economic and Social Cooperation) acquired greater salience. With some of these nations embroiled in internal conflicts soon after independence, especially in Africa, peacekeeping remained important to the UN. With the end of the Cold War, the UN decided to frame its objectives with relevance to the new world situation. The outcome was a seminal document produced by Secretary-General Boutros Boutros-Ghali, titled *An Agenda for Peace: Preventive Diplomacy, Peacemaking and Peace-keeping,* presented during the 1992 Security Council Summit Meeting. This document analysed the functioning of the UN and recommended methods for improvement in areas of peacekeeping and preventive diplomacy. In the final chapter titled 'An Agenda for Peace', the Secretary-General's prophetic remarks warrant repetition, "…peace in the largest sense cannot be accomplished by the UN system or by governments alone. Non-governmental organisations, academic institutions, parliamentarians, business and professional communities, the media, and the public at large must all be involved".[7]

The holistic concept of peace and security was amplified further in the 'Resolution adopted by the General Assembly on 16 Sep 2005' at the 2005 World Summit Outcome, which stated, "We acknowledge that peace and security, development, and human rights are the pillars of the UN system and the foundations for collective security and well-being. We recognise that development, peace and security, and human rights are interlinked and mutually reinforcing".[8] The major portion of the resolution deals with aspects of development (including sustainable development), global partnerships, financing, trade, education, employment, health, gender and women empowerment, and science and technology. Peacekeeping and terrorism are mentioned towards the end, indicating the priority of objectives within the overall focus on sustainable peace and development adopted by the UN.

It is likely that because of the aforesaid priorities (and not because of the decline in demand for Blue Helmets), and reluctance of nations to part with their dues towards the UN regular and peacekeeping budgets, finances for peacekeeping have seen a decline in real terms. Some nations have defaulted on their contributions. The approved peacekeeping budget for 2025-26 has fallen to USD 5.38 bn[9], as against the 2024-25 budget of USD 5.6 bn, the 2023-24 budget of USD 6.1 bn[10], and the 2020-21 budget of USD 6.58 bn.[11]

As brought out in the beginning of this article, the geopolitical, technological, and military developments around the world have significantly affected the prosecution of warfare with an inevitable fallout on peacekeeping. Earlier too, the UN peacekeeping missions have come under scrutiny on whether they have fulfilled the mission objectives. While it is difficult to lay down a comprehensive template for judging mission success[12], glaring failures like Rwanda or the inability of a potent force like UN Interim Force in Lebanon (UNIFIL) to effectively play a meaningful role have given rise to comments by critics that many missions have failed to carry out their intended mandates. Such views disregard the turbulent and dynamic circumstances in which such missions operate and the conflict of interests that leaves the UN hamstrung.

Implications for Future Peacekeeping

To appreciate the implications for future peacekeeping and ensure its relevance, some crystal gazing is warranted. On 01 Jan 2025, the International Crisis Group (ICG) published a commentary, titled '10 conflicts to watch in 2025'.[13] It has identified Syria, Sudan, Ukraine and Europe, Israel-Palestine, Iran-United States (US) and Israel, Haiti, the US-Mexico border, Myanmar, the Korean Peninsula, and China-US relations as the major arenas of conflict. Of these, UN peacekeepers are deployed in two regions—South Sudan (the UN Mission in South Sudan [UNMISS]) and Israel-Palestine (the UN Truce Supervision Organization, UNIFIL, and the UN Disengagement Observer Force). Another festering area is Afghanistan-Pakistan, where the situation across the Durand Line is tense, with strikes carried out by both sides.

Before proceeding further, a look at the history of an unarmed UN military mission earlier deployed in one of the areas mentioned above is instructive. Unarmed UN observers had been operationally

deployed earlier under the ambit of UN Supervision Mission in Syria (UNSMIS) in May 2012 to monitor the ceasefire between the government and rebel groups. UNSMIS deployed fast; it was established under the UN Security Council Resolution 2043 of 21 Apr 2012, and the mission deployed 300 unarmed peacekeepers in various locations in Syria by 30 May 2012. The mission faced numerous obstacles, such as limited access to incident locations, security concerns about the safety of peacekeepers, and unrealistic expectations of the civilian populace, who felt that the UN would protect them from violence. In UNSMIS's short span of less than three months, there were numerous incidents of firing in the vicinity of observer teams, with one incident on 12 Jun 2012 when UN vehicles were blocked, damaged by a crowd, and then fired upon by unknown gunmen, even as the observers attempted to reach their destination.[14] It appears that the six-point plan proposed by UN and League of Arab States, to which the warring parties had committed as a precursor to UNSMIS deployment, was either for optics or agreed to despite a lack of good faith. With UNSMIS unable to fulfil its mandate due to the aforesaid reasons, the mission was terminated on 19 Aug 2012.

The experience of UNSMIS shows that the first principle of peacekeeping—consent of parties—had been violated, putting unarmed Blue Helmets in danger. Many other lessons can be derived—the dilemma of having an inadequate mandate vis-à-vis the danger of 'Mission Creep', where peacekeepers keep on taking additional responsibilities, the feasibility of protecting large numbers of civilians, and getting involved in a conflict that has turned into an insurgency. All these issues are relevant today.

With respect to another of the conflict areas mentioned above—the ongoing Ukraine War—a detailed analysis by an Indian general with extensive peacekeeping experience has recently been published. The article discusses the viability of deploying peacekeepers in Ukraine to oversee a negotiated peace, should parties to the conflict agree to the presence of the UN.[15] The author has outlined various challenges—how to control non-state actors who might not adhere to a ceasefire or work as proxies for interested parties, how to find Troop Contributing Countries (TCCs) acceptable to both sides, and the force structuring of this mission. The article concludes with the suggestion that a multidimensional observer mission comprising civilian, military, and police forces is

the best combination. Considering the devastation wrought in Ukraine and the multifarious challenges that any monitoring force would face, including from the erstwhile belligerents, this would likely be the optimal solution.

With uncertainty over the peace process, skewed mandates, and a multiplicity of actors with access to new technologies (state, non-state, mercenaries, criminal gangs, proxies, and civilians actively aiding their sides, with many working at cross purposes), it is debatable whether the UN should consider enforcing the peace as a viable option in the conflict regions identified by the ICG. Is it possible to have Chapter VII missions like the UN Command in 1950 during the Korean War? Current Chapter VII missions like UN Organization Stabilization Mission in the Democratic Republic of the Congo have been operating for over 15 years. Another Chapter VII mission, UNMISS in South Sudan, has been operating since 2011. Even a large Chapter VI mission like UNIFIL in Lebanon, with enough heavy equipment like howitzers and tanks, finds itself unable to perform its role. Given the hesitation of TCCs to place their troops in harm's way, the repercussions of even minor negative incidents on the UN's reputation, a mandate that seems increasingly challenging to carry out, and the effects of a diminished peacekeeping budget, peace enforcement in any of the volatile areas highlighted by the ICG is unlikely to succeed.

Overall, what should be the shape of future UN missions? A summary of opinions regarding future prospects for peacekeeping has been collated by the UN's Future of Peacekeeping Operations project. This study, available on the UN Peacekeeping website[16], explores different themes and analyses key conflict trends by a host of subject experts. An important observation of Adam Day states, "Rather than continue to saddle peacekeeping with sprawling mandates covering national reforms, security sector transformation, capacity building, and extension of state authority, the UN may need to consider a much smaller set of tasks for tomorrow's missions".[17] Similarly, the independent UN study on 'The Future of Peacekeeping, New Models, and Related Capabilities', published in Oct 2024, has presented an exhaustive list of 30 models for future peacekeeping, catering to various scenarios that might arise.[18] Provided that there is consent (even conditional) of the parties involved, a suitable mandate incorporating

reservations of both sides could still be arrived at in respect to the peacekeeping missions in the conflict areas mentioned earlier.

With the UN being made aware daily of its limitations about peacekeeping, the viable alternative is monitoring the peace with elements of peacebuilding. This would entail employment of unarmed observers or troops lightly armed for self-protection. With focused mandates, these uniformed personnel would be complemented by other components, who would assist in peacebuilding activities, where cooperation of belligerents is likely to be more forthcoming. Here too, given the UN's financial limitations (and the fund crunch faced by allied organisations like the UN Foundation), it must start small. Small infrastructure projects, governance, education, gender empowerment, training of non-governmental organisations, and its likes are topics that must be chosen from. Investing in some of them would produce results on the ground and restore the credibility of the world body, even while reducing the scope of its work.

Implications for India

Considering the above, what should India, as a supporter of UN initiatives and major TCC, plan for? Should the Centre for UN Peacekeeping , currently under the military, widen the scope of its training and envisage multiple specific roles as suggested above to include policing, governance, and capacity building in conflict regions? The performance of non-military Indian contingents, such as all woman police units that have garnered praise internationally, is a pointer in this direction. Given India's vast capacities in these fields, it is possible to incorporate a variety of specialists—civilian technical experts, engineers, educators, medical and public health experts, and others, as required by a particular mission mandate. This would require an all-of-government approach, with greater interaction and interfacing with new stakeholders, in addition to the Ministry of External Affairs. Other government ministries and even private Indian players could be incorporated on 'As Required Basis' if such a proposal is accepted.

Conclusion

India's core strength has been its humanitarian approach and outreach to the afflicted. Contributing to UN missions in this manner would play to Indian strengths and buttress its credibility in the

organisation and other world fora. More so, when in terms of troop contribution, India has slipped to fourth place with a marked decline in numbers—5,384 personnel of all categories including police on 31 Dec 2024—as against third place on 31 Dec 2015 with 7,798 personnel[19], even as numbers of TCCs have plateaued. This comprehensive approach would enhance India's relevance as a major contributor towards world peace, not just by deploying troops but by contributing towards the comprehensive national security of the country in question.

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Air Littoral: The New Sub-domain that Demands a Fresh Look at Verticality

Major General Jagatbir Singh, VSM (Retd)[@]

Abstract

The article examines the emergence of the air littoral—the low-altitude airspace up to approximately 10,000 feet above mean sea level—as a decisive and contested battlespace in contemporary warfare. It argues that advances in uncrewed aerial systems, loitering munitions, and precision weapons have fundamentally altered traditional notions of air superiority, shifting operational emphasis from high-altitude dominance to persistent, localised control of low-altitude airspace. Drawing on global case studies, including the Russia-Ukraine conflict and Indian operational experience from Operation Sindoor, the article demonstrates how control of the air littoral directly affects ground-force survivability, tempo, and freedom of manoeuvre. It highlights the limitations of episodic, air force-centric models and makes a strong case for land force-led command and control of the air littoral, supported by integrated joint structures. The article concludes by recommending doctrinal clarity, layered air defence, indigenous technological investment, and institutionalised joint command mechanisms to secure dominance in this critical domain.

Introduction

Contemporary battlefields are evolving swiftly, driven by new technologies and geopolitical changes. The air littoral, the airspace from the surface up to approximately 10,000 feet above mean sea level, has now become crucial, integrating land, maritime,

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and air operations. This region was first called the 'Air Littoral' by Dr Kelly A Grieco and Colonel Maximilian K Bremer, who described it as the "Area from the coordinating altitude to the Earth's surface, which must be controlled to support land and maritime operations and can be supported and defended from the air and/or the surface".[1]

Historically, air superiority focused on high-altitude control by air forces. But "The airspace between ground forces and high-end fighters and bombers is quickly emerging as the more challenging and important contest for air control".[2]

Today, asymmetric threats such as low-cost Unmanned Aerial System (UAS), loitering munitions, and precision aerial weapons dominate the air littoral, exploiting terrain masking and sensor blind spots to disrupt ground forces.

Surface forces operate below this vertical space, exposed to immediate aerial threats. Recent conflicts and operational experience have demonstrated that local, continuous control of the air littoral is crucial for protecting ground troops, enabling rapid engagement, and maintaining tempo. Integrated Command and Control (C2) among land, air, and maritime forces is crucial, as ambiguity or fragmentation undermines operational effectiveness and survivability.

One of the biggest challenges of modern warfare is that large numbers of uncrewed drones have effectively taken control of the airspace above the contemporary battlefield, diminishing the dominance traditionally exercised by manned aircraft. The drone revolution suggests that attaining traditional air superiority—long the core mission of air forces—will become increasingly difficult, and in some contexts unattainable. In contemporary conflicts such as Ukraine, uncrewed systems, rather than manned aircraft, now dominate the airspace directly above ground forces. As a result, the contested air littoral has emerged as a vital new subdomain of warfare, marking a clear paradigm shift in the conduct of air operations.

There is, therefore, a need to establish principles for the control of the air littoral, drawing on lessons from both global and Indian experiences, including Operation Sindoor. Additionally, there is a need for enabling technologies and effective command structures to attain dominance in this domain.

The Army Chief, while speaking at a Tri-Services Symposium on 23 Sep 2025, said that "Conflicts in the recent past have demonstrated that the effectiveness of the unmanned aerial systems, and Counter-UAS (C-UAS) for exploiting the airspace, just above the land battle area. The effective management and exploitation of this space, known as the air littoral, has become imperative.[3] With the persistent presence of weapons, radar systems, artillery, missiles, unmanned aerial systems, and C-UAS, this space 'Needs Exploitation' as well as efficient management, including that of the electromagnetic spectrum. "We need a de novo innovative solution for force application and force preservation in this limited space of air littoral", he said.[4]

In summary, air littoral control is not just tactical but a strategic necessity for modern warfare. Recognising the littoral zone and strengthening a force for C2 is essential.

Operational Definition and Boundaries of the Air Littoral

A precise operational definition is essential. The air littoral features intricate terrain masking, sensor limitations, and congested airspace. Aircraft, helicopters, and UAS perform vital mission profiles within this layer, while ground-based air defences operate at overlapping altitudes.

Altitude up to 10,000 feet marks the direct influence of surface weapons, affecting the operations of both manned and unmanned platforms. The air littoral coincides with tactical battle areas and theatres of operation i.e., coastal zones for joint sea-land force activity and inland theatres with intensive fires, UAS, and artillery.

Air Defence (AD) operations today face a multitude of complex challenges that significantly impact detection, tracking, and engagement effectiveness. Other challenges include terrain masking that obscures sensor and complicates targeting. There is also an issue of congestion with overlapping flight paths, artillery, missiles, and UAS. The engagement cycles are short, measured in seconds, and threats are layered and adaptive, such as swarms and advanced electronic warfare.

Unlike high-altitude air superiority, which permits only episodic control, littoral dominance demands persistent presence, integrated layered defence, and decentralised authority. Control over the air littoral shields ground forces from surveillance and strikes, enables

rapid targeting, and synchronises multi-domain operations. This shift highlights the increasing significance of the air littoral as a distinct and critical battlespace.

The Air Littoral as a Decisive Battlespace

Control of the air littoral directly shapes the tempo of battle and the survivability of operations. Without dominance in this zone, ground manoeuvre remains constrained. Dominance in this zone, therefore, provides freedom of manoeuvre, persistent surveillance, precision engagement, and force protection against a broad spectrum of aerial threats. The operational value, thus, lies not only in neutralising enemy air activity but also in enabling friendly forces to exploit initiative on the ground.[5]

Recent conflicts highlight these dynamics. In Ukraine, swarms of drones and loitering munitions proved decisive in disrupting tactical operations. Similarly, in Operation Sindoor, integrated AD, real-time command, and indigenous systems enabled both successful defence and accelerated strike cycles. Together, these cases demonstrate how littoral control translates directly into operational advantage.

The traditional doctrine of high-altitude-centric control offers only fleeting coverage and remains ineffective against terrain-shielded, low-altitude threats. Furthermore, the air littoral has become an extension of close-quarters battle, with drones and loitering munitions posing an immediate overhead threat. What was once a peripheral concern is now central to tactical survivability.[6]

Tackling this environment requires consistent surveillance, quick sensor-to-shooter connections, multi-domain integration, and decentralised command. These demands set the bar for effective control and signify the shift from episodic air power to ongoing battlespace management.

Historical and Contemporary Case Studies

The importance of air littoral control is best understood through a detailed analysis of both contemporary conflicts and evolving doctrinal practice. Such studies underscore how lessons from the past inform future operational design. When General Norman Schwarzkopf, the United States (US) and Allied Commander,

proclaimed 'Air Supremacy' over the Iraqi Air Force on the tenth day of the Gulf War in 1991, the Iraqi Air Force had ceased all fixed-wing operations, and any Iraqi helicopters that still dared to fly were shot down. Yet Iraqi flak and short-range, mobile infrared anti-air missiles remained a serious threat, accounting for 71 per cent of all coalition aircraft losses in the war.[7]

The prolonged conflict between Russia and Ukraine since 2022 exemplifies the modern air littoral battlespace. Ukraine's establishment of the Unmanned Systems Force in 2024 centralised drone operations, reflecting an institutional realisation that persistent, land force-led control of low-altitude airspace is vital to operational success.

The war has dramatically accelerated the military use of drones in ways few could have foreseen. Today, they saturate the skies above battlefields in numbers previously unimaginable, conducting missions in surveillance, intelligence gathering, early warning, and precision strike. Ukrainian forces have employed swarms of small drones and loitering munitions to conduct reconnaissance, target enemy artillery, and disrupt Russian manoeuvres.[8] This persistent aerial presence has compelled Russian forces to adapt by deploying fibre-optic-controlled drones resistant to electronic jamming and by reinforcing ground-based AD specifically designed to counter UAS threats.

The continuous overhead activity of drones has prevented both sides from massing or manoeuvring their forces, making decisive breakthroughs on the front nearly impossible.[9] The conflict, therefore, exemplifies how control of the air littoral directly influences artillery effectiveness, troop mobility, and the overall tempo of the battlefield. This dynamic contest has simultaneously exposed the limitations of traditional high-altitude air superiority models and revealed the pressing need for ground-centric, persistent airspace management that integrates AD, reconnaissance, and rapid strike capabilities in the air littoral domain.

Operation Sindoor: A Paradigm of Tactical Airspace Command

Operation Sindoor marks a crucial point in Indian military strategy, establishing land force dominance in air littoral control amid multidomain threats. The operation was characterised by the army's

handling of the tactical battle area, where troops encountered persistent drone swarms and loitering munitions.

While the Indian Air Force executed strategic strikes and suppression of enemy AD, it was the army's responsibility to maintain control of the low-altitude airspace directly above frontline units. The deployment of indigenous systems such as the fully automated 'Akashteer'; AD control and reporting system enabled real-time sensor fusion and rapid engagement of aerial threats, underscoring the operational necessity of ground-controlled airspace management.[10]

Operation Sindoor validated long-standing doctrinal arguments supporting decentralised, land force led C2 of the air littoral. It showed tangible improvements in troop survivability, decision-making speed, and integration of multi-domain assets, thereby, strengthening the case for a doctrinal shift towards ground-led airspace management.

Comparative International Doctrinal Models

Globally, militaries have adopted varied models for controlling air littoral domains, balancing the roles of land forces and air forces according to operational realities and technological capabilities. Each nation tailors its doctrinal approach to suit its geography, threat environment, and service strengths. Despite these variations, there is near-universal recognition of the critical importance of unified C2 in this contested domain.

This comparative analysis reveals a set of common principles that cut across national approaches. In most cases, tactical airspace control is vested in land forces or in joint structures that are closely integrated with ground operations. Air forces generally retain the responsibility for strategic airspace and high-altitude command, while the low-altitude littoral is managed in coordination with frontline manoeuvre elements. At the same time, integrated joint command-and-control centres remain essential for deconfliction, operational cohesion, and the seamless employment of multi-domain assets.

Understanding how leading militaries approach control of the tactical airspace within the air littoral offers valuable insights for doctrinal development and operational planning.

Country	Tactical AD Control	Air Force Role	Integration Framework
United States (US)	The US Army controlsshort- and medium-range AD assets and operates tactical crewless aerial vehicles (UAVs) within the tactical battle area to providepersistent airspace control and protection for ground forces.	The US Air Forcemaintains controlover strategic airspace, long-range strike capabilities, and strategic UAVs, focusing on theatre-wide air superiority and interdiction.	A joint architecture featuring integrated airspace coordination centres ensures deconfliction and synchronisation between army and air force operations.
Russia	The Russian Ground Forces manage tactical AD, deploying surface-to-air missile systems and electronic warfare units to protect ground formations.	The Russian Air Force is responsible for air superiority missions and strategic strikes at high altitudes.	A federated control model maintains operational integrity and responsiveness by defining roles for both ground and air forces, ensuring seamless coordination and effective management.
China	The People's Liberation Army (PLA) Ground Force exercises control over tactical missile and AD systems to safeguard ground operations.	The PLA Air Force retains command over strategic airspace, overseeing air superiority and long-range operations.	Layered joint operations combine ground manoeuvre forces and air dominance efforts in coordinated campaigns.
NATO	Engagement authority is devolved to ground commanders within defined airspace zones, enabling responsive, localised AD.	NATO Air Forces maintain centralised joint airspace management to coordinate operations across member states.	A layered tactical-strategic control model integrates joint operational command for coherence and effectiveness.
United Kingdom	The British Army operates ground-based AD systems within the tactical battle area to shield forces from low-altitude threats.	The Royal Air Force commands strategic airspace and aerial combat assets.	Integrated air and missile defence with joint command posts ensures operational cohesion.

Country	Tactical AD Control	Air Force Role	Integration Framework
France	The French Air Force operates tactical radar sites and missile AD systems, supporting ground operations.	The air force manages air superiority and strategic AD missions.	Centralised air operations with distributed control centres ensure unified command and control.
Israel	The Israeli Army operates short-range missile defence systems such as the Iron Dome to protect critical assets and ground troops.	The Israeli Air Force controls strategic airspace and high-altitude missile defence systems.	Close coordination through joint operations centres enables layered and integrated air and missile defence.

Table 1: Comparative Models of Tactical Air Defence Control

Common Themes and Lessons

Several consistent themes emerge from the comparative overview of international practices. A clear trend is the devolution of tactical control, with most militaries assigning authority over low- and medium-altitude airspace, along with associated AD assets, to land or ground forces. This reflects the operational necessity for persistent, localised command that can respond rapidly to dynamic threats. At the same time, air forces generally retain responsibility for high-altitude airspace, strategic strike missions, and theatre-wide air superiority, leveraging advanced platforms and centralised command structures.

Another universal feature is the emphasis on joint integration and coordination. Modern models prioritise robust command-and-control architectures—whether through integrated airspace coordination centres or joint air operations centres—that synchronise actions, prevent fratricide, and ensure operational cohesion.[11] Finally, a layered approach to AD emerges as a common denominator, combining ground-based systems with airborne assets to provide comprehensive coverage of the battlespace.

Implications for Indian Doctrine

India's evolving security environment and operational experience suggest the adoption of a similarly layered and integrated framework. Firstly, the Indian Army must be empowered with unequivocal authority over low- and medium-altitude airspace in the tactical battle area, enabling rapid and context-specific responses.[12] Secondly, the Indian Air Force should retain primacy over high-altitude airspace and strategic missions, preserving theatre-wide air superiority. Next, permanent joint command mechanisms, such as institutionalised airspace coordination centres staffed by both army and air force personnel, are essential to ensure seamless integration and operational coherence. Ultimately, sustained investment in layered AD capabilities, which blend indigenous ground-based systems with air assets, will provide resilient protection against diverse aerial threats.[13]

Despite the growing centrality of the air littoral, most militaries still lack an explicit doctrine for this domain. Ambiguous definitions and overlapping authorities between air and surface forces foster operational fragmentation and create vulnerabilities. Inconsistencies in terminology and the limited scope of joint exercises further compound the risks posed by low-cost drones, loitering munitions, and sophisticated electronic warfare. Latent command structures not only delay response but also leave gaps in coverage, raising the risk of fratricide.[14]

It is, therefore, imperative to define the air littoral as a distinct operational domain. Primary authority should rest with land forces, supported by institutionalised joint command-and-control structures and standardised terminology. Integrated training and rapid technological adaptation are equally critical. Evidence from Ukraine's centralised UAS operations and Operation Sindoor underscores that unified command markedly enhances both threat neutralisation and force protection.

Arguments for Land Force-Led Air Littoral Control

A range of operational and doctrinal considerations converge in favour of land force leadership in the air littoral. The first is persistence: ground forces require uninterrupted surveillance, protection, and continuity of operations in the air littoral. The second is stake and accountability: since ground troops are the most

exposed, their survival depends on immediate, context-aware control of the overhead battlespace. Proximity and responsiveness also matter, as sensor-to-shooter integration at the front lines enables near-instant engagement against fast-moving threats.

Land force-led control also remedies fragmentation by eliminating overlaps in authority, thereby improving interoperability. By contrast, concepts of air superiority rooted in high-end manned platforms lack persistence and are inefficient against swarms or low-altitude precision threats. Finally, the very character of close-quarters battle has expanded vertically. Ground formations now face multiple threats and only forces embedded in the tactical environment possess the agility to respond effectively to these threats.

Counterpoints and the Role of Air Forces

While arguments for land force-led control of the air littoral are compelling, counterpoints highlight the indispensable role of air forces, which retain critical expertise in airspace management, strategic planning, and networked command and control. Capabilities such as high-end fighters, advanced electronic warfare platforms, and persistent intelligence, surveillance, and reconnaissance assets augment joint operations, providing episodic massed effects that can rapidly shape the battlespace.

Challenges, however, emerge when land forces seek exclusive control of the littoral. Risks of procedural fragmentation, interoperability gaps, and resource duplication cannot be overlooked. The advanced sensors, networked systems, and electronic warfare capabilities that the air forces possess remain vital enablers. In this context, joint control models, structured through layered authority and flexible allocation of responsibilities, offer a pragmatic way to balance institutional strengths while minimising operational risks.[15]

Synthesising Joint Command: Layered Authority and Integration

Layered joint C2 divides strategic (air force) and tactical (land force) airspace control. Joint Airspace Operations Centres provide situational awareness, deconfliction, and dynamic tasking with representatives from all services. Advanced sensor fusion and networked C2 systems are essential, supported by clear rules of engagement, identification, and continuous joint training.

India's geography and conflict history necessitate army-led tactical airspace control. Persistent threats, ranging from UAS and loitering munitions to attack helicopters, require proximity, situational awareness, and the ability to leverage indigenous capabilities.[16] The army's operational experiences, culminating most recently in Operation Sindoor, demonstrate the value of direct and localised command, coupled with seamless integration and joint coordination at the operational and corps levels.

Modern dominance in the air littoral depends on a suite of evolving technologies. Tactical and loitering UAS, often organised in swarms, provide reconnaissance and precision strike options, especially when integrated with indigenous systems. C-UAS platforms that blend sensors, electronic warfare, and kinetic interceptors are equally critical. Advances in radar technology—such as active electronically scanned array and light detection and ranging—combined with sensor fusion and real-time airspace management systems, enhance detection and engagement capabilities. Artificial Intelligence enables autonomous targeting and swarm coordination, while rotary-wing assets and manned–unmanned teaming expand flexibility and coverage across the battlespace.[17]

Recommendations for Effective Air Littoral Control

Several policy imperatives follow from these operational realities. First, there is a need to codify tactical airspace control under a joint doctrine, clearly defining army-led authority, operational ceilings, and engagement protocols. Second, army AD must be expanded through investment in indigenous, multi-layered C-UAS and missile systems with integrated C2. Third, institutionalising joint structures, such as permanent Joint Airspace Coordination Centres, is essential for standardised procedures and effective inter-service coordination.[18]

Simultaneously, the air force's strategic roles must be preserved, including high-altitude command, strategic strike, and theatre-wide air superiority, with clearly demarcated boundaries and coordination protocols. Training and doctrine must keep pace, with the army developing programmes in multi-domain operations, conducting realistic joint exercises, and fostering cross-service exchanges. Finally, indigenous innovation must be prioritised by supporting research and development of terrain-optimised,

advanced defence systems, with rapid deployment cycles informed by frontline feedback.[19]

The Imperative of Tactical Airspace Ownership

Commanding tactical airspace is now a crucial operational requirement for survival and success. The army's constant presence and situational advantage enable rapid decision-making and prioritisation of threats. Collaboration with the air force's strategic roles must be fostered through doctrine and operational integration, ensuring a unified effort.

Implementing this doctrine requires clear authority for the army, the development of strong joint C2 structures, ongoing investment in technology and training, and a purposeful culture of joint effort. Sovereignty over tactical airspace not only protects frontline forces but also deters aggression and offers a lasting battlefield advantage.

Measurable benchmarks must support these imperatives. This includes training Commanders, empowering C2 of formations across all services, and expanding organic platforms within a set period to incorporate counter-UAS deployment for frontline units. Annual joint and multi-domain exercises, along with an increase in budget allocations for air littoral research and development.

Conclusion

Undoubtedly, assessing threats to the air littoral requires a paradigm shift in military thinking about verticality. An Australian Army Research Centre report points out that the use of drones has greatly increased the operational tempo of artillery engagements by 'Shortening time-critical targeting and firing cycles from about 30 minutes to 3-5 minutes'. AD dynamics and economics have also become problematic, with a range of small, low-altitude aerial targets now bypassing detection, and the existing AD systems not being cost-effective for engaging such inexpensive drones.

Countering drones in the air littoral is, therefore, one of the most urgent tasks facing military planners, and all services must participate in the solution. The rapid progress of drone warfare in ongoing conflicts is transforming the meaning of air superiority and challenging traditional ideas of airpower. Drones have largely

replaced manned aircraft in daily combat over the front lines, and they are actively contesting the emerging domain of the air littoral.

There is, therefore, a need to identify and empower a principal service responsible for the air littoral domain. Presently, the army seems to have responded decisively to the new contestation of the air littoral with the 'Eagle on the Arm' concept, as lethal drones directly threaten its soldiers.

Therefore, it is important to clearly distinguish and 'Decouple' the blue skies from the narrow, low-altitude area over the battlefield where these drones operate, by establishing a doctrine that assigns a service, preferably the army, to coordinate all resources to counter this emerging threat. The reality is that the future can no longer be approached as the past was.

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Super Soldiers

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Abstract

Human enhancement is a deliberate act of intervention in the body to change or augment otherwise normal ranges of human capabilities. These could be temporary or permanent. Recent advances in biotechnologies and related fields have led to the emergence of the idea that capabilities of a soldier could be augmented to perform most difficult tasks. The idea of enhancing soldiers is neither inherently wrong nor right; however, the consequences of enhancement are significant. An augmented or super soldier may constitute a new means or method of warfare. The International Humanitarian Law has four fundamental principles of military necessity, humanity, distinction, and proportionality. Each of these principles could be impacted by human enhancement both negatively and positively. The need to use human augmentation may ultimately be dictated by national interests.

Introduction

The militaries world over are trying to enhance the capabilities and performance of their soldiers through various means. Enhancements are not restoring lost function but surpassing normal human limits.[1] During earlier days, Greeks discovered enhancement properties of opium and used solution of opium in alcohol to augment soldiers during war, and in the aftermath of battle to calm them down and relieve hateful memories. During the colonial wars of the 19th and early 20th Centuries, the Western militaries

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faced serious challenge from the forces of local tribes, who enhanced themselves by consuming a wide variety of stimulating and hallucinogenic psychoactive drugs. An attempt was made in the 1920s to create 'Super Soldiers' for warfare, where the Soviet Union sought to use deoxyribonucleic acid manipulation to crossbreed humans with apes to create an army that would not easily die or complain by becoming resistant to pain and unconcerned about the quality of food they ate.[2] During the World War I, armies on the Allied as well as Axis power employed the drug on a mass scale to improve soldiers' performances. Alcohol has played major roles in war.[3] The Defence Advanced Research Projects Agency, a research and development agency of the United States (US) Department of Defence, also intended to create 'Human Chimeras' with genes from humans and animals in the name of creating a more efficient soldier. This project was later cancelled.[4]

Today, a few militaries are making investments in the enhancement of their armed forces. The emerging technologies like neuroscience, biotechnology, nanotechnology, robotics, Artificial Intelligence (AI), and data processing are being exploited to build soldiers and convert them into 'Super Soldiers', who could operate for days without sleep, lift heavy loads, learn faster, and execute operational tasks with ease. In Aug 2023, the Integrated Headquarters of Ministry of Defence (Army) issued a request for technical and commercial information for 48 jetpack suits that enable soldiers to fly short distances and heights.[5] A jetpack suit is a turbine-based individual mobility platform, which can lift a man safely across varied terrain and could weigh up to 40 kgs. An individual wearing such a suit can fly at a maximum speed of 50 km/hr and reach an altitude of up to 3,000 m. The duration of the fight can vary depending upon the model but would most likely be less than 10 minutes. These suits could be used in counterinsurgency, counterterrorism, war situations as well as during natural calamities.[6] Gravity Industries, which has developed the military version jet suit, demonstrated its military use during a North Atlantic Treaty Organization mountain warfare rescue exercise held in Slovenia in Dec 2021. The British Royal Navy and the US Marine Corps already use these jetpack suits in a limited role.[7]

Defining Super Soldier

A super soldier is a concept implying a soldier capable of operating beyond normal human abilities in terms of physical, cognitive, sensorial, and biological capabilities. This is possible only if a soldier is enhanced. It brings up the question of what exactly is 'Human Enhancement'. The term 'Enhancement' denotes the act of increasing or improving something's magnitude, quality, or value. Thus, the phrase human enhancement means the process of increasing well-being by improving the human mind, physical function, and natural abilities. Enhancement differs from therapy.[8] Soldier enhancement can be defined as enhancements that have a statistically relevant likelihood of increasing the probability of accomplishing the stated military objective through biological, medical, or technological change to a soldier's physical, metabolic, mental, emotional, or moral baseline (or current capability).[9] There is no single definition of human enhancement among authors representing different ethical positions. According to Boisboissel (2015), enhancing a soldier is the action of rendering him or her more efficient during military operations by:

- Strengthening intellectual skills (mental, psychological, cognitive) and/or physical abilities, or by letting the soldier acquire new skills.
- Using technologically advanced equipment worn by the soldier to enhance performance.
- Using non-therapeutic substances or static dynamic implants (nanomaterials, prostheses) or applying suitable gene therapeutic treatment.
- Applying enhancement for short- or long-term usage that can even be irreversible, provided its effects are controlled.[10]

According to another paper (Canadian Defence Research and Development), human enhancement includes any technology (drug or device) implanted, ingested, or worn closely to the body that temporarily or permanently modifies or contributes to human functioning.[11] Enhancement of the combatant, according to the author, could be defined as explained by Boisboissel above.[12]

This definition is broad in scope and unrestrictive to encompass enhanced performance derived from different techniques. Some possible enhancement techniques to improve performance of a soldier are as follows:

- **Training**. Physical or intellectual training to prepare for future missions (e.g., building muscular mass, following mental exercises, and improving on endurance).
- **Psychology**. Techniques for maximising potential esprit de corps.
- **Pharmacology**. Pharmacological adjustment or support in cases of stress, fatigue, decreased perception, increased cognitive capacities.
- **Neurosciences**. Transcranial magnetic stimulations to adjust neuronal activity levels, higher-learning capacities, or improved reaction times.
- **Surgery**. Anthropotechnics to improve human performance, free of any medical objective other than enhancing the human in an irreversible manner.
- **Biotechnologies**. Use of methods and techniques on living material to transform the human being and that of integrating mechanical elements or intelligent micro-components in human tissues.
- **Genetics**. Genetic modification for military use.

Military Enhancement Technologies

Armed forces personnel can be enhanced in different ways and for different purposes. Human augmentation, according to a British Government report, will become increasingly relevant and future wars will be won by those who can most effectively integrate the unique capabilities of both people and machine.[13] In a few developed countries, the methods currently being employed include nutrition and nutrigenomics (i.e., genetically personalised meals and supplements) which are designed to optimise physical and cognitive performance; pharmacological enhancement (e.g., nootropic substances, or smart drugs), which can modify biochemistry and improve physical and cognitive performance; and assisted wearable technologies and exoskeletons, which

enable loads to be carried that exceed the unaided ability whilst reducing injury risk. Enhancement can be accomplished through the use of following methods or devices, and each has its own advantages and drawbacks: exosuits and jetpack suits;[14] pharmaceuticals; vaccines; gene editing; body implants; nanotechnology; neuroscience; and biotechnology—especially synthetic biotechnology. Neuroscience, together with computing technology, also offers radical opportunities for enhancing cognitive performance. Uploading of human minds to AI systems represents one of the most radical possibilities for human enhancement.[15]

Wearable suits for the military are being tested by the US, China, Canada, South Korea, Great Britain, Russia[16], Australia, and many other countries for their military and special operation forces. With regards to pharmaceuticals, during the Vietnam War, the US military supplied its servicemen with speed, steroids, and painkillers to help them handle extended combat. Advancements in molecular biology have also provided an unprecedented level of accuracy and efficiency in genome editing.[17] A team of military medical scientists in China has claimed that they inserted a gene from the microscopic water bear[18] into human embryonic stem cells, which significantly increased these cells' resistance to radiation. The development of these technologies is based on the premise that military supremacy must be maintained at any cost.

Future of Super Soldier

The US Department of Defence predicts that by 2050, it will be feasible to enhance four capabilities in a soldier: ocular implant to sharpen vision, hearing, and situational awareness; optogenetic-enabled body-suits for full muscular control; auditory enhancement for communication and protection; and direct neural enhancement of the human brain for two-way data transfer.[19] Hopefully, in the near future, it will be possible for super soldiers to survive on grass for weeks; run for days without rest like wild dogs; communicate telepathically; may not need to sleep for days like dolphins; climb wall like lizards; resist stress; and undertake military operations in most difficult environment. This idea of enhancing soldiers is neither inherently wrong nor right; however, the consequences of enhancement are significant. Enhancement may question the identity of a soldier, challenge the core values of the military, alter the concept of war, and could lead to unanticipated

consequences during war and peace. Human performance enhancement in the military also raises issues of fairness and equity; it raises questions of health and safety, the possibility of social disruption, and legality under International Humanitarian Law (IHL).

Super Soldier and International Humanitarian Law

None of the IHL treaties directly regulate human enhancement technologies or creation of a super soldier. The Geneva Conventions of 1949 do not refer to terms like enhanced or super soldiers. According to Rain (2020), IHL prohibits the use of any enhancing intervention that diminishes the ability of a soldier to comply with the law.[20] For example, administration of a drug or the biomedical human performance enhancement would be unlawful under IHL, if it has an adverse effect on the soldiers' capacity to make judgements required by the law. Such enhancements may make them disinhibited and more impulsive or reduce their inclination to critically evaluate the lawfulness of orders given to them.[21] Criminal liability may still attach to soldiers who use the weapons to commit certain crimes under both domestic and international law. For instance, under the Geneva Conventions, wilful killing constitutes a war crime. There is a strong possibility that with the use of magnetic chips or transcranial magnetic stimulation in helmets, the super soldier could be remotely controlled by their commanders. If these soldiers commit a war crime, will it be legally justified to try them for the crime, when their capacity to make decisions was diminished or externally controlled. An enhanced soldier, who kills one or more persons protected under the Geneva Conventions during an international armed conflict, may be tried for war crimes before the International Criminal Court.[22]

Review under Article 36. The weapon review authorities of a state under Article 36 of Additional Protocols (AP) I[23] must ensure the following:

- The enhancement process is not of a nature that might cause superfluous injury or unnecessary suffering.
- The removal or reversal of enhancement must not be painful.

- The effects of the enhancement are irreversible—for example, in the case of gene editing or the physical modification of body parts, its reversal process would, thus, affect the soldier's return to civilian life.

- The enhancement must not cause any permanent psychological torment, disability, or disfigurement.

According to Harrison and Kleffner (2016)[24], an enhancement could be reviewable as one of the following:

- As a weapon, if the enhancement is specifically designed to cause injury or death to enemy personnel or cause damage or destruction to an object. For instance, an artificial limb with an inbuilt gun.[25]

- As means of warfare, if the technology is part of a weapon system and specifically used for the purpose of an attack. For instance, in the case of a brain–computer interface that allowed an operator to control a weapon with his or her mind or in the case of an eye lens that helped a soldier to identify targets.

- As a method of warfare, when the use of enhancement constitutes an integral part of offensive activities at the strategic and tactical levels. An enhancement could be reviewed as a method of warfare, if it is established that the purpose of the enhancement is to make the rule relating to distinction or proportionality impossible to apply.

If super soldiers are considered weapons, they are not *hors de combat* (out of the fight) entitled to legal and ethical protections under the Geneva Conventions.[26] Boulanin (2018) is of the view that an enhanced soldier could not be viewed as weapon, since the concept only refers to objects. Treating combatants as weapons would contradict the good-faith interpretation and ordinary use of the term.[27] According to Harrison (2016), if human enhancement technologies emerge as techniques for weapons and military units to deliver force against opposing armed forces and military objectives, they will invite the review obligations under Article 36 of AP I.[28]

Conclusion

In future warfare, the call for enhanced soldiers to serve as a country's elite killing machine would be a top priority for militaries. The enhanced individual would be programmed to be part of the expeditionary units to perform the most difficult tasks. These super soldiers could be equipped with exoskeletons that would allow for quicker reaction times, precision, and strength of robotic systems and the control and superior cognitive abilities of humans.[29] The pharmacological and bio-technological enhancement of soldiers raise important moral and legal concerns that are unique to the military environment. Enhanced soldiers must be able to follow the principles of IHL, namely distinction, proportionality, and precautions, and not to cause superfluous injury or unnecessary suffering to enemy combatants. Instead of classifying super soldiers as weapons, they should be considered as human beings with rights to autonomy, respect, and well-being.[30] It is necessary that innovative military weapon technologies are encouraged; however, the world needs to exercise care in ensuring that biotechnology and genetic engineering relating to the enhancement of a soldier does not outpace the principles and treaties of IHL.

Endnotes

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[2] Russell Grigg, "Stalin's ape-man Superwarriors", *Creation Ministries International*, 20 Aug 2007, accessed 15 Nov 2025, https://creation.com/stalins-ape-man-superwarriors

[3] Alcohol has played four major roles in war: (i) It has been employed to anaesthetise the wounded and prevent infections; (ii) It has been used as a stimulant to alleviate the stress of battle, raise courage and bring self-confidence in combat; (iii) It has mental therapeutic value, helps in relaxation, inducing sleep and has been used as a reward for the hardship of battle; and (iv) It has a psychological use, it strengthens the body by supplying considerable extra energy.

[4] Serious ethical objections were raised to chimeras because they blurred the lines between human and animal, male and female, parent, and child, and one individual and another individual. This resulted in adoption of the Human Chimera Prohibition Act of 2005 in the United States. The

Act made it unlawful for any person to knowingly, in or otherwise affecting interstate commerce: (i) create or attempt to create a human chimera; (ii) transfer or attempt to transfer a human embryo into a non-human womb; (iii) transfer or attempt to transfer a non-human embryo into a human womb; or (iv) transport or receive for any purpose a human chimera. Penalties for the violation of the Act was imprisonment up to 10 years, or/and fine of USD 1 mn.

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[17] Jonathan Montgomery et al., "Genome Editing: An Ethical Review", (London: Nuffield Council on Bioethics), 30 Sep 2016, p 128.

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Short Recoil System for Artillery Systems and its Application in the Indian Army

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Abstract

Modern artillery faces an increasingly lethal counter-bombardment environment, demanding rapid deployment, high mobility, and the ability to 'Shoot and Scoot' before adversary precision fires can respond. The ongoing war in Ukraine has underscored that survivability is now inseparable from mobility and reduced signatures. Against this backdrop, Soft Recoil System (SRS) technology represents a transformative shift in artillery design and employment. By introducing a controlled forward movement of the gun barrel prior to firing, SRS offsets recoil forces through momentum balancing, reducing trunnion pull by up to 60 per cent. This enables large-calibre artillery to be mounted on significantly lighter carriages or vehicles without compromising performance. This article examines the technical principles, operational advantages, and limitations of SRS, and assesses its relevance to the Indian Army's Field Artillery Rationalisation Plan. It highlights how SRS can enhance mobility, reduce deployment time, lower logistics and manpower requirements, and improve rates and consistency of fire. International developments, including combat validation in Ukraine and indigenous progress through systems such as the Garuda 105 mm, are analysed to draw lessons for India. The article

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argues for a phased adoption strategy encompassing indigenous development, retrofitting of existing guns, and expansion to 155 mm calibres. SRS is presented as a critical enabler for modern, agile artillery, and a strategic opportunity for India's defence industrial ecosystem.

Introduction

Modern artillery systems should be capable of rapid deployment, fire, and move before enemy Counter Bombardment (CB) becomes effective. There is, thus, a requirement for mobile, responsive artillery systems that can provide quick fire support and be adequately mobile to avoid adversaries' CB. The 'Shoot and Scoot' capability has become essential for survival against modern precision strike capabilities, which is more than evident from observations of the ongoing Ukraine War. It is imperative that innovative technologies are incorporated in the artillery systems to acquire this requirement. Adoption of a few emerging technologies may fundamentally change the operation of artillery guns, one of these is the Soft Recoil System (SRS). This can provide unique advantages in terms of mobility and, thus, operational effectiveness.

The Indian Army's ongoing artillery modernisation program under the Field Artillery Rationalisation Plan (FARP) involves significant transformations in artillery firepower capabilities. FARP aims to acquire 2,800 modern 155 mm artillery systems by 2027, including 1,580 towed guns, 814 mounted systems, 180 self-propelled wheeled guns, 100 tracked self-propelled guns, and 145 ultra-light howitzers.[1] It is imperative that this ambitious plan embodies technologies such as SRS. In this article, SRS is discussed with respect to the modernisation of India's artillery.

Technical Principles and Mechanism

The SRS is a paradigm shift from conventional recoil mechanisms, offering up to 60 per cent reduction[2] in recoil forces and enabling the deployment of larger calibre guns on smaller and more mobile carriages and mountings. Unlike traditional systems, where the gun barrel fires from a stationary fully runout position and absorbs the full recoil force, SRS employs a rapid pre-firing forward movement of the barrel that significantly reduces the Trunnion

Pull (TP). The rearward momentum of the barrel is due to the Newton's Third Law of Motion and the principle of conservation of momentum. A conventional recoil cycle requires the gun to absorb the entire recoil force generated by the projectile's forward momentum. In the case of SRS, the forward momentum of the barrel partially counteracts the rearward momentum due to the forward movement of the projectile. This results in significantly reduced net forces transmitted to the trunnions and, thus, the basic structure of the gun.

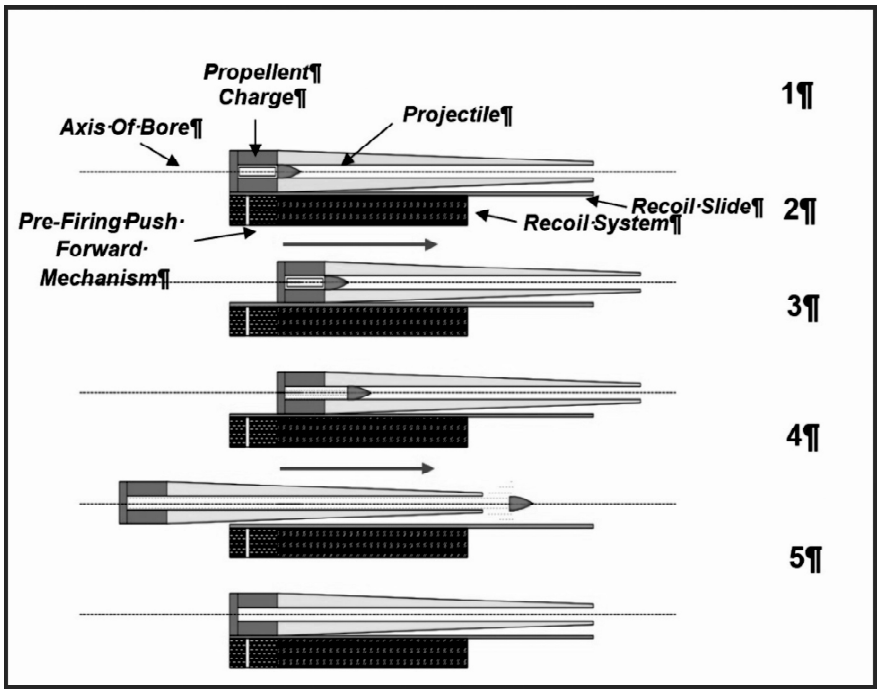

Figure 1: The Broad Stages of SRS
Source: Compiled by the author

The operational sequence of SRS is illustrated in the figure above. It can be described in five stages, as follows:

- **Stage 1: The Gun Barrel (Ordnance) Positioned in a Fully Runout Position**. Though the barrel is at rest any fully runout (advanced position post-recoil) position, it can move forward rapidly along the recoil slide by using the energy stored by compressed gases in hydro-pneumatic system, which can also be termed as Pre-Firing Push Forward System

(PFPFS). It is held in runout position by a restraining mechanism, which can be released when required to initiate the firing sequence.

- **Stage 2: Initiation of the Firing Sequence**. When the firing sequence initiates, the restraining mechanism releases the barrel. The barrel moves forward rapidly using the energy stored in the PFPFS to a pre-determined distance.

- **Stage 3: Ignition of Propellant Charge**. Upon reaching the optimal run-up distance of the barrel, the propellant charge is ignited, and projectile commences its forward movement. The precise timing of the ignition at an optimal runout distance is critical; it is calculated by onboard sensors and electronics based mainly on the type of ammunition. Part of the rearward recoil momentum is offset by the forward momentum of the barrel.

- **Stage 4: Movement to Fully Recoiled Position**. The hybrid recoil mechanism, comprising the conventional recoil system and PFPFS, absorbs the remaining part of the momentum of the recoiling mass and brings it to the rest in the fully recoiled position. The remaining recoil energy is stored in two components in compressed air and gas, one part in the PFPFS for the next firing cycle and rest to push the recoiling mass to fully runout position.

- **Stage 5: Barrel in Fully Runout Position for Next Firing Cycle**. The recoiling mass including the barrel is pushed forward to its fully runout position by compressed gases in the recoil system. The PFPFS has adequate energy stored in the form of compressed gas to move the recoiling mass forward for the next firing sequence.

This SRS technology leverages advanced hybrid hydro-pneumatic systems, which cater to both PFPFS and conventional recoil systems, where compressed air acts as a spring mechanism for storing energy in the Stage 1 position (refer to Figure 1) for forward movement of the barrel. Moreover, the recoil impulse is spread over a longer period rather than over the shorter interval in a conventional recoil system. This distribution of forces significantly reduces peak TP on the basic structure.

Advantages Over Conventional Recoil Systems

- **Reduction of TP**. The reduction of the TP represents the most significant benefit, with SRS systems achieving almost 60 per cent reduction in forces transferred to the platform, as compared to conventional systems. This reduction enables the mounting of larger calibre weapons on significantly lighter carriage and mounting, thus, reducing the weight-to-firepower ratio of the system. This reduction of the TP unleashes a plethora of options and opportunities for the development of artillery systems, which are elaborated further.

- **Reduction of Weight**. Due to the reduced TP, the weight of the bulky systems (trails, spades, or mountings) required to transmit firing stresses to the ground reduces significantly. SRS may enable up to 50 per cent lighter gun carriages compared to conventional recoil systems.[3] This weight reduction directly translates to enhanced mobility. Mounted Gun Systems (MGS) with lighter mounts provides a dramatic advantage in the on-road and off-road mobility of artillery gun systems and enables artillery pieces to be deployed by lighter prime movers or aircraft. The reduced structural requirements simplify logistics and transportation.

- **Higher Rate of Fire**. Higher firing rates represent another operational benefit. SRS can achieve significantly higher firing rates due to increased stability and faster return to runout position.

- **Improved Consistency**. Reduced firing stress allows for a higher degree of stability during firing sequences for higher consistency of fire at the target end.

- **Time to Come into Acton**. With reduced weight, the time required to bring an artillery piece into action is likely to reduce drastically; it is estimated that the time may reduce by half.[4] This parameter is valuable in modern warfare scenarios, where rapid deployment and redeployment are essential for survival.

- **Reduction of Gun Detachments**. The strength of gun detachments is likely to reduce with lighter and efficient systems fostered by SRS. This, again, reduces the logistics tail and enables the manning of additional assets within the same manpower.

- **Reduction of Moving Parts**. The SRS itself is a complex technology, however, the number of moving parts reduce significantly. The reduction of number of moving parts is directly related to reduction of stabilising assemblies like trails, etc. This reduces the maintenance tail and engenders economy.

- **Economy**. In the longer run, SRS is likely to reduce the overall cost of the equipment. While initial system costs may be higher, reduced infrastructure requirements and enhanced capability provide favourable lifecycle economics.

- **Reduced Logistics Trail**. There is a meaningful reduction in logistics tail in SRS-equipped systems. This is primarily due to lighter equipment, where mobile gun mounts will eliminate requirement of separate Field Artillery Tractors (FAT), and result in lesser fuel consumption, limited spares inventory, and reduced manpower.

Limitations

- **Complex System**. The SRS is a complex system which requires sophisticated timing and control systems to ensure proper firing sequence coordination. Moreover, different charges and projectile weights require varying run-up velocities to optimise the system. However, this can be overcome by using high-grade sensors and microcontrollers. This necessitates advanced systems with integrated sensors, which can calculate optimal timing parameters for different ammunition types.

- **Misfires and Premature Firing**. If a round fails to fire during the run-up phase (refer to Stage 2 in Figure 1), the mechanism and force required to bring the forward-moving mass to zero will cause instability to the weapon and may even cause damage. Similarly, premature firing before reaching the optimal velocity and distance can generate immense recoil forces, which will lead to instability or severe damage.

International Adoption and Development

- **Hawkeye: 105mm Mobile Howitzer System (Refer Table 1 below)**. SRS has evoked interest in a few countries to develop this technology. The United States (US) leads in

practical application through the AM General and Mandus Group collaboration, which has developed the Hawkeye 105mm Mobile Howitzer System. This system has undergone extensive testing with the US Army and has been deployed to Ukraine for combat evaluation, representing the first operational use of SRS in an active conflict.[2] The system was delivered in Apr 2024 and immediately entered combat testing, providing real-world performance data under actual battlefield conditions.

Image 1: Hawkeye: 105mm Mobile Howitzer System (Lightweight Trails and Platform Stabilisers)

Source: Mandus Group[3]

- **Brutus: 155 mm System (Refer Table 1 below)**. Brutus is a 155 mm mobile hybrid soft recoil howitzer, jointly developed by AM General and Mandus Group. It employs SRS like that of the Hawkeye 105 mm mobile weapon system. It meets the requirement of a lightweight, vehicle-mounted large calibre howitzer. The equipment was tested in Feb 2018[4]; its present status of induction into the US Army is not known.

Image 2: Brutus 155 mm System (Lightweight Trails and Platform Stabilisers)

Source: AM General[8]

- **Garuda 105/37 mm V2 4×4 Go-Anywhere System (Refer to Appendix A)**. This equipment has been developed by Kalyani Strategic Systems Limited (KSSL), in collaboration with Mandus Group. It demonstrates India's capability to develop indigenous SRS. This ultra-light system, weighing about 900 kgs as compared to the conventional 105 mm systems at 3.2 tons[9], showcases the technology's potential. The system can be mounted on standard tactical vehicles like the TATA 4×4 or lighter platforms, providing exceptional mobility. Initial trials were conducted by the Indian Army with purportedly positive results.[10]

Image 3: Garuda 105/37 mm system (Lightweight Trails and Platform Stabilisers)

Source: KSSL[11]

Weapon System	Garuda 105 V2 4×4 Go-Anywhere Gun by KSSL India[12]	Hawkeye: 105 mm Mobile Howitzer System by AM General and Mandus Group[13]	Brutus Mobile Howitzer System by AM General[14]
Calibre and Mount	105/37 mm Mounted on TATA 4x4/Humvee or 6×6 High-Mobility Vehicles; Towed/Mounted versions	105 mm/3 mm mounted on M1152A1w/B2 Humvee. The system consists of two trucks	155/39 mm
Range	Rocket-Assisted Projectile (RAP): 19.6 kms; Standard: 11.6kms	RAP: 19.6 kms; Standard: 11.6 kms	RAP: 30 kms; Charge 5: 24.7 kms
Traverse	Traverses 30 degrees left and right Elevation-5 to 72 degrees	Traverses 180 degrees. 360 degrees possible, if required. Elevation: 5 to 72 degrees	Traverses 360 degrees Elevation: 5 to 72 degrees
Weight (without Mount)	900 kgs[15] Air-portable using helicopters	1,156 Kgs	2,890 kgs
Rate of Fire	NA	Maximum 8 rounds per hour for 3 mins Sustained: 3 rounds per hour	Max 5 rounds per hour Sustained: 2 rounds per hour
Time to Come into Action and Shoot and Scoot Capability	1.5 mins-Day 2 Mins-Night	Fire a two-round mission and vacate the firing position in 3 minutes, i.e., 1.5 mins to first round fired	NA
Crew	3-5	4 2 in extreme conditions	5-7 5 in extreme conditions
Equivalent Full Charge	4,500	6,500	NA
Carriage Material	High Strength Aluminium	Aluminium Alloy	Aluminium

Table 1: Major Parameters of Current and Under Development Artillery Systems with SRS

The evolution of SRS continues advancing toward more sophisticated and reliable systems. Automation integration is critical in SRS, wherein high technology is used to transfer data between different systems and applications. These systems incorporate advanced sensors and computer control to optimise firing sequences automatically. These systems should be able to work out and apply run-up distances and timings in real time, based on ammunition type, environmental conditions, and target posture.

The initial applications have been focussed on 105 mm calibre, which has been operationalised. However, SRS must be extrapolated to minimum calibre of 155 mm for an optimal operational effect. Brutus 155 mm system, developed by AM General and Mandus Group, is one such example, however, its operational status is not known yet. The differential in weight and mobility from conventional systems is evident in the details of artillery systems in Table 2 below:

Gun/How System	**105 mm Light Field Gun (LFG)[16]**	**Dhanush Artillery System[17]**
Calibre	105/37 mm LFG	155/45 mm with auxiliary propulsion gun
Range	17.2 kms	38 kms with base bleed unit
Traverse and Elevation	Traverses 360 degrees on platform; 5 degrees left and right Elevation-5 to 72 degrees	Traverses 30 degrees left and right Elevation-3 to 70 degrees
Weight	2,380 kgs	13,000 kgs
Time to Come into and out of Action and Shoot and Scoot Capability	2-3 mins	NA
Crew	7	6-8
Equivalent Full Charge	4,500	NA
Rate of Fire	Normal-4 Intense-6 Sustained Operations Up to Charge 5: 1 round per hour for 2 hrs For Super Charge: 1 round per 2 min for 2 hrs	3 Rounds in 15 seconds (burst mode) Sustained Operations: 60 rounds per hour in sustained operations.
Carriage Material	Conventional	Conventional

Table 2: Details of Existing Artillery Systems with Conventional Recoil Systems

The Way Forward

The future development of SRS in India should follow a structured approach, progressing from developed systems like the 105 mm Garuda towards advance technologies. Initially, India should focus on 105 mm systems, where it has already reached a fieldable level of development. Thereafter, 155 mm calibre should be developed building on experience gained with 105 mm systems. The development of SRS variants of Advanced Towed Artillery Gun System (ATAGS) or Dhanush could provide enhanced capabilities while leveraging existing state of indigenous development. The progress on 105 mm and 155 mm systems could progress in tandem.

- **Retrofitting of Existing Equipment.** India has a large inventory of non-SRS artillery equipment, which should be retrofitted with SRS. Once the SRS has been perfected, the existing towed assets should be retrofitted with SRS and mounted on light mounts. The aim should be to hold on to existing barrels and ammunition while replacing the remaining systems with SRS. This will also eliminate the requirement of FAT. Several major retrofitments have been made in Indian Artillery on earlier occasions and should be feasible at the level of base workshops. This turns out to be the only viable option till the entire inventory is 'SRS-ised'.

  The current concept of MGS is a hybrid between self-propelled and towed artillery without SRS. It provides significant mobility advantages over towed artillery. Since, India has a large inventory of towed artillery, adoption of MGS could proceed side-by-side till the retro fitment with SRS is completed and deployed. The target should have all towed assets with SRS while resorting to MGS as a stop gap, in a phased manner.

- **ATAGS.** ATAGS enhancement with SRS would be a force multiplier in the Indian context. The gun's present weight of 18 tons can be significantly reduced by the SRS while retaining its other features. The heavy FATs can be eliminated once the SRS-fitted equipment is fixed on light mounts.

- **Research and Development (R&D).** R&D infrastructure supporting SRS includes specialised manufacturing facilities and design centres. Indian industry has developed expertise in critical technologies including advanced metallurgy, hydraulic systems, and precision timing mechanisms essential for soft

recoil operations. India's pursuit of SRS reflects the nation's broader commitment to developing indigenous defence capabilities under the 'Make in India' initiative. KSSL, a subsidiary of Bharat Forge, has emerged as the primary developer of SRS in India through their Garuda 105 mm howitzer. Defence Research and Development Organisation's involvement in soft recoil research extends through various laboratories, including the Armament Research and Development Establishment and Vehicle Research and Development Establishment. These organisations have developed expertise in advanced recoil mechanisms and continue researching applications for larger calibre systems. Tata Advanced Systems, Mahindra Defence, and Advanced Weapons and Equipment India Limited have the potential to develop SRS. They can create a competitive development environment. Technology transfer opportunities through partnerships with companies like AM General and Mandus Group could provide Indian industry with advanced artillery technologies while supporting its Make in India objectives.

- **Exports.** KSSL is already an arms exporter with export of 100 artillery guns (non-SRS), in 2024. The export order covers the sale of the MAG 155 mm wheeled self-propelled howitzer and ATAGS 155 mm towed gun to Armenia. This achievement showcases the growing presence of India in the global artillery market. KSSL's ability to produce one gun barrel per day with an annual capacity of 350 barrels represents significant industrial capability.[19] The SRS technology is already in the reach of Indian Industry within the existing industrial and technological environment, with KSSL well on the way of perfecting this technology. The growing global interest in lightweight artillery systems creates export opportunities for India. Export validation through international trials will provide additional validation of Indian SRS technology capabilities and demonstrating its export potential.

Conclusion

SRS represents a transformative advancement in artillery systems with relevance for the Indian Army's operational requirements and modernisation objectives. The successful combat deployment of SRSs in Ukraine validates the technology's battlefield effectiveness while demonstrating its readiness for operational use. The

successful development and initial trials of indigenous systems, like the Garuda 105 mm, demonstrate India's capability to develop and deploy this advanced technology independently. Initial trials of this technology by the Indian Army provides confidence in the technology's reliability. Looking forward, the Indian Army should pursue graduated adoption of SRS. The technology's potential for enhancing India's capabilities while supporting indigenous defence industrial development makes it a strategic priority, worthy of deserving continued investment and development. Through pragmatic implementation and continued technological advancement, SRSs can provide the Indian Army with the desired artillery capabilities. India should capitalise on the enviable progress already made in this field by its industry in a short period.

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India's Northeast Region and its Significance as India's Gateway to Southeast Asia

Brigadier Nishit Ranjan[@]

"Bharat is considered the world's most diverse nation, and our Northeast is the most diverse part of this diverse nation. From trade to tradition, from textiles to tourism, the diversity of the Northeast is its greatest strength"

- Narendra Modi,
Prime Minister of India

Abstract

The article examines India's enduring engagement with Southeast Asia, rooted in ancient cultural and maritime ties and reshaped by contemporary strategic interests. Following the Cold War, India recalibrated its foreign policy through the Look East Policy of 1992, which strengthened economic and political cooperation with the Association of Southeast Asian Nations and expanded regional integration. This evolved into the Act East Policy in 2014, broadening collaboration into security, education, health, technology, and maritime domains. Central to this outreach is India's Northeast Region, positioned as a strategic gateway to Southeast Asia but challenged by security concerns, porous borders, and uneven connectivity. The article highlights major infrastructure projects—including the Kaladan Multimodal Transit Project and the India–Myanmar–Thailand Trilateral Highway—designed to unlock the region's economic potential. It concludes

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that realising the Act East vision requires improved connectivity, a stable security environment, deeper regional partnerships, and effective utilisation of the Northeast's rich natural and economic resources.

Introduction

Southeast Asia has always been an 'Area of Interest' for India, which enjoys multifaceted linkages transcending cultural, social, commercial, and religious affiliations. Close cultural engagements of India with Southeast Asian countries can be traced to antiquity. Temples and monasteries of Angkor Wat in Cambodia, Borobudur in Indonesia, Champa Kingdom in Vietnam, and the Shwedagon in Myanmar are some of the many attestations of the flourishing interactions. The region has often been referred to as *Swarna Bhumi* (Golden Land). Proliferation of Buddha's teachings and Buddhism, as a religion, evidences the deep geocultural linkages in the region. Flourishing maritime relations established during the Chola dynasty with Southeast Asia are often referred to in historical discourses, highlighting the economic engagements and prosperous trade during the period.

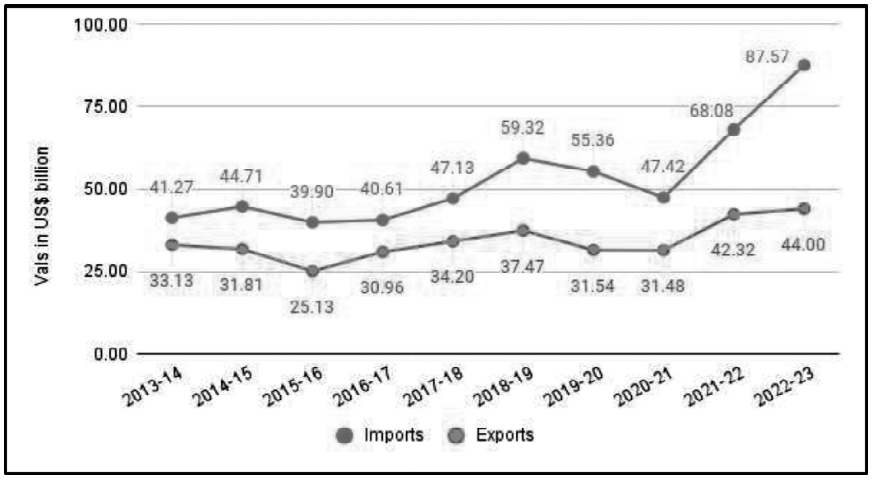
India's strategic arena has always prioritised its neighbourhood extending to the South and Southeast Asian region. Priority accorded to the region was evident when India hosted the Asian Relations Conference in New Delhi from 23 Mar to 02 Apr 1947.[1] India's strategic calculus, stemming from its trust in non-alignment, fairly engaged with different global powers and regional entities without affiliating with any group or bloc of countries. By the latter half of the last century, and evolving through its conflicts with neighbouring countries, India gravitated towards the Soviet bloc and was dependent on it for military, political, and economic support during the Cold War era.

The dissolution of the Soviet Union in 1991 necessitated a re-calibration of India's foreign policy as its fall deprived India of assured partners. The subsequent world order and the turmoil in the Middle East, in the closing decades of the 20th Century, mandated that India diversified its strategic associations to include countries in addition to its traditional partners, viz, the Russian Bloc (the erstwhile Soviet Union) and the Middle East countries, for securing its national interests. A shift in Indian approach for its strategic outlook towards the economically robust Southeast Asia

was a natural consequence, acknowledging the latter's significance in the global landscape.[2]

The Look East Policy

The strategic approach of India was edified in its enumeration of the 'Look East Policy' in 1992 by the then-Prime Minister Narsimha Rao, wherein, the then-Government of India (GoI) defined its approach to Southeast Asia and started with becoming a sectoral dialogue partner of the Association of Southeast Asian Nations (ASEAN). The policy was subsequently expanded to include East Asia and Oceania.[3] India's Look East Policy marked a significant shift in its foreign policy, as it aimed to re-connect and strengthen relationships with countries of Southeast and East Asia.



Graph 1: India–ASEAN Trade
Source: The Economic Times

During tenancy of the Look East Policy, bilateral trade between India and Southeast Asia got a major boost, wherein, Singapore, Malaysia, Vietnam, and Indonesia emerged as the most significant trade partners. Emphasis was directed to engage with Cambodia, Myanmar, Laos, Vietnam, where huge opportunities existed for extension of India's influence. New Delhi formalised bilateral Free Trade Agreements (FTAs) with Thailand and Malaysia and economic cooperation agreements with Indonesia, Malaysia, and Singapore. Myanmar, India's eastern neighbour, emerged as a land bridge to ASEAN.

The Look East Policy was effective in significantly enhancing India's interactions with Southeast Asian countries. Trade volumes between India and major countries of Southeast Asia reflected the focus and priority. India's exports to ASEAN member countries stood at USD 25,627.89 mn in the year 2010-11, while imports from these nations amounted to USD 30,607.96 mn. In the fiscal year 2022-2023, India's exports to ASEAN countries were posted at USD 44,000.42 mn, but imports surged far ahead at USD 87,577.42 mn during the same period.[4]

The Act East Policy

A detailed analysis of bilateral trade between India and ASEAN countries reveals growth across various sectors, including minerals, fuels, oils, organic chemicals, plastics, rubber and rubber products, gems and jewellery, iron, steel, and electronic equipment, among others. A notable achievement of the Look East Policy was the signing of the India-ASEAN FTA on 13 Aug 2009 in Bangkok.[5]

While India was steadily progressing its Look East Policy and making an impressive progress, it realised that the efforts needed a boost and there was a need to engage with the Indo-Pacific region with a greater prominence. It was in 2014 that the Indian Prime Minister Narendra Modi announced enhancement in engagements with India's East and Southeast through an action-oriented appellation, the Act East Policy.[6] While the focus remained on trade and commerce, the engagements have significantly increased in areas of education, medical, agriculture, security, maritime information exchanges, cyber security, defence, energy, science and technology, tourism, and youth exchange programs.

India's Northeast Region (NER)

Geostrategic importance of the NER has time and again been emphasised, as it serves as India's gateway to Southeast Asia. As a confederation, the NER, comprising of eight states of the Republic of India, christened as India's *Ashtalakshmi* (the eight representations of the goddess of wealth) by Prime Minister Modi[7], has direct land borders with five countries—Myanmar, Bangladesh, Bhutan, Nepal, and China and, thus, has an important role in India's outreach towards its east under the overarching umbrella of the 'Act East' and the 'Neighbourhood First' policies. The wealth of natural resources and its potential for development provides a very lucrative opportunity for holistic growth of the region.

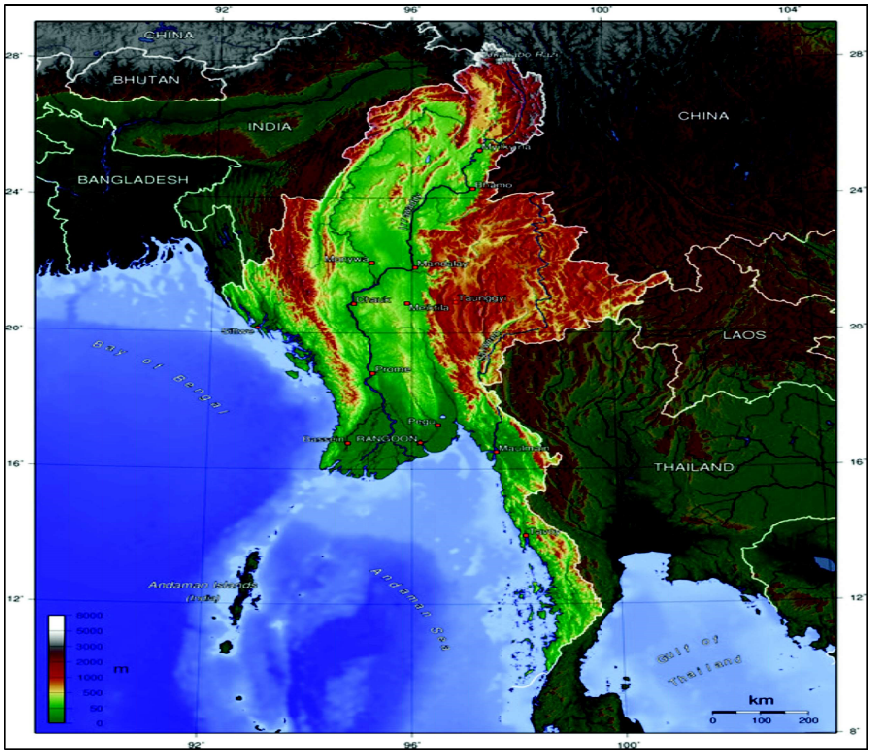


Image 1: India's Eastern Neighbours
Source: Wikipedia

The region has a volatile security situation emanating from its violently antagonised social structures. A porous border with Myanmar only allows frequent movements of insurgents across the international boundary along with the flow of arms and combat equipment. The region has also been considered as a conduit of drugs and narcotics, emanating from the 'Golden Triangle'. The recent past has also witnessed growing demographic and social stress in the region. An assuring security environment and a stable political setup becomes an imperative for the development of the region as a spring board for India's eastward endeavours.

While social, security, and economic challenges remain, the region has emerged as the fulcrum of India's outreach to Southeast Asia. The NER can be a catalyst in India's engagements with Southeast Asia. India's participation in eight sub-regional and regional groupings—ASEAN, the East Asia Summit (ASEAN+6), Bay of Bengal Initiative for Multi-sectoral Technical and Economic Cooperation (BIMSTEC), Asia-Pacific Trade Agreement (APTA),

South Asia Subregional Economic Cooperation (SASEC), the Asia-Pacific Economic Cooperation (APEC), the Greater Mekong Subregion, and the Mekong-Ganga Cooperation—reflects the importance accorded by New Delhi to the region.

Leveraging the geostrategic advantage of the NER, the GoI initiated major connectivity projects with an aim to enable smooth trade flow between the Indian subcontinent and the Southeast Asia. Emphasis was on developing communication channels through economic corridors with air, rail, and road links. The initiatives, mainly driven under the aegis of the Ministry of Development of NER, focussed on developing infrastructure to integrate the region through a network of transport systems.

Over the decades, the GoI has remained focussed on infrastructural development of the region, with special emphasis accorded to multi-modal transportation network through its various developmental projects like the Pradhan Mantri Gatishakti, Bharatmala Pariyojana, Ude Desh ka Aam Nagrik schemes, and others. Projects under the Special Accelerated Road Development Program for North East have resulted in better connectivity through laying new roads as well as improving existing ones. Road construction projects covering up to 3,300 kms with a cost estimate of INR 60,211 cr, funded by the Asian Development Bank and the Japan International Cooperation Agency, are under progress and likely to be completed by 2028. Surface communication in the region has significantly improved with over 10,000 kms of road surface constructed during the last decade (2014-24) at a total cost of INR 1.07 lakh cr. Projects for expansion of the National Highways network in the region are currently being undertaken for construction of over 5,000 kms of highways. Numerous bridges extending up to 28.48 kms are presently under construction in states like Assam, Sikkim, and Manipur and are likely to be commissioned by 2028. Significant projects include the Bogibeel Bridge and the Dhubri–Phulbari Bridge (presently under construction).[8]

Major initiatives in waterways have been taken to facilitate economic development of the region. Development of Brahmaputra and Barak rivers as National Waterways (NWs), under the aegis of Inland Waterways Authority of India, has significantly impacted connectivity with more than 15 identified NWs in the region.[9] The

geographical disadvantage of the region in being 'Land-locked' and remaining distant from any sea has remained a major constraint and necessitates passage through neighbouring countries like Bangladesh and Myanmar to allow faster access to the maritime routes.

Image 2: Government of India's Infrastructural Development in North East
Source: PIB

The objectives of the initiative were to enhance trade, foster cultural exchanges, ensure regional stability, and strengthen India's strategic and geoeconomic influence in the Southeast Asia.[10] The Kaladan Multimodal Transit Transport Project and the India–Myanmar–Thailand Trilateral Highway (IMT–TW) Project are the two major initiatives by the GoI to connect the region with the 'East of India'.

Kaladan Project was a joint initiative by India and Myanmar, initiated in 2008 when the Framework Agreement was signed. The project was conceptualised with an aim to provide connectivity between India and Myanmar from ports on India's eastern seaport to Myanmar's Sittwe Port and further to Northeast India through Myanmar using sea, river, and road transport routes. The project facilitates access to coastline, a necessity for economic development of the region. The project includes a waterway component of 158 kms on Kaladan River from Sittwe to Paletwa in Myanmar and a road component of 109 kms from Paletwa to Zorinpui on India-Myanmar border in Mizoram.[11]

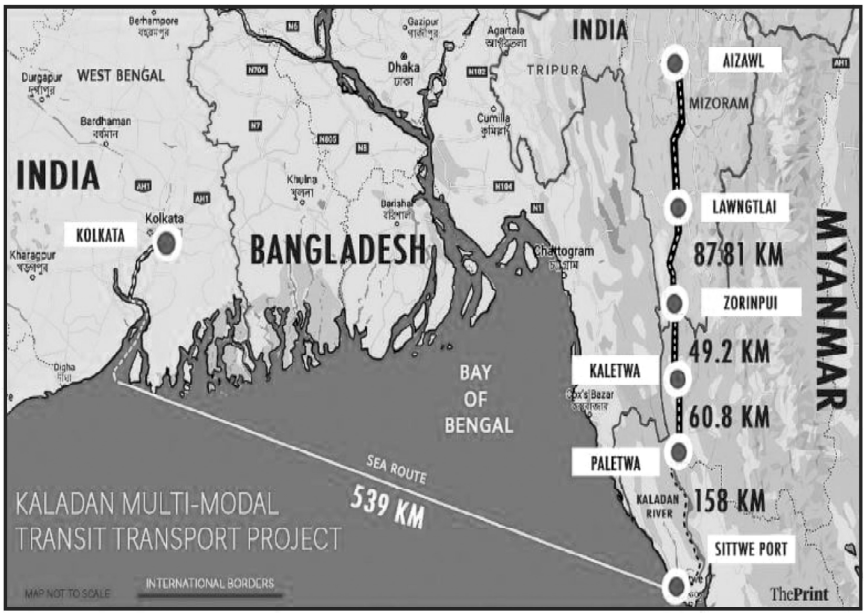


Image 3: Kaladan Multi-Modal Transit Transport Project

Source: The Print

While the project has made significant progress, the political situation in Myanmar and the civil unrest there, especially the security situation in its Rakhine and Chin states (through which the project is planned), has adversely affected the completion of the project. The major portions of the project have been completed–which includes the construction of Sittwe Port, a river terminal at Paletwa, and the dredging of a stretch of 158 kms of the Kaladan River–but the Paletwa-Zorinpui highway is yet to be constructed.[12,13]

The IMT–TW Project was conceptualised in 2002 to enhance connectivity with India's Eastwardly neighbours. The project was initiated to develop the NER as a launch-pad for India's trade with its East. Future proposals include extension of the road connectivity to Cambodia, Laos, and Vietnam.

Image 4: India–Myanmar–Thailand Trilateral Highway Project

Source: Google

The IMT-TH aims to connect India's Northeast with Thailand via Myanmar, facilitating trade, education, tourism, and health links by providing a more efficient and cost-effective transportation route. The land route stretching 1,360 kms has significant economic incentives for India as it engages with the 'Tiger Economies' of Asia. India's trade with ASEAN has witnessed a major enhancement in the recent past. In 2022-23, India's exports to ASEAN rose to USD 44 bn from USD 42.32 bn in 2021-22. Imports surged in 2022-23, reaching USD 87.57 bn, as compared to USD 68 bn in the previous year.[14]

Despite the focus on early completion of the IMT-TH project, political instability, a worsening security situation, financing issues, environmental concerns, and multiple natural calamities have delayed its progress.

As of 15 Dec 2024, a total of 86 projects, valued at INR 71,970.54 cr, have been approved, with INR 21,590.81 cr disbursed under various schemes of the Ministry of Development of NER viz., Northeast Special Infrastructure Development Scheme (NESIDS) Other Than Roads Infrastructure, NESIDS–Roads, Prime Minister's Development Initiative for Northeast Region, schemes of Northeastern Council, and special development packages.[15]

The Act East Policy defines India's approach towards its eastern neighbours. The enormous economic, cultural, and political potential of the NER needs to be leveraged by India as it strides to emerge as a regional power. Multinational organisations like ASEAN, BIMSTEC, East Asia Summit, APTA, SASEC, APEC, the Greater Mekong Subregion, the Mekong-Ganga Cooperation, and others needs to be made effective with economic integration and social inclusion. Some of the recommended measures which may be prioritised for regional integration and making the Act East Policy of India more effective are as under:

- **Understanding of NER**. The NER is often understood as a homogeneous collective entity, disregarding the varied social, cultural, and historic identities of its individual constituent states. The eight states in the region have vastly divergent traditions and cultural identities, and the unique ethnicity needs to be understood in the correct context with due weightage to its divergence and uniqueness.

- **Connectivity**. Projects like the Kaladan Project and the Trilateral Highway Project need to be pursued with greater diligence in consultation and collaboration with all stakeholders especially the military junta and the armed insurgent groups. Concerns of the Arakan Army (the most significant armed insurgent group active in the Rakhine state) needs to be assuaged and the benefits therein explained as a win-win situation for all. Faster and direct access to sea is essential for the economic growth of the region and this mandates safe, secure, and smooth routes through Bangladesh and Myanmar to assess the maritime trade opportunities.

- **Security Environment**. India and Myanmar must initiate confidence-building measures towards stabilising the regional security situation, especially in Chin and Rakhine states. Though it may appear politically outlandish, armed insurgent groups like the Arakan Army need to be co-opted into the peace process. It is also important to have a conducive security situation in Northeast India for developmental projects to complete.

- **Development of NER**. The vast economic potential of the Northeast states of India, in terms of its natural resources, must get explored and utilised to make the region economically lucrative for investments. The area has abundant opportunities as a manufacturing hub and a tourist destination. The NER must get intricately integrated in the *Atmanirbhar Bharat* (self-reliant India) initiatives with an aim to exploit its potential in the manufacturing sector. But for all these to flourish in the region, it is imperative that a stable, peaceful, and secure environment is established.

- **Enhanced Defence Cooperation**. Enhanced defence cooperation in areas of disaster management, military training (allowing enhanced vacancies to foreign personnel in respective training establishments), bilateral and multilateral exercises, facilitated access to the evolving indigenous defence manufacturing industry, and more frequent interactions across the hierarchy will facilitate better understanding of the other's strategic environment, its compulsions, and complexities. Such engagements help build long-term and sustained relations across the borders.

Conclusion

India's NER has inherent potential to develop as an economically viable hub with its native availability of natural resources and vast potential in areas of industrialisation, tourism, medical facilities, and agriculture. The region is an essential component in India's outreach to its East as its endeavours to connect with the core of Asia—Southeast Asia, East Asia, and the Indo-Pacific. While the GoI is motivated to create infrastructures and establish systems and procedures to integrate the region, the disorderly security situation and vested interests of other competing regional powers make such efforts challenging. The enormous economic potential of the region needs to be acknowledged and, through collective and collaborative efforts, developed to benefit all of its constituent partners.

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Metal Minds and Machine Soldiers: Warfare Reimagined Beyond the Human Edge

Colonel Vikas Yadav (Retd)[@]

Abstract

The landscape of modern warfare is undergoing a profound transformation as witnessed recently through the integration of advanced technologies, most notably Artificial Intelligence (AI)-driven drones and autonomous weapons. AI-enabled drones possess the capability to perform surveillance, execute strike missions, and undertake decision-making with minimal human intervention, while the deployment of autonomous weapons has generated critical debates concerning issues of control, accountability, and ethics. Despite the promise of enhanced operational effectiveness, these technologies present formidable challenges, including cybersecurity vulnerabilities, risks of malfunction, the potential proliferation to non-state actors, and the diminishing role of human oversight in lethal engagements. Moreover, the intensifying global competition for technological superiority threatens to exacerbate instability and accelerate an arms race. Addressing these concerns necessitates a careful balance between innovation and humanitarian imperatives, supported by robust international regulations, clearly defined doctrines, and ethical frameworks to govern the responsible employment of AI-driven drones and autonomous weapons in future warfare.

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Introduction

"*The will is a beast of burden. If God mounts it, it wishes and goes as God wills; if Satan mounts it, it wishes and goes as Satan wills. Nor can it choose its rider…. the rider contends for its possession*" [1]

- Martin Luther

As the world steps into the era of drones, Artificial Intelligence (AI), and autonomous weapons, the warfare too evolves into an AI-first domain.[2] In just a few months, three military operations[3] reshaped the dynamics of modern warfare—Operation Spider Web, Operation Rising Lion, and Operation Sindoor—employing autonomous drones and weapons with AI. India's Operation Sindoor[4] marked a defining moment when India and Pakistan, two nuclear-armed adversaries, crossed the threshold into autonomous warfare, led by intelligent drones at the forefront—high-tech Harops and Herons—capable of loitering, manoeuvring, and autonomously selecting targets with precision altering fundamental Rules of Engagement (ROE) and embracing a 'New Normal' of unmanned airborne deterrence. The conflict proved right the various themes[5] of a futuristic war, which will be fought in moral and cognitive domains, high technology-short duration, not contained in time and space, difficult to find enemy, and finally blurred boundaries in war and peace, civil and military, order and chaos. Most importantly, the conflict being in moral and cognitive domain, any military action was considered as a form of communication as psychological and information operations became dominant, especially for India to retain control of escalation. As technology continues to advance every single minute, the role of AI driven drones will expand further with the development of swarming drones (increased autonomy, payload capacity, and range) and autonomous weapons with autonomous decision-making algorithms resulting in enhanced combat capabilities in unmanned warfare. These will reshape the strategic, operational, and tactical landscape, which necessitates an in-depth analysis of the capabilities, transformative powers, opportunities, and challenges—these elements offer in the futuristic warfare using metal, minds, and machine, which will be beyond the human edge.

The Machine Soldiers: Rise of Autonomous Warfare

The drones today have rapidly transformed into autonomous platforms capable of carrying out sophisticated, pre-programmed missions in combat zones with remarkable precision. Yet their current autonomy remains incomplete, as many systems still depend on fixed instructions and struggle to respond to sudden or unpredictable changes in the battlefield environment. The integration of advanced coding, adaptive firmware, and AI is now pushing these systems toward true autonomy-enabling drones to interpret their surroundings, make independent in-flight decisions, and adjust to dynamic conditions with minimal or no human intervention. Such advances mark a broader shift toward autonomous warfare, where control over these technologies—and the data they generate—will play a decisive role in shaping future military power and governance. This evolution is unfolding within the wider context of the Fourth Industrial Revolution, driven by breakthroughs in AI, quantum computing, machine learning, nanotechnology, genetic engineering, robotics, and interconnected cyber-physical systems such as the Internet of Things (IoT). With AI at the centre of this transformation, the interplay between emerging military technologies and evolving operational strategies underscores the urgent need to navigate the ethical, strategic, and geopolitical complexities of an increasingly autonomous battlespace.

The emergence of autonomous warfare represents a profound transformation in contemporary conflict. AI-enabled drones, loitering munitions, and automated defence systems are now capable of independently identifying, tracking, and engaging targets, thereby, increasing operational speed and precision. These technologies reduce risks to military personnel and enable forces to function effectively in contested environments where communication links may be disrupted. Yet their adoption raises significant concerns related to accountability, ethical judgement, and the protection of civilians. As nations expand their investment in autonomous weapons, the potential for rapid escalation and inadvertent harm intensifies. The proliferation of low-cost, AI-driven systems is reshaping warfare into a faster and more unpredictable arena.

Artificial Intelligence, Drones, and Autonomous Weapons: The Technology Life Cycle[6] Curve

Every technology undergoes a life cycle that includes four phases (refer to Figure 1). The introductory phase involves research and development of an idea, followed by prototyping and testing; technologies such as quantum computing and directed-energy weapons fall into this category. The ascent or launch phase occurs when new technologies become widely available and gain traction—examples include drones, AI, autonomous weapon systems, blockchain and big data analytics, robotics, and machine learning. The maturity phase begins when technologies become stable and ready for widespread use, such as cloud computing, nanotechnology, genetic engineering, the internet, and cyberspace, including cloud platforms for IoT. Finally, the decline phase represents obsolete technologies that are no longer effective or in use, such as 3G technology.

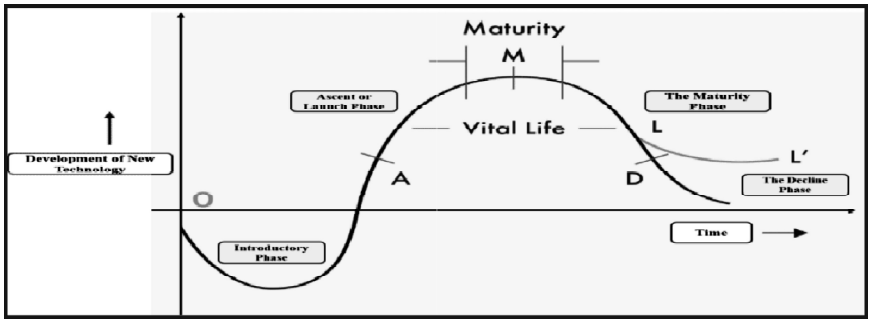

Figure 1: The Technology Life Cycle Curve

Source: dPrism[7]

AI, drones, and autonomous weapons being in ascent or launch phase form part of 'Collingridge Dilemma'[8], named after David Collingridge, who described the mismatch between the fast pace of technological progress and the much slower response of regulation. It indicates that initially when a technology (AI, drones, and autonomous weapons) is evolving, control is more, however, knowledge and understanding is less. As the time elapses, knowledge increases, however, control becomes far difficult (refer to Figure 2). However, AI's position in the ascent phase has several key implications as mentioned below:

- **The Regulatory Norms**. The governance decisions made now will shape the future safety, transparency, and accountability of AI-driven autonomous systems. Delaying action risks the technology, outpacing the capacity to regulate it.

- **Design Choices Today Lock in Future Pathways**. Standards related to data governance, system interoperability, and human oversight made during the ascent phase will determine how autonomous systems behave in future conflict scenarios.

- **Uncertainties must be Managed, not Ignored**. The knowledge being limited, ethical foresight and responsible experimentation are essential to anticipate risks such as unintended escalation, loss of human control, or algorithmic bias in military decision cycles.

- **Need for Adaptive Oversight Mechanisms**. The rapid pace of AI innovation requires flexible governance structures that can evolve alongside the technology, preventing the loss of control that Collingridge warns about as systems mature.

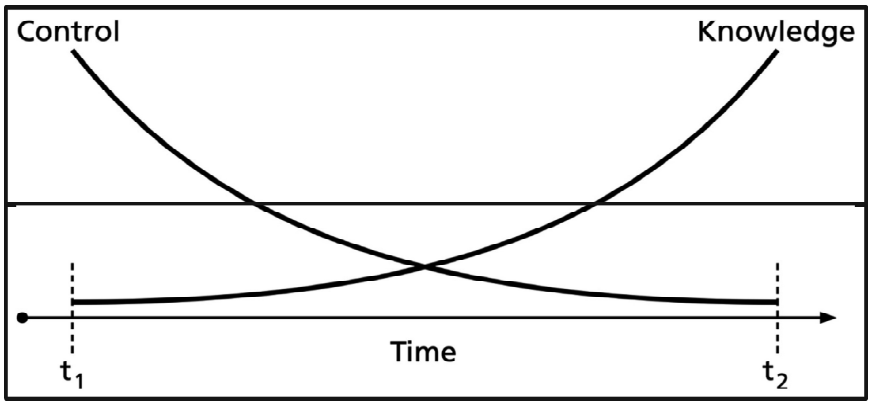

Figure 2: The Collingridge Dilemma
Source: D Collingridge[9]

Autonomous Dominance: Metal Minds in Combat

Integrating Drones and AI in Modern Warfare. The AI-powered drones today have redefined the landscape of futuristic war by opening new possibilities and enhancing capabilities of these

unmanned aerial vehicles. AI-powered drones are the new cavalry of the digital age—swift, silent, and deadly. From small quadcopters to massive unmanned aerial vehicles, these can now identify, track, and destroy targets independently. Autonomous weapons like loitering munitions or 'Kamikaze Drones' hover over conflict zones, waiting to strike with precision. Autonomy in weapon systems is spread across multiple functions, creating an autonomy spectrum. The transition from remote-controlled tools to self-governing machines marks a revolutionary shift. The AI algorithms have resulted in greater autonomy, intelligence, and efficiency, allowing them to perform the tasks impossible for a human being. The integration of AI and drones[10] can take place in the following manner:

- **Mobility**. The integration of AI will revolutionise mobility capabilities, resulting in autonomous navigation and obstacle avoidance. AI algorithms process data obtained from various sensors onboard to comprehend surroundings and navigate through obstacles by adjusting flight paths.

- **Recce, Surveillance, and Targeting**. The AI powered computer vision algorithms can detect and track objects of interest with speed and accuracy. These can identify potential targets with accuracy and make intelligent decisions to neutralise them with precision strike minimising collateral damage.

- **Swarm Intelligence**. AI enhances capabilities of swarm drones and enables them to work as a team. AI-based algorithms enable swarm drones to share data with one another through multiple coordination models. Central coordination involves all drones being controlled by a single central system. Under hierarchical coordination, the swarm is divided into squads and teams that can be directed individually or as a group. Coordination by consensus relies on drones communicating among themselves to arrive at collective decisions. Emergent coordination is the most complex form, where drones dynamically react to one another in either friendly or hostile ways (refer to Figure 3).

- **Real-Time Monitoring and Decision Making**. The AI-enabled computer-vision system provides the operator with real-time situational awareness and can also activate

automated decision-making processes based on predefined algorithms.

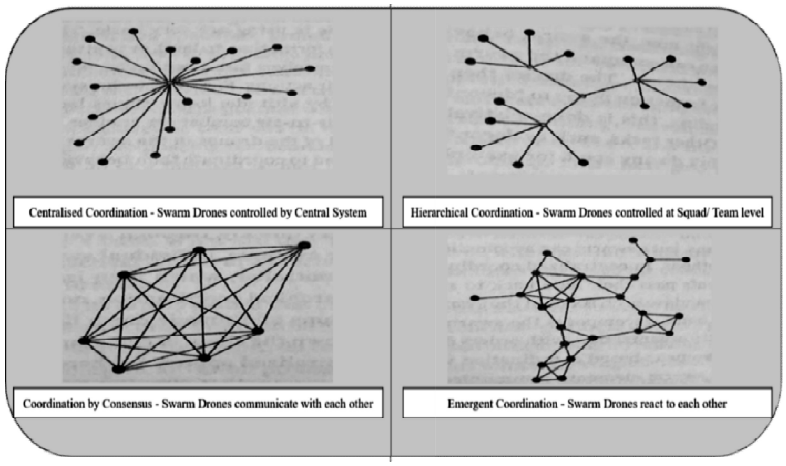

Figure 3: Swarm Drones and AI-based Control Models
Source: Paul Scharre[11]

The AI and Unmanned[12] **Weapons**. AI is becoming the brain behind modern weapon systems, which includes various types of sensors, decision making elements, and munition. The lethal[13] autonomous weapon system may be on a single platform or may be distributed across multiple physical platforms. The automation[14] in weapon systems is used to search, identify, track, prioritise, time the attack, launch munition, destroy, and re-engage, if required. The weapon systems will be semi-autonomous with a 'Human-in-the-loop' framework, wherein the automation searches for, identifies, and tracks targets, but a human operator makes the final decision to engage. Moving a step further, supervised autonomous weapon system human-on-the-loop, once activated, will search, detect, and decide to engage targets on their own, but a human can intervene, if necessary. These weapon systems provide edge when speed of engagements could overwhelm human operators. Fully autonomous weapon system or 'Human-out-of-the-loop' can search for, decide to engage, and engage targets on their own and no human can intervene. Summarily, it is the freedom provided that makes a system autonomous and not the intelligence. The AI-powered drones and autonomous weapons will impact strategic, operational, and tactical levels of battlefield. which will force soldiers to plan a battle construct via various means to

navigate through the challenges[15] posed by these. The same has been depicted in Figure 4 and forms the basis for further discussion and research.

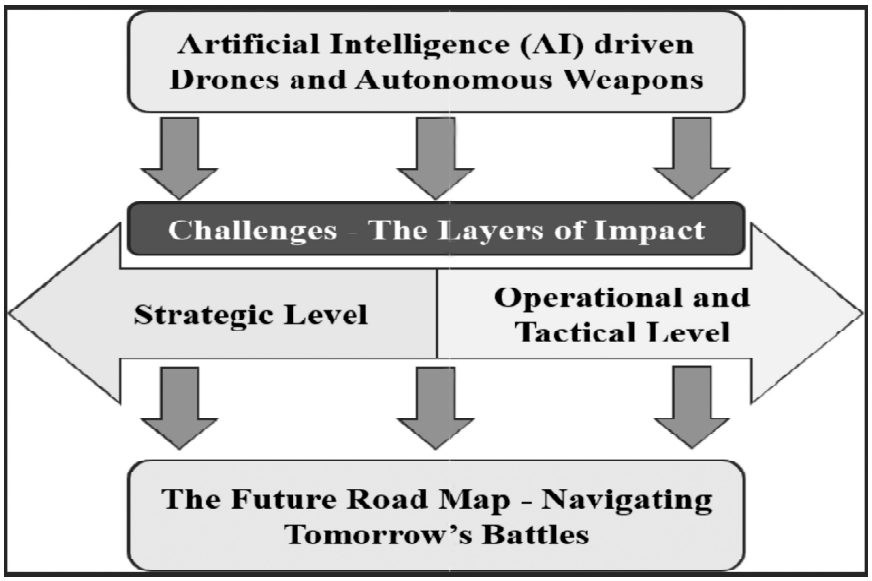

Figure 4: Flow Chart Depicting Effects of AI-driven Drones and Autonomous Weapons

Source: Compiled by the author

Impact at Strategic Level

The strategic impact of AI drones and autonomous weapons is revolutionary, not evolutionary. These will compress decision cycles, reshape global power hierarchies, redefine deterrence, and challenge the logic of conventional and nuclear strategy.

- **Shift in Military Doctrines**. The traditional force-on-force doctrines will shift from massed formations to networked, dispersed, and high-tech units exploiting AI-centric capabilities like drone swarms and AI-enhanced command, control, communications, computers, intelligence, surveillance, and reconnaissance. Same will force the militaries to redesign their strategy, training, and operational planning from the top down.

- **Deterrence and Escalation Dynamics**. Autonomous weapons with pre-delegated strike authority or autonomous counterstrike capabilities could lead to faster and unpredictable escalations. Nations possessing AI drones and weapons capable of instant retaliation or disabling strikes will gain new forms of strategic deterrence. This may destabilise nuclear deterrence[16], introduce accidental wars, or shift the balance in favour of pre-emptive strategies.

- **Power Asymmetry**. Technologically advanced states will widen the gap over conventional or less tech-savvy militaries. Non-state actors or smaller states might use cheap, intelligent drones to disrupt large-scale forces, creating asymmetric strategic threats.

- **Persistent Surveillance and Strategic Transparency**. AI drones can provide continuous surveillance of strategic assets—missile sites, bases, or fleets. This erodes strategic ambiguity, potentially making surprise offensives or hidden mobilisations more difficult. This will emphasise importance of secrecy, mobility, and deception in strategic operations.

- **Human-out-of-the-Loop Warfare**. The development of fully autonomous systems to respond without human input will challenge the core principle of human judgment in use-of-force decisions. This will raise risks of algorithmic escalation, unaccountable warfare, and strategic decision-making at machine speed—beyond diplomacy's ability to intervene.

- **International Arms Race**. Strategic competition will shift from nuclear warheads to algorithms, semiconductors, and AI arms race, resulting in enhanced geopolitical competition between major powers. This may create new alliances or rivalries based on tech dependencies.

- **Legal and Ethical Aspects**. Autonomous weapons systems pose serious challenges to International Humanitarian Law (IHL), particularly in terms of accountability. When an autonomous system commits a targeting error or causes unlawful harm, assigning responsibility becomes unclear, undermining the enforcement of war crimes and weakening

established legal norms. These systems also risk infringing fundamental IHL principles:

- **Distinction**. AI may struggle to reliably differentiate between combatants and civilians in complex environments, increasing the risk of wrongful targeting.
- **Proportionality**. Autonomous systems cannot fully assess nuanced proportionality judgments, potentially leading to excessive or unforeseen civilian harm.
- **Precaution**. Reduced human oversight may limit the ability to take feasible precautions to minimise collateral damage.
- **Martens Clause**. Deploying AI weapons without global norms may violate principles of humanity and public conscience, especially in ethically ambiguous situations.

- **Constant Conflict below Threshold of War**. AI drones enable grey-zone operations—constant low-intensity conflict, subversion, espionage, or sabotage without formal war declaration. Persistent low-cost drone operations blur the line between war and peace, requiring new strategic frameworks to manage continuous confrontation without open war.

- **New Strategic Domains: Cognitive and Cyber Warfare**. AI weapons will dominate information warfare—manipulating public opinion, generating fake content, and conducting psychological operations. Strategic dominance will depend not just on battlefield strength, but on digital sovereignty, narrative control, and information resilience.

Impact at Operational and Tactical Level

AI drones and autonomous weapons will reshape the operational and tactical landscape of warfare by introducing unprecedented speed, precision, and intelligence. The future tactical doctrine will revolve around human-AI teaming, swarm tactics, counter-AI capabilities, and real-time battlefield autonomy management. In the recent Russia-Ukraine conflict, Kiev deployed AI-enabled drones that can navigate, identify targets, and even continue missions when communication is lost. For example, Saker Scout quadcopters reportedly use AI to recognise terrain and targets,

improving both navigation and strike accuracy. During Operation Spiderweb in mid-2025, Ukraine smuggled dozens of small drones into Russian territory via cargo trucks, and when they lost remote control signals, AI systems reportedly took over to guide them to targets.[17] Some of these drones used visual recognition algorithms (powered by AI) to identify aircraft on Russian airfields and strike them. The envisaged challenges are enumerated below:

- **Enhanced Situational Awareness**. AI-driven drones including swarm drones can autonomously study enormous zones, recognise enemy locations, and communicate instantaneous intelligence. Tactical edge AI enables on-board processing, reducing latency and dependence on human operators or remote data links. Commanders can make faster and better-informed decisions, gaining a tactical advantage in dynamic combat scenarios.

- **Precision Strikes**. AI-enabled weapons can identify and engage specific targets (vehicles, radars, or even individuals) with high accuracy. Systems like loitering munitions (e.g., AI-guided Harops) can circle an area and strike only when the target appears. Operations become more surgical, reducing collateral damage and increasing effectiveness in urban and hybrid warfare.

- **Speed and Automation of Tactical Decision-Making**. AI allows faster observe-orient-decide-act loops than human counterparts. Autonomous weapons can respond to threats or targets in milliseconds, outpacing human reaction times. Speed creates tactical shock, overwhelming slower opponents and potentially neutralising threats before they can act.

- **Force Multiplication and Asymmetric Superiority**. Small units equipped with drones and autonomous systems can punch above their weight, holding ground or attacking more effectively. AI-driven unmanned systems enable smaller, faster, more mobile teams to dominate larger, less technologically equipped forces.

- **Disruption of Enemy Command, Control, and Communications**. AI drones can jam, spoof, or destroy enemy communication nodes autonomously. AI-enabled offensive cyber capabilities can paralyse enemy networks in

real time and may disrupt enemy's coordination at the tactical level, causing disarray and confusion during engagements.

- **Risk Reduction**. Drones can be deployed for high-risk missions such as clearing minefields, reconnaissance, and room intervention, etc. Autonomous systems can act as first contact or decoys in engagements, reduce own casualties, and increase the tactical sustainability of forces in prolonged operations.

- **Obstinate Surveillance and Area Denial**. AI drones can maintain 24/7 overwatch on key tactical points or enemy movement corridors. Autonomous loitering drones can enforce no-go zones, making terrain tactically unusable for the enemy.

- **Tactical Vulnerabilities and Risks**. AI-enabled systems are prone to jamming, spoofing, or hacking. Misidentification or software flaws could lead to fratricide or unintended escalation. Ethical issues arise if decisions to engage are made entirely by machines. This creates new risks of miscalculation and the need for robust counter-autonomy strategies.

Navigating Tomorrow's Battles: AI-Driven Drones and Autonomous Weapons

To harness the benefits of AI-driven drones and autonomous weapons, a multifaceted approach is required and ethical considerations—creating framework for accountability and transparency—are key considerations to navigate the double-edged sword of AI. The development of AI drones and AI- driven autonomous weapons is inevitable, which necessitates the Indian Armed Forces to introspect and adapt to challenges of futuristic battle field dominated with AI-powered drones and autonomous weapons. This can be addressed by a three-tiered multifaceted approach, which will make one understand and survive through the chaos.

Tier I: The Development, Doctrine, Defence or Offensive, and Diplomacy Model.[18] Based on the concept of 'Whole-of-Nation Approach' The Indian Armed Forces in coordination with the civil agencies, must invest in research and development to 'Develop' safe, reliable, fail safe, and accountable AI systems. The formulation of 'Doctrine' including

strategic planning, setting deployment ceilings on AI-enabled lethal systems, mandating mission-specific authorisation before AI weapon activation by incorporating AI warfare doctrines into national security strategies, and policy framework establishing clear national policies and ROE for AI weapons will prevent collateral damage and will control the escalatory matrix. At the same time, it is necessary to develop the 'Defensive or Offensive' capabilities by exploiting anti-drone systems, Electronic Warfare (EW), restricting autonomous operations in civilian-populated areas, unless under strict human control and AI countermeasure capabilities. The 'Diplomacy'[19] will include creating global treaties to prevent an AI arms race.[20] Escalation including sharing non-sensitive AI safety protocols with allies, formalising a convention on use of AI drones and AI-driven autonomous weapons, banning fully autonomous 'Kill without Consent' weapons globally and defining permissible combat environments.

Tier II: Adopt the Security, Adaptability, Fairness, and Ethics Approach.[21] The defence research agencies must work to strengthen security including cybersecurity to develop counter-AI defences, fail-safe controls, and audits to keep human in or on the loop. Enhanced cybersecurity to protect AI drones from hacking or data manipulation, building anti-drone and AI jamming systems to neutralise hostile swarms, enhancing EW capabilities against autonomous threats, establishing AI reliability benchmarks for all deployed systems, and researching AI versus AI counter-offensive strategies is essential. The 'Adaptability' to new changes must be fast and continuously upgrading AI systems will help to tackle new threats effectively. The adaptive AI models capable of handling unpredictable combat situations must be researched and developed. The nations must come together and ensure 'Fairness' enforcing collateral damage thresholds in targeting protocols, post-operation accountability[22] reporting for every autonomous mission, standardising kill-switch protocols across nations for emergency deactivation, and set boundaries to govern deployment and engagement rules. Last but not the least, adhering to the 'Ethical' behaviour is necessary by keeping human oversight in lethal decision-making, protect civilians, and preventing collateral damage. The policies must

be IHL compliance into AI algorithms to develop clear national and international regulations for AI-based drones and weapons usage.

Tier III: The New Era ROE. It is important to formulate the universal ROE while employing the AI powered drones and autonomous weapons. These must address civilian protection and collateral damage concerns in AI warfare. Pre-mission rules must include human review and approval of AI mission parameters, in-mission rules must allow conditional autonomy, with live human override, and post-mission rules must record mandatory audit logs and accountability reports. The humanitarian safeguards must be developed so that AI must abort missions if target identification confidence drops below a set threshold. Wargaming and simulations to anticipate future scenarios must be conducted to exercise the same. To ensure transparency, there should be public disclosure of AI ROE framework to assure compliance with global norms. The ROE must be flexible and must evolve with latest AI trends and technology.[23] The human-machine teaming must evolve simultaneously with ROE, which will include maintaining human control or oversight in critical decision-making (human-in-the-loop) and training of soldiers for AI-assisted operations and counter-AI tactics, techniques, and procedures.

Conclusion

The militarised AI-driven drones and autonomous weapons undoubtedly poses challenges in several respects. These are advantageous in shielding soldiers and precision strikes, minimising collateral damage to civilian and civilian assets especially in highly uncertain and dangerous environment. The challenges include security risks on account of its wide accessibility especially to unscrupulous countries and the non-state actors. This technological competition that has turned into an arms race amidst growing geopolitical tensions has created a dangerous global context. A strategic framework acceptable to all nations needs to be chalked out to extract maximum benefits from such futuristic developments.

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India-Malaysia Defence Diplomacy: An Analysis

Mr PJ Khache, PhD[@]

Abstract

The defence cooperation between India and Malaysia has been growing in the recent times, and both the countries have increased their defence expenditures. There are several factors which influence defence budgets; whether the territory and sovereignty are challenged; whether the national interest is at stake; whether the adverse state(s) raise its defence expenditure; or whether there is internal security being challenged (political instability). This article analyses factors influencing the rise of defence expenditure of India and Malaysia and examines different aspects of the growing relations between the two nations in defence sectors and the intersection of their interest. It suggests that both the countries look at each other for strategic balance in the Indo-Pacific region and seek to strengthen maritime security. The article will explore common security threats and strategic challenges to understand defence cooperation between India and Malaysia.

Introduction

The relations between India and Malaysia can be traced back to centuries, particularly in terms of trade and cultural influence. The Chola Empire (9th-13th Centuries) had a significant influence in the Malay Peninsula. Between 18th and 20th Centuries, both countries experienced British colonial rule, and the ruler benefited greatly from them. Notably, both the countries gained independence with the peaceful transaction from the colonial ruler. While tracing the military relation of India and Malaysia, it is noteworthy to recall the Indian National Army's (INA) military expedition from Southeast Asia to liberate India from British rule, spearheaded by Netaji

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Subhas Chandra Bose. For instance, Puan Sri Janaki Thevar Nahappan of Rani Jhansi Regiment[1], a commandant of the INA, was fighting against the British in the Northeast region of India. The regiment was the first to hoist the Tricolour on the Indian soil in Moirang, Imphal, on 14 Apr 1944. Janaki, a Tamil origin woman from Malaysia, on return to her country, was questioned about joining the INA. She mentioned she did so "Because I want to fight the British".[2] She claimed that Netaji Bose ensured freedom not only for India but whole Southeast Asia.[3]

Analysis on Malaysia's Defence Policy

Malaysia's defence budget has historically been relatively low, as the government often prioritised social spending and deprioritised defence. Malaysia has enjoyed the dubious advantage of big power military alliances. It has discovered to its dismay that defence self-reliance is a costly policy because much of the funds for the expansion of the armed forces has to come from a pruning back of other socio-economic development projects.[4] Despite the sporadic bilateral tensions in the past with Indonesia and Singapore, it opted out of military competition with both countries.[5] However, there has been a demand for more modern equipment and stronger capabilities, not only for national status but also to deter concerning regional issues, particularly in the South China Sea.[6]

Ever since Malaysia attained independence in 1957, the defence establishment has been oriented almost exclusively towards confronting land-based threats, especially countering guerrilla.[7] Even after the colonial rule in Malaya Peninsula, Britain stationed troops and provided support and training to the Malaysian military until 1960 to manage the communist threat in the region.[8] From 1963 to 1966, during the *Konfrontasi* (confrontation) period or *Ganyang* Malaysia (Crush Malaysia), Malaysia for the first time faced an external security threat. The intermittent war was waged by Indonesia to oppose the formation and existence of the Federation of Malaysia.[9] In 1971, the Anglo-Malaysia Defence Agreement (AMDA) was terminated and was replaced by the Five Power Defence Arrangements. The termination of the AMDA and reduction of British commitment in 1971, coupled with the shift in Malaysia's foreign policy orientation, resulted in the policy of self-reliance. The policy sought to progressively modernise and develop defence capabilities such that Malaysia could increasingly assume the responsibility for its external defence.[10]

In the 1980s, the government emphasised on modernisation and upgradation of the Malaysian Armed Forces (MAF) under a special program called PERISTA.[11] The modernisation effort was put on hold in the mid-1980s due to economic recession, but was reinstated in the early 1990s.[12] The signing of the Hat Yai Peace Agreement on 02 Dec 1989 opened up a completely new dimension for the MAF, as much as it began to be openly asked about its primary mission and its assumed role in the future.[13] The PERISTA program continues to support by increasing defence budget. In the early 1990s, more arms were being brought in and began to exert more leverage over the conditions of arms contracts, spread its courses, and insist on transfer of technology along with the imported finished weapons.[14] To catalyse the defence program in Malaysia, a private-sector initiative, known as Malaysian Defence Industry Council (MDIC), was established in 1990. The MDIC functioned under an umbrella organisation to promote defence industrialisation. It envisaged an integrated pattern of defence industrial production.[15] The arms procurement in 1990s priorities on naval and air forces requirements.[16] Malaysia concentrated on modernisation of the MAF throughout the 1990s and 2000s. In 2010, Malaysia introduced the National Defence Policy, and published its first Defence White Paper in 2020. Prime Minister Anwar Ibrahim, after he took office in Nov 2022, emphasized on prioritising anti-corruption measures in defence and military modernisation. There was an increase in the initial defence budget allocation in 2023 by 10 per cent, as compared with the previous year. This year, the budget saw a 26 per cent increase in funds for military maintenance and procurement.[17]

Analysis on India's Defence Policy

Soon after India gained its independence in 1947, the country was led into the bitter partition. In the aftermath, there were four major wars fought between India and Pakistan—the First Indo-Pakistan War (1947-48), the Second Indo-Pakistan War (1965), the Third Indo-Pakistan War or the Bangladesh Liberation War (1971), and the Kargil Conflict (1999). In 1962, China launched an attack on India, where the latter was suffered a sound defeat.

Indian defence expenditure was as low as 1.8 per cent of the Gross Domestic Product (GDP) for the first 12 years after independence. Following the Sino-Indian War of 1962, it started

rising up to three per cent average mark over the next 25 years.[18] In view of the grave national security crisis, defence outlay went up to its peak in 1963-64 (4.3 per cent) and 1971-72 (3.7 to 3.8 per cent).[19] In the period from 1985 to 2005, the military expenditure was around 2.75 per cent of the GDP, however, in absolute figures, the expenditure moved up from INR 7,987 cr in 1985-86 to INR 26,562 cr in 1995-96, and reached INR 83,000 cr in 2005-06.[20] As per the Stockholm International Peace Research Institute's data, India has been spending an average of around two per cent of the GDP on defence in the last two decades. According to Global Firepower Rankings, since 2005, India has been among the top five world military power, and, in 2025, India was at the fourth position with the defence budget of USD 75 bn.[21] While India spends high on defence, it heavily relies on imports in defence acquisition. Over the past decades, New Delhi has consistently been amongst the world's top defence importers.

India has been focusing on self-reliance and indigenous production for the past several decades. In 1956, it adopted Industrial Policy Resolution (IPR) and one of the key objectives was to ensure self-reliance. The vision of IPR was aimed on emphasising the role of the state in developing defence industries, hence, Defence Research and Development Organisation (DRDO) was formed in 1958 and Defence Public Sector Undertakings (DPSUs), under the Department of Defence Production, was set up in 1962. These initiatives were to upgrade India's defence capabilities, self-reliance, and indigenous defence production. Frustration was felt deeply in the military, which accused the DPSUs and the DRDO for over-committing beyond their existing capabilities, binding the military to sub-standard and under-powered equipment and missing the deadlines, and hosting a lobby of vested interest in the form of 'Middlemen'.[22] Despite decades of efforts on self-reliance and indigenous defence production, India remains one of the biggest arms importers in the world.

India, through its *Atmanirbhar Bharat* (Self-Reliant India) and 'Make in India' initiatives, attempted to address the problem of over-reliance on defence import and promoted defence export. Through such efforts, it fits into the arms import policy of some Southeast Asian countries, which have expressed interest in procuring a range of Indian military hardware.

Maritime Security Challenges of India and Malaysia

India is of extreme strategic importance to Malaysia, and vice versa. The littoral states of the Indian Ocean, which link through an entrepot like the Malacca Strait, have a significant strategic location. According to the World Economic Forum, around 94,000 ships pass through the Malacca Strait every year and these ships carry around 30 per cent of all trade goods globally.[23] Hence, without the proper maritime security of India, which is in the Indian Ocean, and Malaysia, which straddles in the Indian Ocean and Pacific Ocean, it is very difficult to imagine the sea trade and major shipping channel for the regional and global economic growth. The two countries played a vital role in securing sea lines of communication and bilateral trade that reached USD 20.01 bn in the fiscal year 2023-24.

As far as the maritime security is concerned, India has expressed its concerns with the Chinese 'Research' vessels in the Indian Ocean. New Delhi perceived that Beijing has an interest in a military strategy expansion in the region and raised questions about the intention of such vessels (referred as 'Spy Vessels'). As reported in the *Indian Express,* there has been a noticeable uptick in the presence of Chinese research and fishing vessels in the Indian Ocean region, with an annual deployment averaging 12-15 ships.[24] An American think-tank has also alleged that such ships are collecting data from the ocean for military purposes, but Beijing denied the charges.[25] There is no denying that China has been determined to access the Indian Ocean through corridors like China-Pakistan Economic Corridor to the Arabian Sea and China-Myanmar Economic Corridor to the Bay of Bengal. 'String of Pearls' is a popular theory amongst the strategic community.

Malaysia also has maritime security challenges with China. Its offshore territorial claims with Beijing included an estimated five billion barrels of oil reserves and 80 trillion cubic feet of gas reserves.[26] China's oil exploration and drilling in the Malaysian Exclusive Economic Zone (EEZ) were interrupted when the former's largest coast guard ship intruded into the EEZs of Malaysia and other Southeast Asian countries.[27] Considering the vast disparity in the naval capabilities and assets of China, it is obvious that Malaysia cannot militarily or even diplomatically confront it. Also, for the 16th consecutive year, China remained Malaysia's largest

trading partner with a trade volume of USD 212.04 bn in 2024.[28] Therefore, despite repeated Chinese incursions into Malaysian airspace and waters, and maritime territorial dispute, the Malaysian policymakers prefer to designate China as a non-threat.[29]

In the geopolitical landscape of the Indo-Pacific, due to the rising influence and increasing competition, Malaysia and India demand greater relations. To effectively leverage maritime security in the region, both countries require to explore strategic relations by strengthening defence capabilities and by fostering cooperation. There are serious non-traditional security threats in the region. The Indo-Pacific region is the most vulnerable to climate impacts. Due to huge coastal areas in this region, the livelihood of the people relies heavily on marine resources. The livelihoods of such communities were impacted due to climate change like coastal erosion, disaster, etc. The region also has issues like Illegal Unreported and Unregulated fishing and transnational crimes. According to the United Nations, by 2050, the Indo-Pacific could see as many as 89 million climate refugees.[30]

Synergy of India-Malaysia Defence cooperation

Though India and Malaysia have long-standing historical ties in terms of trade and commerce, it was after the Cold War that they began to look for commitment in defence cooperation. There are several factors that influence their defence cooperation. The transaction in international systems from bipolar to multipolar, the globalisation that took off, economic reforms in India that led to the launch of the 'Act East Policy' (from Look East Policy), and Malaysia's Vision 2020 (Wawasan 2020) of 30-year programme since 1990, which aimed to transform it into a developed country. These are some of the major factors that opened avenues for cooperative engagement.

In 1993, the two countries signed a memorandum of understanding for defence cooperation and established the Malaysia-India Defence Cooperation Meeting (MIDCOM). Through this agreement, both sought to expand defence cooperation in areas like joint ventures, research, development, logistical, and maintenance support, and identified areas of cooperation through a joint working committee.[31] In Feb 2025, the 13th meeting of the MIDCOM was held in Kuala Lumpur. This meeting sought to further expand bilateral relations in emerging areas, such as cyber security

and artificial intelligence, and deepen existing collaboration, particularly in the defence industry, maritime security, multilateral engagements, and jointly focus to address non-traditional maritime security threats.[32] To enhance military capabilities, particularly in counterinsurgency operations in the jungle terrain, India and Malaysia conducted the 4th edition of joint military exercise Harimau Shakti in Dec 2024.

To accelerate the progress in defence diplomacy between India and Malaysia, on 11 Jul 2023, India's Defence Minister Rajnath Singh inaugurated the regional office of Hindustan Aeronautics Limited (HAL) in Kuala Lumpur. The regional office also serves as a hub for HAL's engagement with the Southeast Asian region.[33] However, when HAL submitted a proposal in response to the Royal Malaysian Air Force's request of proposals, amongst the stiff competition between six nations, which includes India's Tejas, China's JF-17, Russian's Mig-35 and Yak-130 fighter jet, South Korea's FA-50 was selected.

Conclusion

The foreign policy and domestic defence requirements in the 1990s have led to foster defence cooperation between Malaysia and India. It is also found that the major factors influencing the rise of defence expenditure were territorial dispute with the neighbouring countries and maritime strategic complexity. These security and strategic challenges motivate to seek greater relationship between the two countries. There are avenues that India and Malaysia need to explore in relation to defence cooperation, particularly in the area of non-traditional security. Strengthening the defence cooperation between the two countries can address major maritime security threats and challenges and provide security in the Indo-Pacific region. As India looks forward to tap new business opportunities, in alignment with its defence exports policy, it is important to keep in mind that Malaysia is a significant country. Both countries are maritime nations with a long coastline and have a significant geographical location in the Indo-Pacific region, which demands bilateral commitment on strengthening maritime security.

Endnotes

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KĀmandakanĪtisĀra: Decoding Ancient Indian Army Formations

Ms Manashi Ghosh[@]

Abstract

The Kâmandakânîtisâra, written during the Gupta period, explores statecraft, diplomacy, and warfare by combining dharma (righteousness) with practical military strategy. It looks at how armies were organised, how battles were fought, and the tactics used, all while reflecting the politics of its time. Unlike the Arthasâstra, this text gives us a different viewpoint and is still an important source for understanding ancient Indian military ideas.

Introduction

Kâmandaka, an influential ancient Indian political thinker, classified military forces into six categories—the standing army, mercenary forces, guilds, allied forces, territorial forces, and tribal warriors.[1] He emphasised the strategic integration of these troop types to create a cohesive fighting force and posited that each category was vital to the army's overall strength. The core standing army and skilled mercenaries were considered the most critical.[2]

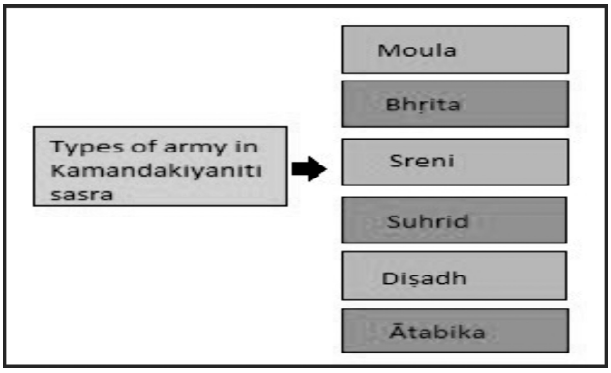

Figure 1: Types of armies in *Kamandakanîti*

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Due to their unwavering loyalty and dedication to the king, their willingness to eliminate any potential threats to his safety, and their shared values and beliefs, the Moula troops were considered more dependable force than the mercenary or Bhita troops.[3] On the other hand, the mercenary troops have been observed to be more dependable, as compared to the Sreni troops. This is because the former relies on the king for their livelihoods.[4] The reliability of Sreni troops is higher when compared to the troops of the allies. The allies do not share in the king's victory, whereas the Sreni troops participate in the king's joy and grief. Additionally, they live in the same country as the king does.[5] The reliability of allied troops is often considered higher than that of enemy troops due to the former's shared objective with the king, known country of origin, and predictable time of action. In contrast, enemy troops may have differing opinions and lack a clear, predictable plan of action.[6] The tribes residing in the low forest areas are often perceived as untrustworthy, materialistic, and prone to immoral behaviour. As a result, the enemy's trained and experienced troops are considered superior to them, especially when compared to the undisciplined and wild nature of the former.[7] The forest tribes and the enemy troops are observed to be following the king, with the intention of causing harm to him and waiting for the right moment to accomplish their actions. Victory is assured only after all chances of causing any difficulty are eliminated.[8]

To ensure efficient management, control, and strategic placement, the military was structured into units. After setting up a secure camp at a distance of 500 bows, the infantry should be positioned with a gap of one *sama* (equal to 14 angulas or finger-widths) between two soldiers, while cavalry should maintain three *samas,* chariots at four *samas,* and elephants at twice or thrice the distance. With such spacing between sections of the army, one can engage in combat without any confusion.[9]

There should be three soldiers in front of a horse army. Behind the horses, there should be three-foot soldiers who can provide support.[10]

According to the stated military strategy, there should be a total of 15 companies of soldiers in front of the chariot and elephant army, accompanied by five companies of horse army. Additionally, fifteen companies of foot army should be stationed at the back side of the chariot and elephant.[11]

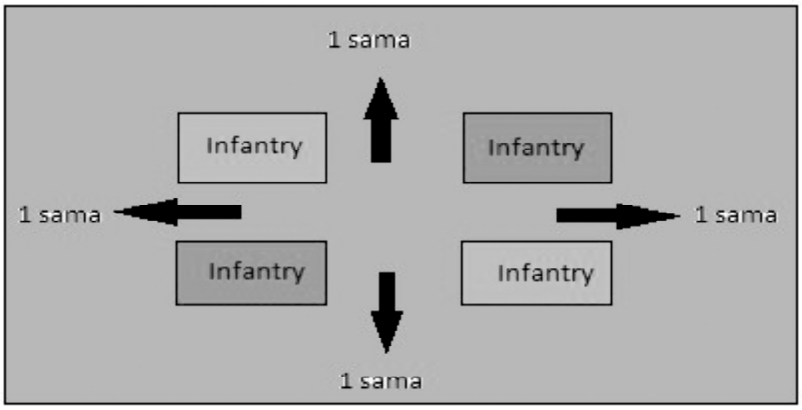

Figure 2: Positions of Infantry

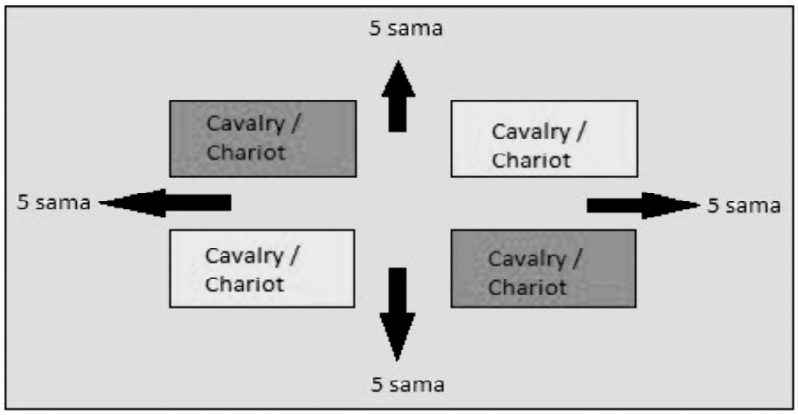

Figure 3: Positions of Cavalry

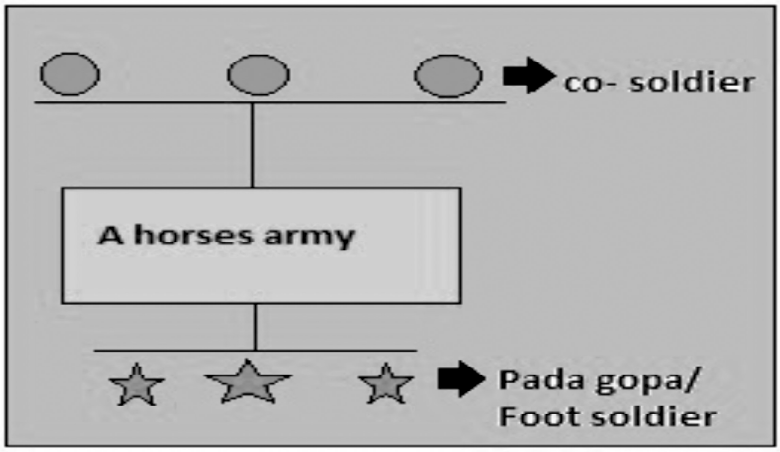

Figure 4: Positions of Foot Soldiers

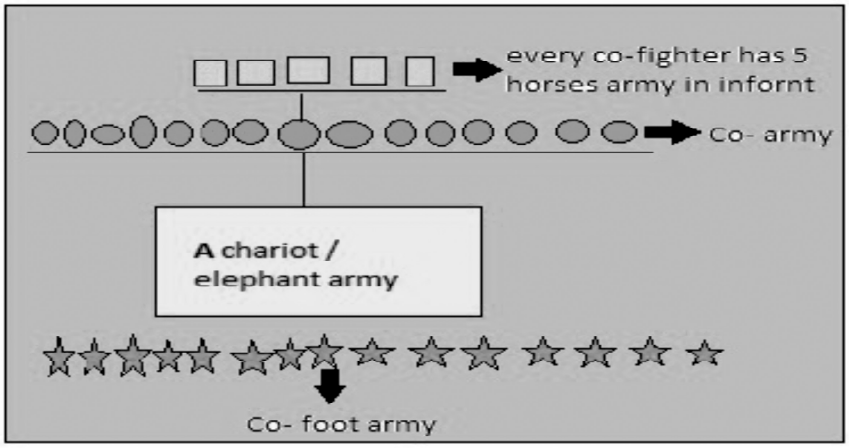

Figure 5: Positions of Foot Army

The *Arthasâstra* offers a close look at how ancient Indian armies were organised. A basic unit had a chariot or elephant, five horses, 15 soldiers, and 15 guards. A single-row formation with one chariot included five chariots, 25 horses, 75 soldiers, and 75 guards. A three-row formation had 45 chariots, 225 horses, 675 soldiers, and 675 guards. Armies could grow by adding two-chariot units, up to 21 in total. The largest formation described had 315 chariots, 1,925 horses, 4,725 infantry, and 4,725 guards. The one, three, and 21-chariot units are similar to today's company, battalion, and division. The *Sukranîti* suggests a more varied army, with infantry, cavalry, elephants, chariots, bullocks, camels, and *brhannâlika* (machines). Infantry should be four times the cavalry, bullocks one-fifth, camels one-eighth, elephants one-fourth of camels, and chariots half the elephants. Machines should be twice the number of chariots. For example, if an army had 20,000 cavalries, it would have 80,000 infantry, 4,000 bullocks, 2,500 camels, 625 elephants, 312 chariots, and 625 machines. These sources show how carefully ancient Indian armies were planned, with clear hierarchies and careful use of numbers to manage the battlefield.[12] As per Kamandaka, it is recommended to position archers or a bow army at a distance of one dhanu, measuring five *aratnis* (equivalent to 120 angulas). Horses should be stationed at a distance of three *dhanus,* which is 15 *aratnis* each, while elephants or chariots should be placed at a distance of 5 *dhanus,* measuring 25 *aratnis*.[13]

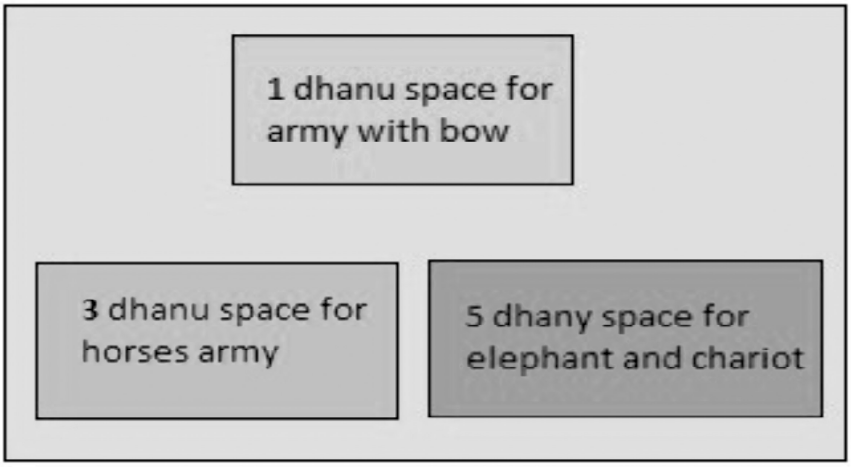

Figure 6: Positions of Archers or Bow Army

According to military experts, it is recommended that foot soldiers maintain a distance of one *sama* (equivalent to 14 *angulas*), while horses should be placed at an interval of three *samas* and elephants and chariots at an interval of five *samas* each. This arrangement ensures that the infantry, cavalry, and elephant force are well organised and avoid clashes or disruptions during movements or exercises, if required.[14] The suggestion is for each section of the group to have its distinctive trumpet call, flags, and banner. These can be used to communicate instructions to the sections, enabling them to split up and reunite as needed.[15]

The concept of *Vyûhas* (army formations) played a pivotal role in ancient Indian warfare. These formations were meticulously crafted arrays of soldiers, chariots, elephants, and cavalry, each with a specific strategic purpose. The choice of a particular *vyûha* was influenced by factors such as the terrain, the enemy's nature, and the battle's strategic objectives. The *Kamandakîya Nîtisara* categorises arrays into four fundamental types—*Danda* (Line Formation), *Bhoga* (Mobile Formation), *Mandala* (Circular Formation), and *Asamhata* (Compact Formation).[16] It represents a significant advancement in the evolution of arrays, introducing seven components, including *Ura* (central), *Kaksa* (flanks), *Paksa* (frontal wings), *Madhya* (middle unit, behind the central one), *Prstam* (rear middle), *Pratigraha* (the reserve at the rear, including the royal camp at a distance), and *Kotî* (outer sides of front wings).[17]

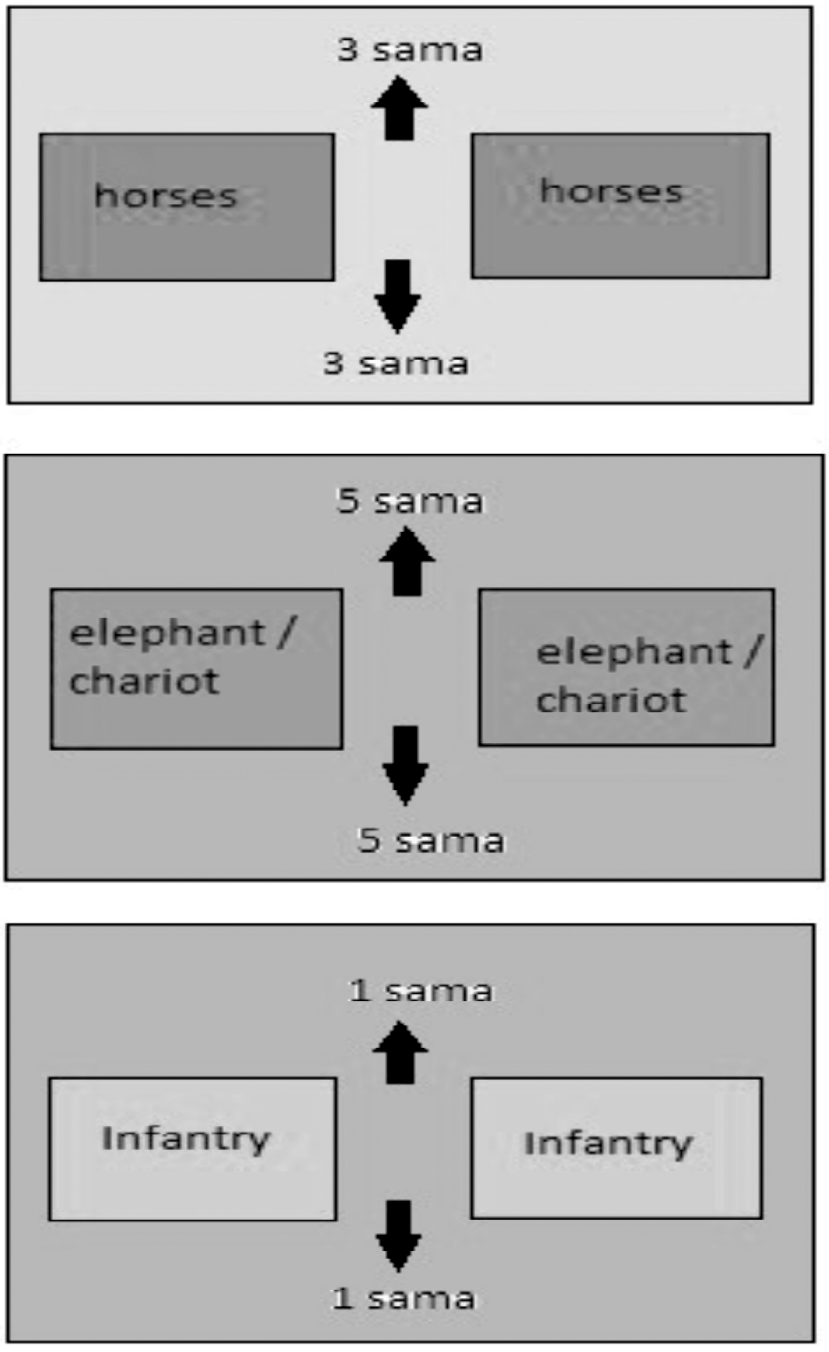

Figure 7: Various Army Formations

The inclusion of komi as a component of *vyûha* by Kamandaka may have revolutionised the whole system of warfare. The *Arthasastra* had laid down that after arraying the army on the battlefield, an attack could be made with one or two troops from the wings, flanks, and the centre, while the rest could support the attack.[18] *Kâmandakanîti* suggests starting by attacking the enemy's wings, then surrounding them with komis. Once the wings and reserves are secure, the enemy can be outflanked, the rear attacked, and, finally, the centre moves in to win the battle.[19]

Types of Vyûhas

- ***Achala***. In the *achala vyûha* formation, the soldiers were arranged with infantry in the front, cavalry behind them, charioteers in the middle, and elephants in the rear.[20]

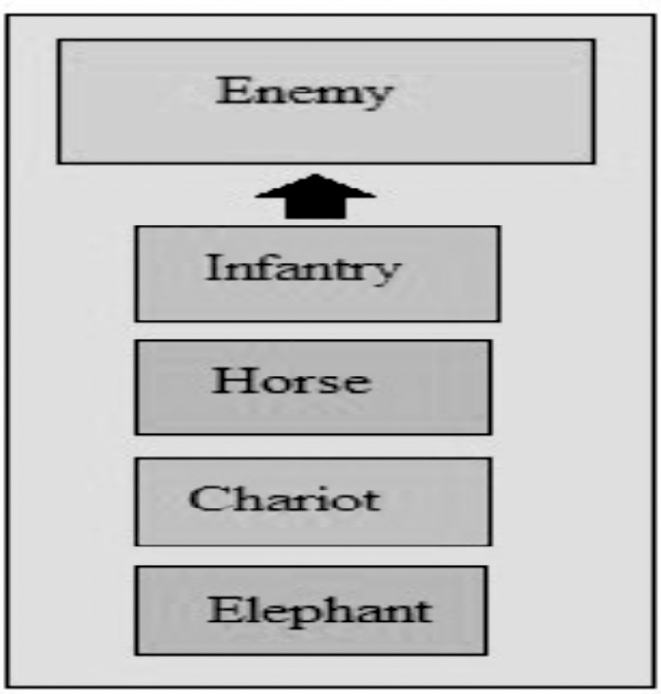

Figure 8: *Achala Vyuha*

- ***Apratihata***. The opposite formation of *acala vyûha* is *apratihata vyûha,* where the elephants stand in the first line; the chariot stands behind the horses, followed by the infantry army.[21]

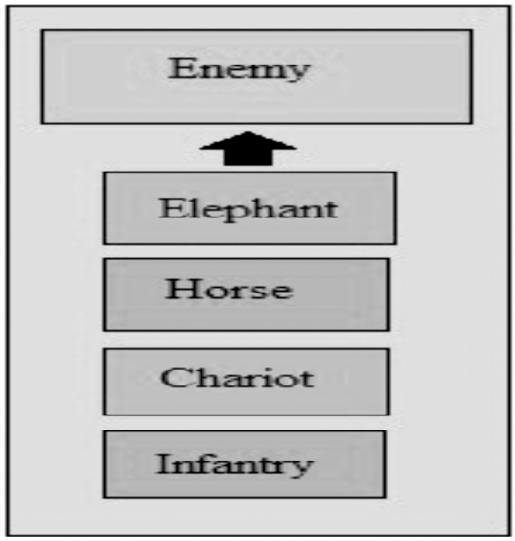

Figure 9: ***Apratihata Vyuha***

- ***Madhyabhedi****. Madhyabhedi vyûha* is a battle formation with elephants at the center, chariots on the wings, and cavalry at the front, which is capable of penetrating the enemy's array.[22]

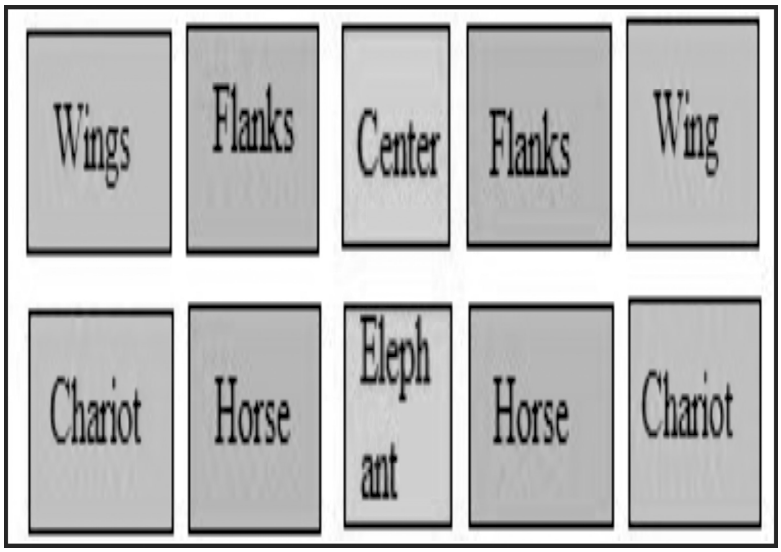

Figure 10: ***Madhyabhedi Vyuha***

- ***Antabhid***. When the cavalry forms the centre, chariots on the flanks, and elephants on the wings, it is known as the *antabhid vyûha.* This formation can be used to destroy the enemy's flanks.[23]

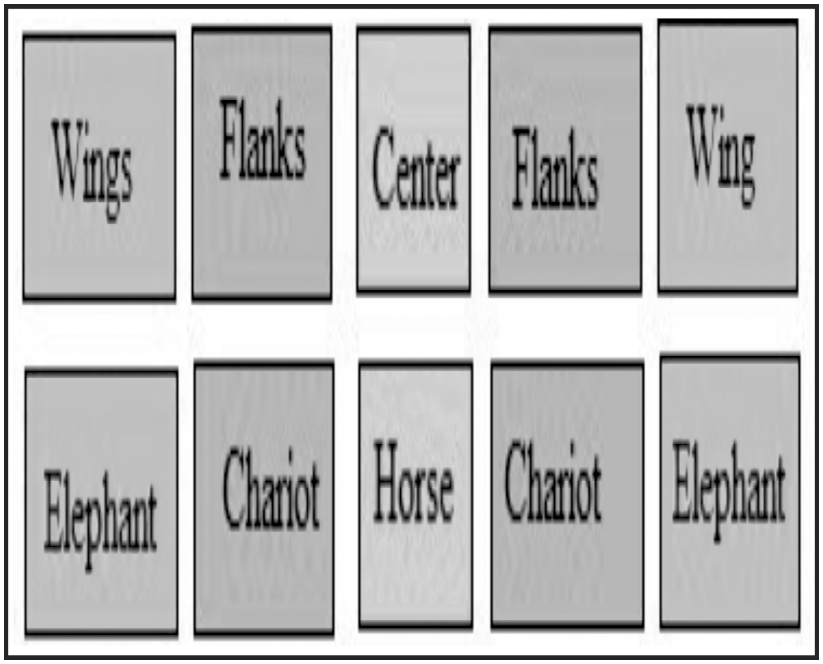

Figure 11: *Antabhid Vyûha*

Types of Arrays

- ***Danda***. In the *Danda Vyûha* formation, the centre, flanks, and wings operate in a straight line. There are 17 ways to form the formation.[24]

  - ***Pradara***. When an array is formed in a straight line like a *danda* with two lines—a front line and a back line—and the centre is in the middle, this formation is called *pradara vyûha.*[25]

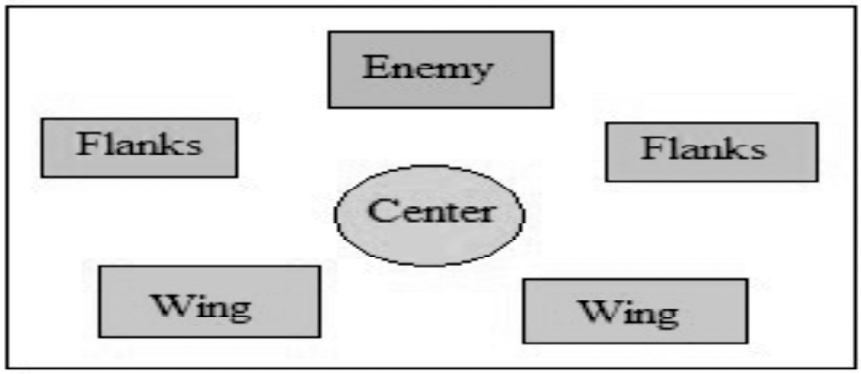

Figure 12: *Pradara Vyûha*

- ***Drdhaka****. Drdhaka* is another variation of *danda vyûha.* The centre is formed in a line with wings and flanks formed at the end of the line. This formation or array is called *drdhaka vyûha.*[26]

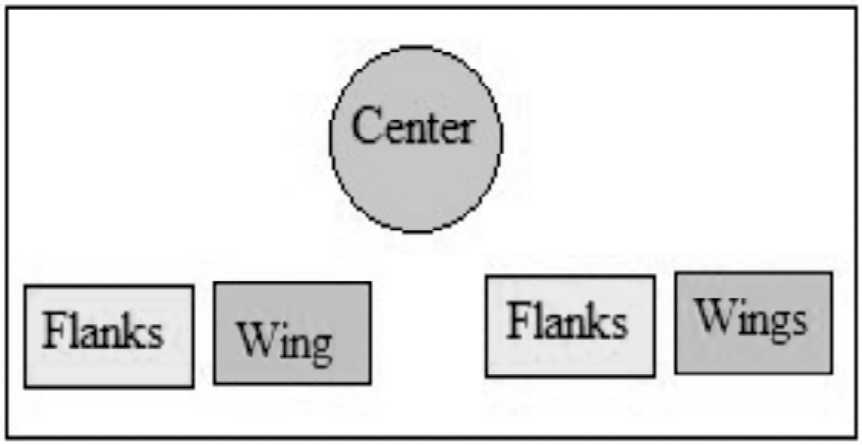

Figure 13: *Drdhaka Vyûha*

- ***Asahya****.* When the army marched out, they formed a formation called *asahya vyûha,* with a centre and two wings in the front line and two flanks in the end line.[27]

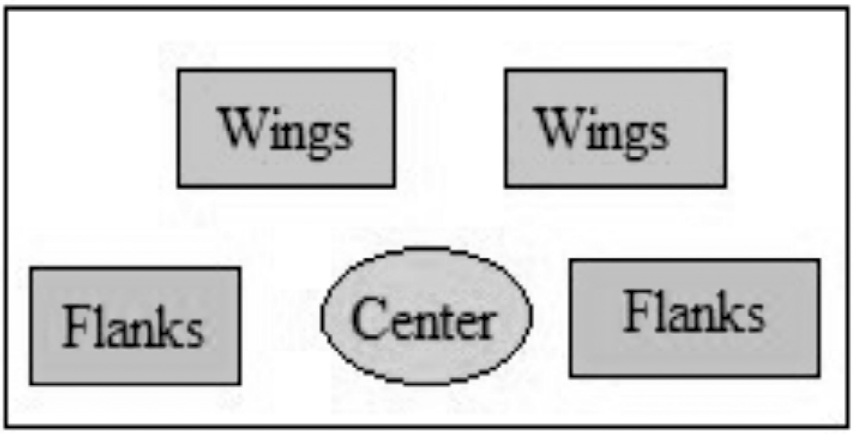

Figure 14: *Asahya Vyûha*

- ***Capa.*** When arranged in a *capa vyûha* formation, wings, and flanks are formed in the front line while the centre is formed in the end line.[28]

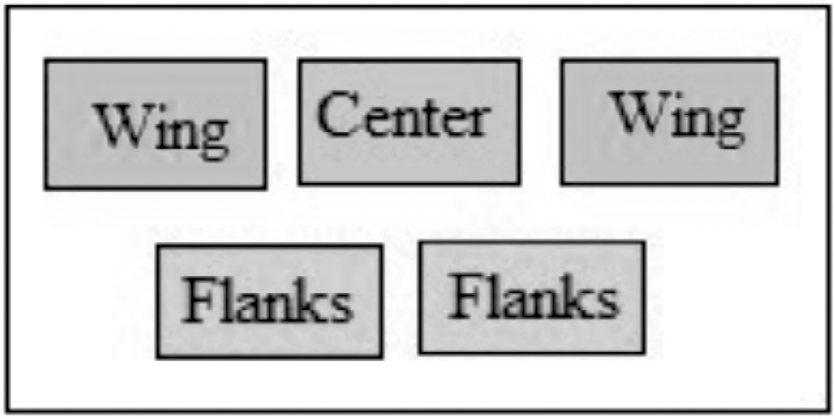

Figure 15: *Capa Vyûha*

- ***Capakuksi.*** *Drdhaka vyûha* in in reverse formation is *capakuksi vyûha.* The first line forms the wings and flanks, and the centre is in the last line.[29]

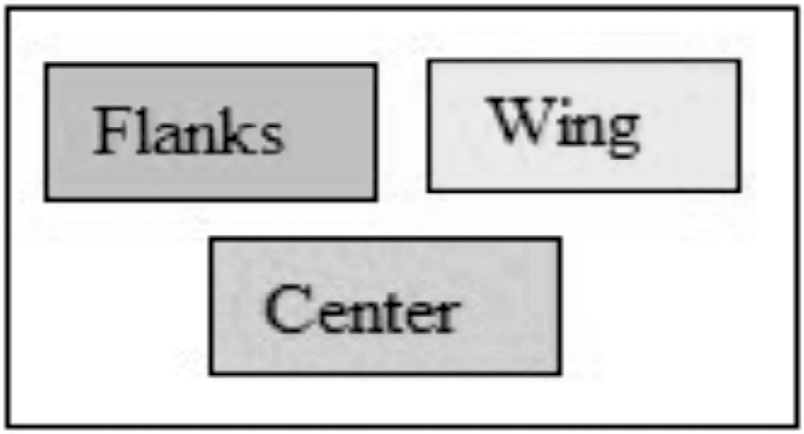

Figure 16: *Capakukci Vyûha*

- ***Praticmha.*** When wings and flanks are formed in the first line, and the centre is arranged in the last line, the formation is called praticmha.[30]

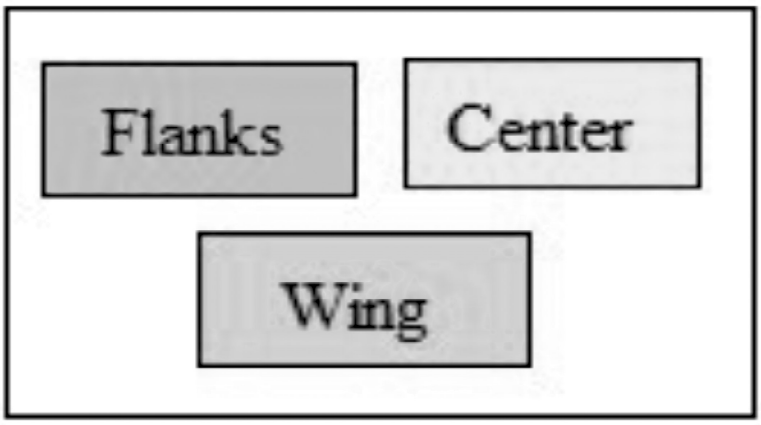

Figure 17: *Praticmha Vyûha*

- ***Supratitha.*** This *vyûha* has three lines. In the first line, the army keeps two wins; in the middle line, flank; and at the end, the line will keep the centre. This formation of the array is called Supratitha *vyûha.*[31]

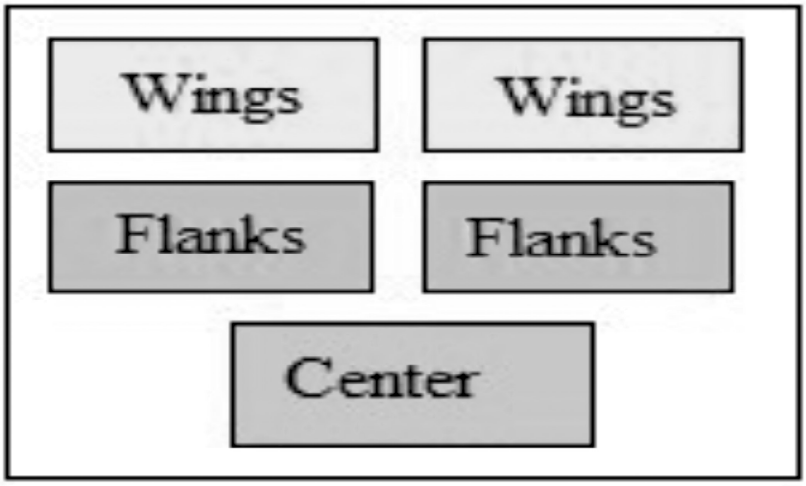

Figure 18: *Supratitha Vyûha*

- ***Syena***. The opposite formation of *supraticmha vyûha* is *Syena vyûha.* The first line is cantered, the second line has wings and the third line is arranged with flanks. This arrangement of the array is called *Syena vyûha.*[32]

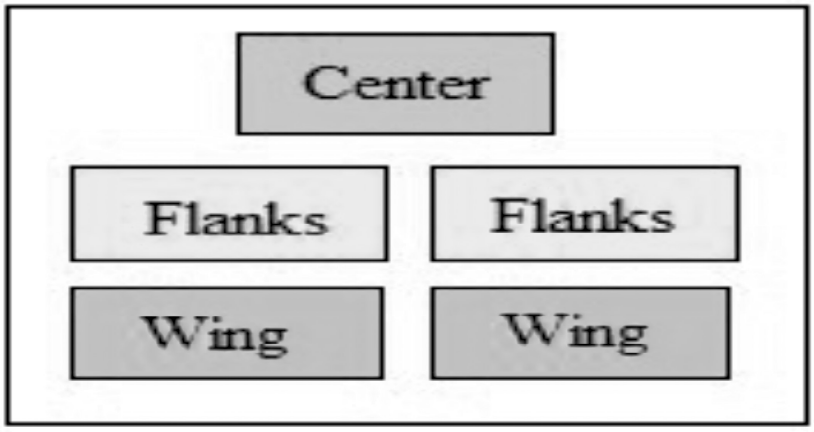

Figure 19: *Syena Vyûha*

- ***Vijoy***. When the second line is formed with two flanks and one centre and the wings are formed with two *sthunakarna vyûha,* it is known as *vijoy vyûha.*[33]

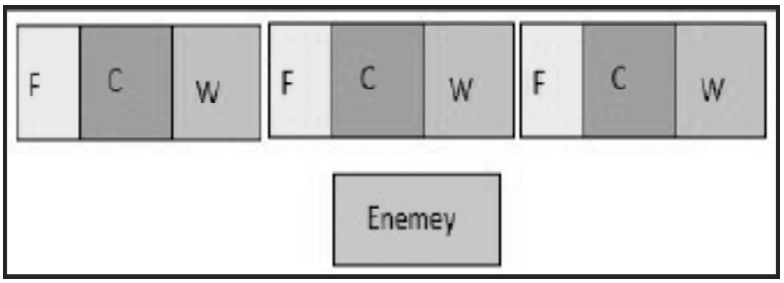

Figure 20: *Vijoy Vyûha*

■ ***Sanjaya.*** In the *sanjaya vyûha,* the formation of the array looks like a bow. The second line is arranged with a centre and two wings, and two capa arrays are kept in two flanks.[34]

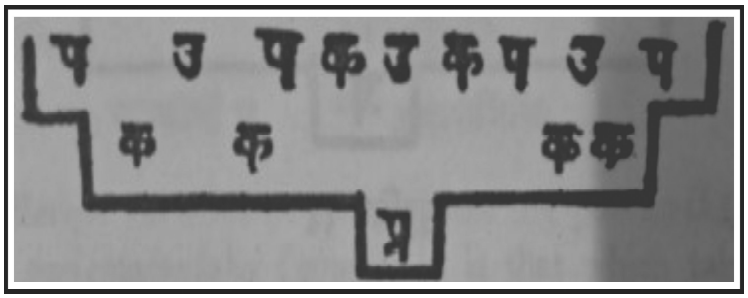

Figure 21: *Sanjaya Vyûha*

■ ***Visala Vijaya.*** When the wings are made twice, *sthûnakarna vyûha* is called *visala vijaya vyûha.*[35]

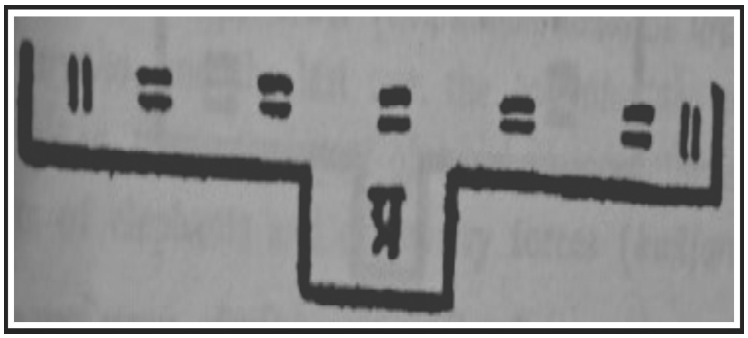

Figure 22: *Visala Vijaya Vyûha*

■ **Sûcî**. In *sûcî vyûha,* the army troops are arrayed in a single column with wings, the flanks, the centre, and then again flanks, and end with flanks.[36]

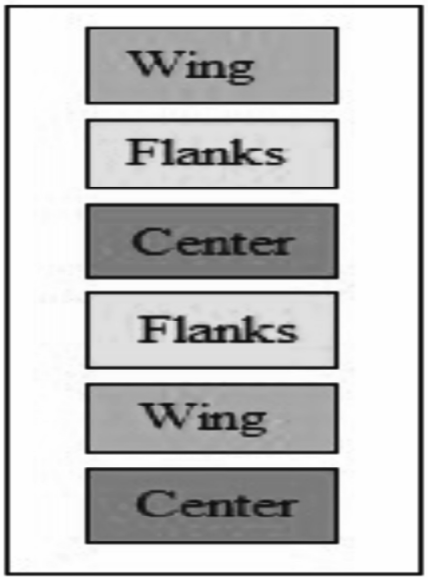

Figure 23: *Sûcî Vyûha*

■ ***Sthûnakarna.*** When the first line of an array is formed with four flanks and a centre, and the second line is formed with two wings, the array formation is called *sthûnakarna vvûha.*[37]

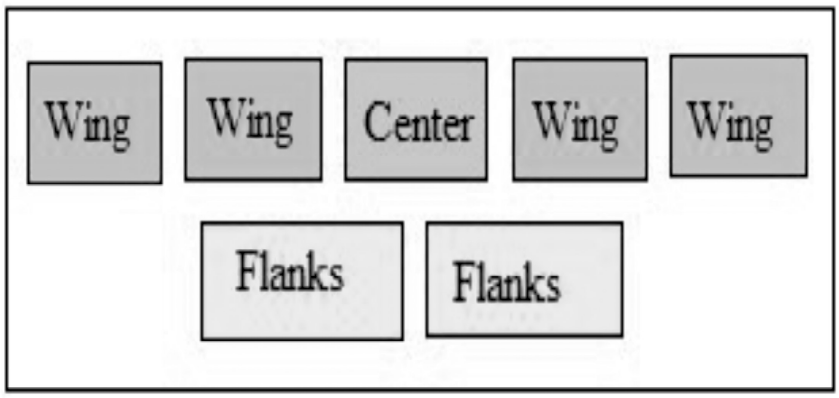

Figure 24: *Sthûnakarna Vyûha*

■ ***Camûkha***. Camûkha vyûha has eight flanks. Six flanks and two wings are kept in the first line, and the rest and centre are kept in the second line.[38]

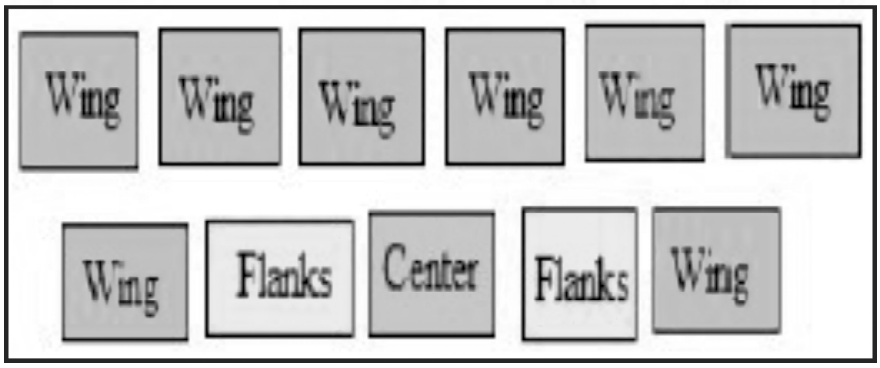

Figure 25: *Camûkha Vyûha*

■ ***Risasya***. The opposite formation of *camûmukha vyûha* is called *risasya vyûha*.[39]

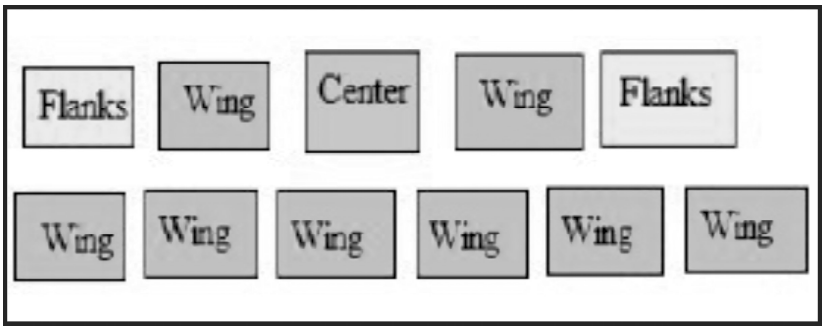

Figure 26: *Risasya Vyûha*

■ ***Balaya***. When the army troops are formed in two straight columns, it is known as *balaya vyûha*. The formation includes two wings in the first line, a second line formed with a centre, and two wings kept on both sides.[40]

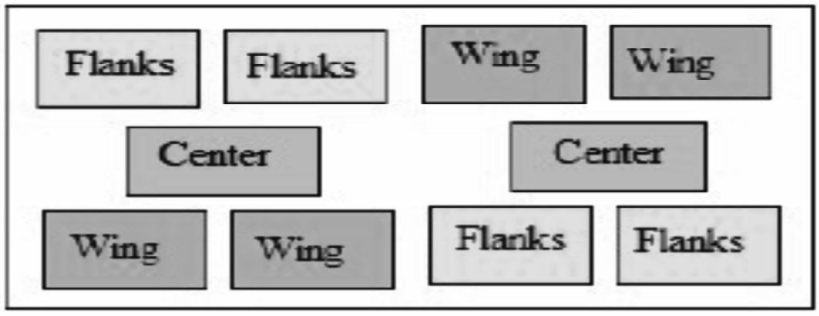

Figure 27: *Balaya Vyûha*

■ ***Sudurjaya***. The *sudurjaya vyûha* is formed with four *danda vyûha.*[41]

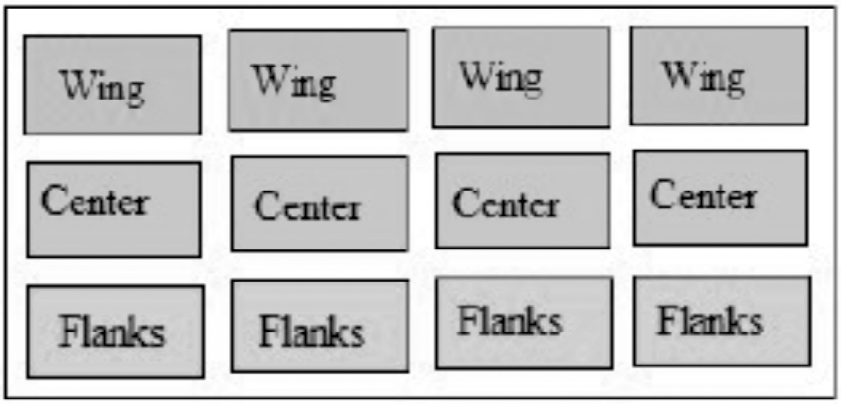

Figure 28: *Sudurjaya Vyûha*

■ ***Bhoga Vyûha***. Bhoga vyûha has five types of formation. Those are *gomûtrika, ahisancharî, sakata, makara,* and *paripantaka.*[42]

■ ***Gomûtrika***. *Gomûtrika vyûha* formation takes a similar shape to the flowing urine of cows. *Kamandaka* did not mention what is the array position.

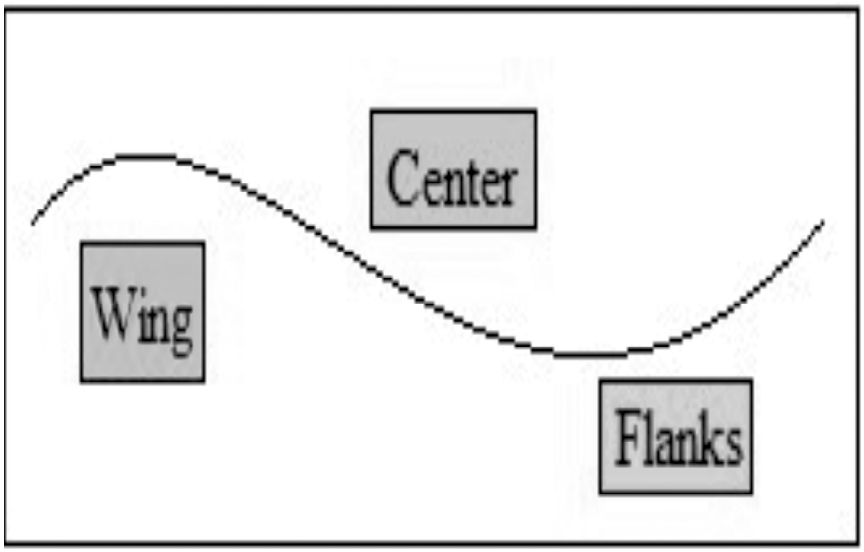

Figure 29: *Gomûtrika Vyûha*

- ***Ahisarl.*** It is similar to the movement of a snake. The first line formed with two centres, two wings, and in the last line, two flanks. This snake formation of the array is known as *ahisarî.*

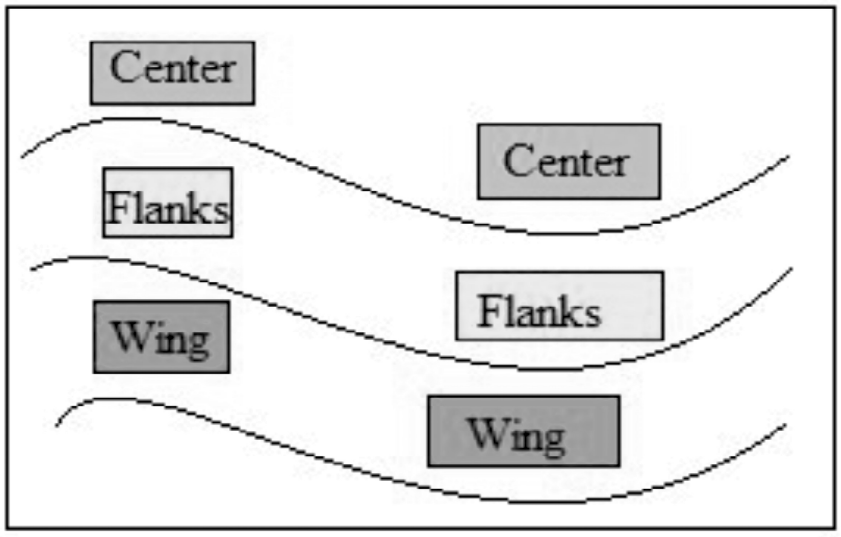

Figure 30: *Ahisarî Vyûha*

■ ***Sakata.*** This *vyûha* looks like a cart. The opposite formation of *ahisarî* is *sakata vyûha.* When the wings are arranged like *dandas* with double units of center, it is known as *sakata vyûha.*

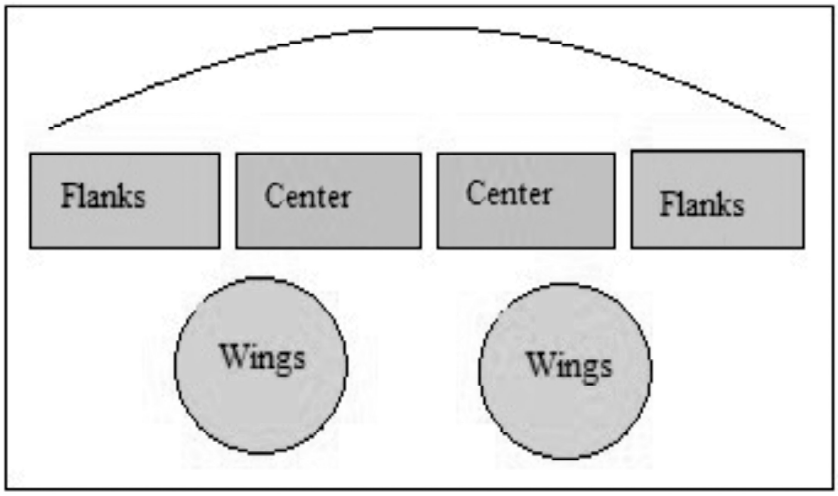

Figure 31: *Sakata Vyûha*

■ ***Makara.*** When the formation of an array looks like capricorn, it is called *makara vyûha. Kamandaka* did not mention how to form this *vyûha.*

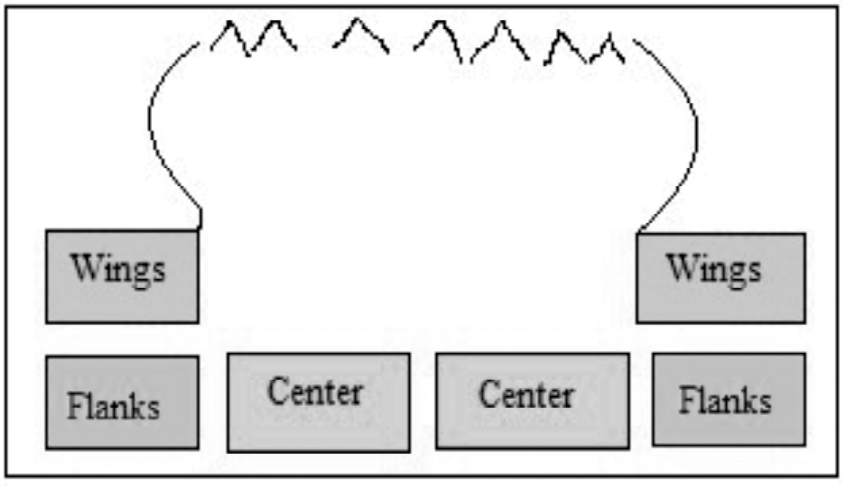

Figure 32: *Makara Vyûha*

■ ***Paripantaka.*** The following formation of array troops is known as *paripantaka vyûha.*

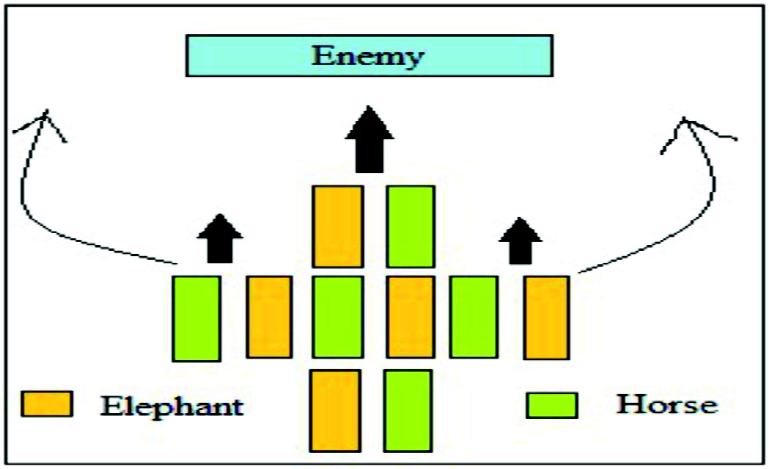

Figure 33: *Paripantaka Vyûha*

■ ***Mandala.*** *Mandal vyûha* has two types of formation—*sarvatobhadra* and *durjaya.*[43]

■ ***Sarvatobhadra.*** It is a circular array formation. When troops are formed with *astanîka saînya* and the *astanîka saînya* is divided into eight different positions, it is called *sarvatobhadra vyûha.*[44]

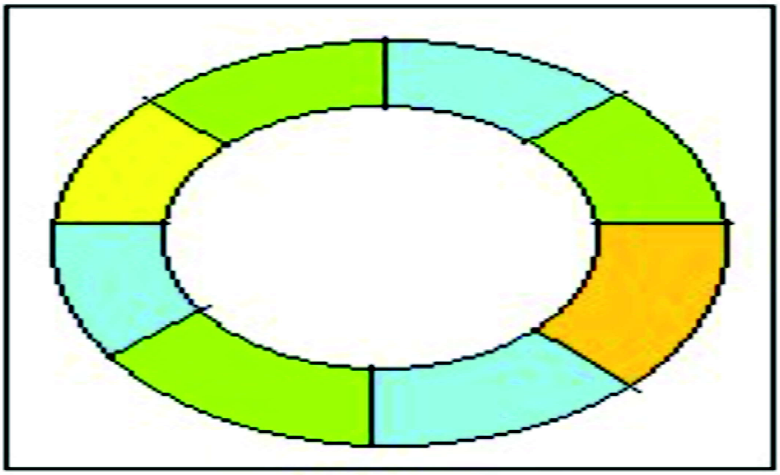

Figure 34: *Sarvatobhadra Vyûha*

■ ***Durjaya***. When any emergency is created in *sarvatobhadra vyûha* and a double army is needed to make it, such robust array is known as *durjaya*.[45]

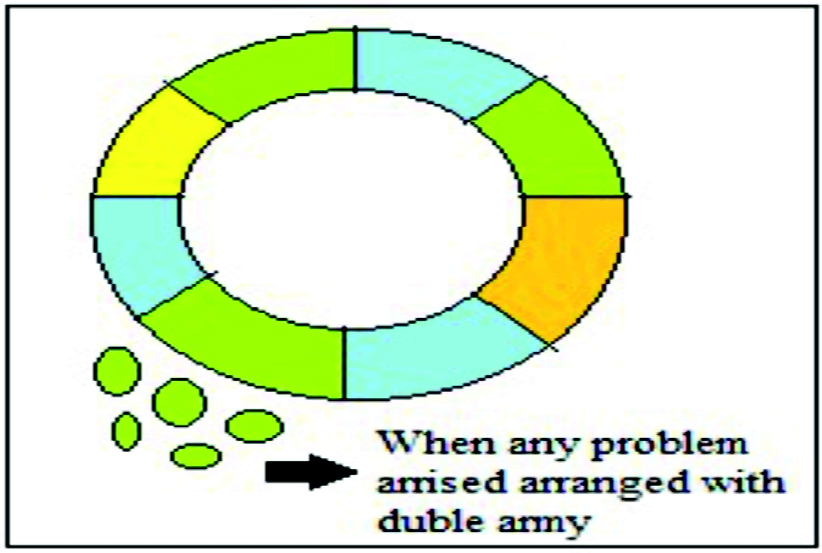

Figure 35: *Durjaya Vyûha*

■ ***Asamhata***. The variety of shapes of *asamhata vyûha* depends on whether it is three-pronged or four-pronged, or five-pronged. Five types of different formations could be formed.[46]

■ ***Ardhacandraka***. This array could be arranged with three, four, or five *aniksainya,* according to their size. When the army formed with the *tinanîka* army and placed on two sides and another army troop placed in the centre, this kind of arrangement looked like a half moon. So, it is known as *Ardhacandraka.*

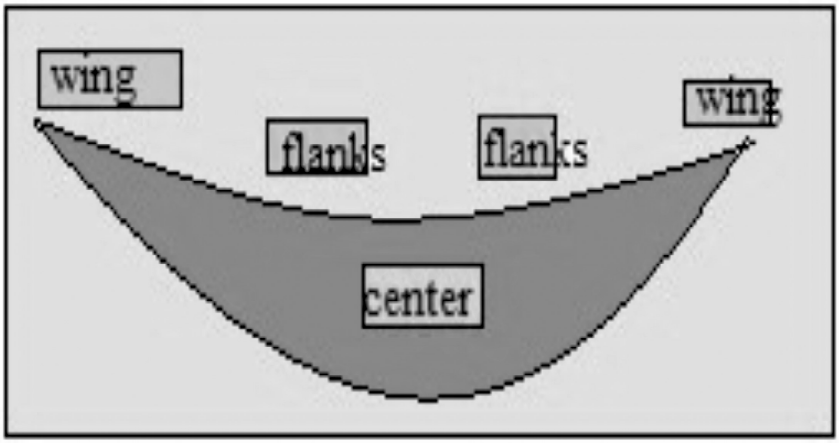

Figure 36: *Ardhacandraka Vyûha*

■ ***Uddhar***. When an army troop is formed with three army groups, it looks like a cooking oven, and is called *uddhar vyûha.*

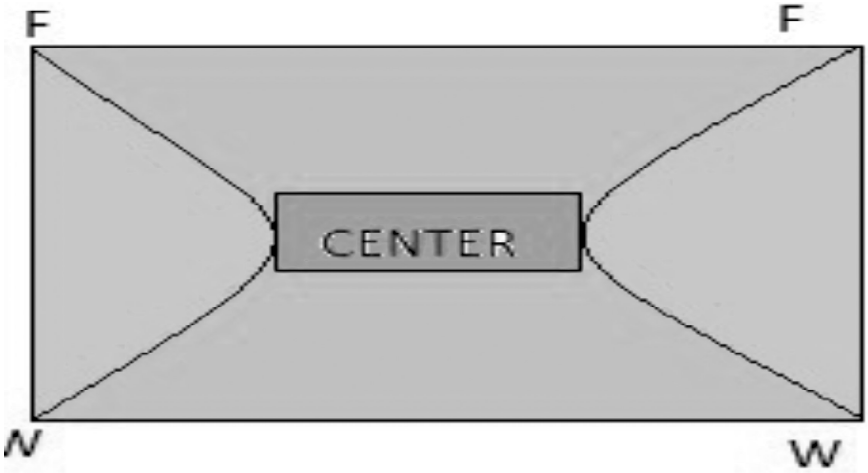

Figure 37: *Uddhar Vyûha*

■ ***Vajra***. When the army is formed with *charanî* troops, it looked like *varjra.*

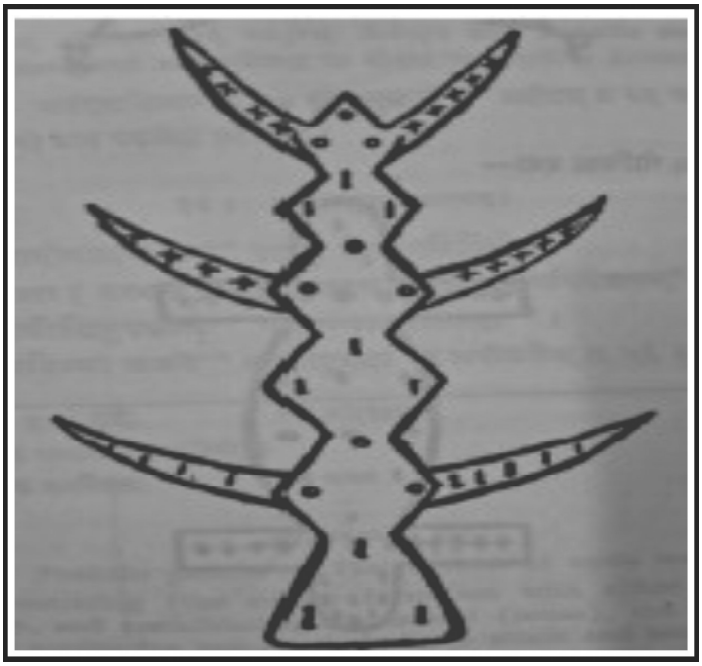

Figure 38: *Vajra Vyûha*

■ ***Karkatsringak***. When the army troops look like the crab, it is called *karkatasringi*.

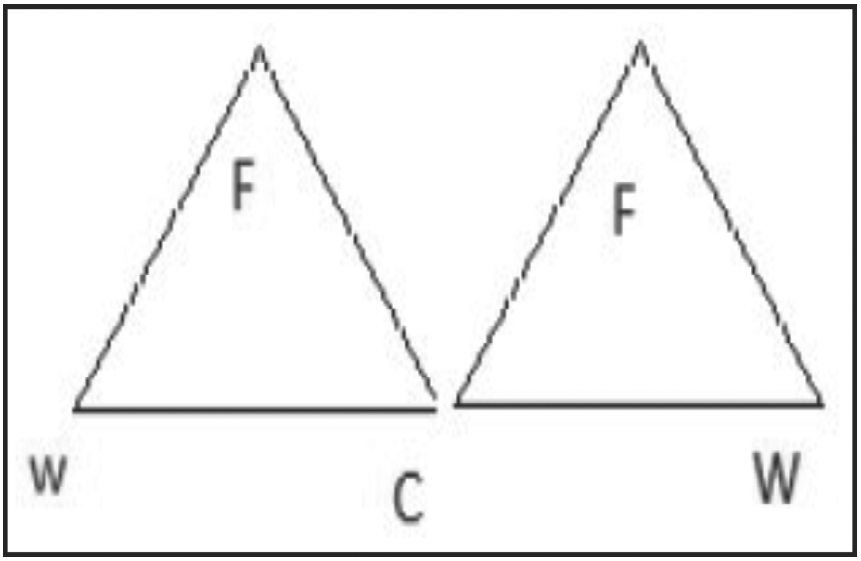

Figure 39: *Karkatsringak Vyûha*

■ ***Kakapadî***. This array is formed with five *anîka* troops, and it looks like a crow bird.

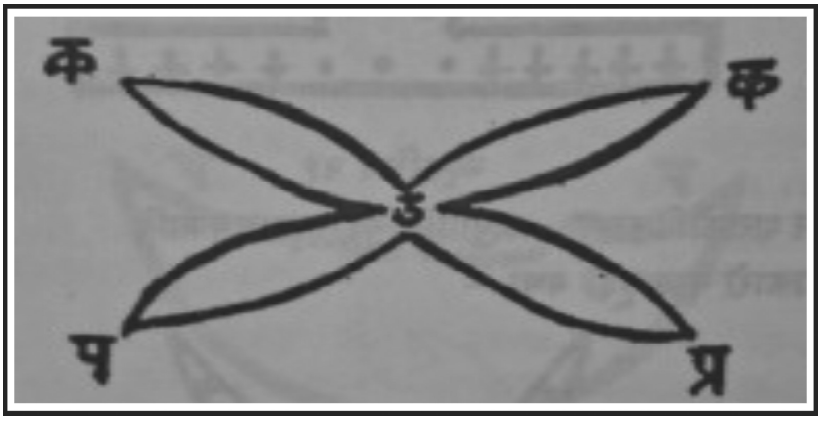

Figure 40: *Kakapadî Vyûha*

■ ***Godhika.*** When the array looks like a water ball snake, it is called *godhika.*[47]

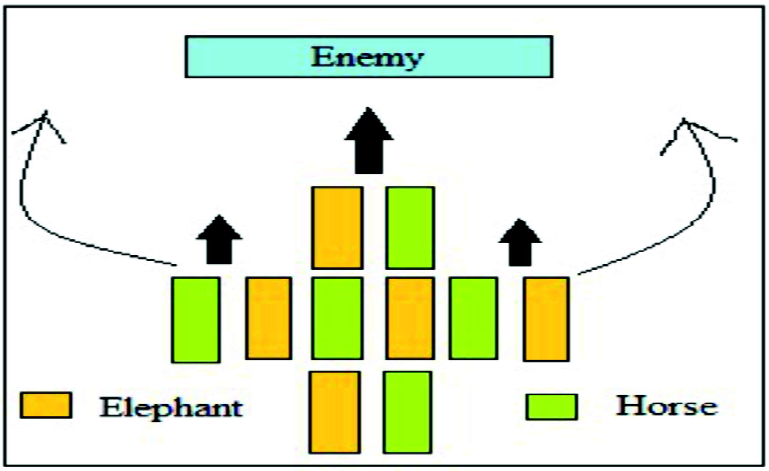

Figure 41: *Godhika Vyûha*

Findings

The *KĀmandakanĪtisĀra* presents a detailed look at Gupta-era military organisation, focusing on strategies, troop types, and *vyûhas.* It connects *dharma* (righteousness) with practical governance and reflects the social and political context of its time. The text classifies troops, such as standing armies, mercenaries,

guilds, and tribal warriors, by their loyalty and strategic importance. It describes battlefield formations like *Acala, Madhyabhedi,* and *Danda vyûhas,* showing careful tactical planning for different situations. The coordination of infantry, cavalry, elephants, and chariots is also emphasised. Comparing *vyûhas* in works like the *Arthaúâstra* and *Sukranîti* highlights the depth of ancient Indian military traditions.

Critical Analysis

The *vyûhas* of ancient Indian warfare warrant analysis of both their practical and symbolic functions. Examining their relationship to the socio-political and military contexts of their era clarifies whether these formations constituted actionable strategies or theoretical constructs, as described in the *Arthaúâstra* and the *Kâmandakanîtiúâstra.* Comparative analysis with other ancient military traditions demonstrates that, despite differences in formation design, strategic objectives frequently aligned. This situates *vyûhas* within a broader global context of warfare. In addition to their tactical role, *vyûhas* were influenced by philosophical, cultural, and religious concepts, including cosmic order and *dharma.* These formations, therefore, possessed ethical and symbolic significance alongside practical utility. The hierarchical structure of the army, comprising core troops *Moula,* mercenaries, and allies, reflected broader societal organisation. Factors such as caste, loyalty, and alliances influenced the reliability and deployment of these groups, underscoring the interconnection between military, social, and political dynamics. *Vyûhas* also served to reinforce royal authority by addressing both internal and external threats. Interdisciplinary research that incorporates literary, archaeological, and artistic evidence is necessary to address gaps in textual sources and clarify their practical application. This approach reveals the complex interplay among military, cultural, and philosophical dimensions, providing a comprehensive understanding of *vyûhas* as tactical, symbolic, and socially embedded constructs.

Further Research Aspects

The *KĀmandakanĪtisĀra* provides an intricate perspective on military organisation and strategy, yet significant questions remain that merit further exploration.

- It is necessary to re-examine the applicability of *vyûhas* in the *KĀmandakanĪtisĀra* in order to ascertain whether they are theoretical creations or useful tactics from the Gupta era. A methodical comparison of written descriptions with historical and archaeological data is required for this evaluation.

- To find out if the *KĀmandakanĪtisĀra* is from the Gupta era or another historical tradition, its timing and historical accuracy must be critically examined. The *Arthaúâstra* and *Sukranîti* can be compared to them to have a better understanding of their chronology and contextual significance.

- To ascertain their effect on the military formations mentioned in the book, an examination of outside factors such as invasions and imperial relations is required. The evolution of Indian military thought can be better understood with this method.

- To shed light on the moral underpinnings of Indian statecraft and warfare, future studies should examine how *dharma* affects military strategy in the *KĀmandakanĪtisĀra.* To clarify their strategic roles, formations like *Godhikâ* and *Kâkapâdî,* which are not well documented in the main sources, need in-depth historical, interpretative, and multidisciplinary examination.

Conclusion

The *KĀmandakanĪtisĀra* is a key source on ancient Indian military thought, detailing troop classifications, formations, and strategy. Though overshadowed by the *Arthaúâstra* and marked by historical uncertainties, it offers distinct perspectives on warfare, statecraft, and philosophy, warranting deeper scholarly attention for its theoretical and cultural significance.

Endnotes

[1] Kamandaka, *Kamandakiyanitisara*, translation by Manabendu Bandyopadhyay, (Kolkata: Sanskrit Pustak Bhander), 1999, Shloka 19.24

[2] Ibid. Shloka 19.2-3

[3] Ibid. Shloka 19.4

[4] Ibid. Shloka 19.5

[5] Ibid. Shloka 19.6

[6] Ibid. Shloka 19.7

[7] Ibid. Shloka 19.8

[8] Ibid. Shloka 19.10

[9] Kautilya, *Arthasatra*, translation by Manabendu Bandyopadhyay, (Kolkata : Sanskrit Pustak Bhander) 2010, Shloka 10.5.1

[10] Ibid. Shloka 10.5.2

[11] Ibid. Shloka 10.5.2

[12] Sukrachariya, *Sukraniti*, translation by Benoy Kumar Sarkar, (Delhi: J. P. Publishing House), 2018, Shloka 4.7.19-20

[13] Kamandaka, *Kamandakiyanitisara*, translation by M Bandyopadhyay, Shloka 20.26

[14] Ibid. Shloka 20.27

[15] Kautilya, *Arthasatra*, translation by M Bandyopadhyay, Shloka 10.6

[16] Kamandaka, *Kamandakiyanitisara*, translation by M Bandyopadhyay, Shloka 20.29

[17] Ibid. Shloka 20.30

[18] Kautilya, *Arthasatra*, translation by M Bandyopadhyay, Shloka 10.5.48

[19] Kamandaka, *Kamandakiyanitisara*, translation by M Bandyopadhyay, Shloka 19.55-6

[20] Ibid. Shloka 20.36

[21] Ibid. Shloka 20.36

[22] Ibid. Shloka 20.36A

[23] Ibid. Shloka 20.37

[24] Ibid. Shloka 20.49-50

[25] Ibid. Shloka 20.43

[26] Ibid. Shloka 20.43

[27] Ibid. Shloka 20.43

[28] Ibid. Shloka 20.43

[29] Ibid. p. 432

[30] Ibid. p. 432

[31] Ibid. p. 432

[32] Ibid. p. 433

[33] Ibid. p. 433

[34] Ibid. p. 433

[35] Ibid. p. 433

[36] Ibid. p. 433

[37] Ibid. p. 434

[38] Ibid. p. 434

[39] Ibid. p. 434

[40] Ibid. p. 435

[41] Ibid. p. 435

[42] Ibid. Shloka 20.54-56

[43] Ibid. Shloka 20.35.50

[44] Ibid. Shloka 20.35.50

[45] Ibid. Shloka 20.35.50

[46] Ibid. Shloka 20.35.51

[47] Ibid. Shloka 20.58

Bibliography

1. M Bandhopadhya, *Kamandakîya Nîtisara,* (Kolkata: Sanskrit Pustak Bhander), 1999.
2. RRL Mitra, *Kamandakîya Nîtisara*, English translation, (Kolkata: The Asiatic Society), 1894
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Heritage Conservation and the Indian Armed Forces

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Abstract

This article is based on a talk given by the author at the Indian Military Heritage Festival at the India International Centre, held on 08 and 09 Oct 2024. It explains the meaning of heritage conservation and outlines the types of heritage generally found in the armed forces. It argues that these need to be conserved in a comprehensive and professional manner. It is, therefore, proposed that an overall policy and planned system be developed to identify, record, conserve, and maintain, both the tangible and intangible heritage of forces in a holistic and systematic way. The creation of a National Military Heritage Trust is suggested for this purpose.

Introduction

It is well known that the Indian Armed Forces have a rich history and a valuable heritage. It is, therefore, necessary that it should be looked after in a professional manner. To do so, four basic questions arise:

- What is the meaning of heritage?
- Why should it be conserved?
- What constitutes the heritage of the Indian Armed Forces?
- How can it be conserved?

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To begin with, history is not heritage. Though closely related, the terms have different meanings. History is basically an account of what happened in the past, while heritage refers to what has survived from the past that is deemed valuable today. It must, therefore, possess both the qualities of continuity and value. The values themselves can be of different kinds. The organisation English Heritage categorises these values as being evidential, historic, aesthetic, and communal.[1] The relevant values will normally lie in the significance of a place, object, custom, or tradition, followed by a community or group of people. The item or subject of the heritage itself could be identified by using special techniques that examine both its qualities and its context.

Heritage may be either tangible or intangible. The tangible kinds can be natural, such as rivers, forests, hills, water bodies, etc., or man-made, such as buildings, artefacts, items, and objects of value. The intangible kind includes traditions, customs, rituals, ceremonies, social practices, festivals, and performing arts.

Why Should Heritage be Conserved?

It should be conserved because it is a valuable cultural resource. Heritage is who individuals are—their identity, their origin, their past, present, and future—all connecting in a powerful way. It has been said that "The man who has no inheritance, has no future".[2] It reflects the aspirations and achievements of a community. Through its emphasis on valuable traditions, it provides individuals with a sense of pride in their past achievements and the zeal to perform still better in the future. If the heritage is not looked after, it will decline—with a loss in the inspirational value and emotional sustenance that it has the power to provide. It becomes the duty of everyone to ensure that this does not actually happen.

The Heritage of the Indian Armed Forces

Most of the tangible kinds can be seen in the army cantonment areas. These include historic buildings, open spaces and old spatial structures, or layout patterns. Then, there are memorials, forts, fortresses, and war cemeteries. There are also items of warfare, vehicles, machinery, artefacts, souvenirs, uniforms, documents and records, and various kinds of regimental heritage items. Likewise, there are aircraft, missiles, ships, submarines, and other service specific items. In fact, it appears that technological growth

ever leads to the development of newer items of warfare, which have the potential to become items of heritage value in the future.

The intangibles kinds include traditions and customs, ceremonial parades, music of army bands, equestrian and sporting events, and a host of traditional ceremonies and social functions. It is often not just the event itself that is significant but the manner of conducting it that is indicative of human virtues and values, which remain invaluable to society, at large, and to the services, in particular. In fact, a number of these customs should fall within the ambit of charters of the United Nations Education, Scientific, and Cultural Organization and other internationally renowned agencies, which have defined the scope and meaning of 'Heritage Customs' worthy of worldwide conservation for posterity.

In a civilisation as old as the Indian, this heritage, especially the intangible kind, goes back many centuries. It extends from the period of the Mahabharata and beyond several thousand years ago, through the Mauryan and Gupta periods, medieval Indian, Sultanate, and Moghul periods, to the British colonial and princely states period, right to 1947 and after. It draws from all major events that have transpired during these times. Furthermore, it may continue to do so in the future, as heritage is constantly being created and re-created with the passage of time. A rich civilisation is, therefore, not only creates objects and traditions of value in the past but constantly continues to do so.

How can this Heritage be Conserved?

It needs a bold policy and an overall framework for its conservation. While several individuals and institutions have done valuable conservation work, these efforts seem to be largely piecemeal. What is really required is a policy framework and a comprehensive plan for the development and management of the history and heritage of the Indian Armed Forces.

One can look at the existing situation of two sources—official records and built form. In case of official records, these are understood to be kept in multiple locations in different departments and organisations, such as the National Archives, Ministry of Defence's History Division, Indian Navy and Indian Air Force's History Divisions and the concerned service headquarters. Some war histories have also been written by independent authors and

are of a laudable quality and standard. Yet, there seems to be a paucity of books and publications on heritage-specific themes, or of thematically developed historical records. An overall planned system to properly identify, record, maintain, educate, research, and disseminate information about valuable historic items and traditions is needed.

As long as the built form of the buildings and sites is concerned, there is the Archaeological Survey of India Act, 1958 (amended 2010), which applies at a national level, along with corresponding state-level acts. Apart from these, there is a provision to protect natural heritage, precincts, buildings, monuments, and artefacts under the Cantonment Act, 2006. However, specific regulations to define and apply these provisions are lacking. At present, there is only a cursory mention of the requirements of heritage conservation in Chapter IV (Duties and powers of Cantonment Boards). Further details on how to go about with this exercise require to be developed and provided.

It is worthwhile here to clarify the meaning of the term 'Conservation'.[3] This technique is defined in broad terms today and can refer to all the processes of looking after a place to retain its cultural significance.[4] Conservation does not mean 'Preservation'. It rather means that any development work that is contemplated should be carried out in a manner that respects the original character of a building, space, or area, where it is to be carried out. Its significant and valuable qualities and features are, therefore, meant to be retained in the proposed development. If required, the techniques of preservation and restoration can be incorporated in the overall conservation exercise that has been planned. This is not the same as preserving or 'Freezing' the use of a building or of an area.

Several cantonments are now over 200 years old. It is learnt that these areas are to be divided into civil and military ones.[5] The cantonments were conceived as singular area enclaves for purposes that were considered necessary at that time. The decision to 'Separate' them in two areas will have obvious implications on their growth and urban development. This will affect demography, population density, circulation and movement patterns, environment, microclimate, and other developmental factors. These aspects ought to be appropriately investigated and their findings

be used in planning the said demarcations. However, the concern here is that of the historic and heritage aspects.

The cantonments, or several parts of them, possess important characteristics in terms of natural and man-made features. The man-made ones include the area's spatial layouts and a significant number of historic buildings. Some architectural and building styles have also gradually developed in them. Some of these characteristics have a heritage value. These could, conceivably, lead to their surrounding areas being considered as 'Heritage Precincts'[6] and, therefore, worthy of conservation activity of some kind. The proposed separation, therefore, has implications for the integrity, retention, care, and management of these characteristics or features, and for the underlying systems of human activities that exist in the cantonments. Therefore, it is considered that a heritage impact assessment of the policy to separate them into two areas should be carried out. Its purpose will be to ensure that there is no loss or damage to valuable historic features or items during the declared separation, or because of the kinds of urban development and growth that is expected to follow in the civil areas.

With regards to war memorials, there are many of these at different locations in the country. They are usually simple structures built by the forces to commemorate their fallen comrades. It is doubtful if their quantity is more than about 150 overall. According to internet sources, there are over 4,000 memorials in Australia[7] and over 70,000 in the United Kingdom (UK).[8] Unlike Britain, India was never a colonial empire that engaged in multiple wars all over the world. As such, making direct comparisons between the number of memorials in the UK with those in India might lead to disparate results. Nonetheless, it does seem that for a country which sent about 1.3 million soldiers in the World War I and 2.5 million in the World War II, the existing number of memorials built to its soldiers is extremely small. The reasons why this should be so may well constitute a separate subject for study. For now, it should suffice that the design, development, care, and maintenance of the existing ones receive due professional care.

Museums and memorials are important means to display the Indian heritage to the visitors. however, the real issue remains about how the heritage should be identified and conserved.

It is suggested that a National Military Heritage Trust be created for this purpose. Such a trust could function under the overall guidance and control of the Chief of Integrated Defence Staff. The United Service Institution of India's Executive Council could act as its trustee. Its main function would be to record and to help maintain historic and heritage material. Appropriate legislation could be drawn up for this purpose. The following are proposed as objectives of such trust:

- Development of criteria and classification system for deciding which objects, items, and practices should be conserved. Grades of importance can be assigned.
- Identification and documentation of the existing items and practices for inclusion in the classifications that are developed.
- Powers to lease or purchase objects of art and artefacts of heritage value to the forces.
- Uniform guidelines for the conservation, preservation, and restoration of the listed items to be developed and communicated to the concerned officials for further action.
- Education and training programmes on history and heritage subjects to be conducted along with research on contemporary practices in these fields.
- Monitoring of conservation and maintenance programmes of the listed articles and practices to ensure compliance with the established standards.

It is further suggested that in due course, a single central facility could be built or designated to house the foregoing essential functions of research, documentation, and archives, along with preservation, education, and display. Wherever possible, visitor education for the public should be developed.

Conclusion

Based on the foregoing objectives and the policies that are adopted, a comprehensive Conservation Development Plan, covering all types of military heritage, could be prepared. If accepted, such a holistic programme and exercise would go a long way to help safeguard and maintain a valuable national resource that India has.

Endnotes

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[2] Noble Margaret E, also known as Sister Nivedita, was an Irish social worker and a disciple of Swami Vivekananda. This quotation is attributed to her.

[3] *Burra Charter*, 1999, Australia. Article 1 of this Charter defines conservation as being all the processes of looking after a place so as to retain its cultural significance, accessed 30 Nov 2024, https://patinations.com.au/wp-content/uploads/2023/03/the-burra-charter. pdf

[4] *Burra Charter*, p 2, Defines cultural significance as meaning the aesthetic, historic, scientific, social, or spiritual value for past, present, or future generations.

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From the Archives

PRINCIPLES OF WAR

Illustrated from Indian Campaigns

BRIGADIER S. K. SINHA

INTRODUCTION

From the time Adam was tempted by the forbidden fruit, wars have been a regular feature of history. In fact it can be said with justification that the history of mankind has been one long history of wars.

Through the ages, wars have originated from different causes tribal wars for rich pastures and pretty omen. holy wars for religion. imperial wars for annexing domains and modern wan, for political ideologies. The equipment used for warfare, has also changed radically. Bows and arrows have given place to bombs and bullets horses and chariots to tanks and aeroplanes, and flags and pigeons to radios and radar. In spite of these revolutionary changes both in the causes of war and in the equipment used for warfare, the principles of war have remained constant and unalterable. Convincing examples of the application of these principles to European campaigns can easily be quoted by most of us. We do not generally illustrate these principles from campaigns fought in India. This is because Indian Military History is, by and large, an unexplored subject. Therefore, a study of the principles of war against the backdrop of Indian campaigns is an illuminating undertaking.

THE PRINCIPLES

The following ten principles of war are almost universally accepted:

(a) Co-operation

(b) Selection and maintenance of aim

(c) Maintenance of morale

(d) Administration

(e) Offensive action

(j) Concentration of force

(g) Economy of effort

(h) Surprise

(j) Flexibility

Some military thinkers consider the selection, and maintenance of aim as the master principle. If a master principle has to be selected for the Indian Army, there is a strong case for elevating the principle of Co-operation to that status, The reason for this will be apparent if we analyse the application of this principle to our past history and to our present problems. Basically, however, these principles being fundamental truths are all equally important. The application of different principles gets highlighted in different campaigns according to the circumstances of the operation. They should not, therefore, be graded in any order of priority as such.

CO-OPERATION

Wars envisage the combined and co-ordinated efforts of individuals comprising the Armed Forces and the Nation, towards the attainment of the common goal. It is axiomatic that Co-operation between all agencies engaged in war effort, is an essential pre-requisite for victory. Co-operation must be ensured not only between the different components of the Army, but also between the Army and the other two Fighting Services and between Allies. The modern concept of total war adds a new dimension to this principle. The need for Co-operation between the Nation and its Fighting Services has assumed great importance. War industries, agriculture and civil defence have all to be geared to co-operate with the Armed Forces.

VIOLATION OF THE PRINCIPLE

Flagrant and repeated violation of the principle of' Cooperation has cost us dearly in the past. Almost every invading army coming to India through the centuries, has found us a divided house, with some elements in the country actively co-operating with the invader. Ambhi co-operated with Alexander against Pon1s, Jaichand with Mohammad Ghori against Prithviraj, Daulat Lodi with Babar against Ibrahim Lodi

and Mir Jaffer with Clive against Sirajudaulah. One can only visualise what course Indian history might have taken if the Raj puts, Sikhs and Marathas had co-operated with each other during the third battle of Panipat. Or again what may have happened if the Sikhs and Marathas had fought unitedly against the British in early nineteenth century. Their failure to do so, resulted in both being defeated, one after the other.

Apart from our repeated failure to put up a united front against the enemy, we have also had several instances of violation of the principle of Cooperation on the battlefield. Silahdi with a force of 30,000 deserted. Rana Sanga and joined Bahar during the battle of Kanwa. Amin-ul-Malik betrayed Ram Raya and went over with his contingent to the Sultans during the battle of Talikota. Tej Singh with a force of 11,000 fresh troops refused to participate in the battle of Feroz Shah and allowed the British to defeat Lal Singh. The treacherous conduct of Mir Jaffar and Raja Durlabh Rai at the a battle of Plassey is well known.

Even in tactical terms our armies often violated this principle. Whether at the battle of Hydaspes (Jhelum) or 1,800 years later at the first battle of Panipat, our elephant arm could not co-operate with our other arms in battle. As a result, our own troops repeatedly suffered more casualties from our elephants than the enemy did anu the outcome of battle~ was a foregone conclusion.

ADHERENCE 'IO THE PRINCIPLE

Having listed our dismal record of failures due to violation of the principle of Co-operntio11, it would now be pertinent to see how one of the most decisive battles of Indian history was won by a successful application of this principle. The four Muslim Sultans of Ahmednagar, Bijapur, Golconda and Bidar formed an alliance known as the League of the Faithful, to fight the Hindu ruler of Vijayanagar. The Confederate Army of the Sultans met the Army of Ram Rayn. of Vijayanagar near Talikota on 5 January 1565. The strength of the Confederates was 50,000 cavalry and 3,000 infantry supported :by 600 pieces of artillery. Ram Raya had a force of 70,000 cavalry, 90,000 infantry and 1,000 elephants. Sultan Nizam Shah of Ahmednagar

commanded the centre wing of the Confederate Army. He had 2,000 skirmishers in front to conceal his 600 ordnance pieces drawn up in three lines of 200 each under Rumi Khan. Behind these guns, he kept his cavalry in reserve, ready to charge through the gaps between the guns. While the two sides were fighting indecisive engagements on the two wings, Ahmed Shah's skirmishers assailed the Hindu centre with arrows. Thereafter, they withdrew according to plan drawing the Hindus to the loaded guns kept ready for them. As the Hindus approached the guns, Rumi Khan fired successive salvos at point blank range inflicting heavy casualties on them. In a matter of mim.1tes the Hindu centre broke and this was the signal for 7,000 fresh horsemen under Sultan Nizam Shah to charge into them. The battle resulted in the complete rout of the Hindu Army which is said to have suffered approximately 16,000 killed and thrice that number wounded. Talikota was not a defeat but a cataclysm for the Hindus. The once flourishing Empire or Viajayanagar, which reigned supreme in South India for nearly three centuries, ceased to exist and its capital was turned into a howling wilderness. This battle is an excellent example of the successful application of the principle of Co-operation by the Confederates, not only before the battle in the formulation of their alliance, but also during the battle, in the close Co-operation achieved between the cavalry and the artillery. To-day we in India face two hostile neighbours, who for some reasons can claim support from certain misguided elements within our country. We have our military and our large para military forces functioning under completely different commands. The concept of a Supreme Commander or a Chief of Defonce Staff for the three Fighting Services does not appear to have found favour with us. Our paramilitary forces organised like a parallel army, function under a separate Ministry. In this context and in view of our past history, shouldn't we elevate the principle of Co-operation to the status of our master-principle ?

SELECTION AND MAINTENANCE OF AIM

This principle requires the correct selection of an objective and then remaining steadfast in efforts to attain it. [n simple terms it means that we must carefully select what we want and then concentrate all our efforts to achieve it. It may be argued that this is something very simple. After all in war our aim should be to achieve victory and we

should not at any stage allow ourselves to be deflected from it. This is, however, an oversimplification of the problem. ln war, every campaign and also the different phases of a campaign will require careful selection and maintenance of aim. In modern times, the selection of war aims is one of the complex problems facing strategic planners.

It may be asked as to what should have been our aim when we were forced to take an offensive in West Punjab in September 1965. Should our aim have been the destruction of Pakistan's field army on the plains or Punjab or should it have been a limited offensive to relieve pressure in Kashmir and ensure favourable terms for a peace settlement? The former aim is the conventional objective for armies in battle. Napoleon advocated the destruction of the enemy's "masses", saying that the accessories will then fall of their own accord. Military leaders have therefore stressed the need for destroying the enemy's field armies and not being deflected from this by the bait of capturing a city. However, such an aim in the Indo-Pak war of 1965 would not have been in conformity with our political policy. Moreover, it should have been obvious to our strategic planners that due to our economic resources and on account of international pressures, the war could not be a long-drawn affair. In the circumstance, the selection of the alternative aim of a limited offensive into West Punjab was obviously the right choice. The question now arises as to how should we have translated this "limited offensive" into a concrete tactical objective for our Army? Should this have been the capture of Lahore or should it have been an advance up to the Ichhogil Canal? In a recent statement General Chaudhuri has ruled out the former saying that the capture of Lahore was not the objective given to the Army and he did not want to get involved in all the problems of capturing and holding a big city. Notwithstanding this valid and weighty argument, we would perhaps have done better by having the capture of Lahore as our objective. In a short war to be followed inevitably by a ceasefire, a big political prize like Lahore would have provided us with a trump card at the bargaining counter. In the event, our failure to go for Lahore which at one stage should have been within our grasp, deprived us of a more decisive victory.

We may now examine how an outstanding military leader, Chandragupta Maurya, successfully followed this principle. He trounced the seemingly invincible Greek phalanx led by Alexander's able general, Seleucus, m 310 .BC at the battle of the Indus. Chandragupta's aim was to expel the invader and to establish a strong and united empire in India. The resounding victory gained by him at the Indus did not deflect him from this aim. He did not attempt to emulate Alexander's brilliant though barren march of conquest, by advancing from the opposite direction. Had he done so, his empire would perhaps have disintegrated like Alexander's immediately after his death. Instead, Chandragupta chose to accept the peace offer of Seleucus and in the process married the latter's daughter and annexed the Greek provinces of Kabul, Kandahar and Herat. The wisdom of this decision can be gauged from the fact that for the first time, the entire Indian sub-continent was politically united and the greatest empire of Indian history flourished for a century and a half. His grandson Asoka, in the words of HG Wells, became an unparalleled ruler in the history of the world. And to-day by adopting the Mauryan Lions as our national emblem, we honour the memory of the Great Mauryas.

MAJNTENANCE OF MORALE

Morale is the spirit or the soldier which keeps his zeal for fighting alive. 1t strengthens his determination to snatch victory in battle, no matter what hazard or difficulty he may have to face.

Alexander’s retreat from Beas. provides a classic example of how even an "invincible" army can be forced to retreat due to its morale giving way. Western historians have written that Greek soldiers were tired after their long and arduous march of victory and that the summer heat of Punjab plains was oppressive. Therefore, the soldiers mutinied and forced Alexander to retreat. This is an untenable theory. There is no physical fatigue which an army cannot get over after a couple of weeks or rest and revelry in camp. Moreover, a large proportion of Alexander's army comprised Persians and other nationalities, and he had at the start of his campaign in India received a large batch or fresh reinforcements from Macedonia. As regards the summer heat, this was not relevant to the issue. Alexander fought Porus in the battle of Hydaspes during the height or summer that is, in May or

June. By the time his troops advanced to Beas, the monsoons must have begun. The pleas of oppressive heat cannot therefore be accepted. It is obvious that low morale was the cause for mutiny by Greek soldiers. Having won a hard-fought victory against Porus and having heard of the military might of the Nanda ruler of the Gangetic plain who had a large host or war elephants, the Greek soldier lost his appetite for further conquests. This view is supported by the famous Greek historian, Plutarch, who wrote, "But the combat with Porus abated the spirit of the Macedonians and made them resolve to proceed no further in India ..... The opposite shore (the Ganges) was covered with number of squadrons battalions and elephants."

An example of how a great victory was won by an army having high morale is the Arab invasion of Sindh in A.D. 712. The Arab army comprising 6,000 cavalry and 6,000 armed camel riders marched into Sindh under a young lad of seventeen, Muhammad-bin-Qasim. The army was fired with religious zeal for *jihad* and defying all obstacles it marched through the inhospitable desert to decisively defeat the much larger force of Dahir in the battle of Raor.

ADMINISTRATION

It is axiomatic that an army cannot function if its administrative needs are not attended to. The administrative requirements of a modern army have become very complex. Gone are the days when Sun Tzu advocated that an army should rely on forage and not burden itself with an administrative tail. Rommel maintained that even before a battle is joined, it is won or lost by Quartermasters. Previously armies used to live off the land but now armies have to be kept supplied from their bases. However, notwithstanding this difference, the fact remains that provisions have to be made available to the Army, irrespective of the method of doing so.

In India the importance of administration was recognised long ago. Chandragupta's War Office consisted of six boards of five officers each. These were, elephants, chariots, infantry, cavalry, admiralty and commissariat. It is interesting to note that Chandragupta had accorded equality of status to his commissariat department in this War Office. To-day the administrative staff or services are only grudgingly equated with the general staff and the fighting arms.

During the third battle of Panipat, the Marathas allowed themselves to be cut off from their base and Abdali's patrols prevented any food getting into their camp. A stage came when starvation stalked the Maratha camp. On 14 January 1761 it was a starving Maratha Army that advanced to give battle to Ahmed Shah Abdali. The result was a catastrophic battle in which the flower of Maratha youth was annihilated.

Mahmud Gazni's advance to Somnath in 1025 provides an outstanding example of how sound administrative arrangements can overcome difficulties. He advanced from Multan to Somnath with a force of 30,000 cavalry covering a distance of 1,000 miles across the Rajasthan Desert in 42 days. The success of this brilliant advance depended on meticulous administrative planning. The barren desert had little to offer by way of supplies, forage or water. A highly organised and efficient commissariat department catered for the needs of the Expeditionary Force. Each trooper was given camels for carrying fodder, water and rations. In addition 30 000 camels loaded with water were kept as reserve for any emergency. Thus: the Expeditionary Force not only performed the remarkable and unique feat of advancing over such a long stretch of the desert, but also won two decisive engagements en route, each against 20,000 Rajputs near Jaisalmer and Mundher. After 42 days of leaving Multan, Mahmud Gazni was at the gate of Somnath temple fortress and within a couple of days, he completely overwhelmed the defenders said to be 50,000 strong.

OFFENSIVE ACTION

Offensive action is an essential pre-requisite for victory in battle. No battle can be won by the defensive alone. Defence may be adopted as a temporary expedient to blunt the enemy's strength but victory can only be consummated by going over to the offensive. The offensive, however, must be delivered at the right place and at the right time. Otherwise it will be barren of results.

Rana Sanga violated this principle during the battle of Kanwa in 1527. Babar had won the battle of Panipat on 21 April 1526 and immediately after the battle, launched a vigorous pursuit under his son Humayun to capture Delhi and Agra. Rana Sanga failed to exploit the situation created by the collapse of Afghan power by securing Agra or

even Delhi. He also failed to give immediate battle to the tired Mughal Army. Instead, he chose to wait for over nine months. It was only in February 1527 that he advanced to fight Bahar. Having captured the fortress of Bayana on 16 February 1527 and defeated a Mughal contingent sent to the rescue of the fortress, Rana Sanga waited for one full month till 16 March 1527 before he took any further offensive action. This respite gave Bahar the much needed time to reinforce his troops and to organise his defence with elaborate earthworks.

Rana Sanga's subsequent defeat at the hands of Bahar was largely due to his failure to take timely offensive action against his enemy.

The Indo-Pak war of 1965 provides an interesting example of success obtained through the application of this principle of war. Offensive action was the keystone of every counter-measure taken by the Indian Army- crossing of the ceasefire line in Kashmir to defeat the infiltrators or again the offensive into West Punjab to relieve the pressure in Kashmir. Had we confined ourselves to purely defensive measures against the infiltrators in Kashmir or to only containing operations at Chhamb, the result of the conflict would have been very different.

Yet another example of the successful application of this principle is the great Peshwa, Baji Rao’s Palkhed Campaign of 1727-28. While Baji Rao was out campaigning, the Mughal Army under the Viceroy of Deccan, Nizam-ul-Mulk, entered Poona, the Maratha capital. King Sahu evacuated Poona and sent urgent summons to his Peshwa to return to the rescue of his capital. Baji Ruo judged the situation correctly. Instead of returning to Poona, he advanced deep into the Nizam's territory threatening his capital and plundering his cities. The Nizam promptly evacuated Poona to meet this threat. He was subsequently outmanoeuvred by Baji Rao and forced to sign the humiliating treaty of Shevgaon conceding all Maratha claims. Thus without going to defend Poona as such, Baji Rao through offensive action relieved the Maratha capital and secured a great victory.

CONCENTRATION

This principle requires the delivery of a decisive blow on the enemy at the appropriate time and place. A large army dispersed over a wide area can be defeated by a smaller army which through judicious deployment may concentrate greater strength at the chosen place. Napoleon considered this the most important principle of war. He went to the extent of advocating that the art of war could be reduced to a single principle- to unite on a single point greater mass than that of the enemy.

In 1962 we appeared to have lost sight of this principle. The then Indian Army with a total strength of over 5,00,000 men organised in over ten divisions employed only about 20,000 men, approximately one division, against the Chinese. Lack of administrative support for fighting in the Himalayas and lack of proper appreciation of the threat, prevented us from employing greater strength. The fact, however, remains that our failure to concentrate our resources against the enemy at the chosen point contributed to our debacle.

There are numerous examples of how remarkable victories have been won by military leaders by concentrating all their resources at the desired place. Before the battle of Kanwa, Babar had a large portion of his army campaigning under his son Humayun at Jaunpur against the Afghan chieftains. When Rana Sanga advanced to Bayana in February 1527, Babar at once saw the danger in this move and called back his entire force under Humayun from Jaunpur. The subsequent battle at Kanwa testified to the wisdom of this decision. Based on his victory at Kanwa, Babar firmly established M\1ghal rule over India which lasted for over two centuries.

ECONOMY OF EFFORT

This principle is corollary to the principle of concentration. It visualises judicious employment of all available forces so as to ensure maximum concentration at the chosen place. It should not be misinterpreted to mean minimum employment of resources because that by itself without any corresponding concentration will be meaningless.

Our employment of the bulk of our forces in 1962 in Kashmir and Punjab and failure to achieve concentration against the Chinese was not only a violation of the principle of concentration but also of economy of effort. On the other side of the scale, we can see Alauddin Khilji successfully applying this principle at the battle of Deogiri in 1296. He laid siege to the Fort defended by Ramchandra. At that time the bulk or Ramchandra's army was out on a campaign under his son Sankar Deva. On hearing the news of the siege, Sankar Deva returned to Deogiri to rescue his father. Faced with this situation, Alauddin left a covering force of only 1,000 to continue the siege and with his remaining 7,000 soldiers engaged Sankardeva. He gained a decisive victory over him. Subsequently, he also reduced Deogiri Fort.

SURPRISE

Every commander must constantly endeavour to surprise his enemy and at the same time ensure that he is not at any time surprised by the latter. Surprise is a most powerful weapon in war and commanders who can successfully surprise their enemy will gain results out of all proportion to the efforts made.

Shaista Khan the Mughal Commander-in-Chief in the Deccan allowed himself to be surprised inside Poona Fort by a small party led by that great strategist, Shivaji. The Marathas entered Poona Fort in the garb of a wedding procession and during the night raided the house of the Commander -in-Chief. The latter managed to escape through the window but only after he had lost the fingers of one hand to a Maratha sword.

The Raja of Travancore caused considerable confusion in the Army of Tipu Sultan by accidentally exploiting the principle of surprise. He had a defensive wall built between the Annamalai Hills and the Arabian Sea. Tipu Sultan attacked this wall in 1789. Apart from a frontal attack, the Sultan also carried out a wide outflanking night movement with two brigades from the side of Annamalai Hills. The outflanking force got to the rampart of the wall and was steadily advancing over it when one platoon of the Raja's army suddenly attacked it from the flank. The leading brigade commander was killed and utter confusion prevailed during the darkness. The Sultan's Army

panicked. The Muslims pushed against each other and a large number of them died by falling in the ditch in front of the wall. Tipu Sultan himself fell in the ditch and broke his knees from which he never fully recovered. His palanquin, seals, rings and personal ornaments were captured by the Travancore Army. Thus a platoon of some 40 men foiled the attempt of two brigades comprising some 5,000 men and inflicted 2,000 casualties. This astounding success was possible only because of complete surprise.

FLEXIBILITY

Flexibility visualises ability to readjust according to changing circumstances. Seldom will the course of a battle or campaign proceed strictly according to plan. Unforeseen circumstances inevitably arise and a commander should have sufficient flexibility to cope with them. Mobility is an important adjunct of flexibility and is a means of achieving it.

During the last World War, the Japanese had made plans for the capture of Imphal and Kohima. In a brilliant offensive they besieged the Allied forces at both these places but failed to fully exploit their advantageous position. The large administrative base at Dimapur with depots overflowing with almost all commodities lay unprotected at the mercy of the Nippon Anny. Capture of Dimapur would have tilted the scales in favour of the Japanese and would have enabled them to obtain much-needed replenishments. The Japanese Generals, however, stuck rigidly io their old plans and kept dissipating their strength in fruitless assaults at Kohima and Imphal. This Jack of flexibility on their part cost them dearly. It accounted for the total defeat of their Expeditionary Force.

The Marathas in their campaigns against Mughals displayed remarkable flexibility. Unencumbered by milling non-combatants, dancing girls and other luxurious equipment, the Maratha horse became legendary. The Marathas became renowned for their incredible mobility and for altering their plans to suit changed conditions. No wonder the might of these great warriors was felt throughout the Indian sub-continent in the eighteenth century. Apart from their sway over South India, they held the Mughal Emperor as their pensioner at Delhi,

while their horses grazed on the banks of the Indus in the West and raided up to the Maratha ditch at Calcutta in the East.

SECURITY

Security visualises suitable measures to ensure freedom of action. Adequate defence of vulnerable bases must be ensured so that own forces are free to strike at the enemy at the chosen point. Risks have to be taken in war but they must be calculated risks.

Porus failing to prevent Alexander from crossing the Jhelum unopposed or Ram Raya of Vijayanagar repeating a similar mistake before the battle of Talikota in allowing the Confederate Army to cross the Krishna unopposed, can be quoted as instance of the violation of this principle. An example of the successful application of this principle was our retaining a credible defence posture against the Chinese, during the Indo-Pak war of 1965. Thus, the Chinese ultimatum had no effect on the course of our conflict with Pakistan.

CONCLUSION

The principles of war are a means to an end and not an end in themselves: The end in every case is to obtain a military victory over the enemy in battle. In their application, these principles are complementary and interdependent. Co-operation by itself will achieve little unless it is related to other principles like selection and maintenance of aim or offensive action. One cannot achieve concentration without economy of effort and security nor can one exploit concentration without high morale and sound administrative backing. Flexibility is important io take full advantage of concentration. Concentration coupled with surprise will invariably deliver a knock out blow to the enemy. However, at times there may appear to be apparent contradictions between these principles. There may be a conflict between concentration and economy of effort. Concentration may not be possible without sacrificing surprise. Since war is an art and not a science, no set formula for victory can be prescribed. It is upto the genius of the military commander to resolve any apparent contradictions between these principles and to give due weightage to different principles in accordance with the operational situation. Like the ten commandments, these ten principles are eternal

truths, which apply to warfare in all ages and in all countries. The campaigns fought in India, illustrate the validity of these principles just as much as those fought in Europe and elsewhere. However, a study of our past military history and an analysis of our present military problems, highlights the importance of the principle of Co-operation. An Indian Military leader who ignores this principle will do so at this own and his nation's peril.

Cutting Edge for Future Joint Operations: A Transformed Indian Air Force

Wing Commander Vikas Kalyani[@]

"*Capacity building is important for Indian Air Force. As far as China is concerned, it is not just numbers. The technology is also growing at a rapid pace. Production agencies must invest in advanced manufacturing processes for timely induction of new platforms. Technology delayed is technology denied*"[1]

- Air Chief Marshal AP Singh, PVSM, AVSM

Abstract

In a rapidly evolving global security environment marked by volatility, uncertainty, complexity, and ambiguity, the role of air power in modern warfare has gained strategic importance. This essay examines the critical role of the Indian Air Force (IAF) in safeguarding national interests and adapting to future warfare through joint and integrated multi-domain operations. It highlights the necessity for transformation across infrastructure, logistics, human resources, technology, and indigenisation to ensure operational readiness and strategic superiority. The essay further explores the challenges and opportunities posed by emerging technologies such as artificial intelligence, cyber warfare, and space-based operations, and proposes a phased roadmap for IAF's comprehensive transformation. Emphasis is placed on fostering jointness among armed forces and leveraging innovation to position the IAF as a decisive force in future joint operations.

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Introduction

In the 21st Century, the world is increasingly becoming Volatile, Uncertain, Complex, and Ambiguous (VUCA), and threats to national security are following suit. In these times, no nation can undermine the importance of future-ready joint operations by its modernised armed forces. The Indian Air Force (IAF), one of the world's largest and most formidable air forces, has been at the forefront of national defence, playing a critical role in safeguarding India's vast airspace. As the security environment evolves globally, the IAF faces the challenge of keeping pace with rapid technological advancements, complex geopolitical dynamics, and new modes of warfare. The IAF will have to evolve continuously at the pace of changing character of warfare while enhancing interoperability with the army and the navy in integrated operations. IAF must aim at acquiring advanced capabilities in air, space, Artificial Intelligence (AI), and cyber domains while promoting innovation. To play its critical role in future joint operations, the IAF must undergo a comprehensive transformation encompassing modernisation across various dimensions, including infrastructure, logistics, human resources, technological advancements, and indigenisation.

Air Power in Changing Geopolitical and Security Environment

Air power was initially intended for reconnaissance and bombing enemy populations, with the Italian Army officer Giulio Douhet advocating its use to force an enemy's surrender through extensive bombing of civilian areas to break the morale. During and after World War II, the growth of air forces was pivotal in determining the outcome of conflicts, with superior air forces playing a crucial role in victory by neutralising weaker air forces.

Today, air power has evolved into a key instrument for achieving national interests and its role should not be studied in isolation. In the 21st Century, air power must be viewed as a tool to achieve broader strategic goals, extending beyond military tactics. Success in any war should not only be measured by the tactical effectiveness of air, land, or maritime forces, but by their effective contribution towards national security objectives. In the ultimate analysis, success on the battlefield is not as important as success in meeting the conflict termination criteria, which are invariably set by the political leaders and dictated by larger national security objectives.

The role of air power in the VUCA geopolitical scenario must be seen from this perspective. Air power cannot simply bomb an enemy's population into submission, as history shows questionable results—especially when the enemy is not clearly defined. From the Vietnam War to Gaza, targeting civilians has caused more problems than solutions. In the Cold War, air power was tied to nuclear deterrence but remained unused due to the fear of mutually assured destruction. Though seen as a key solution after the 1991 Gulf War, it has failed to address complex security issues effectively, highlighting the need to consider problems in their full width, depth, and context. Thus, the instrument of air power must be used very judiciously.

Air Power in the Indian Context

In the history of air power, the outcomes of peer or near-peer air wars are yet to be witnessed. There are important lessons for IAF in this conundrum. India would do well to tailor the lessons from the recent conflicts to suit the unique geostrategic environment prevalent in the sub-continent. The wars would be fought to safeguard the territorial integrity and sovereignty, and the adversaries would be peer or near-peer. Therefore, employing air power in a highly unrestricted manner—as has often been the norm with Western air forces in the past—would be difficult to achieve. The option of learning on the job does not exist for India; therefore, the IAF must develop its capabilities based on its own threat perception and the nature of competition, rather than merely imitating the doctrines and capabilities of others.

Need for Jointness

> "*There are experts of land, sea, and air warfare. But as yet, there are no experts of warfare. And warfare is a single entity, having a common purpose*"[2]
>
> - Giulio Douhet

The rapid advancement of technology demands seamless coordination among land, sea, and air forces to enhance their capabilities. Victory in warfare now relies on mastering information flow and conducting joint military operations. Believing the three military branches can operate independently in future wars ignores global changes. Success will depend on the ability to integrate

and synchronise efforts across all armed forces, highlighting the critical importance of a unified approach to modern combat.[3] The Defence Minister of India recently stressed upon the significance of evolving a joint military vision and preparing for the challenges that the country may face in future wars, while emphasising synergised, swift, and proportionate response to provocations.[4]

In the Indian context, the theatre command concept is expected to bring about much-needed degree of integration and jointmanship among the three services. With the real-time threat of a two-front scenario and less than the required number of squadrons with the IAF[5], seamless and cohesive jointness is the 'Urgent need of the hour'. Appropriate use of air power has been and will remain a critical factor for the success of future operations. However, the strategic impact of air power in complex operations will be significant only through well-planned and well-executed roles by all services in well-defined domains. According to stakeholders in national security, special attention needs to be given to the strategic importance of cyber and space-based capabilities in modern warfare, underlining the necessity of preparing for future conflicts that will increasingly span multiple domains.[6]

Beyond Joint Operations: Multi-Domain Operations

The modern battle-space is heavily influenced by technology and it has forced modern militaries to ponder over the question, 'What is after joint'.[7] The character of warfare has undergone a profound transformation; the modern battle-space has become an intricate, multifaceted environment where success is contingent upon the harmonious orchestration of capabilities spanning diverse operational domains.[8] The term 'Joint' usually signifies the operational level, whereas multi-domain seeks to integrate at every level, from the strategic down to the tactical level.[9] Multi-Domain Operations (MDOs) have evolved as a method to integrate and synchronise activities across land, sea, air, space, cyber, and information domains to achieve strategic objectives. The ability to seamlessly operate across these domains is crucial for military success in any contemporary and future conflict. Looking at various recent conflicts spread across all kinds of domains, the author opines that it is time to ponder upon planning and execution of joint MDOs.

Role of the Indian Air Force in Multi-domain Operations

> "*Our increasing space assets will have to be protected from hostile actions, and since air and space belong to the single aerospace continuum, the IAF would remain the logical primary military component to undertake air and space defence*"[10]
>
> - Late Air Commodore Jasjit Singh, AVSM, VrC, VM (Retd)

Traditionally, air forces have exercised and executed cross-domain deterrence and coercion, as evidenced by numerous historical examples, where they have softened army targets or conducted anti-shipping strikes to support naval operations—often while simultaneously engaging enemy air power across different theatres. Air forces are inherently equipped, organised, and trained to operate in a multi-domain construct. They have personnel with skills and expertise within their organisation who can leverage the specialised capabilities required to move from the joint operations construct into MDO.

The IAF has all the driving elements required to play the most crucial role in MDO. Leveraging high-end technology, the innovative mindset of personnel, strategic reach and flexibility, integrated Command and Control (C2) infrastructure, Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, and technological prowess in the space and cyber domains are all key strengths of the IAF. When applied in any MDO scenario through well-orchestrated joint planning and integrated operations, these capabilities can effectively contribute to achieving both military and political objectives.

Challenges for Indian Air Force to be Joint Multi-domain Operations Ready

The rapid pace of technological advancements and their infusion in the battlespace are already leading to increased complexities[11] in the operating environments and will surge in future wars. The use of AI, hypersonic weapons, weaponisation of space, and cognitive warfare present new challenges and opportunities for military operations. AI and Machine Learning[12] (ML) have the potential to revolutionise military operations. Data is already being termed the new munition—and could well be called the new gunpowder. Powered by vast amounts of data, AI and ML are

transforming battlefield decision-making by enabling faster and more accurate responses to dynamic threats. Hypersonic weapons have blurred the distinction between air and space, posing significant challenges for detection and interception, and necessitating new approaches to effectively counter their threat. Contested space environments[13], where adversaries can degrade or deny access to space-based assets, coupled with weaponisation of space, necessitate the development of new capabilities and strategies to ensure continued effectiveness of space operations. Successful conduct of MDO by IAF mandates that these challenges are addressed. IAF, with its focus on technological innovation, capability, and human capital enhancement, also needs to undergo transformation concentrating on developing joint doctrines and niche technology-based frameworks across all domains to achieve seamless integration with other services to ensure successful joint MDOs.

Other undeniable factors that pose challenges in this process include a limited budget with the Ministry of Defence (MoD), reliance on foreign military technology in certain critical areas, the perception of modernisation as a threat by regional neighbours—potentially leading to conflicts—and, finally, internal resistance within the system towards the adoption of new doctrinal concepts.

Key Factors for Transformation

There are many factors to be considered for overall transformation, however, six major drivers of transformation are mentioned below:

Modernisation of Infrastructure. The foundation of any successful military force lies in its infrastructure. As the IAF prepares to undertake more complex and integrated operations with other armed forces, the modernisation of its infrastructure becomes critical. The following infrastructure must be enhanced to accommodate newer, more advanced systems, ensure efficient operations, and maintain readiness[14]:

- **Airbases and Runways**. With the increase in the size and capabilities of aircraft, existing airbases need extensive upgrades. Runways must be extended and reinforced to handle modern supersonic jets, heavy cargo aircraft, and future unmanned systems. Remote and forward bases in strategically important areas should be developed to support rapid deployment and quick reaction. While the Modernisation

of Airfield Infrastructure project is a step forward, its application should be expanded nationwide to enable all-weather operations.

- **C2 Centres**. Integrating C2 systems across different military branches is vital for joint operations. Modernised operations centres, equipped with advanced communication and tracking systems, are essential for ensuring seamless coordination with the army, navy, and paramilitary forces during joint exercises and combat operations.[15] The proliferation of the Integrated Air Command and Control System highlights progress, but further combined efforts are required.

- **Maintenance Facilities**. To ensure operational readiness, the IAF must establish cutting-edge maintenance, repair, and overhaul facilities focusing on advanced systems such as the Rafale, Tejas, and Unmanned Aerial Vehicles (UAVs). Additionally, the emphasis should be on dual-use technologies to cater for both defence and civil aviation needs, thus, maximising resource utilisation.[16]

Logistics and Supply Chain Optimisation. An efficient logistics system is fundamental for sustained operations, especially during joint deployments. The transformation of IAF logistics must focus on modernisation and optimisation.

- **Automated Systems**. Integrating AI and ML into logistics can streamline inventory management, predict maintenance needs, and optimise supply chains. Smart warehouses and autonomous systems for material transportation will ensure reliable and timely supply chains. The Integrated Material Management Online Logistics System of IAF already exemplifies this approach but requires broader inter-service sharing.[17]

- **Joint Logistics Operations**. Integrated logistics systems are necessary for multi-service deployments. The IAF must collaborate with the army and navy to establish shared logistics hubs, ensuring synchronisation during crises.

- **Rapid Mobility and Deployment**. Enhancing rapid deployment capabilities, including airlift capacity and positioning strategic reserves of supplies and fuel in key locations will ensure readiness.

Human Resource and Doctrinal Development. The Chief of Defence Staff General Anil Chauhan in one of his recent podcasts said that biggest challenge to transformation is changing the mindset and to go through the process of learning, unlearning, and relearning.[18] The quality and adaptability of personnel are critical for modern warfare. Developing a skilled workforce is the top priority for the Indian Army, which requires the following:

- **Training Programs**. Comprehensive training regimes focusing on joint operational tactics and proficiency in new technologies. Training modules must be changed to focus on developing mindset for jointness in MDO. Virtual training and simulations will prepare personnel for multi-domain battlespaces.[19] The initiative of Future Warfare Course by Headquarters Integrated Defence Staff is a step taken to develop an understanding on the manner in which future wars will manifest in terms of being contact, non-contact, kinetic, non-kinetic, psychological, or informational, as also the domains where they will be fought, be it cyber, space, or electromagnetic spectrum.[20]

- **Innovation and Adaptability**. Fostering a culture of innovation through collaboration with research organisations, universities, and private tech companies will enhance problem-solving and technology integration. More focus must be on cyber, space, and AI-related technologies.

- **Doctrinal Evolution to Foster Joint Culture**. For ensuring operational transformation across services and developing culture of jointness, the IAF needs to collaborate to create unified joint operations doctrine. Focus of this doctrine must be seamless integration of services at all stages of training, learning, planning, and execution.

Technological Advancements and Cyber Capabilities. The IAF must leverage the following cutting-edge technologies to maintain an edge over adversaries:

- **AI and Autonomous Systems**. Investing in AI-driven systems for surveillance, reconnaissance, and combat operations will enhance battlefield awareness and, consequently, operational efficiency.[21]

- **Cyber Warfare**. Strengthening cyber offence and defence and electronic warfare capabilities is crucial. Specialised units focused on these domains will ensure air superiority while countering adversaries.[22]

- **Interoperability with Other Services**. This will prove to be the backbone of integrated operation in MDO. Adopting standardised communication protocols and ensuring compatibility of IAF systems with systems across army and navy will play crucial role in joint operations at any and every level.

Indigenisation of Key Platforms. Self-reliance in defence production is vital, especially given global supply chain uncertainties. The present government's *Atmanirbharta* (Self-reliance) supports the 'Make in India' policy with sincerity. Time is ripe for mastering new technologies and boosting domestic defence production. AI and information technology will support the following process[23]:

- **Indigenous Aircraft**. The continued development of platforms like the Hindustan Aeronautics Limited Tejas and advanced stealth aircraft should be prioritised. The Light Combat Aircraft (LCA) production must be increased to around 18 a year to begin with. The present Chief of the Air Staff has already expressed his views regarding importance of time-sensitive technology for the armed forces.[24]

- **Drone and UAV Technologies**. Investments in drone development to enhance operational effectiveness in future wars is a must. IAF still has mostly Israeli UAVs and Unmanned Combat Aerial Vehicles (UCAVs). Drone production ecosystem in India is picking up. The lessons from Ukraine conflict indicate the need for large weapon stocking and, therefore, there is need for continuous review. Kamikaze drones have turned game-changers and having those kind of cheap yet effective weapons in bulk is important.[25]

- **Missiles and Air Defence Systems**. Indigenous missile systems such as Akash and BrahMos are bolstering Indian defence capabilities. A multi-layered air defence architecture is essential for joint operations. Development in area of

Ballistic Missile Defence system needs whole-of-the-system approach by the MoD.

Collaborative Defence Approach and Strategic Partnerships

Leading joint operations in MDO scenario requires seamless collaboration with other branches of the armed forces, as well as with international partners.

- **Integrated Defence Teams**. The IAF must work closely with the army and navy to foster joint operational strategies, conducting joint training exercises and sharing intelligence. This approach will create a cohesive fighting force capable of responding to modern threats in real time.

- **Space and Cyber Domain Integration**. There is a need to integrate ground-based sensors with space-based assets for networked warfare proliferating into cyber domain. It will involve bringing public sector undertakings as well as private players onboard. IAF needs to up the ante with putting its best on this front.

- **Partnerships with Foreign Nations**. Strengthening defence ties with global powers such as the United States, Russia, and European nations will allow India to access advanced technologies and share knowledge. Strategic partnerships can also facilitate joint exercises and interoperability, which are key in MDOs.

Roadmap for the Transformation of the Indian Air Force for Leading Future Joint Operations

To transform the IAF into a future-ready force, a strategic and phased approach is essential, considering its critical role in modern warfare and the evolving threats of the future. The journey on the road of transformation can be divided into three distinct phases i.e., short-term, mid-term, and long-term.

Short-Term: Joint Doctrines, Capability Gaps, and New System Induction

Objective. Strengthen the immediate operational readiness by enhancing joint operational doctrines, bridging existing capability gaps, and inducting new technologies and systems to address contemporary needs.

Joint Doctrines and Interoperability.

- **Objective**. Develop and implement joint doctrines for seamless integration across all branches of the Indian Armed Forces. This will ensure smooth collaboration and optimised resource utilisation during joint operations[26], particularly concerning C2 and communication networks.

- **Focus Areas.**

  - Establish protocols for joint planning and execution.

  - Implement robust systems for inter-service communication and data sharing.

  - Standardise joint tactics, techniques, and procedures for a unified response.

  - Develop training programs focused on inter-service operations.

Filling Capability Gaps.

- **Objective**. Address current deficiencies in air power, such as fleet obsolescence, limited precision strike capability, and insufficient surveillance systems.

- **Focus Areas.**

  - Upgrade or replace aging platforms, such as the MiG-21 Bisons, with modern aircraft, e.g., Rafale, Tejas Mk2.[27]

  - Enhance air-to-air combat and air-to-ground strike capabilities. Precision and range are the two critical requirements for both air-to-air and air-to-surface weapons. There is, thus, a need for long-range sensors and weapons that can operate in adverse electronic environment.[28]

  - Improve surveillance and reconnaissance systems, focusing on UAVs and airborne early warning systems.

  - Expand logistics, maintenance, and training systems to maintain operational readiness.

Induction of New Systems.

- **Objective**. Incorporate cutting-edge technologies to bolster defence capabilities and ensure quick adaptation to changing warfare dynamics. IAF needs to have independence in terms of aero-engine, stealth technology, advanced multifunction active electronically scanned array radars, infra-red search and tracking system, directed energy weapons, hypersonic platforms, and smart weapons. This phase demands greater public-private sector cohesion and national will power.

- **Focus Areas**.

  - Upgrade and increase multirole fighter jets like the Su-30MKI and Rafale. Pace of manufacturing indigenous aircraft like LCA and Light Combat Helicopter needs to increase. Timely induction of multi-role fighter aircraft will compensate for the ageing fleets.[29]

  - Integrate more advanced air defence systems, including S-400 systems.[30]

  - Expand the use of UAVs, UCAVs, and drones for surveillance and strike operations.

  - Implement digital technologies and software solutions for command, control, communications, computers, and intelligence.

Mid-Term: Multi-Domain Operational Framework

Objective. Build a multi-domain operational framework integrating air, land, sea, space, and cyber domains to provide comprehensive operational dominance.

Multi-Domain Integration.

- **Objective**. Develop and maintain an operational capability across all domains—air, land, sea, space, and cyber—to conduct integrated warfare.

- **Focus Areas**.

  - Strengthen cyber capabilities and defence to secure IAF's data, communication, and operational infrastructure.

- Leverage space capabilities for ISR, and communications, especially with satellite assets.
- Establish interoperability with the army and navy across various domains for synchronised MDOs.
- Expand joint exercises involving air, ground, naval, and cyber forces to ensure tactical readiness in a multi-domain context.

Data Fusion and Real-Time Decision-Making

- **Objective**. Enhance the ability to fuse information from multiple domains in real time to facilitate rapid and accurate decision-making.
- **Focus Areas**.
  - Develop systems that aggregate data from air, sea, land, and cyber operations to create a unified battle picture.[31]
  - Implement advanced AI and ML systems to analyse real-time data and provide actionable insights for operational commanders.
  - Train personnel in decision-making processes that incorporate multi-domain perspectives, ensuring quicker response times during crises.

Cyber and Space Warfare Dominance.

- **Objective**. Strengthen cyber and space capabilities to ensure operational supremacy in these emerging domains.
- **Focus Areas**.
  - Build offensive and defensive cyber capabilities to protect IAF infrastructure and disrupt adversary operations.
  - Expand satellite reconnaissance capabilities for enhanced situational awareness and target identification.
  - Develop anti-satellite capabilities to counter enemy space assets and deter adversary space-based intelligence gathering.[32]

Long-Term: Dominance in Joint Warfare with Artificial Intelligence and Autonomous Systems

Objective. Achieve strategic superiority in joint warfare by integrating cutting-edge technologies like AI, autonomous systems, and next-generation warfare tools into all operational domains.

AI Integration for Enhanced Decision-Making.

- **Objective**. Leverage AI to automate routine tasks, enhance situational awareness, and improve decision-making efficiency in high-stress, real-time environments.
- **Focus Areas**.
  - Develop AI-powered systems for real-time battlefield management, including predictive analytics for mission planning, threat identification, and resource allocation.[33]
  - Integrate AI in combat platforms for enhanced targeting, flight control, and decision support systems.
  - Use AI to optimise logistics, maintenance, and mission planning in a resource-efficient manner.

Autonomous Systems for Increased Combat Efficiency.

- **Objective**. Employ autonomous systems in combat, surveillance, logistics, and reconnaissance to increase operational effectiveness and reduce the risk to human personnel.[34]
- **Focus Areas**.
  - Develop and deploy autonomous aircraft, drones, and robotic systems capable of performing air-to-ground strikes, surveillance, and reconnaissance.
  - Expand the use of unmanned platforms for hazardous missions where human presence is risky or unnecessary.
  - AI and robotics will allow autonomous operations, drone swarming and support manned unmanned teaming. Much greater investments are required in these. Private sector is investing big in AI and that needs to be harnessed.

- Enable autonomous resupply and maintenance systems to ensure faster turnaround times for operational readiness.

Advanced Joint Warfare through AI, Robotics, and Cognitive Technologies.

- **Objective**. Transform warfare capabilities by combining AI, robotics, and cognitive systems to achieve superiority in joint combat operations.

- **Focus Areas**.

  - Build platforms that leverage AI for autonomous decision-making in complex environments, reducing human intervention.

  - Develop AI systems that can work collaboratively across land, air, sea, and space domains, ensuring joint operational excellence.

  - Integrate advanced cyber capabilities to support AI and autonomous systems, ensuring resilience in the face of sophisticated electronic warfare tactics.

Conclusion

The roadmap for the transformation of the IAF for future ready joint operations is complex but achievable. This path must be trodden not alone but as part of Integrated Capability Development Plan.[35] It is a systematic and phased approach wherein by modernising infrastructure, optimising logistics, developing human resources, embracing technological advancements, and prioritising indigenisation, the IAF can enhance its capabilities to excel in integrated and MDOs. This transformation, guided by a vision of self-reliance, technological supremacy, and joint interoperability, will ensure that the IAF remains a formidable force in the 21st Century, capable of responding to the challenges of a dynamic global security environment.

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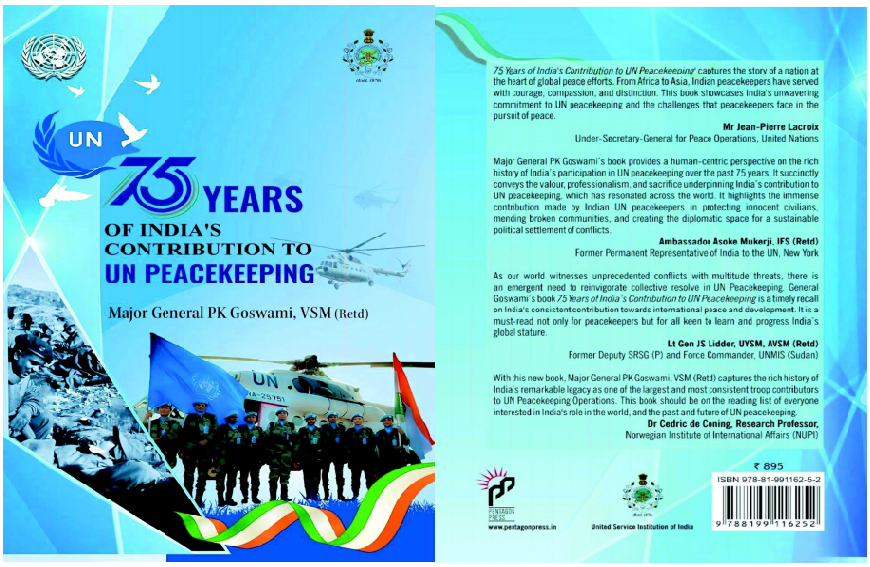
Review Articles and Book Review

Review Article 1

75 Years of India's Contribution to UN Peacekeeping

Major General PK Goswami, VSM (Retd)



Introduction

75 Years of India's Contribution to UN Peacekeeping written by Major General PK Goswami and published by Pentagon Press captures the essence of India's peacekeeping contributions. It rightfully showcases India's unwavering commitment to the challenges that the peacekeepers face and how they serve distinctively with courage, commitment and compassion.

Over the years, from Korea in 1950 to the last deployment at Abyei in Sudan, India, by far has deployed over 2,90,000 military personnel and nearly 15,500 police personnel across 50 out of 71 Peacekeeping missions which remains one of the largest contributions by any country. The peacekeepers include military personnel, police forces and civilian experts and have played a

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75 Years of India's Contribution to UN Peace Keeping by Major General PK Goswami, VSM (Retd), Pages: 156, Price: ₹ 795, Publisher: Pentagon Press LLP, ISBN: 978-81-991162-5-2

Journal of the United Service Institution of India, Vol. CLV, No. 642, October-December 2025.

crucial role in conflict resolution, humanitarian assistance and nation building in regions ravaged by war.

Beyond the mission-areas, India has also played a critical role in shaping the doctrines and policies of United Nations (UN) peacekeeping operations. She has consistently advocated for stronger mandates, better equipped forces and more representative global security architecture. India also continues to call for a reformed and equitable UN Security Council further reflecting its capacities, capabilities and contributions.

About the Author

Major General PK Goswami, VSM (Retd) is the Director Centre for United Nations Studies at the United Service Institution of India. He is also the Chief Coordinator for all activities related to UN and Peacekeeping. As an Army Air Defence officer, he has served across diverse terrains in the country and has held key command, staff, and instructional appointments. He served as a Military Observer with the United Nations Verification Mission in Angola from 1991 to 1992. He has also been Senior Directing Staff at the National Defence College, New Delhi. He regularly conducts and participates in national-level seminars and conferences related to UN peace operations. This is his second book; his first was *India and UN Peacekeeping: Through the Prism of Time*.

About the Book

The Book which has seven Chapters with seven Appendices is a detailed chronicle of India's rich and multi-faceted peace-keeping journey which analyses its impact, challenges and evolving role. It does this admirably by its historical and policy analyses, firsthand accounts and mission insights which provide a comprehensive understanding of India's role in UN peacekeeping operations over the last 75 years.

As one of the founding members of the UN, "India has consistently demonstrated strong commitment through its active cooperation and clear understanding of its obligations to UN activities".

For several decades, India has championed the cause of UN peacekeeping earning global recognition for its focused resolve, impartiality and professionalism of its peacekeepers.

Today, roughly 5,500 Indians are deployed in nine active missions. Over the years, India's peacekeepers have paid a high price as 182 have made the ultimate sacrifice in the line of duty. This blend of valour and sacrifice reflects India's traditions (often summarised as *Vasudhaiva Kutumbakam* (The world is one family) in action, aligning its non-violent philosophy with UN values.

Indian women have also been part of the missions since the 1960s, in Congo. India was first country to deploy an all-women contingent for a peacekeeping mission, in 2007 in Liberia. Today women are part of all missions where Indian troops are deployed. More women in peacekeeping means a more effective peacekeeping.

Besides troops, India has regularly contributed senior leadership to UN peace missions, including three Special Representatives of the Secretary-General, one Deputy Special Representative of the Secretary-General, 15 Heads of Mission and Force Commanders, two Divisional Commanders, and nine Deputy Heads of Mission and Deputy Force Commanders, along with several Police Commissioners in various UN operations. In addition, India has provided two Military Advisers, two Police Advisers—including one woman—and two Deputy Military Advisers to the UN Secretary-General. There was also an instance when the Secretary-General wrote directly to Prime Minister Jawaharlal Nehru requesting Ambassador Rajeshwar Dayal's services for the Congo mission.

India has adhered to the principles of non-violence and peaceful dispute resolution through dialogue and mediation which remain the central tenants of its foreign policy. Thus, the author writes that "India's contribution to UN peacekeeping is not merely a calculated engagement but a reflection of its civilisational and cultural values, ethical foreign policy and commitment to global peace and security aimed at fostering harmony, cooperation and a stable international order".

It is, therefore, evident that India's contribution is both sought and valued by the UN, due to its dedication and professionalism of its soldiers. The acceptability of Indian troops, by diverse communities in war-torn countries, lies in its deeply rooted social, cultural, and religious ethos.

This remarkable heritage is deeply ingrained in the Indian character and reflected in Indian troops and police personnel serving in the missions abroad. As a result, Indian peacekeepers quickly understand and respect different cultures, and effectively connect with local populations wherever they are deployed. This helps in building trust, leading to greater acceptance, and maintaining peace in conflict areas, resulting in effective peacekeeping.

Crucial themes in the book include leadership under fire, dedicated diplomacy, and the protection of civilians. For example, Captain Gurbachan Singh Salaria led a small platoon against Katangese rebels in Congo in 1961 and was posthumously awarded the Param Vir Chakra, India's highest military honour—he remains the only Indian to receive this decoration while serving on a UN mission.

Presently, Indian units often provide vital humanitarian aid. This year, Indian medical teams ran an outreach clinic in South Sudan that treated over 300 displaced people. Likewise, India operates a Level-III UN hospital in Goma, DR Congo, whose humanitarian outreach aided Forces Armées de la République Démocratique du Congo (Congolese army) and civilians and was praised by the UN's Special Representative for its professionalism.

In the Chapter on the Way Forward the author has stated that India's strength lies in its capacity to undertake peacekeeping operations in any terrain, social milieu, or adverse situations, and then sustaining such operations across the globe for prolonged periods. He further states that India's future peacekeeping approach should enhance its global standing and diplomatic influence by linking peacekeeping activities to its wider foreign policy objectives. For instance, the recently conducted Chiefs Conclave of UN Troop Contributing Countries in Delhi in Oct this year.

The appendices in the book provide valuable facts and data on India's contributions, including details of senior Army leadership such as then Major General (later General) KS Thimayya, who served as Chairman of the Neutral Nations Repatriation Commission. They also list the personnel who laid down their lives in UN service and those honoured for their contributions, including Lieutenant Colonel AC Rangaraj and Major NB Banerjee of the Army Medical Corps, among the five Maha Vir Chakra

awardees. In addition, the appendices feature vintage newspaper cuttings from international publications and a sonnet written by Brian Urquhart, the Executive Secretary to the Secretary-General, in Dec 1976 on the farewell of Major General Dewan Prem Chand from Cyprus, capturing his remarkable service.

Conclusion

The book undoubtedly provides a human centric perspective on the rich history of India's participation in UN peacekeeping over the last 75 years and succinctly conveys the professionalism, valour and sacrifice underpinning India's contribution. Written at a time of unprecedented armed conflicts raging worldwide with peacekeeping forces facing multiple challenges – from proxy wars and terrorism to climate-driven crises the book reminds readers that strong multilateral resolve is essential.

The Blue Helmets play a vital role is preserving peace. India's remarkable and distinguished legacy as one of the largest troop contributors is admirable which not only reflects the growing global stature of India but also its commitment to uphold the values enshrined in the UN Charter. India's role has gone far beyond providing manpower: it has often led peace-enforcement efforts, protected civilians, and extended humanitarian aid under fire.

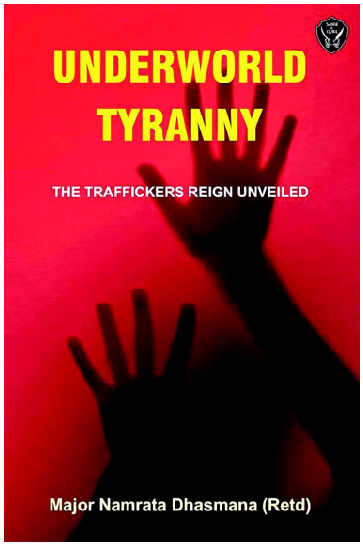
The book is undoubtedly a must read for those interested in learning about India's consistent commitment and principled approach to global peace and its pivotal role in in upholding the vision of a just world order. In an era of evolving security threats India's continued engagement will be critical in strengthening peace keeping mechanisms, promoting stability and upholding the vision of collective security as it marks 75 years of its peacekeeping legacy.

Major General Jagatbir Singh, VSM (Retd)

Review Article 2

Underworld Tyranny: The Traffickers Reign Unveiled

Major Namrata Dhasmana (Retd)



Introduction

'Underworld Tyranny: The Traffickers Reign Unveiled', by Major Namrata Dhasmana (Retd), is a compelling and well-researched work that examines in depth how different forms of trafficking—human, narcotics, wildlife, and financial—are bound together by organised crime and weak governance. The book brings together an impressive range of contributors from different sections including the armed forces, civil services, law enforcement, and academia. Each of their perspectives adds weight to the discussion, explaining how these criminal networks function, and the kind of leadership and cooperation that are needed to dismantle them.

The editor's introduction makes it clear that trafficking is not only a crime but also a humanitarian and security challenge. The book shows how the forces of globalisation, digital technology, and limited enforcement capacity have helped traffickers in

Underworld Tyranny: The Traffickers' Reign Unveiled by by Major Namrata Dhasmana (Retd), Sabre and Quill Publishers, Pages: 272, Price: Price ₹ 1,099, ISBN: 978-9348152213

expanding their network beyond borders. These syndicates, which include cartels, criminal financiers, and intermediaries, now form a shadow economy and are mirroring legitimate trade. The book closes with a strong appeal for ethical leadership, coordinated institutional action, and greater public awareness to counter what Major Dhasmana calls the 'Traffickers' reign.

Ultimately, this volume seeks to inspire policymakers, law enforcement officers, and citizens to work together against one of the greatest threats to human dignity and security. It aims to expose the mechanics of this underworld and brings to attention how deeply these illicit networks affect our collective well-being.

About Major Namrata Dhasmana

Major Namrata Dhasmana (Retd) is a veteran officer who has worked in both defence and corporate sectors. Her work spans geopolitics, strategic leadership, and policy advocacy. She brings together military discipline, strategic vision, and a deep understanding of governance and human behaviour. With her strategic experience across defence, policy, corporates, and strategic consulting, she now heads a cutting-edge Strategic Consulting firm with her concurrent venture Centre of International Futures.

She is the recipient of the Pillars of Maharashtra Award as the Best Thought Leader and Geopolitical Strategist. She is a qualified independent director, entrepreneur, and global thought leader and earned the title of the most followed women leaders on the global platform in 2022 for her visionary insights in strategy, governance, and geopolitical affairs.

Her leadership in editing this book has ensured a balanced mix of ground experience and academic research. The book captures the seriousness of trafficking and provides practical insights for policymakers, security professionals, and researchers. She steps beyond the surface to expose the shadow economy fuelled by exploitation and facilitated by inaction. The book is her bold attempt to challenge silence with strategy and awaken systems to action. This work is not just a chronicle—it is a reckoning.

About the Book

The book demonstrates how shadow economies have emerged, expanded over a period, and entrenched themselves with the global commerce. These activities have been facilitated by

globalisation, which has opened markets and blurred boundaries. Adding to it is the fact that criminal operations are meticulously undertaken and designed to exploit the weaknesses in the system.

The book highlights that today's cartels operate almost like parallel states, they finance insurgencies, influence elections, and even shape foreign policy. Citing examples of Mexico's drug wars to Afghanistan's opium trade, trafficking has become a huge business that thrives on corruption and conflict. It also explains how drug, human, and wildlife trafficking share the same financial lifeline through money laundering. Profits from one illegal activity are often utilised to sustain another, and this is how the cycle of exploitation is undertaken.

Each chapter of Underworld Tyranny contributes a distinct perspective to this larger narrative. The combination of historical insights, field experiences, and policy recommendations makes it a valuable reference for readers. The salients of each chapter are discussed in the subsequent paragraphs.

The discussion in the chapter 'Drug trafficking to Human Trafficking' shows how closely the two trades are related in Myanmar and Northeast India. This connection is very strong in the region's tribal community, and is exasperated especially due to the porous borders, as these groups have continued to have strong cultural ties that date back even before the time modern borders were created. The analysis suggests that any good approach to tackle the threat must take into account the tribes' feelings while also going after the criminal networks that take advantage of their weaknesses.

Next is the chapter 'Crime Chronicles: True Stories of the Underworld Darkest Secrets' written by an Interpol officer, drawing from his first-hand law enforcement experience and years of investigative work in both Indian and international institutions. The book recounts rarely told stories from the underworld and adds authenticity and realism to the account and underlines the fact that outdated systems, procedural rigidity, and overburdened enforcement system continue to hinder the responses to organised crime. The pint is succinctly made that, "Utilizing an 18th Century judicial system alongside a 19th-century police model to combat 20th Century crime is a formula for catastrophe".

The chapter 'Wildlife Trafficking in India – An Overview' explores how illegal wildlife trade is interlinked with other forms of organised crime, where defenceless creatures are treated as commodities in a troubled economy. The book brings out that wildlife smugglers generally use the same routes, networks, and ways to get money as drug and people traffickers. The report says that India needs stronger enforcement laws, more institutional capacity-building, and more public involvement to safeguard its biodiversity. Moreover, the lack of public understanding of this issue results in inadequate policy emphasis and limited institutional support. Wildlife trafficking is often seen as a 'Victimless' crime as the victims cannot speak for themselves and regarded as a 'High value–low risk' business as the detection rates are low and profit margins high.

The book's chapter on 'A Tide of Darkness: Drug Smuggling and Human Trafficking in India's Coastal Areas' talks about how India's long coastline and major shipping routes are being increasingly used for smuggling operations. India's strategic location between the Golden Crescent and the Golden Triangle makes it a crucial link in the international drug transit chain, particularly through sea routes. These unlawful operations are shown to be supported by factors such as political instability, sustained demand, and significant economic disparities in the region. The book calls for stronger coastal security mechanisms, including enhanced surveillance, improved information sharing, and more active international coordination.

The book explains how organised criminal groups use instability in a region to enhance their hold, which is discussed in the chapter, 'Global Kingpins Narcos Networking: A Geopolitical Perspective and Strategic Impacts on India'. The chapter emphasises that India's response must include a combination of diplomacy, enforcement, and cooperation mechanisms with other countries in the region. Case studies from India's border states show how global cartels use complex networks to facilitate cross border operations. The book also highlights the shortcomings of the Narcotic Drugs and Psychotropic Substances Act, noting its limited reach and the absence of robust asset-forfeiture provisions, and calls for timely reforms to ensure that the law keeps pace with the realities of global organised crime.

The chapter on 'Human Trafficking and National Security: A Hidden Threat to Sovereignty' shifts focus to the human consequences especially for women and children. It argues that trafficking needs to be regarded not solely as a social or criminal matter, but as a national security issue. It highlights how trafficking erodes social trust, makes governance weak and damages institutional integrity. It underlines that trafficking remains one of the gravest violations of human rights and human dignity wherein individuals are subjected to grave exploitation.

The discussion in the chapter 'Goa and North-East Connect via the Trafficking Route' reveals how Goa, which was for long perceived as a peaceful and low-crime state, is slowly emerging as a hub for the flesh trade. It is getting increasingly connected to the Northeast and these activities are largely being supported through tourism and local corruption. In this framework, victims from geographically distant areas especially from the Northeast remain the most vulnerable, often trapped in cycles of debt and exploitation.

The chapter 'The Underbelly of Mumbai: Uncovering the Drug Menace' shows how Mumbai has been a popular place for drug traffickers for many years. The city's active seaports, busy international airport, and diverse population make it a good hub for both smugglers and buyers to meet. Over the years, a strong network of drug peddlers has grown in the city which has adapted to crackdowns by law enforcement agencies whilst successfully spreading addiction to different strata of the society.

In the next chapter, 'The Emerging Role of the Drug Enforcement Administration (DEA) in US Drug Enforcement and Global Collaboration', the book discusses how international agencies like the United States DEA are working with partner nations to counter drug trafficking. The publication emphasises the need for data-sharing, unified legal frameworks, and harmonised cross-border enforcement mechanisms to enable international agencies to combat the menace effectively. The chapter further stresses that the enduring challenge lies in building a sustainable global framework that integrates enforcement with education, social awareness, and community resilience.

The book also talks about and relates the fight against trafficking, with the United Nations Sustainable Development Goals (SDGs). The authors put forward the point in the chapter 'From Awareness to Action: How Sustainable Developmet Goals Can Help Eradicate Trafficking' that social awareness, gender equality, and inclusive education are vital in combating this menace. The SDG framework thus offers a practical path to addressing poverty, inequality, and gender disparity. The SDG goals when implemented with commitment and seriousness, can transform vulnerable populations into empowered and resilient communities and make our fight against trafficking stronger.

The chapter titled 'Unveiling Shadows: A Comprehensive Analysis of Human Trafficking and Policy Frameworks in India' analyses India's pathway and also whether enough is being done to stop human trafficking. It stresses that the country needs to build mechanisms that make it easier for non-governmental organisations and law enforcement to work together. Also, awareness campaigns can significantly contribute towards reducing the danger of becoming a victim. The analysis also states that these initiatives need to be backed up by strong legislation and greater cooperation between countries and groups. The book states that only a framework that bears all these aspects can ensure long-term response to trafficking.

The chapter 'Beyond Borders: Assessing the Interconnected Challenges of Drug and Human Trafficking in BRICS Societies' takes a regional view and focuses on the BRICS—Brazil, Russia, India, China, and South Africa—countries and their immediate neighbourhood. It says that drug and human trafficking are both hard problems that can readily cross-national borders. The chapter argues that meaningful progress can be achieved only through regional cooperation, shared resources, exchange of best practices, and sustained dialogue. By working together, the BRICS countries can strengthen criminal prosecution, dismantle trafficking networks, and address the broader social and economic conditions that sustain these illicit operations.

The analysis of the darknet and cryptocurrency in the chapter 'Drug Economy on the Darknet and its Implications on BRICS Countries' explores how traffickers are using technology extensively to grow their businesses on the dark web. Cryptocurrency provides them with the advantage of anonymity and encryption, and

therefore, such transactions become difficult to trace. The chapter also talks about the rise of a digital drug economy that is slowly spreading to BRICS countries. It says that the dark web is a safe area for both traffickers and buyers because there are not any clear regulations for regulating cryptocurrencies, policing the dark web, or cross-border economic relationships. To address jurisdictional gaps and deal with the anonymity that makes this digital underworld feasible, the authors have suggested a single legal system and agreements for enforcing the law across borders.

The final section, Strategic Policy Interventions, serves as an imperative roadmap to combat illicit money flows. It provides clear, actionable strategies to dismantle shadow economies and reinforce institutional safeguards. This section elevates the book from being merely descriptive to genuinely prescriptive, offering stakeholders a coherent framework to drive systemic reform.

Conclusion

The book provides a thorough and realistic look at how trafficking networks work and how they affect national security and government. The book has both real-life examples and policy suggestions. For military people, scholars, and policymakers, it serves as a timely reminder that fighting trafficking needs far more than enforcement alone—it demands ethical leadership, inter-agency cooperation, and an informed public.

Underworld Tyranny: The Traffickers' Reign Unveiled is both a study and a call to action. It helps readers understand that trafficking is not only a crime, but also a sign of deeper problems with governance and social responsibility.

The editor and contributors have underscored that this menace demands collective action and a mix of law, technology, and human compassion. Traffickers have been thriving on secrecy and exploitation, and their power can be weakened only through collective strength, cooperation and innovation.

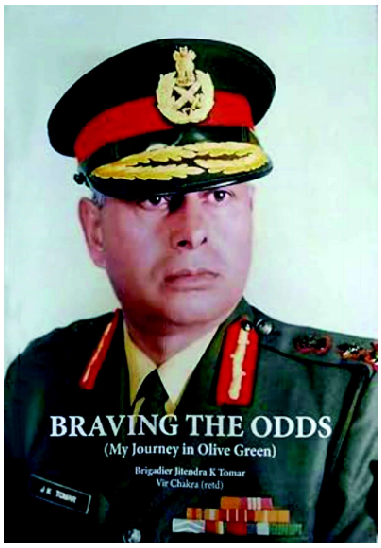
The work ends on a note that perfectly echoes the spirit of service: "The trafficker's greatest adversary is not the law but the determined officer who refuses to yield". It is a reminder that moral courage, teamwork, and dedication remain the strongest weapons in this enduring fight against the underworld.

Commander Saurav Mohanty

Review Article 3

Braving the Odds: My Journey in Olive Green

Brigadier Jitendra Kumar Tomar, Vir Chakra (Retd)



Introduction

Braving the Odds is a forthright and compelling military autobiography that chronicles the life and service of Brigadier Jitendra Kumar Tomar, Vir Chakra—an infantry officer whose career spans formative decades of the Indian Army and culminates in one of the fiercest defensive battles of the 1971 Indo-Pakistan War during the battle of Balnoi. The book is as much a personal memoir as it is a primary historical account of leadership under fire. The book opens with a background of the Tomar Dynasty and the author's lineage, before moving on to his entry into the Indian Military Academy and his days as a Gentleman Cadet.

Formative Years and Regimental Foundations

The third and fourth chapters describe his service with the 2nd Battalion of the RAJPUTANA RIFLES, followed by his subsequent association with the 9th Battalion of the RAJPUTANA RIFLES. The

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Braving The Odds: My Journey In Olive Green by Brigadier Jitendra Kumar Tomar, Vir Chakra (Retd); Jitendra Kumar Tomar, Pages: 156, Price: ₹ 500.

Journal of the United Service Institution of India, Vol. CLV, No. 642, October-December 2025.

first four chapters are basically a background to the author as these chapters trace his formative years at the Indian Military Academy, his tenure with the two Battalions of the RAJPUTANA RIFLES and his postings to high-altitude warfare in Sikkim and Nathu La, and the demanding task of re-raising 9 RAJPUTANA RIFLES. These sections are particularly valuable for readers interested in the post-1962 rebuilding of infantry units and the realities of soldiering in inhospitable terrain, and how it coincided with the military career of Brigadier Tomar.

Brigadier Tomar was born in 1941 in Hapur, Uttar Pradesh. His early life reflects the values of discipline, education, and service that later defined his career. He was commissioned into the Rajputana Rifles in Dec 1962. It was a period of profound institutional challenge happening with the Indian Army following the 1962 War with China, when it faced a rare and severe setback. Consequently, his early years in the army coincided with a phase in which the institution stood on the cusp of monumental change.

Strategic and Emotional Core: The Battle of Balnoi

The emotional and narrative core of the book is the detailed account of the Battle of Balnoi (FDL 468) on the night of 3-4 Dec 1971. The chapters on Battle of Balnoi and the Bravehearts are a guide to leadership during the war and perhaps a case study for students of military and corporate leadership.

Combat Narrative and Professional Precision

As a company commander placed under 6/11 GORKHA RIFLES, the then Major found himself defending a tactically vital post guarding the approaches to Poonch. The author's description of the battle is precise and objective, without glorfying anyone. The part dealing with communications break down, ammunition shortages, bunkers burning, and enemy assaults supported by heavy artillery are some of the realities depicted in a very meticulous manner. What distinguishes this account is not dramatisation, but professional precision—clear explanations of dispositions, fire control, and command decisions taken under extreme pressure.

Combat Narrative and Professional Precision

Tomar's leadership during the battle stands out vividly. His decision to call artillery fire dangerously close to his own position, and later to personally organise and launch a small counterattack to recapture an overrun portion of the post, reflects both tactical audacity and moral courage. The counterattack, carried out by a handful of soldiers with bayonets and grenades, decisively turned the tide. A platoon-plus held-off and defeated a battalion-level assault, making Balnoi one of the earliest and most decisive Indian successes of the 1971 War in the Mendhar sector. The award of the Vir Chakra, as cited in the Gazette of India, finds its full and convincing justification in these pages. His belief that the true heroes of Balnoi were the soldiers who fought beside him adds moral depth and humility to the narrative.

Combat Narrative and Professional Precision

Most importantly, the author presents the battle not as a solitary act of personal gallantry, one man doing it all; but as a collective achievement born of coordinated effort. The book is not narrowly focussed to an individual hero's narrative, rather highlight the interdependence of his company, supporting arms, and neighbouring units, showing how victory emerged from teamwork, shared sacrifice, and mutual trust under extreme adversity. the book frames the battle as a joint struggle, where leadership, supporting fire, and the courage of ordinary soldiers together overcame overwhelming odds.

Career Beyond Balnoi: Command, Instruction, and Staff Roles

The book like the career of Brigadier Tomar does not ends with the historic battle of Balnoi. It traces his steady rise through command and staff appointments—battalion command in Jammu and Kashmir, instructional tenures at premier army institutions, brigade command, and divisional-level responsibilities in sensitive sectors such as Jammu and Arunachal Pradesh. These chapters underline his professional breadth and his contribution towards the Indian Army, and the contains many fascinating anecdotes.

Veterans and Welfare Commitments

Brigadier Tomar's post-retirement dimension is also discussed in the book, particularly his engagement with veterans' welfare, his role in securing lifelong annuities for pre-1986 gallantry award recipients in Uttar Pradesh, reflects a lifelong commitment to those who serve.

Lighter Dimensions of Army Life

Despite being a military biography, the book does not focus on a single facet of the army such as battles, war, command, or hierarchy. It also captures the lighter side of the Indian Army, including a chapter devoted to military music. The narrative contains several lighter moments that both inform readers about other dimensions of Army life and prevent the tone from settling into a single, monotonous grim depiction of war.

Overall Assessment

Braving the Odds is an important addition to Indian military literature. It combines operational history, leadership lessons, and personal reflection without appearing artificial or superficial. The emotional aspect of the soldier is conveyed without being sentimental for students of military history, leadership practitioners, and general readers alike, the book offers an authentic window into combat command and professionalism of the Indian Army's infantry officer.

Mr Gaurav Kumar

Russia-Ukraine War: Strategic Conundrum by Bharti Das and Uday Pratap Singh, Pentagon Press, Pages: 278, Price: 1,295; ISBN: 978-8197198656

Scope, Structure, and Strategic Contribution

The book makes a significant contribution to the growing literature and analysis by researchers on the Russia-Ukraine War. The book aims to combine multiple perspectives, varying from India's national security concerns to global geopolitical shifts and regional impacts. It is divided into three broad sections i.e., India's Perspective and Strategic Response; Global Impact and Geopolitical Implications; and Regional Implications. These enable readers to grasp all dimensions of the war and also its ripple effects on diplomacy, global economy, world order and regional dynamics. The chapters on India's strategic recalibration and lessons for future hybrid warfare add fresh insights for Indian and South Asian audiences, as this is something that is often missing from Western analyses.

Writing Style, Methodology, and Accessibility

The language throughout the book is largely crisp and direct by being to the point and relying on concrete examples, historical evidence and strategic analysis. That said, some chapters begin with extended historical surveys before diving into current dynamics. Though this can enrich context, however, for a reader seeking purely contemporary analysis it can feel like a detour.

Analytical Breadth and Scholarly Rigor

It offers a thorough comprehensive analysis covering evolving warfare, global diplomacy, economic consequences and geostrategic shifts. Citations and references are relied on by all the authors from a wide array of sources, data, previous literature, referencing treaties, past conflicts and alliance dynamics.

Gaps, Limitations, and Structural Critique

The comprehensive thematic breadth leaves out certain critical dimensions like detailed military-technical assessments, frontline

operational analyses and the evolving role of emerging technologies such as artificial-intelligence-enabled targeting and cyber-kinetic integration. Some chapters are descriptive narrative rather than possessing analytical depth, creating unevenness across contributions. The book would have benefited from tighter cross-chapter integration, more comparative case studies and deeper examination of long-term implications for global security architectures and great-power competition. The book's may feel slightly disjointed to some readers owing to its organisation shifting from India-centric analysis to global context and then to a region-wise breakdown.

Overall Assessment and Recommendation

The book's strengths outweigh minor structural quibbles as it fills an important gap in existing analyses by tying Indian strategic thinking with a global view. *Russia-Ukraine War: Strategic Conundrum* is strongly recommended for anyone seeking a well-rounded, India-anchored yet globally aware analysis of the conflict. It is particularly valuable for students, policymakers, strategic-studies scholars and general readers interested in how the war reshapes international order and what lessons India and other comparable nations could draw.

Mr Neelotpal Mishra, dis

RESULTS OF ESSAY COMPETITIONS 2025

USI-GOLD MEDAL ESSAY COMPETITION

Subject: 'Cognitive Warfare: India's Approach to Influencing Perception and Behaviour'

First	**06805-R** **Commander Arun Kumar Yadav** NHQ/DNCO West Block IV, RK Puram, Sector-1 New Delhi-110 066	Gold Medal, Cash Award of INR 15,000/-, and entry accepted for publication.
Second	**29966-F** **Wing Commander Maxmillan Gerard Gomez** 4, Air Force Selection Board Mint Road, Varanasi Cantonment, Varanasi, Uttar Pradesh-221 002	Cash Award of INR 10,000/- and entry accepted for publication.
Second	**07889-B** **Lieutenant Commander Pradynesh S Shinde** Defence Services Staff College Wellington, Nilgiris Tamil Nadu-643 231	Cash Award of INR 10,000/- and entry accepted for publication.

LIEUTENANT GENERAL SL MENEZES MEMORIAL ESSAY COMPETITION

Subject: 'Doctrinal Evolution of the Indian Armed Forces Since 1947'

First	**24079-K** **Group Captain Brijesh Shukla** Bravo Tower 22 Officers Quarter HQ SWAC Gandhinagar, Gujarat-382355	Award of INR 15,000/-, Certificate, and entry accepted for publication.
Second	**07844-A** **Lieutenant Commander Dipyaman Sharma** Defence Services Staff College, Wellington, Nilgiris, Tamil Nadu-643231	Award of INR 10,000/- and Certificate.

USI-WAR WOUNDED FOUNDATION JOINT ESSAY COMPETITION

Subject: 'Courage and Resilience—Personal Journeys of War-Wounded Achievers'

First	**52833-Z** **Commander Abhishek Verma** Drona Officers Mess, DSSC, Wellington, Tamil Nadu-643231	Award of INR 15,000/-, Certificate, and entry accepted for publication.
Second	**33609-S** **Squadron Leader CM Modak** 6 Sqn, C/o 33 Wg, C/o 56 APO Pin-936006	Award of INR 10,000/- and Certificate.

USI-CAS JOINT ESSAY COMPETITION

Subject: 'Transformation of the Indian Air Force for Future Ready Joint Operations'

First	**Sqn Ldr Naveen Rana**	Reccomended for Gold Medal, Cash Award ₹ 45,000, and publication in the USI Journal
Second	**Wg Cdr Vikas Kalyani**	Reccomended for Silver Medal, Cash Award ₹ 30,000, and publication in the USI Journal

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The following are eligible to become members of the Institution:

- Officers of the Armed Forces.
- Class I Gazetted Officers of Group 'A' Central Services.
- Any category mentioned above will be eligible even though retired or released from the Service.
- Cadets from the National Defence Academy and Cadets from the Service Academies and Midshipmen.

For further particulars, please write to Director General, USI of India, Rao Tula Ram Marg, (Opposite Signals Enclave) Post Bag No. 8,Vasant Vihar PO, New Delhi – 110057.

USI Latest Publication: 2024-2025

Pub Code	Type	Title of Publication and Author	Price '₹'	Year
Adm/SYB-2025*	Year Book	STRATEGIC YEAR BOOK 2025; Editor-in-Chief: Maj Gen BK Sharma, AVSM, SM** (Retd); edited by Maj Gen Sanjeev Chowdhry (Retd), Ms Komal Chaudhary, Mr Vinayak Sharma, and Ms Richa Sharma **M/s Pentagon Press**	2,950	2025
Adm/SYB-2024*	Year Book	STRATEGIC YEAR BOOK 2024; Editor-in-Chief: Maj Gen BK Sharma, AVSM, SM** (Retd); edited by Maj Gen Sanjeev Chowdhry (Retd), Ms Komal Chaudhary, Mr Vinayak Sharma, and Mr Mihir S **M/s Vij Books of India Pvt Ltd**	2,750	2024
P-39/ 2023*	National Security Paper-2023	THE INDO-PACIFIC CONSTRUCT—INDIA'S MARITIME HIGHWAY TO GREAT POWER STATUS by Vice Adm (Dr) Anil Kumar Chawla, PVSM, AVSM, NM, VSM (Retd) **M/s Vij Books of India Pvt Ltd**	395	2024
M-5/2024*	Monograph	FUTURE EMPLOYMENT OF AIR POWER—STRATEGIC INFERENCES FOR INDIA by Air Mshl (Dr) Diptendu Choudhury, PVSM, AVSM, VM, VSM (Retd) **M/s Vij Books of India Pvt Ltd**	395	2024
M-4/2024*	Monograph	CHINESE AND RUSSIAN MILITARY ARTIFICIAL INTELLIGENCE: DRIVERS OF NATIONAL GOALS by Brig Pawan Bhardwaj **M/s Vij Books of India Pvt Ltd**	395	2024
M-3/ 2024*	Monograph	Fifth General KV Krishna Rao Memorial Lecture INDIA'S STRATEGIC AUTONOMY OPPORTUNITIES AND CHALLENGES IN THE EMERGING WORLD ORDER, Manekshaw Centre: 05 Oct 2023 by Gen Anil Chauhan, PVSM, UYSM, AVSM, SM, VSM, Chief of Defence Staff, Amb Sujan R Chinoy (Retd), Director General, Manohar Parrikar Institute for Defence Study and Analyses, and Lt Gen Ata Hasnain, VSM, UYSM, AVSM, SM, VSM** (Retd); edited by Maj Gen Sanjeev Chowdhry (Retd), Ms Komal Chaudhary, and Mr Vinayak Sharma **M/s Vij Books of India Pvt Ltd**	295	2024
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CS3/R-119/ 2024*	Book	ENHANCING OFFENSIVE CYBER CAPABILITY AT NATIONAL LEVEL by Col Suraksh Vir **M/s Vij Books of India Pvt Ltd**	850	2024
CS3/R-118/ 2024*	Book	SALIENCE OF SOCIAL MEDIA IN HYBRID OPERATIONS by Col Dheeraj Kumar **M/s Vij Books of India Pvt Ltd**	1,450	2024

USI

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OUR ACTIVITIES

Centre for Strategic Studies and Simulation (CS3)

The erstwhile Centre for Research was re-christened as CS3 on 01 Jan 2005. The Centre focuses on detailed and comprehensive enquiry, research and analyses of national and international security related issues, and undertakes gaming and simulation of strategic scenarios, to evolve options for wider discussion and consideration.

Centre for Military History and Conflict Studies (CMHCS)

The CMHCS was established in Dec 2000 at the behest of the three-service headquarters for encouraging an objective study of all facets of Indian military history with a special emphasis on the history of the Indian Armed Forces. It focuses on diverse aspects of the history of Indian military evolution, policies, and practices—strategic, tactical, logistical, organisational, socio-economic, as well as the field of contemporary conflict studies in the broader sense.

Centre for Emerging Technology for Atma Nirbhar Bharat (CETANB)

The centre started as the Atmanirbhar Bharat Initiative in Apr 2022 and later rechristened as the CETANB on 01 Jan 2024 and includes Cyber Centre of Excellence (CCoE) as part of it, in conjunction with Cyber Peace Foundation. The centre's objective is to forge emerging technologies with geostrategic and geopolitical situations, with a view to make the services self-reliant by making possible the indigenous production of defence equipment and spares. The CCoE trains military personnel in artificial intelligence, cyber, and machine learning, in addition to cyber forensic analysis in its well-equipped lab. Furthermore, it helps MSMEs to break into the defence industrial ecosystem.

Centre for United Nations Studies (CUNS)

The centre was established as Centre for United Nations Peace Keeping (CUNPK) in 2000. It organises workshops, seminars, and training capsules for peacekeepers, observers and staff officers, both Indian and foreign. It also oversaw the practical training of the Indian contingents. In Aug 2014, CUNPK moved to the Integrated Headquarter (Army) of Ministry of Defence. The USI has now established CUNS, which is focusing on operational, strategic, and policy issues related to United Nations Peacekeeping. It also organises seminars and conferences on such issues.

Centre for Professional Military Education (CPME)

The Institution conducts regular correspondence—interactive courses and mock test practices and assists armed forces officers in online and offline modes to help them prepare for promotion examinations and competitive examinations for entrance to the Defence Services Staff College, and the Technical Staff College. Over the years, this has been a significant and well-received activity.

Centre for Publications (CP)

This section manages the USI's key publications including the *Strategic Year Book, USI Journal,* books, monographs, occasional papers, and joint publications. These works contribute to an informed discourse on defence, strategy, and national security. The *Strategic Year Book* offers an annual review of critical developments, while other publications provide deeper analysis and collaborative perspectives. The *USI Journal,* Asia's oldest defence journal (est. 1871), serves as a platform for military and strategic thought, welcoming contributions regardless of rank. The journal remains a vital space for responsible and quality-driven engagement.

USI Gold Medal Essay Competition

Every year, the Institution organises a Gold Medal Essay Competition, open to commissioned officers of the Defence Services of India, officers of the Territorial Army, Assam Rifles, and the Senior Division of the National Cadet Corps, and Gazetted Officers of the Civil Administration in India, including retired officers. These essays, the first one of which was introduced in 1871, constitutes a barometer opinion on matters that affect national security, in general, and the defence forces, in particular.

Lt Gen SL Menezes Memorial Essay Competition

This has been instituted from 2015 on a subject related to armed forces historical research. The essay competition is open to everyone across the globe.

USI War Wounded Foundation Joint Essay Competition

This essay competition was instituted in 2021 through a Memorandum of Understanding between the USI and the War Wounded Foundation. The competition is open to all across the globe and must be about issues relating to the experiences and/or rehabilitation of war-disabled personnel of the Indian Armed Forces.

MacGregor Medal

This medal is awarded to armed forces personnel for valuable reconnaissance and adventure activity they may have undertaken.

Lecture, Discussions and Seminars

A series of lectures, discussions, and seminars on service matters, international affairs, and topics of general interest to the services are organised for the benefit of local members in Delhi.

Library and Reading Room

The library holds over 68,000 books and journals, including some books from the 17th, 18th, and 19th Centuries, on an astonishing variety of subjects. While the principal emphasis is on strategy and defence, there are many works on different vistas of Indian life. There are memoirs, biographies, recollections, diaries, journals, and manuscripts for scholars and researchers. The reading room is air-conditioned, spacious, and well-stocked in terms of current reading material. The library was automated in 2002.

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