Medals and Ribbons

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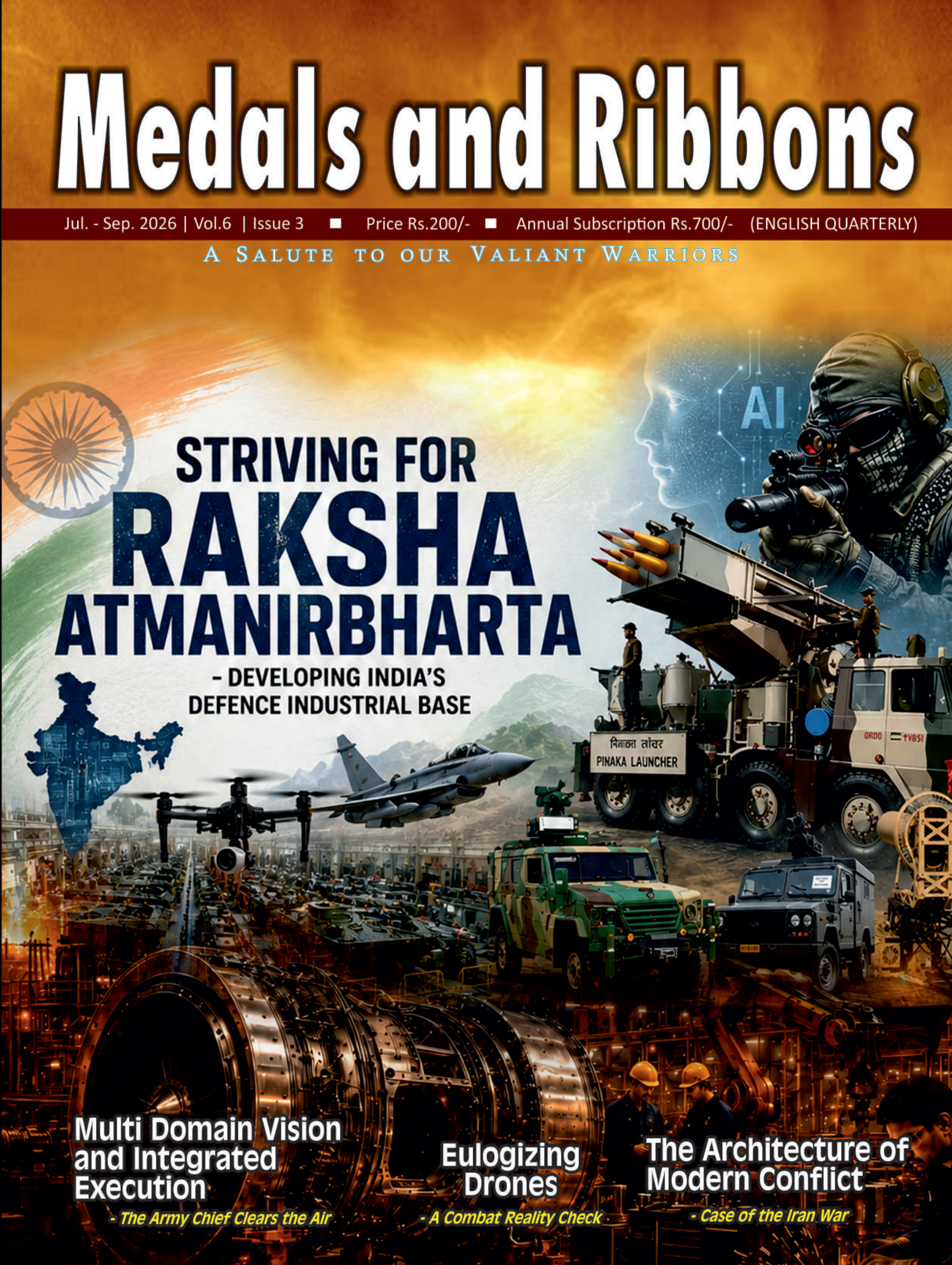
A Salute to our Valiant Warriors



STRIVING FOR RAKSHA ATMANIRBHARTA

- DEVELOPING INDIA'S DEFENCE INDUSTRIAL BASE

Multi Domain Vision and Integrated Execution
- The Army Chief Clears the Air

Eulogizing Drones
- A Combat Reality Check

The Architecture of Modern Conflict
- Case of the Iran War

SURYA KIRANS AND SARANGS AT THE PASSING OUT PARADE OF 150TH NDA COURSE

The Indian Air Force's elite Surya Kiran Aerobatic Team (SKAT) and the Sarang Helicopter Display Team performed spectacular aerial displays during the historic 150th Course Passing Out Parade at the National Defence Academy (NDA), Khadakwasla, Pune on 29 May 2026.

The world-renowned Sarang helicopter display team captivated crowds utilizing brightly painted, indigenous ALH Dhruv helicopters, executing upgraded and high-precision formations. The legendary nine-aircraft Surya Kiran display team flew their iconic Hawk Mk-132 aircraft, painting the skies above Khetarpal Parade Ground with vibrant smoke trails, synchronized loops, and heart-stopping crossovers.

FOUNDER'S NOTE

Col David Devasahayam

Political power grows out of the barrel of a gun! Mao Zedong's oft quoted slogan epitomises the criticality of military power. Undoubtedly, economic power is also critical, but recent wars have highlighted that economic development should be backed by strong military capability. Global powers apply many instruments to pressure other nations to follow their diktat. A weak military may result in national interests being compromised.

Wars have been fought for centuries, and will be prevalent in the future as well. The attacks by Russia on Ukraine, USA on Venezuela and Iran (in partnership with Israel), the US threat regarding Greenland, Pakistan's bombing of Afghanistan targets and other such recent conflicts have again brought military readiness to centrestage in national considerations. Self-reliance is an extremely important facet in defence preparedness, as it enables a country to protect its interests without having to depend on other nations for weapons and munitions.

Fortunately, Make in India and *Atmanirbharta* has been given utmost priority in the last decade plus, and steady progress is visible in many fields including in the defence sector. Having deliberated on conduct of operations in our recent issues, we decided to do a reality check on the defence industrial base. Technology plays a vital role in operational capabilities, and our Armed Forces have to be '*technologically equipped*' for modern wars. In this issue, we have hence looked at India's indigenous defence manufacturing, the capability acquisitions and restructuring required in the Army, and the hurdles and bottlenecks in equipment procurements. Though there are slippages and weaknesses in our bureaucratic systems, I am glad to state that these are being fine-tuned and overcome, while alternate processes have also been put in place to fast-track some urgent acquisitions.

Dr. Shashi Tharoor's incisive insight of the global geopolitical situation is widely acknowledged. In his article **The Architecture of Modern Conflict** for the Reflections Column of our magazine, he has astutely discussed the coalition compulsions of USA and Israel in their conflict with Iran, and how diplomacy can smoothen differences and disagreements, which are natural between allies too.

With Maj Gen Jai Menon in Israel

I had visited Israel a few years ago, when my friend Major General Jai Menon, who recently retired from the United Nations, was the Force Commander of UNDOF (United Nations Disengagement Observer Force) in the Golan Heights between Israel and Syria. Israel undoubtedly has powerful and technologically superior Armed Forces, capable of inflicting immense destruction on its enemies. But its enemies too have developed the ability to defeat or absorb Israeli attacks - so the end state remains nebulous and the conflict is prolonged. Exit strategies also need to be worked out in conflict situations.

Drones and Unmanned Aerial Systems are the buzzword in many recent conflicts, but they are not a panacea in all situations. Air Chief Marshal V R Chaudhari (retd), former Chief of Air Staff does a reality check of '*drone warfare*' and cautions '*military pundits*' on several pitfalls in their employment. We also have an incisive interaction with General Upendra Dwivedi, Chief of Army Staff, who gives us a macro-view of the Army's steps to engage in multi-domain warfighting in the future.

As has been our endeavour in past issues, we have served a healthy mix of insights into contemporary events, regional and defence developments, as also human interest narratives from the Armed Forces. **Medals and Ribbons** has gained greater readership, with increased reach on social media too. We, the Editorial Team are grateful for your loyal 'Thumbs Up'.

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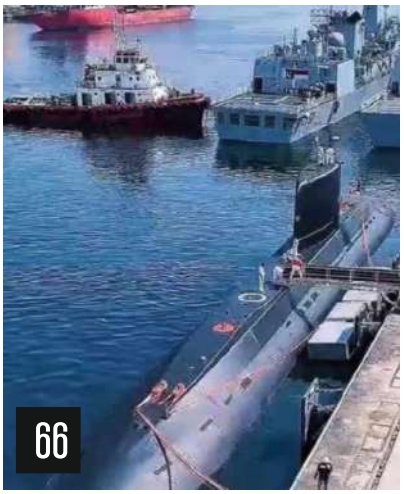

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EDITOR'S NOTE

Lt Gen J S Sandhu, (Retd).

The phrase "*victory is measured by foot*" is a famous military maxim, often referring to the reality that conflicts can only be fully secured, held, and won through ground troops. It highlights that wars are ultimately decided by boots on the ground rather than just air power or long-range weapons. But in recent conflicts, contact battles are being avoided, as they can be messy and prolonged. The Russia - Ukraine conflict is a clear example, Russian attacks met with strong resistance and made slow progress.

Two imperatives have impacted land offensives. **The first**, **battlefield transparency**, has resulted in better situational awareness and the enemy can pick up movement and offensive signatures. In January 2002 after the December 2001 Jaish-e-Mohammed terror attack on India's Parliament, our potent Strike Corps staged forward towards the International Border as a part of **Operation Parakram**. Though the movement was largely by night and dense fog conditions prevailed, American satellites detected the large scale movement. The Americans were alarmed as they were operating from Pakistani bases against Taliban and Al Qaeda. A flurry of calls ensued, Musharraf agreed to rein in the terrorist groups. Battlefield transparency has improved vastly since then.

The **second imperative** has been **precision long range targeting**. Indian Forces first used Precision Guided Munitions in Kargil 1999, with Mirage 2000 fighter aircraft launching laser guided bombs and Indian artillery using Krasnopol ammunition. We have come a long way since then, and BrahMos and other weapons struck targets deep inside Pakistan precisely during **Operation Sindoor** in May last year. Such precision strike capability is available to many nations. In the US-Israel campaign against Iran, Iranian leadership was hit accurately and crippled temporarily in Tehran by long range rockets and missiles. The inclusion of an exceptionally lucid and thought provoking article on long range vectors by Lieutenant General T K Chawla (Retd) is hence appropriate.

Long range vectors have major advantages in strategic messaging, and escalation can be controlled too. But, non-contact kinetic weapons based operations may not give clear victory. So, future warfighting will have to synergise the contact and non-contact operations. Drones and unmanned aerial systems (UAS) have contributed immensely in improving battlefield transparency, and in long range precision targeting too. But, drone warfare is not a **'Revolution in Military Affairs'** - an aspect emphasised by Air Chief Marshal V R Chaudhari (Retd) in his assessment of the drones and counter drones environment.

But a clear takeaway for our warriors is that our campaigns have to be fought dispersed. Russian attacks in Ukraine have largely been by small groups, inching forward to clear the enemy from towns and villages. Whenever a large group of soldiers assembled or formed up, the Ukrainian drones / friendly satellites detected them, and precision targeting followed. What is visible can be targeted, and so the

EDITOR'S NOTE

FUP (Forming up Place) is obsolete. In Gaza too, the Israelis operated in smaller groups of soldiers clearing the alleys and tunnels.

General Upendra Dwivedi has been the Army Chief for two years, and has helmed substantive changes in structures and capabilities of the Army. I interacted with him, and his perspective of multi-domain operations and future readiness is insightful. *Atmanirbharta*, innovations and fast track procurements have also been a Key Result Area for the Army Chief. As elucidated by Colonel David Devasahayam (Retd) in the Founder's Note, we have examined the development of India's defence industrial base, with three articles looking respectively at technology challenges in indigenous manufacturing, improvements in the Defence Acquisition Procedure 2026, and capabilities and structures which need to be created for future war readiness. A write-up on The North Tech Symposium held at Prayagraj in May 2026 also brings out the various steps being taken to involve the private sector and start-ups for improved defence needs.

We have presented a bouquet of many other interesting articles in this issue. The closure of the **Strait of Hormuz** and its boomerang effect on global energy supplies is the current crisis facing the global economy. A perceptive analysis of naval lessons from the Iran War has been included, with the horizon being the **Strait of Hormuz** chokepoint. The Afghanistan-Pakistan conflict of February and March 2026 is extremely important for us, and we have delved into the dynamics of Taliban 2.0 and Pakistan's Western borders turmoil. And, importantly, we have reviewed Pakistan's Hangor Class submarine programme, where the Chinese are doing a transfer of technology - Pakistan's submarine arm will become more potent in the next decade.

In addition, we have an article dissecting the interplay of Foundational Doctrine, and its effect on strategy; and a hard-hitting reminder from Air Marshal R Nambiar (Retd) that networks and information flow cannot replace hard warfighting assets, and more fighter squadrons are a must for our growing stature and power.

Amongst other articles, we pay tribute to Major Mukund Varadarajan, AC (Posthumous) and salute the professional calibre of Subedar Vishnu Saravanan and his sister, Havildar Ramya Saravanan (our sailing champions). I had a relaxed chat with a veteran marathoner-cum-biker, namely Brigadier Sanjay Dikhit (retd), and have elaborated his passion and toil over the roads and hills. In our regular Wellness column, with hantavirus, ebola and other virus strains being detected, Dr. Renuka David talks about fever and how it is the defence mechanism of the body. Our Money Matters Column elaborates on protecting investments during global turmoil situations and stock market drops.

We will continue to focus on contemporary issues and current events in our issues, while also including articles on adventure activities, valiant heroes, sports personalities, anecdotes and operational activities of the Armed Forces. Desirous authors may please send the articles to chiefeditor@medalsandribbons.com by 10 August 2026. We look forward to your earnest feedback. The Editorial Team thanks all the readers for your valuable support and your positive kudos to this publication.

The Indian Air Force Doctrine has possibly been the most frequently changed amongst the services

WHEN DOCTRINE LAGS,

STRATEGY SUFFERS

Recent conflicts have rewritten assumptions that most militaries considered permanent and written in blood. Russia entered Ukraine in 2022 with a strategy designed around rapid manoeuvre, rigid command structures, overwhelming firepower and assumptions of a quick political collapse. **Operation Epic Fury** brought to the fore the concepts of targeting leadership at all levels, the vulnerability of infrastructure, cyber disruptions, and the limits of technological superiority. **Operation Absolute Resolve** showed how a sitting President of a sovereign nation could be kidnapped amidst a *'quiet hailstorm'* of cyber and information operations. **Operation Sindoor** demonstrated the effectiveness of non-contact long-range precision warfare under a nuclear overhang. In both **Operation Sindoor** and **Operation Epic Fury**, the land forces were not activated, and the conflicts saw no close contact, yet there were outcomes. Together, these conflicts have created a **'Doctrinal Paradox'**, in which the future battlefield is becoming highly visible, connected, autonomous, and compressed, yet simultaneously more volatile, uncertain, complex, and ambiguous (VUCA). How then does one define future warfare? Perhaps there is no rigid, pervasive definition!

The End of Predictable Wars

For most of the previous century and a large part of the current one, military doctrines have revolved around relatively stable assumptions such as clearly delineated frontlines, territorial integrity, domain-specific operations, sequential escalation, linear progression, well-protected rear areas, and manageable decision timelines. The last few years have been a testimony to the omnipresence of cyber, space and information operations across the entire spectrum. Their combined effects have debunked traditional assumptions and caused paradigm changes in the conduct of modern warfare.

The battlefield has become extremely transparent and porous. Anything that is detectable is now targetable; anything that remains static is becoming vulnerable, and, more importantly, anything that is connected and networked can and will be disrupted. These developments have altered the relationship between force, time and space. The implications are enormous. While simultaneously encompassing the five domains of warfare (land, sea, air, cyber and space), wars are no longer just about physical destruction. They are more about functional paralysis, disruption, cognitive overload, degradation of critical infrastructure, economic coercion and strategic signalling.

Conflicts tomorrow will not necessarily begin with the rumble of armour, thunder of artillery and the roar of a fighter aircraft. They might just start with the clicking sound of a computer keyboard. The first kinetic strike might simultaneously decapitate strategic and operational leadership, and a cyber-attack could cripple communication between echelons and the broader decision-making apparatus. This reflects an important doctrinal transition to cognitive warfare aimed at causing decision paralysis. The side that can disorient command structures faster would gain a disproportionate advantage. However, this also creates a new interesting vulnerability. Highly centralised Command and Control (C2) structures may become operationally brittle under sustained

The Russia-Ukraine war has revealed the dangers of imposing an ill-suited doctrine onto a contemporary conflict. Bottom Left. A still image taken from video shows what are said to be destroyed armoured vehicles of the Ukrainian armed forces, in the course of Russia-Ukraine conflict in an unidentified location in the southern Donetsk direction in Ukraine, in this image taken from a handout footage released June 10, 2023 (Photo Reuters).

disruption (as in Russia). What emerges is that future wars will reward decentralised execution, mission-based command structures, distributed control, adaptive autonomy and organisational flexibility. The winner may not necessarily have the most interconnected Armed Forces and the shortest decision cycle. Rather, victory will be theirs who are capable of continuous operations in a degraded and denied environment.

The Great Illusion of Technology

To get the most out of technology, it is important to start with a clear goal or objective. Some modern Armed Forces mistakenly believe that technology alone can guarantee victory, but **Operation Epic Fury** has proved otherwise, serving as a reality check. While advanced systems can create operational shock, they cannot automatically produce strategic collapse. There is no denying the fact that technology matters. Precision weapons, Artificial Intelligence (AI), stealth, cyber capabilities, space-based Intelligence, Surveillance and Reconnaissance (ISR), and information warfare have all transformed the way humans fight. But beyond a point, wars are sustained by something far more fundamental, such as doctrine, leadership style, production scale, innovation, operational adaptability, and societal resilience. This is the lesson most modern militaries risk ignoring. The inherent obsession with exquisite technology can create an illusion of strategic superiority while masking institutional fragility. Obsolescence in the future will definitely be punished, but so will over-centralisation and hyper-reliance on technology, in the absence of a coherent doctrine which balances the ways and means of war fighting with the extant combat capabilities.

Defining Future Wars

Doctrine's greatest challenge will be to describe future wars because they may not necessarily have a well-defined canvas. They may simultaneously involve trenches and drones, AI and conventional artillery, stealth and hypersonic weapons, autonomous systems and mass mobilisation, narrative control and societal resilience, and nuclear sabre-rattling to energy warfare. The battlefield has become far more hybrid, well beyond traditional military theory. Therefore, future warfare should perhaps not be defined by platforms, technology and domains. It should instead be defined by certain enduring characteristics, such as persistent command, compressed decision cycles, domain convergence and adaptive resilience.

The Doctrinal Challenge: Static Doctrine vis-à-vis Rapid Revision

Defining future wars is not a simple task, which is why traditional doctrinal systems appear to be struggling to keep pace. History is replete with examples of strategies that have been found wanting. The US Armed Forces have always had well-defined, well-structured, and deftly worded doctrines, yet many of their operations have failed. Are these doctrinal failures or strategic miscalculations? Is it a failure to comprehend the enemy, or is it institutional delinquency? What emerges is a dichotomy: **most doctrines are written for stability, while warfare evolves through disruption.** By the time doctrinal revisions are formally approved, battle spaces may have changed, creating a dangerous gap between institutional thinking and operational reality.

Militaries that treat doctrine as rigid, top-down dogmas often get left behind by technological and geopolitical realities. By attempting to codify *'exactly how to fight'* into flexible manuals, they stifle critical thinking. This approach prioritises hierarchy over innovation, making the organisation best prepared for the last war. Some militaries believe in continuity of a doctrine, while some revise it so often that the doctrine becomes more of a paper exercise than a lasting piece of strategy. Militaries that publish endless updates, amendments, or new service-

specific concepts risk **'Doctrinal Fatigue',** as the incessant churn makes doctrine irrelevant, hard to implement and less credible.

Doctrines and Strategy: Lessons for India

The Russia-Ukraine war has revealed the dangers of imposing an ill-suited doctrine onto a contemporary conflict. The realities of a transparent, multi-domain environment saturated with unmanned systems, space-based ISR, and precision-enabled battle space exposed Russia's severe doctrinal rigidity. Poor integration, weak logistics, inadequate air-land coordination and an inability to adapt quickly to the decentralised Ukrainian resistance led to operational paralysis in the first few months of the conflict. On the other hand, several NATO advisers initially attempted to orient Ukrainian operations around Western concepts of centralised planning and NATO-style combined-arms tactics. Very often, these attempts proved unsuitable for the immediate battlefield realities, limited Ukrainian resources, and significantly different Concepts of Operations (CONOPS). Ukrainian forces eventually adapted by blending selective NATO enablers with their own flexible, mission-oriented, and highly innovative combat methods, built around drones, anti-drone systems, dispersed operations, and rapid tactical adaptation.

The US, on the other hand, remains a potent military power, trained, equipped and scaled for operations far from its shores. It places enormous faith in its air power to seize control of the air and dominate the theatre. Thus, a conventional continental warfare approach to defend the homeland is distant in its strategic mind-set. The US military has also faced the challenge of pursuing traditional doctrinal approaches that are unsuited to fighting a non-traditional, radically different adversary. Despite the destruction caused to Iran by the US and Israeli air power, expecting a regime change without committing troops on the ground was a military doctrine-political strategy mismatch. A lesson that emerges is that doctrines cannot be transplanted from one strategic culture or battle space to another. An out-dated or contextually misaligned doctrine risks poor operational adaptability in situations where flexibility would prove decisive. India needs to learn from these wars, especially when sweeping reforms in the Higher Defence Organisation (HDO) are on the anvil. Armed Forces without a coherent doctrine and strategy are akin to an orchestra without a conductor: immense capability, but no synchronicity in battle. **Does India want to go that way?**

In 2017, India published two joint doctrines: The Joint Doctrine for the Indian Armed Forces and the Joint Armed Forces Training Doctrine. Between 2021 and 2025, India published seven separate joint doctrines and one Technology Perspective and Capability Road Map (2025). Additionally, the Indian Army published the Land Warfare Doctrine in 2018, the Indian Navy published the Indian Maritime Doctrine in 2025, and the Indian Air Force (IAF) published the Doctrine of the Indian Air Force IAP 2000-22 in 2022. Effectively, from 2017 to the present, India has published eleven doctrines on various modalities of warfare *(As of May 29, 2026, a new doctrine on Air Defence has also been published).* These doctrines cover service-specific aspects and some low-hanging sub-sets of joint warfare, and not what is much needed – how will the three services fight together to produce joint outcomes in the larger national interest? Are all the service doctrines current and relevant? Are they adequate for future conflicts? Or is the Indian military struggling to cope with the rapidity of change in technology, warfighting concepts, and structural changes in the HDO? Serious introspection is needed to formulate future-relevant doctrines. For decades, India's conventional doctrine against Pakistan remained constrained by escalation anxieties, nuclear overhang, political caution and largely reactive frameworks. **Operation Sindoor** demonstrated that modern wars may increasingly occur in the grey zone between peace and war. This space demands dynamic doctrines.

A Need for Two Doctrines

The greatest doctrinal mistake militaries make is attempting to use a single document for two fundamentally different purposes. An effective doctrine must simultaneously provide enduring institutional direction and contemporary operational relevance. When viewed objectively, both these requirements are often contradictory. How does a doctrine provide enduring direction while remaining contemporary and alive to all changes that might take place? Herein lies the need to have two distinct doctrinal layers. The Basic Doctrine of IAF, IAP 2000-12, now replaced by the 2022 version, speaks of three levels of doctrine: *strategic, operational, and tactical.* At the strategic level, a doctrine enunciates fundamental and enduring principles that guide the use of air forces during war and crises. It establishes an overarching framework for the effective use of air power. For example, the tenet that *'control of air becomes a pre-requisite for the effectiveness of*

President Maduro was brought to the US to face drug trafficking charges, January 2026 (Image: Kyle Mazza/Consolidated News Photos/picture alliance)

all military activities' is an enduring principle. The operational level doctrine translates the principles of the basic doctrine into military action by prescribing the proper use of the air forces based on distinct objectives, force capabilities, broad mission areas, and operational environments. These need periodical revision at the higher operational level of Command Headquarters (HQ). Conceptually, the tactical-level doctrine rests on the tenets of the strategic and operational doctrines, delineating the proper use of specific weapon systems to accomplish objectives. A tactical doctrine flows from the operational art, prescribes how roles and tasks are to be carried out and is usually published in combat manuals, such as those issued by specific organisations within the larger service framework. In the IAF, these are reviewed more frequently due to continual changes in platform, weapons and systems capabilities.

To prosecute modern wars and remain relevant, Armed Forces need to have two distinct doctrinal layers: the *Foundational Doctrine* and the *Operational Doctrine*. The tactical layer is most prone to change and is deliberately left out of this piece because it primarily deals with Tactics, Techniques and Procedures (TTP), which are easier and faster to change.

The Foundational Doctrine - An Enduring Compass

The foundational doctrine for the Armed Forces of India should provide contextual clarity for planning, preparing, and training to fight its future wars. Its job is not to dictate tactics or keep pace with technology; rather, it should define the Armed Forces' overall purpose within the framework of India's grand strategy. It should clearly articulate the core roles, tasks, and responsibilities of each service; explain the Principles of War; examine Civil-Military Relationships (CMR); discuss India's strategic culture; address India's geopolitical imperatives; highlight jointmanship and integration; and present the broad strategic framework in the Indian context. Such a doctrine must be able to outlive governments, platforms and transient technological advancements. It needs to be a foundational document that provides continuity, identity, and institutional coherence, without which the Armed Forces may become tactically reactive and strategically incoherent. A relook at the enduring principles within the myriad joint doctrines issued to date will provide doctrinal clarity and enable fine-tuning.

Changes in the foundational doctrine usually occur when assumptions about war, technology, threats, or national interests shift. Change should happen only when there is a major shift in how a nation believes wars will be fought, deterred or won. Some changes of this level could include the establishment of Theatre Commands, changes in threat perception, or major shifts in political objectives and national strategy. If ongoing conflicts show that stand-off precision strikes can achieve political aims without territorial capture, or if drones and missiles begin to dominate conventional war-fighting means and produce desired national outcomes, the doctrine must be reviewed. Similarly, by some miracle, if all nuclear weapons in the world are disarmed and the threat diminishes, it would need changes in the fundamental precepts of deterrence. While what India achieved in 88 hours is truly creditable, and what the USA has not achieved in over three months is surprising, the need to rethink the traditional foundational doctrines is evident. Foundational doctrine will necessitate changes when the answer to the following questions changes (these are a few illustrative examples):

- What kind of wars are most likely in the next five to ten years?
- What kind of wars are winnable?
- What technologies dominate the battlefield?
- What political outcomes are sought?
- Have the country's national interests changed?
- Have new threats emerged which are significantly different from the existing ones?

The Operational Doctrine- Encompassing Change

The operational doctrine must evolve continuously and absorb lessons from ongoing conflicts and technological developments. It should be modular, iterative and frequently revised; to be able to function as a living operational ecosystem rather than a static publication. **An operational doctrine is the intellectual foundation that links national objectives to military action.** It provides a common understanding of how a force will be organised, employed, sustained and integrated in war. Without an updated doctrine, even technologically advanced militaries risk preparing for the wrong war, employing forces inefficiently or failing to exploit emerging opportunities. Russia is a prime example of this doctrinal lag. An operational doctrine performs the following core functions:

- Aligns military power with contemporary threats.
- Provides conceptual clarity across the force.
- Drives capability development and modernisation.
- Integrates lessons from recent and ongoing conflicts.
- Enables faster decision cycles.
- Enhances deterrence.

While changes in the Foundational Doctrine would trigger changes in the Operational Doctrines, certain other factors would warrant changes only in the Operational Doctrines. The emergence of new technology, the adoption of newer war-fighting methodologies by the adversary, and major operational experiences would require updating operational doctrines. Minor reviews could be conducted every three to five years, and major reviews every eight to 10 years or when deemed essential.

Parting Shot

The defining military competition in the coming decades may not be about who possesses the best technology. It may be about which institutions learn the fastest under constant disruption, because future wars will reward adaptability over rigidity, resilience over showmanship, doctrinal agility over institutional inertia, and an iterative, two-layered doctrinal approach that remains institutionally agile while safely grounded in enduring principles. Military doctrines are ultimately about preparing the Armed Forces for the wars they are likely to fight.

The challenge for India is not just modernising its Armed Forces and reforming HDO. The real challenge is creating the intellectual framework through which comprehensive national power, in general, and military power, in particular, are understood and applied. India's security environment spans the entire gamut, from contested borders, state-sponsored terror, grey zone coercion, cyber-attacks, information warfare and the ubiquitous nuclear overhang. Future conflicts are unlikely to offer the luxury of massive mobilisation and sequential campaigns. In such a VUCA environment, doctrine can no longer afford to remain static and be revised only once every decade. What India needs is a foundational doctrine that clearly articulates national interests, deterrence philosophy, and strategic culture, while simultaneously evolving operational doctrines that rapidly absorb lessons from past and ongoing conflicts and imbibe technology to control escalation, dominate decision-making, and impose strategic outcomes. It is no longer just an academic exercise; it is a national security imperative that must be given due cognisance. Doctrine and strategy are like Siamese twins, inseparable, where one gives purpose, and the other provides direction. As current conflicts have highlighted, both are vital: shortcomings in one will impact the other. The end result is clear: ***When doctrine lags, strategy becomes the first casualty.***

❑ ❑ ❑

Group Captain VP Naik, VM, commissioned in the IAF in June 1999 in the fighter stream, is an alumnus of the National Defence Academy, Pune; Defence Services Staff College, Wellington and College of Air Warfare, Secunderabad. The officer holds an MSc in Defence and Strategic Studies and an MPhil. He has been an Instructor at the College of Air Warfare and is presently posted as a Senior Fellow at the Centre for Aerospace Power and Strategic Studies (CAPSS).

Group Captain VP Naik

AFGHANISTAN PAKISTAN CONFLICT 2026 AND INDIA'S STRATEGIC OPTIONS

The Afghanistan–Pakistan relationship remains one of the most complex and enduring fault lines in South Asian geopolitics. Contrary to the common assumption that the two countries should enjoy obvious strategic convergence because of shared religious identity, their relationship has historically been shaped by mistrust, unresolved territorial disputes, ethnic tensions, proxy warfare, and competing geopolitical objectives. At the core of this conflict lies the unresolved Durand Line dispute, the question of Pashtun identity, and Pakistan's long-standing concern that a strong and independent Afghanistan could revive Pashtun nationalism and challenge Pakistan's western territorial cohesion. Over several decades, Pakistan developed a strategic framework aimed at neutralising these perceived threats through geopolitical leverage, ideological mobilisation, economic pressure, and support for proxy groups. This article examines the historical roots of the Afghanistan–Pakistan conflict, Pakistan's strategic design in Afghanistan, the limitations of its Taliban leverage strategy, the present conflict dynamics, possible future trajectories, and strategic implications for India.

Pakistan strikes and escalation in Afghanistan, 27 February 2026 (Source Pakistan Television, State Media, Courtesy Al Jazeera)

The Durand Line: The Foundational Dispute

The roots of the Afghanistan-Pakistan conflict can be traced to the Durand Line Agreement of 1893, concluded between British India and Afghanistan by Sir Mortimer Durand and Afghan Amir Abdur Rahman Khan. The arrangement primarily served British imperial interests during the **"Great Game"** against perceived Russian expansion in Central Asia.

The Durand Line divided the Pashtun tribal belt into two parts - one under British India and the other under Afghanistan. For Afghanistan, the line represented the division of a historically connected ethnic and tribal population. Successive Afghan governments repeatedly questioned either the legitimacy or the permanence of the arrangement. Pakistan, however, inherited the Durand Line after Partition in 1947 and has consistently treated it as a settled international border under accepted principles of state succession.

The dispute remains unresolved because no Afghan government - monarchist, republican, communist, Mujahideen, Taliban 1.0, post- 2001 democratic administration, or Taliban 2.0 - has formally recognised the Durand Line as a permanent international border. This unresolved issue continues to shape the strategic psychology of both states.

Pashtun Nationalism and the Politics of Partition

The origins of the trust deficit between Afghanistan and Pakistan also lie in the politics of Partition and the pre-Partition history of the North-West Frontier Province (NWFP), now called Khyber Pakhtunkhwa. The Pashtun nationalist movement led by Abdul Ghaffar Khan, popularly known as Bacha Khan, aligned itself with the Indian National

Congress rather than the Muslim League. His **Khudai Khidmatgar** movement advocated non-violence, Pashtun social reform, and a united India.

The movement opposed Muhammad Ali Jinnah's two-nation theory and viewed Partition with deep suspicion. During the 1947 referendum in the NWFP, the *Khudai Khidmatgars* boycotted the vote because the option of an independent Pashtunistan was excluded. Afghanistan itself opposed Pakistan's admission to the United Nations in 1947, becoming the only country to **vote against Pakistan's entry.** This was emblematic of Kabul's dissatisfaction regarding the status of Pashtun territories and the political outcome of Partition. These developments created a strategic mistrust that continues to influence Afghanistan–Pakistan relations.

The Pashtunistan Question

After 1947, Afghanistan periodically supported the idea of **"Pashtunistan"** - a separate homeland for Pashtuns inhabiting areas of present-day Khyber Pakhtunkhwa and adjoining tribal regions. At different stages, certain Afghan political narratives also invoked the **concept of a "Greater Afghanistan,"** extending historically towards the Indus Valley. Although these ideas never evolved into a realistic geopolitical project, their rhetorical persistence deeply concerned Pakistan's strategic establishment and significantly shaped Pakistan's subsequent Afghan policy. Pakistan increasingly concluded that:

- Pashtun nationalism could threaten Pakistan's territorial cohesion.
- Afghanistan could become a base for anti-Pakistan ethnic mobilisation.
- And a strong Afghanistan aligned with India could strategically encircle Pakistan.

Strategic Depth and Pakistan's Security Calculus

Pakistan's Afghan policy, fearing a two-front strategic challenge with India to the East and a hostile Afghanistan to its West, gradually evolved around the concept commonly described as *"strategic depth."* The Pakistan Army therefore concluded that Afghanistan should ideally remain friendly, dependent, fragmented, or strategically manageable. The persistence of Pashtun nationalism and Afghanistan's refusal to formally recognise the Durand Line reinforced Pakistan's security anxieties. Consequently, Pakistan developed a strategy aimed at:

- Reducing the salience of the Durand Line dispute.
- Weakening Pashtun ethno-nationalism.
- Retaining leverage in Kabul and limiting Indian influence in Afghanistan.

The Soviet Invasion and Transformation of the Frontier Region

The Soviet invasion of Afghanistan in 1979 fundamentally transformed the regional strategic landscape. Pakistan became the frontline state for the anti-Soviet campaign supported by the United States, Saudi Arabia, and several Western and Gulf countries. Using its contiguous geography and intelligence infra-structure, Pakistan emerged as the principal conduit for arms, finances, training, and ideological mobilisation for the Afghan Mujahideen. Simultaneously, Pakistan was successful in diverting significant international attention towards the Kashmir dispute, while the Durand Line issue remained diplomatically marginalised for decades.

This period proved strategically decisive for several reasons. **First**, Islamist mobilisation increasingly displaced ethnic Pashtun nationalism across sections of the frontier belt. **Second**, millions of Afghan refugees entered Pakistan, transforming the demographic and ideological environment of border regions. **Third,** extensive madrasa networks, militant infrastructure, and intelligence linkages emerged with long-term regional and for Pakistan, internal consequences.

Pakistan's strategic and military establishment appeared to conclude that an Islamist identity could more effectively override ethnic Pashtun nationalism, addressing the territorial questions linked to the Durand Line. In effect, Pakistan redirected political mobilisation in the frontier region away from ethnic nationalism towards transnational jihadist identity.

Creation and Leveraging of the Taliban

Following the Soviet withdrawal, Afghanistan descended into prolonged factional civil war during the early 1990s. Amid this instability, Pakistan supported the emergence of the Taliban movement, largely drawn from Pashtun religious seminaries and militant networks located in Pakistan.

The Taliban offered Pakistan several strategic advantages: a Pashtun-led but Islamist-oriented movement; the possibility of strategic depth in Kabul; reduction of Indian influence; and a force capable of restoring order amid Afghan instability. The Taliban eventually captured Kabul in 1996 and ruled Afghanistan until 2001. After the events of 9/11 and the subsequent US intervention, Pakistan officially aligned with the United States in the global war on terror. Nevertheless, over the years,

Damages near Kabul Airport, after Pakistani airstrikes

Taliban sanctuaries, leadership structures, and support networks continued operating from Pakistani territory with Pakistan's support and facilitation.

This created a strategic paradox. Pakistan simultaneously functioned as a key US ally and a major recipient of Western military assistance, while also innocuously and two-facedly being the sanctuary space for Taliban networks. The United States tolerated this contradiction partly because Pakistan remained critical for logistics access, intelligence cooperation and operational support linked to Afghanistan.

The Doha Process and Taliban 2.0

By the second decade of the conflict, the United States increasingly recognised that a decisive military victory in Afghanistan was unlikely. The Obama administration initiated gradual drawdown planning, while subsequent negotiations led to the Doha process involving the Taliban. Pakistan viewed these developments favourably because they increased the likelihood of Taliban re-entry into Afghan power structures. Following the hasty and rushed withdrawal of US and NATO forces in August 2021, the Taliban rapidly captured Afghanistan and re-established power. Initially, Pakistan appeared to believe that its long term Afghan strategy had succeeded. However, developments after 2021 gradually exposed the enduring fault lines in Pakistan's approach.

Limitations of Pakistan's Leverage

Evolution of Taliban Autonomy. A significant development after the return of Taliban 2.0 has been the gradual assertion by the Afghan Taliban of autonomy from Pakistan. Even during the NATO presence in Afghanistan, many Afghans increasingly believed that Pakistan was using the Taliban instrumentally to advance its own strategic objectives. The principal Afghan grievance was that Pakistan had used Pashtun populations strategically, sustained instability within Afghanistan, and leveraged conflict to retain influence. After returning to power in 2021, the Taliban leadership prioritised sovereign Afghan interests over Pakistani strategic preferences. This marked a significant departure from precedence and Pakistan's expectations.

Taliban 2.0 versus Taliban 1.0. Taliban 2.0 differs from Taliban 1.0 in several important respects. The current Taliban leadership is more politically experienced and more internationally exposed, more conscious of state sovereignty, and more focused on consolidating long-term internal control. Unlike the Taliban of the 1990s, Taliban 2.0 inherited an entire state structure, military infrastructure, and governing apparatus after the withdrawal of NATO forces. As a result, the movement increasingly seeks strategic autonomy and independence in decision making rather than functioning merely as an external proxy.

Internal Consolidation and Governance. The Taliban today exercises greater territorial control over Afghanistan than at any other time in modern Afghan history. According to several regional observers and local accounts, corruption levels appear lower than during the previous internationally backed Afghan administration. The security situation in many regions has also improved in terms of the reduction of conventional armed conflict. The Taliban administration has additionally launched environmental initiatives such as the **"Green Afghanistan"** campaign, aimed at reviving forest cover through plantation drives and environmental restoration. However, serious concerns continue regarding women's rights, restrictions on girls' education, political freedom, and broader human rights issues. Despite these concerns, Taliban 2.0 appears considerably more internally consolidated than many external observers initially anticipated.

The TTP Challenge and Pakistan's Strategic Dilemma

A serious issue in Afghanistan-Pakistan relations today concerns the TTP. The TTP emerged from militant networks operating primarily in Pakistan's tribal and Pashtun belt. Although organisationally distinct from

the Afghan Taliban, the two movements share ideological linkages, tribal affinities, battlefield histories, and overlapping social networks. Pakistan expected that once the Taliban returned to power in Kabul, the Afghan Taliban would decisively suppress the TTP. This expectation has not materialised. Pakistan now accuses the Afghan Taliban of tolerating TTP sanctuaries inside Afghanistan or lacking the willingness to act decisively against them. For the Afghan Taliban, acting directly against the TTP is complicated because many within the broader Taliban ecosystem view the TTP not as foreign adversaries but as fellow Islamist and Pashtun actors. This has created a **serious strategic dilemma for Pakistan.**

Revival of Pashtun Assertion

A major unintended consequence of Pakistan's long-term Afghan strategy may now be the gradual revival of Pashtun political consciousness. Although Islamist mobilisation weakened traditional Pashtun nationalism for several decades, the underlying realities of ethnic identity, tribal linkages, cross-border kinship and the Durand Line dispute never fully disappeared. Increasing tensions between Kabul and Islamabad are once again reviving debates surrounding Pashtun identity and territorial questions. Pakistan fears that renewed Pashtun assertion, instability in Balochistan, and sustained TTP violence could collectively **generate long-term pressure on Pakistan's Western frontier.**

Present Conflict Dynamics and Likely Trajectories

Escalating Border Tensions. The current Afghanistan-Pakistan conflict is increasingly characterised by recurring border tensions, militant attacks, retaliatory strikes, and rising nationalist rhetoric. Pakistan accuses the Afghan Taliban of harbouring TTP elements responsible for attacks inside Khyber Pakhtunkhwa and adjoining regions. The TTP continues targeting Pakistan Army personnel, security installations, police structures, and intelligence networks. Pakistan has repeatedly retaliated through artillery strikes, air operations including bombing by fighter aircraft, drone attacks, and missile strikes inside Afghan territory. These actions generate civilian casualties and intensify Afghan public resentment against Pakistan.

Economic Leverage. Pakistan also exercises significant economic leverage over Afghanistan. As a landlocked country, Afghanistan depends heavily on transit access through Pakistan, particularly via the Khyber Pass and the Chaman corridor. Pakistan periodically uses border closures, customs restrictions, and transit controls as instruments for messaging and pressure.

Distinguishing Taliban, TTP and ISIS-K. There is a clear distinction between the Afghan Taliban, the TTP and Islamic State - Khorasan Province (ISIS-K). The Afghan Taliban is primarily a nationalist-Islamist movement currently governing Afghanistan. The TTP is an anti-Pakistan establishment militant movement operating largely within Pakistan's Pashtun belt. ISIS-K, by contrast, is a transnational extremist organisation hostile not only to regional states but also to the Taliban itself. The interaction among these actors significantly complicates regional security calculations.

Asymmetry in Military Capabilities. The Afghan Taliban currently lacks a modern conventional military structure capable of confronting Pakistan in a conventional war, with the Pakistan military possessing clear superiority in air power, artillery, conventional military infrastructure and organised state military capacity. However, Afghanistan possesses other forms of strategic resilience. The Taliban's strengths lie in terrain familiarity, decentralised warfare capability, tribal mobilisation, ideological cohesion and extensive asymmetric warfare experience. This historical pattern confirms that external military superiority is difficult to sustain in Afghanistan or contiguous areas over extended periods.

Balochistan and Internal Pressures on Pakistan. Parallel to the Pashtun issue, Pakistan also faces insurgent pressures in Balochistan. Baloch insurgent groups have targeted security installations, Chinese projects and state infrastructure effectively. This convergence of TTP violence, Pashtun unrest and Baloch militancy creates increased internal security pressures for Pakistan. This does not imply imminent collapse of the Pakistani state. However, it significantly complicates Pakistan's long-term security hubris on its Western borders.

Likely Trajectory One: Chinese Stabilisation and Connectivity. China has strategic and economic interests in Afghanistan. These include mineral access, rare earth reserves, copper projects such as Aynak and broader regional connectivity initiatives. China may therefore increasingly attempt to stabilise Afghanistan–Pakistan relations through Belt and Road Initiative connectivity, economic integration, rail and road projects and regional infrastructure diplomacy. If successful, such projects could reduce instability, deepen Chinese influence in the region and integrate Afghanistan into the broader China–Pakistan economic

(Left) Taliban soldiers pose as they stand on a Humvee in Afghanistan's Nangarhar province, which shares a border with Pakistan on February 28 2026 (Photo Reuters)
(Right) Taliban security personnel stand guard near the Torkham border crossing between Afghanistan and Pakistan in the Nangarhar province on February 27, 2026 (Photo AFP)

architecture. From India's perspective, this trajectory is not favourable because it would expand Chinese geopolitical reach Westward through Pakistan into Afghanistan.

Likely Trajectory Two: Prolonged Instability. A second trajectory involves prolonged instability. Under this scenario Pakistan continues facing sustained pressure from the TTP and Baloch insurgent groups, Afghanistan–Pakistan tensions persist and low-intensity cross-border conflict continues intermittently. This could gradually increase the economic and military costs of Pakistan's Western deployment. However, prolonged instability also carries broader regional risks, including extremist spillover, refugee flows, narcotics trafficking networks and the reactivation of transnational jihadist ecosystems.

Strategic Implications and Options for India

India has historically enjoyed considerable goodwill among the Afghan people. Civilizational interactions, trade links, educational exchanges, developmental cooperation, and cultural affinity have traditionally provided India significant soft power in Afghanistan. Unlike many external actors, India has generally been viewed by large sections of Afghan society as a constructive development partner rather than a coercive geopolitical actor. This remains an important positive attribute.

Calibrated Diplomacy. India's current policy of calibrated and quiet engagement with the Taliban appears strategically prudent. Complete disengagement would adversely reduce India's influence in a region of major long-term strategic significance. Sustained diplomatic engagement enables India to:

- Monitor regional developments.
- Preserve communication channels.
- Maintain goodwill.
- Protect long-term strategic interests.

Conditional Political Recognition. India may eventually consider a calibrated framework for deeper political engagement or limited recognition linked to women's education, humanitarian commitments, inclusive governance, and counterterrorism assurances. Such engagement should remain gradual and strategically flexible.

Regional Diplomacy. India should strengthen coordination with Iran, Central Asian states, Russia and other regional stakeholders. These countries share concerns regarding extremist instability and regional security.

Connectivity. India must continue developing alternative connectivity frameworks through Iran, particularly the Chabahar corridor. Reducing Afghanistan's dependence on Pakistan-based transit routes serves both Afghan autonomy and India's strategic interests.

Developmental Assistance. India's developmental projects in Afghanistan have often generated significant goodwill. Continued assistance in healthcare, education, food security, infrastructure and humanitarian relief would strengthen India's goodwill and long term standing within the Afghan people.

Strategic and Security Considerations

Preventing Jihadist Spillover. One of India's principal security concerns remains the possibility that militant ecosystems emerging from the Afghanistan–Pakistan theatre could again be redirected towards Jammu & Kashmir or other parts of India. After the Soviet withdrawal from Afghanistan, jihadist infrastructures developed during the anti-Soviet war increasingly shifted towards Kashmir during the late 1980s and early 1990s. India must therefore maintain sustained intelligence monitoring of TTP dynamics, Taliban factions, Pakistan-based India focussed militant groups and broader extremist ecosystems.

Eye on Pakistan's Designs. Pakistan's military establishment may attempt to offset Western pressures by reinforcing anti-India narratives or reviving proxy dynamics. Any major geopolitical realignment

involving the United States, Iran, China or Gulf powers could indirectly influence Pakistan's regional behaviour. India must therefore remain vigilant.

Limits of India's Options. India's policy choices also face significant constraints. India lacks direct land access to Afghanistan. The China-Pakistan strategic partnership limits India's manoeuvrability in the region. Taliban ideology remains uncertain in several areas, particularly regarding religious extremism and governance, though the Deobandi link of the Afghan Taliban is notable. International sanctions and financial restrictions further complicate large-scale economic engagement. Consequently, India must avoid both, over-commitment and strategic disengagement. Its approach should remain pragmatic, flexible, and long-term in orientation.

Soft Power and Afghan Society. India should continue investing in people to people engagement. This includes scholarships, medical outreach, educational exchanges, cultural diplomacy and support to Afghan civil society. The Afghan diaspora across Europe, the Gulf, North America, and elsewhere also remains an important bridge for sustaining India-Afghanistan goodwill. India's long-term strength in Afghanistan lies less in military influence and more in trust, developmental credibility, and civilizational connectivity.

Prognosis

The Afghanistan-Pakistan conflict is not a contemporary border dispute, but is the product of more than a century of unresolved territorial questions, identity politics, strategic insecurities, and proxy warfare. At the core of the conflict lies the Durand Line and the unresolved question of Pashtun identity.

Pakistan's long-term strategy sought to manage these challenges through strategic depth, ideological mobilisation, Taliban leverage, and calibrated management of Afghanistan's internal instability. For several decades, this strategy appeared tactically successful. However, Taliban 2.0 has increasingly demonstrated strategic autonomy from Pakistan. Simultaneously, the TTP challenge has intensified, Pashtun political consciousness is gradually re-emerging, and Pakistan's Western frontier has become more volatile. Pakistan today faces a strategic contradiction in which some of the militant and ideological ecosystems cultivated over decades now seriously threaten its own internal security.

For India, the evolving situation presents both opportunities and risks. India must avoid simplistic approaches driven either by excessive optimism or purely adversarial calculations. A stable Afghanistan is in India's interest. But India must remain vigilant regarding extremist spillover, regional proxy warfare, Chinese strategic expansion and renewed Pakistan backed militant mobilisation. The appropriate Indian response should therefore combine strategic patience, calibrated diplomacy, regional engagement, developmental outreach and sustained security preparedness.

The Afghanistan–Pakistan theatre will remain one of the most consequential geopolitical fault lines in Asia during the coming decade. India's ability to navigate this environment with realism, restraint, and strategic foresight will significantly enhance both regional stability and India's long-term security interests.

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Major General Sanjay C Meston, AVSM, SM, VSM (Retd), an alumnus of Oak Grove School, Mussoorie and National Defence Academy, Pune was commissioned into the Mahar Regiment in 1981. He has extensive operational experience across Jammu & Kashmir and other sensitive regions of the country, besides a stint as a United Nations Military Observer in Mozambique and Rwanda. During his distinguished military career, he held several important command, staff, intelligence, and diplomatic assignments. As a Brigadier, he served in the Military Operations Directorate as DDG MO (A) and also as Director, Military Intelligence (Foreign Division). He was India's Defence Attaché in Afghanistan from 2011 to 2014. He commanded an Infantry Brigade on the Northern borders and later commanded an Infantry Division on India's Western borders. Both his sons are serving officers in the Indian Army, continuing the family's long tradition of military service.

Major General Sanjay C Meston

LONG RANGE VECTORS ALTER THE DYNAMICS OF MODERN WARFARE

"War is now a matter of sensors and vectors. The side that can see first and strike from the farthest distance without putting a human in the loop is the side that dictates the terms of peace."
General Valery Gerasimov

A missile unit moves to its deployment area in the mountains (Image AI generated)

Imagine a moonless, suffocating dark night in the Red Sea. A massive, multi-billion-dollar Western destroyer-bristling with the world's most advanced phased-array radars, and a crew of hundreds of highly trained sailors-cuts quietly through the water. Down in the Combat Information Centre, bathed in the blue glow of tactical screens, an operator suddenly detects a flicker. It isn't the signature of a rival superpower's stealth jet. It isn't a nuclear submarine rising from the depths. It is a fifty-thousand-dollar ballistic missile, launched from the back of a rusted commercial truck hidden on a rugged Yemeni hillside. Within seconds, alarms blare. The entire ship is forced into a life-or-death defensive crouch. Automated systems take over, firing a two-million-dollar interceptor to stop a crude weapon made of welded scrap, and smuggled smartphone electronics. High above the black water, the two objects collide in a blinding flash of light and sound.

In that singular, brilliant flash over the ocean, the old, traditional rules of war faded away.

For generations, the ultimate symbol of military might was a human being standing on conquered ground. It was the mud-soaked infantryman planting a flag atop a captured hill. It was the rumbling, diesel-choked column of heavy main battle tanks kicking up a massive dust cloud as they crossed a sovereign border. Or, projecting power globally, it was the massive, looming silhouette of an aircraft carrier appearing on the horizon off the coast of a troubled nation. **For thousands of years, war was fundamentally about capturing physical space, holding that physical space, and showing your face to your enemy.**

Today, that entire paradigm has been flipped completely. In the deep, multi-domain conflicts of the mid-2020s, the new face of warfare doesn't wear a Kevlar helmet, and it doesn't need to cross a border on foot. **The ultimate, most highly visible tools of modern statecraft and strategic dominance are long-range vectors-specifically, missiles and rockets.**

From the hypersonic gliders tearing through the skies of West Asia at impossible speeds, to the supersonic cruise missiles that defined India's **Operation Sindoor,** rockets and missiles are no longer just reinforcing artillery waiting in the rear echelons. They are the star performers. **They are the primary instruments through which nations communicate, coerce, deter, and conquer. We have entered an era where the fiery flight path of a missile is the most visible, terrifying, and effective strategic tool on the planet.**

The Theatre of the Sky: Why Visibility Matters

To truly understand why missiles have taken over the modern strategic playbook, we must understand the psychology of modern war. Today's conflicts are fought on high-definition television sets, on viral social media feeds, and in the highly reactive minds of global investors, just as much as they are fought in sand and mud. Missiles are inherently theatrical. They are designed by their very nature to be seen. When a massive ballistic missile launches, it instantly triggers early warning infrared satellites across the globe. Supercomputers in foreign capitals start crunching trajectories in milliseconds. Sirens begin to wail in cities hundreds of miles away, sending civilians scrambling into underground shelters. Millions of people pull out their smartphones to film the streaks of fire crossing the night sky, or to capture the spectacular, terrifying explosions as multi-million-dollar interceptors meet their targets in mid-air. **This extreme visibility is not an accidental by-product of the weapon's exhaust plume; it is the entire strategic point.**

During the Cold War, superpowers used the movement of aircraft carriers to signal their intentions. It was a slow, deliberate *"flex."* If a crisis kicked off, moving a carrier strike group took weeks of sailing, providing ample time for diplomatic backchannels to cool the temperatures. Today, moving a carrier takes just as long, but launching a medium-range ballistic missile takes few minutes. A rocket streaking over a capital city or detonating near a contested border is the ultimate, undeniable display of kinetic power. It sends a message that no softly worded diplomatic cable ever could: *"We can touch you; we can hurt you, and there is nothing your standing armies or your heavily fortified surroundings can do to stop us."*

Operation Sindoor: The Strategic Scalpel

There is no clearer historical example of the missile acting as a strategic, visible tool of statecraft than India's **Operation Sindoor.** In May 2025, this brief but overwhelmingly violent operation forced military academies from West Point to Sandhurst to entirely rewrite their textbooks on how punitive military campaigns are waged in the 21st century. Following the devastating Pahalgam terror attack, the Indian government faced a classic, agonizing dilemma: how do you inflict severe, undeniable, and highly public punishment on terrorist infrastructure deep inside Pakistan without triggering a messy, uncontrollable, and highly unpredictable ground war? Sending several Indian infantry and armoured divisions across the Line of Control or the International Border would have inevitably resulted in heavy casualties, dragged the region into a protracted conflict, and invited massive global diplomatic blowback.

Instead of choosing the soldier, India chose the vector. The country executed a massive, multi-domain punitive campaign that relied almost entirely on standoff lethality. The weapons of choice were predominantly air-launched BrahMos supersonic cruise missiles and SCALP stealth missiles. In a highly compressed, 23-minute window of extreme violence, Indian forces systematically dismantled nine high-value terror hubs deep inside Pakistan and Pakistan-Occupied Kashmir. These were targets in Muridke and Bahawalpur - places located hundreds of kilometres behind the border, deeply embedded in what was previously considered completely safe, untouchable sanctuaries.

The strategic impact of **Operation Sindoor** was in its clinical execution. India achieved devastating physical destruction and overwhelming psychological dominance without committal of *"boots-on-the-ground"* infiltration. The BrahMos, flying at Mach 3 and hugging the terrain to evade

The Pinaka missiles are equivalent to the US-made HIMARS (High Mobility Artillery Rocket Systems) (Photo Reuters)

Indian Air Force Su-30 MKI firing BrahMos air to surface missile (Photo ANI)

radar, gave the enemy practically zero time to react. The message sent by those missiles was highly visible, brutally undeniable, and perfectly calibrated: *"Your geographic depth is an illusion. Your safe sanctuaries are a myth. We can reach out and dismantle your most secure facilities at will, and you will be powerless to stop us."* The missile acted as a strategic scalpel, cutting out the cancerous target while leaving the broader geopolitical stability of the subcontinent largely intact.

Wars in the Gulf: The Language of Rockets

The 40-day US-Israel-Iran war has redefined modern missile combat, featuring unprecedented deployments of advanced ballistic missiles, cruise missiles, rockets and unmanned aerial systems. The US and Israeli Forces launched decapitation and SEAD strikes, with new Precision Strike Missiles, Tomahawks, and mass precision aerial bombardments to devastate Iranian infrastructure. In retaliation, Iran and its proxies have launched over 650 advanced munitions at Israel and US Gulf bases. Iran also debuted solid-fuelled, manoeuvrable and hypersonic missiles armed with cluster sub-munitions to maximize widespread damage and overwhelm responses. If **Operation Sindoor** showed how missiles can be used as a surgical tool by a conventional military, the ongoing Wars in the Gulf show how rockets and missiles have become the daily, violent language of geopolitical negotiation. **In West Asia, the missile is not just a weapon of war; it has emerged as a finely tuned tool of political risk management, economic coercion, and strategic signalling.**

When Iran launched **Operation True Promise III** in June 2025, they didn't mass troops on a border or send an invading army. They launched massive, synchronized salvos of Mach 15 *Fattah-1* hypersonic missiles and *Sejjil* solid-fuelled ballistic missiles, specifically targeting the Kirya military-intelligence complex in the heart of Tel Aviv and the heavily fortified Nevatim Airbase in the desert. It was a strategic broadcast to the entire world. By using hypersonic glide vehicles that could manoeuvre inside the earth's atmosphere, Iran completely bypassed traditional exo-atmospheric interceptors like the Arrow-3. Even if the physical damage to the concrete runways was repaired by Israeli engineers the very next day, Iran's strategic goal was flawlessly achieved. The missiles were launched to signal domestic resilience, to actively probe the seams and blind spots in the combined American and Israeli defence networks, and to definitively show the region that Israel's highly touted, multi-layered air defence grid was permeable.

A massive barrage of rockets is often a calibrated lever. It keeps the conflict at an elevated, painful intensity while intentionally avoiding the threshold of a runaway, full-scale regional war that could draw in global superpowers. A leader might fire a rocket into an empty desert base to look incredibly tough to their angry citizens back home, while secretly signalling to their enemy through backchannels that they don't want to escalate to World War III.

The Maritime Chokehold: Rockets Strangle Global Trade

The strategic power of the long-range vectors becomes even more terrifying when you look over the sea. For over a century, the global oceans were ruled securely by the nations with the biggest blue-water navies. Today, the oceans are held hostage by the actors with landmass overlooking channels and an arsenal of rockets to dominate these. Take the Houthi forces in Yemen, a militant group that does not possess a modern Navy. They don't have nuclear-powered aircraft carriers, stealth destroyers, or attack submarines. Yet, by utilizing a relatively cheap, easily hidden arsenal of Anti-Ship Ballistic Missiles and long-range suicide drones, they managed to throw an absolute chokehold around the Red Sea and the Bab al-Mandeb Strait-one of the most critical, highly trafficked maritime arteries on the planet.

When a Houthi rocket streaks toward a massive commercial

freighter, it isn't just an act of localized violence in the Strait; it is a strategic, calculated strike at the very heart of the global economy. These anti-ship missiles forced the world's most advanced Western navies into high-alert, defensive *"standoff"* postures, essentially pinning billion-dollar warships in place just to play defence.

More importantly, the sheer visible threat of these rockets has forced global shipping conglomerates to reroute their massive vessels thousands of miles around the Horn of Africa. This is the strategic power of the visible vector. A single missile that costs maybe $100,000 to manufacture can force billions of dollars in added marine fuel costs, severely delay global supply chains, cause factories in Europe to halt production due to missing parts, and immediately spike inflation in Asian and Western markets. The rocket has fundamentally democratized sea-denial.

The Economics of the Vector: Bleeding the Enemy

Missiles are the weapon of choice due to a devastating, yet rarely discussed, cost-exchange ratio. War is, fundamentally, a grim math problem: if you consistently force an enemy to spend ten times more defending than you spend attacking, you can bleed their treasury dry without killing a soldier. Groups like Hezbollah exploit this by purposeful layering. They launch a massive cloud of cheap, unguided *"dumb"* rockets (costing a few thousand dollars each) to hide advanced, precision-guided missiles targeting infrastructure. The defender cannot risk civilian casualties, so they must use high-end interceptors. These defensive marvels are engineering triumphs but carry a staggering $2 million to $4 million price tag per shot. Firing a $2 million interceptor to down a $20,000 crude rocket is a tactical victory but a financial catastrophe. Over a sustained campaign, this exhausts the defender's limited stockpile, eventually leaving the skies open to high-end strikes. This grim strategy allows smaller actors to engage in sustainable attrition against superpowers, fighting not for territory but to break the enemy's economic and political will to continue funding the defence.

The Hypersonic Nightmare

The prominence and terror of the modern missile is also deeply tied to the sheer, mind-bending physics of its speed. We are currently witnessing the end of the era of the predictable ballistic trajectory and the slow, lumbering subsonic cruise missile. The new, undeniable gods of the battlefield are Hypersonic Cruise Missiles and Hypersonic Glide Vehicles. When a weapon travels at speeds between Mach 5 and Mach 10 (roughly 3,800 to 7,600 miles per hour), the very laws of physics that govern warfare fundamentally change. A traditional, subsonic cruise missile might take an hour to reach a naval carrier group, an hour that gives the carrier group ample time to detect the threat, scramble fighter jets, turn their ships into defensive formations, and ready their automated close-in weapon systems. A hypersonic missile closes the same distance in a matter of minutes. Furthermore, at speeds of Mach 8, the missile moves so fast that it creates a sheath of superheated plasma around itself, which can absorb radar waves and make it incredibly difficult to track. Moreover, a weapon moving that fast has so much inherent energy that it doesn't even need to be equipped with an explosive warhead; the sheer, brute force of the physical impact is enough to crack a multi-billion-dollar destroyer in half and instantly *"mission-kill"* it. This extreme speed violently compresses the decision-making window for military commanders. Human beings simply cannot perceive, think, communicate, and react fast enough to intercept a target that is manoeuvring unpredictably through

The ocean bears witness to a moment before catastrophe (Image AI generated)

A U.S. Navy Tomahawk missile launches from USS Cape St. George in the Mediterranean Sea during Operation Iraqi Freedom, March 23, 2003 (Picture Source: U.S. Navy / Raytheon)

the atmosphere at over a mile per second. This grim reality is forcing modern militaries to hand over defensive firing authorizations entirely to Artificial Intelligence (AI).

The Orbital Front: The Invisible Backbone of the Rocket

But amidst all this fire and speed, remember that these highly visible streaks rely on a completely invisible backbone. Long-range vectors, no matter how advanced, are fundamentally blind without the space domain. The pinpoint accuracy demonstrated by modern missiles-from an Indian BrahMos to an American ATACMS-relies heavily on Low Earth Orbit satellite constellations for GPS, real-time tracking, and mid-course corrections. Because of this absolute reliance on space, the rocket has inadvertently turned orbit into the first front of any future conflict. Defeating a barrage means conducting aggressive anti-satellite warfare: jamming uplinks, hacking grids, and blinding missiles before launch. Successfully sever the invisible data link between rocket and satellite, and that multi-million-dollar weapon becomes merely a fast, blind, and incredibly expensive piece of flying metal.

Defending the Indefensible: Lasers and AI

So, how do militaries and civilian populations survive in a world where the sky is constantly falling? If thick concrete armour and deep underground bunkers no longer work, and if firing expensive interceptors bankrupts the state, what is the ultimate solution? To restore the balance of power, defence architectures are currently undergoing a radical, sci-fi evolution. The victor of tomorrow will be the force that can process massive amounts of sensor data instantly and shoot down incoming threats cheaply.

We witnessed a successful glimpse of this future during **Operation Sindoor.** The Indian Army utilised the *Akashteer* system-a deeply integrated, AI-enabled command and control network. *Akashteer* acted as a massive, automated central brain for the entire battle-space. It integrated data feeds from ground radars and satellites, instantly identified the swarm of incoming threats, and automatically assigned the most cost-effective weapon to the right target. It reserved the highly expensive, high-end interceptors (like the S-400) for the massive, existential ballistic missile threats. Simultaneously, it utilised cheap electronic jammers to scramble the guidance systems of drones and directed legacy anti-aircraft guns to swat down the cheaper, low-flying rockets. By automating the threat prioritization process, *Akashteer* reportedly achieved a flawless kill rate without much cost to the national exchequer.

But the ultimate, permanent counter-revolution to the missile and drone threat is light itself. High-Energy Lasers and High-Power Microwave Systems are rapidly becoming standard issue for base defence, operating at the speed of light to prevent target evasion. These weapons cost less than a dollar per shot and possess an infinitely deep *"magazine,"* limited only by fuel for their generators. Microwave pulses can instantly fry an entire drone swarm's electronics, while lasers silently burn through a supersonic missile's fuselage in seconds. Lasers are the only mathematically viable way to survive the mass proliferation of cheap rockets. They finally fix the broken cost-exchange ratio and give the defender a fighting chance in an era of saturated skies.

Organizing for the Future

The staggering success of long-range precision-strike operations and the shift toward **"non-contact" warfare** necessitate a profound institutional reckoning: restructuring the force around the primary tool of modern war. Currently, India's formidable missile inventories-spanning tactical, operational, and nuclear roles-are fragmented across the Army, Navy, and Air Force. This creates strategic bottlenecks, dilutes

procurement budgets, and results in slowing the *"sensor-to-shooter"* loop. By consolidating these assets into a unified Integrated Rocket Force (IRF), India can eliminate inter-service decision paralysis and cultivate a specialized cadre of experts dedicated to the complexities of trajectory physics, electronic countermeasures, and rapid-reload logistics. Beyond bureaucratic efficiency, a dedicated Rocket Force significantly enhances conventional deterrence by denial, particularly along the Line of Actual Control. A unified inventory of high-precision assets, such as the **Pralay** and extended-range **BrahMos,** allows India to credibly threaten enemy command centres and logistics nodes without immediately crossing the perceived nuclear threshold. This provides a vital layer of strategic flexibility and a symmetrical organizational response to China's People's Liberation Army Rocket Force.

By shifting the initial strike burden from the Indian Air Force to the IRF, India can preserve its multi-role fighter assets and pilots from high-threat air defence systems. Ultimately, the creation of the IRF recognises that long-range, precision-guided systems now define the modern battlefield. A unified command can seamlessly coordinate *"saturation strikes"* to overwhelm enemy defences, while the visible deployment of mobile launchers in Himalayan passes serves as a potent psychological deterrent in *"grey-zone"* standoffs.

A Contest of Credibility

At its core, the relentless rise of the long-range vectors is a quiet, ongoing contest over the fundamental credibility of superpower security umbrellas. During the height of the Cold War, extended deterrence was a simple, terrifying promise: if you attack my ally, my massive standing army and nuclear arsenal will annihilate you. Today, adversaries use rockets and missiles to meticulously exploit the grey zones of that promise. By utilizing precise, carefully calibrated missile strikes against allied military outposts or critical energy infrastructure, they pierce the defence network without ever triggering the tripwire of a total, world-ending war.

These highly visible, fiery strikes are purposefully designed to sow deep political doubt. They ask a profound, unsettling question to the watching world: *"If a global superpower's multi-billion-dollar air defence grid cannot protect a vital oil refinery or a capital city from a barrage of cheap rockets, can they really, truly guarantee your security?"*

The psychological and diplomatic fallout of a successful missile strike is immense. It forces global powers into agonizing, lose-lose dilemmas: do you risk igniting a catastrophic regional war by launching a massive, disproportionate retaliation, or do you absorb the bloody blow, show restraint, and project weakness and vulnerability to your watching allies? This is exactly why the missile and the rocket have become the absolute, ultimate tools of modern warfare. They are the new medium through which nations negotiate the limits of acceptable escalation. They rigorously test the true breaking point of international alliances. They determine the exact, painful price the global economy will pay for strategic dominance.

The era of strategic depth and safe, untouchable havens has evaporated in the blinding exhaust plume of the hypersonic engine. Today, the visible fist of the state is the missile, and it has proven definitively that there is simply nowhere left to hide.

"The invention of the long-range rocket has done more than change the battlefield; it has abolished the sanctuary of the homeland."
- Bernard Brodie, US Military Strategist

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Lieutenant General Tarun Chawla, PVSM, AVSM (Retd) was commissioned into 8 Field Regiment in June 1984, a unit he subsequently commanded. His extensive operational experience encompasses the command of a Medium Regiment in the Western Sector, an Artillery Brigade along the Line of Control in Jammu & Kashmir, and an Artillery Division. He has also served as the Director General Financial Planning and, later, Director General Artillery. His military service extends globally, having served as a United Nations Military Observer in Liberia, West Africa. Demonstrating visionary leadership, he pioneered the establishment of the Army Design Bureau. He has been an instructor at both the College of Defence Management and the School of Artillery. Post retirement, he is associated with various Defence Think Tanks and Educational Institutions. He is a prolific communicator, speaking and writing extensively on issues related to Firepower, Defence Technology and Defence Procurement.

Lieutenant General Tarun Chawla

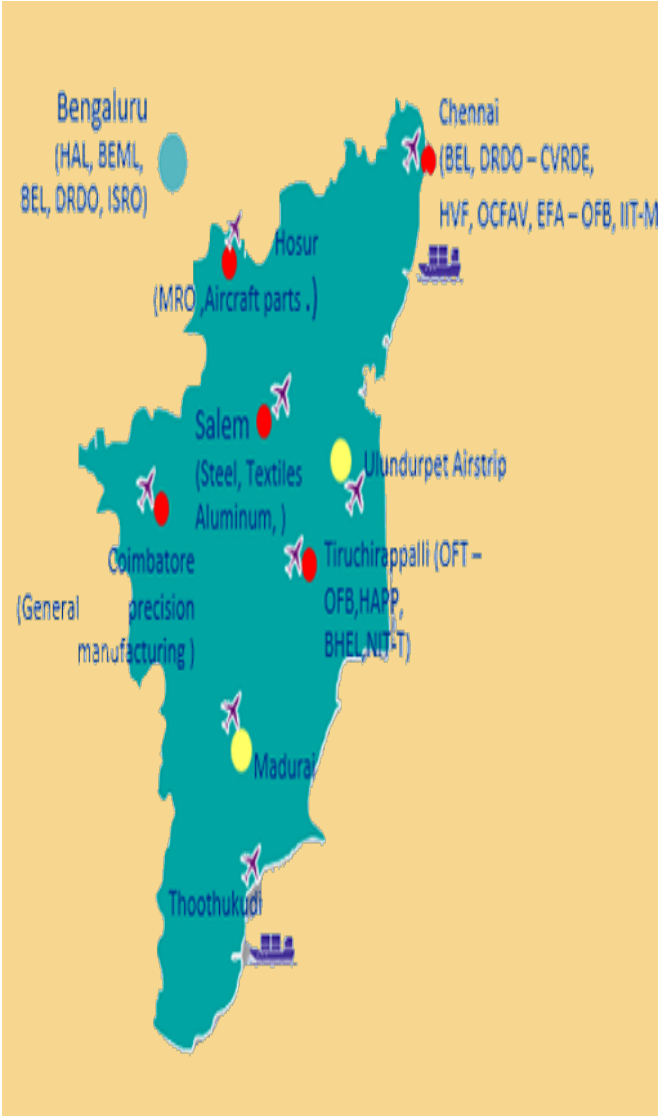
TECHNOLOGY CHALLENGES IN INDIGENOUS DEFENCE MANUFACTURING

From Policy to Capability

Contemporary warfare assessments on asymmetry and deterrence are significantly moderated by the capabilities of relatively few but technologically superior equipment and munitions. Potency of leverages in the military as well as politico-economic domain can be increased considerably with superior technology and modern weapons. In India, while there is a large indigenous content of traditional warfare capabilities, the technological challenges emanate essentially in the cutting edge technologies required in modern and emerging battlefields. This well researched essay highlights the current challenges.

During ***Operation Sindoor,*** *the world saw the capabilities of our indigenous weapons. Our Air Defence Systems, missiles, and drones have proved the strength of* ***'Atmanirbhar Bharat'.***

- Shri Narendra Modi, Prime Minister at a public rally in UP, Economic Times, 02 August 2025



Tamil Nadu Defence Corridor (Photo sidm.in)

Modern day warfare demands fail-free performance of military technologies in an intensely confrontational and highly advanced digital battlefield. Recent conflicts have underscored the importance of standoff distances, precision targeting and electronically robust equipment. Operational readiness can be seriously compromised in the absence of these modern weapons and systems. While some long drawn conflicts may prevail in the global context, the Indian sub- continent has little appetite for prolonged wars. Short conflicts demand *'results'* in a matter of days, enhancing the importance of very advanced and *'incontestable'* weapons and munitions.

In the Indian context, decision making on indigenous defence manufacturing has generally been a function of operational exigencies, industry capacities, technical knowhow and costs. Also pertinent has been the interplay between the time required for Research & Development (R&D) versus outright acquisition, cost of indigenous development versus transfer of technology (ToT) / joint venture (JV) costs and the life time costs versus the immediate criticality. While there have been few technology challenges prior to the recent phenomenon of modern and niche technologies dominating the battlefield, the solutions have not necessarily been indigenous in character. Holistic and real indigenization / *atmanirbharta* is a relatively recent policy of 2020[1], now dominating the decision making in the Indian defence manufacturing and technology development domains.

Defence Technology Environment in India

Traditional Import Dependence. While the intensity and scope may vary in countries, technology challenges are endemic in all manufacturing. In defence manufacturing, technology challenges tend to accentuate owing to complex and long drawn R&D, worldwide *'knowhow'* restrictions,

[1] *MoD's big push to Atmanirbhar Bharat initiative. Press Information Bureau, MoD, 09 August 2020.*

sophisticated and costly production infrastructure and low propensity of return on investment. Options to overcome technology challenges, especially in the cutting edge new technologies domain encompass a variety of measures like time consuming R&D, JVs / strategic partnerships or acquiring ToT / Intellectual Property Rights from relevant entities / countries. Owing to urgency of operational needs and manufacturing challenges, technology development / absorption has traditionally been giving way to outright purchase of the equipment without acquiring the technical *'knowhow'*.

Long Term Determinants of R&D in Technology Development. Dynamism in the politico-security environment necessitates constant review of military capabilities. To ensure favourable asymmetry, there is a need to constantly modernise and acquire cutting edge technologies. Complex military systems like ships, aircrafts, tanks, etc., enjoin huge investments over protracted periods, necessitating long term plans. Capacity building and modernisation are therefore long term plans with a deliberate process. Long term perspective plans, determine the military capabilities required of the Armed Forces which in-turn drives the design and development of new technologies.

Historical Context of Indigenisation. Historically, India's low and mid technology weapons and equipment (approximate inventory of three lakh items) were procured from Ordnance Factories and Defence Public Sector Undertakings (DPSUs). Complex platforms and cutting edge technologies like aircrafts, helicopters, tanks, night sights, etc., were procured from friendly countries or produced indigenously on ToT / JV. Indigenisation in defence received special impetus after the 1962 War and 1999 Kargil conflict, but technology improvements remained confined to ToT / JV models, with little indigenisation. It was only after start of the *Atmanirbhar* policy in 2020 that realistic indigenisation in military technologies and defence manufacturing was undertaken.

Contemporary Focus on Indigenisation. Combined with the new policy, increasing procurement from the private sector thereby increasing competition, reorganising 41 Ordnance Factories into seven DPSUs for production efficiency, mandating higher indigenous content in all procurements, banning import of over 5500 foreign origin products, were some of the initial steps which ushered in a wave of indigenisation. To further incentivise indigenisation, two defence corridors in UP and Tamil Nadu were established and Foreign Direct Investment was significantly increased[2]. Partnership / JVs with established global manufacturers were also permitted to catalyse indigenous defence production in new technologies.

Increasing the Private Industry Participation. There has been a steady improvement in the defence manufacturing environment in recent years. Driven by improved *'ease of doing business'* and *'atmanirbharta'*, defence production rose to Rs 1.51 lakh crore. 788 industrial licenses were issued to 462 private companies and over 16,000 Micro, Small and Medium Enterprises (MSMEs). While DPSUs still account for 77% of defence production, however, private companies' share increased steadily from 19% in 2022-23 to almost 28% in 2025-26. Exports also increased to Rs 23,622 crores in FY 2024-25 from less than Rs 1,000 crores in 2014[3]. Increased participation of private industries in the defence sector has ushered in both cooperation and competition, which has given a fillip to improved technologies and quality at lower costs in indigenous technologies.

Significant Technology Challenges in Indigenous Defence Manufacturing

Challenges in a Vast Operational Need Paradigm. The technology challenges in development of indigenous military technologies emanate from the diversity of terrain and operations on two and half fronts. In the seas, the military reach transcends the traditional Indian Ocean region to encompass the expanding arc of India's economic interests. The Air and Space needs have also expanded beyond traditional limits. Adversary capabilities are also important determinants of technology needs. India's military technologies must therefore perform optimally on vast fronts and in diverse contingencies.

Inadequacy in Core Technologies. The principal technological challenges are the core technologies required in the manufacture of jet engines, semiconductors, sensors and stealth frames. While progress is apparent in missile and rocket technologies, large dependence on imported sub systems persist, especially in servos, radars and military microelectronics. Manufacture of electronics, guidance kits, advanced materials and autonomous systems continue to remain in less than optimal state.

[2] *Defence Atmanirbharta: Record Production and Exports, PIB New Delhi (MoD), 20 November 2025*
[3] *Ibid*

Multiplicity of Interests in Policies, Rules and Procedures. Governed essentially by General Financial Regulations, Defence Procurement Manual and Defence Acquisition Procedure (DAP), the procurement / acquisition process by the Armed Forces is inherently conformatory and deliberate. It is a multi-stage process where advise, scrutiny and audit of many agencies like the Defence Research and Development Organisation (DRDO), Directorate General of Quality Assurance (DGQA), Integrated Financial Advisors, oversight by various functionaries in the Ministry of Defence, are statutorily embedded in the process. Each of these agencies have their own mandate and objective, which may not necessarily align entirely with that of technology

Long Drawn Procurement Process. Cutting edge technologies tend to be costly and need to be procured indigenously or exported to sustain R&D costs. Newly developed equipment / technologies have to undergo a protracted acquisition process enshrined in DAP. Technical evaluation and trials by the Armed Forces and DGQA is at the heart of the process. It starts after the Acceptance of Necessity (AoN) and Request for Proposal (RFP) stage with the evaluation of the technical offer by the Technical Evaluation Committee (TEC) and is followed by the Field Evaluation Trials. Staff Evaluation of the entire TEC and trial process as also oversight by Technical Oversight Committee is undertaken for high value and new technologies / platforms. After the technical evaluation, a protracted commercial evaluation is undertaken. The entire process from AoN to contract takes more than two to three years, prior to commencement of bulk production and delivery. This step by step sequential process involves numerous agencies and appointments which in turn result in numerous iterations and repetitions.

Inadequacy of Funds for R&D in the Private Sector. In the absence of firm orders / contracts / sales, the Indian private industry and MSMEs are loath to spend on R&D. On the other hand, global industry leaders have an established market which is capable of sustaining high investments in the research for new technologies. While the focus on self-reliance and R&D for indigenous technologies continues, the industry faces challenges in increasing R&D funding compared to global competitors who spend up to 10-15%[4]. Owing to large purchases in their respective countries (US, EU, China and Russia), costly research in private industry is also supported by their respective Governments. The same is not yet feasible in India owing to relatively small foreign market / exports and relatively less domestic consumption.

Government Support and Funds for R&D in Defence Industry. Only about 5.5% of India's defence budget is allotted to R&D. Most of the Government R&D funds are absorbed by DRDO leaving little for the private industry and start-ups. A 25% apportioning of the R&D budget for the private industry was approved in 2021, but its realisation has been lethargic. Apart from Funds, indulgence of the Indian Government in R&D is broadly confined to monitoring and auditing. Large private sector industries, which are capable of funding original research, have to contend with challenges in ensuring quality, timeliness and costs. Encouraging indigenisation necessitates funding, handholding

[4] *Roles & Tasks of India's Defence R&D vis-a-vis USA's RDT & E: A Preliminary Analysis, Vice Adm Raman Puri, (Retd.), Vivekananda International Foundation Report of 2022.*

and fair opportunities. The private industry has to be encouraged for R&D in terms of policies, funding and sales to generate real and competitive growth of high end indigenous technologies in India.

Deficiencies in Quality Control Infrastructure and Procedures. Quality is critical in high end technologies. Ensuring quality of defence equipment is a direct function of quality control. While there are functional issues with the premier quality control organisation, the DGQA, consistency of product specifications and verifiable testing facilities are related technological infrastructural inadequacies. Testing and validation infrastructure for large number of military equipment and munitions are yet to be fully modernised. Ballistic testing, wind tunnels, simulation, are some of the persistent gaps in institutionalised trials-test facilities.

Policy Changes

Consortium and Collaborative Format of Production. Modern technologies are complex platforms incorporating intricate and costly systems like satellites, electronics, metallurgies, composites, etc. Aero / jet engines, drones, servos / guidance for missiles, electronic hardening are some of the new military technologies requiring indigenisation and R&D. Defence manufacturing of modern platforms therefore acquires a multidimensional complexion, generally beyond the scope of traditional industry specialising in certain / one product type only. A consortium and collaborative format of production with more than one industry, each with its proven specialisation, supported by a *'credible eco system'* is therefore considered a cost effective and result oriented model for India.

Public - Private Competition and Cooperation in R&D. Traditionally, defence R&D has been the preserve of the DRDO. The poor R&D record of the DRDO has had a cascading impact on foreign procurements with India growing as the largest importer of foreign defence equipment. Direct allotment of R&D funds to selected Private Industry, academia and start-ups has the potential to mitigate monopoly of DRDO and usher in competitiveness and quality.

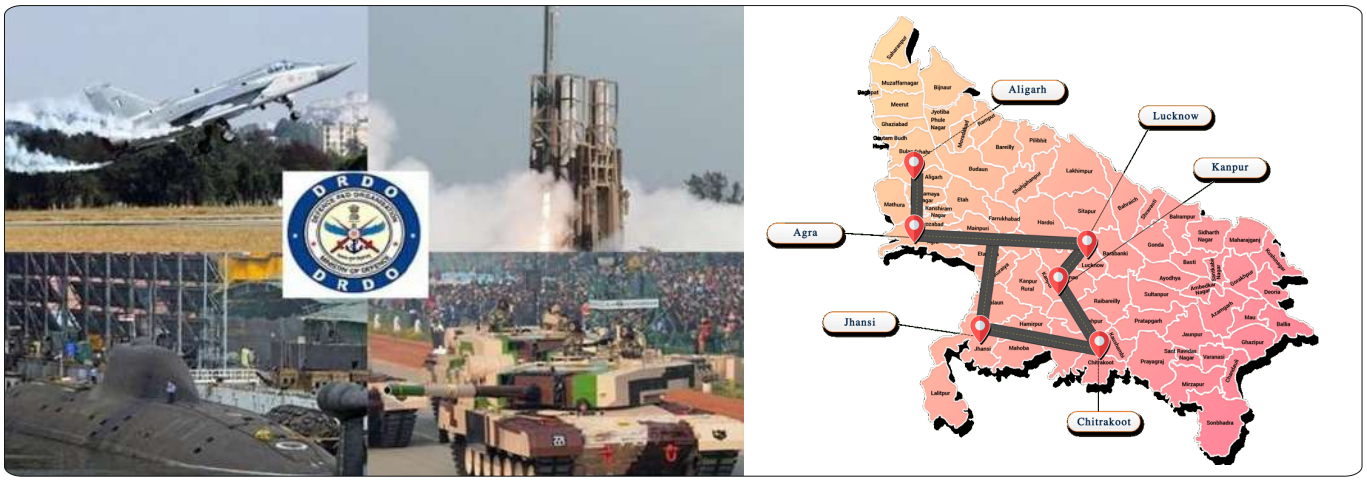
Increase Defence Spending – Core Factor Driving Indigenisation. India's defence spending in 2025 between $94 billion and $277 billion and China's between $688 billion and $1,258 billion indicates a vast asymmetry (four to seven times)[5] . Development and growth in any industry, including the defence industry, is a function of growth in its sales / revenue. Defence spending has accordingly been growing steadily. The Defence Acquisition Council of Ministry of Defence accorded AoN worth Rs 6.73 lakh crores, and approved capital contracts worth Rs 2.28 lakh crores in FY 2025-26. Both the quantum of AoN given and capital contracts signed have been the highest in any given Financial Year[6]. High expenditure pattern on defence procurements must continue for another five to seven years to make the indigenous defence industry self-sustaining and competitive with the best in the world.

Modernise Procedures: Override Lowest Bid (L1) by Best Technology Bid (T1) Format. The lowest bidder (L1) selection system for vendors has stood the test of time but is encumbered with low technology content and poor quality complaints. A technology biased procedure with T1 system (technical primacy of selection) being opted over the existing L1 system (financial primacy of selection), has the potential to significantly upgrade

(Image Credit bharatshakti.in)

[5] *Chinese and Indian Defense and Defense Procurement Spending 2025, China and India, 2025. A Comparative Assessment, National Defence Research Institute, Paper prepared for the Office of the Secretary of Defense, January- February 2026*

[6] *DAC clears proposals worth Rs 2.38 lakh crores to augment defence capabilities, MoD, Press Information Bureau, 27 March 2026*



Left Image. Image credit government.economictimes.indiatimes.com *Right Image. Uttar Pradesh Defence Corridor (credit sidm.in)*

technology threshold and improve high end indigenous content of India's military inventory. Such a change is considered essential to ensure quality in the indigenous defence ecosystem.

Encourage Exports in Defence Sector. Large military systems and platforms are complex technologies with high costs. The investment by the Indian defence industry is accordingly not possible to be fully amortised by the Indian Armed Forces. Focus on exports and proactively pursuing foreign buyers has the potential to substantially increase volumes, enlarge profits and concurrently reduce indigenous costs.

Capability Improvements Recommended

Strategic Partnership with Established Global Players. For challenging defence technologies which are at a nascent stage of development in India, *'strategic partnership'* with concerned global players is recommended. Active involvement of Indian private sector (in collaboration with foreign strategic partners) in the manufacturing of major defence platforms will serve to enhance competition, improve absorption of new technology, and promote participation in global value chains as well as exports. From a strategic perspective, this will help reduce current dependence on imports and gradually ensure greater self-reliance and indigenisation.

Market Supported Intrinsic Funding for R&D. Costly and time consuming R&D for high end technologies, is a critical indigenisation need which in turn is a function of size and funds inherent in the defence industry. In effect, therefore, greater the size of defence industry, greater will be the innovation and niche content in their products (and vice versa). Relatively speaking, the present size of Indian defence spending is barely one fifth to one seventh of the Chinese and much smaller to that of US and EU. India's defence manufacturing has to therefore increase significantly. Increased revenues and larger investments in defence industry is likely to *'multiply effect'* of growth as well as R&D.

Realistic Qualitative Requirements (QRs) and Pragmatic Need Assessment. The Armed Forces also need to inculcate greater pragmatism in formulating technical parameters for military equipment. Complex Staff QRs delays development of the product, complicates trials, and enhances costs. Greater understanding of the defence industry challenges is equally essential for the Armed Forces as understanding terrain and operational challenges is for the defence industry. There is a need for greater synergy between defence industry and procurement stakeholders.

Quality Tests and Quality Assurance. The mandated body for certifying quality of the equipment under procurement, as per the Staff QRs and test parameters set by the Services, is the DGQA and equivalent organisations in the Air Force and Navy. Modern day quality tests of electronics, software, metallurgy, avionics, and suchlike require very high grade test equipment and resources, which are generally not available with DGQA. They have to depend on private and Government accredited laboratories spread across the country. In this environment,

accepting self-certification for simple items and accredited laboratory certificates for high end systems has the potential to expedite tests and enhance indigenisation.

Low Availability of Rare Earth Metals and Critical Sub Systems. The challenge quotient in availability of certain metals, materials, components and sub systems for the Indian defence industry is high. While numerous initiatives like acquiring stakes in rare earth mines in friendly countries, establishing indigenous *'chip'* manufacturing and strategic partnerships with established firms / companies have been undertaken, timely procurement of few rare earth metals, microchips and some sub systems still remains challenging. A long term and trans-regional outlook in these fields is essential for attaining self-reliance in the defence sector.

Human Talent for Development of Defence Technologies. There is high traditionalist quotient in research. *'Build to Print';* wherein the manufacturer follows the ToT / a blueprint exactly is adopted intuitively as compared to *'Build to Spec'* wherein the manufacturer has to design, test and create the product based on broad functional requirements. Slow adoption of emerging technologies and inadequate absorption of ToT from established Original Equipment Manufacturers is a norm. There are little reverse engineering attempts in India's defence industry. One of the main reasons for these inadequacies is lack of appropriate talent. Increasing incentives, recognising employment realities of technical graduates, appropriate awards in defence research and long term HR management are some of the measures needed to draw better talent to defence R&D and defence manufacturing.

Data Released by Ministry of Defence

Conclusion

Simple purchases from indigenous sources alone do not promote indigenisation. Achieving self-reliance and self-sufficiency enjoins assimilating new technologies and developing self-sustaining ecosystems. Long term investments in manufacturing infrastructure, eco-system of suppliers, skilled human resources, and R&D for modernisation are essential. The overall aim should be to progressively build indigenous capabilities in the public and private sector to design, develop and manufacture complex weapon systems for the future.

The present focus of the Armed Forces and the Government towards greater indigenisation and modernisation with cutting edge technologies has the potential to enhance the military capabilities of the country significantly. While the policies and the direction have been well set and widely recognised, the implementation of these improvements and recommendations is lacking. **The need to pursue improvements / change dynamics in real earnest, with ever increasing impetus at the level of the Armed Forces, the procurement agencies and the manufacturing organisations is pronounced and exigent.**

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Lieutenant General (Dr) Shantanu Dayal, PVSM, UYSM, AVSM, SM, VSM (Retd), an alumnus of National Defence Academy, Pune was commissioned in the Garhwal Rifles in 1984. He has participated in all major operations undertaken by the Indian Army till 2022, when he superannuated as the Deputy Chief of the Army Staff. He commanded a Corps on the Northern Borders during the Galwan crisis and a division on the Line of Control after the surgical strikes. After a brief stint as Chairman Arunachal Pradesh Public Service Commission, he is now working as an Advisor in the defence industry sector.

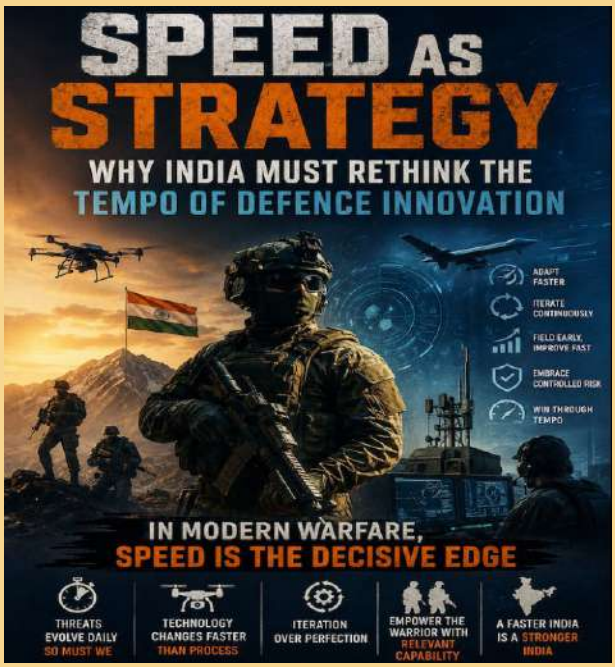
Lieutenant General (Dr) Shantanu Dayal

CAPITAL DEFENCE PROCUREMENTS IN THE INDIAN ARMY

A PULSE CHECK

"Innovation and indigenisation are important components, which are central to a strong and long-standing cooperation among the Armed Forces, Industry, R&D establishments and academia. This collaboration is needed to achieve **'Atmanirbharta'** in defence and the overall goal of safety, security and holistic development of the Nation."

- Raksha Mantri Shri Rajnath Singh[1]



(From Lt Gen Ashok Bhim Shivane, PVSM, AVSM, VSM (Retd)'s LinkedIn Post)

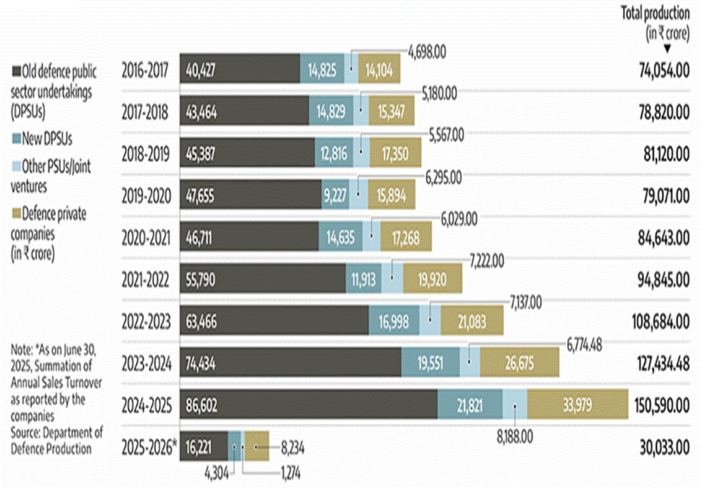
Backdrop

Capital procurements of the Army have always been a closely followed subject, directly impacting the functional efficiency of the potent Indian Army and providing the tools to prosecute and deter war. The Indian Army has come a long way to kit itself to remain in step, if not ahead in the journey to be a deterrent fighting force; ***Operation Sindoor*** *is testimony to this.* ***India has taken bold steps to ensure Atmanirbharta and bolster defence exports*** and done admirably till date.

The Chief of Defence Staff (CDS) General Anil Chauhan[3] describes the journey to achieving *Atmanirbharta* in defence manufacturing, by underlining the need for reform in key three pillars - ***Research & Development (R&D), Trials & Testing*** and ***Serial production,*** for steady progress towards indigenisation and innovation.

Defence procurement is currently governed by Defence Acquisition Procedure (DAP) 2020; the *detailed process laid down ensures that only the right equipment is procured*, but as Voltaire stated, ***"The perfect is the enemy of the good."***[4] The fastest procurements with minimal delays, takes three to five years. Emergency Procurements have demonstrated shortened procedures to maintain operational readiness, proving the point that standard procedures take too long.

Indian Defence Production Doubles in Nine Years (INR crore)



Source: Business Standard Blueprint (2026).

Note: DPSU = defence public sector undertaking; PSU = public sector undertaking.

Source: Bhagwati, J. & Sabharwal, A. (2026), ***Strategic considerations and India's defence manufacturing sector*** **(CSEP Working Paper 118)** [2]

[1] *General Anil Chauhan, Ready, Relevant and Resurgent – A blueprint for the transformation of India's military, ISBN 978-81-984458-6-5, Pentagon Press LLP, 2025, pp 117.*

[2] *Bhagwati, J. & Sabharwal, A. (2026). Strategic considerations and India's defence manufacturing sector (CSEP Working Paper 118). Centre for Social and Economic Progress. https://csep.org/working-paper/strategic-considerations-and-indias-defence-manufacturing-sector/.*

[3] *General Anil Chauhan, Ready, Relevant and Resurgent – A blueprint for the transformation of India's military, Op cit., pp 112.*

[4] *https://www.heartsandminds.org/inspire/perfectionism.*

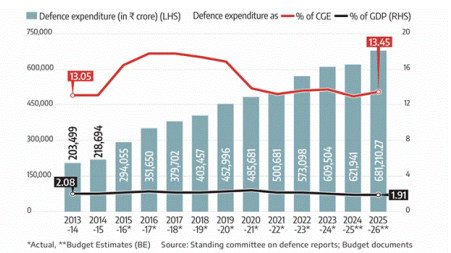
Challenges

Inadequate budgetary allocation tops the list with just ***27% for capital expenditure including committed liabilities,*** given the rising pension bill and overall reduction in percentage GDP allocation. The 15th Finance Commission (2020) recommended drastic steps including establishment of non-lapsable Modernisation Fund of Rs 1.53 lakh crores and monetisation of defence lands[5]. ***Bureaucratic delays coupled with inflexible procedures*** and constrained cash flows, especially for Micro, Small and Medium Enterprises (MSMEs) and smaller players, and further beset ***with numerous complaints and inquiries,*** hinder the process. Defence production has not grown significantly, with the domestic share barely increasing since 2014-15, primarily because India ***lacks the technological depth to design and manufacture major systems, critical parts, components, and raw materials,*** which are eventually imported.

An unstated informal concern for manufacturers is that equipment requirements are not evenly paced, resulting in ***production lines falling into disuse*** for ***two or three decades between orders,*** which too are not assured. Also, the concept of winner takes it all, whilst the other competing agencies have to absorb the high costs of participation.

The **Draft 'DAP 2026'** [7] has been released to seek comments and incorporates significant changes. Jointness, *Atmanirbharta* and Innovation are the keystones, reflected in the doctrinal shift

Defence Expenditure Share in Gross Domestic Product and Central Government Expenditure

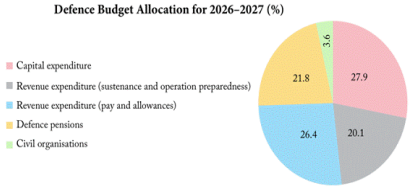


*Actual, **Budget Estimates (BE) Source: Standing committee on defence reports; Budget documents

Source: Business Standard Blueprint (2026).

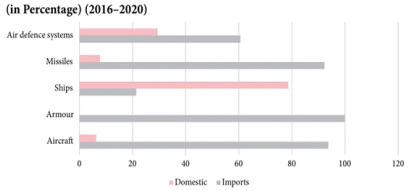
Note: CGE = central government expenditure; BE = budget estimate.

Defence Budget Allocation for 2026–2027 (%)



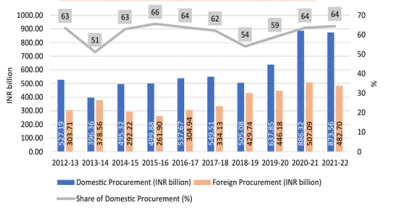
Source: Press Information Bureau (2026).

India's Domestic vs Imported Share of Arms Procurement by Category (in Percentage) (2016–2020)



Source: Stockholm International Peace Research Institute (n.d.).

Capital Acquisition by Armed Forces (Domestic and Foreign)



Source: Extrapolated from Standing Committee on Defence, Demands for Grants 2023-24.[26]

Source: Laxman Kumar Behera, India's Defence Industry: Achievements and Challenges, ORF Issue Brief No. 708 *

Source: Bhagwati, J. & Sabharwal, A. (2026), ***Strategic considerations and India's defence manufacturing sector*** **(CSEP Working Paper 118)** *less **

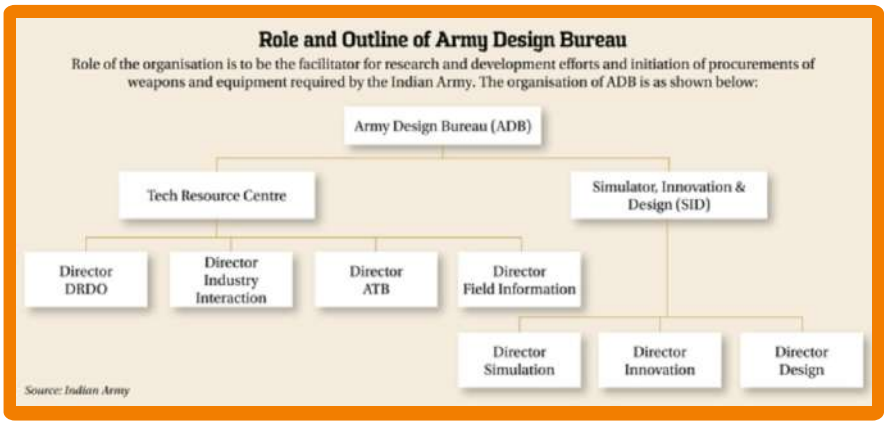
What's New?

[6]

[5] *Bhagwati, J. & Sabharwal, A. (2026). Strategic considerations and India's defence manufacturing sector (CSEP Working Paper 118), Op cit.*

[6] *https://www.linkedin.com/posts/harjeetsinghsaini-strategy_india-just-rewrote-the-rules-of-defence-procurement-share-7451950002396119040-Yhyq?utm_source=social_share_send&utm_medium=android_app&rcm=ACoAAFwBFNsBz8ZXoeM3kQbBbDn0moqgKHEyXGc&utm_campaign=gmail and https://www.linkedin. com/posts/harjeetsinghsaini-strategy_dap2026-atmanir bharbharat-defencestrategy-ugcPost-745434037 7760673792-R3BP?utm_source=social_share_ send&utm_medium= android_app&rcm=ACoAAFwBFNsBz8ZXoeM3kQbBbDn0moqgKHEyXGc&utm_campaign=gmail.*

[7] *DEFENCE ACQUISITION PROCEDURE 2026, https://mod.gov.in/sites/default/files/DRAFT-DAP-2026_0.pdf.*



from 'Made in India,' to ***'Owned by India';*** prioritising ***Co-development and Intellectual Property (IP) Ownership*** with retention of source codes, critical design data, and upgrade authority within Indian entities. Some important changes are outlined hereafter.

- **Compensation for Cost of Trials.** 10% of the cost or Rs 10 crores, whichever is lesser, to be paid to all participants who successfully clear trials[8].
- **Absorption of Technological Infusion during Procurement Delay.** Latest specifications can be offered at the Cost Negotiation stage, to cater for technological improvements, given the long process duration[9].
- **Exploitation before Deciding Bulk Procurement.** Low Cost Capital Acquisition allow the Services to buy limited quantities for exploitation, with follow-up for bulk procurement if found fit[10].
- **Long Term Bulk Acquisition (LTBA).** Acquisition of capital intensive, hi-tech and complex equipment, systems, platforms and ammunition, in multiple tranches, with progressive indigenisation and upgrades, allow for a stable long-term procurement cycle to evolve[11] while addressing the production line sustainability concerns.
- **Technology Assessment.** Technology Maturity levels are defined with Technical Readiness levels (TRLs) spelt out from 1 to 9[12] - establishing technology as an important metric.
- **Quality Assurance.** Service Headquarters can choose the methodology, moving from '*Government Inspection*' to ***'Self-certification & third party certification'***[13].
- **iDEX (Innovations for Defence Excellence) as "Mainstream Acquisition Pathway".** iDex, a key component of meaningful R&D, empowers acquisition from Make, Design & Development projects, integrating young talent into defence manufacturing[14].

Pulse Check

Process Intent. The Defence Procurement Process came into being essentially as a fallout of the *Tehelka case*, ***deeply committed to put in place a process that would be corruption free and air-tight***, primarily based on ***'total mistrust'***, *involving a large number of processing agencies and numerous checks and balances.* While the intent is well understood, it inevitably leads to time consuming bureaucratic processes and takes away flexibility in fast changing technology cycles. A revamp towards a ***Trust-based process with punitive measures*** for the bad players would be logical.

Spiral Development. The original concept of spiral development envisaged introduction of smaller numbers of equipment as Mark I for exploitation and subsequently better versions would progressively come in with changes as Mark II and so on; the ***key was exploitation to incorporate continuous incremental improvements***[15] carried out by the same production agency. *DAP describes spiral development, the development process till introduction*[16] leading to freezing specifications at procurement, with the ***AHSP (Authorised Holder of Sealed Particulars) or Directorate General of Quality Assurance (DGQA)*** holding the designs and blueprints. Any meaningful improvement triggers the complete process afresh, ***a time and capability penalty generally unacceptable.*** With open competition for all new equipment, incremental changes for better operational capabilities remain unavailable procedurally. With Make and Own in India, ***incorporating improvements should be part of the process with no AHSP.***

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[8] *Ibid., Chapter II, Para 20, pp 29.*
[9] *Ibid., Chapter II, Para 72, pp 40.*
[10] *Ibid., Chapter VII, pp 81-83.*
[11] *Ibid., Chapter I, Para 19.1, pp 8-9.*
[12] *Ibid., Chapter I, Para 21 and 22, pp 10-14.*
[13] *Ibid., Chapter II, Para 22, pp 30.*
[14] *Ibid., Chapter IV, pp 61-66.*
[15] *Trevor Taylor and Dr Linus Terhorst, Five Innovations that Make Defence Procurement Faster and Cut Cost and Risk, 20 November 2024, Royal United Services Institute for Defence and Security Studies (RUSI), https://www.rusi.org/explore-our-research/publications/commentary/five-innovations-make-defence-procurement-faster-and-cut-cost-and-risk.*
[16] *DEFENCE ACQUISITION PROCEDURE 2026, Op cit., Chapter V, Para 6, pp 69.*

Research & Development (R&D). Gross Expenditure on R&D (GERD) doubled from 2010-11 to 2020-21, but remains well below 1% of GDP against developed countries spending more than 2% (USA 3% and China 2.4%)[17]. Certain recommendations to bridge the gap are:-

- **Defence Research and Development Organisation (DRDO)** needs to refocus and reorient towards niche technologies[18], for which *restructuring is imperative*.
- **Technology Development Fund**[19] managed jointly between DRDO and Invest India is a good step. *Performance-based spending outcomes however, need close monitoring*.
- **R&D by the Army** needs to go beyond Army Design Bureau's problem statements[20]. Hands on approach, modelled on Indian Navy's *Weapons & Electronic Systems Engineering Establishment (WESEE),* would yield results for in-house developments, upgrades and integration.
- **iDEX** in the current form finds product solutions with the *IPR remaining with the manufacturer* - an equipment solution by a small company, rather than R&D; *the process framework will need to deliver mainstream R&D end-result, building on the proposed mandate in DAP 2026*.
- **Collaborative R&D ~ No Frittering Away of Resources.** DRDO, Services, Indian Institutes of Technology (IITs) & Academia, Defence Public Sector Undertakings (DPSUs) and private industry are all investing into R&D independently, risking duplication and wasteful administrative infrastructure overheads. A centrally managed, transparent collaborative mechanism for objective based research, including ***management of Intellectual Property rights***, for coordination and sharing, is essential to ***boost R&D output***.
- **Establishing Defence Technology Parks** in the planned Defence corridors, with co-located army units for user inputs, would enable better evolution, stage-wise testing and time saving, through coordinated R&D, technical infrastructure, skilled-manpower and monetary-support.

Whole of Nation Approach in Product Development. The current system is a typical buyer-seller relationship - *the Army issues Qualitative Requirements (QRs) and the industry meets them, after being evaluated through stringent trials.* A c***onsultative approach in product development and outcome based priority*** is the need of the hour. The Troika –DPSUs and industry at one vertex, DRDO and academia at the second vertex and the Services at the third, have to collaborate seamlessly. This **will need a mind-set change for the Indian Army**. Government, industry and the Army must come together, for ***collaborative development with a clearly defined functional ethos to succeed.***

Project based Approach. The current Army approach is **process based,** with specialists working on assigned sections, with over three year overlapped tenures. The Navy and the Air Force follow a project approach ~ one section covers all aspects of procurement for a single equipment type with longer tenures, officers often returning after mandatory tenures outside. This is in principle akin to the Project Execution Office (PEO) system followed by the US military. The project based system functions with greater trust, responsibility and accountability; if adopted by the Army, duplication by Army Line Directorates would reduce.

Flexibility, Progressive Adoption and Scalability. Strategic autonomy lies in self-reliance, but 100% indigenous development may not always be feasible; collaboration, as successfully carried out for BrahMos must continue. ***Systemic flexibility*** to meet desired targets in the defined timelines economically, needs to be inbuilt in the process.

L1T1 System. With Tech Readiness levels now defined in DAP 2026, the **L1T1 system** needs to be adopted. The Government of India has already allowed Quality cum Cost Based Selection **(QCBS)** for Consultancy Services and Works; *applying this to defence procurement is now essential*. The **Best Value approach**[21], considering additional value like better post-contract support and future upgrades along with the bid price, ensures ***we get the best deal***, though not necessarily the cheapest. Due credit should be given to equipment offering additional operationally-useful capabilities beyond the stated QRs.

Quality Assurance (QA) and Testing. The move of DAP 2026 towards self-certification and third party QA is a welcome step. The Vijay Kelkar Committee (2005) recommendation that ***DGQA should be placed under the respective Service Chiefs*** is

[17] *General Anil Chauhan, Ready, Relevant and Resurgent – A blueprint for the transformation of India's military, Op cit., pp 127.*
[18] *Ibid , pp 112 and 127.*
[19] *Ibid, pp 124.*
[20] *Ibid, pp123.*
[21] *Vice Admiral SN Ghormade (Retd), Optimising Defence Acquisition Procedure, 30 July 2023, Indian Aerospace and Defence Bulletin, https://www.iadb.in/2023/07/30/optimising-defence-acquisition-procedure/.*

even more relevant in light of theatreisation, ensuring that responsibility for equipment rests fully with the Services, resolving functional issues of delays, prioritisation and poor HR manning. Precedence exists for this in Naval Armaments. The CDS has flagged the lack of a robust trial & testing infrastructure ecosystem, suggesting an independent umbrella agency for testing and certification as per international standards, especially for exports, through the ***Defence Testing Infrastructure Scheme (DTIS)***[22]**.** Care in implementation is essential to ensure ease of business and authenticity, without adding another layer of smothering bureaucracy.

AMC and Maintenance Support. The aim is to make India an ***'MRO Hub for the World'*** as average life cycle costs are three to four times that of acquisition[23]. Shifting costs from Capital towards Revenue with enhanced allocations, does not resolve the issue. The ***repair cover*** and the ***life cycle sustenance*** for ***new generation equipment needs a complete de novo look for shared responsibility***, especially when the equipment is Made and Owned in India.

Defence Exports Push: National Focus. ***Exports have a deep connection to the sustainability of the industry, keeping production lines running.*** The draft DAP 2026 speaks of ***'exportability'*** as a desirable QR. ***"India's defence exports have grown 34-fold over the last decade",*** declared the Hon'ble Raksha Mantri Rajnath Singh[24]. To meet the target of Rs 50,000 crores of defence exports by 2029, close coordination between DPSUs (Old & new), Private defence industry, Department of Defence Production (DDP) and the Armed Forces is imperative; this requires ***greater deliberation to arrive at an implementable strategy and plan, duly incorporated in the procedure.***

Role of the Army in the Defence Industry. The role of the Army needs to change to ***an involved partner*** to adapt to the new paradigm of rapid changes in technology and warfighting, especially in product development, manufacture, upgrades and exports.

Final Thought

"Success is the result of perfection, hard work, learning from failure, loyalty, and persistence." - Colin Powell[25]

The multiplicity of the agencies involved in acquisition, each following a different chain of command, absence of an overarching procurement organisation managed by trained professionals and absence of outcome-oriented financially viable acquisition plans, have been the bane of defence procurement; these issues were beyond the remit of the Committee which prepared the draft DAP 2026, but in the long run, Ministry of Defence needs to address issues to improve the efficacy of the acquisition system.

The US ***Streamlining Procurement for Effective Execution and Delivery (SPEED)*** **Act, H.R. 3838 (2025)** prioritises speed, adaptability and outcome-oriented processes, compressing deployment timelines to 90-150 days through agile governance and early prototyping, embedding DevSecOps, innovation, and speed as systemic values rather than exceptions. For India, the challenge lies in adopting SPEED's core principles - ***iterative design, empowered governance, digital-first oversight and continuous evolution,*** while preserving the safeguards essential to public accountability[26] . ***Perhaps, it is time for a new script to enable the defence industry along with the associated organisations to realise the dream set out by the Hon'ble Prime Minister.***

A Revolution in Defence Procurement with a de-novo review is essential. The time for reforms in thought, process, perception and action is now!

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[22] *General Anil Chauhan, Ready, Relevant and Resurgent – A blueprint for the transformation of India's military, Op cit., pp 112 and 128.*

[23] *Ibid, pp 115-116.*

[24] *General Anil Chauhan, Ready, Relevant and Resurgent II -Shaping a future ready force, Op cit., pp 199.*

[25] *https://in.indeed.com/career-advice/career-development/quotes-about-success*

[26] *Cdr Chaitan Chouhan, Towards Effective Defence Procurement: Lessons from the US SPEED Act 2025, 07 November 2025, Manohar Parrikar Institute for Defence Studies and Analyses (IDSA), https://idsa.in/publisher/issuebrief/towards-effective-defence-procurement.*

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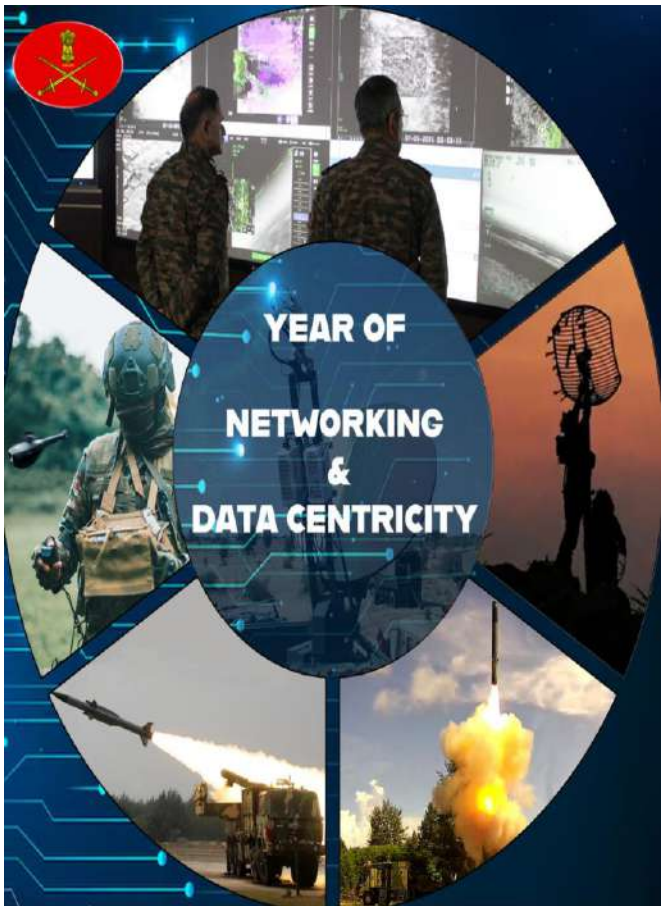
Major General Vivek Venkatraman



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ACQUISITIONS AND FORCE STRUCTURING

TAKEAWAYS FOR THE INDIAN ARMY

The contemporary battlefield, shaped by persistent surveillance, stand-off engagements, and rapid decision cycles, dictates that the Indian Army juxtapose platform centric modernisation with integrated capability ecosystems. The emphasis must be on networked systems that compress the sensor to shooter loop, enhance survivability, and sustain high operational tempo across dispersed battlefields, particularly along the Northern and Western borders. This article elaborates that **acquisitions should not be viewed as isolated procurements but as interlocking components of a digitally enabled, multi-domain force.**

"If I had asked people what they wanted, they would have said faster horses" - Henry Ford

Contextual Reference

As recent wars indicate, the use of military force remains a potent tool for protecting and furthering national interests in State vs State conflicts. Today, the emergent pattern of force application in near peer and asymmetric conflicts alike, is characterised by controlled effects delivered at ranges beyond conventional front lines and at tempos dominated by autonomous or semi-autonomous precision systems. Combatants aim to inflict operationally relevant effects using missiles, rockets, artillery, loitering munitions, and drones **rather than attempting concentrated combined arms ground offensives into the enemy's depth.** Thus, increasingly, state-on-state conflicts are settling into what may be termed the **"mid-spectrum":** a domain characterised by stand-off engagements, precision strikes, information warfare, and calibrated escalation below the threshold of full-scale conventional war[1].

The standoff paradigm has profound implications across deterrence, acquisitions, force structuring, doctrine, and the industrial base. From an organisational and operational perspective, the critical implications for the Indian Army in the backdrop of this new paradigm of warfighting are primarily in the technology and acquisitions, and by extension, force structuring domains. In this emerging paradigm, the Indian Army would need to comprehensively relook its force structuring, acquisition priorities and **operational / doctrinal concepts. In this context, operational imperatives below the nuclear threshold are threefold:**

- Dominate the tactical battle space through information superiority, kinetic capability, dispersed application of force and defensive safeguards to impose significant damage on a weaker adversary and deter a stronger adversary through a discernible ability to impose costs.
- Win stand-off exchanges through precision, reach, volume and scalability of platforms, while denying the effective use of the same through layered and effective defensive systems.
- Retain decisive capability for high-intensity combined arms warfare to cater for an escalatory spiral.

The Indian Army policy is reflected in its ongoing **"Decade**

[1] *Technology and the New Paradigm of Deterrence in the Indian Sub-Continent by Major General Ravi Murugan (Retd), Medals and Ribbons, January 26.*

A picture of the front of a Elbit Hermes 900 UAV at display during FDAE 2024 (author TRTPUWU, courtesy commons.wikimedia.org)

of Transformation (2023–2032)" centred on jointness, force restructuring and technology infusion. The **central thesis of this decade of transformation can probably be construed as:**

"The Indian Army must evolve into a networked, modular, precision strike force capable of dominating the mid spectrum stand-off conflict, while retaining escalation dominance / deterrence for a full-intensity war."

Unmanned Autonomous Systems (UAS)

Unmanned systems are having a **revolutionary impact** on the battlefield. Whether it be Intelligence, Surveillance and Reconnaissance (ISR) or kinetic drones, operator controlled or autonomous, the availability of this resource at the lowest tactical sub-unit has changed situation awareness and destructive capability at the individual level. In effect, nearly every soldier will have unprecedented situation awareness with the ability to see well beyond line of sight and alongside, the means at his disposal to strike precisely and with maximum impact.

For the Indian Army, unmanned systems must form the **backbone of tactical and operational awareness**, as well as **precision engagement.** Towards this:

- At the company level, nano and micro ISR drones, along with First Person View (FPV) strike drones, will enable real time situational awareness and immediate precision strike capability in close combat, especially in complex terrain such as high altitude areas and urbanised sectors.
- At the battalion and brigade levels, tactical Unmanned Aerial Vehicles (UAVs) will provide broader surveillance coverage, target acquisition, and battle damage assessment, facilitating coordinated fires. Short range loitering munitions will add kinetic capability to influence the battlefield.
- At the corps level, Medium Altitude Long Endurance (MALE) UAVs will deliver persistent ISR, deep reconnaissance, and target tracking across the operational depth, with longer range loitering munitions providing kinetic influence.
- Loitering munitions need to be institutionalised as a core component of the indirect fires architecture. Tactical variants with ranges of 5–15 km could support battalion / brigade level engagements, while operational systems with 20–50 km reach will enable interdiction of enemy reserves and logistics nodes at the Division level. Additionally, one-way attack drones deployed for deep strike missions against high-value targets, offer a cost-effective complement to conventional missile systems.
- Interceptor drones as part of the counter UAS ecosystem (C-UAS) are providing a viable cost per kill and emerging as effective point defence response against adversary drone capabilities.

Sensor Dominance

The dominant technological challenge which is defining the battlespace is the proliferation, increasing sophistication, and multi-spectral nature of sensors in all domains. This trend is driven not only by advances in sensor technology, but also the enormous increases in compute, data-storage capacity, and network bandwidth, all of which have enabled post-processing of sensor data and multi-spectral sensor fusion to become common practice. The notion of one sensor being connected to one operator is being rendered obsolete by the effects of fusing returns from multiple sensors on a single platform using Artificial Intelligence (AI)[2].

The effectiveness of targeting is contingent upon robust sensing and data fusion for which, the Army requires:

- Multi-spectral sensor suites, encompassing electro-optical,

[2] *The Arms of the Future by Jack Watling, RUSI*

infrared, radar, and electronic intelligence, deployed across all echelons to ensure redundancy and resilience in contested environments.

- AI enabled data fusion engines processing inputs from diverse sensors, UAVs, ground radars, remote sensing satellite feeds, electronic intelligence systems, will generate actionable intelligence in near real time, thereby compressing the observe–orient–decide–act (OODA) loop.
- A distributed sensor grid, networked across formations, will enable a common operating picture and facilitate real time targeting. This is particularly critical for the Indian Army, where terrain induced fragmentation of battlespace can otherwise degrade situational awareness. The objective should be seamless integration from the tactical edge to higher headquarters (HQ), enabling faster and better decision making and precise targeting.
- Cyber resilience must be built in by design, with robust encryption, spectrum agility, and active cyber defence mechanisms to counter adversary intrusion and electronic attack.

Against the array of modern sensors that will permeate the future battlefield, achieving operational surprise by large combined arms arrays is doubtful. To achieve surprise, ground forces will need to disperse in smaller groups and be able to seek and destroy adversary stand-in sensors to create ambiguity, while using multiple measures to screen own signatures.

Networks

Networks carrying voice and data are the backbone of the informatised battlefield. The capability, fidelity, protection and resilience of these networks will decide whether the potentiality of network centric operations is leveraged. In essence, three networks become the communication architecture of warfighting. The first are bounded networks which bind tactical formations, with the identified structure being a mobile ad hoc network (MANET) connected by meshed radio links. These networks would be relatively low bandwidth, supporting voice, localised blue force tracking and low volumes of data.

The second network is a vertical integration of key sensors to the fire control HQ and from the fire control HQ to shooters. High bandwidth and low signature are critical. This system demands low latency. The third network structure is a command and control database containing orders, relevant data layers and information support to subordinate units, and unit situation reports. This network is to transmit finished products rather than raw data and therefore requires a comparatively low bandwidth [3].

A secure, high-bandwidth, communications architecture with built in redundancy, which seamlessly integrates satellite communications, terrestrial fibre, mobile ad hoc networks, and software defined radios will thus be the core of network centric operations. Given the challenges of high altitude areas along the Northern borders and dense electromagnetic environments on the Western front, the network would need to be self-healing, mesh-enabled, and capable of operating in degraded or denied conditions.

Interoperability across services will be essential, enabling real-time data exchange with the Air Force and Navy for joint targeting and airspace management. At the tactical edge, soldiers, platforms, sensors, and shooters must be digitally connected through a common operating picture, ensuring that information flows

[3] *Ibid*

Counter UAS graphic (Credit Indian Aerospace and Defence Bulletin, 28 January 2023)

Suryastra MLRS with cone-shaped mock-ups mounted on the missile transport-launch containers (Open source photo)

vertically and horizontally without latency induced friction. A Battlefield Management System (BMS) customised for the Indian Army thus, becomes an essential need.

Equally critical is the integration of advanced data management and security protocols within this networked ecosystem. In effect, the Indian Army's **network architecture should not merely connect the force but enable it to fight as a cohesive, adaptive, and information dominant system.**

Electronic Warfare (EW) Spectrum

The next major technology advantage is being driven by the development of a wide range of EW capabilities intended to blind, degrade and spoof sensors, and frustrate network centric warfare through denial of datalink and connectivity, in short, to deny the use of the Electro-Magnetic (EM) spectrum. Today, the **electromagnetic spectrum has become as critical on the battlefield as land, naval, air or space domains.**

Control of the electromagnetic spectrum will be decisive in future conflicts in the Indian sub-continent. At the divisional level, **tactical jammers** must be deployed to disrupt enemy communications, navigation systems, and drone operations. At the corps level, dedicated **EW companies** will be needed to conduct coordinated spectrum operations, including electronic attack, support and protection. In addition, **spectrum monitoring capabilities** must be enhanced to provide continuous awareness of adversary emissions. Offensive cyber capabilities, integrated with EW operations, will enable the Indian Army to degrade adversary command and control networks, thereby creating windows of opportunity for kinetic operations.

Shooters

Historically, artillery has been the primary killer throughout the era of industrial and manoeuvre warfare. The trends suggest that its importance and impact are likely to increase in future conflicts. The indirect fires critical to success on the battlefield can be identified as **155mm howitzers, Multiple Launch Rocket Systems (MLRS), long-range loitering munitions, short-range loitering munitions, Short and long-range ballistic and cruise missiles.** Thus, the availability and adequacy of these weapon systems will be an outcome deciding factor.

The Indian Army needs to prioritise the expansion and modernisation of 155 mm howitzer inventories, alongside MLRS capable of delivering precision effects at extended ranges. Cruise and ballistic missile capabilities should be integrated into land based strike doctrines to enable deep interdiction and deterrence, with accompanying organisational changes. The inclusion of long range loitering munitions and one way attack drones in the fires category provides flexibility in the options for engagement based on target profile and sensor data.

In addition, ammunition stocks to sustain prolonged high-intensity operations need to be catered for. This includes conventional artillery shells as well as advanced munitions such as sensor-fused and top-attack systems designed to defeat armoured targets. The integration of these munitions with real-time targeting data from UAVs and sensor networks will significantly enhance lethality. It is worth noting that the demand for ammunition in large scale conflicts remains high. In Ukraine, Russia was firing up to 6000 rounds per three km of targeted frontage per day during the height of its attack in the Donbas. Though precision reduces the number of rounds that must be fired for a given effect, most tactical simulations have found that mass remained essential.

Layered Defences and Survivability

As the battlefield becomes increasingly transparent, survivability will depend on a combination of active and passive measures. C-UAS

systems need to be deployed organically at all levels to protect troops, command posts, and critical infrastructure from enemy drone threats. This includes both kinetic and electronic countermeasures. The proliferation of un-crewed turrets should, with appropriate programming and ammunition types, enable combat units to have some organic C-UAS capability. With high speed interceptor drones becoming viable C-UAS options, kinetic counter measures to adversary drones now provide a range of options. EW adds perhaps the most effective response in targeting UAS. In the C-UAS calculus, the provision of hard kill capabilities with reasonable cost per kill, across the force for point defence, is a key planning requirement.

Short-range air defence systems require densities to provide layered protection against aerial threats to both shape the enemy and protect a dispersed force, particularly in the forward edge of the battlespace. Although dedicated medium and long range air defences are important, the distribution of short range air defence closes down the lanes by which enemy aircraft can approach high value targets.

Beyond these hardware requirements there is also a need for the distribution of a range of protective suites, from active protection systems on vehicles, to multispectral camouflage screens for vehicles and personnel, which are critical to survival on the emerging battlefield. These sub-tactical tools are vital in ensuring the staying power of armoured fighting vehicles and the survivability of infantry. Multispectral smoke, defensive lasers and other means of defeating precision-guided weapons increase the survivability of troops. Beyond survivability these measures have the effect of increasing the effort required for effective ISR and the volume of precision munitions that must be massed to achieve an effect.

Legacy Systems - Technological Sophistication

Simultaneous to the ushering in of new technology systems and platforms, the need for technology insertion in legacy systems assumes equal importance.

Armoured Platforms (Tanks and Fighting Vehicles). Modernisation of the Indian Army's armoured fleet must pivot toward survivability, adaptability, and reduced logistical burden rather than a continued escalation in platform weight. Advances in optics and fire control systems, and uncrewed turrets, will enhance first-round hit probability in both day and night conditions, while hybrid internal combustion–electric power packs can improve fuel efficiency, reduce thermal and acoustic signatures, and enable silent mobility in tactical situations. Open architecture design will be critical, allowing rapid integration of emerging subsystems such as improved sensors, communication suites, and protection systems without extensive redesign. Concurrently, breakthroughs in battery technology and material sciences, particularly in lightweight composites and advanced armour, offer the potential to offset the traditional trade-off between protection and mobility. Active protection systems and next generation ammunition, including programmable and top-attack munitions, will further increase lethality and survivability. Collectively, these developments are likely to disrupt the long-standing trend of increasingly heavy armoured platforms, enabling more agile and deployable forces suited to varied Indian terrain.

The Soldier as a System. The Army must conceptualise the infantry soldier as an integrated combat system, where lethality, protection, and situational awareness are seamlessly combined. This entails equipping soldiers with lighter, more effective rifles fitted with advanced optics, alongside wearable situational awareness devices that integrate battlefield data in real time. Renewable and portable power sources will be essential to sustain these systems without overburdening the soldier, while lightweight body armour must strike an optimal balance between protection and mobility. The integration of unmanned ground and aerial systems at the section and platoon level will significantly enhance reconnaissance, surveillance, and precision engagement capabilities. Manned– unmanned teaming (MUM-T), autonomous logistics convoys, and robotic *"section mules"* for load carriage will reduce physical strain and extend operational endurance. The cumulative effect will be to increase the survivability and combat effectiveness of smaller, highly agile teams operating in dispersed formations.

Battlefield Infrastructure. Battlefield infrastructure that enhances survivability and operational sustainability also needs to be developed. Pre-fabricated defensive structures can provide rapid fortification in forward areas, while advanced tunnelling equipment will be critical for creating protected logistics hubs, command posts, and troop shelters, particularly in high-threat environments along contested borders.

Battlefield Management System (Credit bel-india.in)

Organisational Integration and Restructuring - Operational and Tactical

Considering the ubiquity of surveillance and battlefield transparency, application of large combined arms formations over restricted frontages will come with exponentially high costs. From an operational perspective, **force application templates will need to change radically from existing industrial war metrics.** While de-centralisation and dispersion are terms that have been used over decades, **actual changes in force structuring and doctrinal templates** have been slow in coming.

With the formalisation of Integrated Battle Group (IBG) structures, albeit with limited applicability, certain planning parameters that should inform technology based organisational restructuring initiatives are:-

- In view of disputed borders both to the North and West, **occupying static defensive lines is a mandated need in the Indian security context.** Towards this, **existing division structures, which are intrinsically all arms, continue to have maximum relevance from a defensive stand point.** Therefore, **regular divisions having a defensive role** need to continue in the present form, with extensive restructuring in the ISR and organic interdiction capabilities.
- There is also a need to **re-look traditional tactical activities** undertaken by defensive formations, like extensive, across the front mine laying, and substitute these with remotely delivered precise laying capability in view of the battlefield transparency provided by ISR and remote smart mine laying capabilities using mine launch vectors. This will not only save effort and casualties but also reduce the enormous stocks of mines held in the inventory and destroyed periodically on culmination of shelf life.
- As the battlefield becomes increasingly transparent due to pervasive surveillance and sensor networks, force mobility and employment concepts must transition toward **smaller, dispersed teams** that are both operationally and administratively self-contained. **Offensive formations and mobile defensive reserves** will need to be restructured considering the vulnerability of force concentration, the need for dispersion, the likely spectrum of conflict and relatively shallow depth of offensives. It would make operational sense to **restructure all offensive formations and defensive reserves into IBGs,** with terrain specific organisations, and modular *'plug and play capability'* for dual tasked contingencies. Factoring the ability of networked architecture to draw on non-integral ISR feeds, EW support and indirect fire augmentation, when operating in the shadow of defensive divisions, IBGs would be able to **project nearly as much effect as a full sized division.** The application of multiple IBGs will continue to be controlled and coordinated by a Corps HQ as extant with Divisional HQs.

The **structural integration of drones in the Indian Army** is probably the most important operational challenge that needs to be undertaken on priority. **Introducing drone platoons in combat units** through internal restructuring provides flexibility and decentralised access to a potent resource for the contact battle. Organisationally, in addition to drone platoons at the unit level, the creation of **drone battalions at the division and IBG level,** with appropriate mix of ISR payloads, short range loitering munitions, logistic carriers and counter-UAS interceptors will provide the desired scale in the leveraging of this capability for shaping the contact battle. **Adding appropriate C-UAS capability, both kinetic and electronic, for point defence, at every unit**

and sub unit is an organisational need for preserving combat power and cohesion.

The **Surveillance and Target Acquisition regiments at Corps level** will need to be equipped with MALE UAVs, long range loitering munitions and soft kill C-UAS capability in keeping with the areas of influence and interest of a Corps. The organisation of the regiment will need to be re-structured to ensure a composite mix of multi-spectral sensors, UAS and loitering munitions addressing the operational depth for a holding corps and a leaner mobile structure for an offensive corps.

Raising of **four to six missile brigades holding a mix of cruise and ballistic missile units**, along with organic Air Defence, UAS and C-UAS capabilities is a necessity when viewed, both, from a high spectrum conventional war and mid spectrum stand-off exchange standpoint.

EW Companies at the Corps level for exploiting the EM spectrum and data communication networks that allow the seamless and secure sharing of data, Software defined radios and MANET at the tactical level, AI / Machine Learning backend processing capability are all essential requirements of an informatised battlefield. **Composition of combined arms** teams forming part of **divisions and IBGs** will accordingly need to be rethought to include distributed resources in the form of UAS (ISR and kinetic), Counter-UAS including unmanned ground platforms and EW and surveillance teams.

In addition to **tube artillery,** the use of **loitering munitions and sensor fused sub-munitions through MLRS are critical in the 'shooter'/ indirect fires ecosystem** for causing attrition and shaping the battle space. The architecture of the **fires cell** will need to incorporate inputs from the **sensor data processing cell** for both initial targeting and subsequent direction of fire. **Ammunition requirements** are likely to be far higher than being planned for. Stocking and resupply has to be reworked looking at the Russian experience where traditional resupply convoys were being destroyed using loitering munitions and rocket fire, leading to guns going dry.

With high attrition likely to be the norm, **Battlefield Damage Assessment and Repair** capabilities will lead to regeneration of combat capabilities by leveraging the potentiality of 3D printing of spares. Location and siting of Replenishment Points / Maintenance areas will need to be rethought. Medical support and casualty evacuation using custom drones available commercially will compress time lines and help navigate the complexities of contested battle spaces.

Conclusion

In sum, we don't have to envisage the impact of new technologies on the battlefield, it is staring us in our face. **What is needed is the evolution of concepts in adapting to their battlefield use and impact, converting these to doctrines and carrying out necessary organisational re-structuring, all in quick time.**

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Major General Ravi Murugan

MULTI DOMAIN VISION AND INTEGRATED EXECUTION

THE ARMY CHIEF CLEARS THE AIR

After over four decades serving the Indian Army, General Upendra Dwivedi, PVSM, AVSM, the current and 30th Chief of the Army Staff (COAS) is superannuating on 30 June 2026. The Editor had a freewheeling and futuristic chat with the tech-savvy and visionary Chief, discussing various aspects of modern warfare and how the Army is preparing for the operations of the coming decade. **A word about the Chief.**

General Upendra Dwivedi, flew a sortie together with the Air Chief in the indigenous LCA Tejas on 09 February 25 at Yelahanka, Bengaluru

An alumnus of Sainik School, Rewa and National Defence Academy, Pune, Dwivedi was commissioned into the 18th Battalion of the Jammu and Kashmir Rifles on 15 December 1984. He has had a balanced exposure of both Northern and Western Theatres. On 1 February 2022, Lieutenant General Upendra Dwivedi took over as the General Officer Commanding in Chief, Northern Command. Being a technology enthusiast, he worked towards enhancing the tech-threshold of all ranks in Northern Command and pushed for critical and emerging Technologies like big data analytics, Artificial Intelligence (AI), quantum and blockchain based solutions. He took charge of the Indian Army on 30 June 2024. He is married to Mrs. Sunita Dwivedi, a science graduate, who has been associated with Aarushi, an Institute for specially abled children, at Bhopal. The couple have two daughters who are working with NGOs.

Contemporary conflicts such as the Russia–Ukraine war and the recent West Asia conflicts have highlighted new technologies, new threats and the changing character of warfare. In this context, how is the Indian Army transforming its force structures, absorbing emerging technologies and strengthening jointness to remain future-ready?

We live in an era where the **world order is shifting rapidly** and conflicts across the globe are no longer distant events; they are **living laboratories of modern warfare,** offering lessons directly relevant to India's long and sensitive borders. Future wars will be fought simultaneously across **land, air, sea, space, cyber, electronic and cognitive domains,** in a **network-enabled environment** and with varying intensity. Drones now stalk armour columns, autonomous systems disrupt communications, precision fires reach deep targets and information campaigns shape outcomes even before the first shot is fired. In the Indian context, all generations of warfare are visible together, from **trench and manoeuvre warfare** to **hybrid, non-contact, technology-driven and AI-enabled warfare.** Our approach, therefore, must blend **modern technology with the timeless fundamentals of soldiering.**

Keeping these realities in view, the Indian Army is undertaking comprehensive transformation under the **Decade of Transformation 2023-2032.** The focus is not merely on induction of weapons and technologies, but on their **rapid and effective absorption** into fighting units. The **Future and Transformation Cell,** established in September 2024, is analysing the changing character, duration and technological dimensions of warfare and contributing to new concepts, structural recommendations and the conceptualisation of a **Futures Command.**

As far as force restructuring is concerned, the Army is progressing the **Integrated Battle Groups (IBGs)** and **All Arms Rudra Brigades** for rapid strikes, **Bhairav Battalions** for tactical-level special operations, **Shaktibaan Regiments and Divyastra Batteries** for long-range strike and surveillance and **Ashni Drone Platoons** to enhance **surveillance, lethality and precision**. **Jointness and integration** remain central, not only with the Navy and Air

Force, but also with ministries, Central Armed Police Forces (CAPFs), police, local administration and citizens. Even as we advance technologically, our transformation remains **soldier-centric**. Technology must empower the soldier, not the other way around. The aim is to build a **future-ready, technologically empowered and operationally agile Indian Army**.

In the past, many conflicts commenced with cross border skirmishes and attacks and escalated up the spectrum of conflict. Contact battles were a major part of warfighting. Of late, non-contact kinetic operations have become the preferred method to commence operations as witnessed in the US - Israel - Iran conflict and also during Operation SINDOOR in May 2025. Long range Vectors like missiles, rockets, drones striking deep into the enemy heartland possibly have greater effect vis-à-vis border battles, but they may not achieve a clear victory. Your comments please.

Recent conflicts have clearly shown that non-contact kinetic operations, long-range precision vectors, drones, rockets and missiles are now important instruments of modern warfare. They allow a force to strike deep, create operational and psychological impact, impose costs and shape the battlespace without immediately committing large formations into battle. **Operation SINDOOR** also demonstrated the value of swift, precise and measured action, where calibrated use of force can achieve **defined military and political objectives** while **controlling escalation**.

However, non-contact operations by themselves **do not replace the centrality of land domain**. Long-range vectors can degrade, disrupt and deter, but clear and enduring outcomes often require control of territory, domination of the operational environment and the ability to impose our will on the adversary. **The land domain continues to retain the currency of victory**, even though it is now far more complex due to drones, loitering munitions, Electronic Warfare (EW), integrated air defence and information warfare.

The future battlefield will not be defined by contact or non-contact operations alone, but by their integrated employment. The **Indian Army's focus** is on **building a multi-domain force** where sensors, shooters and protection systems are fused, long-range precision fires are integrated with manoeuvre and joint planning enables decisive outcomes. **Non-contact capabilities** will **shape** the battle, but trained, agile and **technology-enabled land forces** will remain **essential** to achieving clear military results.

Punitive responses after Uri, Pulwama and Pahalgam and more recently Operation SINDOOR, have conveyed a clear message to Pakistan, its proxies and terror sponsors. How does the Indian Army define this 'New Normal' in counter-terror operations and what doctrinal message does it convey for future action against terrorism and its sponsors?

Operation SINDOOR is a reflection of India's robust response to cross-border terrorism through a **proactive, decisive and integrated security strategy**, aligned with Prime Minister Narendra Modi's vision of a **secure and self-reliant India**. The operation reflected India's doctrine of **Zero Tolerance to Terrorism**. Our actions during **Operation SINDOOR** were **focused, measured and non-escalatory**, even as they conveyed a clear message of resolve.

The Indian Army defines the **New Normal** as a doctrine of **proactive engagement**, where the fight is taken to **the source of terrorism** rather than waiting for threats to manifest. This marks an unambiguous doctrinal shift in India's counter-terror response.

Prime Minister Modi met Defence Minister Rajnath Singh, National Security Advisor Ajit Doval, and the three service chiefs and the Chief of Defence Staff on 09 May 25 (Photo ANI)

Chief of the Army Staff General Upendra Dwivedi was the Chief Guest at the commissioning ceremony of INS Mahe held at the Mumbai Naval Dockyard, November 2025

Any **act of terrorism** will be considered **an act of war** and will be responded to decisively. There will be **no distinction** between the **terrorist and the terror sponsor**. India's response will not be constrained by sabre-rattling or nuclear blackmail.

As the Indian Army navigates an era of rapid modernisation, evolving doctrines and emerging contours of fifth-generation warfare, how do you assess the operational lessons of Operation SINDOOR, particularly in terms of joint and multi-domain operations, precision weapons, technological integration and capability development for future conflicts?

Operation SINDOOR's greatest legacy is its affirmation that **integrated, multi-domain and technology-enabled operations** are now the decisive template for the future battlefield. It was a defining moment which demonstrated the Indian Armed Forces' ability to deliver **swift, precise and strategically coherent military outcomes** in a compressed timeframe. Our assessment is that the operation validated **integrated planning, real-time intelligence fusion and decisive leadership** at all levels. It also reaffirmed that future conflicts are likely to be **short, intense and technology-driven**, requiring rapid mobilisation, seamless logistics and compressed decision cycles.

The lessons of **Operation SINDOOR** have reinforced the importance of **synergy, precision and rapid decision-making**. Even while conducting focused operations, the Army ensured that its posture on other fronts remained stable and deterrent. The performance of **drones and loitering munitions** validated our indigenous initiatives and gave commanders confidence to rely on **home-grown solutions** in complex operational environments. At the same time, the challenges are increasing and we need to hasten our journey towards **self-reliance**, invest more in **Research & Development (R&D)**, enhance the quality of weapons and cutting-edge technologies and ensure timely delivery of equipment. **EW and counter-Unmanned Aerial Systems (UAS) measures** must also evolve in tandem.

The role of **joint and multi-domain operations** was central to the overall planning and conduct of the operation. **Land, air, cyber and EW capabilities** worked synchronously, creating an operational advantage at critical moments. **Precision weapons** further enhanced this synergy by enabling high-impact results with minimal collateral damage. **Training, SOPs and battlefield integration of unmanned platforms** will therefore remain crucial in future conflicts.

In the backdrop of Operation SINDOOR and persistent grey-zone and hybrid threats, how is the Indian Army balancing its internal and external security priorities to maintain operational dominance across both borders, J&K, the North East and other sub-conventional domains?

The **two-and-a-half front challenge** is well recognised and the Indian Army remains fully prepared to meet **simultaneous threats without dilution of focus**. As stated by the **Hon'ble Raksha Mantri** during Ran Samwad at Army War College, Mhow on 27 August 2025, the Indian Armed Forces must be prepared for every security challenge, from sudden short conflicts to wars that could stretch as long as five years. Accordingly, our approach is guided by **readiness, flexibility, adaptability** and a **Whole-of-Nation approach**.

We maintain a calibrated balance between **internal and external security priorities**. Safeguarding national sovereignty remains our foremost responsibility and our deployment posture, surveillance architecture, logistics systems and operational readiness remain **robust, responsive and fully prepared** for any contingency. New structures and technology-empowered forces such as **Rudra Brigades, Shaktibaan Regiments, Divyastra Batteries, Ashni Platoons and Bhairav Battalions** are strengthening our capability to respond decisively across operational scenarios.

Our internal security commitments are being handled through **intelligence-driven operations** in coordination with **CAPFs, Central**

and State agencies. The situation in the North East remains stable with positive indicators and the lowest violence parameters are testimony to this. Modernisation efforts are also incorporating **niche technologies at the lowest level of the battlefield**. Plans are in place to respond decisively across contingencies, while ensuring that both borders remain secure and internal stability is maintained with **professionalism and resolve**.

With Integrated Theatre Commands being progressed as a major reform for the Armed Forces, how is the Indian Army integrating into this process, what benefits will theatreisation bring and what key structural, doctrinal and institutional issues need to be resolved to ensure seamless jointness and interoperability among the three Services?

Theatreisation is a necessity for the Indian Armed Forces to address emerging threats and fight future wars in the Indian context. We are approaching Theatre Commands as **joint warfighting structures**, not as a single-Service initiative. Army officers are embedded in core planning groups, studies and working panels examining **command and control, areas of responsibility, logistics, communications and HR policies**. Internally, the Army has begun rationalising formations, streamlining operational aspects and aligning logistics, communications, doctrine, training and HR structures so that formations can integrate smoothly once Theatre Commands are notified.

Theatre Commands will provide **unity of command, unity of effort and single-point responsibility** in a defined theatre. They will enable better utilisation of national combat power by pooling **sensors, shooters and logistics** across Services, reducing duplication and improving speed of decision-making. Future conflicts will be **short-cycle, high-intensity and multi-domain**, with space, cyber, information and EW fused with land, sea and air combat. Theatre Commands, supported by integrated networks and joint targeting processes, will enable the Armed Forces to **see together, decide together and act together**. Progress has also been made in joint exercises, doctrine publications, common training modules, cross-posting of officers, joint capability development, common Qualitative Requirements (QRs) and shared logistics and maintenance infrastructure.

At the same time, this is a deep structural reform and must be addressed methodically. Each Service has distinct operational philosophies, doctrines and resource structures evolved over decades. The key challenges include getting the theatre design right, preserving Service expertise while ensuring **joint primacy**, harmonising doctrines, establishing clear command and control mechanisms, ensuring interoperable communication and data networks, compatible equipment, integrated logistics chains and standardised administrative policies. The most important shift is **cultural and organisational**: moving from Service-centric planning to **theatre-centric and mission-centric joint planning**. The direction is clear and irreversible. The future of Indian warfighting is **joint, integrated and theatreised** and the Indian Army is fully on board to ensure that this reform strengthens operational readiness and makes the Armed Forces more agile, lethal and prepared for future threats.

You have laid significant emphasis on technology adoption in the Indian Army. What steps are being taken in areas such as AI, Quantum technologies, EW and network-centric systems and how is collaboration with industry, start-ups, academia and national institutions enabling faster absorption?

The Indian Army's approach to technology is clear. We do not adopt technology merely because it is

Media briefing by Army Chief on the eve of Army Day 2026

Chief of Army Staff General Upendra Dwivedi felicitates a veteran achiever during a ceremony in New Delhi on Wednesday, June 10, 2026

available; we are absorbing it where it is **enhancing operational effectiveness**, improving **commander's decision-making** and **empowering the soldier** at the cutting edge. This is aligned with the Hon'ble Prime Minister's focus on **JAI - Jointness, Atmanirbharta and Innovation**. AI, secure communications, drones, counter-drone systems, EW and network-centric systems are being pursued to improve **speed, precision, protection and decision-making**.

AI is a major focus area. We are working with national platforms such as **NITI Aayog's Frontier Tech Hubs, India AI Mission, Defence AI Council and Defence AI Project Agency** to build sovereign AI capabilities. Within the Army, the **Army AI Research and Incubation Centre** is progressing projects in AI-enabled surveillance, aerial object detection, security systems, avalanche forecasting, enemy pattern recognition, drone-based mine detection, war-gaming and UAV-based surveillance. The establishment of **16 technology clusters** is helping link operational requirements with innovation.

The larger effort is to create an ecosystem where the **Army, industry, start-ups, academia and national institutions** work together with speed and purpose. Initiatives such as **iDEX ADITI, the Indian Army Internship Programme, AI-in-a-box solutions and sensor-shooter integration** are helping convert ideas into field capabilities. In Quantum technologies, the focus is on **secure communications**.

The aim is clear, technology must not remain confined to trials or induction alone; it must be **absorbed**, **fielded** and **effectively employed** to deliver **operational advantage** at the cutting edge.

The Indian Army has declared 2026-27 as the 'Year of Networking and Data Centricity', carrying forward the momentum of the Years of Technology Absorption. How will this transition towards data-driven, network-enabled and AI-assisted operations enhance decision-making and operational effectiveness across various levels of command?

The momentum of the **Years of Technology Absorption** will continue in **2026-27** under the overall theme of the **Decade of Transformation**. While technology absorption was about moving from adoption to integration by embedding new technologies into actual functioning, the next logical step is to connect these capabilities into a unified system. Accordingly, **2026-27 will be observed as the Year of Networking and Data Centricity**, with the aim of making the Indian Army **data-driven, network-enabled and fully integrated**.

This effort rests on three interlinked domains: **Data, Networks and Institutional and Workforce Networking**. **First,** Data will be treated as a **strategic resource** through unified data architecture, capturing inputs from sensors, platforms, units and Headquarters to provide a single and accurate operational picture. Big Data will facilitate indigenous training and refinement of AI, enabling better prediction and decision support. **AI-enabled decision support** will speed up decision cycles, strengthen commander decision advantage and support **smart kill-chain employment**. Forward-deployed edge data centres will improve redundancy and shorten the kill chain, while curated data will make logistics management and maintenance cycles faster, automated and more efficient.

The **second domain** is **secure, resilient and interoperable networks**, connecting platforms, sensors and users with reliable last-mile connectivity. AI-assisted network management will optimise bandwidth and improve redundancy in contested or degraded environments, while quantum encryption will prepare the Army for the era of quantum computing.

The third domain, **institutional and workforce networking**, will connect people, ideas and organisations within the Army, with the other Services, national agencies, veterans, industry and friendly nations. This will support aligned planning, seamless execution, transition to

Integrated Theatre Commands, a unified national effort, stronger *Atmanirbharta* and a coherent national narrative. The implementation plan is built around a **two-year framework with six-monthly objectives**, each led by a three-star General for accountability and focused execution.

Cognitive warfare is now an important domain of multi-domain operations. In the context of Operation SINDOOR and the growing role of information warfare, perception management and social media in modern conflicts, what measures has the Indian Army adopted to strengthen its capabilities in this domain? How can the Army harness media and social media effectively while avoiding negative fallouts?

Cognitive warfare and narrative management are now an **essential part of modern conflict**. **Operation SINDOOR** reinforced that credibility, consistency and speed are critical in the information domain. Any information put out by the Army must be credible, calibrated and aligned with the larger national narrative. Equally, there can be no vacuum in the cognitive space, as misinformation and negative narratives move very fast and can create avoidable confusion.

During **Operation SINDOOR**, the Indian Army took deliberate measures to prevent unauthorised or fragmented messaging. After 22 April, social media handles facing the Western Front were closed down to avoid multiple versions being attributed to different formations. **ADG Strategic Communication** was designated as the single source of truth, ensuring coordinated and responsible information release. Institutional mechanisms have also been strengthened through **Information Operations Groups** and **Information Operations Detachments** up to Corps Headquarters. A **Psychological Defence Division** has also been established to monitor the information environment on a 24x7 basis and protect serving personnel, veterans and dependents from hostile narratives.

This effort follows a **Whole-of-Nation approach**. During **Operation SINDOOR**, a central cell with representatives from various Ministries countered fake news and disseminated correct information. The Army also worked with the Ministry of Information and Broadcasting and MeitY to block hostile URLs, YouTube channels and social media handles when required. The Army's approach is not to avoid media, but to partner with it responsibly, credibly and through authorised channels. **Operation SINDOOR** showed that proactive, centralised and credible communication can shape perception effectively, as reflected in the wide traction received by the **"Justice Served: Operation SINDOOR"** message.

The Indian Army has operationalized Integrated Battle Groups (IBGs), Divyastra Drone Batteries, Command Cyber Operations Wings, among others. You have espoused the need for a new command culture where leaders *"command technology rather than merely operate it"* to ensure decision advantage. What changes would you like to additionally see in officer training and professional military education to prepare our leaders for future operations?

Future operations require officers who are **tactically sound, technologically fluent and able to adapt technology** without losing sight of the fundamentals of warfare. In the Indian context, leaders must understand the basics of **all generations of warfare**, from conventional and contact operations to hybrid, non-contact, cyber, electronic and cognitive domains, while appreciating the peculiarities of the Indian Army's deployment patterns, terrain conditions and operational responsibilities.

As **IBGs, Divyastra Batteries and Command Cyber Operations Wings** become part of our operational architecture, the focus is shifting from merely operating platforms to **integrating technology into combat decision-making**. The future battlefield will be shaped by a **systems-of-systems approach**, where Intelligence, Surveillance and Reconnaissance (ISR), drones, counter-drone systems, cyber, EW, long-range precision fires, logistics and command-and-control systems function as one integrated capability.

We are therefore graduating our officer training and professional military education to prepare leaders for this transition. Professional military education is being oriented towards **multi-domain operations, AI-assisted decision-making, sensor-shooter integration, information warfare, joint planning** and operations in contested or degraded environments. The larger aim is to develop officers who can adapt technology to operational realities, retain **decision advantage** and apply human judgement decisively in a fast-changing battlefield.

The same training philosophy is also being extended to **Agniveer training**, so that our young soldiers are prepared to adapt to the future battlefield. The aim is to create soldiers who are comfortable with **smart boots**

on the ground operating alongside bots, with **eagle on the arm and ears on the net**, enabled by electronic, cyber, sensor and secure communication systems and supported by First Person View (FPV) drones, logistic drones, aerial assets and information warfare capabilities in real time.

The welfare of veterans, Veer Naris and dependents has always remained a priority for the Indian Army. Could you elaborate on the recent initiatives undertaken to strengthen outreach, grievance redressal, digital support, skilling and comprehensive welfare for the Army's extended fraternity?

Veteran welfare remains a top priority for the Indian Army and is one of our important **Key Result Areas**. Our approach is centred on fostering **bonding, inclusiveness, recognition and respect** across the extended Army family. The **Directorate of Indian Army Veterans (DIAV)** functions as a single-window facility, supported by a nationwide network of Colonel Veterans, Directors at Command Headquarters and **226 Ex-Servicemen Cells**, ensuring last-mile connectivity and structured grievance redressal for nearly **1.25 crore individuals**, including serving personnel, veterans, Veer Naris and dependents.

Digital platforms have expanded both reach and responsiveness. The **DIAV website** provides a centralised gateway for pensions, entitlements and welfare schemes. **Project NAMAN** is a major veteran facilitation initiative, with centres across India providing SPARSH pension support, government services and community access points. **Veerangana Seva Kendra + (VSK+)**, staffed by Veeranganas, assists widows, Next of Kin and veterans with documentation, SPARSH issues and grievance resolution and has enabled over **1.8 lakh outreach calls**.

The **SAMBANDH WhatsApp chatbot**, developed with Meta, has connected with more than **1.2 lakh veterans**. DIAV also handles nearly **6000 cases monthly** with **97 per cent resolution efficiency**. In parallel, automation of pension-related processes, digitisation of Record Offices and a strengthened **Grievance Redressal Mechanism** are improving transparency, speed and accessibility.

Skilling and transition programmes have also expanded, with more than **33000 prospective retirees** trained under PMKVY in FY 2025–26, over **21000 retirees** receiving entrepreneurship training through I-Create, **2588** establishing ventures and nearly **8000 widows and dependents** trained through Army Skill Training Centres.

Through **Shaurya Sampravah**, the Army is also drawing upon veterans' experience in studies and wargames. Our effort is to enable meaningful integration of veterans, Veer Naris and dependents with civil society while retaining the **umbilical cord with the Army fraternity** and ensuring **dignity, recognition and lifelong support** to those who have worn the uniform and their families.

Sir, could you recall your journey from joining the Army as a young cadet at the National Defence Academy, Pune to reaching the rank of a four-star General? What were the key experiences, principles and moments that shaped your path and leadership outlook?

My decision to join the Army was shaped by the environment at home and by a **desire to do something different**. As a child, whenever I asked my uncle for notebooks, he would bring ones with a soldier's photograph on the cover. My father would often narrate stories of freedom fighters and the Second World War, stories of courage, daring escapes, brave pilots and victories against great odds. These accounts left a **deep impression on me**. In my family, one of my brothers became a doctor and another became an engineer, so I felt those paths were already taken. Once I went to Sainik School, Rewa and saw the Army more closely, I decided to join the Army.

My journey in the Army was never driven by a fixed ambition to reach a particular rank. I followed three principles which I often emphasise in the Indian Army: **Attitude, Adaptability and Ability**. Attitude is about having a positive mindset, adaptability is the capacity to adjust to any situation and ability comes into play when the first two are in place. However, leadership is also about understanding whether you are doing the right task and whether you are doing it at the right time.

As a young officer, I did not think far ahead or aspire to become the Chief. As a Captain or Major, I only had one clear thought: if I ever became a Commanding Officer, I would take my unit in a certain direction. When that responsibility came, I executed those plans. Beyond that, my focus remained on doing every task given to me to the best of my ability. Even when a task was not specifically assigned, I tried to identify areas that needed attention and take them up with my seniors. The confidence of superiors, their willingness to listen and the strength of teamwork shaped my journey. Ultimately, it was this collective approach, rather than individual ambition, that guided me through my career.

Lt Gen JS Sandhu (Retd) *Editor*

NAVAL LESSONS OF THE 2026 AMERICAN-ISRAELI CONFLICT WITH IRAN IN WEST ASIA

The latest American-Israeli conflict against Iran in West Asia, at present paused by a tenuous ceasefire, has had a prominent naval dimension, mainly seen in the Persian Gulf and parts of the Indian Ocean. Though there have been hostile incidents involving the belligerents in the Caspian Sea, this article will primarily focus on the naval actions witnessed in the Persian Gulf and in the Indian Ocean.

From a theoretical and strategy perspective, the war has provided vital insights into the enduring postulations of masters of maritime strategy like Alfred Thayer Mahan and Julian Corbett, even as advent of new warfighting technologies may appear to challenge some of the tactical presumptions that they or others may have made of capabilities that existed in their times. Particularly, Mahan's focus on strategic positions, fortified points, "*value of the defensive*" and the relation between **fleet** and **fort** (coastal defences) was reflected in developments as the war unfolded, while Corbett's emphasis that maritime strategy must aim to influence events ashore by controlling "*maritime communications*", and that command of the sea is always relative, bound by time/space, and needs to be purposive, was borne out in the manner the conflict shaped.[1]

It is endeavoured in this essay to glean ten lessons of the war by looking back at events through an analytical prism.

Surface Ships near Shore Will Be Vulnerable to Precise Long Range Missiles

One of the key lessons of the war is that surface warships, as also un-submerged submarines operating / located near shore, can be exposed to precision strikes by missiles and drones that make them highly vulnerable to early disability in the conflict. The war demonstrated that enhanced battlefield transparency, combined with highly precise, variable range missiles, drones, and distributed communication networks, has greatly eroded the survivability of combatant naval platforms operating in the littoral.[2]

This vulnerability was evident on both sides. Iranian ballistic and cruise missiles (*Khalij Fars* and *Zolfaghar Basir* ballistic missiles, *Abu Mahdi, Noor, Qader, Ghadir* cruise missiles), supported by drones and fast attack craft, were able

[1] *The Strategist, Australian Strategic Policy Institute, Richard Dunley, "How Useful Is Classical Maritime Strategy in an Age of Long Range Anti-Ship Missiles?," June 30, 2020, https://www.aspistrategist.org.au/how-useful-is-classical-maritime-strategy-in-an-age-of-long-range-anti-ship-missiles; Julian S. Corbett, Some Principles of Maritime Strategy (London: Longmans, Green and Co., 1911), https://www.gutenberg.org/ebooks/15076.*

[2] *Council on Foreign Relations, "Military Analysis of the War With Iran, Strategy and Conflict," https://www.cfr.org/event/military-analysis-of-the-war-with-iran-strategy-and-conflict; Tuneer Mukherjee, "Dominance without Control, Naval Dynamics in Operation Epic Fury," Observer Research Foundation, April 1, 2026, https://www.orfonline.org/expert-speak/dominance-without-control-naval-dynamics-in-operation-epic-fury.*

Induction Ceremony for Abu Mahdi Cruise Missile (Photo Erfan Kouchari, Tasnim News Agency, Courtesy commons.wikimedia.org)

to contest the approaches to Hormuz Strait and threaten US naval units like the USS *Abraham Lincoln* Carrier Strike Group. Iranian naval bases and units near the shore, including larger surface combatants and at least one submarine, were decimated by missile strikes carried out by carrier borne aircraft and unmanned combat aerial systems, submarine launched cruise missiles (Tomahawk Land Attack Missile), and also shorter range missiles launched from ashore.[3]

Iranian warships and auxiliary ships operating in constricted waters in the Gulf lost the element of surprise to maritime surveillance too soon in the war and could not offer much resistance against overwhelming air and missile power of the US Central Command (CENTCOM).[4]

The lesson is not that large surface combatants or capital warships are redundant or obsolete. Rather, it brings home with urgency the fact that surface fleets must now be employed with a far more heightened appreciation of risk of precision munitions and drone attacks in the littoral. The reality of battle-space dominated by coastal missile batteries, drones, small craft, and cruise missiles launched from multi-dimensional platforms is upon us and needs to be addressed through stronger tactical and operational defensive measures.

The Fleet May Fight a Fort But It Seldom Wins

Alfred Thayer Mahan wrote about strategic positions, communications and the defensive power of fortified points.[5] The recent war confirms that the insights he provided from his historical study remain valid and relevant even in the age of Artificial Intelligence (AI). A fleet may attack, contain or isolate a "**fort**" (coastal defensive position), but where the fort is integrated into favourable geography and sustained by asymmetric offensive capabilities, heightened situation awareness, and layered defences, the fleet may find itself fighting inconclusively without prevailing decisively over the adversary.[6]

Iran's defensive advantages in Abu Musa, Larak, Greater Tunb, Lesser Tunb, Qesham and Hormuz islands were evident in the strategy of sea denial it implemented in the Strait of Hormuz and its approaches from either side. These islands, located astride narrow waters of the Gulf, dominate the restricted navigable sea lanes, and can host supporting garrisons of Iran's Islamic Revolutionary Guard Corps (IRGC), especially the naval elements.

The war showed that these defended positions in the littoral could impose disproportionate costs on a stronger adversary. US military planners contended with the difficulty of reopening the Strait by force, and the risks associated with seizing islands such as Abu Musa, Tunb or Larak, recognising them as fortified maritime positions. For an invading force, merely landing assault forces successfully is not enough, it must still hold the ground under the real and persistent threat of missile and drone attacks, not to forget sea mines, and sustain itself in such conditions.[7]

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[3] *An Iranian submarine and other naval units were reportedly destroyed by an Army Tactical Missile System (ATACMS) short-range ballistic missile launched by a US Army Artillery Unit, based in UAE. The War Zone, 'Iranian Submarine Sunk By ATACMS Short Range Ballistic Missile', 13 March, 2026, https://www.twz.com/land/iranian-submarine-sunk-by-atacms-short-range-ballistic-missile*

[4] *Council on Foreign Relations, "Military Analysis of the War With Iran, Strategy and Conflict," https://www.cfr.org/event/military-analysis-of-the-war-with-iran-strategy-and-conflict.*

[5] *Alfred Thayer Mahan 'Naval Strategy Compared and Contrasted with the Principles and Practice of Military Operations on Land: Lectures Delivered at U.S. Naval War College, Newport, R.I., Between the Years 1887 and 1911' Little, Brown, 1911*

[6] *Dunley, "How Useful Is Classical Maritime Strategy in an Age of Long Range Anti Ship Missiles?" https://www.aspistrategist.org.au/how-useful-is-classical-maritime-strategy-in-an-age-of-long-range-anti-ship-missiles; Corbett, Some Principles of Maritime Strategy, https://www.gutenberg.org/ebooks/15076.*

[7] *Ibid.*

This is where Mahan's discussion of strategic position and defence becomes relevant to modern missile, drone and mine warfare. A coastal "**fort**" of today resembles less a structure of stone masonry fitted with sea facing cannons but is in effect a paraphernalia of mobile anti-ship missile launchers, shifting drone launchers, underground command nodes, and hardened pens/tunnels for mines, mine layers and fast-attack craft.[8]

Places and Bases Matter and Their Defence Matters Too

The war also reaffirmed that naval power depends not only on combat platforms but on access, involving places, bases, anchorages, logistics hubs, and friendly political environment. Without secure bases, repair facilities, underway and ashore replenishment arrangements, and faraway support systems, the operational advantages of even a large navy can be significantly eroded.[9]

In this regard, the relative contrast between the navies of US and Iran was stark. The US Navy retained a broad support architecture based on its posture of global reach, including allied facilities, integral logistics chains, underway replenishment, and the sustainment of deployed naval forces by the Military Sealift Command. Iran, by contrast, faced acute limitations and difficulties in sustaining naval presence beyond its immediate neighbourhood, especially in the Indian Ocean, where support to its naval forces became uncertain after hostilities commenced.[10]

The examples of IRIS *Dena*, which was sunk off the South coast of Sri Lanka after a torpedo attack carried out by a US Navy submarine, and of two other Iranian ships - IRIS *Bushehr* and IRIS *Lavan* which sought temporary refuge in regional ports in the Indian Ocean, highlight the truism that ships at sea eventually need to seek the protection of ports for shelter and sustenance. In times of hostility, during which the laws of armed conflict become applicable, the operational freedom of a navy without reliable external bases (or places) can shrink significantly to its disadvantage.[11]

The conflict also showed that bases themselves require robust defence (especially air defence), without which such bases may be rendered "*unsafe places*". Reportedly, US Central Command's Naval facilities in Bahrain became vulnerable to missile and drone attacks.[12] In the missile and drone age, defence of ports, fuel tank farms, airfields and dockyards will demand layered defence, including anti-missile/anti-drone systems, deception measures, dispersal arrangements, and redundancy of key command and control facilities.

Surveillance Satellites can Surprise Ships

Another lesson of the war lies in the dramatic enhancement of battlefield transparency enabled by commercially available satellite imagery and open source analyses. Publicly highlighted discussions based on satellite imagery of warships located at sea (combined with electronic and synthetic aperture radar signatures), assessments by open source intelligence communities, and rapid digital dissemination appears to have narrowed the space for warships to remain undetected at sea. In a notable example, a Shanghai-based company **MizarVision** publicly and frequently posted imagery and assessments of warships in harbour and at sea, and damage to bases, through the conflict.[13]

This is an important lesson for navies because the element of surprise is becoming harder to achieve and preserve in the changing technological landscape. While commercially available satellite imagery by itself may not be sufficient for targeting, it definitely helps to improve situational awareness of adversaries and third parties, introducing higher complexities for naval planners. Operationally, this means that emission control and information security

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[8] *Dunley, "How Useful Is Classical Maritime Strategy in an Age of Long Range Anti Ship Missiles?" https://www.aspistrategist.org.au/how-useful-is-classical-maritime-strategy-in-an-age-of-long-range-anti-ship-missiles.*

[9] *Council on Foreign Relations, "Military Analysis of the War With Iran, Strategy and Conflict," https://www.cfr.org/event/military-analysis-of-the-war-with-iran-strategy-and-conflict; Mukherjee, "Dominance without Control, Naval Dynamics in Operation Epic Fury," https://www.orfonline.org/expert-speak/dominance-without-control-naval-dynamics-in-operation-epic-fury.*

[10] *Ibid.*

[11] *Simkins and Ceder, "US Submarine Sinks Iranian Ship in First Torpedo Kill Since WWII, Pentagon Confirms," https://www.militarytimes.com/news/your-military/2026/03/04/us-submarine-sinks-iranian-ship-in-first-torpedo-kill-since-wwii-pentagon-confirms; Mukherjee, "Dominance without Control, Naval Dynamics in Operation Epic Fury," https://www.orfonline.org/expert-speak/dominance-without-control-naval-dynamics-in-operation-epic-fury*

[12] *Jonathan Beale, BBC Defence correspondent, "Iran retaliation raises questions about US air defences", 1 March 2026, https://www.bbc.com/news/articles/cg5nm6v2p4no*

[13] *Ryan Finnerty, "Chinese Intelligence Company Tracking US Military Assets during Iran Operations," FlightGlobal, March 2, 2026, https://www.flightglobal.com/fixed-wing/2026/03/chinese-intelligence-company-tracking-us-military-assets-during-iran-operations.*

Strait of Hormuz (credit britannica.com)

remain necessary, but no longer sufficient. It would need innovative concealment methods or countermeasures focussed on degrading detection/dissemination capabilities of satellite-based networks.

Naval Belligerency Is Not Bound By Geographical Considerations of the Air Land Battle

The sinking of IRIS *Dena* by a US submarine off Sri Lanka was among the war's most important strategic events. Its importance lies less in the tactical neutralisation of a warship than in the reminder that naval belligerency can rapidly extend far beyond the immediate theatre of air-land battle. US INDOPACOM (Indo-Pacific Command), in a post on the micro blogging platform "X", justified the targeting of IRIS *Dena* by stating that *"Law of Armed Conflict authorised the use of force to target and destroy valid military targets."*[14]

Such actions may be politically controversial, or ethically questionable, yet navies would seek to exploit tactical advantages when the target is a lawful military objective and the broader legal conditions of hostilities are met. The interconnectedness and vastness of the ocean allows belligerents to seek opportunities at far away distances, and this can produce escalatory effects.

One must also mention that threats like these by the Houthi regime against US and allied shipping in the Red Sea, including warships could continue as in the past two years. In January 2026, as the US aircraft carrier USS *Abraham Lincoln* and guided missile destroyers escorting it moved towards the Red Sea, the Houthis put out public videos, images and messages threatening attacks on shipping.[15] Such belligerency by the Houthis, widely viewed as proxies of Iran, evidently impacted subsequent US' naval planning. This was seen in the safer route planned for the transit of the aircraft carrier USS *George H.W. Bush* and its escorts around the Cape of Good Hope (off South Africa) to enter the Indian Ocean from the Atlantic in April 2026.[16]

A "Minefield in Being" Can Be More Impactful Than a "Fleet in Being"

One of the most striking lessons of the recent war in the Gulf is the power of the undeclared minefield in maritime choke points. All through the conflict, Iran has not officially declared deploying a minefield in the Strait of Hormuz but has resorted to indirect insinuation to suggest the same through strategic communication.[17] Iran's actual ability to mine the Strait may have mattered less than the widespread belief that mines had been laid, and there exists a credible *"danger area"* in the approaches to Hormuz.[18] That belief alone created a decision dilemma for commercial shipping, marine insurers and also military planners, with effects far beyond the relative frugality of the weapon.[19]

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[14] *U.S. Indo-Pacific Command @INDOPACOM X Post dated March 08, 2026, https://x.com/INDOPACOM/ status/2030357666342772882?s=20*

[15] *The Times of Israel, By AP and ToI Staff, "Houthis threaten new Red Sea attacks as US aircraft carrier heads toward Iran", 26 January 2026, https://www.timesofisrael.com/houthis-threaten-new-red-sea-attacks-as-us-aircraft-carrier-heads-toward-iran/*

[16] *USNI News, Mallory Shelbourne, 'Carrier USS George H.W. Bush Operating off Southern Africa as Iranian Blockade Begins', April 13, 2026, https://news.usni.org/2026/04/13/carrier-uss-george-h-w-bush-operating-off-southern-africa-as-iranian-blockade-begins*

[17] *ORF Expert Speak Raisina Debates, Sayantan Haldar, Tuneer Mukherjee, 'Mines, Blockades, and Coercion: Iran's Strategy in the Strait of Hormuz', May 19, 2026, https://www.orfonline. org/expert-speak/mines-blockades-and-coercion-iran-s-strategy-in-the-strait-of-hormuz*

[18] *NDTV (Associated Press/World News), 'Danger Zones': Iran Shares Map Of Sea Mines In Hormuz Amid Ceasefire',*

[19] *Apr 09, 2026, https://www.ndtv.com/world-news/us-israel-iran-war-have-irans-revolutionary-guard-have-put-sea-mines-in-strait-of-hormuz-middle-east-conflict-11332209 Australian Broadcasting Corporation, Syan Vallance, 'Analysts raise doubts about America's ability to clear mines from Strait of Hormuz', 19 Apr, https://www.abc.net.au/news/2026-04-19/us-israel-strikes-on-iran-strait-of-hormuz-mine-clearing/106569736*

We could call this a *"minefield- in-being"*. Much like the classical *"fleet- in-being"* concept (denoting a smaller or inferior fleet that may create strategic influence simply by existing), a *"minefield-in-being"* can influence events not by actual action but by extending a credible and potent threat to shipping by its existence, and the disproportionate costs it can impose. In this conflict, the Iranian *"minefield's effect"* appears in some ways to have surpassed that of a fleet of warships, because it has severely constrained movements of both commercial and naval vessels in the narrow waterway of Hormuz.

A Blockade Is Only As Good As the Navy Enforcing It

The US decision to impose a naval blockade on Iran was strategically imaginative and served to put Iran on a backfoot after it exerted a chokehold over Hormuz. A blockade can curtail sea trade of the targeted belligerent, generate economic pressure, and signal resolve, but its practical effect depends on the capacity, endurance, and tactical freedom of the Navy enforcing it.[20]

Assessment suggests that implementation of the blockade by the US Navy was mixed. Some Iranian shipping was intercepted and partially deterred, but some movements reportedly escaped the US Navy's net, while Iran's own disruptive hard posturing in Strait of Hormuz imposed costs on shipping that was adapting to the regime of transit earlier promulgated by Iran. It can also be surmised that political pressure from allies, possibly also from China, whose shipping was impacted by the blockade, may have influenced US' strategic thinking concerning the blockade. Cumulatively, all this created a situation of impasse in which blockade and counter blockade effects have interacted with one another undecidedly.

The lesson for Navies is that for a blockade to be effective some essential elements need to be ensured, including persistent surveillance, large warship and surveillance aircraft numbers, broad capability of maritime interception, and ability to visit, board, search and seize vessels, backed by legal preparation, proactive diplomacy, and political will.

Hostile Shores Can Deter Amphibious Operational Manoeuvre from the Sea

The war also demonstrated why amphibious manoeuvre from the sea could turn out to be one of the most difficult of operational plans, especially against a defended coast. There was speculation that US, with its Gulf allies, might launch operations to seize some Iranian islands and/or undertake ground operations to seize the enriched uranium held with Iran, possibly using assault forces launched from Amphibious Ready Groups. However, such operations have not occurred despite the requisite forces being mobilised to the theatre.[21]

The most important deterrent may have been the extended hostile Iranian shores. Iranian islands, defended coastline, and the wider southern littoral forms an integrated threat environment comprising missiles, drones, mines, fortified positions, and rapidly deployable armed boats. The difficulty is not simply in landing troops, but also in sustaining and protecting them afterwards against enemy counterattacks. In this backdrop, former US CENTCOM commanders

File photo of Iranian frigate IRIS Dena (Photo Credit MojNews Wikipedia Commons)

[20] *Council on Foreign Relations, "Military Analysis of the War With Iran, Strategy and Conflict," https://www.cfr.org/event/military-analysis-of-the-war-with-iran-strategy-and-conflict.*

[21] *Brandon Carr and Trita Parsi, "Limited US Ground Operations in Iran Will Not Shift the War's Balance," Quincy Institute for Responsible Statecraft, Policy Note no. 23, 2026, https://quincyinst.org/research/limited-us-ground-operations-in-iran-will-not-shift-the-wars-balance.*

The Iranian frigate IRIS Dena sank off the coast of Sri Lanka (PhotoArchive voiceofemirates.com)

General David Petraeus and General Joseph Votel were perspicacious in cautioning against ground assaults, in their public comments.[22]

Maintenance of Morale At Sea Cannot Be Taken For Granted

Sailors on combat platforms at sea fight within closed communities, often under physiological and psychological strain, responding to varying alert states, and while handling isolation from their families. Morale is one of the intangible yet most important determinant in war, and naval warfare is especially impressionable. The recent war brought this truth home through reports of fires aboard US naval vessels and complaints about poor food service,[23] both of which pointed to the human and material stresses of sustained deployment.[24] The reports about poor food standards were subsequently refuted by the US Chief of Naval Operations.[25]

Morale of the Iranian naval forces must also be considered. The sinking of IRIS *Dena*, the destruction of bases and numerous naval units, and the pressure of sustained strikes would have imposed severe psychological costs on Iranian naval crews and commanders. Reuters reported that the US pressed Sri Lanka not to repatriate the survivors of IRIS *Dena*. Nevertheless, they were subsequently transferred to Iran, possibly due to health considerations.[26] The morale of the concerned individuals must have been affected by the ordeal.

Ultimately, morale is not measured only by losses suffered, but is also shaped by belief in purpose and endurance under adversity. The lesson for Navies is that morale cannot be assumed as a given. It must be maintained through high quality leadership, logistics support, habitability, sound human resources management and human security.

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[22] *Fox News, Nora Moriarty, 'Ex-CENTCOM commander warns against 'risky' US ground operation to seize Iran's enriched uranium', April 20, 2026 https://www.foxnews.com/media/ex-centcom-commander-warns-against-risky-us-ground-operation-seize-irans-enriched-uranium*

[23] *USA Today, Cybele Mayes-Osterman, 'Cookies, deodorant, socks. Iran war puts military packages in limbo', April 17, 2026, https://www.navytimes. com/news/your-navy/2026/04/20/cno-denies-reports-of-poor-food-service-aboard-navy-vessels/*

[24] *CBS News, James LaPorta, Jennifer Jacobs, 'Fire aboard Navy destroyer USS Higgins, officials say', April 30, 2026 https://www.cbsnews.com/news/uss-higgins-navy-destroyer-fire-singapore/ also see National Security Journal, 'The U.S. Navy's Biggest Enemy Isn't Russia or China: Fire Is the Real Foe' by Kris Osborn, 24 May 2026, https://nationalsecurityjournal.org/the-u-s-navys-biggest-enemy-isnt-russia-or-china-fire-is-the-real-foe/*

[25] *Navy Times, Riley Ceder, 'CNO denies reports of poor food service aboard Navy vessels', Apr 20, 2026, https://www.navytimes.com/news/your-navy/2026/04/20/cno-denies-reports-of-poor-food-service-aboard-navy-vessels/*

[26] *Reuters, Humeyra Pamuk, "Exclusive: US pressing Sri Lanka not to repatriate Iranian crew and survivors from sunken ship, memo says", March 6, 2026, https://www.reuters.com/world/asia-pacific/us-pressing-sri-lanka-not-repatriate-iranian-crew-survivors-sunken-ship-memo-2026-03-06/*

The Ability to Influence Affairs on Land Ought to Remain a Paramount Consideration

The final and most important lesson for Navies returns us to Julian Corbett. The highest purpose of maritime strategy is to influence events on land, because human communities, enterprise, economy, political legitimacy, and state power ultimately reside there.[27]

Both sides used Navies to shape desired political outcomes ashore. The US employed sea- based air power, submarines, blockade, and maritime interdiction in support of larger political and military goals. Iran used its critical geography and maritime position to employ an asymmetric Naval strategy to severely disrupt the flow of commerce, impose economic stress on global markets, and deny the US a clear political victory. Sea control, sea denial, blockade, amphibious forces, and strike capabilities matter, but they matter because of the effect they can bring to affairs on land, to influence political decisions, and economic activities.

Conclusion

The Naval war of the conflict has demonstrated unequivocally that command of the sea cannot be determined only by number or size of warships in a fleet, or the possession of overwhelming airpower alone.[28] In the confined waters of the Gulf and the approaches to the Strait of Hormuz (Gulf of Oman, Northern Arabian Sea), the naval contest was initially shaped by both sides seeking to deny the other the control of the sea that they respectively sought for obtaining favourable political and economic outcomes.[29] Later, the war transmuted into an impasse created by blockade and counter blockade actions, with no clear decisive strategic outcome for either side. Even as peace negotiations are underway between US and Iran through third parties, the ten lessons for navies discussed earlier could form "*food for thought*" for practitioners and students of warfare alike.

Firing Qadr Missile from a truck launcher in Velayat-90 Naval Exercise, 02 January 2012 (Photo Mohammed Sadegh Heydari commons.wikimedia.org)

(The article reflects the views of the author and not those of the Government of India or the Indian Navy)

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[27] *Julian S. Corbett, Some Principles of Maritime Strategy (London: Longmans, Green and Co., 1911), https://www.gutenberg.org/ebooks/15076.*

[28] *Council on Foreign Relations, "Military Analysis of the War With Iran, Strategy and Conflict," event transcript, April 29, 2026, https://www.cfr.org/event/military-analysis-of-the-war-with-iran-strategy-and-conflict.*

[29] *Tuneer Mukherjee, "Dominance without Control, Naval Dynamics in Operation Epic Fury," Observer Research Foundation, April 1, 2026, https://www.orfonline.org/expert-speak/dominance-without-control-naval-dynamics-in-operation-epic-fury.*

EULOGIZING DRONES
A COMBAT REALITY CHECK

The hum of drones over the battlefields, along with their buzz amongst armchair strategists, has become the defining feature of 21st-century warfare. Drones have become synonymous with modern combat because they kill with precision, shape movement across the battlespace, and impose a constant psychological presence. Military strategists, whether in uniform or out, increasingly speak of drones as transformational weapons, because they have apparently altered the character of ground combat. The real question is whether their apparent supremacy is a new Revolution in Military Affairs, or whether it has evolved from redundant weaponry held in large numbers or from a lack of a genuine combined arms culture. Revolutions in military affairs are those that are so disruptive as to render old weapons, ways of fighting, and organisational constructs obsolete. **Can we say the same of drones?**

During a conflict, it is often difficult to distinguish fact from fiction, especially when both sides equally engage in information warfare to shape others' perceptions. There was much hype over the Turkish Bayraktar TB2, which was instrumental in repelling the initial waves of Russian attacks. But once the Russian Air Defence (AD) was given full freedom to engage, most of the TB2s were shot down, and in actual fact, they disappeared from the battlefield. Undoubtedly, drones are proving to be more of a psychological weapon. Their success has been measured less by physical destruction than by fear. A weapon that can break armoured formations, make infantry lose cohesion, and render them vulnerable has been viewed as the panacea for asymmetry on the battlefield.

A Russian army Pole-21 jamming system in Ukraine (Russian state media photo)

It is not uncommon for adversaries to draw different lessons from the same conflicts. In **Operation Desert Storm**, the US and its allies deployed to a new theatre of operation, built up the combat power of CENTCOM, and defeated one of the world's largest land armies with 37 days of relentless air strikes followed by 100 hours of ground combat. The lesson the US learned was that strategic mobility to respond to threats anywhere in the world was essential and that stealth and precision air strikes can overpower the strongest resistance. The lesson its adversaries learned was that a rapid build-up of combat power close to your borders can be disastrous. Since then, Russia and China invested heavily in anti-access/area denial capabilities. Iran followed suit, focusing on building infrastructure to disperse and protect its assets.

The Russia-Ukraine War Experience

The recent trend in the Ukrainian military has been that it has taken more casualties than it has recruited. This has created a slow rotation of soldiers, but over time, the result has been a hollowing out of units along the line of contact and, thus, a growing paucity in the defence, which has reached a point where drones have filled a vacuum left by the dearth of artillery and infantry. Here is where drones rose to compensate for weakness, not to redefine war itself. This distinction must be understood clearly.

Since World War II, Soviet and later Russian war-fighting concepts have been based on the capacity to absorb punishment and continue fighting, emphasising mass, firepower and endurance over flexibility and the integration of air power with army formations. The last four years have revealed a deeper problem: the lack of Russian capacity to synchronise armour, fires, engineers, logistics, and airpower at scale. When Russia failed to achieve a decisive victory, it also resorted to attrition through drones. Its inability to manoeuvre effectively has forced it into adopting a defensive stance. And it is within this environment that drones have flourished.

The conflict in Ukraine has demonstrated that when manoeuvres are limited and airspace is contested, drones rule the roost. Russia's failure to manoeuvre and to establish air superiority has created a permissive environment for unmanned systems. The drones on the battlefields of Ukraine may have been lethal, but without effective integration with the overarching war-fighting strategy, they seem to have contributed to a stalemate rather than introducing a new way of warfighting. While High Altitude Long Endurance (HALE) / Medium Altitude Long Endurance (MALE) drones have been rarely employed in this war, both Ukrainian and Russian ground forces have extensively used smaller military or even commercial drones. These small drones have created new capabilities at a scale that previously did not exist, but it was not drones operated by small units that were transforming the battlefield; it was the combination of pairing them with artillery that brought in unprecedented capabilities. Drones have been used as spotters to acquire targets and help to adjust fires by sharing targeting information, thereby enabling inaccurate indirect fire weapons to have precision effects.

In the absence of a sustained air campaign or ground manoeuvre strategy to dislodge drone operators, both Ukrainian and Russian fighting units and logistics nodes remain exposed and vulnerable. What we see on social media are instances where Ukrainian drones exploited these conditions by reconnaissance and striking at will. Drones have thrived not just because of their ubiquity, but also because they have compensated for absent airpower, inadequate manoeuvre, and top-heavy command

Israeli Air Force F-15I Ra'am (Strike Eagle) taking off for a strike mission, armed with a massive precision air to ground loadout (photo TdtNews Soweto Facebook)

A grenade-armed quadcopter drone belonging to the Ukrainian army's 30th Mechanized Brigade striking Russian tanks attempting a hit-and-run raid on Ukrainian positions north of Bakhmut (photo forbes.com)

structures that restricted decentralised decision making. In recent debates across a multitude of seminars, it became difficult to shut out the barrage of platitudes being showered upon swarm drones, first-person-view (FPV) drones, and loitering munitions. Let us analyse their effectiveness and relevance, as seen from the ongoing conflicts.

FPV Drones are controlled by an operator wearing virtual-reality goggles that receive the image from the drone's forward-facing camera. The most common types of FPV drones fly directly into their target, where they detonate an explosive charge weighing one to two kilograms. These drones supposedly give troops their own organic precision-strike capability. They can strike moving targets or targets in difficult-to-reach locations, such as bunkers, basements, or even inside buildings. Analysts have claimed that FPV drones will make concealment and the massing of troops and equipment in the combat zone nearly impossible.

What we see on the much-hyped social media are the exceptional cases of their success, rather than a consistent one. Statistics on the success of drone operations in Ukraine have revealed that only 20-30 per cent of FPV drone sorties resulted in a hit on the intended target, primarily because these drones are hard to use and are susceptible to electronic interference. Despite the technology available, very few FPV drones have night-vision capabilities, because installing them would double their cost. In winter, the 14 hours of darkness in Russia and Ukraine severely limit their usage. Additionally, FPV drones are difficult to fly in rain, snow, and fog. It is also estimated that Russian Electronic Warfare measures have downed over 30 per cent of Ukrainian drones.

The Ukrainians discovered that operating a FPV drone successfully is not easy. Training a proficient operator requires drone pilots to complete a five-week course. Since the FPV drones used by Ukrainian forces have no navigational aids, such as a GPS receiver or an inertial navigation system, the operator has no choice but to rely on their knowledge of the local terrain or on instructions from other reconnaissance assets tracking the target. If we were to visualise their usage in our context, we need to consider both physics and geography. Even if the operator successfully navigates the drone to the vicinity of the intended target, the drone's radio signals will be cut off as it descends below a certain height, easily calculated using a line-of-sight formula. Ukraine (Donbas region) or the battle spaces of Israel, Iran or the Middle East are flat plains, with very few obstacles or even trees. The terrain along our borders, barring the desert areas, is mostly mountainous, forested, or urbanised, creating significant limitations for FPV drone operators. Thus, operating an FPV drone in our region would limit its use to a range of only three to four km from the operator.

Another important aspect to consider is that these drones (and, for that matter, all drones) must operate in a crowded segment of the electromagnetic spectrum. FPV drones use unencrypted radio signals, and up to 10-12 drones can share a small band of frequencies over a frontage of 40-50 kms. Ukraine had worked out elaborate *'deconfliction'* procedures, so sometimes a drone team had to wait as long as half an hour for a frequency to become available before launching their drones. Many of those who did take-off had poor video input or were lost simply due to radio contact loss.

In a battlespace where both protagonists make copious use of electronic jamming, FPV drones have very few chances of completing their mission. Own jammers would need to be switched off to allow even one drone to fulfil its mission of delivering a small warhead, while exposing own VAs and VPs to enemy attacks by large calibre weapons. If every small unit is equipped with anti-drone jammers, there is a high likelihood that they will be activated as soon as someone hears the

distinctive drone hum, which could have been launched by the adjacent formation.

The operators of FPV drones have to remain tethered to their positions, which is a serious liability on the battlefield today where a static position is a viable target. Some of the technical problems with FPV drones will eventually be resolved as technology matures. In the meantime, drones controlled by fibre-optic wires are making their way onto the battlefield. Fibre optics make jamming impossible and does not require frequency *'deconfliction'*. These drones, however, have several drawbacks compared to radio-controlled drones. The drone's manoeuvrability is extremely limited, and if the wire gets snagged on an obstacle, it can result in a loss of control.

A vast majority of FPV drone missions can be completed more cheaply, effectively, or reliably by other assets. Artillery, or even mortars, can't be stopped by bad weather or jamming of radio frequencies. Gunners can fire shells on a target in less than five minutes, if the need arises. A FPV drone would take upwards of 15 minutes to be readied, launched and find its way to the target. Even large numbers of small drones will never match the firepower of air-launched weapons, artillery or even howitzers. Scaling up drone use would also involve extending the drones' logistical tail. If there is agreement that drones would not fully replace other weapons systems, it means that the military will have two competing logistical tails: one for drones and one for artillery.

Discussions about Artificial Intelligence (AI) and autonomy are generally inaccurate and create false impressions about the level and type of autonomy that actually exists on the battlefield. It needs to be clearly understood that most drones in the war in Ukraine are remotely piloted by humans. There have been no reported true drone swarms with cooperative authority. In fact, each drone typically has two human operators: one responsible for navigation and communication, and the other for piloting. Only limited autonomy has been observed in mundane tasks, such as automatic take-off and landing, and perhaps in collision avoidance, object recognition, or simple navigation. Additionally, swarm drones require specific conditions — open ground, prepared positions, and time to set up, which adversaries would certainly deny. The effectiveness of swarm drones would be fundamentally reliant on secure launch sites and sanctuaries.

Additional Lessons from the Middle East

The US Congressional Research Service Report on **Operation Epic Fury** stated that at least 42 US aircraft, including four F-15s, one F-35, seven KC-135 tankers, one E-3C Sentry AWACS, and two MC-130Js, were lost or damaged during the operations. The largest loss, however, was 24 MQ-9 Reaper drones and one MQ-4 Triton drone. While most of the manned aircraft were lost during Iranian attacks on forward airfields, all drones were lost to traditional AD weapons. To put matters in perspective, the cost of a Reaper varies from 30 to 100 million dollars (depending on mission configuration and payload), the cost of a Triton is 200-240 million dollars, and the cost of an F-15EX Eagle II is between 90-97 million dollars.

The conflict has shown that although drones are not more survivable than manned aircraft, they have a greater risk acceptance. It is another matter that drones need not be survivable if they are cheap and can be built indigenously in large numbers. Ten days into the air campaign against Iran, General Dan Caine, Chairman of the Joint Chiefs of Staff, announced that Iranian launches of *"one-way attack drones have decreased 83 per cent since the beginning of the operation."* Whether there

This infographic depicts a hypothetical or fictionalized military scenario termed 'GOLDEN HORIZON' illustrating an Israeli strike against a target in Tehran, Iran, using hypersonic missiles launched from aircraft

An RQ-4 Global Hawk unmanned aircraft (U.S. Air Force photo by Bobbi Zapka, courtesy commons.wikimedia.org))

is hype in the statement or not, what is important is that one has never heard of such huge losses to a single weapon system in any conflict.

Doctrinal Issues in the Iran Conflict

The asymmetric force levels between US - Israel and Iran meant that Iran had to devise an innovative counter-air campaign. So, they systematically targeted the *'enablers'* of American airpower, radar and communication infrastructure, aerial refuelling tankers, and an Airborne Warning and Control System, which were located across US bases in Bahrain, Qatar, Kuwait, Saudi Arabia, and the United Arab Emirates. By degrading these enablers, Iran could continue with their drone and missile attacks, with the same goal as traditional counter-air, namely to weaken the enemy's ability to launch aerial attacks.

When viewed against air power doctrines, Iran's tactics relied on cheap drones and missiles rather than fighters and bombers to attain some level of *'air denial'* to deny control of the air to the US forces. Without doubt, drones exposed the vulnerabilities of US airpower operating in forward locations, putting them under repeated attacks. Ironically, the US military seemed to have learnt no lessons from the Russians who have lost significant number of bombers and specialist aircraft lying exposed in the open. The immense importance that even the Indian Air Force gives to passive AD measures, dispersal of assets, and their blast protection, was evidently missing in the US military.

Importantly, absent from media reports is the extent of damage/destruction of Iranian targets by US and Israeli airpower. Coalition air forces struck over 13,000 Iranian targets in the first four days of intense offensive air operations, targeting Iranian missile and drone launchers, production and storage sites, among other strategic targets. The figure of over 80% is derived from degraded sensors, launchers, and disrupted command and control nodes, which have translated into fewer drones and fewer cruise or ballistic missiles being launched by Iran.

For a military analyst, the level of damage caused by any weapon system is the benchmark of its effectiveness. While basic physical damage assessment done through imagery and electronic measures reveals damage to a particular target, functional damage assessment estimates how much of a target's operational capability has survived after a strike. Ultimately, a *'target system'* damage assessment would be required to evaluate whether the offensive campaign has succeeded in degrading the adversary's ability to fight. This requires an intensive data-crunching process that may take weeks, if not months. The biggest pitfall of drawing lessons too early from any conflict is making conclusive arguments in the absence of *'target-system'* level assessments. To some observers, drones have provided affordable airpower to Iran, but what they miss is that neither drones nor traditional air forces have replaced the other, nor have they been able to perform majority of air power roles.

So far, **Operation Epic Fury** has shown that to address Iran's advantage of mass production and employment of drones, the US military needed to choke force generation at its source, something that they had not pursued at scale since World War II. From the very start of the operations, US forces have focused on the destruction of Iran's defence–industrial capacities and preventing Iran from either replenishing or reconstituting critical elements of its military power. The US military's targeting of Iran's missile and drone production facilities can be seen as a doctrinal shift away from targeting deployed forces toward attacking production facilities persistently.

Closing Thoughts

The ongoing conflicts have highlighted that the world has come a full circle, where warfare involves campaigns to degrade an adversary's ability to maintain their war economy and supply their military forces. The efforts of the US to disrupt Iranian supply lines via economic sanctions, diplomatic pressure, maritime interdiction, and strikes against military–industrial facilities have created a new normal. Conducting such operations may require a different set of offensive capabilities than those required for striking military forces or defending against a hostile neighbour. Military planners should now also consider various methods of impeding adversary war production over the duration of a protracted conflict.

Drawing from these lessons, in our context, where our own and adversarial armies are capable of manoeuvre and employing traditional air power, drones would remain dangerous, but not decisive. They would supplement combat power rather than replace missing functions. Their effectiveness would depend on integration rather than substitution. In a contested airspace environment, their targeting windows would be narrow, their survivability questionable, and their operational effects sporadic rather than systemic. Only if either of the opposing forces loses the ability to manoeuvre under fire will drones be decisive. For the Air Force, counter-air operations would now include disrupting drone operators, disabling launch and control nodes, and drone operator support ecosystems.

Men and women in uniform should continue to study, train with, and use drones aggressively without losing sight of the fundamentals of land, sea, or air combat and the core-competencies of each Service. While drone attacks have proven deadly against individual soldiers, vehicles, and small units, they are not yet capable of destroying brigades, divisions, or corps. They will, of course, remain dangerous tools for irregular warfare, given their affordability, portability, and ability to be assembled in urban areas or remote outposts, allowing their users to harass and strike Armed Forces and even civilians, at low cost and risk.

Ukrainian soldiers prepare a drone near Bakhmut, 26 March 2024 (Photo Efrem Lukatsky, AP Photo)

Finally, drone capabilities envisioned by chairborne strategists may not deter, let alone defeat, a near-peer adversary. Confusing concepts of operations with doctrine and mistaking innovations with Revolution in Military Affairs would be disastrous, particularly for a military already weakened by depleted resources.

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Air Chief Marshal Vivek Ram Chaudhari, PVSM, AVSM, VM (retd), an alumnus of the National Defence Academy, Pune was commissioned as a fighter pilot on 29 December 1982. A Category 'A' qualified flying instructor, and Instrument Rating Instructor and Examiner, he has a flying experience of over 3800 hours on various fighter aircraft including MiG-21, MiG-23MF, MiG-29 and Su-30MKI. He was also a pioneer member of the Surya Kiran Aerobatic Display Team. He has commanded the MiG-29 squadron at Jamnagar and the forward base in Awantipora in Jammu and Kashmir. He also served as the chief operations officer of the Srinagar Air Force Station and later commanded the Lohegaon Airbase in Pune. On 1 August 2020, he took over as the Air Officer Commanding-in-Chief Western Air Command, and went on to become the 27th Chief of the Air Staff on 30 September 2021.

Air Chief Marshal Vivek Ram Chaudhari

DANGEROUS DELUSIONS

Recent years have seen a wide range of air power applications in wars and conflicts. Whether it is the sub-optimal employment of the Russian Air Force in Ukraine, Israel's lethal aerial pounding of Gaza, or the combined might of US and Israeli air power against Iran, warfighting itself has seen a distinct transition from the past. There is a fundamental shift in that nations are reluctant to commit boots on ground, and the aerial medium has been increasingly employed to seek geopolitical outcomes. Given the total absence of air opposition over Gaza and Iran, and the small ineffective Ukrainian Air Force, weaker nations have had no choice but to rely exclusively on drones and missiles to mitigate the disadvantage. The rise in the use of drones and missiles, and the fact that it is the surface forces who are most impacted by their proliferation, has given rise to a dangerous thought that the days of manned air power is over.

Explosions seen above Tel Aviv on 14 June 2025 as Israel's Iron Dome air defence system intercepted a fresh wave of Iranian missiles (image dw.com)

In these interesting times, a growing cohort of non-practicing self-styled air power specialists, armchair strategists, and corporate-minded theorists, have shown a worrying inability to grasp the fundamentals of aerospace warfare, as they confuse bureaucratic flowcharts for combat capability. In India, a few pundits are mouthing biased narratives as they gloss over the harsh, greasy truth of military aviation with tidy boxes, bright arrows, and cherry-picked history. They argue, rather absurdly, that a "*system*" can replace fighters. Even the Battle of Britain has been hijacked; the ghost of Lord Dowding-whose integrated system won that conflict and is now being used as a flawed blueprint for modern "*systems thinking*"-would be outraged. They believe that a sufficiently shiny "**National Air Defence Architecture**" will somehow negate the laws of physics, the constraints of geography, and the stark arithmetic of the fighter shortfall in the Indian Air Force (IAF). This somewhat Utopian, uni-dimensional and management-driven thinking is an unaffordable distraction in the Indian threat scenario and the brutal realities of warfare.

The Numbers Game: You Can't Network Zero

The central obsession of this flawed school of thought is a clean, academic separation between what they call the "*Systems Argument*" and the "*Resource Argument.*" Theorists routinely dismiss the urgent concern over how many fighter squadrons India actually has, treating it as a pedestrian distraction. This is a **dangerous delusion** of those who have never sat in a cockpit, never scrambled on a dark night in an ageing aircraft, and never carried the responsibility of running a combat-ready air force.

Let us be blunt about the hard numbers. The IAF is currently operating with roughly 29 fighter squadrons against a long-sanctioned minimum of 42. When you are short of nearly 200 high-performance combat aircraft, the sophisticated "*triage*" the modern planners speak of is not an elegant strategic choice. It is a desperate gamble.

You can build the most beautifully integrated "Dowding-style" filter room in the world, complete with fibre-optic feeds and giant LED displays. But if the final "Act" in your OODA loop (Observe, Orient, Decide, Act) still consists of sending a

lone pilot in a legacy platform against a lethal swarm of fifth-generation threats-simply because some cross-service *"joint nucleus"* labelled him the *"prioritised asset"*- then you have not built a revolutionary military system. You have built an incredibly expensive, highly networked funeral.

The simple logic that some strategic and military minds fail to grasp is this: information systems are force multipliers, not force substitutes. You cannot multiply zero. If you have zero aircraft available to cover a critical vector over the icy Himalayas or the vast Thar Desert, no amount of cloud computing, sensor fusion, or tri-service meetings will generate an intercept. The network is merely a pipeline; when the reservoir of actual combat platforms is dry, the pipeline carries nothing but illusions. This desperation is compounded by a theoretical framework that not only underestimates the number of aircraft needed but fundamentally mis-categorizes how those remaining must be used.

The False Wall Between "Offence" and "Defence"

Perhaps the most dangerous idea put forward is the attempt to surgically separate Air Defence (AD) from Offensive Operations. Elaborate papers divide the sky into distinct zones, treating defence as a passive shield and offence as a separate luxury. The IAF's doctrinal precept of offensive air power and AD being fused inseparably, whether it be a contemporary grey zone limited operation in a no-war-no-peace scenario or the conventional war realities of India's two-front threat, was operationally validated in **Operation Sindoor** against Pakistan last year.

In the real world of supersonic combat, a Sukhoi-30MKI does not drop its tactical AD role the moment it crosses an international border. Air power is fluid, rapid, and indivisible. Yet many argue that our traditional, aggressive "*fighter culture*" is too hostile for the patient restraint required for strategic AD. This view is dangerously naïve.

In modern high-intensity air warfare, Offensive Counter Air (OCA)—destroying enemy jets, fuel dumps, and radars on their own runways—is the most effective form of AD. If our strike fighters can eliminate an enemy F-16 or fifth-generation platform while it sits in its hangar, our cities do not need to endure its missiles later. By aggressively pushing for a separate "**National Air Defence Architecture**" as an independent strategic tier, these theorists are advocating an institutional split that our dwindling fleet cannot afford. A modern fighter is dual-tasked by geography and necessity, not by choice. To suggest that a civilian or cross-service "*systems architect*" should control air combat commanders and teach seasoned fighter pilots the virtue of "*restraint*" is preposterous. It implies we should let the enemy fire first so that our "*Joint Battle-Management Nucleus*" can get clean data. In the final analysis, while India's robust AD denied Pakistan's ability to hurt us, it was the aerial offensive onslaught against Pakistan, which caused substantial and serious damage to the Pakistan Air Force, which forced it to seek a ceasefire after **Operation Sindoor**.

The Dowding Fetish

The recently repeated invocation of the 1940 Battle of Britain has become the ultimate historical red herring. Force-fitting dated theoretical air power of World War II into India's complex contemporary military dynamic, conveniently overlooking the vast differences between a small, isolated European island and a massive sub-continental nuclear power is utterly foolish.

In 1940, Dowding defended a compact island against attacks across a

An Indian Air Force Rafale in a new heavily-armed configuration with missiles on third wing station (photo reddit.com)

Fighters bring a critical mass of offensive and defensive firepower in modern combat

narrow channel. He faced slow, propeller-driven bombers that could be spotted visually. His main tools were basic radar and a telephone network. India faces a two-front threat across the high Himalayas and the Thar Desert, dealing with S-400 systems, ballistic missile defence, space assets, and hypersonic missiles over vast distances. Comparing Bentley Priory's Filter Room to today's challenges is like equating Snakes and Ladders with grandmaster chess.

More importantly, to his great advantage which India does not enjoy, Dowding had a robust British industrial base that rapidly replaced losses. He was not trying to systematise an empty hangar. He had actual aircraft to manage.

The "Committee" Conundrum

Some thinkers scoff at the idea of the IAF serving as the central nervous system of air operations. They fear "*single-service primacy*" and propose a top-heavy "**Joint Battle-Management Nucleus**" headed by a four-star commander. In a domain where reaction times are measured in seconds, these theorists propose a layer of civil-military bureaucracy where decisions are measured in committee meetings and political clearances. When a saturation missile and drone attack is already underway, the last thing the nation needs is a desk-bound commander, with little knowledge and understanding of aerospace power, seeking authorization and consulting manuals before sanctioning an intercept. A committee focused on peacetime issues will not suddenly become swift and lethal when hypersonic salvos arrive. These theorists want planning centralised under a committee while execution remains with a resource-starved force.

The Illusion of Technology Over Mass

There is also an almost childlike faith in emerging technologies-Artificial Intelligence (AI), machine learning (ML), and automated networks. Essays overflow with buzzwords like "*compressing the sensor-to-decision cycle*" and "*algorithmic threat triage*." The belief is that good software can bridge the gap left by missing aircraft. This misunderstands technology's role in war. AI can quickly rank threats and colour-code displays, but it cannot materialise an expended S-400 missile. It cannot split one overworked Sukhoi squadron across three theatres. It cannot bear the moral weight of deciding which city or base to leave undefended.

When the skies turn hostile, the ultimate constraint is the number of kinetic effectors available. By focusing only on networks and human architecture, these theorists are building a sophisticated brain for a body that is losing its muscles.

Cutting-edge high-tech weapons come at a cost, and place a budget- driven limit to the number of holdings, and also on the employment philosophy. Even the best military in the world has to find a practical balance between the high-tech high-cost specialist weapons, and relatively lower-tech mass which makes up the volume of its inventory. Can only high-tech long-range precision weapons provide the necessary deterrence against China and Pakistan, who have strong air forces? And in case escalation-controlled limited operations expand into a larger conflict or war, there is no option but to fall back on the conventional mass. Thus, conventional mass is an undeniable reality and a critical necessity in India's future threat and security matrix.

The Operational Reality of the Skies

In an actual air campaign across our complex geography, the enemy will launch drones, cruise missiles, Electronic Warfare aircraft, and fighters in a synchronised effort to overwhelm us. In such chaos, the line between AD and theatre command dissolves.

The defensive and offensive plans must be the same plan, executed

by the same commanders using the same multi-role aircraft. Creating separate institutional domains only produces exploitable seams. Consider the friction of such a system: an Army ground-based AD unit hesitating to engage a low-altitude cruise missile while awaiting clearance, or an IAF offensive fighter package being denied real-time AWACS data because the sensor belongs to a separate homeland-defence organisation. This is not modern multi-domain warfare; it is a recipe for operational paralysis and unacceptable military defeat.

The Fluidity of the Air Domain

At its core, this intellectual movement which sees air power through service-specific lenses for narrow service-centric interests and biases, consequently, fails to understand let alone accept, that the air domain is structurally, physically, and temporally different from land and sea. Air Forces move at Mach 2, which is a harsh reality and not an air power brag. Positions are held through constant kinetic dominance, not static occupation of a defined invisible volume of battlespace. A fighter is not a chess piece fixed to one square; it can strike an enemy airfield at dawn, intercept missiles at noon, and support infantry by nightfall.

Attempting to separate the "*defensive*" role of our air assets is operational self-sabotage. It forces a highly flexible, multi-role weapon system into single-purpose boxes just to make organisational charts look neat. The IAF has in all its wars, conflicts and contingencies steadfastly and significantly contributed to joint warfare. It has equally vital service-specific roles of AD and strategic targeting in the wider concept of national security. It is the fluidity with which the IAF executes both defensive and offensive operations in the three-dimensional vertical domain, that make Indian air power a credible deterrent.

Final Thought: Gravity Still Wins

The elegant "*systems argument*" remains a seductive trap. It offers the comforting illusion that superior management can replace physical mass. It cannot.

- Air power is expensive and cannot be built overnight.
- You can never network what you do not physically possess.
- A modern fighter jet is an indivisible, multi-role tool of national power, which provides the vital and flexible combat mass. Splitting its roles through organisational fiats and perception biases will degrade India's air power employment capability in the larger national interest.
- India does not need another sprawling "**National Air Defence Architecture**". The government-accepted benchmark of 42 fully equipped modern fighter squadrons is a non-negotiable criticality. It certainly must be supplemented and bolstered with unmanned aerial and weapon systems, but they cannot be substitutes.
- Given the new-age warfare realities of air power that have significantly altered the dynamics of land and sea powers, the services must embrace it as an equal towards achieving the higher national goals jointly, rather than attempting to apportion and own it, for limited service-centric objectives.

Thus, before we invest all our energy in building a complex "**Integrating Spine,**" we must first ensure we have enough physical ribs to keep the body from collapsing. Until the IAF receives the numbers, platforms, and resources it needs to dominate our vast skies, all the "**Joint Nuclei**" and "**Systems Architectures**" will remain expensive chairs while the sky falls around them.

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Air Marshal Raghunath Nambiar, PVSM, AVSM, VM & Bar (Retd), is an Experimental Test Pilot commissioned into the IAF as a fighter pilot in June 1981. He retired as Commander-in-Chief, Western Air Command, after leading Eastern Air Command, serving as Deputy Chief of Air Staff, and as Senior Air Staff Officer across three Commands. He has extensive experience on Mirage 2000 with over 2300+ hours on type. He commanded No.1 Squadron, was Air Officer Commanding, Air Force Station Jamnagar, and Commandant ASTE Bengaluru. In Kargil 1999, he flew 25 missions, attacking Tiger Hill with a precision Laser Guided Bomb-delivering five of IAF's eight such strikes and was awarded the Vayu Sena Medal (Gallantry). He was a Project Test Pilot for the Light Combat Aircraft Tejas and was awarded a Bar to VM for flight testing it.

Air Marshal Raghunath Nambiar

PAKISTAN'S HANGOR CLASS SUBMARINE PROGRAMME

Pakistan concluded a contract with China Shipbuilding & Offshore International Co. Ltd (CSOC) in 2015 for eight S-26 submarines (called the **Hangor Class** in the Pakistan Navy) at an estimated cost of four to five billion US dollars. This is the largest contract signed by the Pakistan Navy (PN) in its history. As per the terms of the contract, four submarines were to be built by Wuchang Shipbuilding Industry Ltd (WSIL) at their Shuangliu Base in Wuhan and the remaining four by Karachi Shipyard & Engineering Works (KS&EW) in Karachi, Pakistan, under a **Transfer of Technology** (ToT) agreement. The submarines built by WSIL were to be delivered in 2022-23 and those built by KS & EW by 2028. A stated aim of the programme was to transform Pakistan into a submarine- building nation.

The S-26 is an export variant of the Type 039A *Yuan* Class submarine built for the People's Liberation Army Navy (PLAN). Like the *Yuan*, it is equipped with a Stirling engine-based Air Independent Propulsion (AIP) system allowing it to remain submerged for a prolonged duration. The version of the S-26 contracted by Pakistan reportedly has some design modifications. These include a heavier displacement of 2800 tons (as against the S-26's 2550 tons) and a slightly shorter hull of 76 metres (as against the S-26's 77.7 metres).

The programme got off to a good start with both China and Pakistan augmenting their shipyards to facilitate construction. The lone Final Assembly Hall (FAH) at the Shuangliu Base of WSIL (which was being used for the Royal Thai Navy S-26 programme) was augmented by a much larger FAH built adjacent to it, work on which commenced in early

The Pakistan Navy's newly commissioned submarine PNS Hangor (Type 039B Yuan-class derivative built in China) along with frigates PNS Taimur (F262) and PNS Aslat (F254) arrived at Tanjung Priok Port, Jakarta, Indonesia on 19 May 2026 (photo South Asia IntelWire)

2016 and was completed by early 2017. The PN submarines are being built at this facility.

Insofar as augmentation of infrastructure at KS&EW is concerned, a contract was signed in July 2017 with the Norwegian ship design and building firm TTS Group for the construction of a Syncrolift ship-lift system capable of handling ships of up to 7300 tons. The lift-system is connected with a rail-linked traverse mechanism comprising of 30 motorized trollies which are used for shifting vessels to one of 12 custom-designed workstations on land, including two inside a covered shed. Work on this facility commenced in 2018 and it was commissioned on 10 August 2021.

The timeline of the *Hangor* Class programme, however, got derailed by two major events. The first of these was the outbreak of COVID, followed by the lockdown in Wuhan commencing in January 2020. The second major issue was Germany's refusal to accord an export license to China for the locally manufactured MTU 12V 396 diesel engines that power the submarine. To address this issue, the PN opted to wait for China to fully test and certify its indigenously developed and built CHD-620 diesel engine. It may be presumed that sufficient performance guarantees have been given by China to the PN to address the operational risk associated with the fitment of unproven engines.

The delays to the programme were reportedly used by the PN to persuade China to carry out some modifications to the submarine. The most significant of these is the conversion of the earlier wet snorkel mast to a dry one, which allows the crew to drain the snorkel and associated trunkings while remaining submerged. This reduces the time required to start generators and commence the charging of batteries while snorkelling, thereby improving the Indiscretion Rate (IR) of the submarine. Modifications to improve habitability and ergonomics were also undertaken. *(Some readers may not be very aware of what snorkels are. The name derives from the commonly known snorkel that swimmers and divers use to remain just below the surface with a tube jutting out of the water to enable breathing to continue. In the Second World War, German submarines (the "U-Boats") adapted a design conceived by Dutch designers to be able to suck in air by raising a snorkel (or Snort mast) just like a periscope mast while the submarine conning tower and hull remained a few metres below the surface to reduce the visual or radar size of a surfaced submarine. These became standard equipment on all conventional submarines for slightly stealthier battery charging.)*

On 07 October 2020, while briefing the press, Admiral Zafar Mahmoud Abbasi, the outgoing Pakistan Chief of Naval Staff (CNS) had stated that the PN would obtain a *Yuan* Class submarine from the PLAN (over and above those being constructed, as part of the *Hangor* programme) for training and acclimatisation purposes on a '*gratis basis*'. This, however, is yet to materialize and given the advanced stage of the programme, appears unlikely at this point of time.

Milestones. Significant milestones associated with the programme are as mentioned below:

- **29 April 2019 - Naming of the Boat No 1**. Admiral Zafar Mahmood Abbasi, Pakistan CNS visited the Shuangliu Base of WSIL for the naming ceremony of the first submarine as *Hangor*. From the PN's perspective, the name has much significance. PNS *Hangor* was the Daphne class submarine that sank INS *Khukri* on 09 December 1971, just off the Gujarat coast.
- **09 December 2021 - Steel Cutting of Boat No 5**. The steel cutting ceremony of the first *Hangor*-class submarine to be built at KS&EW, originally scheduled for October 2020, was held on 09 December 2021. This submarine would be commissioned as PNS *Tasnim* in honour of the Commanding Officer

Aft Casing of PNS Hangor showing Active Sonar Decoy Dispensors (photo courtesy Royal Malaysian Navy)

Pakistan's President Asif Ali Zardari at the Commissioning Ceremony of PNS Hangor at Sanya, Hainan in China on 30 April 2026 (Photo ISPR, Rawalpindi)

of ex-PNS *Hangor*, Vice Admiral (Retd) Ahmad Tasnim, who was present on this occasion. The event was presided over by Admiral Zafar Mahmood Abbasi, Pakistan CNS.

- **24 December 2022 - Keel Laying of Boat No 5 and Steel Cutting of Boat No 6**. A ceremony to simultaneously commemorate the keel-laying of Boat No 5 and steel-cutting of Boat No 6 was held at KS&EW, Karachi on 24 December 2022. The event was presided over by Admiral Zafar Mahmood Abbasi.
- **14 February 2024 - Keel Laying of Boat No 6**. The keel-laying of Boat No 6 at KS&EW, Karachi was presided over by Admiral Naveed Ashraf, Pakistan CNS.
- **26 April 2024 - Launch of Boat No 1**. Admiral Naveed Ashraf, Pakistan CNS was the Chief Guest at the launch ceremony of Boat No 1 (*Hangor*) at the Shuangliu Base of WSIL in Wuhan.
- **13 March 2025 - Launch of Boat No 2.** Vice Admiral Ovais Ahmed Bilgrami, Vice Chief of the Naval Staff of the PN was the Chief Guest at the launch ceremony of Boat No 2 at the Shuangliu Base of WSIL in Wuhan.
- **16 August 2025 - Launch of Boat No 3**. Vice Admiral Abdul Samad, Deputy Chief of Naval Staff (Project-2) was the Chief Guest at the launch ceremony of Boat No 3 (*Mangro*) at Shuangliu Base of WSIL in Wuhan.
- **17 December 2025 – Launch of Boat No 4.** The launch ceremony of Boat No 4 (*Ghazi*), the last of the Chinese--built boats under this programme was held at Shuangliu Base of WSIL on 17 December 2025. The launch ceremony was attended by senior officials from Pakistan and China. *Incidentally, PNS Ghazi was the submarine that was sunk off the harbour of Vishakhapatnam on the night of 03 December 1971 as per the Indian Navy's official history with the loss of her entire crew. She still lies there as a war wreck.*
- **30 April 2026 - Commissioning of PNS *Hangor*.** The commissioning ceremony of the first *Hangor* class submarine was held at Sanya, Hainan in China on 30 April 26. The importance that the PN has assigned to this programme can be gauged from the fact that the ceremony was presided over by Mr. Asif Ali Zardari, the President of Pakistan. Admiral Naveed Ashraf was also present at the ceremony. **This is the first known commissioning of a foreign naval vessel at Sanya.**

Maiden Passage of PNS Hangor

After commissioning, PNS *Hangor* commenced her maiden passage to Pakistan in the first week of May. She was escorted by the PNS *Taimur*, a Type 54 A/P frigate and PNS *Aslat*, a Zulfiqar class Type 22 frigate. *Hangor's* first port of call was at the Kota Kinabalu Naval Base in Sabah, Malaysia from 8 to 11 May 2026.

While entering harbour, the fin top showed a raised periscope comprising of a two-stage fairing with a rotating head. The periscope is possibly an optronic one with EO/IR sensing capability. The head also incorporates a radar warner as is standard in most modern periscopes. The rear edges of both the fairings below the rotating head appeared to be flat. This may create eddies while doing higher speeds at periscope depth. At the end of the aft casing, just ahead of the rudder are 12 circular ports placed in a staggered manner. These possibly are dispensers for active sonar decoys. These modifications seem to suggest the maturation of Chinese submarine designs with increased stealth, reduced hull and flow noises.

The next port call made by PNS *Hangor* was at Tanjung Priok Port, Jakarta which she entered on 19 May and departed on 22 May 26. She would have transited directly to Pakistan from this port, possibly using the Sunda Strait.

Delivery Schedule of Remaining Chinese Built Boats

The time intervals between launch of the boats built at WSIL are as follows: -

- Boat 1 & 2: 11 months
- Boat 2 & 3: 5 months
- Boat 3 & 4: 4 months

Further, the time interval between launch and commissioning of PNS *Hangor* was two years. Based on experience gained with the first boat, it is anticipated that this period will be compressed for subsequent submarines. It is therefore probable that Boat No 2 will be commissioned by December 2026 and the remaining two boats by mid-2027.

Status of Submarines under Construction at KS&EW

Work on the four submarines being built at KS&EW is well behind schedule with the revised induction schedule reportedly being 2028 to 2030. However, given the fact that after the keel laying of the 6th boat on 14 February 2024 at KS&EW, no information about the seventh and eighth boats has been publicized, it is likely that this schedule will be further delayed with inductions possibly taking place in the early 2030s.

Overall Status

The compiled overall status of the programme (Boat Numbers 1 to 6) is as tabulated in Table-1. No details are available of Boat Nos 7 and 8.

Table 1: Cardinal Dates of Hangor Class Programme (Boat Nos 1 to 6)

Boat No	Yard	Steel Cutting	Keel Laying	Launch	Commissioning
1 (*Hangor*)	WSIL	Not Known	Not Known	26 April 2024	30 April 2026
2 (*Shushuk*)	WSIL	Not Known	Not Known	15 March 2025	December 2026 (Estimated)
3 (*Mangro*)	WSIL	Not Known	Not Known	16 August 2025	1st Quarter 2027 (Estimated)
4 (*Ghazi*)	WSIL	Not Known	Not Known	17 December 2025	2nd Quarter 2027 (Estimated)
5 (*Tasnim*)	KS&EW	09 December 2021	24 December 2022	2027/28 (Estimated)	2029/30 (Estimated)
6 (*Seem*)	KS&EW	24 December 2022	14 February 2024	2028/29 (Estimated)	2030/31 (Estimated)

Assessment

Progressive induction of AIP equipped *Hangor* class submarines in the PN will give a fillip to their submarine arm and its capabilities. Even though the Agusta 90B submarines in PN inventory are AIP equipped, the system has been plagued with several technical and contractual issues rendering these plants practically inoperable. Therefore, these newer submarines would be an important capability from the PN's point.

The experience gained by KS&EW in building four of the submarines under this programme will hold them in good stead for conducting major overhauls as well as modernization of these boats as and when they fall due. The yard will also find it easier to transition to the building of newer classes of submarines, particularly if they are of a Chinese design that share several attributes with the *Hangor* Class.

It is not clear as to where these boats will be based. Construction of shore infrastructure, particularly Liquid Oxygen tanks for meeting AIP requirements would provide early indication of long-term berthing arrangements.

To conclude, **the Indian Navy would need to be watchful and increase its own ASW (Anti-submarine Warfare) capabilities** for which its shore and ship based aircraft, its own attack submarines (conventional as well as nuclear), unmanned submarine vehicles, sea-bed sensors, etc. would need enhancement.

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Rear Admiral Monty Khanna, AVSM, NM (Retd), an alumnus of National Defence Academy, Pune was commissioned into the Indian Navy on 01 January 83. His afloat commands include the submarine Sindhuvijay and the Frigates Krishna and Gomati. He was the Commandant of the Naval War College from January 14 to November 17. He thereafter served as Chief Instructor, Defence Services Staff College till his retirement in August 19. He subsequently served as the Assistant Military Adviser at the National Security Council Secretariat in New Delhi from December 19 till December 23. In April 2025, he was appointed as a member of the National Security Advisory Board.

Rear Admiral Monty Khanna

MAJOR MUKUND VARADARAJAN, ASHOKA CHAKRA (POSTHUMOUS)

A Saga of Valour & Sacrifice where... Duty met Devotion

South Kashmir has persistently been a **'hotbed'** for counter insurgency operations, witnessing frequent engagements between security forces and heavily armed foreign and local terrorists. Within this grid, Shopian district presents a particularly challenging operational environment. Characterised by dense apple orchards, undulating terrain, narrow approach routes, and dispersed habitations, the area offers ample cover and concealment to hostile elements. The terrain and population realities demand precise, well-coordinated operations where threats can emerge from any direction. This is the testament of a fearless Officer who embraced these challenges head on and made the ultimate sacrifice while leading from the front - **Major Mukund Varadarajan,** a soldier whose courage and commitment continues to inspire generations.

Major Mukund Varadarajan, ready for action, in the higher reaches of Shopian District

Shopian - A Volatile Haven for Terrorists

At first glance, Shopian appears serene with lush orchards stretching across undulating land, quiet villages nestled between tree lines, and a rhythm of life that seems untouched by conflict. But beneath this calm lies a complex operational grid. The orchards provide excellent cover for terrorists. Houses, often clustered together, can quickly turn into fortified hideouts. Narrow approaches restrict mobility, while the presence of civilians demands precision and restraint in every engagement. For soldiers, Shopian is not just terrain - it is a test of patience, awareness, and nerve. In this demanding environment, Major Mukund Varadarajan emerged as a leader of exceptional calibre.

The Making of the Warrior

Major Mukund Varadarajan was born on 12 April 1983 in Calicut district, Kerala. Raised in a close knit family, he shared a strong bond with his siblings. Coming from a family with a rich military tradition, his uncle also having served in the Indian Army, Major Mukund grew up listening to stories of courage and sacrifice. These stories were not just inspiring; they shaped his purpose. Academically accomplished, he completed his Bachelor of Commerce and later pursued a diploma in Journalism from Madras Christian College, Tambaram. Here he first met Miss Indhu Rebecca Varghese, whom he later married on 28 August 2009. Despite having promising opportunities in the corporate world, his heart was firmly set on joining the Army. For him, the uniform was not just a career option, but a way of living life.

Joining the 22nd Battalion, The Rajput Regiment

In 2005, Mukund cleared the Combined Defence Services Examination and joined the prestigious Officers Training Academy (OTA), St Thomas Mount, Chennai. At the Academy, he stood out for his determination, leadership and resilience. The training pushed him to his limits but it also revealed his strength of character. On 18 March 2006, he was commissioned into the 22nd Battalion of the Rajput

Regiment, a unit renowned for its valour and proud traditions. It was here that he imbibed the true ethos, values and rich traditions of a soldier's life. The regimental motto, **"Sarvatra Vijay"** resonated deeply within him and became a guiding principle in his service. In the unit, he distinguished himself across all spheres, excelling in academics, sports and professional competitions. His dedication, discipline and competitive spirit aptly reflected the *tartib* of the unit while he tenanted the duties of Company Commander and Battalion Adjutant in field and peace locations. In every endeavour, he upheld and reinforced the finest traditions of the Rajput Regiment.

Family: His Source of Strength

Major Mukund's journey as a soldier was defined by professionalism, courage, and an unwavering commitment to duty. Yet, beyond the uniform, he remained deeply rooted in the values of love, family and enduring relationship, providing him with strength and stability amidst the challenging military life. The couple was blessed with a daughter, Arshea, born on 17 March 2011, who brought immense joy and happiness to their lives. Despite the challenges of service, frequent separation, operational commitments, he remained a devoted husband, caring father and a lovable son. For him, his family was not just mere support but much beyond it, as a pillar of strength that reinforced and propelled his resolve to serve the nation with honour and dedication.

Sharpening the Warrior's Edge

After a brief period of five years with his parent unit 22 Rajput, he was posted to Infantry School, Mhow as an Instructor, this indeed reflects his thorough professional knowledge and acumen. As an instructor he was responsible for mentoring and shaping the next generation of young officers. Even as he imparted knowledge, he continued to refine his own skills sharpening his tactical instincts, deepening his understanding of new generation weapons/ equipment and strengthening his ability to make quick decisions under pressure. A subsequent stint with the United Nations Mission in Lebanon broadened his horizons. Operating in a multinational environment, he gained valuable experience in peacekeeping and conflict management. It taught him the importance of restraint, adaptability, and professionalism - qualities that would later prove critical in counter insurgency operations.

Into the Folds of 44 Rashtriya Rifles

After the successful tenure with the United Nations Mission at Lebanon, he was posted to 44 Rashtriya Rifles in Shopian, South Kashmir. Kashmir valley was a different battlefield altogether. The enemy was unpredictable, the terrain unforgiving, and the stakes constantly high. Major Mukund quickly adapted to the testing operational environment. He developed a reputation for calmness in adverse conditions, quick tactical thinking and controlled aggressive approach. In one operation, he demonstrated remarkable composure by counting the rounds fired by a terrorist during an encounter, waiting for the exact moment to strike. It was a rare display of presence of mind; one that reflected both training and instinct.

Operation Qazipathri - 25 April 2014

In April 2014, 44 Rashtriya Rifles was actively engaged in counter-insurgency operations in Shopian. Intelligence inputs indicated the presence of heavily armed terrorists, including a top district commander of Jaish-e-Mohammed, in Qazipathri village. The same group had carried out a dastardly attack on election officials just a day earlier. The urgency was clear, Major Mukund wasted no time, leading his Quick Reaction Team (QRT),

2nd Lieutenant Mukund Varadarajan with his parents; on commissioning after training at Officers Training Academy, Chennai

The bust of late Major Mukund Varadarajan, AC (Posthumous), was unveiled at the Officers Training Academy, Chennai, 01 June 2015, with his family members present

reached the target area swiftly and established a cordon around a two storey house surrounded by an orchard and outhouses. As expected, the terrorists opened heavy fire.

In a fierce encounter lasting over an hour, the firefight raged without any breakthrough. The terrorists were firmed in inside the house. Sensing the need for decisive action, Major Mukund made his move. Moving under supporting fire from colleagues, he and Sepoy Vikram Singh (his team member) crawled towards the house. Reaching the entrance, he planted an Improvised Explosive Device (IED) and breached the structure. Without hesitation, he stormed inside. In the intense close quarter battle that followed, he neutralised one terrorist. The remaining terrorists fled towards an outhouse, throwing grenades to cover their movement. Major Mukund pursued relentlessly. A grenade thrown into the outhouse killed one terrorist, but the "wanted" terrorist survived and opened fire. Sepoy Vikram Singh was grievously injured and later succumbed to his injuries. At that critical moment, Major Mukund did not pause, with utter disregard to his own safety, he charged forward and eliminated the kingpin at close range, ensuring the success of the mission. In the process, he sustained multiple gunshot wounds.

In the final moments, while being evacuated, there was no panic, only quiet composure on his face. He had accomplished his mission. Major Mukund Varadarajan succumbed to his injuries on the way to the hospital.

Aftermath and Legacy

His sacrifice sent waves of grief across the nation. From his hometown in Chennai to the Valley where he fought, people paid tribute to a soldier who made the supreme sacrifice for the motherland. For his exceptional bravery, indomitable spirit, and supreme sacrifice, Major Mukund Varadarajan was awarded the Ashoka Chakra, the country's highest peacetime Gallantry Award. The award was conferred by Shri Pranab Mukherjee, the Hon'ble President of India to Mrs Indhu Mukund, his wife at New Delhi on 26 January 2015, during the Republic Day Parade.

A Legacy on the Silver Screen - Amaran

The story of Major Mukund Varadarajan's courage and supreme sacrifice resonated far beyond the battlefield. A biopic **"AMARAN"** on Major Mukund Varadarajan, Ashoka Chakra (Posthumous) was released worldwide in October 2024. The film brought alive the extraordinary journey of a soldier who led from the front, fought with unmatched determination, and laid down his life in the line of duty. More than just a cinematic tribute, **"Amaran"** captured the emotional depth of his life, his love for his family, his bond with his men, and above all, his unwavering commitment to the motherland. Through this portrayal, his story reached millions, ensuring that his bravery and sacrifice continue to inspire generations. For us in 22 RAJPUT, Major Mukund Varadarajan remains an inspiration and a heroic warrior.

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Colonel
Amit Kumar Mishra

Colonel Amit Kumar Mishra commissioned on 19 September 2009 into 22 Battalion the Rajput Regiment has distinguished himself as a dedicated and battle-hardened officer earning "Mention-in-Despatches" on two occasions for his gallantry. He has served in demanding operational environments along Line of Control in Jammu & Kashmir and in Manipur. A passionate runner and a strong proponent of physical fitness, Colonel Amit Kumar Mishra embodies the ethos of leading from the front. Currently, he is Commanding 14 Assam Rifles and continues to inspire his troops through his enduring commitment to service.

Vishnu Saravanan working over the waves in ILCA 7 Race.
Left Inset Havildar Ramya Saravanan, Right Inset Subedar Vishnu Saravanan

THE SARAVANAN SAILING LEGACY

Three Lives, One Horizon, One Organisation: Subedar Major R Saravanan, Subedar Vishnu Saravanan and Havildar Ramya Saravanan, and the Indian Army

The story of the Saravanan family is not merely a story about medals, championships, or Olympic participation. It is a story about dedication carried across generations, about a family that transformed sailing from a sport into a shared identity. In a country where cricket dominates public imagination and where sailing remains a niche discipline, the Saravanans quietly built a remarkable sporting legacy through persistence, sacrifice, and vision. From modest beginnings - Salamanatham village in Vellore district, Tamil Nadu, the Saravanans emerged to eventually compete against the best sailors in the world.

At the centre of this story stands Subedar Major R Saravanan — sailor, coach, mentor, and father. A seven-time national sailing award winner and a respected sailing coach, he spent decades nurturing Indian sailing talent while simultaneously shaping the future of his own children. His life amidst the waves laid the foundation for what would become one of India's most inspiring family legacies in the sport of sailing.

That foundation produced two extraordinary athletes: Subedar Vishnu Saravanan and Havildar Ramya Saravanan. Vishnu emerged as one of India's finest Olympic sailors, representing the country on the world's biggest sporting stage and setting new benchmarks in the ILCA 7 class. Ramya, meanwhile, carved her own path through years of national dominance and international competition, becoming one of India's most accomplished women sailors across multiple classes. Together, they represent something rare in Indian sport: a complete family ecosystem built around excellence.

Origins of a Dream

Every sporting dynasty begins with one individual willing to pursue a difficult path. For the Saravanan family, that person was JC 307527W Subedar Major R Saravanan. R Saravanan joined the Army on 29 June 1990, and was inducted into the Army Yachting Node (AYN), Mumbai on 11 July 2001. After serving in AYN for 18 years, he retired on 31 August 2019.

Long before his children became internationally recognized sailors, he had already established himself as a respected figure in Indian sailing. His profile reflects more than twenty years of experience in competitive sailing and athlete development. During those years, he not only competed successfully but also helped shape future generations of sailors through coaching and mentorship.

Subedar Major R Saravanan understood the demands of elite competition. He represented India at three Asian-level competitions and later served as coach of the Indian Army Windsurfing Squad, guiding the team toward numerous national and international victories. Yet statistics alone cannot capture the depth of his contribution.

From left to right. Vishnu Saravanan, Ramya Saravanan, the author and Colonel Ameya, Commanding Officer AYN, Mumbai

Indian sailing has historically faced several challenges: limited infrastructure, low public visibility, expensive equipment, and minimal sponsorship opportunities. Athletes often rely on institutional support, military programmes, or personal sacrifice to sustain international careers. Subedar Major R Saravanan's rise through such a system required not only talent, but resilience and unwavering discipline.

As a coach, he developed a reputation for technical precision and mental toughness. Those who train sailors know that sailing is not simply a physical sport. It demands reading wind patterns, understanding tides, mastering balance, and making split-second tactical decisions. A sailor must think like a strategist while enduring physically punishing conditions. Subedar Major R Saravanan understood these demands intimately, and he introduced his children to the sport not as a hobby, but as a way of life.

A Family Raised by the Sea

For Vishnu and Ramya, sailing was never distant from everyday life. Their childhood was shaped by regattas, training camps, boat maintenance, and discussions about wind, currents, and race tactics. Unlike children who discover sports through television, they grew up immersed in the realities of competitive sailing. Their father did not merely encourage them from the sidelines. He actively coached, guided, corrected, and inspired them. He coached his son to many national titles in the Optimist class and helped his daughter achieve significant success as well. This family environment created an unusual advantage: the children learned discipline before they learned ambition.

Sailing is a sport where patience matters as much as aggression. Young sailors spend countless hours learning fundamentals long before achieving visible success. Subedar Major R Saravanan understood this developmental process and ensured that both Vishnu and Ramya built strong technical foundations.

Havildar Ramya Saravanan: Breaking Waves and Expectations

Before Vishnu became India's Olympic sailing star, Havildar Ramya Saravanan had already established herself as one of the country's leading women sailors. Born on 29 September 2000, Ramya entered competitive sailing at a young age. Her early years reveal steady progress through the Optimist class - the foundational category for young sailors worldwide.

Her national achievements began appearing as early as 2009, when she competed in regattas across Hyderabad, Chennai, and Mumbai. Even in those formative years, consistency became a defining feature of her career. By 2011, eleven year old Ramya was winning gold medals at major national events, including the Cochin Coastal Nationals and the Yachting Association of India (YAI) National Squad Selection Trials. The following years saw her dominate multiple sailing categories, including Optimist, Laser 4.7, Laser Radial, Enterprise, and later Nacra 17.

What makes Ramya's journey remarkable is her versatility. Most sailors specialize early in one category. Ramya, however, demonstrated adaptability across several classes, each requiring different technical skills and tactical approaches. Her transition from youth classes into high-performance Olympic disciplines reflected both athletic intelligence and rigorous training. Between 2012 and 2015, she accumulated an impressive collection of national gold medals. She won titles in Mumbai, Chennai, Hyderabad, Pune, and Kerala, proving her ability to perform in varied sailing conditions.

Internationally, Ramya steadily gained recognition. One of her early breakthrough performances came in 2011 at the Qingdao Optimist Regatta in China, where she finished fourth among forty-nine competitors. In 2012, she secured silver at the India International Regatta in Chennai. By 2014, she represented India at the Asian Games in South Korea, finishing sixth in the Optimist category.

Participation in the Asian Games marked an important milestone. Competing at such a level requires mental maturity beyond age. International sailing exposes athletes to elite tactical racing, unfamiliar weather systems, and intense pressure. Ramya continued progressing through Olympic pathways. In 2015, she won gold at the ISAF Youth Championship in Chennai in the Laser Radial class. This achievement established her as one of India's most promising female sailors.

The Evolution of an Elite Sailor

As Ramya matured, so did the complexity of her sailing career. Her transition into 470 and Nacra 17 classes demonstrated a willingness to embrace technically demanding disciplines. The Nacra 17, in particular, is among the most challenging Olympic sailing categories. It is a high-speed mixed multihull event requiring synchronization, balance, and split-second coordination.

On 05 March 2023, Ramya joined the Corps of Military Police as a direct entry Havildar (sports quota). By 2023, 7789328F Havildar Ramya Saravanan was competing internationally in Nacra 17 events across France, Germany, the Netherlands, and China. Her participation at the Asian Games in Hangzhou represented another major chapter in her career. Her achievements also earned recognition through honours and awards. She received the prestigious Engineer-in-Chief's Trophy twice for being the most promising lady sailor.

Ramya's significance extends beyond medals. In Indian sailing, women athletes often face additional barriers — fewer sponsorship opportunities, lower visibility, and limited institutional support. Her sustained presence at elite levels helped challenge those limitations and inspired younger female sailors. She proved that Indian women could compete internationally in technically demanding sailing categories. Ramya is now training for the Olympics in 2028 at Los Angeles, in the Nacra 17 class.

Subedar Vishnu Saravanan: The Olympic Journey

If Ramya represented consistency and versatility, Vishnu represented breakthrough excellence. Born on 26 February 1999, Vishnu began sailing in 2009. From an early age, he displayed exceptional focus and competitiveness. Under the guidance of his father, he progressed rapidly through junior sailing structures and national competitions.

His rise coincided with the increasing professionalization of Indian sailing. Better international exposure, structured training programmes, and institutional support allowed talented sailors to compete more frequently abroad. Vishnu seized these opportunities with determination. He joined the Army at Madras Engineer Group and Centre, Bengaluru on 17 November 2017 as a direct entry Naib Subedar (sports quota). JC 312349H Naib Subedar Vishnu Saravanan was promoted to Subedar on 03 March 2018.

By 2018, he was already competing in major international regattas across Europe and Asia. His silver medal at the Europa Cup in Italy that year signalled his growing international competitiveness. Then came a series of landmark performances in 2019. Vishnu won bronze medals at both the U21 European Championship in Poland and the U21 World Championship in Croatia. These results were significant because European sailing circuits are among the toughest in the world. Performing consistently against elite youth sailors from traditional sailing nations demonstrated that Indian sailors could compete globally.

For Indian sailing enthusiasts, Vishnu's emergence represented hope. He combined physical endurance with tactical sharpness. His sailing style reflected patience, adaptability, and confidence under pressure — qualities often associated with experienced European sailors.

The Olympic Qualification

The defining moment of Vishnu's career came in 2021. At the Asian Sailing Championship Olympic Qualifiers in Oman, he finished second among twenty-three competitors, securing silver and earning qualification for the Tokyo Olympics. Olympic qualification in sailing is extraordinarily difficult. Unlike sports where nations receive multiple quotas, sailing qualification pathways are fiercely competitive and regionally limited. Athletes must perform consistently across several regattas against world-class opposition.

When Vishnu qualified, he became one of India's brightest Olympic hopes in sailing. The Olympics are unlike any other event. Every race is psychologically intense. Sailors must manage unpredictable weather, technical equipment, and tactical positioning while carrying the expectations of their nation.

At the Tokyo Olympics, he competed in the ILCA 7 class and finished twentieth among thirty-five sailors. While not a medal result, it was nevertheless historic. Competing at the Olympics placed him among the global elite, and his performance reflected India's growing competitiveness in the sport. Vishnu's participation itself was a triumph of perseverance.

Vishnu Saravanan - balancing amidst the wind and the waves

Building International Respect

Vishnu continued to elevate Indian sailing. In 2021, he achieved India's best-ever performance at the ILCA 7 World Championship by finishing twenty-fifth among 168 competitors in Spain. This result established him as one of Asia's leading sailors. In 2022, he won gold at the Asian Sailing Championship in Abu Dhabi. The achievement confirmed his status as a continental champion and demonstrated his ability to convert experience into victories.

Domestically, Vishnu became nearly unbeatable. His national record includes repeated gold medals at YAI Senior Nationals, Sail India, MDL Cup qualifiers, and multiple national championships between 2018 and 2023. He also earned numerous honours, including the Admiral RH Tahiliani Trophy and multiple Army Chief of Staff Commendations. These awards reflected not just athletic performance but institutional recognition of his contribution to Indian sailing.

The Tremendous Army Support

An important dimension of the Saravanan legacy is its relationship with the Indian Army. The Army has historically played a major role in sustaining Indian sailing by providing athletes with infrastructure, financial stability, and international exposure. For sailors, institutional backing is critical because sailing is among the world's most expensive sports. Boats, sails, travel, coaching, and maintenance require substantial investment.

Subedar Major R Saravanan, Subedar Vishnu and Havildar Ramya - all of them were trained and nurtured at the AYN. When then Havildar R Saravanan joined the AYN in its formative years, he was pursuing his own career in Windsurfing. The children were introduced to the sport as a hobby. The environment and dynamics in the node governed by successive Commanding Officers, Training Officers, administrators, mentors and coaches ensured that the Saravanan children were drawn to the tinges of competitive sailing.

The Army system allowed athletes like Vishnu to focus fully on performance. At the same time, the military environment reinforced discipline, structure, and mental resilience — qualities central to elite sailing. The Saravanan family's association with Army sailing programmes therefore represents more than employment. It reflects a partnership between personal ambition and institutional support.

A Family of Competitors

One of the most fascinating aspects of the Saravanan story is how competition existed alongside family unity. In many sporting households, pressure can fracture relationships. Expectations become burdensome. Comparisons create tension. Yet the Saravanans appear to have transformed competition into collective growth.

Subedar Major R Saravanan coached without overshadowing. Ramya developed independently without being reduced to *"Vishnu's sister."* Vishnu carried national expectations while remaining grounded in family values. This balance is rare.

Mrs Saravanan, the mother is the unsung hero and the rock-solid spine in the family. She has long endured the soreness in the bodies of the kids when they used to return after gruelling training sessions, she has also endured the psychological turmoil, the joy of winning and the pain of failure, and never through her demeanour ever reflected weakness. She happily settled the family since moving to Mumbai, from learning the language to managing the household and in the same breath selflessly supporting her husband and children in their endeavours. The nation owes it to her to understand what true teamwork looks like.

Their shared experiences created mutual understanding. All three knew the emotional realities of sailing: early mornings, equipment

failures, disappointing finishes, harsh weather, and lonely international tours. Each family member experienced these challenges personally, they supported one another effortlessly. Their achievements also occurred across different eras and classes, ensuring that each individual maintained a distinct identity within the larger family narrative.

The Technical Excellence Behind the Success

To understand the Saravanan legacy fully, one must appreciate the technical complexity of sailing itself. Unlike many sports, sailing combines physical endurance, engineering awareness, tactical intelligence, meteorology, and psychological resilience. A sailor must constantly interpret changing wind conditions. Tiny shifts in breeze direction can determine victory or defeat. Boat speed depends on body positioning, sail trim, and split-second adjustments.

Classes like ILCA 7 demand immense physical stamina because sailors must counterbalance strong winds with their body weight for extended periods. Nacra 17 events require synchronization between crew members while traveling at high speeds. The Saravanans mastered these complexities through years of disciplined training.

Their achievements across multiple classes reveal deep technical understanding. Transitioning between Optimist, Laser Radial, 470, Enterprise, and Nacra 17 is not simple. Each class demands different tactical approaches and physical adaptations. This versatility reflects exceptional coaching and athlete development.

Inspiring Indian Sailing

The Saravanan family's broader impact lies in inspiration. India has immense coastal geography, yet sailing remains underdeveloped compared to global powers. Success stories are essential because they demonstrate possibility. Young sailors from smaller towns can now look at Vishnu and Ramya and believe international careers are achievable. Parents can look at Subedar Major R Saravanan and Mrs Saravanan and understand the importance of long-term athlete development.

Coaches can study the family's disciplined progression through youth, national, and international systems. Their story also highlights the importance of continuity. Sporting excellence rarely emerges suddenly. It is usually built patiently over decades through systems, mentorship, and consistent work. The Saravanans embody this principle.

Beyond Medals

Perhaps the greatest strength of the Saravanan legacy is that it transcends medals.

Yes, there are championships. Yes, there are international rankings. Yes, there are Olympic appearances and Asian Games participations. But the deeper legacy lies in values: discipline, humility, perseverance, and commitment to excellence. These qualities shaped the family's identity and allowed them to survive setbacks, financial challenges, and the pressures of elite sport. In many ways, they represent the ideal sporting family - one where achievement is rooted not in fame, but in dedication.

The Continuing Journey

The story of the Saravanan family is still unfolding. Vishnu continues competing at the highest level of international sailing, carrying India's hopes in Olympic-class events. Ramya remains an important figure in Indian sailing, particularly in mixed and high-performance categories. Subedar Major R Saravanan continues contributing through coaching and mentorship.

Their combined journey reflects the evolution of Indian sailing itself — from limited visibility to increasing international competitiveness. Future generations may remember the Saravanans not only for what they won, but for what they built: a culture of excellence in a sport that demands extraordinary sacrifice.

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Major General M S Pillai, SM (Retd), from the Corps of Engineers is an international sailor who won his first National Championship in the Junior class in 1971. He has represented India in two Asian Games, and numerous World Championships all over the world. He has been the Asian Champion in 1981, and South Asian Champion three times. He has the unique distinction of winning the OK Dinghy National Championship seven times and ILCA 7 National Championships three times. Presently, the General Officer is the Vice-President of the Yachting Association of India, and also a 'World Sailing' certified International Judge in Sailing.

Major General M S Pillai

RUNNING AND RIDING ON ROADS AND HILLS

Brigadier Sanjay Dikhit, a fourth generation Army Officer, was commissioned into the Corps of Signals in June 1984. An avid Marathoner and Biker, Sanjay has many hair raising experiences on the roads and hills. The Editor bumped into him at the Wooden Bar in the Defence Services Officers Mess and Institute, Mhow.

Running the brutal Malnad 100K Ultra Trail Marathon in Western Ghats and a well earned Belt Buckle!

Hi, Sanjay, good to see you back from your Coast to Coast Epic India Ride. I saw some of the pics that you were regularly posting on social media. It must have been a tiring experience, being on the roads for nearly a month. How did this Coastal Ride idea germinate?

One of my dreams has always been to ride my Harley along the stunning coastal roads of Peninsular India. I first mentioned this idea to Captain (IN) Rajesh Vishnu during the India Hog Rally (IHR) 2024 in Goa, and later shared it with Brigadier BS Kang. Both are part of the Armed Forces Chapter of the Harley Owners Group (AFHOG), and I had previously ridden with them on an epic journey to Ladakh in 2022. My daughter even designed a logo for our ride, which we planned to have embroidered on our T-shirts, and we got down to serious planning.

It felt like the universe was aligning to make our dream a reality, and on December 14, 2025, the three of us set off. Vishnu rode his 1200 cc Triumph Tiger, while Kang piloted his BMW 1250 GSA—both adventure bikes that are perfect for Indian roads. I took my Harley, which weighed nearly half a ton, loaded with everything I needed and nothing I didn't. We rode continuously for about a month, making our way from our homes to Kolkata and then along the East Coast to the West Coast, reaching the Westernmost edge of India at Narain Sarovar/Lakhpat before heading back home. In total, we covered 15 States and Union Territories, and I was powered by adrenaline and caffeine, clocking in 9,500 km on my odometer.

Every day, we would hit the road around 6 a.m. and indulge in local cuisines along the way. Some of the most memorable moments included riding to Dhanushkodi, cruising along the "*Road to Heaven*" in the Rann of Kutch, visiting the World Heritage site of Dholavira, and even ferrying our bikes on a Ro-Ro from Alibaug to Mumbai. We felt immense pride witnessing the respect people have for the Indian Armed

Forces. The diversity of our beautiful country—both in culture and landscape—left us in awe. I had a unique chance to appreciate these differences through the lens of my helmet visor. This journey felt like a pilgrimage for me. And, of course, I owe a huge thank you to my wife for supporting me on this adventurous ride on Indian roads!

Great! How did this Biking Passion develop?

As a kid, I was totally captivated by my dad's battle fatigues and his Bullet! I also looked up to the motorcycle display team **"Dare Devils"** from the Corps of Signals. My first riding lessons happened on my dad's Lambretta and Bullet while I was still in school. In 1985, as a young 2nd Lieutenant, I bought my first bike – a Yamaha RX 100 – and took off on countless solo trips around the country.

Back then, a motorcycle was seen simply as a way to get from point A to B, not as a fun ride. But riding is so much more – it's a full-body, full-brain experience that keeps us sharp, calm, and fully present, unlike driving a car. Fast forward to 2016, I got my first Harley: a stunning Olive Gold Iron 883 with that iconic peanut tank, handmade eagle graphics, and rugged blacked-out looks. It felt like it was just waiting for an army guy in battle fatigues to take it for a spin! I affectionately named it **"JIMMY,"** a nod to the Corps Emblem, symbolizing the Corps of Signals' commitment to speed and reliability in combat communications during war. **JIMMY** served me well, but with a heavy heart, I eventually upgraded to another beautiful Harley – the 2019 Softail Deluxe, a beast weighing 350 kg with a powerful 1750 cc engine. Even now, the sight of a gorgeous motorcycle brings out the kid in me!

There are many members in AFHOG. You must have done many trips with other AFHOGs.

I've embarked on countless solo and group rides with my fellow AFHOGs, racking up nearly 85,000 kilometres on the open road. As an adventure enthusiast, I thrive on overnight moto-camping trips in the jungles of Central India. There's nothing quite like the exhilarating and rejuvenating experience of being out in nature. One ride that stands out in my memory is my solo journey to Puri and back through the jungles of Chhattisgarh. Against the advice of others and fully aware of the risks, I set up camp for the night in the Motinala buffer zone of Kanha National Park. Completely off-grid, with no mobile network, I carefully chose a campsite close to the road, considering my heavy bike. Although the forest department's signs warned of *"Bears, tigers, leopards on prowl – elephant crossings,"* I was more worried about wayward humans than wildlife! Surprisingly, I enjoyed a wonderfully restful sleep.

During my rides through the deserts of Rajasthan and to Hampi, a UNESCO World Heritage site, my only companion was the unmistakable, soul-stirring rumble of my Harley. Some of my most memorable rides as a senior citizen have been to IHRs and the annual India Bike Week (IBW) in Goa, where passionate bikers from across the country gather.

Ladakh has also been a fantastic challenge. A group of us AFHOGs rode our bikes to Umlingla, the world's highest motorable pass at 19,024 feet. I vividly remember patching up a flat tire on my Harley at Zojila Pass in September 2022 while riding with friends to Ladakh. Eventually, I had to backload my Harley from Drass and continue on a rented Himalayan! We tackled some gnarly river crossings and treacherous hairpin bends in Ladakh without any support.

At Narain Sarovar Gujarat during the Epic India Coast to Coast Ride, Sanjay Dikhit is in the Centre

Receiving the completion certificate for Half Marathon at highest altitude 19024 feet in two hrs 30 minutes at Umling La

headlamp for guidance. I slipped and fell three times, tearing the upper part of my shoe. My whole body ached, and it was a real struggle to find the strength to get back up. In moments like these, you have to dig deep and summon that extra energy from within to conquer your own demons. But I trusted my training and kept a positive mind-set. Ultimately, it became a "*mind game*." Out of 128 runners, only 79 completed the race, and I felt an immense sense of achievement finishing it under the 21-hour cutoff. My six months of dedicated training, gradually building up my weekly mileage to 100 kilometres, really paid off. You truly reap what you sow!

I have seen you on a light Enduro Bike too, here in Mhow

Last year I bought a light dirt bike, KTM 390 Enduro R, as I was not able to ride on the numerous off road trails in and around Mhow on my Harley. The light dirt bike opened up a whole new world for me and I was really excited to take it to previously unapproachable locations. I recently rode it 1300 km to Chikmagalur to participate in the 100km Malnad Ultra Marathon Trail run. With a cruiser and a dirt bike in my garage the flexibility of my motorcycling increased significantly.

The Malnad Ultra Marathon is extremely tough, and doing it at your age would have been gruelling

In November 2025, I took on the challenge of the Malnad 100K Ultra Trail run as the oldest participant. It was an incredibly tough race, featuring a brutal 3,800 metres of ascent through the remote Western Ghats, where there was no mobile coverage. The descents were particularly punishing! At about 38 kilometres in, I got lost and wasted a precious hour retracing my steps. Nature was definitely throwing everything at me! By the time I hit 70 kilometres, the rain started pouring, and dense fog rolled in along the mountain trail. I found myself completely drenched and running alone in complete darkness, relying solely on my

Now, we know you have a passion for bikes, but how did your love for marathons come about?

After retirement, I wanted to focus on a sustainable physical activity, so I turned to endurance running. Back in my National Defence Academy (NDA) days, I wasn't a great runner—I only managed to improve from the 6th enclosure to the 4th. However, I excelled in endurance during the Commando course, consistently landing in the **'Excellent'** category in the Battle Physical Efficiency Test. After diving into the science of running, I crafted a weekly schedule for myself and began running three to four times a week, incorporating cycling as cross-training. Sundays became my motorcycle ride day. I committed to three key runs each week—Speed Run, Tempo Run, and Long Run—along with a Rest Day. Just six months of consistent running led to noticeable improvements in my 5 km and 10 km times. A year later, I was running Half and Full Marathons.

Before long, I was participating in competitive running events away from home and securing podium finishes in my age category for both Half and Full Marathons. I even won the Indore Full Marathon in 2023!

To complement my running, I started strength training at least twice a week to build my leg and core muscles and prevent injuries. I quickly learned that there are no shortcuts when it comes to performance—life is analog, not digital! Training is a gradual journey, and consistency is the key. I made sure to prioritize recovery and aimed for six to seven hours of sleep each night. My diet shifted to mostly home-cooked meals with an increased protein intake. I also cut back on alcohol since it disrupts sleep and negatively impacts heart rate variability, which is not great for the heart. Mental preparation and visualization techniques have been crucial in helping me achieve my goals. Running has become an integral part of my lifestyle, and I'm enjoying the daily benefits. My resting heart rate is

around 45, and I feel energetic all day long. Plus, I'm constantly learning from the running and biking community and have made new friends from all walks of life.

Completing the Half Marathon at Umling La in 2024 was indeed a remarkable achievement.

It was tough, especially at 63 years old, as I was the oldest participant. This run presented one of my biggest challenges due to limited acclimatization and an elevated heart rate at such high altitude. Every breath felt like a frantic gasp for oxygen from the thin air, which had only 50% of what we normally breathe!

So, any life lessons?

I've picked up some valuable life lessons from solo motorcycle riding and endurance running. Life isn't a sprint; it's more like an ultra-marathon. During an endurance run, you face challenges that don't come up in shorter distances, such as chafing, blisters, extreme fatigue, and that nagging urge to quit. But you can push through those hurdles with grit and mental strength. This principle applies to both running and life.

Planning a route for a ride is a journey of self-discovery. The importance of preparation and anticipating potential problems before embarking on a journey can't be stressed enough-it's like war-gaming in military terms! Both riding and running remind us to cherish the simple pleasures in life. All you need are two wheels or a good pair of shoes and a sense of adventure to truly embrace life. Adventure lies just outside our comfort zones; it's often hard and risky, yet it breaks the monotony of everyday life. There's a unique joy that comes from tackling tough challenges.

Camping overnight in Choral jungles near Mhow, Central India

As we grow older, our bodies may weaken, but our spirit should remain resilient. Investing in meaningful memories and experiences is the ultimate return on investment. Listening to my heart and embracing my inner child-being spontaneous and trusting life's serendipity-are some of my key takeaways from this journey. Life is uncertain, fleeting, and filled with mysteries. To quote Bob Dylan, "*If you are not busy being born every day, then you are busy dying.*" **So keep your chrome shining, your tank full, and seize life by the throttle! Life is just one amazing ride.**

After 34 years of service, and now as a 64 year old veteran, I am enjoying my passion of riding motorcycles and endurance running. **JAI HIND.**

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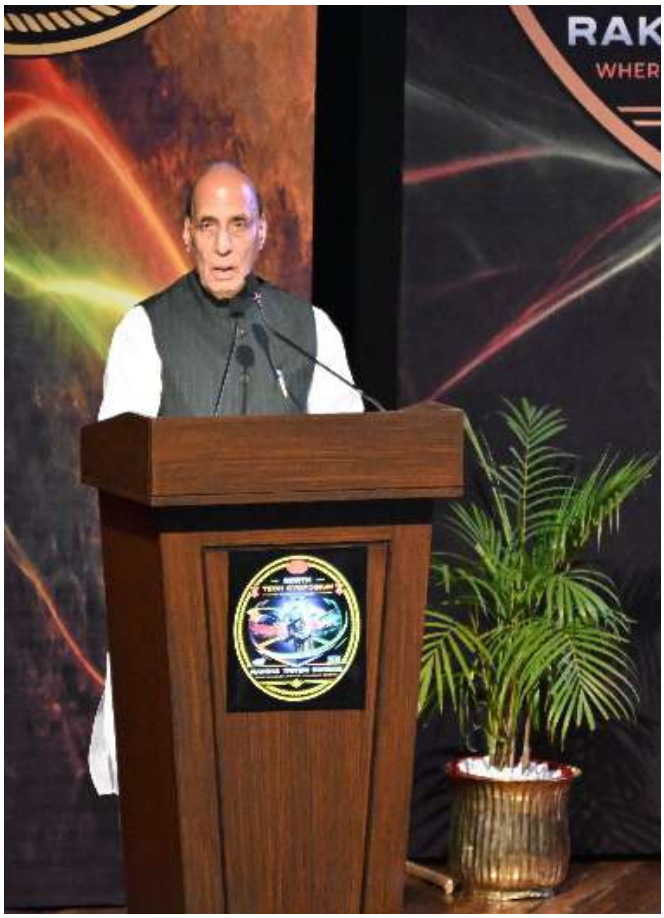
Brigadier Sanjay Dikhit (Retd), an alumnus of NDA, is a graduate of Military College of Telecommunication Engineering (MCTE), Defence Services Staff College and Army War College and holds a B Tech degree in Electronics and Telecommunications, and an MSc in Defence & Strategic Studies. He commanded 33 Armoured Division Signal Regiment (AREN) and has held a number of regimental, staff and instructional appointments. He has tenated the appointment of Chief Signal Officer HQ 11 Corps, and was Commander Faculty of Combat Communications and Electronic Warfare at MCTE before superannuating on 31 January 2018. He hails from a family of warriors - his Great Grandfather and Grandfather were in the 1st Indore Infantry, which later converted to 15 KUMAON. His father from 5/11 GR fought in the 1971 War as a Company Commander. His eldest Uncle, Lieutenant Colonel Onkar Singh Dikhit raised 2/11 GR while another uncle ex 3/11 GR went missing during the UN Peacekeeping operations in Congo in 1961.

Brigadier Sanjay Dikhit (Retd)

NORTH TECH SYMPOSIUM 2026
(PRAYAGRAJ)

The North Tech Symposium 2026, held from 4–6 May 2026 in Prayagraj, Uttar Pradesh, stands out as one of the most significant technology engagement platforms organized by the Indian Army in recent years. Themed on **"Raksha Triveni Sangam – Where Technology, Industry & Soldiering Converge"**, the symposium was jointly organized by the Northern Command and Central Command of the Indian Army, in close collaboration with the Society of Indian Defence Manufacturers (SIDM) and aimed at catalysing indigenous innovations, identification of focus areas and translating cutting-edge technologies into field-ready solutions. North Tech Symposium 2026, brought together over 284 defence related companies, numerous academic institutions, defence research laboratories, civil administration stakeholders and Higher Headquarters (HQs) of the Indian Armed Forces.



Shri Rajnath Singh, Hon'ble Raksha Mantri speaking during the inaugural ceremony

The Symposium provided a common platform for User, Academia & Industry to share innovations, ideas and product requirements to enhance the future combat readiness of Indian Armed Forces in general and Central Command and Northern Command in particular. The event was envisioned as a "*bridge between defence forces, scientists, industry leaders and the academic community, fostering collaboration aimed at strengthening national security & technological excellence*". The theme of "**Raksha Triveni Sangam** – *Where Technology, Industry & Soldiering Converge*" encapsulates the Army's doctrinal intent to integrate three distinct streams: -

- **Technology**. Artificial Intelligence (AI), Quantum, Cyber, Intelligence, Surveillance and Reconnaissance (ISR), Robotics and Advanced Materials.
- **Industry**. Micro, Small and Medium Enterprises (MSMEs), Private Defence Technology Firms, Start-Ups, Defence Public Sector Undertakings (DPSUs) and Defence Research and Development Organisation (DRDO).
- **Soldiering**. Tactical, operational and doctrinal requirements of troops on the ground.

Preparations for the Symposium

North Tech Symposium 2026 was structured around a well-defined problem statement that combined operational and technological priorities of the Indian Armed Forces. The event institutionalised few focus areas to drive structured interaction with Industry and Academia.

- **AI** for decision support, predictive logistics, ISR analytics and battle management systems (BMS).
- **Quantum Technology** for secure communications, quantum sensing, and potentially future-generation encryption and key-distribution.
- **Military Cyber Technology** to protect the Army's C4ISR backbone against state and non-state actors.
- **Cognitive Technology and Human-Machine Teaming** including augmented reality displays, wearable situational-awareness aids, and decision-aids for commanders.
- **Neuromorphic Computing** for low-power, high-throughput data processing at the edge, especially in remote and high-altitude locations.
- **Advanced Materials** for lighter, stronger composites, signature reduction materials, and thermal-protective coatings for troops and platforms.
- **Compound Semiconductors** to power high-frequency RF and microwave systems, radar front-ends, and electronic-warfare sub-systems.
- **ISR Technologies**, including multi-sensor fusion,

data-fusion algorithms, and AI-assisted target recognition modules. Within these broad focus areas, the symposium also carved out operational sub-thematic clusters.

- **Decision making tools enabled by AI** including AI-assisted planning, logistics optimisation and impact prediction in real operational scenario.
- **Unmanned Aerial Systems (UAS)** from micro / canine drones to Medium Altitude Long Endurance (MALE) / High Altitude Long Endurance (HALE) platforms for surveillance, target-designation, and limited strike roles.
- **Advanced Artillery Systems** including long-range rockets, guided projectiles and re-support coordination systems tightly integrated with real-time ISR.

Focus Teams. Based on the focus areas, **eight Focus teams** were constituted under very specific heads - **Secure Tactical Radios**, **Strategic Networks, Satellite Communication, Navigation System, Cyber & Electronic Warfare, Data Connectivity, Voice Connectivity, AI Tools**. These focus teams compiled technological challenges, problem definition statements for further sharing with vendors. Their task was to hold dedicated meetings with vendors for trials of equipment in field conditions during North Tech Symposium, and witness all demonstrations pertaining to respective equipment. Post conclusion of the event, each focus team was made responsible for assigning whether the category of equipment examined was found suitable to be listed for procurement or needed to be improved upon.

Coordination Architecture. The success of North Tech Symposium 2026 hinged on a robust coordination architecture that tied the Indian Army, SIDM, private defence industry, start-ups, academia and civil administration into a single framework. The major steps were joint identification of indigenous alternatives to foreign-origin equipment, facilitation of technology transfer from DRDO and DPSUs to MSMEs, structured interaction between Army design / technical cells and R&D managers of member companies. In coordination with SIDM, a list of **284 exhibitors** (MSMEs, private defence tech firms, start-ups, and innovators in uniform), were finalised so that the exhibition represented a broad cross-section of the Indian defence industry ecosystem. While shortlisting, **Pre-qualify technologies** based on technical briefs were checked so that only those solutions with realistic field-integration potential were granted stalls. There were **organised interactions with SIDM**, where Army representatives designed the problem statements that would be addressed at North Tech Symposium.

- **Participation of Defence Industry and Start-Ups**. The industrial footprint at North Tech Symposium 2026 was substantial and deliberately stratified. **MSMEs** contributed niche sub systems (Antennas, RF components, test and measurement gear & power electronics). **Private Defence Tech Firms** (often specializing in communications, cyber security, ISR, and UAS) showcased end-to-end solutions. **Start-ups and Innovators in uniform**, many of whom were Army personnel or veterans represented capability specific firms.
- **Academia and Research Institutions**. Academic and research participation was woven into the symposium at two levels:
  - > **Direct participation of Universities and Research Labs** (Indian Institutes of Technology (IITs), National Institutes of Technology (NITs), DRDO labs, Council for Scientific and Industrial Research (CSIR) units, and private R&D centres) who co-exhibited technologies or established joint stalls with industry partners.
  - > **Guest-panel participation** in seminars, where faculty members contributed perspectives on quantum computing,

General Upendra Dwivedi, Chief of Army Staff being briefed on a weapon system at the Symposium

General Upendra Dwivedi, Army Chief speaking to some of the officers and troops at the Symposium

neuromorphic hardware and AI-model interpretability.

- **Coordination with Civil Administration.** North Tech Symposium 2026 was not conceived as a purely "*military-internal*" event, its design consciously embedded coordination with civil administration, ensuring that the symposium's outcomes are carried forward in a progressive manner.
- **Public Engagement and Civil Sector Outreach**. The symposium incorporated controlled public viewing days and "*civil-awareness*" sessions on the role of defence technology in national-security, border management, and disaster-relief. Selected technologies (such as AI-assisted logistics drones and modular shelters for high-altitude deployment) were showcased in formats tailored for **civil emergency management agencies**, reinforcing the idea of dual use applications.

In the **Pre-Symposium Phase**, Northern and Central Commands, prepared a Problem Definition Statement enumerating priority gaps in AI, cyber, ISR, and advanced materials and translated these into Technical Evaluation Sheets and shared them with SIDM for disbursement to industry. SIDM, in consultation with Indian Army, conducted a vendor shortlisting exercise, ensuring that only those companies with demonstrable technical maturity and relevant past projects were allowed to participate.

The Main Event

The event was conducted over three days where in senior officers and delegates were scheduled for specific "*walk-through*" sessions with hand-picked exhibitors, ensuring that decision makers had direct exposure to breakthrough technologies. This ensured that North Tech Symposium 2026 was not merely a networking event, but a decision-enabling platform where the Army could fast-track certain technologies into **induction trials** and **formal procurement proposals**. Day wise activities, conduct of daily seminars and guest lectures organised over the period of three days during the event were as follows.

- **Day 1 [04 May 2026]**. "North Tech Symposium 2026" was **inaugurated at Prayagraj by Shri Rajnath Singh, Hon'ble Union Minister for Defence**, in the presence of General Upendra Dwivedi, Chief of Army Staff, Lieutenant General Anindya Sengupta, Army Commander, Central Command and Lieutenant General Pratik Sharma, Army Commander, Northern Command, senior officers from Paramilitary Forces, civil administration and defence industry stalwarts. Indigenous equipment in key technological domains such as communications systems, tactical mobility solutions, protection and survivability equipment, Al based systems, drone and counter-drone technologies and robotics were showcased. These areas reflect Indian Army's focus on enhancing operational efficiency through '*Raksha Atmanirbharta*'. The inaugural ceremony began with a keynote address by Lieutenant General Pratik Sharma, Army Commander Northern Command, who emphasised the strategic significance of indigenisation and collaborative R&D between Armed Forces, Industry and Academia. A special highlight of the event was the live demonstration of indigenous defence systems by industry leaders, with several platforms entirely designed and manufactured in India taking centre stage. Shri Rajnath Singh, Hon'ble Union Minister for Defence toured the exhibition, witnessing various systems on display and engaged directly with industry delegates and academia.
- **Day 2 [05 May 2026]**. The second day of North Tech Symposium 2026 was graced by the presence of **Hon'ble Raksha Rajya Mantri, Shri Sanjay Seth**. There were in-depth deliberations on defence technology, research, innovation and strategic preparedness. In the afternoon, the **Hon'ble Minister of State Science & Technology, Dr. Jitendra Singh** visited the Symposium. Another major attraction of the day was a Seminar on Promotion of Strategic Autonomy in Next Generation Advancement & Manufacturing. The speakers

expressed their views on a range of subjects including Multi Domain Operations, role of academia in innovation, harnessing future talent and encouraging R&D; all under the ambit of *Atmanirbharta*. Senior officers from the Indian Army played a pivotal role throughout the second day, participating in technical discussions, interactive sessions and exhibitions. Army officials highlighted the operational relevance of cutting-edge technologies and stressed the need for continuous innovation to address evolving security challenges. Panel discussions, technical presentations and live demonstrations enriched the day, providing participants an invaluable exposure to the real-world defence applications and emerging technological trends.

- **Day 3 [06 May 2026]**. The third day of North Tech Symposium 2026 was graced by the presence of **Shri Yogi Adityanath, The Hon'ble Chief Minister of Uttar Pradesh**. In addition, there was enthusiastic participation from the Armed Forces, Paramilitary Forces, NCC cadets, academia and scholars. A seminar on "*Promotion of Defence Industry Harnessing through Resilient Uttar Pradesh Expressways Industrial Development Authority (UPEIDA) Verticals and Alliances*" was held in the afternoon. The speakers highlighted the newly created defence corridor in Uttar Pradesh and the opportunities it brings to the public, industry and defence with an overarching vision of **Sashakt Sena**. In the formal closing ceremony of North Tech Symposium, the Army Commanders commended the contribution of the state in promoting the indigenous defence ecosystem.

Participation

A snapshot of the participants is revealing. Approximately 130–150 firms (roughly 45–50% of total exhibitors) were mostly providing niche subsystems and components. About 80 to 90 Private Defence Tech firms focused on communications, cyber, ISR, and UAS. There were approximately 50–60 entities from Start-ups and innovators in uniform, many of whom were Army linked or veteran led ventures. This participation reflects the deliberate diversification of the Indian defence industry base, with MSMEs and start-ups now accounting for a substantial share of innovation in the Army's capability acquisition pipeline. 20 universities and research labs (including IITs, NITs, DRDO labs, CSIR units, and select private R&D centres) formed the Academia and Research footprint. The **Academic sessions included** 12+ panel discussions on AI, quantum, cyber and neuromorphic computing, with participation from 150+ faculty researchers and senior scientists. The academic footprint, while numerically smaller than the industrial one, was strategically significant because it provided the theoretical and research backbone for the applied technologies showcased on the exhibition floor.

In addition, over 400 officers and JCOs from Northern Command, Central Command, and various functional directorates participated.

Technical Sessions and Seminars

Parallel to the stalls display, the symposium ran a packed programme of technical seminars, and panel discussions. Some of the key themes discussed were:-

- **AI for Decision-Making**. Papers and live-demonstrations on AI-driven battle-management systems, supply-chain optimisation, and casualty evacuation planning generated significant interest among operational commanders. A panel on explainable AI (XAI) in military decision making highlighted the need for "*human in the loop*" architectures, ensuring that algorithms support rather than replace commander judgement.
- **Quantum and Cyber Technologies**. Quantum security sessions discussed the potential of quantum key distribution (QKD) for protecting high value communication links between Army HQ and field formations. Cyber security workshops addressed the vulnerabilities of C4ISR networks to spoofing, jamming and data-integrity attacks, reinforcing the need for defence in depth cyber security architectures.
- **UAS and ISR**. Several exhibitors demonstrated swarm UAS concepts for surveillance and target designation, with live simulation feeds projected on large screen displays. ISR-focused sessions dealt with multi sensor fusion, edge processing, and AI assisted target recognition, directly addressing the Army's requirement for high altitude and border monitoring solutions. These sessions were not merely "**talking shops**", they were structured as two-way dialogues, with Army representatives posing special operational scenarios and seeking technical answers grounded in real world data.

Live Demonstrations. A distinctive feature of North Tech Symposium 2026 was its emphasis on **live demonstrations** rather than static display boards. Key demonstrations included:-

- **AI-driven "Kite Interceptors"**. Systems that autonomously detected, tracked, and neutralised hostile aerial

threats (e.g. hostile drones or low-altitude UAVs), a capability particularly relevant to border-security and counter-drone operations.

- **UAS based ISR Simulations**. Real time video feeds from multi-rotor and fixed wing platforms, overlaid with AI generated annotations for target classification and movement prediction.
- Live firing of weapons, demonstration of night sights, mobility and Counter Mobility testing of vehicle platforms was also witnessed during the event.

Media-Management. The Army special Public Relations cells coordinated with SIDM and media outlets and a media briefing panel was convened after the inaugural address, allowing controlled release of information warfare relevant details (e.g. the role of AI in ISR, cyber-defence architectures) without compromising operational secrecy. These measures ensured that North Tech Symposium 2026 did not become a soft target for foreign intelligence services or cyber actors seeking to exploit the concentration of sensitive information and personnel in one location.

Physical and Access-Control Security. On the physical-security side, the symposium implemented a multi-layered Access Control and Screening regime. For **Perimeter Security,** the New Cantonment venue was secured by a composite security cordon involving Army, security forces and local police units, with barricades, vehicle check points, and explosive detection devices at all entry points. For **Access Control,** three tier access passes were issued for Ministers, senior officers, senior/ industry representatives, visitors and media with restricted access to certain zones. **Surveillance and Monitoring** was ensured by UAVs and CCTV networks deployed to provide 360-degree surveillance of the venue, with feeds monitored by a Central Security Monitoring Room. The integration of electronic surveillance and human intelligence elements ensured that North Tech Symposium 2026 remained a secure environment for the exchange of sensitive defence technology information, while still retaining the openness necessary for innovation and collaboration.

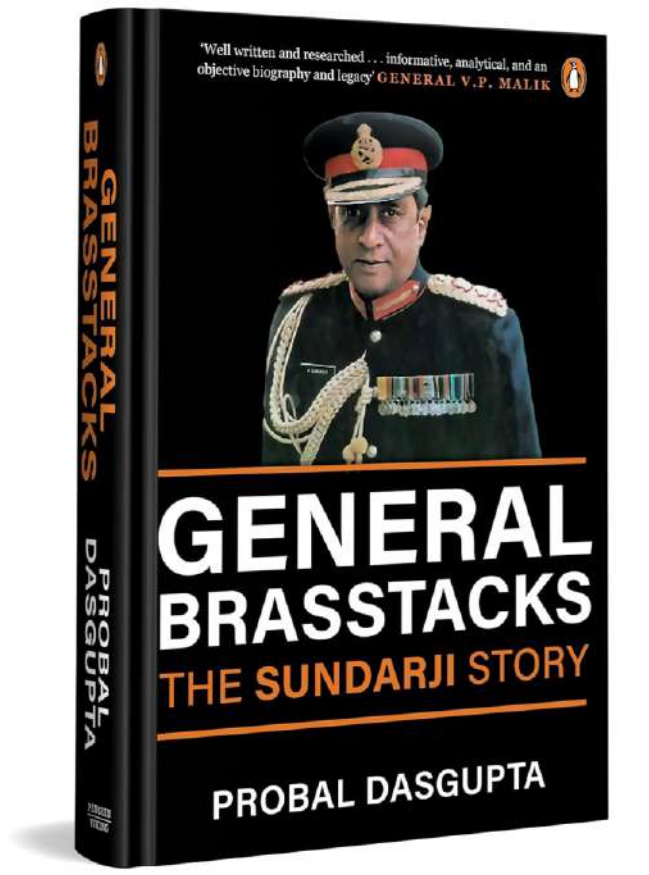
Major Outcomes and Strategic Implications. At the conclusion of the three-day symposium, several major outcomes emerged that will shape the Indian Army's technology acquisition and doctrinal evolution over the next decade. These are highlighted as under:-

- **Identification of Field Ready Technologies.** The Army led Technical Evaluation Cells short-listed over 120 technologies from the 284 exhibitors as having clear field deployment potential within three to five years. These included AI-driven ISR fusion platforms, UAS swarm management systems, and modular-communication-nodes for high-altitude operations.
- **Initiation of Induction-Trials and Procurement Proposals**. Several systems were fast-tracked into induction trials with Northern and Central Commands, with the expectation of formal procurement proposals being submitted to the Ministry of Defence within 12–18 months.
- **Boost to Indigenisation and Made for India Architectures**. The emphasis on indigenous technologies at North Tech Symposium 2026 reinforced the *Atmanirbhar Bharat* and Make-in-India narratives, with over 70–80% of exhibitors classed as Indian owned or Indian incorporated entities.
- **Doctrinal shift towards AI and Cyber centric operations**.

Way Ahead: Evolving the North Tech Ecosystem. Looking forward, the North Tech Symposium model is a robust template for the Indian Army's engagement with the broader defence technology ecosystem. It is clear that North Tech Symposium has been institutionalised as a Flagship Event. It is likely that the model will expand into Regional and Thematic Variants, it will standardise AI-enabled C4ISR-networks, and introduce cyber security by design in all communication systems. Embedding of ISR fusion engines into existing and future generation tactical networks and Policy and Funding Levers for Sustained Innovation are also expected.

To sum up, North Tech Symposium 2026 marks a watershed moment in the Indian Army's journey towards a technology driven, self-reliant and future ready force structure. By successfully converging the streams of technology, industry and soldiering under the **Raksha Triveni Sangam** framework, the event has not only showcased India's indigenous defence innovation capabilities but has also laid the institutional foundations for a structured, repeatable mechanism of technology validation and induction. The positive momentum generated in the three day long North Tech Symposium 2026 is expected to accelerate induction of advanced indigenous technologies into frontline service and pave the way for a new era of operational self-reliance in the Indian Army. *(Write-up prepared based on inputs received from the Army formations)*

Lt Gen JS Sandhu (Retd) *Editor*



GENERAL BRASSTACKS A LOOK AT A DRAMATIC DECADE

Possessed with rare dynamism, General Sundarji was an integral part of the metamorphosis of the Army and also chartered the nation's nuclear doctrine. Highly intelligent, flamboyant in demeanour and eloquent in speech, he led the Army during a period of remarkable transition and through tumultuous events. Probal Dasgupta's book **"General Brasstacks"** covers these events while giving an insight into his personality, his values and the manner in which the events of his formative years and the appointments held by him shaped his outlook and thinking. In this well researched and readable book, Probal has provided a lens to understand his journey and the impact on the "nation's choices and outcomes".

General Brasstacks is a biography of General Sundarji, the charismatic, cerebral and controversial Army Chief who left a lasting impression on India's security environment. He was the Army Chief from February 1986 to May 1988. This 820 day period was marked by various important milestones principally **Exercise Brass Tacks**, India's intervention in Sri Lanka as part of **Operation Pawan** and **Operation Falcon** in Arunachal Pradesh which followed the face off at Sumdorong Chu. General Sundarji, the then Western Army Commander was also involved in **Operation Blue Star**. On his seventeenth day as Chief of Army Staff (COAS), he gave his consent for the procurement of the Bofors guns. Each event was a major milestone in the history of the Army and nation.

Those who saw him closely to include Lieutenant General Harwant Bawa, Lieutenant General Shammi Mehta, Lieutenant General Rustom Nanavatty and Lieutenant General Philip Campose have enriched the book with anecdotes regarding their professional interactions. While his son Vikram, niece Aruna Roy and daughter Jayanti have given wonderful personal insights.

About The Author

Probal Dasgupta was commissioned into 5/11 Gorkha Rifles where he spent the initial decade of his career. After taking premature retirement, he attained a Master's Degree from Columbia University in New York (USA), where he was a Braun-Myers Fellow, Tata Scholar and RD Sethna Scholar. He is also an alumnus of Daly College, Indore.

A senior corporate leader, Probal has headed multinational consulting firms in India and South Asia. He now helms Birdstone - a consulting firm - advising clients on disputes, investment and reputation risks. An acclaimed author his other books include '*Watershed 1967: India's Forgotten Victory over China*' and '*Camouflaged: Forgotten Stories from Battlefields.*'

The Formative Years

Joining the British Indian Army in 1945, a young Sundarji was a close witness to events during Partition when serving in his Battalion 2 MAHAR in Fort Sandeman in Balochistan and thereafter in Hissar and Delhi. He saw the '*bloodiest of killings in Indian history*' and '*he witnessed the mass of madness on both sides of the border*'. As per him '*there was very little to choose between the two - it was*

Lieutenant General K Sundarji (centre) with General A.S. Vaidya (right) and Major General K.S. Brar (left) after Operation Bluestar (Photo by INDIA TODAY/India Today Group/Getty Images)

equally bad on both sides.' The '*horrific scenes of Partition cast a shadow in his understanding of human behaviour*'.

In 1961 he was posted as the Brigade Major (BM) of the Indian Brigade commanded by Brigadier Reginald Stephen Noronha in Congo. He had a dual role; as besides being the BM he was also the Chief of Staff of the UN Katanga Command and this is where he dealt with '*the grey zones of conflict*'. Noronha '*fondly referred to him as a maverick for his unusual approaches*'. His two years there were marked by considerable achievements where his out of the box ideas, initiative and constantly '*pushing the envelope*' enabled Indian forces to overcome a tough guerrilla force in a far-away land.

1965 saw him commanding 1 MAHAR during **Operation Desert Hawk** in the Rann of Kutch. When he reconnoitred the forward area in a police uniform post-Pakistani forays in Kanjrakot, he recommended '*immediate capture of the area and holding ground to prevent further ingress.*' Though his recommendations went abegging due to the prevailing '*defensive mind-set*' it demonstrated his offensive spirit. For Sundarji the actions in 1965 '*laid bare the deficiencies of defensive positional warfare'* and this probably was the first call to mechanise the infantry. He '*understood the need to break free of predictable military thinking that resulted in stalemates and draws.*' He also observed how Pakistani Commanders had seized the initiative while the Indian leadership had been slow to respond. These learnings shaped his understanding of warfare.

1971 saw him posted as the Brigadier General Staff of 33 Corps which executed operations in East Pakistan from the North and fought '*bloody battles at Hilli and Bogra*' under Lieutenant General ML Thapan. He also closely observed Lieutenant General Sagat Singh's brilliance, moral courage and clarity in thinking while crossing the Meghna River with emphasis on speed and surprise. However, it was lessons in the Western front where '*slow progress and the inability to penetrate defences*' exposed the '*lack of alternatives and the focus on technology became paramount*'.

Earlier while undergoing a course at Fort Leavenworth in the US, Sundarji had learnt '*how technology, mobility and speed of warfare needed to be studied in one spectrum*'. The exposure to global ideas made an impression on his thinking about conventional conflict. This along with lessons imbibed from India's two wars shaped his thinking.

Post the 1971 War, he was part of the study headed by Lieutenant General K V Krishna Rao on the transformation of the Indian Army which was ordered by General T N Raina. The Committee evaluated the national security threats and future scenarios and revised the organizational architecture. The Mechanised Infantry was raised based on the recommendations of this report. He had succeeded in bringing his ideas to form and became its first Colonel.

After commanding 33 Corps he went on to head the College of Combat and was the Deputy Chief under General Krishna Rao when **Exercise Digvijay** was conducted to validate and test the new doctrine of war. Large armoured columns moved at speed over distances no one had moved before. It was '*the brief opening glimpse of what was to arrive in the Sundarji era.*' General Rao's support ensured that '*Sundarji was able to push for this offensive Strike Corps orientated vision*'.

The Major Milestones

As the Army Commander Western Command when he oversaw **Operation Blue Star** in 1984, his conduct came under intense scrutiny. Unlike General Vaidya, General Sundarji '*favoured swift military action over a softer approach*' at the Golden Temple and is reported to have told Mrs Gandhi that '*he would clear the complex in a few hours if ordered*'. The author

highlights the challenges of executing this delicate task in a domestic religious setting and says that though the Indian Army overcame the militants they faced much greater resistance than anticipated and the fight was intense. The trauma of **Operation Blue Star** remained with General Sundarji even though he stated that '*we went in with folded hands.*'

The centre piece of the book and indeed General Sundarji's legacy is **Exercise Brasstacks** in December 1986 - a mechanised manoeuvre in the deserts of Rajasthan. Its magnitude had grown to a level not seen since World War II. Pakistan responded by aggressive posturing by their Army Reserves North and South in their exercise areas and India then responded with **Operation Trident**, which escalated the situation and the two sides were locked in an eyeball to eyeball situation in Jammu and Kashmir and Punjab. The exercise, though toned down subsequently, demonstrated India's ability to make deep inroads into Pakistan. Probal gives a detailed account of how this exercise nearly brought India and Pakistan to war and the paradigm shift in the manner in which India viewed its Western neighbour.

The Sumdorong Chu incident in July 1986 led to a mobilisation of troops during **Operation Falcon** in October 1986. He demonstrated his proactive defence strategy by airlifting a Brigade that forced the Chinese to blink. His strategy of '*dissuasive deterrence*' against China was then implemented during Exercise Chequerboard along the Line of Actual Control which involved the operational deployment of ten divisions. The Chinese encountered unexpected resistance as Indian troops dominated the heights and seized the initiative. The book goes into the manner in which Major General JM Singh stood up to General Sundarji and with the backing of Lieutenant General NSI Narahari, the Corps Commander executed the assigned tasks.

Operation Pawan in 1987 has been analysed as a classic case of military objectives being decoupled from political reality. It was a war fought with hands tied behind one's back, where wavering objectives caused confusion and disorder. While General Sundarji's belief in the mission was unwavering, the frustration in dealing with the other organs of the state and the Sri Lankan government and military came to the fore. The author points out how the assessment by Major (later Lieutenant General) Madan Gopal who had accompanied Prabhakaran back to Sri Lanka after talks in Delhi that the Liberation Tigers for Tamil Eelam (LTTE) '*don't want peace*' was '*laughed off*' as Sundarji '*believed the LTTE could be smote in weeks*'. The parts played by Major General Harkirat Singh, Lieutenant General Deepinder Singh, Lieutenant General AS Kalkat and JN Dixit have been well documented. Ultimately there was a sense of frustration and lack of clarity in the task assigned and the way it was executed.

Conclusion

General Sundarji was a brilliant exponent of modern warfare and ahead of his times. He possessed great vision, was focused on technology, was intelligent and impactful and influenced both military and political thought in the eighties.

A sharp, well-read man he was blessed with a phenomenal memory and presented his opinions confidently which impressed those in positions of power in the government. His relationship with Shri Arun Singh, the Minister of State for Defence and Prime Minister Rajiv Gandhi has been well articulated.

In this definitive and well researched biography, Probal has captured General Sundarji's personality and given an insight into how his thoughts and decisions shaped the modern Indian Army. It gives an insight of the role played by the Indian Army in the eighties in India and in the region which has left a lasting impression on our collective memory and on the course of the country's destiny. The book is a must read for the scholars and practitioners of warfare.

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Major General Jagatbir Singh, VSM (Retd), a second generation Army Officer was commissioned in December 1981 into 18 Cavalry, a Regiment he subsequently commanded. He has held varied command, staff and instructional appointments which include commanding the First Armoured Division. Post retirement, he is a Distinguished Fellow with United Service Institution of India and apart from writing for various newspapers and magazines has co-authored Armour 71 and co-edited Valour and Honour.

Major General Jagatbir Singh

WHAT YOUR FEVER IS REALLY TRYING TO TELL YOU

Rising temperature, flushed face, and chills that send us reaching for a blanket even on a warm day are signs of one of the body's oldest defence mechanisms at work. Fever, often feared and frequently misunderstood, is not a disease in itself. Rather, it is a signal that the body's immune system has detected a threat and is actively responding.

Hand holding a digital thermometer with blurred background of a sick person (photo courtesy pexels-cottonbro-5858740)

Few things can bring daily life to a halt as quickly as a fever. One moment you're going about your routine, and the next you're wrapped in a blanket, thermometer in hand, wondering what has gone wrong. Yet fever is not the enemy many of us imagine it to be. In fact, it is one of the body's most ingenious defence strategies, a built-in alarm system that turns up the heat when trouble arrives.

Think of it as your body's way of declaring a state of emergency. When harmful microbes invade, your immune system does not sit back and wait. Instead, it launches a coordinated response, and fever is often one of the first signs that this battle has begun.

A fever is a temporary rise in body temperature, usually above 38°C (100.4°F). It is important to understand that fever is not a disease in itself. Rather, it is a symptom or a signal that the body is fighting something, most commonly an infection. While the average body temperature is considered to be around 37°C (98.6°F), this can vary slightly from person to person and even fluctuate throughout the day.

At the centre of this process is a remarkable part of the brain called the hypothalamus, often described as the body's temperature control centre. Under normal circumstances, the hypothalamus maintains a stable internal temperature. However, when the immune system detects an infection or illness, it releases chemical messengers that signal the hypothalamus to raise the body's temperature set point.

Why would the body deliberately make itself hotter? The answer lies in survival. A higher body temperature can make conditions less favourable for certain germs while helping immune cells work more efficiently. In other words, fever is not a malfunction. It is a carefully orchestrated defence mechanism designed to help the body combat infection.

The most common cause of fever is infection. Viruses responsible for illnesses such as the common cold, influenza and COVID-19 frequently trigger fevers. Bacterial infections, including pneumonia, typhoid and strep throat, can also cause temperatures to rise. Other infectious agents such as parasites and fungi may be responsible in certain cases.

But infections are only part of the story. Inflammatory and auto-immune conditions can also produce fever. Diseases such as rheumatoid arthritis and lupus may trigger periods of elevated temperature as a result of ongoing inflammation within the body. Certain medications including some antibiotics and anti-seizure drugs can occasionally cause fever as a side effect or as part of a drug reaction. Even vaccines can result in a mild, short-lived fever, which is generally a sign that the immune system is responding appropriately and building protection.

Environmental factors matter too. During periods of intense heat, heat exhaustion and overheating can cause body temperature to rise. While technically different from a fever caused by infection, these conditions can still be serious and require prompt attention.

The symptoms accompanying fever are familiar to most people. Feeling unusually hot, sweating, chills, shivering, headaches, muscle aches, fatigue and loss of appetite are all common. Chills can seem particularly confusing because they occur despite an elevated temperature. This happens because the body's thermostat has been reset to a higher level, making a person feel cold until the new target temperature is reached.

Although fever itself is usually not dangerous, it is important to know when it requires medical evaluation. For infants and older adults, extra caution is necessary. If a child below five years of age or a senior citizen develops a fever above 102°F (38.9°C), particularly when accompanied by symptoms such as a rash, abdominal pain, persistent vomiting, unusual fatigue, confusion or disorientation, medical attention should be sought promptly. Similarly, if the fever does not respond to medication or continues to worsen, it is important to consult a doctor.

Medical care is also advised if a fever reaches around 40°C (104°F) or higher, lasts for several days, causes difficulty in breathing, severe pain, seizures or significant confusion, or occurs in an infant younger than three months.

In many cases, however, fever follows a predictable course. A typical viral infection often takes three to five days to resolve. If the fever persists beyond that period, doctors may recommend blood tests or other investigations to identify the cause. Persistent fever may indicate a bacterial infection such as typhoid or pneumonia, or an inflammatory condition requiring specific treatment.

At home, management is usually straightforward. Rest and hydration are essential. Fever increases fluid loss through sweating, making dehydration a common concern. Drinking water, oral rehydration solutions, soups and other fluids can help maintain hydration levels. Medications such as paracetamol or ibuprofen may be used to reduce discomfort and bring down temperature when needed.

One important point often overlooked is the indiscriminate use of antibiotics. Antibiotics are effective only against bacterial infections and will not help viral illnesses. Taking them unnecessarily can interfere with proper treatment and contribute to antibiotic resistance, making future infections harder to treat.

Recovery does not always end when the fever disappears. In the years following the COVID-19 pandemic, many people have noticed that weakness and fatigue can linger for days or even weeks after the temperature returns to normal. Convalescence or the period of recovery after illness, has become increasingly important. During this phase, the body needs adequate nutrition, including proteins, minerals and antioxidants, to rebuild strength and support immune function.

A balanced diet rich in fruits, vegetables and protein, along with gradual return to physical activity, can aid recovery. Vitamin C-rich foods, proper hydration and sufficient sleep remain simple but effective ways to support overall health. During seasons when viral infections and mosquito-borne illnesses such as dengue are more common, preventive measures and attention to hydration become especially important.

Ultimately, fever is not merely an uncomfortable symptom; it is evidence that the body's immune system is doing its job. **It is a natural defence mechanism, a signal that the body has recognised a threat and is actively working to eliminate it.** While some fevers require medical attention, many are simply reminders of the extraordinary resilience built into the human body, a system capable of turning up the heat when protection is needed most.

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Dr. Renuka David

PROTECTING INVESTMENTS DURING GLOBAL TURMOIL

NAVIGATING WAR & GEOPOLITICAL RISK: AN INDIAN INVESTOR'S PLAYBOOK

When conflict reshapes capital flows, the informed investor sees both the storm and the silver lining. This guide maps the US–Iran conflict's ripple effects from crude oil spike to the Nifty 50 drop and equips you with a crisis-tested strategy.

A war torn city in the Middle East (Image courtesy Perplexity AI)

The Conflict Landscape

The Middle East has long been the world's most volatile geopolitical flashpoint, and a US–Iran war represents its most consequential scenario. Iran sits astride the Strait of Hormuz, through which roughly 20% of global oil trade flows daily. Any armed escalation triggers an immediate and visceral response across global financial markets: equity indices fall, commodity prices spike, safe haven assets rally and currencies in oil-importing nations weaken sharply. Conflict is not merely military anymore; it is simultaneously economic, psychological, and deeply structural in its impact on the globalised world order.

Market prices in uncertainty rise faster than armies are mobilised. The mere credible threat of conflict can send Brent Crude surging by 15–20% within days. The Brent Crude which was hovering at about 70$ a barrel last year quickly sprinted to above 110$ a barrel once the conflict started. Experts aver that a sustained war could push prices well beyond $120–$150 per barrel, disrupting global supply chains, rerouting shipping lanes, and forcing nations to tap strategic reserves. Insurance premiums for shipping in the Persian Gulf have skyrocketed and flight tickets through that region are now quoting at least three times higher prices as compared to pre-conflict, adding inflationary pressure across every commodity that moves through the region.

Impact on World Economy

Global GDP growth forecasts have been revised downward almost immediately during major conflict events. Central banks face the impossible trinity of rising inflation, weakening growth, and currency instability simultaneously. The International Monetary Fund (IMF) and World Bank typically issue emergency assessments, and coordinated G7 responses like Reserve releases, diplomatic back-channels and repeated attempts to contain the financial contagion. However, prolonged conflict defies containment and rewrites the rules of global energy geopolitics. So, what are the markers?

Oil prices surged by 20–50%; global stagflation risk rose sharply; global equities risked selloff; emerging market indices were hit hardest initially; USD value increased as investment moved to safer assets; supply chains shipping disrupted and input costs inflated globally.

Impact on Indian Economy

India is among the world's most exposed major economies to a Middle East conflict, for a variety of reasons that make vigilance essential for every Indian investor.

India imports over 90% of its crude oil requirement, and the Middle East i.e. Saudi Arabia, Iraq, the UAE account for roughly 60% of those imports. A sustained oil price surge therefore directly widens the Current Account Deficit, pressures the rupee, stokes domestic inflation (especially fuel, transport and food), and forces the Reserve Bank of India (RBI) into a difficult balancing act between growth support and inflation control. Petrol and diesel price hikes flow through to every corner of the economy with a lag of a few weeks.

Additionally, India's nine million diaspora in the Gulf, send home nearly $40 billion annually in remittances, a vital cushion for the Balance of Payments. Conflict in the region threatens both their safety and their income. Aviation disruptions, rerouted cargo and spiking Liquefied Natural Gas prices compound the macroeconomic pain. Fiscal consolidation plans can unravel swiftly if the government is

forced into oil subsidy support or defence spending increases.

Impact on Indian Investments

The first and most immediate casualty is investor sentiment. The Nifty 50 and Sensex have seen a sharp 15% decline in the early phase of this geopolitical event, driven by FII (Foreign Institutional Investor) outflows as global risk appetite contracts coupled with the FII interests in Artificial Intelligence (AI) driven sectors overseas like Chips making companies. Countries like Taiwan, China have further exasperated the fall. The weakening rupee has made imports costlier and amplified inflation. Bond markets have seen yields rise as RBI has paused any further rate cuts, in fact rate hikes may follow if this situation continues for a few months. The sectors most directly hit include aviation (higher Aviation Turbine Fuel costs), oil marketing companies (under-recoveries on regulated products), paint manufacturers, tyre companies, logistics firms, and any business with significant imported raw material content.

Equity mutual funds with a heavy exposure to these sectors have been affected significantly and seen underperformance. Debt funds have faced mark-to-market losses as yields rise. Real estate, already rate-sensitive, has come under pressure. Small and midcap indices, typically more volatile, have also not been spared despite having corrected quite a bit in the past year. Investors in Equity markets over the past two years are at a loss.

The Silver Lining: Opportunities Within the Crisis

Energy & Oil. ONGC, Oil India, Cairn benefit from higher crude realisations, however it depends on how much the government allows them to pass on the higher price to the consumers. Presently these companies are piling up huge losses.

Defence. One key sector that benefits from war are the Defence companies. The defence companies have seen a surge in demand as they expect the Government to implement expanded defence budgets and India accelerates its self-reliance initiative.

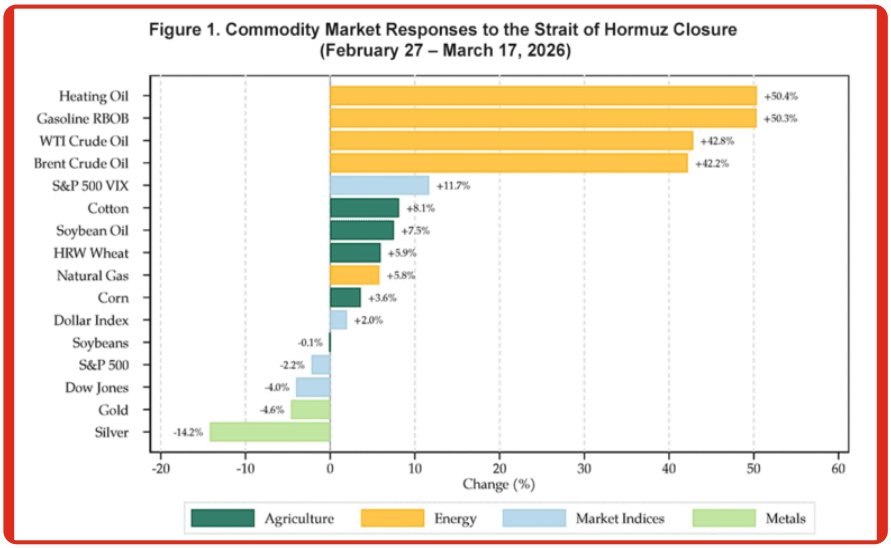
Renewables. Every oil shock is a renewable energy accelerant. After the Prime Minister urged people to adopt austerity due to the extreme war situation, the demand for Electric Vehicles has shot up as people look at options to overcome this crisis.

Gold & Silver. These are the classic safe havens. Gold and Silver Equity Traded Funds (ETFs) offer an alternative to Equity and Debt and in light of their last five years performance, continue to be in demand.

India's growing strategic positioning as a non-aligned geopolitical actor also creates an opportunity. As Western supply chains diversify away from China, India benefits from accelerated manufacturing investment, a trend that conflict-driven de-globalisation amplifies. Information Technology (IT) services companies, already dominant in US and European Union markets, see demand for cyber security and defence-tech consulting increase. Pharmaceutical exports benefit from a weaker rupee. Investors who maintain conviction through the early-phase volatility and position in these sectors capture the recovery premium.

How must investors position themselves from a financial / investment standpoint in times of conflicts/wars: The 8-step Crisis Investment Playbook.

1. **Do not panic and sell; stay asset-allocated.** Market declines during geopolitical events are typically sharp but once the threat passes they tend to bounce back. Liquidating equity at the trough leads to losses.



(Source NDSU using data from Bloomberg farmdocdaily.illinois.edu)

Rupee Breaches 93 Mark For First Time As Crude Prices Spike, 21 March 2026 (image knnindia.co.in)

Review your target allocation, and hold position if you are not in urgent need for funds.

2. **Build a 5–10% gold allocation immediately.** Gold has historically risen 15–25% during major conflict periods. This is your portfolio's shock absorber as it typically works inversely to equity markets in times of conflict.
3. **Rotate toward domestic consumption and defence.** Reduce exposure to oil-dependent sectors and increase allocation to Defence Public Sector Undertakings (DPSUs), domestic FMCG, pharmaceutical exporters, and IT services. All these are relatively contrarian ideas and have a high chance to outperform in conflict environments.
4. **Stagger fresh equity investment via Systematic Transfer Plans (STP) / Systematic Investment Plan (SIP).** Use STP to deploy any surplus cash. Averaging into volatility over six to 12 months captures the downside without the timing risk of lump-sum deployment. Increase SIP size and look at benefitting from these times.
5. **Shift debt allocation to shorter duration.** As yields are expected to rise, long-duration debt funds suffer mark-to-market losses. Move toward liquid funds, ultra-short bond funds, or floating rate funds to protect your fixed income.
6. **Consider international diversification.** US-listed AI & Energy ETFs have been doing well, international gold funds, or feeder funds into global commodity indices provide currency diversification and direct exposure to sectors that gain from conflict-driven price moves.
7. **Maintain 6-month liquid emergency reserve. Crises reveal the cost of illiquidity.** Ensure your emergency corpus is parked in liquid or overnight funds, not locked in equity or long-term instruments you may be forced to break at a loss.
8. **Use market fear as a valuation opportunity.** Quality large cap stocks available at 15–20% discounts to fair value during a fear-driven selloff are a generational entry opportunity. Make a watch-list now, with target buy prices, so emotion does not override logic when the moment arrives.

Recommendation

Geopolitical crises are not anomalies, they are the market's stress tests. The investors who emerge richer are those who prepared before the storm, diversified across assets that behaved differently under pressure, and had the emotional discipline to buy when others sold in fear. India, with its structural growth story intact, its demographic dividend undiminished, and its strategic non-alignment preserved, remains one of the most resilient long-term investment destinations on earth. A US–Iran conflict is a disruption, not a derailment, provided you are positioned correctly.

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Babu Krishnamoorthy

The national flag of Iran flies in the wind as debris lies scattered in the aftermath of an Israeli and U.S. strike on a police station, amid the U.S.-Israeli conflict with Iran, in Tehran on March 3, 2026. (Photo Credit: Reuters)

THE ARCHITECTURE OF MODERN CONFLICT

The Case of the Iran War

The architecture of modern conflict is rarely built on the clean lines of singular national interest; instead, it is a messy, sprawling scaffold of shifting alliances and conflicting duties. When we examine the crucible of the 2026 war involving the United States, Israel, and Iran, we find a case study in the friction between sovereign survival and the collective machinery of coalition warfare.

The relationship between military force, diplomacy, and interstate cooperation has always been fraught with tension, but it becomes especially intricate when national objectives collide with coalition commitments. Nowhere is this more evident than in the triangular dynamic involving the United States, Israel, and Iran, a relationship defined by deep strategic anxieties, ideological antagonisms, and the perpetual shadow of escalation. With the US and Israel, the dilemmas of alliance politics become starkly visible. States that share broad strategic goals may nonetheless diverge sharply on timing, tactics, acceptable risks, and political end-states. Coalitions that appear unified from a distance often reveal, under pressure, the fissures between national imperatives and collective obligations. The interplay of military action, diplomatic manoeuvre, and interstate cooperation becomes a delicate choreography in which each participant must balance its own interests with the expectations and constraints imposed by its partners.

Pakistan Prime Minister Shehbaz Sharif (R) meets with Iranian Parliament Speaker Mohammad Bagher Ghalibaf, ahead of U.S.-Iran peace talks, Islamabad, Pakistan, April 11, 2026 (Photo Reuters)

The United States has long been accustomed to leading coalitions, but leadership does not eliminate the contradictions inherent in alliance politics. Washington's global posture is built on a network of partnerships that require constant maintenance, reassurance, and negotiation. Yet the United States also has its own strategic priorities, domestic political pressures, and global responsibilities that do not always align neatly with the preferences of its allies. Israel, for its part, is a sovereign state with existential security concerns, a unique historical memory, and a political culture that places a premium on self-reliance. Iran, though in different ways an adversary of each, is central to the strategic calculations of both, and its actions often trigger the very dilemmas that test the cohesion of the US–Israel relationship. When conflict flares, the United States may seek to calibrate its response to avoid regional conflagration, while Israel may feel compelled to act decisively to neutralise threats it considers intolerable. The resulting tension is not a failure of alliance management but an inherent feature of coalitions in which partners share broad goals but differ in their threat perceptions and risk tolerances.

Military action, in such contexts, becomes both a tool and a constraint. For Israel, the use of force is often framed as a matter of survival, a necessary response to threats that cannot be deterred by diplomacy alone. For the United States, military force is one instrument among many, to be used judiciously and in concert with diplomatic efforts to maintain regional stability. When Israel undertakes unilateral military operations that risk drawing the United States into a wider conflict, Washington faces a dilemma: to support its ally and risk escalation, or to restrain it and risk undermining the credibility of its commitments. This tension is not new; it has surfaced repeatedly in the history of US–Israel relations, from the Suez Crisis to the Lebanon wars to the debates over Iran's nuclear programme. **What is new in the contemporary context is the complexity of the regional environment, the multiplicity of non-state actors, and the heightened global scrutiny that magnifies every decision.**

Diplomacy, in this environment, becomes both indispensable and extraordinarily difficult. The United States must engage not only with Israel but with a wide array of regional and global actors, each with its own interests and red lines. It must reassure allies in the Gulf, deter adversaries, manage great-power competition, and maintain domestic political support for its foreign policy. Israel, meanwhile, must navigate its own diplomatic relationships, balancing its reliance on American support with its desire for strategic autonomy. Iran, though often portrayed as an isolated actor, is itself engaged in a complex diplomatic game, leveraging its relationships with regional proxies, global powers, and international institutions to advance its interests. Diplomacy in this context is not merely the art of negotiation but the management of a constantly shifting landscape in which every move has multiple audiences and unintended consequences.

Interstate cooperation, therefore, becomes a test of political imagination as much as strategic alignment. **Coalitions are not static entities; they are living arrangements that require constant adaptation**. When national objectives clash with coalition commitments, states must find ways to reconcile their differences without undermining the collective enterprise. This often requires creative diplomacy, strategic patience, and a willingness to accept that perfect alignment is neither possible nor necessary. The United States may need to tolerate a degree of Israeli unilateralism while ensuring that such actions do not derail broader regional goals. Israel may need to accept constraints on its freedom of action – including a tweet from

President Trump on Truth Social *"prohibiting"* it from attacking Lebanon or dismissing an attack on an Iranian oilfield as an error -- in order to preserve the strategic benefits of its alliance with Washington. Iran, though outside the coalition framework, must be factored into any cooperative strategy, for its actions shape the environment in which the coalition operates.

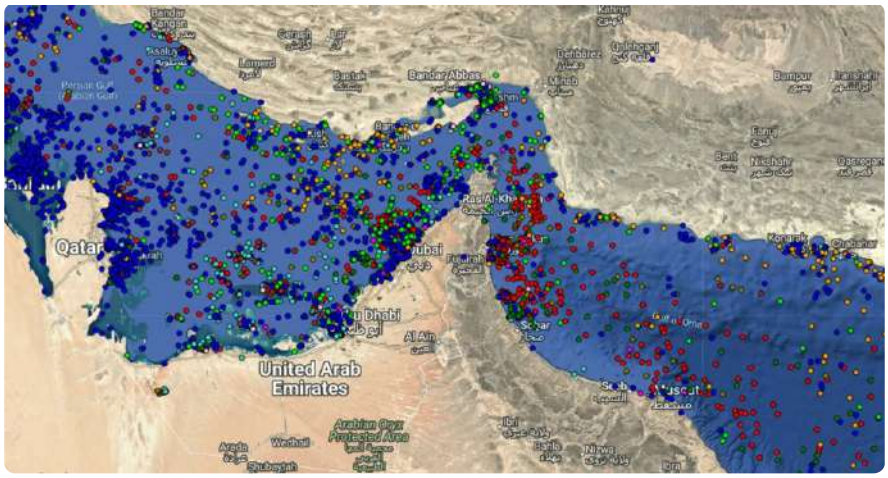
The clash between national objectives and coalition commitments is not merely a strategic problem; it is also a moral and political one. Democracies, in particular, must justify their actions to their citizens, who may question the costs and benefits of supporting allies whose actions they do not fully endorse. The United States must explain why it supports Israel even when Israeli actions complicate American diplomacy. Israel must explain why it sometimes restrains itself at Washington's request, even when it perceives an imminent threat. Iran, though not democratic in the liberal sense, must also manage domestic expectations and nationalist sentiment. The interplay of domestic politics and international commitments adds another layer of complexity to an already intricate relationship.

The challenge becomes even more acute when the conflict escalates into open war. Military operations require rapid decision-making, clear lines of authority, and unity of purpose. Coalitions, however, are inherently pluralistic, with multiple centres of decision-making and divergent priorities. The United States may seek to limit the scope of the conflict to avoid regional destabilisation, while Israel may seek to expand it to eliminate perceived threats. The propensity of President Trump to think out loud and signal his inclinations on social media complicates the options of his allies. Iran may exploit the situation to advance its own objectives, using proxies to pressure both the United States and Israel. In such circumstances, the risk of miscalculation is high, and the consequences can be catastrophic.

Yet history shows that coalitions can survive and even thrive in such environments if they are built on a foundation of mutual trust, shared values, and strategic clarity. The US–Israel relationship, despite its tensions, has endured for decades because both sides recognise the fundamental alignment of their long-term interests. The United States values Israel as a democratic partner in a volatile region, while Israel values American support as essential to its security. Iran, through its hostile posture, plays a role in shaping the strategic environment that binds the United States and Israel together. The challenge is not to eliminate the tensions between national objectives and coalition commitments but to manage them in a way that preserves the integrity of the coalition while allowing each state to pursue its core interests.

This requires a nuanced understanding of the relationship between military force and diplomacy. Military action can create opportunities for diplomacy by altering the strategic calculus of adversaries, but it can also close off diplomatic avenues if used indiscriminately. Diplomacy can prevent conflicts from escalating, but it can also be undermined by the use of force. The key is to integrate military and diplomatic strategies in a way that recognises their interdependence. The United States, for example, may use military deployments to reassure Israel and deter Iran while simultaneously engaging in diplomatic efforts to de-escalate tensions. Israel may use limited military strikes to signal its resolve while relying on the American military as a force multiplier – or on American diplomacy to prevent a wider war. Iran may calibrate its actions to

IEA Advisory issued on 21 March 2026
IEA Warning: "Largest supply disruption in history of global oil market"



Shipping traffic in Strait of Hormuz 28 February 2026 when conflict commenced (Credit Screenshot from Polestar Global Purpletrac)

avoid provoking a full-scale conflict while seeking diplomatic leverage through its regional proxies.

Interstate cooperation, in this context, becomes a form of strategic improvisation. States must constantly adjust their strategies in response to changing circumstances, balancing their national objectives with the demands of coalition politics. This requires not only strategic acumen but also political maturity. Leaders must be willing to accept that their partners will sometimes act in ways that are inconvenient or even counterproductive. They must recognise that coalition politics is not a zero-sum game but a complex negotiation in which compromise is essential.

The US–Israel dynamic over Iran also highlights the importance of communication in managing coalition tensions. Misunderstandings can lead to miscalculations, and miscalculations can lead to escalation. Clear, honest, and continuous communication is essential to ensure that each state understands the intentions and constraints of its partners. This does not mean that disagreements will disappear, but it does mean that they can be managed in a way that reduces the risk of conflict.

Ultimately, the clash between national objectives and coalition commitments is a reflection of the broader tension between sovereignty and interdependence in international relations. States must pursue their own interests, but they must also recognise that their security and prosperity are linked to the actions of others. Coalitions are a way of managing this tension, but they are not a panacea. They require constant effort, strategic flexibility, and a willingness to accept imperfection.

The US–Israel–Iran context offers a vivid illustration of these dynamics. It shows that **military force, diplomacy, and interstate cooperation are not separate domains but interconnected elements of a single strategic landscape**. It shows that coalitions can endure even when their members disagree, provided they share a common vision and a commitment to managing their differences. And it shows that the real challenge of coalition politics is not to eliminate conflict but to channel it in a way that preserves stability and advances shared goals.

This conflict has redefined the boundaries of military science and diplomacy, forcing a reckoning with the reality that a state's most vital security objectives often run perpendicular to the commitments it has made to its partners. In this landscape, the very concept of "*victory*" becomes fragmented, seen through different lenses by a Washington seeking regional stability, a Jerusalem fighting an existential shadow, and a Tehran leveraging the chaos of asymmetric defiance.

The initial strikes launched in February 2026 by American and Israeli forces were marketed as a cohesive effort to dismantle the Iranian nuclear programme and induce a shift in the regional power balance. However, the veneer of a unified front quickly began to erode under the weight of divergent long-term goals. For the United States, the military intervention was a surgical necessity—an attempt to enforce the "*maximum pressure*" doctrine while simultaneously keeping a door ajar for diplomatic off-ramps that would prevent a total collapse of global energy markets. Washington's coalition commitments, particularly to its European and Indo-Pacific allies, demanded a war that was "*contained.*" These partners, though theoretically aligned against Iranian proliferation, remained tethered to the economic reality of the Strait of Hormuz. **When global oil prices surged past $120 per barrel following the disruption of maritime routes, the friction between American military objectives, its domestic political priorities and its diplomatic obligations to the global economy became a glaring strategic fault-line.**

Israel, by contrast, operated under a different temporal and existential framework. For the Israeli leadership, the war was not a

tactical manoeuvre to be balanced against global market fluctuations, but a final resolution to what it perceived as a decades-long existential threat.

While the United States sought to degrade Iranian capabilities to the point of a manageable negotiation, Israel's national objective was the total elimination of the "*head of the snake*." **This discrepancy created a paradox of interstate cooperation: the two primary allies were using the same munitions to fight the same enemy, yet they were fighting two different versions of the same war**. Israel's insistence on striking deeper into the Iranian interior-targeting not just nuclear sites but the very infrastructure of the Revolutionary Guard-often bypassed the restrictive engagement windows preferred by Washington. Here, the coalition was not a source of strength, but a cage of restraint that the Israeli state felt increasingly compelled to break.

Interstate cooperation in this context is further complicated by the "**proxy**" variable. The 2026 conflict proved that a war with Iran is never a war with Iran alone. As missiles fell on Tehran, the responses were felt in the Golan Heights, the Red Sea, in the city centre of Beirut, and the streets of Abu Dhabi. This regionalization of the battlefield forced a sudden, frantic realignment of coalition commitments among the Abraham Accords signatories and other Gulf States. These nations found themselves in a precarious middle ground: providing intelligence and defensive coordination to the US-Israeli axis while fearing the direct Iranian retaliation that their proximity invited. The diplomatic challenge for the United States was to convince these partners that the coalition was a shield, even as the military reality made them a target. The resulting strain highlighted a fundamental truth of modern diplomacy—coalition commitments are only as strong as the security guarantees that back them, and in a multi-front war, no guarantee is absolute.

The role of diplomacy during such an active military campaign often appears subservient to the roar of kinetic action, yet in the US-Israel-Iran theatre, it became the primary tool for managing the inevitable "*mission creep*." Throughout early 2026, we witnessed shadow diplomacy where the United States attempted to leverage its military successes to bring a weakened Iranian leadership to the negotiating table, even as Israel remained wholly opposed to any deal that would leave the Iranian regime's foundations intact. This internal coalition friction provided the Iranian leadership with its only real strategic asset: the ability to play its adversaries' timelines against one another. By offering minor concessions to the Americans while maintaining a posture of total resistance against the Israelis, Iran attempted to fracture the coalition from within. The struggle to maintain a unified diplomatic front while national objectives were so clearly at odds became the defining intellectual challenge of the war's middle phase.

Reflecting on the broader implications of this conflict, we see that the era of "*grand coalitions*" might be giving way to "*coalitions of convenience*," where the terms of cooperation are renegotiated on a daily, even hourly, basis. The traditional model of interstate cooperation assumes a shared definition of the "**end state**," but the 2026 war suggests that in the presence of an existential threat, such as a nuclear-capable Iran, the end state is a subjective concept. **To the U.S., the end state might be a return to the status quo with a weakened adversary; to Israel, it is a new regional order; to the Arab Gulf, it is simply the survival of their infrastructure.** When these objectives clash, the coalition becomes a site of negotiation rather than a unified force.

U.S. Vice President JD Vance (L) speaks with Pakistan Prime Minister Shehbaz Sharif ahead of their meeting on Iran amid the U.S.-Iran peace talks in Islamabad, 12 April 2026 (photo Jacquelyn Martin AFP-JIJI)

The Arak heavy water nuclear reactor in Iran, specifically the calandria (core) area. In June 2025 Israel reportedly conducted an attack on this reactor facility (Credit Radio Free Europe Radio Liberty)

Ultimately, the US-Israel-Iran war of 2026 teaches us that military power, no matter how advanced, cannot bridge the gap between conflicting national identities. The cooperation seen between the U.S. and Israel was robust in its technical execution—shared satellite data, coordinated air refuelling, and integrated missile defence—but it was fragile in its political soul. The tension between the desire to win a war and the need to maintain a coalition is the new frontier of global statecraft. As the smoke clears from the strikes on the Iranian heartland, the enduring legacy of the conflict will not just be the damage done to nuclear centrifuges, but the realization that in the modern world, the most difficult battle is not against the enemy, but with the ally whose definition of safety does not quite match your own. This friction is not a failure of diplomacy, but the very essence of it—a constant, gruelling effort to keep the machinery of cooperation moving even when the parts are grinding against one another in the heat of a regional firestorm.

In the end, the success of any coalition depends on the ability of its members to balance their national objectives with their collective commitments. This is not easy, especially in a region as volatile as the Middle East. But it is essential. The alternative is a world in which states act unilaterally, without regard for the consequences, and in which conflicts escalate unchecked. The US-Israel-Iran dynamic, with all its tensions and contradictions, offers a reminder that even in the most challenging circumstances, cooperation is possible- and that **the careful integration of military force, diplomacy, and interstate cooperation remains the best hope for managing conflict in a complex and interconnected world.**

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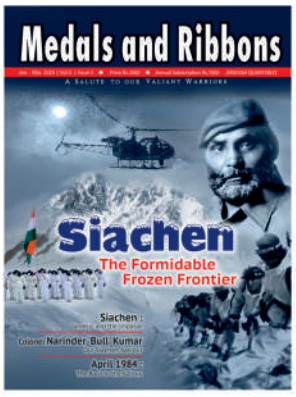
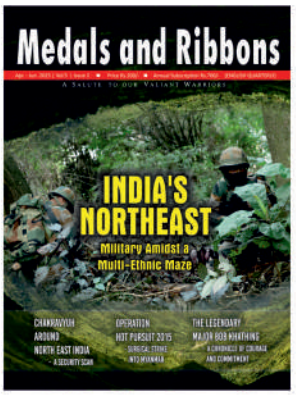
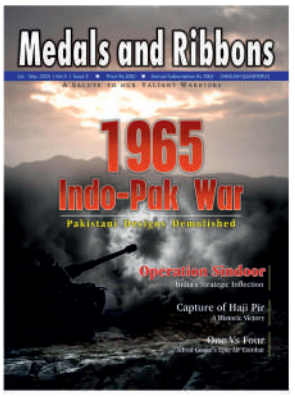
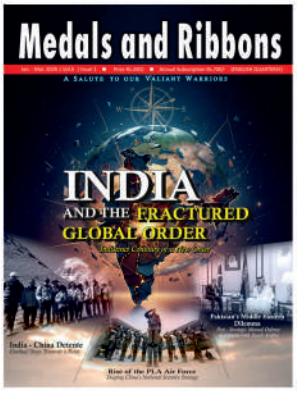
Dr Shashi Tharoor

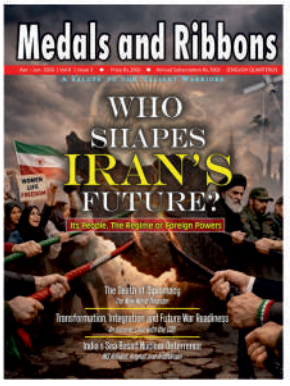
Dr. Shashi Tharoor, a Member of Parliament since 2009, has won the Lok Sabha Elections four times from Thiruvananthapuram, Kerala. A member of the Indian National Congress, Tharoor is a former diplomat and was formerly an Under-Secretary-General of the United Nations. Tharoor graduated from St. Stephen's College, Delhi, in 1975 and was conferred a doctorate in international relations and affairs from the Fletcher School of Law and Diplomacy, Tufts University a few years later in 1978. At the age of 22, he was the youngest person at the time to receive such an honour from the Fletcher School. During the Manmohan Singh Government, Dr. Shashi Tharoor served as the Minister of State for External Affairs. An erudite scholar and intellectual, an acclaimed public speaker, Dr Tharoor is a Sahitya Akademi Award winner, who has authored many works of fiction and non-fiction since 1981. He is presently the Chairperson of the Parliamentary Standing Committee on External Affairs.











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