India

Money, Military & Markets-XVII

Massive upgrades likely in Indian Air Force

- Operation Sindoor has achieved complete strategic success, crippling Pakistan's air defence and command infrastructure with precision airstrikes.
- However, Pakistan is expected to rearm rapidly with Chinese support, including J-35 fighters and PL-17 missiles, and may resume terror attacks in 2–3 years.
- To retain air superiority, India must urgently modernize its air force with stealth detection, hypersonic defences, drone warfare tech, & interim 5th-gen fighters.

Operation Sindoor has been successful, but it won't dissuade Pak

Operation Sindoor has been successful in all aspects. It hit the terror targets with pinpoint accuracy on 7th May 2025. Initially, the Indian Air Force (IAF) got a surprise and Pak fielded full range PL-15 (range ~200km); however, when all gloves came off on 8th, 9th and 10th May 2025, Pakistan's airforce was not able to even put up a minor resistance. Driven by NAVIC navigations system, India successfully attacked at least 11 airbases of Pakistan as well as their command-and-control centres with pinpoint accuracy. After the loss of their command-and-control centres, Pak air force would have been picked like sitting ducks which would have led to major escalation and hence, when Pak's DGMO approached his Indian counterpart, India agreed to cessation of hostilities. However, India maintains that operation Sindoor is still on, and this is just temporary stoppage of war. After every defeat, Pakistan has responded with a fresh terror attack and this time as well it won't be different.

Pakistan will plug its security gaps & China will arm it to the teeth…

While Pakistan's air defence infrastructure and radar systems have been severely degraded, this advantage for India is likely to be short-lived. One should make no mistake: China will move swiftly to rearm Pakistan with advanced platforms, correcting the deficiencies exposed during the current crisis. Pakistan is expected to learn from its operational setbacks and, within the next two-to-three years — the minimum period likely required to rebuild its defences before attempting another major provocation — it will return to terror attacks on Indian mainland (either through Kashmir or Bangladesh) with a significantly more capable air and missile force. The induction of Chinese PL-17 beyond-visual-range (BVR) air-to-air missiles, with claimed ranges exceeding 300km, along with J-35 aircraft is a certainty in three years' time. Furthermore, to counterbalance India's air dominance, Pak is likely to acquire & deploy HQ-16 medium-range surface-to-air missiles.

…hence, India will have to arm its air force to outsmart Pakistan

To maintain credible air superiority in the evolving regional threat environment, India must urgently arm its air force with cutting-edge technologies across multiple domains. 1) **Stealth detection & advanced ISR**: India must invest in stealth detection systems, particularly VHF and L-band radars. Additionally, India should explore the possibility of acquiring Distributed Aperture Systems (DAS), similar to those on the F-35, which offer persistent 360-degree situational awareness and can be integrated with interceptor missile systems such as a SAM variant of the Stunner missile. 2) **Drone-killing capabilities**: This includes technologies like Bhargavastra, a loitering drone killer being developed by Solar Industries, as well as indigenous suicide drones and 'drone mothership' platforms. 3) **Swarm neutralization technologies**: India should prioritize swarm drone-killing solutions, including soft-kill electronic warfare systems and laser-assisted directed energy weapons. 4) **Hypersonic missile engagement**: The induction of BrahMos 2 with speeds up to Mach 4.5, and future hypersonic missile platforms, must be matched with parallel development of counter-hypersonic defences. Projects like Kusha, jointly developed by BEL and DRDO, are expected to provide layered hypersonic defence capabilities. 5) **Next-generation ISR aircraft**: India needs new ISR&T (Intelligence, Surveillance, Reconnaissance, and Targeting) aircraft. 6) **HALE & MALE UAVs**: The IAF must induct high-altitude, long-endurance (HALE) and medium-altitude, long-endurance (MALE) armed UAVs. 7) **Fifth-generation fighter gap**: As the AMCA is realistically at least 10 years away, India must bridge this capability gap through the urgent induction of imported fifth-generation fighters either through the Su-57 or F-35. 8) **Military satellite constellation:** It needs to be launched ASAP as the 2030 target is far away.

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Massive upgrades likely in Indian Air Force

Operation Sindoor has demonstrated that a massive air battle is possible even under the nuclear umbrella. At the same time, it highlights India's strategic compulsions—specifically, the need to respond decisively to any act of terrorism on Indian soil. No future government can afford a policy reversal, and the United Progressive Alliance or UPA's oxymoronic "strategic silence" is now a thing of the past. As a result, India must maintain its technological edge. While infantry will remain the ultimate instrument for capturing enemy territory, it is now clear that air power will be central to any future conflict. For both India and Pakistan, Operation Sindoor has made it evident that the coming era will be defined by air warfare, as Pakistan is unlikely to cease its support for terrorism—and India will be compelled to respond. As a consequence, India is expected to invest heavily in both capacity and inventory building across key defence domains—including ammunition, drone technology, air defence system, scramjet engine development, and established areas such as jet engine technology and aircraft manufacturing.

Can Pakistan stop backing terror organization? No

Indian military planners are well aware that a single act of attrition will not be sufficient to dissuade Pakistan. In all probability, Pakistan will respond with an even more forceful terror strike. It is important to remember that the Pakistani army relies on controlling the mindset of the general population and therefore cannot abandon the path of terrorism. Furthermore, the presence of senior army officials at the funerals of known terrorists, along with the symbolic act of draping coffins in the Pakistani flag, clearly reflects the Pakistani army's stance. If they were to change their policy after a single retaliatory strike by India, it would amount to an admission of defeat—something they are unlikely to ever accept.

India has long borne the brunt of Pak - sponsored terrorism ➤

India has long faced the brunt of cross-border terrorism emanating from Pakistan. While punitive actions—such as the surgical strikes of 2016 and the Balakot air strikes of 2019—have demonstrated India's resolve, they have failed to produce lasting behavioural change in Pakistan's military establishment. At the core of this resilience lies the Pakistani army's strategic doctrine: it views terror proxies not as liabilities, but as low-cost force multipliers in its asymmetric warfare against India.

Terrorism has ideological and institutional embedding within Pakistan military… ➤

The Pakistani army has positioned itself as the guardian of the state, with its legitimacy rooted in the perceived existential threat from India. Sponsoring jihadist groups helps sustain this narrative among the population. Maintaining links with terror groups allows the military to dominate internal security policy, suppress dissent, and marginalize civilian political actors. Terror networks are also used to manage the balance of power within Pakistan's own tribal and border regions. Compared to conventional warfare, proxy groups allow Pakistan to impose persistent costs on India while maintaining plausible deniability and avoiding full-scale conflict. The participation of senior Pakistani army officials at the funerals of designated terrorists, and the symbolic act of wrapping their coffins in the national flag, underscores not just support but celebration of these actors as "martyrs."

…as it allows Pakistan to fight a low-cost war ➤

While India's military responses serve to maintain deterrence and signal resolve, they rarely produce a long-term change. On the contrary, Pakistan tends to retaliate through *deniable escalation*—larger, more publicized terror strikes. Reversing its posture would be perceived by the Pakistani military as an internal loss of face, damaging its domestic narrative and weakening its institutional primacy. Retaliatory operations may unite Pakistan's fractured polity and public under the army's narrative of "Indian aggression."

Pakistan may resort to non-traditional routes for infiltration, with Bangladesh potentially becoming an easy transit point ➤

With a friendly government in place and increasing radicalization within Bangladesh, the situation presents a strategic opportunity for Pakistan. It is widely speculated that Lashkar-e-Toiba (LeT) played a role in overthrowing the Sheikh Hasina-led government. While the Mohammed Yunus-led administration lacks broad domestic legitimacy, support from China—both political and financial—may help it navigate the recent instability. Under these circumstances, Bangladesh risks becoming an easy conduit for the transfer of terrorists into the Indian mainland.

The Modi government's reluctance to intervene in West Bengal's increasing radicalization risks creating a fertile breeding ground for Pakistan-sponsored terrorism ➤

West Bengal has emerged as a critically alert zone, with rising evidence of radicalization tied to Pakistan-based networks—and the Centre's notably cautious approach is fueling growing anxiety.

1. **Bangladeshi/Pakistani militant modules unearthed in West Bengal**
    a. The discovery of the 'Shahadat' module targeting students, with alleged links to Bangladesh's Shahadat-e al-Hiqme and Inter-Services Intelligence or ISI, demonstrates a tangible Pakistan-linked terror cell operating within West Bengal.
    b. This group reportedly had recruitment ties with Bangladesh, and connections to Pakistani terror logistics through Hyderabad-based networks.
2. **Political reluctance hampering proactive action**
    a. Analysts say the state government under Chief Minister Mamata Banerjee has shown a pattern of political hesitation—"lack of political will"—to contain Islamist radical groups.
    b. Recent statements by the chief minister urging vigilance near the border also point to central police dependency over an assertive security framework.
3. **Exploitation of porous borders and communal flashpoints**
    a. Murshidabad, with its communal tensions and border adjacency, has seen incidents that activists attribute to orchestrated radicalization—allegedly "outsiders" stoking unrest.
    b. Reports that Pakistan is seeking to leverage Bangladesh as a regional terror launchpad add to growing concerns about cross-border contamination.
4. **Centre-state dynamics marked the inertia**
    a. Despite Prime Minister Narendra Modi calling out West Bengal's alleged educational/administrative rot and vowing to tackle "terror" under Operation Sindoor, there's little visible federal security intervention on the ground.
    b. This hands-off posture creates a vacuum—politically and operationally—that can be exploited by cross-border terror infrastructure.
5. **Why this matters**
    a. West Bengal's demographics and porous borders make it a fertile recruitment and transit region for radicalized actors.
    b. Delay in central intervention, and a cautious state approach, risks allowing Pakistan-sponsored terror networks to embed themselves, using the state as a launchpad into other regions.

Can West Bengal become the next Kashmir? It may be too early to say definitively, but with each passing day, the region appears to be inching closer to that scenario ➤

1. **Similarities That Raise Alarm Bells**
   a. Cross-border dynamics in Kashmir: Pakistan's involvement via terror groups like LeT, JeM. Bengal: ISI-linked modules (e.g., Shahadat-e-al-Hiqme) using Bangladesh as a conduit, with porous borders in Murshidabad, Malda, and Nadia making infiltration and arms/sleeper cell movement easier.
   b. Radicalization patterns: Both regions have seen rising religious radicalization, often masked under social/religious charities or educational institutions.
   c. Online influence: Telegram, WhatsApp groups linked to overseas handlers are actively spreading jihadist propaganda in West Bengal.
   d. Political paralysis-Kashmir (pre-2019): Political compulsions hindered strong anti-terror operations. West Bengal (current): The Trinamool Congress or TMC government is often accused of political appeasement and "soft-pedalling" Islamist extremism for electoral arithmetic.
2. **Key Differences (Why West Bengal is *not yet* Kashmir)**
   a. No significant separatist movement.
   b. Unlike Kashmir, there's no mainstream demand for secession in Bengal.
   c. Radical elements are mostly externally influenced, not part of a mass uprising.
   d. Ethnic and cultural diversity - West Bengal's social cohesion and Bengali cultural pride still act as a buffer. Mass militancy doesn't yet have fertile ground among the general populace.
   e. Presence of democratic structures – West Bengal still participates fully in India's democratic and judicial framework, unlike Kashmir where Article 370 allowed exceptional autonomy, which complicated countermeasures.
3. **The Road Ahead**
   a. ISI's strategy has evolved: They are using Bangladesh as a "soft" launchpad to infiltrate India through West Bengal rather than Punjab or Kashmir.
   b. Local youth radicalization (e.g., Murshidabad modules) is growing via funding from Gulf and West Asia.
   c. Lack of proactive security action, due to Centre-State friction, allows cells to regroup and expand unnoticed.

Hence, at the least, West Bengal can become an easy conduit for terrorist transfers to Indian mainland ➤

1. **Porous border with Bangladesh**
   a. West Bengal shares a **2,216km border** with Bangladesh — one of the longest international borders in the world.
   b. Large stretches are **unfenced**, with **illegal crossings** and **smuggling routes** long used for human trafficking, arms, and counterfeit currency.
   c. Terror outfits exploit this weak link. For instance:
      i. **Burhanuddin Sheikh module (2018)**: Arrested with links to JMB and ISI.
      ii. **Murshidabad IS module (2020)**: Operatives confessed to cross-border training.
2. **Established Sleeper Cells**
   a. Groups like **Jamaat-ul-Mujahideen Bangladesh (JMB)** and **Ansarullah Bangla Team** have active cells in West Bengal.

b. West Bengal has become a **safe house and logistics hub** — recruits are trained or sheltered here before moving to high-value targets like Delhi, Mumbai, and Hyderabad.

3. **Document Forgery Networks**
   a. Fake Aadhaar, voter IDs, and even passports are regularly busted in **Malda, North 24 Parganas**, etc.
   b. These help operatives **"legally" integrate** into Indian cities before attacks — a method used by 26/11 handlers too.
4. **Political and Policing Paralysis**
   a. Frequent **Centre vs State turf wars** limit National Investigation Agency (NIA) or Intelligence Bureau (IB) effectiveness on the ground.
   b. Police inaction (often to avoid communal flare-ups) allows radical elements to grow silently.

How will India respond to future terror attacks? Given the lowered threshold for retaliation, India must react swiftly and decisively ➤

The Indian prime minister has openly stated that any future act of terrorism will be treated as a declaration of war. As a result, India's response to such attacks has become more predictable — it will retaliate. The only variable now is the speed of that response. What once took days must now be executed within hours. While it is obvious that Indian military planners will war-game various scenarios, the key challenge lies in building the capability to act with speed and precision. Rapid response is no longer a strategic advantage — it is a necessity.

Operation Sindoor was successful in its strategic objective; however, that's behind us

Operation Sindoor was successful in achieving its strategic objectives. It inflicted visible and verifiable damage on the Pakistani military. Terror bases were destroyed deep within Pakistan's heartland — Punjab. Command and control centres were taken out, and multiple air defence radars were neutralized. India's technological superiority played a critical role, especially its air defence system and the indigenous NAVIC GPS system. Indian drone technology and counter-drone defence systems were also effectively deployed. However, it is anticipated that China will quickly innovate and transfer new technologies to Pakistan. As a result, Indian military planners will likely assume that Pakistan has addressed its current vulnerabilities. Planning for future responses will thus begin from 'ground zero' — with the expectation that the next conflict will demand even swifter and more sophisticated action.

Future battles will be fought under the shadow of a nuclear umbrella, where the use of air power is particularly well - suited ➤

Any future conflict between India and Pakistan will unfold under the looming presence of nuclear weapons, which significantly shapes strategic calculations on both sides. This "nuclear umbrella" creates a paradox: while it deters full-scale conventional war, it also provides space for limited military engagements, especially below the nuclear threshold.

In such a scenario, air power becomes a critical tool for the following reasons:

1. **Speed and precision**: Air strikes can be launched quickly and with high accuracy, allowing India to respond within hours (as seen in the Balakot strike in 2019 and operation Sindoor in 2025). This shortens reaction time and demonstrates political will without prolonged escalation.
2. **Flexible targeting**: The air force can hit terrorist camps, command centres, or logistics hubs deep inside enemy territory, while still limiting civilian casualties and infrastructure damage — thus helping maintain escalation control.

3. **Reduced ground commitment**: Using air power avoids the risks associated with large-scale ground incursions, which can lead to heavy casualties and risk drawing in a wider war.
4. **Strategic signalling**: The use of air power, especially beyond the Line of Control (LoC), sends a strong signal both domestically and internationally that India is willing to retaliate — but within calculated boundaries.

That said, both sides will war-game such scenarios extensively. For India, precision air strikes, drone warfare, and electronic warfare will increasingly define future doctrines. Pakistan, in response, may rely on integrated air defence systems, rapid mobilization, and asymmetric responses through proxies.

In essence, future India-Pakistan battles — if they occur — will be sharp, swift, and carefully calibrated to avoid triggering a catastrophic escalation.

Hence, India's defence strategy, which was focused on the Indian army, must shift, and the air force must take centre stage ➤

Rapid deployment of the army and capturing a significant portion of Pakistani territory is not in India's strategic interest. At the same time, the Pakistani army is no pushover like Hamas. Even if India were to seize a large portion of Pakistani land, it would still be a tombstone for India. The radicalized population would never integrate into Indian society. A swift and decisive response to economically punish Pakistan can only be achieved through a technologically superior air force. Hence, the IAF must take the centre stage in Indian war planning.

General K. Sundarji's doctrine of mechanized thrust across Pakistan and breaking it into two is dead, even IBG has lost its relevance ➤

1. Since the advent of nuclear weapons in the subcontinent, conventional military strategy has undergone a significant transformation. Historically, India's defence posture was heavily reliant on the Indian army, with deep-rooted doctrines shaped by past wars with Pakistan and China. General K. Sundarji, who served as India's army chief from 1986 to 1988, was a key architect of India's mechanized warfare vision. Through Operation Brasstacks, he tested the concept of a deep thrust across Pakistan, intending to split the country into two. Though bold in conception, the operation brought India dangerously close to a full-scale war, underscoring the risks of high-intensity conventional warfare in a nuclearized environment.
2. India continued to adhere to this mechanized doctrine through initiatives like Operation Parakram in 2001, following the Parliament attack. However, Parakram exposed severe flaws in India's readiness and strategic planning. The Indian army took nearly a month to mobilize, losing the element of surprise, and ultimately retreated under the shadow of Pakistani nuclear deterrence. The failure of this large-scale mobilisation highlighted the limitations of conventional force projection in modern deterrence scenarios.
3. In response, India restructured its offensive posture through the creation of Integrated Battle Groups (IBGs) — agile, self-contained units designed for rapid deployment and limited objectives. While IBGs represent a tactical improvement over older doctrines, their utility remains constrained in a nuclear environment, where deep incursions risk strategic escalation.
4. However, even the deployment of Integrated Battle Groups pales in comparison to the punitive power of the IAF. The IAF's ability to conduct precision strikes deep inside enemy territory, with minimal troop involvement and faster turnaround times, makes it the most viable tool for calibrated retaliation. In an age where punitive action must be swift, visible, and below the nuclear threshold, the IAF stands out as the most effective arm of state policy.
5. A technologically superior air force allows India to respond within hours rather than days, punishing Pakistan economically and militarily without prolonged

ground engagements. Precision strikes targeting critical infrastructure, supply chains, or military assets impose real costs while avoiding entanglement in hostile population centres — a risk that a ground offensive inherently carries, especially in regions with radicalized populations unlikely to integrate into Indian society.

6. India's defence doctrine must evolve with strategic realities. While ground forces remain indispensable for defence and limited engagements, it is the air force that must now take centre stage in delivering credible, swift, and proportionate responses under the nuclear overhang. This shift not only enhances deterrence but also provides political leadership with flexible options in the face of provocation.

India will assign a disproportionate budget (vis-à-vis recent history) to its air force and navy ➤

1. **Changing nature of regional security threats:**
   - With Pakistan and China posing multi-domain challenges, including in the air and maritime spaces, India's defence posture must evolve to meet these threats effectively.
   - The Indian Ocean Region (IOR) has become a critical geopolitical arena, with China expanding its naval presence and the US reinforcing alliances, compelling India to assert stronger naval dominance.
2. **Nuclear deterrence and precision strikes:**
   - Future conflicts will likely be limited, high-intensity engagements under the nuclear umbrella, where rapid, precise air and naval operations are preferable to prolonged ground mobilizations.
   - Enhanced air and naval capabilities offer India strategic options short of a full-scale war, including power projection, blockade enforcement, and targeted strikes.
3. **Force multiplication through technology:**
   - Investments in advanced fighter aircraft (e.g., Rafale, Tejas Mk2), naval platforms (e.g., aircraft carriers, submarines, destroyers), and integrated network-centric warfare systems amplify India's strategic reach and operational flexibility.
   - Emphasis on UAVs, missile defence, and electronic warfare enhances the IAF and navy's lethality and survivability.

Implications:

- **Reduced reliance on large-scale land mobilization:** The army will increasingly operate in a more specialized role focused on counterinsurgency, rapid reaction forces, and border defence, while the IAF and navy handle strategic deterrence and conventional warfare.
- **Budgetary realignment and procurement priorities:** Expect accelerated funding for naval shipbuilding, acquisition of stealthy fighter jets, long-range maritime patrol aircraft, and indigenous defence technology development.
- **Jointness and integrated operations:** The budget shift will be accompanied by doctrinal reforms emphasizing jointness among the services, with the IAF and navy playing critical roles in integrated battle groups and tri-service commands.

India also needs massive investments in its air force ➤

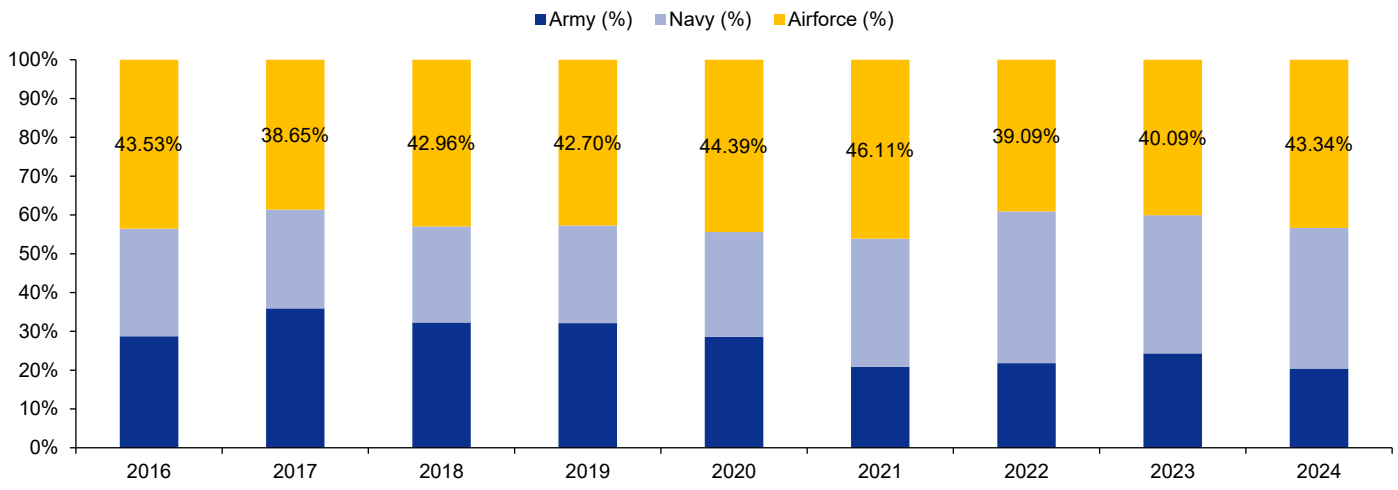
While India has already been allocating a disproportionately high share of its capital expenditure to the IAF, this investment needs to increase even further in the coming years. The evolving nature of warfare — particularly in the shadow of nuclear deterrence — places a premium on rapid, high-precision, and technologically advanced responses, all of which are domains where the air force excels.

To support this doctrinal shift, India's overall defence expenditure must also rise beyond the current level of approximately 2% of GDP. This is relatively low for a

country facing two nuclear-armed adversaries, persistent border threats, and growing regional security responsibilities. A higher defence outlay is necessary not only to modernize the air force but also to invest in critical enablers such as surveillance, electronic warfare, space-based assets, and cyber capabilities — all of which are integral to air dominance in the 21st century.

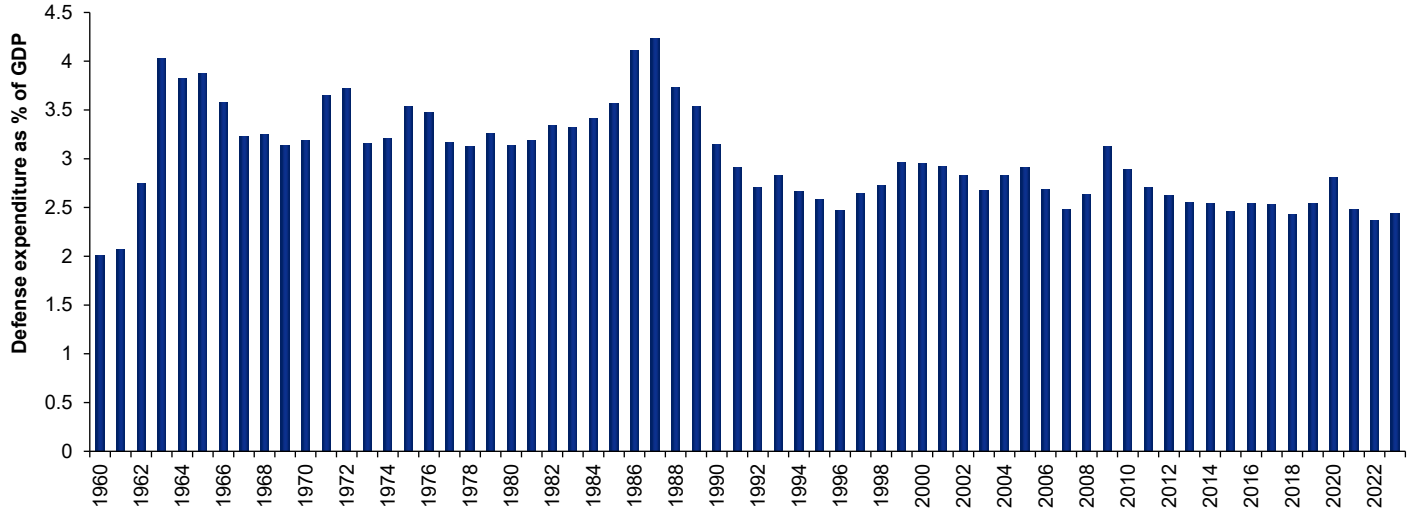
As geopolitical tensions rise and India aspires to play a more assertive role on the global stage, underfunding defence, especially air power, would be strategically short-sighted. A sustained increase in defence spending, with emphasis on air and aerospace capabilities, is essential to deter adversaries, project power, and secure national interests in a rapidly changing security environment.

Figure 1: The IAF has received a disproportionately large share of the overall capital expenditure in the Indian defence budget; however, this allocation needs to increase further; India must significantly increase its overall defence spending, which currently stands at approximately 2% of GDP



SOURCE: COMPANY REPORTS, INCRED RESEARCH

Figure 2: India needs to take its defence expenditure to 3% of GDP



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Air force - India needs multiple new technologies on yesterday's basis

Money, Military, and Markets has consistently emphasized the urgent need for India to bridge the technological gap with China to maintain a credible deterrent against Pakistan. As Pakistan reportedly explores the acquisition of fifth-generation J-35 fighter jets from China, India's response must be centred around the development and deployment of an indigenous fifth-generation combat aircraft. However, the challenge goes beyond airpower alone. India must significantly enhance its investment in a broad spectrum of advanced defensive technologies. These include:

1. Next-generation missile systems.
2. Advanced sensor networks.
3. Hypersonic missiles and corresponding defence systems.
4. Netra AEW&C System (Airborne Early Warning & Control).
5. High-Altitude Long-Endurance (HALE) UAVs.
6. Swarm drones and anti-drone technologies.
7. ISTAR (Intelligence, Surveillance, Target Acquisition, and Reconnaissance) aircraft.
8. Multiple military grade satellites in the orbit. India plans to have 52 such satellite by 2030; however, this timeline needs to be squeezed.
9. Most critically, India must accelerate the development of a fully operational fifth-generation fighter aircraft.

In the following sections, we will outline the operational utility of each of these systems and identify the Indian public and private sector entities currently involved in their development and manufacturing.

Next-generation missile systems both in BVR and air-to-ground usage ➤

1. India's airpower and deterrence capability critically depend on the development of advanced missile systems. In the **BVR (Beyond Visual Range)** category, India has already deployed the **Astra Mk-1** air-to-air missile, with **Astra Mk-2 and Mk-3** under development to extend engagement ranges and improve seeker technology. These missiles are designed to match or exceed the performance of China's PL-15 and Pakistan's AIM-120C-equipped platforms.
2. On the **air-to-ground** front, India is actively working on precision-guided munitions and standoff weapons, such as the **Smart Anti-Airfield Weapon (SAAW)**, **Rudram anti-radiation missiles**, and the long-range **BrahMos-A** (air-launched variant).
3. Till the time **Astra Mk-2 and Mk-3** develops, India needs to acquire R-37 long-range missiles to counter the PL-17 advantage with Pakistan.
4. **Key developers:** Defence Research and Development Organisation or DRDO, BDL (Bharat Dynamics), and private companies such as Solar Industries, and Economic Explosives (an arm of Solar Industries) are increasingly playing a role in component-level development and integration.

Advanced sensor networks for integrated air defence system ➤

Advanced sensor networks are the **nerve centre** of modern **Integrated Air Defence Systems (IADS)**. These networks combine a wide variety of sensors across platforms (land, sea, air, and space) to create a real-time, layered, and resilient picture of aerial threats — including stealth aircraft, cruise missiles, unmanned aerial vehicles or UAVs, and ballistic missiles. Following are the core components of Advanced Sensor Networks in IADS.

1. **Multilayered Radar Systems**
   - **Long-Range Surveillance Radars** (e.g., Russian **Nebo-M**, American **AN/FPS-132**): Detect incoming threats from hundreds of kilometres away.
   - **Medium and Short-Range Radars** (e.g., **S-400's 92N6E**, Israeli **EL/M-2084**): Track and assign targets to interceptors.
2. **Fire-Control Radars**: Provide precision tracking for missile guidance.
   - **Low-frequency Radars (VHF/UHF)**: Useful for detecting stealth aircraft due to their longer wavelengths.
   - **Electro-Optical & Infrared (EO/IR) Sensors-**Deployed on both ground stations and drones. Provide **passive tracking** (undetectable by the enemy). Used especially for **low-flying UAVs** or **stealth aircraft**.
3. **Passive Detection Systems**
   - Systems like **Kolchuga** or **Vera-E** detect emissions (radar, radio, datalink) from enemy platforms.
   - Crucial for electronic order of battle and direction finding.
4. **Space-Based Assets**
   - Early warning satellites track **ICBM launches** via **infrared plumes** (e.g., Russia's **Tundra**, US **SBIRS**).
   - Help with **missile trajectory prediction** and **interceptor cueing**.
5. **Airborne Early Warning and Control (AEW&C)**
   - High-mobility airborne radars like the **E-3 Sentry**, **DRDO Netra**, or **A-50U**.
   - Detect low-flying threats beyond the radar horizon and **coordinate interception** across services.
6. **Networking and Integration-** Modern IADS are built on **real-time sensor fusion**, enabled by:
   - **C4ISR frameworks** (Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance).
   - **Battle Management Systems (BMS)**: **Artificial intelligence or AI-based threat evaluation and interceptor assignment**. Use of **secure, encrypted, and redundant communication links** for network resilience (via satellite, fibre, or HF/VHF/UHF radio).
7. **Future Trends**
   - **Quantum radar** (resistant to jamming/stealth).
   - **Distributed sensor nodes** via low-orbit satellites and drones.
   - **AI-based anomaly detection** for drone swarm defence.
   - **Cognitive radar** that dynamically adapts waveforms.

As of now, India needs expertise in VHF radars ➤

Very High Frequency (VHF) radars are crucial components of air defence systems, particularly in detecting **stealth aircraft** that are designed to evade conventional radars. VHF radars operate in the 30–300MHz range, with wavelengths between 1 and 10 metres. These long wavelengths give them an edge in detecting aircraft with low radar cross-sections (RCS), such as fifth-generation stealth fighters (e.g., F-22, J-20).

The role of VHF radars in Indian air defence:

1. **Detecting stealth threats:** Conventional radars struggle against stealth fighters like China's J-20; VHF radars can detect these aircraft due to resonance effects.
2. **Complementing S-400 & Akash systems:** They serve as early warning layers in multi-tiered air defence networks.
3. **Network-centric warfare:** India is building a **composite air picture**, integrating radar inputs from multiple sources — including satellites, AEW&C (like Netra), and VHF radars — into IACCS (Integrated Air Command and Control System).

Key Indian VHF radar systems

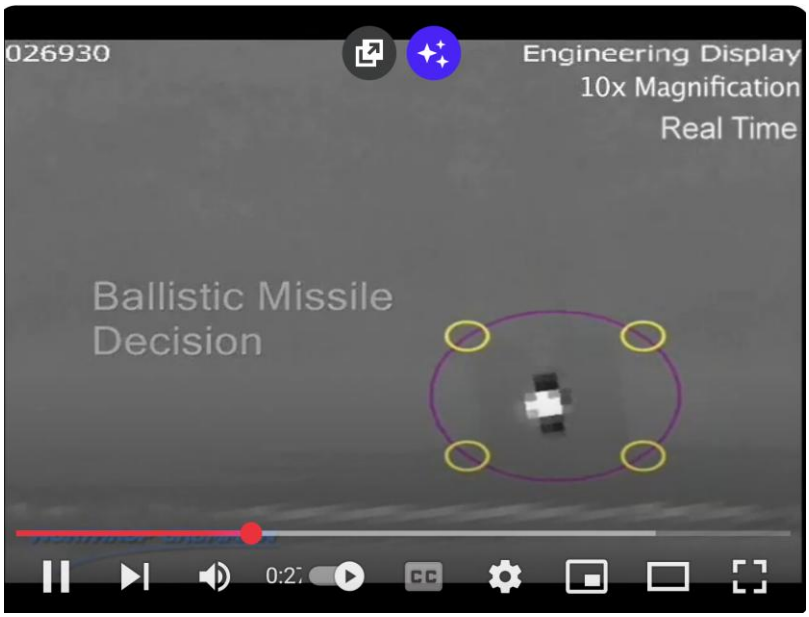
India has developed or deployed several VHF radar systems, mostly through BEL (Bharat Electronics) and DRDO (Defence Research and Development Organisation) in partnership with the IAF.

1. **Aslesha Mk I and Mk II (by DRDO & BEL)- Frequency:** L-band (not VHF strictly, but relevant due to long-range detection). **Type:** 3D Low-Level Light Weight Radar (LLLWR). **Mobility:** Transportable, high-mobility variants exist. **Use Case:** Detect low-flying aircraft and UAVs in mountainous terrain. **Status:** Deployed with Indian army and IAF.
2. **Revathi Radar (Naval Version of Rohini)-Type:** 3D surveillance radar. **Frequency:** S-band, but development has included lower frequency prototypes for long-range VHF surveillance. **Use Case:** Maritime and aerial surveillance. **Status:** Inducted by Indian Navy.
3. **Bharani Radar- Frequency:** VHF/UHF band. **Type:** Low-level lightweight radar. **Use Case:** Designed to detect and track aircraft, helicopters, and UAVs, especially in hilly terrain. **Mobility:** Lightweight, man-portable. **Status:** Inducted with Indian army.
4. **Swathi Weapon Locating Radar- Frequency:** S-band but includes VHF component for target acquisition. **Use Case:** Detect and track incoming artillery, rockets, and mortars. **Status:** In service with Indian army and exported to Armenia.
5. **DRDO Indigenous VHF Active Electronically Scanned Array (AESA) Radar- Development- Phase:** Prototype/early testing. **Purpose:** Specifically focused on **counter-stealth** capability. **Key Feature:** Long-range early warning, leveraging wavelength resonance with stealth aircraft surfaces. **Status:** Ongoing development with DRDO.
6. **Alpha Defense's technology VHF radar-** The company has recently developed and begun delivering a mobile Very High Frequency (VHF) radar system to the IAF. It provides 3D coverage: Scans the entire 360° horizontally, up to 360km range and 15km altitude.
    - **Counter-stealth**: Works in VHF bands optimal for detecting low-RCS stealth aircraft.
    - **Solid-state architecture**: Employs digital processing and T/R modules at the antenna for enhanced signal fidelity and resilience against jamming.
    - **Development & procurement**- Six units bought by the IAF, with the first unit delivered by mid-Mar 2025. Contract value is Rs2bn.

Electro-Optical and Infrared (EO/IR) sensors are the best way to detect stealth aircraft; India would benefit from purchasing them from the US ➤

As of now, the world's most advanced EO/IR sensors are possessed by the US, which uses them on its F-35 aircraft. These sensors are so powerful that they can detect heat signatures from nearly 800km away. The US is unlikely to offer this technology to India easily. However, the best way to acquire it is through serious trade negotiations with the US. President Donald Trump, in particular, understands the concept of give-and-take, and securing this technology—even at a steep price—would be well worth it for India.

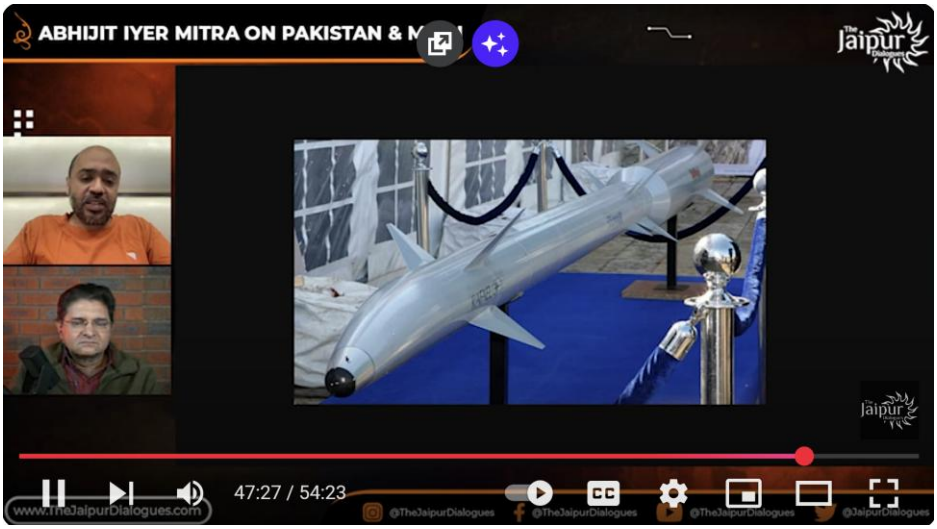
Figure 3: The sensor fusion technology of F-35 aircraft can detect heat signature of Space-X rocket launch at a distance of 800km



SOURCE: COMPANY REPORTS, INCRED RESEARCH, PLEASE CLICEK TO SEE THE VIDEO

India needs to deploy multiple EO/IR sensors and integrate them with heat-seeking missiles that can be guided by these sensors. We must assume that the J-35 will operate from a standoff range of 300km and fire PL-17 missiles from that distance. To counter this threat, India should adopt a Distributed Aperture System (DAS), similar to that of the F-35, and integrate it with Israel's Stunner missiles. This would significantly reduce the threat posed by stealth aircraft and help neutralize the stealth advantage currently enjoyed by adversaries.

Figure 4: The video presented here shows how Stunner missiles, integrated with the DAS system of F-35, can make J-35 a sitting duck



SOURCE: HTTPS://WWW.YOUTUBE.COM/WATCH?V=LIBYKBGJLIG&T=2932S, INCRED RESEARCH.
NOTE: PLEASE CLICK TO SEE THE VIDEO

Hypersonic missiles and corresponding defence systems »

India's hypersonic capabilities are still in advanced testing and early development phases, primarily led by the DRDO.

Figure 5: HSTDV (Hypersonic Technology Demonstrator Vehicle)

Feature	Details
Type	Hypersonic scramjet demonstrator (air-breathing cruise missile tech)
Speed	Mach 6+
Purpose	Tech base for future HCMs (Hypersonic Cruise Missiles)
Status	Successfully flight-tested in Sept 2020

SOURCE: INCRED RESEARCH, COMPANY REPORTS

Will be the foundation for future **hypersonic cruise missiles** similar to US HAWC or Russian Tsirkon.

Figure 6: Shaurya missile

Feature	Details
Type	Hypersonic scramjet demonstrator (air-breathing cruise missile tech)
Speed	Mach 6+
Purpose	Tech base for future HCMs (Hypersonic Cruise Missiles)
Status	Successfully flight-tested in Sep 2020

SOURCE: INCRED RESEARCH, COMPANY REPORTS

Can be considered a **quasi-hypersonic missile**, like Russia's *Iskander*. Hard to intercept due to low radar signature and high manoeuvrability.

Figure 7: BrahMos-II (hypersonic variant of BrahMos)

Feature	Details
Type	Hypersonic scramjet demonstrator (air-breathing cruise missile tech)
Speed	Mach 6+
Purpose	Tech base for future HCMs (Hypersonic Cruise Missiles)
Status	Successfully flight-tested in Sep 2020

SOURCE: INCRED RESEARCH, COMPANY REPORTS

How India plans to deal with hypersonic threats?

1. Indigenous development of hypersonic tech (HSTDV → BrahMos-II).
2. Countermeasures through BMD Phase-II (AD-1/AD-2).
3. Space-based surveillance + ground-based radar fusion.
4. Investment in Directed Energy Weapons (Laser-based defences) – early stage.
5. Potential collaboration with Israel, US, France on missile defence algorithms.

Figure 8: India has the following options to deal with hypersonic missiles

Missile/System	Type	Speed	Role
HSTDV	Scramjet demonstrator	Mach 6+	Tech platform
Shaurya	Quasi-ballistic	Mach 7.5	Tactical nuclear
BrahMos-II	Hypersonic cruise	Mach 7 (targeted)	Supersonic strike
AD-1	Interceptor	Mach 6–7	Endo-atmospheric
AD-2	Interceptor	Mach 8+	Exo-atmospheric
Swordfish Radar	Radar	—	Tracking/Guidance
BMD Phase II	System	Multi-layered	Hypersonic/MIRV defence

SOURCE: INCRED RESEARCH, COMPANY REPORTS

However, it is still around two-to-four years away before all the systems can get operational. India needs to squeeze the timelines at a fast pace, which means more money needs to poured into R&D.

Figure 9: Most hypersonic missiles as well as missile defence systems are two-to-four years away

System	Status	Notes
Shaurya	Operational	Nuclear-capable tactical missile
Swordfish Radar	Operational	Tracking system; hypersonic-capable variant in progress
AD-1	Tested	Needs more trials for induction
AD-2	In development	No flight tests yet
BMD Phase II	Partially validated	Not yet deployed
Early Warning Satellites	Limited capability	No dedicated missile-tracking constellation yet
HSTDV	Proven tech	Tech base, not a missile
BrahMos-II	Development stage	No flight tests yet

SOURCE: INCRED RESEARCH, COMPANY REPORTS

Netra AEW&C System (Airborne Early Warning & Control) ➤

Netra and **AEWR (Airborne Early Warning and Radar)** platforms are key components of India's airborne surveillance and control systems. These systems are primarily being developed by HAL and DRDO.

1. **Netra AEW&C System (Airborne Early Warning & Control)-** Based on the Embraer ERJ 145 jet. Developed by DRDO's Centre for Airborne Systems

(CABS). It's an Active Electronically Scanned Array (AESA) radar mounted on top (dorsal radar dome). 360° radar coverage (achieved via multiple antennae and sensor fusion). It tracks fighter-sized targets at over a 250km range.

2. Integrated IFF (Identification Friend or Foe), COMINT, and ELINT systems - Can direct interceptors and manage air combat.

Operational Status

A. Two NETRA systems are in service with the **Indian Air Force (IAF).**
B. Deployed during Balakot airstrikes and other border tension periods.
C. Plans exist for more advanced Netra Mk-II systems based on larger **Airbus A321** aircraft.

2. **AEW&C and AWACS Systems in India -** Apart from Netra, India also operates:
   a. **PHALCON AWACS- Platform:** Ilyushin Il-76. Developed jointly by Israel (ELTA radar) and Russia. Much larger and more powerful than Netra. Three PHALCONs currently in service with IAF. Radar range exceeds **400–500km**, with 360° coverage.
   b. **AEW&C Mk-II (Under Development)-** Platform: Airbus A321. More capable and larger than Netra (likely to replace or supplement it). DRDO is developing AESA radar with an extended range. Will allow for more operator consoles, mission endurance, and sensor integration.

Figure 10: The comparison of various AEW&C as well as AWACS systems of India; India needs to integrate more AEW&C systems on a war footing

Feature	Netra AEW&C	PHALCON AWACS	AEW&C Mk-II (Upcoming)
Base Aircraft	Embraer ERJ 145	IL-76	Airbus A321
Radar Type	AESA (DRDO)	EL/W-2090 AESA (ELTA)	AESA (DRDO – upgraded)
Radar Range	~250 km	~400–500+ km	~350–400 km (expected)
Operator Consoles	~5	~10–12	More than Netra
Endurance	~6 hours	~10–12 hours	~10 hours (estimated)
Coverage	240° (Netra) via fusion	360°	360°

SOURCE: INCRED RESEARCH, COMPANY REPORTS

Strategic Significance for India

- These platforms are central to airborne surveillance, airspace dominance, and network-centric warfare.
- Their role in **directing air strikes**, detecting enemy aircraft, and coordinating **fighter aircraft** is crucial.
- India's aim is to develop **at least 10–12 AEW&C-class platforms** to ensure coverage over both Pakistan and China borders.

High-Altitude Long-Endurance (HALE) UAVs ➤

High-Altitude Long-Endurance (HALE) UAVs are unmanned aerial vehicles capable of operating at altitudes above **60,000 feet** for **24+ hours**, often for strategic surveillance, reconnaissance, communication relay, and occasionally strike missions. Indian indigenous HALE program is being developed by DRDO and most likley technology will be transferred to HAL.

A. Indian HALE UAV Programs

- **Rustom-II / TAPAS-BH-201** ***(Developed by DRDO-ADE)***
  - **Altitude:** Up to 35,000ft *(technically MALE but long-endurance).*
  - **Endurance:** ~24+ hours.
  - **Payload:** EO/IR, SAR, Communication Intelligence.
  - **Purpose:** ISR missions for Army, Navy, Air Force.
  - **Status:** Flight-tested; being inducted under limited series production.
- **DRDO HALE UAV (Unnamed – Indigenous HALE Project)**
  - **Status:** In **design and development** phase.
  - **Features (Expected):**
    - Altitude: ~60,000ft.

- Endurance: 36+ hours.
- Twin-engine turbojet or turbofan.
- Stealth shaping possible.
- **Objective:** Comparable to MQ-9 Reaper or even Global Hawk in capability.

- **AURA / Ghatak UCAV *(for Strike missions, not strictly HALE)***
  - Stealth UCAV, not purely for surveillance.
  - Likely lower altitude, high-speed, autonomous attack platform.

B. India's Imported HALE Platform

- **General Atomics MQ-9B Sea Guardian / Sky Guardian**
  - **Procurement Status:** India has signed a deal in 2024 to acquire **31 MQ-9B drones** from the US (15 Sea Guardian for Navy, 16 Sky Guardian split between IAF and army).
  - **Altitude:** ~50,000ft.
  - **Endurance:** 35–40 hours.
  - **Sensors:** AESA radar, EO/IR, SATCOM, SIGINT, sonobuoys (for maritime variant).
  - **Weapons Capability:** Can carry **Hellfire missiles**, **GBU-12/38**, etc. (India likely to use primarily for surveillance).
  - **Operational Use:** India already operates two leased MQ-9Bs for its navy for surveillance over IOR (Indian Ocean Region).

Swarm drones, suicide drones and anti-drone technologies »

The importance of drone warfare has been underscored in the recent Operation Sindoor. India must urgently master three critical domains: drone mothership technology, loitering munitions (suicide drones), and drone destruction systems. Encouragingly, several Indian companies — both established defence equipment companies and agile startups — are already active in these areas. What's needed now is a coherent strategy, rapid procurement support, and deep integration with India's warfighting doctrine.

A. Drone Mothership Technology
- Enables launch, command, and recovery of swarms or loyal wingmen drones from a manned/unmanned "mothership."
- Key Indian effort:
  - HAL's CATS Warrior & ALFA-S drones launched from modified Tejas.
- Potential future platforms: C-295, C-130J, or even high-altitude UAVs as launch bases.

B. Suicide Drones (Loitering Munitions)
- Drones that loiter over targets and crash into them when commanded, often with high precision.
- Indian players:
  - Solar Industries: Nagastra-1, Nagastra-2.
  - NewSpace Research & Tech: Autonomous swarm-capable suicide drones.
  - TASL, Z Motion Autonomous, Big Bang Boom: Working on variants for army and IAF tenders.

C. Drone Destruction / Counter-UAV Systems
- Includes radar detection, RF jamming, laser weapons, and kinetic interceptors
- Indian efforts:
  - DRDO Anti-Drone System: RF jamming + laser neutralization (deployed for VVIP and border defence).
  - BEL: Production partner for integrated counter-UAV systems.

- Zen Technologies, Big Bang Boom, Tonbo Imaging: Offer mobile and stationary CUAS solutions.

Figure 11: India needs to do the following

Action	Why It Matters
Define operational doctrine	So that drone systems aren't used in isolation
Fast-track indigenous procurement	Cut red tape and give private players bulk orders
Encourage export-ready platforms	Establish India as a drone-export hub
Invest in AI & EW integration	Enable autonomous targeting and jamming
Simulate full-spectrum drone warfare	Training for swarm ops, CUAS, and air-space integration

SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 12: India's drone warfare timeline

Year	Milestone / Development	Segment	Key Stakeholders
2020	DRDO unveils Anti-Drone System prototype	Drone Destruction	DRDO, BEL
2021	Operation of MQ-9B Sea Guardian on lease for Navy	HALE ISR	Indian Navy, General Atomics
2021	Solar Industries begins development of **Nagastra-1**	Suicide Drones	Solar Industries
2022	DRDO successfully tests Directed Energy Weapon (DEW) prototype	Drone Destruction	DRDO
2022	HAL unveils **CATS Warrior** & ALFA-S swarming drone concept	Mothership & Swarm	HAL, ADE, New Space Research
2023	Army floats tenders for loitering munitions (20km, 100km variants)	Suicide Drones	Multiple Indian startups
2023	BEL begins production of anti-drone systems for Army	Drone Destruction	BEL
2024	Procurement of 31 **MQ-9B drones** (Reaper-class) finalized	HALE ISR / Mothership (future)	MoD, US Govt, General Atomics
2024	User trials of **Nagastra-1** completed	Suicide Drones	Solar Industries
2025F	HAL's **CATS Warrior** to begin **limited-scale flight testing**	Mothership + Loyal Wingman	HAL, ADE
2025F	Nagastra-1 and -2 inducted under fast-track orders	Suicide Drones	Solar Industries
2026F	First AI-powered autonomous swarm drones deployed	Swarm / Loitering	New Space, DRDO
2026F	DRDO's high-power **Laser Weapon System** (20kW+) enters field trials	Drone Destruction	DRDO, Indian Army
2027F	**CATS Warrior** achieves Initial Operational Capability (IOC)	Mothership + Swarm	HAL
2028F	First manned-unmanned teaming exercises involving LCA Tejas and Warrior drone	Mothership Integration	HAL, IAF
2029F	AI-based autonomous CUAS grid deployed across key border areas	Drone Destruction	BEL, DRDO, startups
2030F	India achieves **full-spectrum drone warfare capability**: loyal wingmen, swarm drones, long-range suicide drones, and indigenous laser-based CUAS		

SOURCE: INCRED RESEARCH, COMPANY REPORTS

ISTAR (Intelligence, Surveillance, Target Acquisition, and Reconnaissance) aircraft ➤

An ISTAR platform is a highly advanced airborne surveillance and targeting system, capable of:

1. Real-time intelligence gathering.
2. Electro-optical and radar-based surveillance.
3. Ground target tracking (moving and fixed).
4. Signals intelligence (SIGINT) and ELINT.
5. Target acquisition for precision weapons.
6. ISTAR aircraft are critical in network-centric warfare, especially for precision strikes, battlefield monitoring, and cross-border tracking — capabilities India urgently needs.

Importance of ISTAR for India

1. Real-time battlefield visibility over hostile terrain (e.g., Tibet, LoC).
2. Detecting and tracking deeply buried or camouflaged targets.
3. Targeting support for BrahMos, Pinaka, and PGMs.
4. Force multiplier for precision strikes, cross-border ops (e.g., Sindoor-type).

Figure 13: Following are the various platforms which are under development and the agencies involved

Platform / Project	Type	Role	Status	Partners
DRDO ISTAR Project	Modified Gulfstream G550	Multi-sensor battlefield surveillance	In development	DRDO, IAF, Israel Aerospace Industries (IAI)
Project with US (2020)	Gulfstream G550-based ISTAR	Radar + EO + SIGINT + Data link	Cleared under COMCASA	US DoD, IAF
Netra AEW&C (DRDO)	Embraer-145 AEW&C	Primarily AEW, partial ISTAR	Operational	DRDO, CABS
IAI EL/W-2090	Phalcon AEW&C (IL-76 platform)	AEW+C + SIGINT	In service	IAF, IAI
MQ-9B UAVs	HALE UAVs	EO/IR, SIGINT, maritime surveillance	31 ordered	General Atomics
DRDO Ghatak UCAV (Future)	Stealth drone	Likely with ISTAR-lite functions	Prototype by 2025F	DRDO

SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 14: Following are the key capabilities being developed by India

Capability	Indian Initiative
Synthetic Aperture Radar (SAR)	DRDO has developed SAR under the Uttam AESA program
Electro-Optical & Infrared (EO/IR)	Developed by BEL and Tonbo Imaging
SIGINT / ELINT	Part of DRDO's DLRL and CAIR projects
Data Fusion & AI Processing	Integrated under IAF's AFNET and future battlefield management systems
Secure Datalinks (COMCASA compatible)	Enabled for joint India-US operations

SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 15: Outlook of India's ISTAR program

Year	Milestone
2025F	First Indian-developed ISTAR system on modified G550 enters user trials
2026F	Private sector integration of AI/EO/SAR tech with BEL & DRDO platforms
2027F	IAF fields full-spectrum ISTAR platform on par with Western equivalents
2030F	Deployment of networked ISTAR + swarm drones + loitering munitions in integrated battlefield roles

SOURCE: INCRED RESEARCH, COMPANY REPORTS

India's fifth generation fighter aircraft is still a decade away »

While the Advanced Medium Combat Aircraft (AMCA) represents an important step toward indigenous defence capability, it remains at least a decade away from operational deployment. The key bottleneck in the program is India's inability to develop a reliable jet engine. Hindustan Aeronautics (HAL), despite its strengths in airframe and systems integration, continues to face significant challenges in engine development.

Jet engine technology remains one of the most complex and closely guarded areas in aerospace engineering, and India has yet to successfully develop an indigenous engine that can power fifth-generation fighter aircraft. Moreover, efforts to secure a meaningful technology partnership with leading engine manufacturers — such as General Electric (US), Rolls-Royce (UK), or Safran (France) — have so far failed to result in the kind of deep transfer of core intellectual property required to indigenize engine manufacturing.

Without a high-thrust, combat-proven engine, the AMCA will remain dependent on foreign power plants, limiting its strategic autonomy and raising long-term concerns around supply chain vulnerability, export restrictions, and performance optimization. Accelerating progress in this area, either through a joint venture or a fully licensed technology transfer, is essential if India is to transition from an arms importer to a genuine aerospace power.

India will need to fill the capability gap in the interim by procuring a fifth-generation fighter aircraft ➤

India will need to fill the capability gap in the interim by procuring a fifth-generation fighter aircraft, as the indigenous AMCA remains at least a decade away. In this context, India has two practical options: the American F-35 or the Russian Su-57 (or the future Su-75 Checkmate). However, given geopolitical alignments and procurement history, a Su-57 acquisition appears more likely.

The F-35, while technologically superior in stealth, network-centric warfare, and sensor fusion, comes with stringent operational restrictions and end-user monitoring requirements under the US export policy. Moreover, India's ongoing defence relationship with Russia, including prior collaborations like the Su-30MKI program and the S-400 deal, makes a Russian platform more politically and logistically feasible.

The Su-57, although still evolving and facing its own developmental delays, offers India access to stealth characteristics, super cruise capability, and potential technology transfer with fewer geopolitical strings attached. It also aligns with India’s strategy of maintaining strategic autonomy by balancing defence ties between multiple partners.

While the Su-75 'Checkmate' is still in the prototype stage, it may offer a cost-effective alternative in the longer term, especially if developed into a true single-engine stealth fighter. In either case, acquiring a fifth-generation fighter is critical to maintaining air superiority, particularly as regional adversaries — notably China — deploy the J-20 in increasing numbers.

Figure 16: While F-35 is higher tech; however, integrating it with the Indian eco system is very difficult; Su-57 offers a better interim solution

Category	F-35 Lightning II (A/B/C variants)	Su-57 Felon
Origin	**USA**	**Russia**
Stealth Capabilities	Excellent (low RCS, mature stealth profile)	Moderate (some stealth features, higher RCS)
Sensor Suite	Advanced: AN/APG-81 AESA radar, DAS, EOTS	Moderate to Advanced: N036 radar, IRST
Situational Awareness	Superior – unmatched sensor fusion and datalinks	Improved over legacy systems, less mature
Engine	Pratt & Whitney F135 (very reliable)	Saturn AL-41F1 (1st gen) / Izdeliye 30 (in dev.)
Super Cruise	Limited in current variants	Yes (claimed)
Speed	Mach 1.6	Mach 2.0
Range	~2,200km combat radius (with internal fuel)	~1,500km (without external tanks)
Payload (Internal)	~5,700kg (stealth mode)	~4,000kg (internal)
Multirole Capability	High – air-to-air, air-to-ground, SEAD, EW	Primarily air dominance; evolving multirole
Production Status	Mass production, operational in >15 countries	Limited production; <30 aircraft as of 2025
Cost (per unit)	~US$80–100m (F-35A, excluding support costs)	~US$35–50m (estimated, but subsidized)
Maintenance Cost	High (high-tech, logistics-intensive)	Lower (familiar ecosystem with IAF)
Political Constraints	High – strict end-user monitoring, software control	None
Technology Transfer	Limited	Russia is offering complete TOT
Strategic Alignment	Strengthens Indo-US ties, may anger Russia	Deepens Russia partnership, risks CAATSA
Suitability for India	Excellent tech but politically restrictive	Feasible interim solution with manageable risks

SOURCE: INCRED RESEARCH, COMPANY REPORTS

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Reduce	The stock's total return is expected to fall below 0% or more over the next 12 months.

The total expected return of a stock is defined as the sum of the: (i) percentage difference between the target price and the current price and (ii) the forward net dividend yields of the stock. Stock price targets have an investment horizon of 12 months.

Sector Ratings	Definition:
Overweight	An Overweight rating means stocks in the sector have, on a market cap-weighted basis, a positive absolute recommendation.
Neutral	A Neutral rating means stocks in the sector have, on a market cap-weighted basis, a neutral absolute recommendation.
Underweight	An Underweight rating means stocks in the sector have, on a market cap-weighted basis, a negative absolute recommendation.

Country Ratings	Definition:
Overweight	An Overweight rating means investors should be positioned with an above-market weight in this country relative to benchmark.
Neutral	A Neutral rating means investors should be positioned with a neutral weight in this country relative to benchmark.
Underweight	An Underweight rating means investors should be positioned with a below-market weight in this country relative to benchmark.