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Op Sindoor Victory
(Atmanirbharta Success Story - The Crowning Glory)

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In the aftermath of the barbaric, heinous, religiously targeted killings of 26 innocent civilians in Pahalgam by **The Resistance Front (TRF)**, an offshoot of the Pakistan based UN-designated terrorist group, Laskar-e-Taiba (LeT), PM Narendra Modi on April 24, in a public rally in Bihar, very explicitly announced his intentions to not only extract revenge from the perpetrators of the terrorist strike but their backers as well. He said, '**Today, from the soil of Bihar, I say this to the whole world, India would identify, trace and punish every terrorist, supporter and conspirator. We will pursue them to the end of the Earth. They will be punished beyond their imagination.'**[1]

Towards achieving that aim, the Indian armed forces launched Op Sindoor in the early hours of May 07, 2025, targeting nine terrorist training centres/camps, five across the Line of Control (LoC) in Pakistan Occupied Kashmir (POK) and four across the international border (IB) in Pakistan. India's response to the Pakistan-sponsored terrorist strike was precise, measured and non-escalatory; wherein only terrorist infrastructure was engaged and military or civilian targets were avoided. Pakistan was clearly warned that any follow-up strikes by Pakistan would be considered as further escalation and would be responded by India. Unfortunately, Pakistan failed to heed this sound advice. It continued to progressively up the ante by firstly carrying out aerial strikes with hundreds of drones, missiles and loitering munitions on religious sites and other civilian targets in Indian cities all along our Western border and subsequently on IAF airfields. The Indian armed forces responded to each of these escalations with precise, measured, calibrated but escalated responses - initiating with precise strikes on terrorist camps, leading to Suppression of Enemy Air Defenses (SEAD) attacks on PAF surveillance and AD radars and finally the massive, precise attack on eleven

PAF frontline airbases, which forced Pakistan to wave the white flag and beg for a ceasefire. Each step up the escalatory ladder by Pakistan was responded with a befitting and escalated response by the Indian armed forces.

In barely four days, the Indian armed forces achieved a **resounding military victory** - obliterating nine Pakistani terrorist training camps/centres and very systematically and professionally decimating the Pakistan Air Force, Pakistan's air defences and their major airfields; leaving all the Pakistani strategic and economic infrastructure targets fully exposed. The Indian Air Force's and Indian Army's phenomenal defence of the Indian airspace against repeated, mass aerial attacks by aircraft, missiles, drones and loitering munitions; extending across a border exceeding 3000 kms was a masterful and unmatched performance by the Indian Integrated Air Defence system. **The fact that no Pakistani aircraft could enter the Indian air space throughout the period of hostilities speaks volumes of this highly professional performance**. A defining feature of Op Sindoor was that the major architects of its stupendous success were the indigenous Indian designed and developed or Indian manufactured weapon systems and weapon platforms - fruits of our Atmanirbharta initiative.

Atmanirbharta Success Story - the Crowning Glory

Though there are several reasons for this stupendous success of the Indian armed forces, the most significant contributor to the success of Op Sindoor has been the phenomenal performance of the indigenously developed Indian weapon platforms - the indigenously designed and developed Integrated Air Defence System, the indigenously designed and developed Akash Missile system, the Medium Range Surface to Air Missile system (MRSAM), jointly developed by Defence Research and Development Organisation (DRDO), and Israel Aerospace Indistries (IAI), the integration by Hindustan Aeronautics Limited (HAL) of the Brahmos Air Launched Cruise Missile (ALCM) onto the Su-30 MKI, the locally manufactured loitering munition (Skystriker) and the DRDO developed C-UAS system [(D-4) Drone, Detect, Deter and Destroy] system, our Regional Navigation Satellite System (RNSS) - the Navigation by Indian Constellation (NAVIC) providing precise coordinates for our long range precision weapons, the re-engineering of life-expired R-73's as Surface to Air Missile for Assured Retaliation (SAMAR) weapons, the indigenously upgraded L-70 guns, the Zu-23 mm systems and the Schilka systems.

The other major contributors to the success of Op Sindoor, though not of Indian origin, were the Russian Long Range Surface to Air Missile (LRSAM) - the S-400, the French Rafale aircraft with its Meteor Beyond Visual Range (BVR) Air-to-Air Missile (AAM), SCALP and HAMMER long-range precision weapon systems, and the Israeli IAI designed Loitering Munition (Harop).

The development details of a few of these Atmanirbharta success stories are highlighted in the subsequent paragraphs.

IACCS cum Akashteer Integrated Air Defence System

The undisputed star of Op Sindoor's stupendous success was undoubtedly the indigenously developed multi-layered Integrated Air Defence System - the I**ndian Air Force's (IAF's) IACCS (Integrated Air Command and Control System)** and the **Indian Army's (IA's) Akashteer**. IACCS has successfully fused all ground-based and the airborne sensors scanning the humongous volume of Indian airspace. IACCS has provided a clear and Recognised Air Situation Picture (RASP) to the various AD weapon systems for engaging the incoming enemy targets. The IACCS exercised timely and effective control over the numerous AD weapon systems of IAF, from the shoulder-fired QRSAMs like the Igla missile to the LRSAMs like S-400. Likewise, the Indian Army's component of the Integrated Air Defence System, the indigenously developed Akashteer contributed to the effective monitoring of the airspace over the Tactical Battle Area (TBA) and real-time control of all the ground-based AD weapon systems in the TBA. Both the IACCS and Akashteer worked in synergy to ensure that the 'fog of war' was dispelled and freedom of operation was provided to the all the AD weapon systems for neutralising the hundreds of incoming enemy targets comprising of armed drones, swarm drones, Surface to Surface Missiles (SSMs), loitering munitions and even Air to Air Missiles (AAMs). This ensured that our airspace was practically impregnable to the repeated aerial assaults by our Western adversary throughout Op Sindoor. We can proudly claim that our **Integrated Air Defence System is better, if not equal to, the Israeli Iron Dome**. A point to be reiterated here is that the airspace volume of Israel is only a minuscule percentage of what the IAF has to defend, and this was done with a resounding success during Op Sindoor.

The decision to develop the Integrated Air Defence System indigenously rather than buy a Commercial Off- The-Shelf (COTS) Air Defence system was indeed a visionary decision of the IAF, which has paid back handsomely in Op Sindoor. The evolution of the Integrated Air Defence System has taken several decades, starting in the early 1960s, with the incremental advancements in Air

Defence concepts over the years.[2] The IACCS was conceptualised to integrate all the radars of the three Services and even the radars of civil aviation. One of the biggest hurdles in developing the IACCS was the need to fuse the radar picture of the various sensors, all of different makes and different vintages. Due to the complexities involved, the development of IACCS was initially restricted to the IAF only. IACCS was jointly developed over slightly more than a decade through continuous hard work, ingenuity, and innovation by dedicated IAF officers (fighter controllers and engineers) and the engineers of Bharat Electronics Limited (BEL). IACCS was completed and operationalised across the IAF in 2010.[3] Even after the operationalisation, it has been undergoing software upgrades and modernisations to further enhance its performance. Building on the experience and success of IACCS, the Indian Army and BEL had successfully developed the Akashteer Project for similar command and control over the IA sensors and the AD weapon systems in the TBA and integration with IACCS. IA inducted the first phase of project Akashteer into Service on April 04, 2024.[4] The entire project is scheduled to be completed by early 2027. The Indian Navy's similar command and control project is named **'Trigun.'** It is being indigenously designed and developed by the Centre for Artificial Intelligence and Robotics (CAIR) in DRDO and is presently in an advanced stage of its development.

It is indisputable that the IACCS was the backbone of IAF's network centricity and a crucial enabler for the air operations during Op Sindoor. The system's phenomenal capabilities endowed its numerous users with an unmatched Situational Awareness that significantly reduced the OODA (Observe, Orient, Decide and Act) loop, the Sensor-to-Shooter time-lag and thereby contributed immensely to the protection of the Indian air space and also the execution of offensive air strikes by IAF.

Akash Short Range Surface-to-air Missile System

One of the AD missile weapon systems that was a major contributor to the success of Op Sindoor and its excellent performance was the indigenously designed and developed Akash missile system, which was developed as a part of the Integrated Guided Missile Development Programme (IGMDP). The development of the Akash missile was initiated in 1983 and IAF was intricately involved throughout its development process, through its several variants (Akash Mk-1, Akash- 1S and the latest Akash Prime) and the induction of the first Akash unit into IAF in 2010.[5] The Akash missile system was inducted into the IA in May 2015.[6] The Akash missile system is capable of intercepting high speed, agile aerial threats like fighter aircraft, missiles, helicopters and Unmanned Aerial

Vehicles (UAVs). The Akash system can track and engage multiple targets simultaneously and relies on its Rajendra Passive Electronically Scanned Array (PESA) 3D radar for guiding the missile to the target. The system also has a built-in Electronic Counter Countermeasures (ECCM) capability, enhancing its kill probability even in contested EW environments. The Akash missile system has been designed by DRDO and is being jointly manufactured by Bharat Dynamics Limited (BDL) and BEL. The missile is a supersonic, short-range SAM with command guidance and an effective range varying from 4.5 km to 30 km and a maximum engagement altitude of 20 km. The Akash missile system can engage multiple targets simultaneously in all weather conditions. It was one of the key AD weapon systems of India's multi-layered Integrated Air Defence system during Op Sindoor and was successful in neutralising multiple enemy aerial threats. DRDO successfully conducted a flight test of the **New Generation Akash (Akash-NG) missile** on January 12, 2024 and the missile is now being prepared for user trials. Akash NG would be capable of intercepting high-performance, low-RCS supersonic targets apart from conventional targets. It would have a maximum interception range of 70 kms.

Medium Range Surface to Air Missile (MRSAM)

The exceptional performance of the MRSAM was another contributing factor to the success of Op Sindoor. The MRSAM, is an indigenous variant of the Israeli Barak-8 SAM system, has been jointly developed by DRDO and Israel Aerospace Industries (IAI) as an advanced network centric combat Air Defence System. The MRSAM has been a significant step in our Atmanirbharta initiative and has contributed to the 'Make in India, Make for the world' program. MRSAM can simultaneously engage multiple aerial threats like fighter aircraft, guided and unguided munitions and cruise missiles, both in single and saturation attacks, up to a maximum range of 70 kms. The first unit of MRSAM was inducted into IAF in Sep 2021[7] and into the IA in Feb 2023. The IAF and IA variants are slightly different, with the IAF version being semi-static and the IA version being mobile.

Integration of Brahmos ALCM on Su-30 MKI

The successful indigenous integration of the Brahmos ALCM by HAL on the locally centre pylon modified Su-30 MKI in 2017[8] has been another success story that significantly enhanced the deep strike capability of the IAF. The precise and massive damage inflicted on the PAF airbases by the Brahmos attacks has indeed been highly demoralising to Pakistan. It would be of immense

deterrence value in the future. Brahmos missile presently has a maximum range of 290 kms, but this would get enhanced to 800 kms in the Brahmos ER, which is currently under development.

Locally Manufactured Loitering Munition (Skystriker) & DRDO Developed C-UAS system (D-4)

The Israeli Elbit Systems designed, Alpha Design Technologies locally manufactured Skystriker loitering munition and the DRDO designed and developed C-UAS system (D4) were other huge success stories. They had a decisive impact on Op Sindoor. The IA operated Skystriker loitering munitions were instrumental in the precise destruction of the terror training camps and other training infrastructure in POK and Pakistan in the early morning of May 07. The DRDO developed the D4 C-UAS system, with its 3 km engagement zone, which was successful in neutralising the repeated attacks by the enemy drones and contributing to the safety of our VA/VPs.

Conclusion

The most obvious and enduring lesson of Op Sindoor has been that India's Atmanirbharta initiatives towards the indigenous development of weapon systems and weapon platforms have started bearing fruit, and they contributed massively towards the phenomenal success of Op Sindoor. Even though the gestation period for indigenous development is relatively longer, all the players - from the DPSUs to the three Services to the private industry to the Start-ups need to not only persist with it, but they need to speed up the indigenisation process. The Atmanirbharta initiative needs to be further strengthened with a whole of nation approach and be made more broad-based. The indigenous development programs of Tejas Mk1A, Tejas Mk II, AMCA, the 110 kN high-performance jet engine, Ghatak UCAV, larger range C-UAS systems and the CATS air warrior program need to be focused upon and speeded up.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies [CAPS])

Notes:

[1] "Pahalgam Attackers, Conspirators will be Punished Beyond their Imagination : PM Modi in Bihar," *The Hindu*, April 24, 2025 https://www.thehindu.com/news/national/modi-speech-bihar-pahalgam-terror-attack-punish/article69485876.ece. Accessed on May 10, 2025.

[2] Air Mshl VPS Rana, PVSM, VSM, "Invisible Warriors - Scientific Art of Fighter Controlling", (KW Publishers Pvt Ltd, New Delhi), p. 182.

[3] Air Mshl VPS Rana, PVSM, VSM, "Invisible Warriors - Scientific Art of Fighter Controlling", (KW Publishers Pvt Ltd, New Delhi), p. 176.

[4] "Army Starts Induction of Akashteer System to Enhance Air Defence Posture," *The Times of India,* April 04, 2024, https://timesofindia.indiatimes.com/india/army-starts-induction-of-akashteer-system-to-enhance-air-defence-posture/articleshow/109044544.cms. Accessed on May 10, 2025.

[5] Ajai Shukla, "First Akash Missile System to Fill Gap in Air Defence," *Broadsword,* May 22, 2010, https://www.ajaishukla.com/2010/11/first-akash-missile-system-to-fill-gap.html. Accessed on May 10, 2025.

[6] "Induction Ceremony of Akash Weapon System into Army Air Defence," PIB, May 05, 2015, https://www.pib.gov.in/newsite/PrintRelease.aspx?relid=121193, accessed on May 10, 2025.

[7] "DRDO Hans over MRSM to IAF in presence of RM Shri Rajnath Singh at Jaisalmer, Rajasthan," PIB, September 09, 2021, https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1753559. Accessed on May 11, 2025.

[8] "Inside Story : How Brahmos Missile Got Integrated with Su-30 Fighter Plane," The Print, November 29, 2017, https://theprint.in/opinion/inside-story-how-brahmos-missile-got-integrated-with-sukhoi-30-fighter-plane/19329/. Accessed on May 11, 2025.