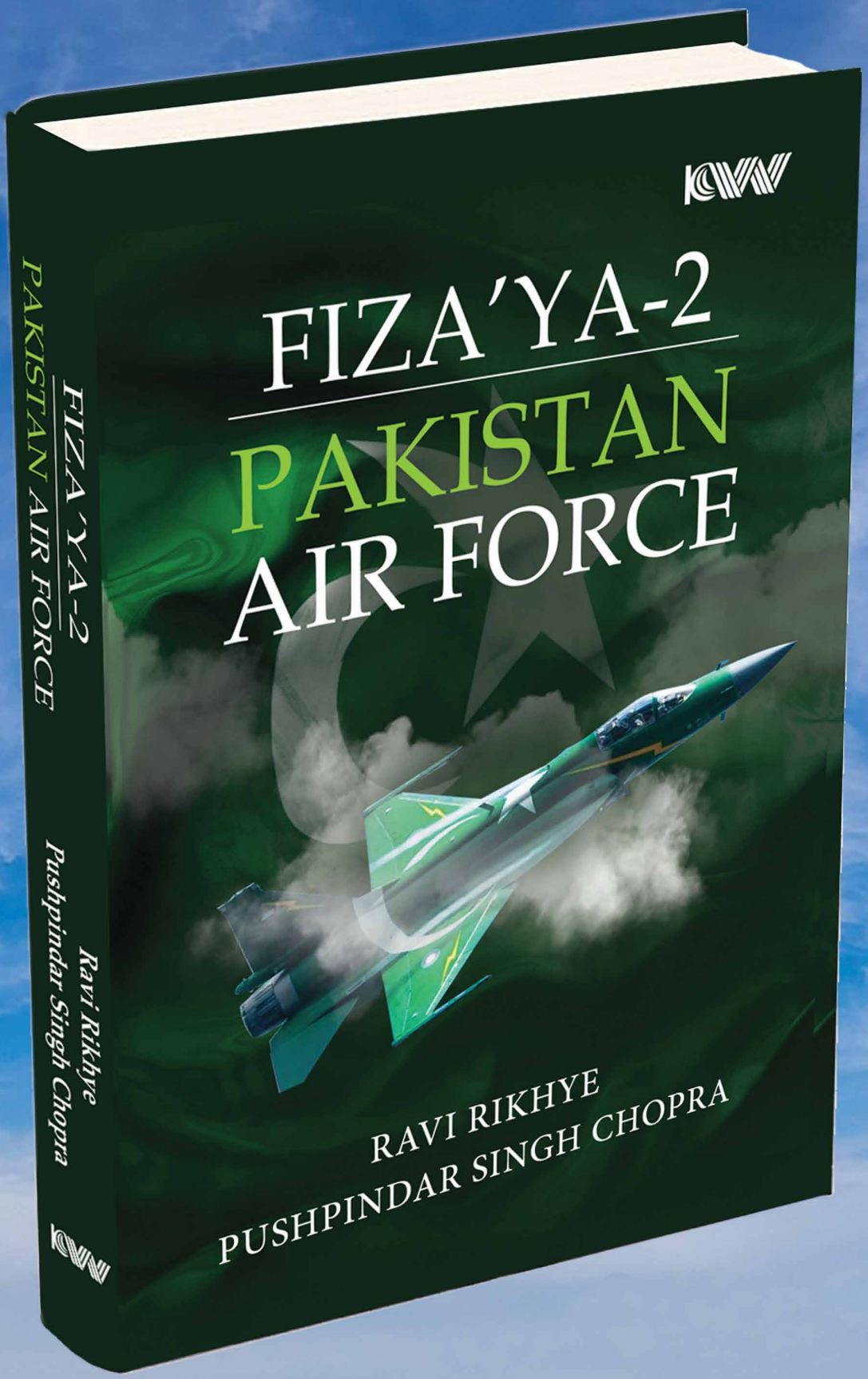
VAYU

Aerospace & Defence Review

III/2025

OPERATION SINDOOR

Visit to AFTC
IN & Varuna/Tropex
IAF at Iniochos
Rafale-M contract signed
Exercises & visits
Lessons of past accidents



COMING SOON – IN JULY 2025

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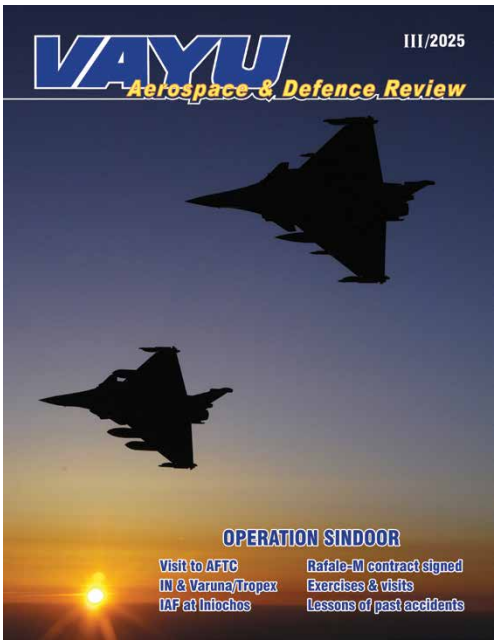

Cover : Rafale's on combat patrol.
Photo by Dassault Aviation.

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Lt Gen Kamal Davar says...

.....India 2025: A Time of Reckoning

Post the devastating Covid–19, the world is witnessing grave and continuing geopolitical disruptions as never before since the end of World War 2 in 1945. The emergence of Cold War 2.0 appears graver than its original avatar with powerful nations striving exclusively for their own selfish ends. That the globe's sole super power, the United Sates (US) , who it was hoped, after the installation of a new President on 20 January 2025, will give a new direction to the comity of nations and help restore sanity and peace appears, unfortunately, doing just the opposite!

America's new President Donald Trump, known since his first presidential term in for his mercurial nature and an unconventional orientation has surprised the world, including US's allies, by voicing and implementing rather incoherent economic policies buttressed by naive and unacceptable political declarations. Some of the recipient nations targeted by Trump are responding strongly to the US president's kite–flying whether in the case of tariff tyranny unilaterally imposed by him or the latter's wayward political declarations. Notwithstanding the unsound economic health of many nations, they are mostly condemning Trump's unilateral decisions. And now, where does India stand in the current geopolitical turmoil affecting not only the Global South but also the developed nations of Europe, Asia, and South America? The fact that the bulk of the global media since the last two months or so has been trying to decipher Trump's likely trajectories in his strategic relations with the rest of the world —particularly his economic policies, whether coercive or otherwise—needs no further elaboration.

Among the many nations on Trump's radar is India, an emerging power whose global and regional significance the US acknowledges and has publicly emphasised. India is a much sought after power for any bloc in the world owing to its adherence, since its independence, to democracy, freedom of speech, secularism and the pursuit of human values. The fact that India is the world's fifth largest economic power, continuing to grow, and potentially the largest market for both military and non–military goods

only enhance its global standing. The US is more than aware of India's strategic significance, especially as it recognises China as an emerging competitor in many domains and seeks to position India as a counterbalance. Somewhere the US keeping a check on China especially in the Indo–Pacific region leads to strategic convergence between India and the US. It will be interesting to observe the shaping up of the Quadrilateral Security Dialogue and Australia–United Kingdom–United States set–ups in the months ahead to keep in check the ever growing Chinese assertiveness in the Indo–Pacific region. The Chinese media, in the past one month, has referred to India–US relations getting

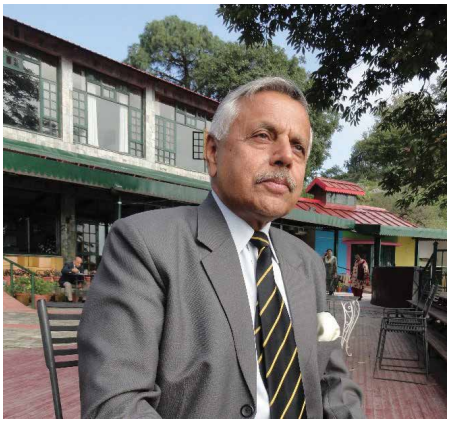
closer much to Chinese discomfiture. However, another Chinese viewpoint going around also suggests that uncertainties in dealing with Trump may prompt India to improve ties with China. This viewpoint, however, forgets that China, overall, is a cause of concern for both the US and India and when it comes to China there is a fair degree of strategic convergence between the two large democracies.

It may be recalled that Indian Prime Minister (PM) Narendra Modi had established good personal relations with then US President Donald Trump in the latter's first term as the president and thus analysts surmised that in Trump's presidency 2.0, it will be a cakewalk for the continuation of more than warm India–US relations across many domains of human endeavour. The visit of PM Modi to Washington on 13–14 February 2025 and early in Trump's second avatar (preceded only by the Israeli and Japanese PMs) was a mere 40–hour trip but has been touted as a success. The devil lies somewhere in the details, and beyond the seemingly warm welcome and the optics, India too has been called a 'Tariff Abuser' by the US President. After the trip, both the US president and Indian PM conducted a long press conference in Washington and shared details of the broad agreements reached between the two democracies. The Agreement embraces a new broad 10 years framework with cooperation in matters defence, trade, energy security, counterterrorism, space exploration, technical cooperation in frontline technologies, co–production arrangements and increasing people to people contacts. This Agreement carries forward the thrust in cooperation between the US and India conceived in the 2005 Framework of US–India cooperation. Tariff differences between the two nations will be sorted out jointly by the fall this year which is thus a sound recommendation.

India has been seeking state–of–the–art defence technologies from the US for years, but with limited success. Looking back at the chequered history of Indo–US relations, it is evident that the United States has not been entirely reliable in its defence supplies to India, having imposed multiple sanctions during the 1965 and 1971 operations against Pakistan, as well as after India's nuclear tests in 1974 and 1998. The US has not been particularly keen on supplying the latest defence technologies to India in recent years. The prolonged failure to supply India aeroengines for the Tejas indigenous aircraft is a case in point. India's purchase of the Russian S–400 air defence squadrons also invited major US sanctions on many Indian companies via their 'Countering America's Adversaries Through Sanctions Act' in 2018. Thus, India must look beyond mere compliments to its resurgence in the years ahead and avoid falling for flattery, to which it is often susceptible. Since India pays for whatever, it acquires, it must engage with the United States on an equal and sovereign footing.

The positive outcomes in Defence Cooperation and other areas post PM Modi's visit have been the launch of a new initiative—the US–India COMPACT (Catalysing Opportunities for Military Partnership, Accelerated Commerce and Technology) for the 21st century. Both nations would aim for USD 500 bn in trade by 2030. Currently, the US is India's second largest trading partner with a trade surplus for India as of Financial Year 2024–25. The US has also offered India the F–35 stealth fighter, which the IAF may now consider for trials alongside other fighters being offered by France, Russia and the European consortium. Ofcourse HAL, Bangalore is endeavouring hard to double its production of the indigenous Tejas for the IAF. In addition, the co–production of the Javelin anti–tank guided missiles and Stryker infantry combat vehicles in India appears well on the cards. Cooperation in co–production of unmanned aerial systems appears also in the pipeline.

Keeping in view the modus operandi of President Trump in furthering the sale of US material to India, India will need to exercise financial prudence and be highly selective in acquiring only those platforms and defence equipment that are essential, cost–effective, and suitable for future deployment by the Indian Armed Forces. While bilateral relationships may be transient, national interests remain paramount. We do not have to be hustled into any purchases which do not meet India's operational requirements. India must never forget that as, a pivotal player in the emerging global order, it carefully navigates its strategies with equity keeping a long–term perspective in mind.



The writer, a retired lieutenant–general, was the first head of India's Defence Intelligence Agency, is a long–time Pakistan watcher and has been involved in Track–2 diplomacy.

This article first appeared in www.usiofindia.org

Admiral Arun Prakash says....

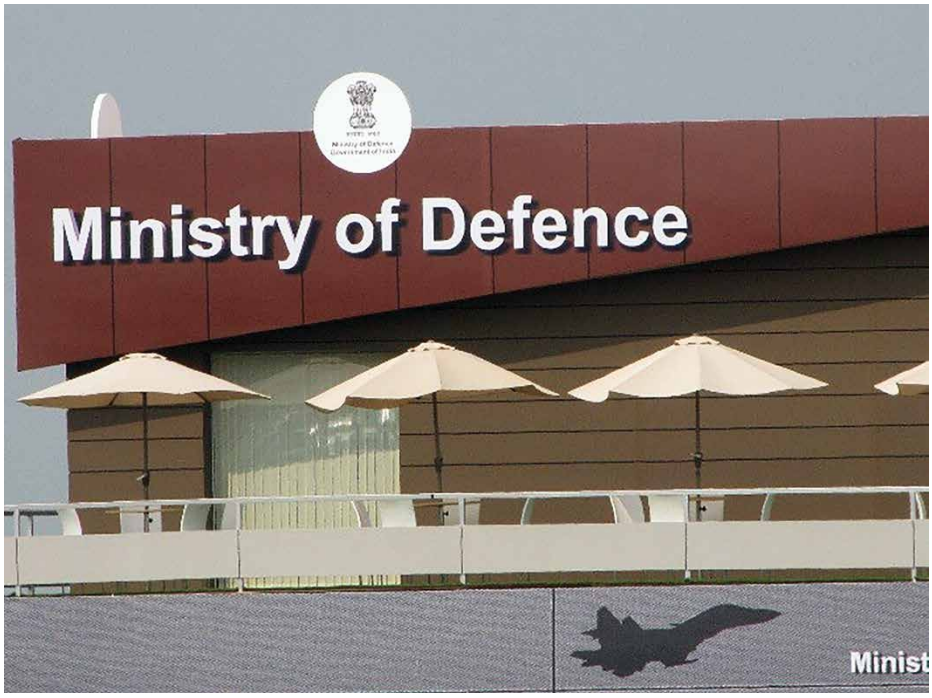
....Case for investment in science and tech

Responding to a journalist's question about the periodic political bombast about Pakistan Occupied Kashmir (PoK) "being soon restored to India". Chief of Army Staff (COAS), General Upendra Dwivedi, aptly and tactfully, pointed out, that should the government desire such an "end state" or outcome, not only must the whole nation be prepared to go to war, but the armed forces must also be adequately "empowered" or equipped for such an ambitious undertaking.

Given this backdrop, the question arises: What is achieved by often heard rhetoric of this kind—whether in the context of PoK or the bizarre notion of Akhand Bharat (Greater India)? Is there insufficient appreciation at the political level that short–sharp revanchist wars of territorial conquest/re–conquest are no longer possible? And are we oblivious of the fact that such belligerent statements, even if meant for electoral gains, evoke deep resentment amongst our neighbours and impose a diplomatic cost?

An early indication of this strategic myopia came in December 2001 after the Pakistan inspired terror strike on Parliament. India's unprecedented general mobilisation involving its million plus armed forces, was met by Pakistan's counter–mobilisation, resulting in a tense, eyeball–to–eyeball confrontation. Anecdotally, it has been said, that when the Army chief asked for specific orders about the "end state" desired by the government, he was told at the highest echelon: "Baad mein batayenge" (you will be told later). A year later, both sides de–mobilised, with no change in the security situation, and the Army chief no wiser!

This seemed to be an affirmation of former Prime Minister Narasimha Rao's priceless comment, "When I don't make a decision, I think about it and make a decision not to make a decision." The fast–changing current international environment and the situation in India's close neighbourhood do not brook such a relaxed and lackadaisical approach to national security any longer. The resumption of the US presidency by a ruthlessly self–centred Donald Trump has cast the world into a state of entropy. His inimical stance towards United Nations (UN) organs, the European Union and climate crisis agreements, his threat of invoking "tariff–wars", and his isolationist obsession with making "America great again", are precursors of the storm that threatens the existing world order. As he reaches out to Russia's Vladimir Putin, over imposition of an armistice on Ukraine, and to Iran over its nuclear programme, will Trump also strike a deal with Beijing, leaving India out on a limb?



Even without direct Trumpian intervention, India's security concerns are mounting. An increasingly powerful and belligerent China not only poses a direct territorial threat, but has also circumscribed India, strategically as well as economically. While all of India's neighbours, with the exception of Bhutan, have jumped on China's Belt and Road Initiative (BRI) bandwagon, many of their bilateral relationships with India have soured. At the same time, China's comprehensive support to its South Asian proxy, Pakistan, has encouraged the latter's belligerency against India.

As the world's most populous nation and a nuclear armed military power with an economy expected to attain podium position by 2047, the future contours of a Viksit Bharat are becoming discernible. But, even as the spectre of Beijing's military and technological dominance looms menacingly over us, India's growing dependence on China for vital imports of electronics, machinery, pharmaceuticals, and rare earths contributes not just to a huge trade deficit but also a significant economic and strategic vulnerability.

An old maxim of international relations that will help India weather the coming storm, says that "nations have neither eternal

allies, nor perpetual enemies, but only permanent interests, which they arc duty–bound to protect". Safeguarding its vital interests would require adroit diplomacy, juggling many balls simultaneously—the US, Russia, China, Europe and Japan — while ensuring that the neighbours are not alienated. India's approbation of Trumpian policies, and its diplomatic ambivalence about the ongoing slaughter in Gaza may call into question its traditionally acknowledged leadership of the Global South.

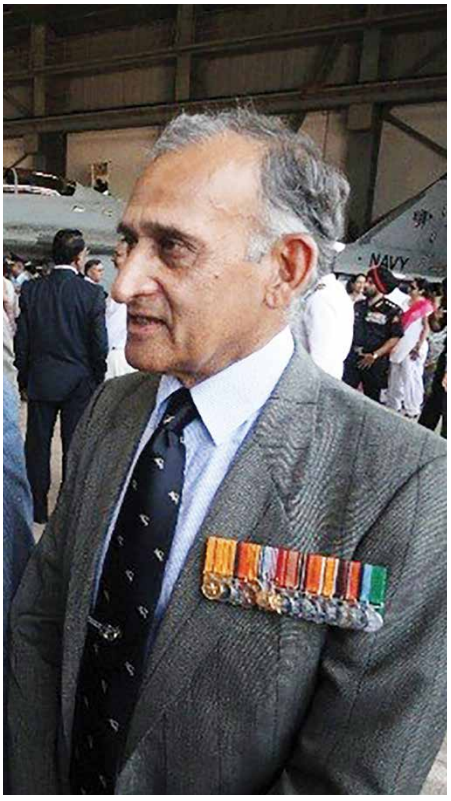
Closer home, the biggest challenge to preservation of its cherished strategic autonomy is India's technological and industrial backwardness, which has obliged it to become abjectly reliant on foreign sources— mainly Russia, Ukraine, Israel, France and South Africa—for import of military hardware. Having missed the industrial revolution, independent India leap–frogged from

being an agrarian economy to the status of service economy, but unlike China, failed to conceive a national vision for self–reliance in the vital area of defence production.

This omission is essentially rooted in India's non–serious approach to science and technology (S&T), exemplified by its meagre investment in research and development (R&D). As a proportion of Gross Domestic Product (GDP), India devotes only 0.64% to R&D, against China's 2.41%, but in actual terms, China spent 20 times as much as India. Little wonder that China is not only a world leader in military hardware production, but is also a global power in Artificial Intelligence (AI), robotics, aeronautics, space and undersea exploration.

Apart from sub–par investment, both by public and private sectors, another significant cause of deviation from a focused pursuit of S&T has been the prominence accorded to religiosity in all aspects of India's political and public life. Some see the resultant, faith–based polarisation as delivering benefits in terms of "national unity" and consolidation of political/electoral constituencies. Be that as it may, the excessive importance accorded to issues of faith has brought along with it pseudo–science, superstition and mythology, distracting our youth front the single–minded pursuit of a "scientific temper" as mandated by our Constitution.

It is not its GDP and population that will mark India as a global power, but its achievements in the fields of science, technology and industry. One hopes that political aspirations having been met, the nation will be able to resume the resolute pursuit of S&T which is the only path to attainment of great power status. It is in this context that PM Modi's inspiring slogan of aatmanirbharta must be faithfully implemented, not just in name but also by investing in R&D and encouraging the spirit of genuine, innovation that our talented youth is capable of.



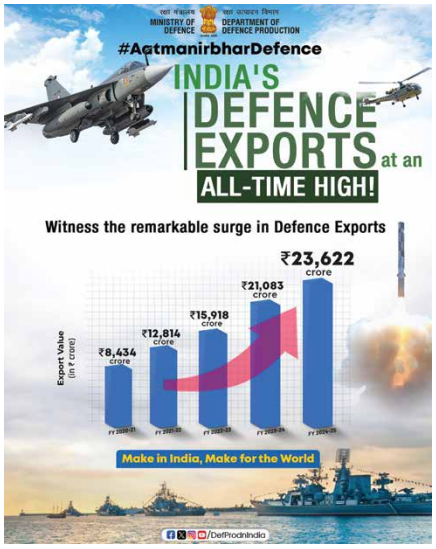
In the photo above is Admiral (Retd) Arun Prakash

Make in India powers defence growth

According to a Ministry of Defence report, India's defence production has grown at an extraordinary pace since the launch of the "Make in India" initiative. India's defence production reached Rs. 1.27 lakh crore in FY 2023–24, marking a 174% rise since 2014–15, driven by the Make in India initiative. Defence exports hit a record Rs. 21,083 crore in FY 2023–24, expanding 30 times in a decade, with exports to 100+ countries. Initiatives like iDEX and Samarthya are driving technological advancements in AI, cyber warfare and indigenous weapon systems. 14,000+ items have been indigenised under SRIJAN and 3,000 under Positive Indigenisation Lists. India aims for Rs. 3 lakh crore in production, Rs. 50,000 crore in exports by 2029.

Defence exports surge to record high

Defence exports have surged to a record high of Rs 23,622 crore (approx. US$ 2.76 billion) in the Financial Year (FY) 2024–25. A growth of Rs 2,539 crore or 12.04% has been registered in the just–concluded FY over the defence exports figures of FY 2023–24, which were Rs 21,083 crore. The Defence Public Sector Undertakings (DPSUs) have shown a significant increase of 42.85% in their exports in the FY 2024–25 reflecting the growing acceptability of Indian products in the global market and the ability of the Indian defence industry to be a part of the global supply chain. The private sector and DPSUs have contributed Rs 15,233 crore and Rs 8,389 crore respectively in defence exports of 2024–25, whereas the corresponding figures for FY 2023–24 were Rs 15,209 crore and Rs 5,874 crore respectively.



Contract for ATAGS and HMVs

Ministry of Defence (MoD) has signed contracts with Bharat Forge Limited and Tata Advanced System Limited for the procurement of 155mm/52 calibre Advanced Towed Artillery Gun Systems (ATAGS) and High Mobility Vehicle 6x6 Gun Towing Vehicles respectively at a total cost of about Rs 6,900 crore. The 155 mm/52 calibre ATAGS will replace the vintage and smaller calibre guns and enhance the artillery capabilities of the Indian Army.

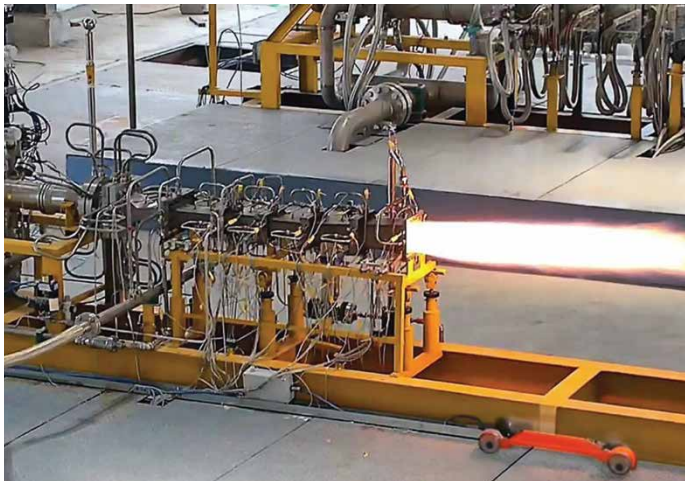
DRDO DEW tested

DRDO conducted a successful field demonstration of the land version of vehicle mounted Laser Directed Weapon (DEW) MK–II(A) at Kurnool on 14 April 2025. It defeated the fixed wing UAV and swarm drones successfully causing structural damage and disable the surveillance sensors. With this successful trial "the country has joined the exclusive club of the global powers who possess the high power laser DEW system".

(Screengrabs from ANI video)

DRDO milestone in scramjet engine development

Defence Research & Development Laboratory (DRDL), a Hyderabad based laboratory of Defence Research and Development Organisation (DRDO), has achieved a significant milestone in the field of Hypersonic Weapon Technology. DRDL conducted long duration Active Cooled Scramjet Subscale Combustor ground testing for more than 1,000 seconds at the newly built state–of–the–art Scramjet Connect Test Facility at Hyderabad on 25 April 2025. The ground test is in continuation of the earlier test reported for 120 seconds in January 2025. With the successful test, the system will be soon ready for full scale flight worthy combustor testing.



Contracts for NAMIS and 5,000 LVs

Ministry of Defence has signed a contract with Armoured Vehicle Nigam Limited for the procurement of Nag Missile System (NAMIS) tracked version of anti–tank weapon platform and Force Motors Ltd & Mahindra & Mahindra Ltd for around 5,000 Light Vehicles for the Armed Forces at a total cost of around Rs 2,500 crore.

Hanwha Aerospace in 2nd K9 Vajra–T contract

Hanwha Aerospace has announced the signing of a new USD 253 million contract with Larsen & Toubro (L&T) to supply components for 100 additional K9 Vajra–T self–propelled howitzers to the Indian Army. This second contract follows the successful delivery of the initial 100 units ordered in 2017, which demonstrated exceptional performance across India's diverse operational environments. The new contract marks a significant advancement in the established production framework. While the first K9 Vajra–T programme achieved over 50% local production, the new contract aims to increase this to 60% through expanded industrial cooperation.

BEL in record turnover of Rs. 23,000 crores

Bharat Electronics Limited (BEL) has achieved a turnover of around Rs. 23,000 Cr (Provisional & Unaudited), during the Financial Year 2024–25, against the previous year's turnover of Rs.19,820 Cr registering a growth of 16%. This includes export sales of around US$ 106 million during FY 2024–25, as against the previous year's export turnover of US$ 92.98 million, registering a growth of 14%.

In the fiscal year 2024–25, BEL secured orders worth Rs.18,715 Cr. Some of the major orders received during the year are BMP II Upgrade, Ashwini Radar, Software Defined Radios, Data link, Multi–Function Radars, EON 51, Seekers, Anti Drone System, Airport Surveillance Radar, Sonar Upgradation, Flycatcher spares, Radar upgradation, Spares and Services, etc, and other projects in non–defence sector. With this, the total order book of BEL as on 1 April 2025, stands at around Rs.71,650 Cr including export order book of USD 359 million.

DAC clears acquisition proposals worth Rs 54,000 crores

Under the chairmanship of Raksha Mantri Rajnath Singh, the Defence Acquisition Council (DAC), on 20 March 2025, accorded Acceptance of Necessity (AoNs) to eight capital acquisition proposals amounting to over Rs 54,000 crores. For the Indian Army, AoN for procurement of 1350 HP engine was accorded to upgrade the present 1000 HP engine for the T–90 tanks. For the Indian Navy, AoN for procurement of Varunastra torpedoes (Combat) was accorded by DAC. For the Indian Air Force, AoN for procurement of Airborne Early Warning & Control (AEW&C) Aircraft Systems was accorded.

LCA AF Mk.1 fires BVRAAM

Aeronautical Development Agency (ADA) has successfully conducted test launch of homegrown Astra, Beyond Visual Range Air–to–Air Missile (BVRAAM) from LCA AF Mk.1 prototype fighter aircraft. The test launch was carried out on 12 March 2025 off the coast of Chandipur, Odisha. The test firing successfully demonstrated the direct hit of the missile on flying target. The missile is already inducted into the Indian Air Force.

DRDO and IN test VLSRSAM

Defence Research & Development Organisation (DRDO) and the Indian Navy conducted the successful test of indigenously developed Vertically Launched Short–Range Surface–to–Air Missile (VLSRSAM) from the Integrated Test Range (ITR), Chandipur off the coast of Odisha at about 1200 hrs on 26 March 2025. The flight test was carried out from a land based vertical launcher against a high speed aerial target at very close range and low altitude.

DRDO and IA conduct tests of MRSAM

Defence Research and Development Organisation and the Indian Army conducted four successful flight tests of the Army version of Medium–Range Surface–to–Air Missile (MRSAM) from Dr APJ Abdul Kalam Island off the coast of Odisha on 3 and 4 April 2025. The four operational flight trials were carried out against high speed aerial targets and the missiles intercepted the aerial targets and destroyed them, registering direct hits. The MRSAM is developed jointly by DRDO and Israel Aerospace Industries for use by the Indian Army. The MRSAM Army weapon system comprises multi–function radar, command post, mobile launcher system and other vehicles.

Saab delivers AT4 to Indian Armed Forces

"We are proud to announce the successful delivery of our AT4 anti–armour weapon system to the Indian Armed Forces. Selected through a competitive evaluation, AT4 joins India's arsenal as a trusted single–shot solution for short range combat. India has procured the AT4CS AST variant, specifically designed for confined space operations—including use from within buildings, bunkers and other urban environments. This marks a milestone moment as the Indian Armed Forces, long standing users of our Carl–Gustaf system, extend their trust to our AT4 weapon system as well", stated Saab India.

BEL LLTR (Ashwini) for IAF

As part of the Government's efforts to strengthen indigenous defence capabilities of the country, Ministry of Defence has inked a capital acquisition contract with Bharat Electronics Limited (BEL), Ghaziabad for the procurement of Low–level Transportable Radar, LLTR (Ashwini) at a cost of Rs 2,906 crore. The radar is indigenously designed and developed by Electronics & Radar Development Establishment, DRDO. LLTR (Ashwini) is an active electronically scanned phased array radar based on state–of–the–art solid state technology.

BEL receives orders for Akash

Bharat Electronics Limited (BEL) has signed a contract with Indian Air Force valued at Rs.593 crores (excluding taxes) for providing maintenance services for the Akash Missile System, which was supplied by BEL.

BEL in order for EW for Mi–17V5

Bharat Electronics Limited (BEL) has signed a contract with the Ministry of Defence valued at Rs. 2,210 crores (excluding taxes) for supply of EW Suite for Mi–17 V5 helicopters of the Indian Air Force. These systems are indigenously designed and developed by CASDIC, DRDO and manufactured by BEL. The EW suite comprises Radar Warning Receiver (RWR), Missile Approach Warning System (MAWS) and Counter Measure Dispensing System (CMDS).

BEML launches HMV 12x12

BEML Ltd has launched its indigenously designed and manufactured High Mobility Vehicle (HMV) 12x12 at its Palakkad complex. Developed for the Vehicles Research and Development Establishment (VRDE), DRDO, this vehicle "enhances operational mobility for India's defence forces while advancing the nation's vision of AatmaNirbhar Bharat in strategic military assets".

Indian Navy and Kirloskar Oil Engines in contract

Project Sanction Order under Make–I category for the Design and Development of 6MW Medium Speed Marine Diesel Engine has been signed between Indian Navy and Kirloskar Oil Engines Limited. The prototype diesel engine with indigenous content of over 50% will be developed at a cost of Rs 270 crore with 70% funding from the Government of India. The order also includes development of detailed design for 3–10MW diesel engine. The developed engines will be used for main propulsion and power generation on ships of the Indian Navy and the Indian Coast Guard.

Army Commanders Conference

The Army Commanders' Conference was held at New Delhi 1–4 April 2025. The conference serves as a platform for senior leadership of the Indian Army officials to review and assess the overall security situation and deliberate on key operational priorities to deal with emerging challenges. Mr. Rajnath Singh, Raksha Mantri chaired the Raksha Mantri Session and delivered the keynote address. The session also included a presentation on Indian Army's focus in the 'Year of Reforms'.

Naval Commanders' Conference

The first edition of Naval Commanders' Conference 2025 was conducted in two phases (Phase I at Karwar on 5 April and Phase II at New Delhi from 7–10 April 25). The Conference commenced with Phase I covering 'Flag–Off of Indian Ocean Ship Sagar' by the Raksha Mantri Rajnath Singh on 5 April 2025 at Karwar. The Phase II of the Conference was held at New Delhi, which witnessed a comprehensive review of major Operational, Materiel, Logistics, HR Development, Training, and Administrative aspects.

Ashok Leyland secures multiple orders

Ashok Leyland announced that its defence business has won multiple orders valued more than Rs. 700 Cr. The vehicles to be supplied under these orders are to fulfil defence sector needs of troop transportation, logistics and other specialised mobility requirements under the Close–in Weapon Systems (CIWS) programme. The recently awarded contracts encompass a diverse range of specialised vehicles, including the Stallion 4x4, Stallion 6x6, Short Chassis Bus, and Mobility System Travelling Platform.

Avantel secures contract from GSL

Avantel Limited has received an order from Goa Shipyard Limited (GSL) valued at Rs. 11.37 crores, reinforcing its commitment to India's self–reliance in the defence sector. The contract entails the supply, installation, and commissioning of Satcom equipment on GSL's new ships under supply to the Indian Navy that will enhance the communication infrastructure across India's maritime defence ecosystem.

Paras Defence in MoU with MicroCon

Paras Defence and Space Technologies Ltd, a leading Indian defence engineering company specialising in advanced optics, mechanical design and cutting–edge defence solutions, has signed a strategic Memorandum of Understanding (MoU) with MicroCon Vision Ltd, Israel, part of Controp and the Rafael Group, marking a significant advancement in India's defence and drone industry.

Airbus awards H130 fuselage contract to Mahindra

Pursuing its strategic commitments to 'Make in India' and to promote the helicopter ecosystem in the country, Airbus Helicopters has awarded a contract for the manufacturing of the main fuselage assembly of the H130 helicopter to Mahindra Aerostructures Pvt Ltd in India. Mahindra will produce the H130's main fuselage assembly, which will then be shipped to Airbus Helicopters' facilities in Europe. Industrialisation will commence immediately, with the first cabin assembly scheduled for delivery by March 2027.

JCBL Group Signs MoU with Slovakia

Airbornics Defence & Space Pvt. Ltd. (ADSL), the dedicated defence arm of the JCBL Group, has entered into a strategic partnership with Slovakia to co–develop and manufacture next generation technologies for Light Tanks, Future Ready Combat Vehicles (FRCVs) and Future Infantry Combat Vehicles (FICVs). ADSL, Defence Unit of JCBL Group, to offer Turret, RCWS and Active Protection System for Light Tank, FRCV & FICV under Make–in–India initiative.

IAI and DCX in JV

IAI (Israel Aerospace Industries) and DCX Systems Limited have announced the establishment of a new joint venture (JV) to support the Indian Government's 'Atmanirbhar Bharat' – 'Make in India" vision. Named ELTX, the new JV is expected to deliver transfer of knowledge and technology of high end defence systems' capabilities such as airborne radars and ground systems for the Indian defence sector.

Delivery of Yard 133 (LSAM 23)

Induction ceremony of ninth Ammunition Cum Torpedo Cum Missile (ACTCM) Barge, LSAM 23 (Yard 133) was held on 12 March 2025 at Naval Dockyard, Mumbai. Chief Guest for Induction Ceremony was Cmde Manish Vig, GM (QA), ND (Mbi). Eight ACTCM Barges have already been delivered and the shipyard has also been awarded a contract for construction and delivery of four Sullage Barges to the Indian Navy thereby highlighting the Indian Navy's commitment towards encouraging MSMEs.

Goa Shipyard launches second P1135.6 frigate

Goa Shipyard Limited achieved yet another historic milestone with the launch of 'Tavasya', the second frigate of Project 1135.6 (Yard 1259) on 22 March 2025. With a displacement exceeding 3800 tons, 'Tavasya' is engineered "to execute a diverse range of offensive and defensive operations, ensuring strategic dominance in the Indian Ocean Region".

Keel laying of 2nd and 3rd NGOPV

Keel Laying ceremony of the second and third Next Generation Offshore Patrol Vessels (NGOPV), to be constructed by Goa Shipyard Ltd (GSL), was held at Yeoman Marine Services Private Ltd (YMSPL), Ratnagiri on 23 March 2025.

Keel laying of 2nd FFS

Keel laying ceremony of second of the five Fleet Support Ships (FSS) was held at L&T Shipyard, Kattupalli on 12 March 2025, in the presence of VAdm Rajaram Swaminathan, Controller Warship Production & Acquisition and senior officials from Indian Navy, Hindustan Shipyard Limited and L&T. The Indian Navy had signed a contract with HSL for acquisition of five Fleet Support Ships (FSS) in August 2023, with delivery commencing mid–2027.

Keel laying of 3rd OPV (Yard 3039)

Keel Laying ceremony of Yard 3039, the third Next Generation Offshore Patrol Vessel (ex–GRSE) was held at GRSE Ltd, Kolkata on 11 April 2025. The contracts for indigenous design and construction of eleven NGOPVs were concluded on 30 March 2023 with Goa Shipyard Ltd (GSL), Goa and Garden Reach Shipbuilders and Engineers (GRSE), Kolkata, with seven ships to be constructed by Lead Shipyard GSL and four ships by Follow Shipyard GRSE.

Induction of 4th 25T bollard pull tug

Induction ceremony for fourth 25T Bollard Pull (BP) Tug Yuvan was held on 26 March 2025 at Naval Dockyard (Visakhapatnam) in presence of Cmde Rajeev John, General Manager (Refit) as the Chief Guest. These Tugs are a part of the contract for construction of six 25T BP Tugs concluded with Titagarh Rail Systems Limited (TRSL), Kolkata.

Launch of 10th ACTCM

Launching ceremony of 10th ACTCM Barge, LSAM 24 (Yard 134) was held on 26 March 2025 at Suryadipta Projects Pvt Ltd, Thane. The contract for construction of eleven (11) Ammunition Cum Torpedo Cum Missile Barge was concluded with MSME Shipyard, Suryadipta Projects Pvt Ltd, Thane on 5 March 2021.

Keel laying of 4th NGOPV

Keel laying ceremony for Yard 3040, the fourth (ex–GRSE) Next Generation Offshore Patrol Vessel (NGOPV), was held at Garden Reach Shipbuilders & Engineers Ltd (GRSE) in Kolkata, on 24 April 2025.

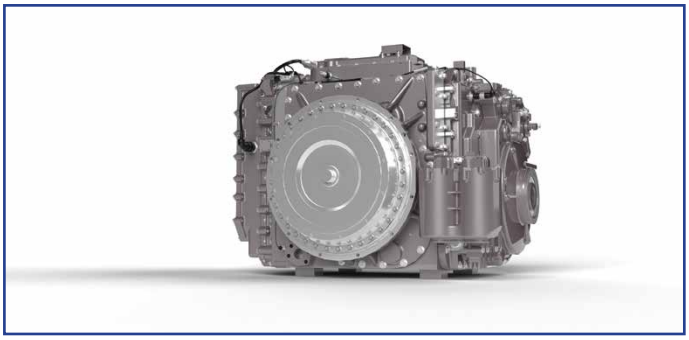
Liquid Robotics and Sagar Defence in MoU

Liquid Robotics, a Boeing company, has signed a memorandum of understanding with Sagar Defence Engineering Pvt. Ltd, an Indian unmanned systems startup, to co–develop and co–produce Autonomous Surface Vessels (ASV). The agreement builds on the joint US–India Roadmap for Defence Industrial Cooperation. This

partnership aims to enhance undersea domain awareness through manufacturing, system interoperability, ocean testing, and the establishment of a maintenance, repair, and overhaul (MRO) capacity for the Wave Glider ASV platform. The MoU supports the ASIA aimed "at expanding industry partnerships and strengthening production capabilities across the Indo–Pacific region".

Allison Transmission for India's FICV programme

Allison Transmission, the world's largest manufacturer of medium and heavy duty fully automatic transmissions for commercial and defence vehicles, has been selected to provide its 3040 MX cross–drive transmission for all three Government funded original equipment manufacturers (OEMs) competing in India's Future Infantry Combat Vehicle (FICV) prototype programme. The FICV programme aims to modernise the Indian Army's fleet by replacing the aging BMP–II Infantry Fighting Vehicles (IFVs) with advanced, domestically manufactured combat vehicles.



Paras DST and CHESS

Paras Defence & Space Technologies Ltd has secured a Rs. 142 crore contract from Centre for High Energy Systems & Sciences (CHESS), Defence Research and Development Organisation (DRDO) to develop a high powered laser system, an "indigenous air defence system inspired to make India's most advanced anti–drone laser dome".

Thales' new avionics MRO in Gurugram

Thales has celebrated the opening of its new avionics MRO facility in Gurugram, near the New Delhi airport. Aligned with the vision of "Aatmanirbhar Bharat" (self–reliant India), this centre will provide a wide range of services, including the maintenance and repair of avionics components, to prominent Indian airlines such as Air India and IndiGo. This new repair hub "draws on Thales's expertise as a global leader in the aerospace industry, providing premium support and services to airline customers in India".

Saab inaugurates engineering centre in Hyderabad

Saab has inaugurated its Saab Engineering India Pvt Ltd, a new IT engineering and development centre based in Hyderabad. "Saab takes forward its long–term commitment to India by strengthening the company's global development capabilities and deepening its footprint in the Indian defence and security ecosystem. The new centre will contribute to Saab's global product development in areas such as advanced software engineering, electronic systems, industrial engineering and mechanical design" stated the company. According to Mats Palmberg, Chairman and Managing Director of Saab India Technologies, "This is a natural progression of Saab's continued engagement with India and a milestone in building local engineering capabilities. This facility will not only support our global programmes but also support India's aspiration to be a self–reliant defence manufacturing hub."

The ePlane Company and ModAir collaboration

ModAir is set to become one of the first lessors in India to embrace eVTOL leasing, marking a historic step toward the mainstream adoption of electric aviation through its strategic collaboration with The ePlane Company. Through this collaboration, ModAir will offer leasing solutions for The ePlane Company's flagship eVTOL, the e200X—an ultra–compact aircraft designed for safe, sustainable and affordable transport.

Indo–Pacific Maritime Domain Awareness

India has requested to buy SeaVision software (including requested software enhancements); Technical Assistance Field Team (TAFT) training; remote software and analytic support; access to SeaVision documentation; and other related elements of logistics and programme support. The estimated total cost is $131 million.

DRDO in trials of Stratospheric Airship Platform

Defence Research and Development Organisation successfully carried out maiden flight trials of Stratospheric Airship Platform from Sheopur Trial site in Madhya Pradesh on 3 May 2025. Developed by Aerial Delivery Research and Development Establishment, Agra, the airship was launched carrying an instrumental payload to an altitude of around 17 kms. Data from onboard sensors was received and will be utilised for development of high quality fidelity simulation models for future high altitude airship flights. The total duration of the flight was about 62 minutes.

APPOINTMENTS

Air Marshal Narmdeshwar Tiwari is VCAS, IAF

Air Marshal Narmdeshwar Tiwari took charge as the Vice Chief of the Air Staff, IAF on 2 May 2025. The Air Marshal completed his schooling at Rashtriya Indian Military College (RIMC) in Dehradun before joining the National Defence Academy, Khadakwasla. He passed out from NDA in June 1985 with the President's Gold Medal. He was commissioned as a Fighter Pilot in the Indian Air Force on 7 June 1986. The Air Marshal has over 3600 hours of flying experience on various types of aircraft. His extensive field experience encompasses operational testing of various weapons and systems, including a key role in operationalising the 'Litening' Laser Designation Pod during the Kargil Operations in 1999. He was actively involved in the flight testing of the LCA from 2006 to 2009 and later in 2018–19, wherein, as the Project Director (Flight Test) at the National Flight Test Centre, he was involved in the Final Operational Clearance of the aircraft. Prior to assuming charge as the Vice Chief of the Air Staff, he was the Air Officer Commanding–in–Chief at South Western Air Command.

APPOINTMENTS

Air Marshal Tejinder Singh takes over as AOC–in–C Training Command

Air Marshal Tejinder Singh took over as Air Officer Commanding–in–Chief (AOC–in–C), Training Command on 1 May 2025. An alumnus of the National Defence Academy, Air Marshal Tejinder was commissioned in the fighter stream of the IAF on 13 June 1987. He is a Category 'A' Qualified Flying Instructor with over 4500 hours of flying, an alumnus of Defence Service Staff College and National Defence College. He has commanded a Fighter Squadron, a Radar Station, a premier Fighter Base and was Air Officer Commanding, Jammu and Kashmir. His varied staff appointments include Operational Staff at a Command HQ, Air Commodore (Personnel Officers–1) at Air HQ, Deputy Assistant Chief of Integrated Defence Staff, Financial (Planning) at HQ IDS, Air Commodore (Aerospace Safety), Assistant Chief of Air Staff Operations (Offensive) and ACAS Ops (Strategy) and Senior Air Staff Officer, Eastern Air Command at Shillong, Meghalaya. Prior to his present appointment, he was the Deputy Chief of the Air Staff at Air HQ (VB).

Lieutenant General Pratik Sharma takes over command of Indian Army's Northern Command

Lieutenant General Pratik Sharma assumed the appointment of General Officer Commanding–in–Chief (GOC–in–C), Northern Command on 1 May 2025. A highly decorated officer, Lieutenant General Pratik Sharma is an alumnus of NDA, Khadakwasla, Indian Military Academy, Dehradun and Defence Services Staff College, Wellington. He was commissioned into the Madras Regiment in December 1987. He has held important appointments at Military Operations Directorate and Military Secretary Branch in the Army Headquarters. He was also the Director General of Military Operations and Deputy Chief of Army Staff (Strategy), prior to taking over as GOC–in–C, Northern Command.

Air Marshal Ashutosh Dixit assumes the appointment of CISC

Air Marshal Ashutosh Dixit assumed the appointment of Chief of Integrated Defence Staff (CISC) at Headquarters, Integrated Defence Staff in New Delhi on 1 May 2025. He succeeds Lt Gen JP Mathew who superannuated on 30 April 2025. Prior to taking over as CISC, Air Marshal Ashutosh Dixit was serving as the Air Officer Commanding–in–Chief of Central Air Command. He focused on enhancing operational readiness and fostering coordination with other services in Uttar Bharat and Central region.

The Air Marshal was commissioned into the fighter stream of the Indian Air Force on 6 December 1986. He is an alumnus of National Defence Academy, Khadakwasla; Defence Services Staff College (Bangladesh) and National Defence College, New Delhi. He is a Qualified Flying Instructor and Experimental Test Pilot with over 3,300 hours of flying experience on over 20 types of aircraft, including Mirage–2000, MiG–21 and Jaguar.

Signature of the Dassault Rafale Marine contract for India

The Inter–Governmental Agreement between India and France was signed on 28 April 2025 in the presence of the Chairman and CEO of Dassault Aviation, Eric Trappier, for India's acquisition of 26 Rafale Marine to equip the Indian Navy.

This contract follows the announcement in July 2023 of the selection of the Rafale Marine, for which the Indian Navy will be the first user outside France, after an international consultation. It confirms the Indian authorities' satisfaction with the aircraft's capabilities and their desire to broaden the spectrum of its operational use.

"This new acquisition testifies to the importance of the strategic relationship between India and France and the recognition of the Rafale as an essential vector of national sovereignty. It honours Dassault Aviation's commitment to meeting the operational needs of the Indian Forces since the induction of the Toofany seven decades ago, and its determination, through its significant contribution to the 'Make in India' policy and the 'Skill India' initiative, to make its presence in India a success in the service of Indian interests", stated Dassault Aviation.

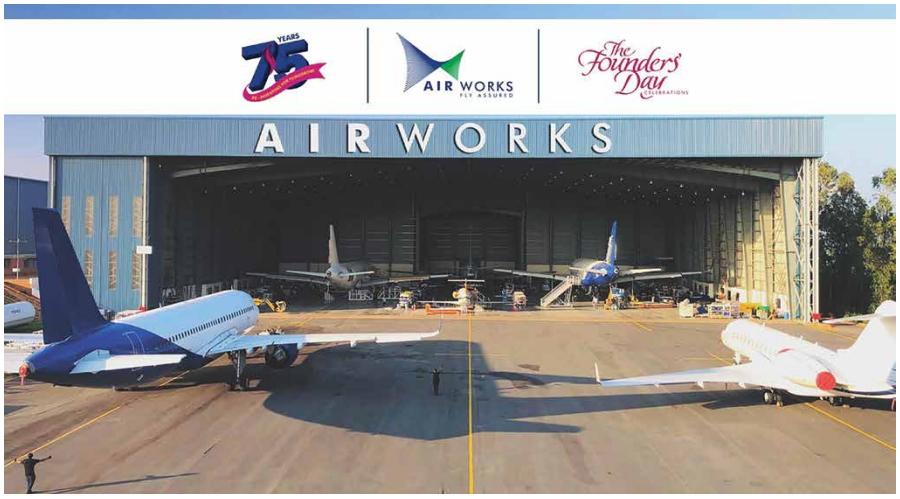
The Rafale Marine will provide the Indian Armed Forces with state–of–the–art capabilities and the Indian Navy will benefit from the experience of the French Navy, which already operates this aircraft. Along with the 36 Rafales already in service with the Indian Air Force, the Rafale Marine will play an active role in guaranteeing national sovereignty and consolidating India's role as a major international player.

"On behalf of Dassault Aviation and its partners, I would like to thank the Indian authorities, with whom we have been working for more than 70 years, for their confidence in us and reaffirm our unwavering determination to stand by their side to contribute to India's expression of its sovereign power, its strategic challenges and its ambitious vision of the future," stated Eric Trappier.

Manufactured by France's Dassault Aviation, the Rafale–Marine is a carrier–borne combat–ready aircraft with proven operational capabilities in maritime environment. The delivery of these aircraft would be completed by 2030, with the crew undergoing training in France and India.

Rafale–Marine has commonality with the Rafale being operated by IAF. Its procurement will substantially enhance joint operational capability, besides optimising training and logistics for the aircraft for both Indian Navy and IAF. The induction would lead to the addition of a potent force multiplier to the Indian Navy's aircraft carriers, substantially boosting the nation's air power at sea.

Air Works turns Platinum



Air Works Group, one of India's oldest and biggest MRO and aviation services major, has achieved a unique and historic milestone, completing 75 years of service to the nation. It was on 16 April 1951, that Air Works' founders, (Late) Mr. BG Menon and (Late) Mr. PS Menon, laid the foundation of what has today become the "Indian MRO industry" – by commencing operations at the Mumbai International Airport.

Beginning with maintenance of Douglas DC–3s and DC–4s on behalf of leading industrialists and international airlines flying to India, Air Works eventually established a comprehensive portfolio of aviation Engineering and Maintenance services that spanned over 50 different types of aircraft (General Aviation) at a time, including forging strong and meaningful relationships with several global OEMs such as Dassault, Bombardier, Bell, Leonardo, Gulfstream and others. The founders' visionary and self–reliant (Atmanirbhar) approach even saw Air Works establishing a specialised academy that trained and produced highly skilled aircraft maintenance professionals in the early 80s, ahead of time.

After about 50+ years, eyeing the fast–growing global market, Air Works undertook a series of radical steps that included professionalising its management and ways of working and infusing capital, to set up the country's first, EASA approved, private commercial aircraft maintenance facility at Hosur, Tamil Nadu, turning a new leaf and diversifying its business to include maintenance of commercial aircraft within Indian shores, boosting indigenous MRO capabilities significantly. In 2011–12, Air Works entered the Defence MRO business by forging a strategic partnership with Boeing for maintaining BBJ aircraft for Heads of State, thereby straddling every customer segment with a rich suite of offerings.

With JVs such as SA Air Works (with Scandinavian Avionics) and Acumen (into asset management services), Engineering and Maintenance excellence at its core, a philosophy of ensuring complete customer satisfaction (Fly Assured) fueled by a legacy of transforming for tomorrow, Air Works Group has become an enterprise success story and a well respected brand in the Indian Maintenance, Repair, and Overhaul (MRO) industry, with an enviable customer mix that includes leading Indian and regional airlines, lessors, airlines and cargo operators, OEMs and defence forces such as the Indian Air Force and Indian Navy. In fact, prior to its strategic focus on India beginning 2019, Air Works Group was India's only MNC in the Aviation sector with interests across the USA, UK, Europe, Middle East, and China.

"The entire company is thrilled to celebrate this momentous and record–breaking, once–in–a–lifetime milestone," stated D Anand Bhaskar, MD & CEO, Air Works Group. He further added, "Our journey has been one of passion, perseverance, and professionalism, driven by the commitment of our founding fathers' to continue serving the evolving needs of our customers and those of the overarching aviation industry. None of this would however be possible without the support and dedication of every one of our 1600+ employees, our customers and partners. Turning 75 isn't just a company achievement – but a collective tribute to the faith and commitment of every member of the Air Works family."

Sharing his experiences with young colleagues, Ravi Menon, Director, Air Works Group, remarked, "We never imagined surviving such a long journey in this dynamic industry, or of ever growing from 50–100 member team to become a family of 1600+ today. Our greatest advantage is our culture and family values that foster collaboration, trust, and transparency, together with the unique opportunity to rub shoulders with some of the finest, most passionate and sought after minds in the field of aviation engineering and maintenance, across our pan–India network. The developments over the past year at Air Works have made us even more agile, and we're raring to go."

Dynamatic TL and Deutsche Aircraft collaborate on D328eco

Dynamatic Technologies Limited, India's leading aerostructure manufacturer, and Deutsche Aircraft, the German Regional Aircraft OEM driving sustainable regional aviation, have inaugurated the Rear Fuselage Assembly Line for the 40 seater D328eco turboprop aircraft at Dynamatic's state–of–the–art aerospace facility in Bangalore, India.

The inauguration marks the transition from planning and design to serial manufacturing and showcases the world class aerospace engineering and production capabilities in India. This milestone builds on the strategic partnership announced in 2024 and strengthened at Aero India 2025, where both companies reaffirmed their commitment to developing the rear fuselage for the D328eco aircraft.

The momentous occasion was marked by the presence of Mr. Tobias Gotthard, State Secretary of the Bavarian State Ministry for Economic Affairs, Regional Development and Energy, who officially inaugurated the assembly line. Also present were Mr. Nico Neumann, Co–CEO of Deutsche Aircraft, and Mr. Udayant Malhoutra, CEO and Managing Director of Dynamatic Technologies Limited.

Mr. Tobias Gotthardt highlighted the significance of this initiative in fostering international collaboration: "This collaboration between Deutsche Aircraft and Dynamatic Technologies exemplifies our mutual dedication to innovation, sustainability and economic growth. Bavaria, as a leading hub for aerospace innovation, is proud to support initiatives that not only strengthen our regional capabilities but also contribute to global advancements in green aviation."

Mr. Nico Neumann emphasised the global vision: "Our partnership with Dynamatic Technologies fortifies the global supply chain and underscores our commitment to sustainable aviation. This collaboration, supports the efficient regional transport system under the Udaan scheme, is a testament to Bavaria's role in driving aerospace innovation and fostering international cooperation."

Mr. Udayant Malhoutra added: "We are honoured to build this critical structure for the D328eco here in Bangalore. This assembly line is a testament to the 'Make in India' initiative, our deep capabilities in aerospace and our commitment to supporting green aviation goals globally."

"The inauguration of the assembly line represents a major boost to the strategic partnership between India and the European Union in the aerospace sector, fostering international collaboration, high skilled employment, advanced technology transfer and a robust transnational supply chain. This collaborative effort between India and Germany, the EU's largest economy, clearly demonstrates the shared vision to build a more sustainable and interconnected aviation future", stated company officials.

The Dornier 328 is no stranger to India. In 1995, Dr. Syed Ainuddin Arif started his airline VIF Airways based out of Hyderabad with 2 Do–328's (VT–VIF and VT–VIG). He initially ordered 5 but due to financial problems the airline ceased operations in 1996. (Editor's comment)

HAL registers revenue of Rs 30,400 crores, builds capacities

HAL recorded a revenue of Rs. 30,400 crores (provisional and unaudited) for the financial year ended on 31 March 2025 as against the revenue of Rs. 30,381 crores during the previous year.

"This achievement was despite the shortfall in deliveries of LCA and ALH. The deliveries of LCA were affected due to non–availability of engines. The ALH delivery schedule too got hit due to the accident in January 2025 and subsequent grounding of the fleet. However, the deliveries of other products and services were accelerated which helped us to maintain the top line", stated Dr DK Sunil, CMD, HAL.

With the Company's order book significantly improving in the last 12 months, the company used the year to add capacities as additional lines for LCA and HTT–40 were put–up besides augmenting the aero engine capacity at Koraput. The order book stood at Rs.1,84,000 crores as against the opening order book position of Rs. 94,129 crores and after adjusting current year liquidation. During the year 2024–25, HAL received new manufacturing contracts of Rs 1,02,000 crores and ROH contracts of Rs 17,500 crores. Recently, the company signed a contract with MoD for supply of 156 LCH Prachand worth Rs. 62,777 crores. This is the single biggest procurement by MoD from HAL till date.

The other highlights of 2024–25 were: HAL becoming the first Defence PSU to achieve the prestigious `Maharatna' status, contracts signed for supply of additional 12 Su–30MKI aircraft, Mid Life Upgrade (MLU) of 40 Do–228 aircraft, supply of 240 AL31FP engines of Su–30MKI aircraft and avionics upgrade of one Il–78 aircraft. The first engine of AL31FP was handed over within one month of contract signature.

With the supply chain issues stabilising, new orders in hands and enhancement of capacities, the company is gearing up for more robust physical and financial performance in the FY 2025–26.

MoD signs contracts with HAL for 156 LCHs and wet lease of KC–135 via Metrea

Ministry of Defence on 28 March 2025, signed two contracts with Hindustan Aeronautics Limited (HAL) for supply of 156 Light Combat Helicopters (LCH), Prachand, along with training and other associated equipment worth Rs. 62,700 crore, excluding taxes. The first contract is for supply of 66 LCHs to the Indian Air Force (IAF) and second is for supply of 90 LCHs to the Indian Army.

The supply of these helicopters shall commence from the third year and will be spread over the next five years. The contracts will enhance the combat capability of Armed Forces at high altitudes. LCH is India's first indigenously designed and developed combat helicopter having a capability of operating at an altitude of over 5000 metres. This helicopter has a large number of components designed and manufactured in India and it is planned to achieve an overall indigenous content of over 65% during the execution of this procurement. This will involve over 250 domestic companies mostly MSMEs and will generate over 8,500 direct and indirect jobs.

Ministry of Defence also signed a contract with Metrea Management for Wet Leasing of one Flight Refuelling Aircraft (FRA) for providing air to air refuelling training to pilots of IAF and Indian Navy. Metrea will provide FRA (KC–135 aircraft) within six months which will be the first FRA to be wet leased by IAF. Metrea is a military contractor based in the United States which provides air logistics and surveillance, electronic and cyberwarfare services support to militaries in the US, Canada, NATO and allied countries.

With signing of these three contracts, the total number of contracts signed by Ministry of Defence during 2024–25 reaches to 193 with overall contract value exceeding Rs 2,09,050 crore, which is the highest ever and nearly double the previous highest figure. Out of these, the contracts to domestic industry are 177 (92%) with contract value Rs 1,68,922 Crore (81%).

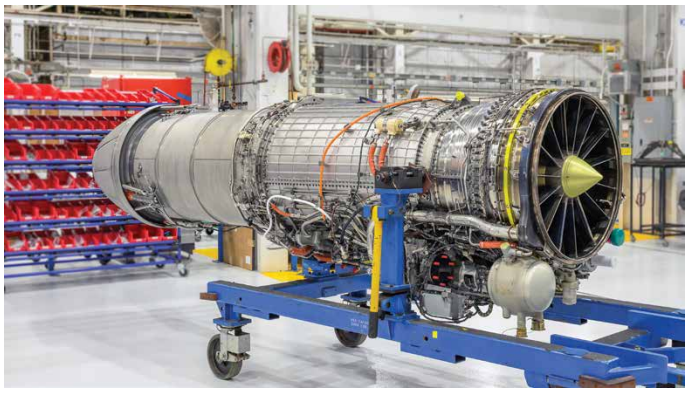
First of 99 GE F404–IN20's delivered to HAL

On 25 March 2025, we were excited to deliver the first of 99 F404–IN20 engines to our valued customer Hindustan Aeronautics Limited (HAL) for the Tejas Light Combat Aircraft Mk.1A fight jet. It is an important milestone in our 40 year relationship with HAL and in our efforts to ensure a strong future for India's military by developing next generation fighters while enhancing the country's defence manufacturing capabilities.

GE Aerospace has a strong history of military jet propulsion collaboration in India. After collaborating with the Aeronautical Development Agency in the 1980s, GE Aerospace's F404–IN20 engine was selected for the single–engine Tejas in 2004. This was an important breakthrough for both India and GE Aerospace.

Our F404 engine family, one of the most successful in military aviation history, powers thousands of combat aircraft worldwide. The F404–IN20 engine is a tailored design for India's single engine fighter with the highest thrust within F404 family and a higher–flow fan, unique single crystal turbine blades, and numerous special components. GE Aerospace and Tejas teams collaborated closely for several years to customise it for the needs of Indian Air Force. The F404 demonstrated it was an excellent fit for the Tejas LCA. On its first test flight in 2008, the aircraft climbed to numerous mission altitudes and achieved Mach 1.1 speed.

By 2016, GE Aerospace fulfilled its commitment to HAL and delivered 65 F404–IN20 engines for the Tejas LCA. With no additional engine orders on the horizon, the production line for F404–IN20 was shut down. However, when HAL ordered an additional 99 engines in 2021 for the Tejas Mk.1A LCA, our team began the complex task of restarting the F404–IN20 production line, which had been dormant for five years, and re–engaging the engine's global supply chain.



Restarting a jet engine production line is a challenging process. Restarting the F404–IN20 engine line during the COVID pandemic was even more challenging. With a high focus on safety and quality, and a remarkable commitment from our supply chain teams and our suppliers and partners, we have managed to restart the line. Our proprietary lean operating model, Flight Deck, helped us alleviate bottlenecks and identify solutions to improve manufacturing processes and turnaround time. Today, we are working closely with our suppliers to ramp up production on parts and materials for the F404–IN20.

We will continue to work together with our suppliers to keep the production line efficient, maintain the highest standards of safety and quality, and deliver to our customer. This week's first engine delivery is a testament to what we have accomplished with HAL over the past 40 years, and a symbol of our combined potential to ensure a strong future for India's military.

By Shawn Warren, General Manager, Combat & Trainer Engines, GE Aerospace

GE Aerospace Foundation announces 'Next Engineers' expansion to Bengaluru

The GE Aerospace Foundation has announced the expansion of its 'Next Engineers' college readiness programme to Bengaluru, India, to advance the programme's goal of encouraging young people to pursue careers in engineering.

The expansion of 'Next Engineers' will help build a strong engineering pipeline in India. With this announcement, the GE Aerospace Foundation, alongside leadership and volunteers at the Bengaluru facility, will now move forward with identifying an academic partner to be announced in late 2025.

"GE Aerospace in India has supported new technologies for the industry collaborating with academia for more than 25 years," stated Alok Nanda, Chief Technology Officer at GE Aerospace's India Technology Centre. "The expansion of the 'Next Engineers' programme locally allows increased engagement for students interested in engineering careers."

Bengaluru was selected using a range of criteria, including GE Aerospace's employee footprint, the strength of GE Aerospace's manufacturing and engineering presence, and anticipated engagement in the programme. GE Aerospace in India supports the entire lifecycle of the company's engines and products. It has a strong history of volunteering in the local community, including STEM education.

"We are immensely proud to announce our 'Next Engineers' programme in Bengaluru," stated GE Aerospace Foundation President Meghan Thurlow. "Nearly 22,000 students around the world have experienced the power and possibility of engineering through our programme and the GE Aerospace volunteers that support it. We look forward to reaching even more students with this programme expanding to India."

In 2024, the GE Aerospace Foundation committed $20 million through 2030 to expand 'Next Engineers'. This commitment will help bridge the gap for students in middle school to college who are interested in engineering careers. The Next Engineers programme currently serves students in Cincinnati, Ohio, Greenville, South Carolina in the United States, Johannesburg (South Africa), Staffordshire (United Kingdom), and Warsaw (Poland), reflecting the global reach and impact that GE Aerospace has in communities around the world.

The GE Aerospace Foundation, an independent charitable organisation funded by GE Aerospace, complements the company's purpose to "lift people up" in communities where employees live and work around the world. The Foundation's philanthropic strategy and programmes focus on engineering education, workforce development and disaster relief.

We also support GE Aerospace employees through programmes such as Matching Gifts and STAR Awards. When GE Aerospace launched as an independent company in 2024, the GE Foundation was relaunched as the GE Aerospace Foundation, commencing a new chapter that builds on the successful, 100+ year legacy of the previous GE Foundation.

GE Aerospace is a global aerospace propulsion, services, and systems leader with an installed base of approximately 45,000 commercial and 25,000 military aircraft engines. With a global team of approximately 53,000 employees building on more than a century of innovation and learning, GE Aerospace is committed to inventing the future of flight, lifting people up, and bringing them home safely.

GE F404 front view

IAF LCA powered by GE F404 engine

GE Aerospace has been a partner to India's aviation industry for over 40 years. 1400 GE Aerospace and partner engines are in service, powering major Indian airlines. GE Aerospace's defence engines and systems power Indian Air Force's Light Combat Aircraft Tejas Mk.1 and helicopters and Indian Navy's aircraft carrier battleships and frigates. Its Pune manufacturing facility and 13 local India partners are part of the company's global supply chain. Researchers and engineers at the company's 25–year–old India technology centre in Bengaluru are building the latest aviation technologies.

Text courtesy: GE

Indian and French Navies conduct Varuna 2025

The 23rd edition of the bilateral naval exercise Varuna, a testament to the enduring maritime partnership between India and France, took place from 19 to 22 March 2025. Since its inception in 2001, Varuna has evolved into a cornerstone of cooperation, showcasing the two nations' commitment to enhancing naval interoperability and operational synergy. This year's edition saw an exhilarating array of maritime exercises and complex manoeuvres across the sub–surface, surface and air domains. The joint participation of the aircraft carriers Vikrant and Charles de Gaulle, alongside their fighter aircraft, destroyers, frigates and an Indian Scorpene class submarine, highlighted the collaborative strength of both Navies.

Varuna 2025 featured advanced air defence drills and fighter exercises, including mock air–to–air combat between the French Rafale–M and Indian MiG–29K, designed to refine tactical and operational capabilities. Anti–submarine warfare exercises provided rigorous training in underwater domain awareness, while surface warfare operations demonstrated synchronised manoeuvres and engagements by the Indian and French fleets. Maritime patrol aircraft enhanced situational awareness, and replenishment–at–sea exercises will fortified logistical cooperation.

The Varuna exercises symbolise the enduring military cooperation between France and India, who have shared a robust strategic partnership for more than 25 years. It is part of a series of bilateral training exercises on land (Shakti), in the air (Garuda), and at sea (Varuna). "By fostering the exchange of best practices and mutual understanding, the exercise reaffirms the ability of both nations to operate seamlessly in even the most complex maritime scenarios. Varuna 2025 stands as a powerful reminder of the deep bonds uniting the Indian and French Navies in their pursuit of maritime peace and security" stated the Indian Navy.

Since November 2024, France has been deploying its CSG as part of the CLEMENCEAU 25 mission to strengthen ties with its partners in the Indo–Pacific. After conducting air and naval exercises with Indian forces following the stopovers of French ships in Goa and Kochi in January 2025, cooperation between the two countries continues with the return of the French CSG in the Indian Ocean.

Text: Indian Navy and French Embassy in India
Photos: French Navy

Culmination of Indian Navy's TROPEX–2025

The 2025 Edition of the Indian Navy's capstone Theatre Level Operational Exercise (TROPEX) was conducted over a period of three months from January to March 2025. The Exercise which culminated in early March 2025, helped validate many of the Navy's concepts of operations. The exercise construct included an amphibious exercise AMPHEX, a Joint Work Up Phase focused on precise delivery of ordnance on target, Cyber and Electronic Warfare and a Tactical Phase. The exercise "provided a valuable evaluation of the Navy's ability to

respond to multifarious challenges in a synchronised and integrated manner to defend national maritime security interests".

Set in the Indian Ocean, including the Arabian Sea and Bay of Bengal, the theatre of operations for the exercise extended approximately 4300 nm from North to South upto 35 deg South Latitude and 5000 nm from the Strait of Hormuz in the West to the Sunda and Lombok Straits in the East. TROPEX 25 witnessed participation of 70 Indian naval ships, 10 submarines and over 80 aircraft of different types. The exercise achieved a very high level of operational synergy in planning and execution of theatre level scenarios with the other Services. It witnessed extensive participation by the units of Indian Army, Indian Air Force and Indian Coast Guard comprising Sukhoi Su–30MKI, Jaguar, C–130, Il–78 flight refueller and AWACS aircraft, over 600 infantry troops and more than 10 Indian Coast Guard ships.

TROPEX 25 marked the successful culmination of an intense operational campaign designed to assess the Indian Navy's operational preparedness and material readiness for combat, and "reaffirmed the Navy's commitment to remain a Combat–ready, Credible, Cohesive and Future–ready Force".

Royal Navy aircraft carrier to visit India

Final preparations are underway for a multinational deployment, led by the Royal Navy flagship HMS Prince of Wales, reaffirming the UK's commitment to the security of the Mediterranean and Indo–Pacific, while providing an opportunity to promote British trade and industry.

Aircraft carrier HMS Prince of Wales is scheduled to sail from Portsmouth on 22 April, where it will proceed to join a formation of warships, supply ships, and aircraft off the coast of Cornwall, before departing for the Mediterranean where it will conduct exercises to reinforce European security.

Around 2,500 personnel from the Royal Navy and 592 from the Royal Air Force will be involved in the eight–month deployment, which will see the group sail through the Indian Ocean to conduct exercises and port visits with partners including the US, India, Singapore, and Malaysia. They will be joined by around 900 personnel from the British Army for exercises during the deployment.

The deployment, named Operation Highmast, provides an opportunity for the UK's Armed Forces to conduct a major global deployment and a chance to exercise complex operations alongside partners and allies in the region, with 12 other nations supporting the deployment with ships or personnel. The Indo–Pacific is a critical region for UK trade, with imports and exports in the region worth billions of pounds for the UK economy, and the deployment will provide a chance for UK companies to take part in trade events during port visits.

Trade between the UK and Indo–Pacific accounted for 17% of total trade between the UK and all trading partners in the 12 months to September 2024, with the total amount traded in goods and services between the UK and Indo–Pacific standing at £286 billion in the same period.

As the biggest class of ship in the Royal Navy, the flight decks of HMS Prince of Wales and her sister ship are roughly the size of three football pitches and defended by advanced weapons. A maritime strike force of this size is composed of multiple types of ship, frigates, destroyers, submarines, and supply ships to support logistics.

Of the 12 other nations supporting the deployment, Norway will provide a warship to support the carrier strike group for the entire duration of the deployment. Canada and Spain are among the other nations providing support to the deployment.

After its complement of up to 24 Royal Air Force F–35B Lighting fighter jets is embarked on board HMS Prince of Wales, and the departure for the Mediterranean, the group will initially be placed under NATO command as it joins Exercise Neptune Strike – testing the Alliance's ability to use high–end maritime strike capabilities, including multiple aircraft carrier and amphibious strike groups.

The group will transit though the Indian Ocean, conducting exercises and port visits with partners including the US, India, Singapore and Malaysia, before joining 19 partner nations for Exercise Talisman Sabre near Australia, and then training alongside the Japanese Self Defence Forces and conducting a port visit to India.

Following the inaugural deployment in 2021, the Carrier Strike Group 2025 highlights the strength of the UK's leadership in seeking to uphold stability in the Indo–Pacific. This has been bolstered by the Royal Navy's persistent presence in the region through HMS Spey and HMS Tamar, as well as the landmark Global Combat Air Programme collaboration.

Keeping the country safe is the Government's first priority and is the foundation of its Plan for Change. The strength, capability and global reach of the Royal Navy, British Army and Royal Air Force, demonstrated through Operation Highmast, is critical to the security and stability of the UK, supporting the delivery of the Government's five missions.

Text and image: UK MoD

India–Kyrgyzstan Exercise Khanjar–XII

The 12th edition of the India–Kyrgyzstan Joint Special Forces Exercise Khanjar–XII took place in Kyrgyzstan from 10 March to 23 March 2025. Since its inception in 2011, Ex Khanjar XII has evolved into an annual training event. The alternating venues between India and Kyrgyzstan reflect the unique dimension of the thriving strategic relationship; the last edition of the same exercise was conducted in India in January 2024. The Indian contingent was represented by troops from The Parachute Regiment (Special Forces) and the Kyrgyzstan contingent was represented by Kyrgyz Scorpion Brigade.

INS Imphal in Mauritius

Indian Naval Ship Imphal made her maiden port call at Port Louis, the capital city of Mauritius, on 10 March 2025; the ship participated in the 57th Mauritius National Day celebrations. The visit of INS Imphal was in keeping with the tradition of Indian warships and aircraft participating in Mauritius National Day celebrations. The ship fielded a marching contingent, naval band and helicopter for the flypast at the National Day Parade at Champs de Mars. Mr. Narendra Modi, the Prime Minister of India, was the Chief Guest at the celebrations. Commissioned in December 2023, Imphal is the third of the four Project 15B (Visakhapatnam class) indigenous destroyers. Equipped with state–of–the–art weapons, sensors and machinery, she ranks amongst "the largest and most technologically advanced warships in the world".

ICGS Saksham at Seychelles

Indian Coast Guard (ICG) Offshore Patrol Vessel Saksham made a port call at Port Victoria, Seychelles, on 12 March 2025 for a three day visit aimed at strengthening maritime cooperation and fostering regional partnerships. The crew of the ship engaged in a series of interactions, including high–level calls on local dignitaries, joint training exercises, and sporting events with their counterparts. These engagements "will enhance interoperability, promote mutual learning, and reinforce the strong maritime ties between India and Seychelles".

Exercise Bongosagar 25

The India–Bangladesh Exercise Bongosagar 2025 and Coordinated Patrol was conducted in Bay of Bengal. The exercise saw participation of INS Ranvir from Indian Navy and BNS Abu Ubaidah from Bangladesh Navy. The exercise "enhanced interoperability between the two navies, facilitating collaborative responses to shared maritime security challenges".

ICGS Saksham at Madagascar

The Indian Coast Guard's Offshore Patrol Vessel (OPV) ICGS Saksham, made a port call at Antsiranana, Madagascar as part of its ongoing overseas deployment to Friendly Foreign countries in the Indian Ocean region on 18 March 2025. This visit marked a significant milestone in strengthening maritime cooperation between India and Madagascar. During the visit, the crew of ICGS Saksham engaged in professional interactions with the Madagascar Coast Guard, focusing on Marine Pollution Response (MPR), Maritime Search and Rescue (M–SAR), and Maritime Law Enforcement.

India–Russia Exercise INDRA 2025

The 14th edition of the Indian–Russia bilateral naval exercise INDRA took place off Chennai from 28 March to 2 April 2025. Since its inception in 2003, Exercise INDRA epitomises the long–term strategic relationship between the two Navies. The exercise saw participation of Russian Federation Naval Ships Pechanga, Rezkiy and Aldar Tsydenzhapov along with Indian Naval Ships Rana, Kuthar and maritime patrol aircraft P8I. The Harbour Phase included Opening ceremony, Subject Matter Expert Exchanges (SMEEs), reciprocal visits, sports fixtures, and pre–sail briefings between personnel from both navies. The Sea Phase witnessed advanced naval drills, including tactical manoeuvres, live weapon firings, anti–air operations, underway replenishment, helicopter cross–deck landings and exchange of sea–riders.

IAF at Exercise Iniochos–25

The Indian Air Force (IAF) participated in Exercise Iniochos–25, a prestigious multi–national air exercise hosted by the Hellenic Air Force. The exercise took place at Andravida Air Base, Greece, from 31 March 2025 to 11 April 2025 and the IAF contingent included Su–30MKI fighters along with combat enabler Il–78 and C–17 aircraft.

Iniochos is a biennial multinational air exercise hosted by the Hellenic Air Force. It serves as a platform for air forces to hone their skills, exchange tactical knowledge, and strengthen military ties. The exercise integrated multiple air and surface assets from fifteen countries under realistic combat scenarios, designed to simulate modern–day air warfare challenges

"The IAF looks forward to participating in Exercise Iniochos 25, a platform to enhance international cooperation, synergy and interoperability among participating Air Forces. This exercise will provide an opportunity to train in planning and executing Combined Air operations, refine tactics in complex air warfare scenarios, and gain insights into operational best practices. With all operations conducted from Andravida, IAF's participation will not only strengthen its operational capabilities but also contribute to mutual learning and enhanced coordination among participating countries", stated IAF officials.

Exercise Tiger Triumph 25

The Fourth edition of Exercise Tiger Triumph, the bilateral Tri–Service India–US Humanitarian Assistance and Disaster Relief (HADR) Exercise, took place on the Eastern Seaboard from 1 to 13 April 2025. The exercise was aimed at developing interoperability for conducting HADR operations and for the formulation of Standard Operating Procedures (SOPs) to establish a Combined Coordination Centre (CCC) that would enable rapid and smooth coordination between Indian and US Joint Task Forces (JTF) during exercises and crisis/contingencies. The Indian side was represented by Indian Naval Ships Jalashwa, Gharial, Mumbai and Shakti with integral helicopters and landing craft embarked, long range maritime patrol aircraft P8I, Army troops from 91 Inf Brigade and 12 Mech Infantry Battalion, IAF C–130 and Mi–17 helicopters, along with the Rapid Action Medical Team (RAMT). The US side was represented by US Navy Ships Comstock and Ralph Johnson with troops of the US Marine Division embarked.

INS Tarkash in PASSEX with RNZS Te Kaha

The Indian Navy's stealth frigate INS Tarkash participated in a PASSEX with the Royal New Zealand Navy's Anzac class frigate Te Kaha on 4 April 2025 in the Gulf of Aden. This exercise marked the culmination of the New Zealand led CTF 150 Joint Focused Operation ANZAC Tiger (27 March to 4 April 2025), a Combined Maritime Forces (CMF) operation in which INS Tarkash was mission deployed. The PASSEX involved a range of interoperability drills, including cross–deck landings, cross boarding, Sea Rider exchanges, and tactical manoeuvres, all integrated with communication procedure exercises.

INS Sahyadri at Colombo

Strengthening maritime ties between India and Sri Lanka, the Indian Navy's Eastern Fleet warship INS Sahyadri mission deployed in the Indian Ocean Region (IOR) arrived at Colombo, Sri Lanka on 8 April 2025. The visit marked a key moment in regional cooperation, reinforcing mutual commitment to maritime safety and environmental protection. As part of the visit, personnel from both navies engaged in professional interactions, knowledge sharing sessions, and joint activities to enhance operational synergy between the two maritime forces.

Exercise Tiger Triumph 2025 culminates

The fourth edition of bilateral tri–service Humanitarian Assistance and Disaster Relief (HADR) amphibious Exercise Tiger Triumph 2025 between India and the United States culminated with a Distinguished Visitors' (DV) Day at Kakinada, on 11 April 2025. The DV Day was attended by the Flag Officer Commanding Tamil Nadu and Puducherry Naval Area (FOTNA), US Consul General, Commander US Navy Strike Group Five and Deputy General Officer Commanding 54 Infantry Division, along with other senior dignitaries.

The DV Day witnessed seamless execution of complex operations at and off the coast of Kakinada including Standoff and Hard Beaching, Slithering Operations by Special Operations Forces from SC and Mi–17 V5 helicopters, participation of C–130 aircraft and integrated air operations by the Indian Navy,

Indian Army, Indian Air Force, US Navy, US Army and US Marine Corps. The operations reflected the enhanced degree of combined combat drills, jointmanship and interoperability achieved between the Armed Forces of India and United States of America.

Conducted from 1 to 11 April 2025, the exercise "provided invaluable training in HADR operations and familiarised participants with each other's capabilities, techniques, and procedures". Notably, Ex Tiger Triumph was first held in 2019, with the primary aim of strengthening operational synergies, facilitated by logistics exchange under the Logistics Exchange Memorandum of Agreement (LEMOA) and towards integrating emerging technologies between the two militaries.

The harbour phase of the exercise was conducted from 1 to 7 April 2025 at Visakhapatnam. The phase commenced with an opening ceremony attended by Mr. Jorgan K. Andrews, Chargé d'Affaires, US Embassy, and Vice Admiral Sameer Saxena, Chief of Staff, Headquarters Eastern Naval Command. Activities during this phase included Pre–Sail Conferences, Subject Matter Expert Exchanges (SMEEs) on key technologies including medical, drone, and space. The harbour phase also included cross–deck visits, ship boarding drills and friendly sports fixtures.

INS Sunayna in Mozambique

INS Sunayna, currently on deployment to Africa as Indian Ocean Ship IOS SAGAR arrived at Nacala Port, Mozambique on 17 April 2025. The ship had earlier participated in the inaugural session of the India–Africa maritime partnership exercise AIKEYME 25, at Dar–es–Salaam, Tanzania. IOS SAGAR is a unique mission based on the Government of India's regional initiative of maritime collaboration titled SAGAR, which stands for Security and Growth for All in the Region. The mission is aimed at fostering international cooperation between India and several African countries.

IAF at UAE for Exercise Desert Flag–10

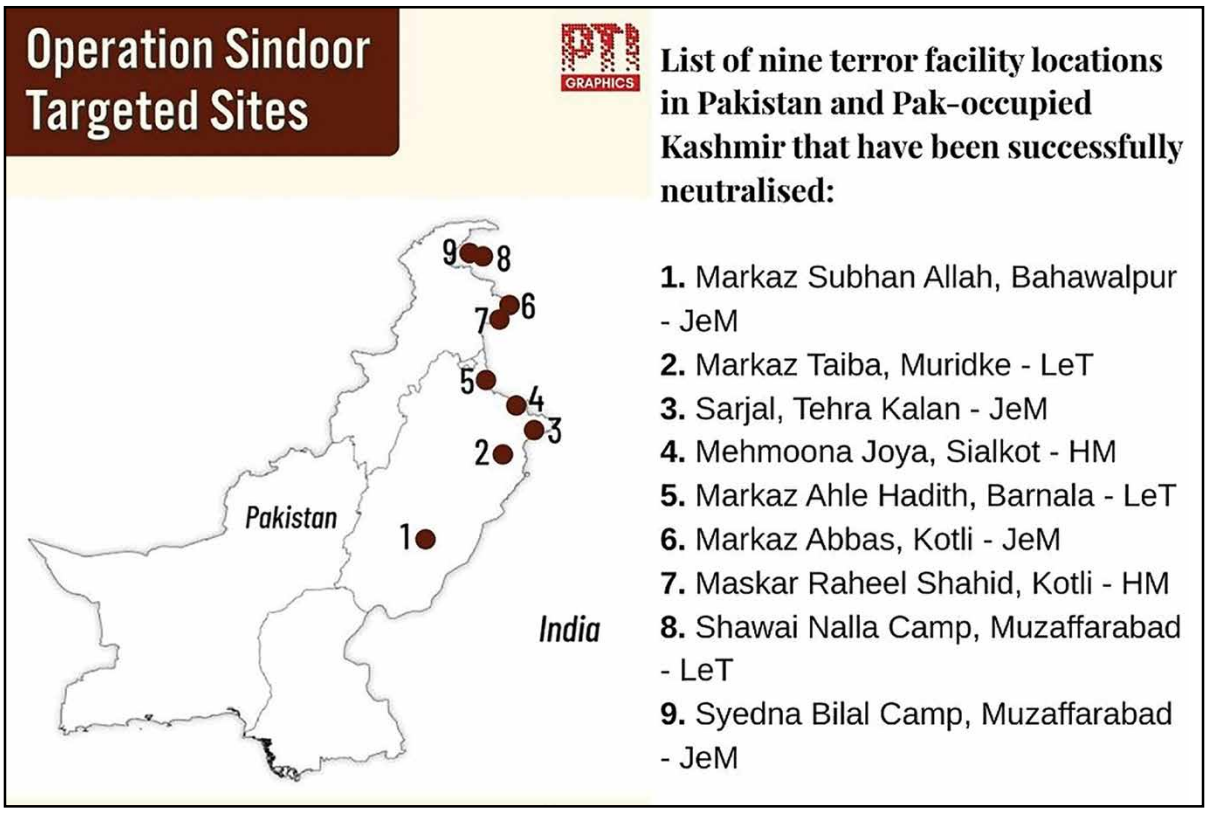
On 20 April 2025, a contingent of the Indian Air Force reached Al Dhafra Air Base in the United Arab Emirates to participate in Exercise Desert Flag–10. The IAF fielded MiG–29s and Jaguars in the exercise. Exercise Desert Flag is a multinational exercise being hosted by the UAE Air Force, with participating contingents from the Air Forces of Australia, Bahrain, France, Germany, Qatar Saudi Arabia, Republic of Korea, Turkey, UAE, United Kingdom and the United States in addition to the Indian Air Force. The exercise took place between 21 April and 8 May 2025.

"The aim of the exercise is to undertake complex and diverse fighter engagements, with exchange of operational knowledge and best practices with some of the most capable air forces in the world. Participation in such exercises enhances mutual understanding interoperability and strengthens military cooperation among the participating nations. The IAF's participation underscores India's commitment to strengthening defence ties and interoperability with friendly nations in the region and beyond", stated the IAF.

OPERATION SINDOOR

Indian Armed Forces carry out precision strikes

On 7 May 2025, the Indian Armed Forces launched 'Operation Sindoor', hitting terrorist infrastructure in Pakistan and Pakistan occupied Jammu and Kashmir from where terrorist attacks against India had been planned and directed. Altogether, nine sites were targeted. "Our actions have been focused, measured and non–escalatory in nature. No Pakistani military facilities were targeted. India has demonstrated considerable restraint in selection of targets and method of execution. These steps come in the wake of the barbaric Pahalgam terrorist attack in which 25 Indians and one Nepali citizen were murdered. We are living up to the commitment that those responsible for this attack will be held accountable", stated the official statement from MoD.



Courtesy: PTI

"Through Operation Sindoor, India has used its 'Right to Respond' to the attack on its soil, and the Armed Forces scripted history by acting with precision, precaution and compassion to destroy the camps used to train terrorists in Pakistan and PoK," stated Raksha Mantri Mr. Rajnath Singh while addressing the Nation. Raksha Mantri asserted that, as per the plan, the targets were destroyed and no civilian population was harmed. He commended the Armed Forces by giving a befitting reply under the leadership of Prime Minister Mr. Narendra Modi.

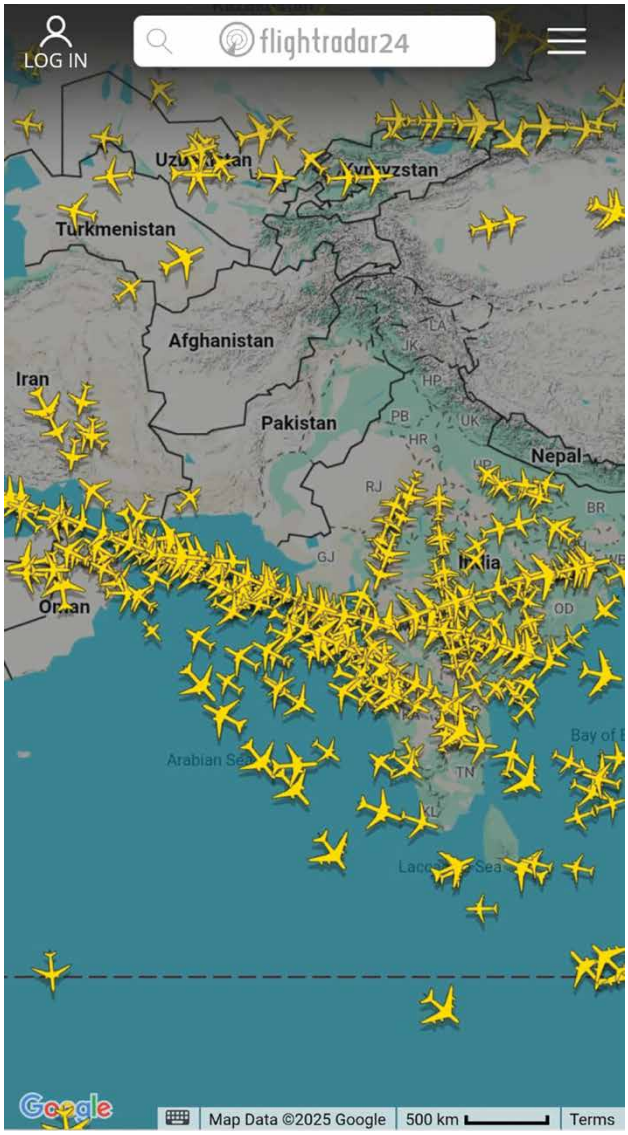
"The whole world has witnessed what our Armed Forces have done today. The action was carried out very thoughtfully and in a measured manner. It was limited only to the camps and other infrastructure used for training terrorists, with the aim of breaking their morale. I congratulate the Armed Forces on behalf of the whole country. I also congratulate Prime Minister Mr. Narendra Modi for providing complete support to the Forces," added Mr. Rajnath Singh.

Satellite pics from Maxar Technologies show damage caused by Indian missile strikes on the city of Muridke, Pakistan, before (left) and after (right) the strike. (Source: Reuters)

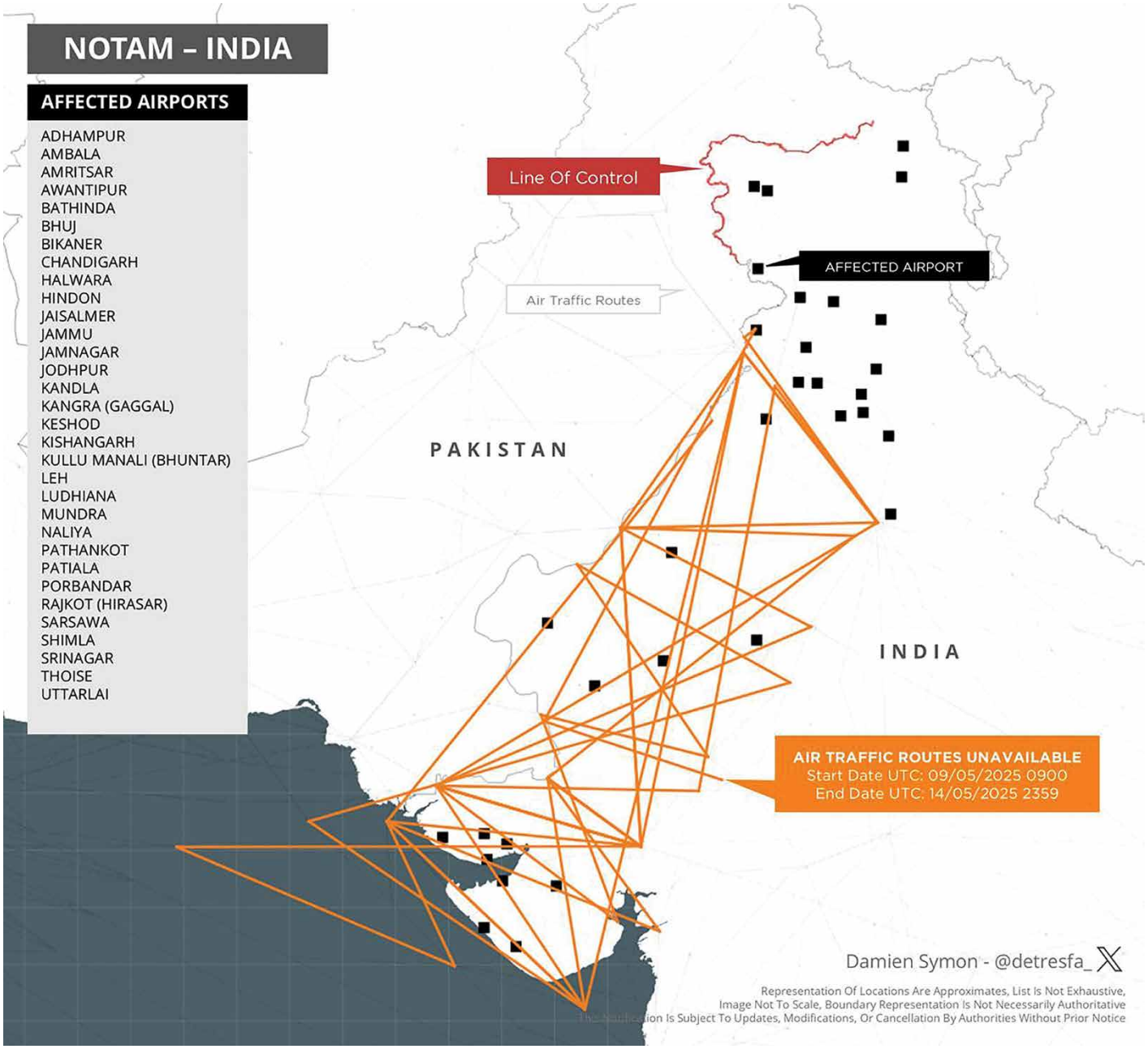
8th May:
Pakistan's bid to escalate negated; proportionate response by India

On the night of 7–8 May 2025, Pakistan attempted to strike multiple military targets across Northern and Western India–including Awantipora, Srinagar, Jammu, Pathankot, Amritsar, Kapurthala, Jalandhar, Ludhiana, Adampur, Bathinda, Chandigarh, Nal, Phalodi, Uttarlai and Bhuj—using drones and missiles. These threats were neutralised by India's Integrated Counter–UAS Grid and Air Defence systems. Debris from these attacks was recovered from several locations, providing concrete evidence of the Pakistani offensive.

"This morning, the Indian Armed Forces targeted air defence radars and systems at multiple locations in Pakistan. The Indian response remained within the same operational domain and of equivalent intensity. It has been reliably confirmed that an air defence system in Lahore was neutralised", stated MoD.



Air traffic situation on 7–9 May 2025. Airlines completely avoiding Pakistan.



India issues a NOTAM extending the suspension of multiple flight routes along the western border with Pakistan, halts civil aviation across 32 airports as well. Courtesy: Damien Symon (X: @detresfa_)

On 8 May, MoD stated: "Pakistan has intensified its unprovoked ceasefire violations across the Line of Control, using mortars and heavy calibre artillery in areas including Kupwara, Baramulla, Uri, Poonch, Mendhar and Rajouri sectors in Jammu and Kashmir. Tragically, sixteen innocent civilians—including three women and five children—have lost their lives due to Pakistani shelling. Consequently, India was compelled to respond in order to suppress and neutralise Pakistani mortar and artillery fire. The Indian Armed Forces reaffirm their commitment to non–escalation—provided this principle is respected by the Pakistani military".

The 8th night and early 9th morning saw intense drone activity along India's northern and western borders, after Pakistan launched a coordinated wave of drone attacks targeting military infrastructure across 26 locations, ranging from Leh in the north to Sir Creek in the south. Several of the targeted sites included key airfields, forward military bases, and civil aviation facilities. India successfully repelled each attack.

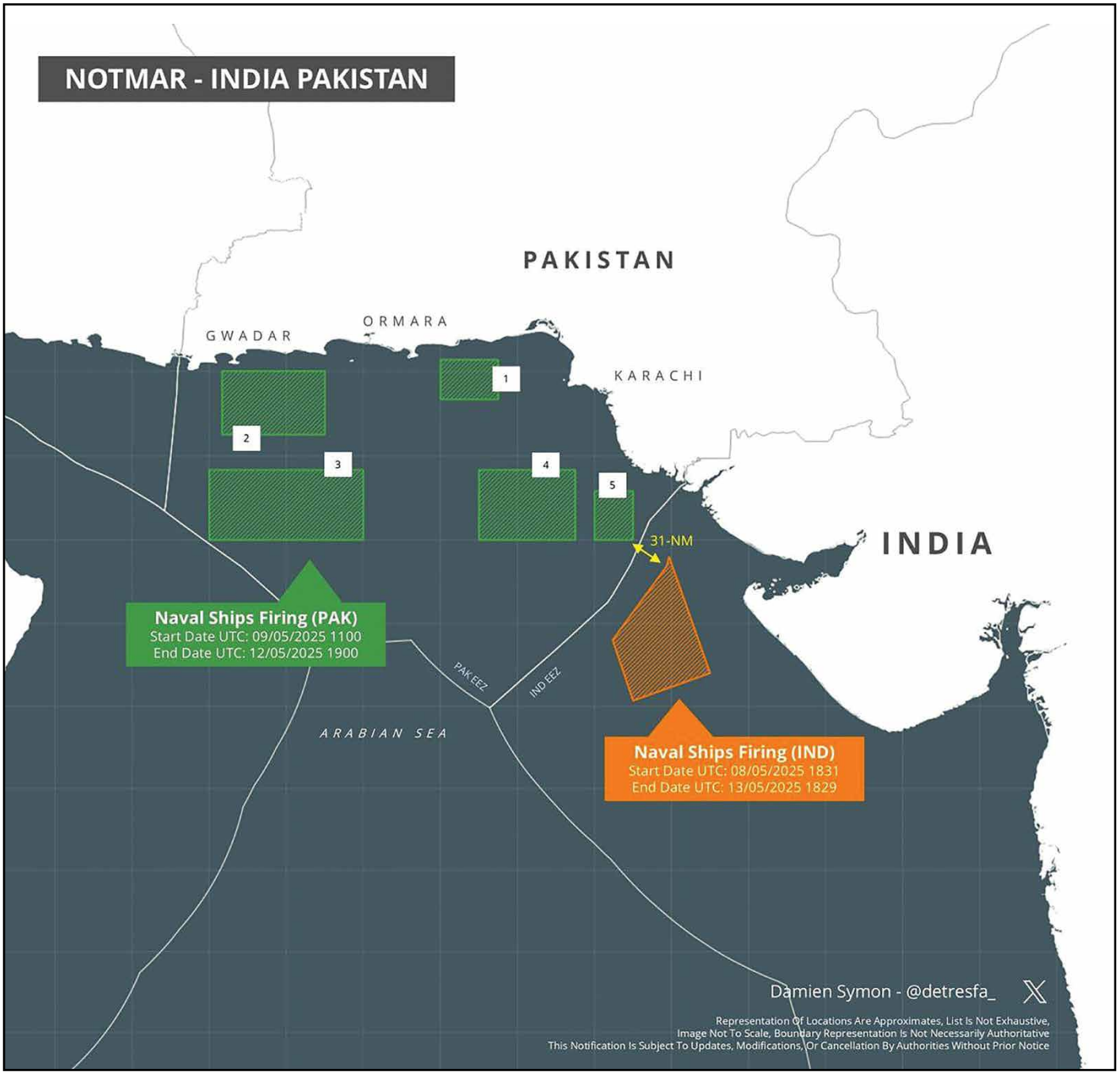
Multiple explosions were heard over Srinagar the same morning, around 6 am. Simultaneously there were reports of at least three explosions at three Pakistani air bases.

9 and 10 May

"Operation Sindoor was successfully executed because our formidable and professionally trained Armed Forces were equipped with high–quality equipment," stated

Raksha Mantri Rajnath Singh while addressing the National Quality Conclave in New Delhi on 8 May 2025. Raksha Mantri commended the precision with which the Armed Forces executed the operation without harming any innocent person and with minimum collateral damage, terming it as unimaginable and a matter of great pride for the nation.

Singh. He asserted that India had always played the role of a responsible nation exercising great restraint and it believed in resolving issues through dialogue, however, if anyone tried to take advantage of this restraint, they would will face 'quality action'. He assured the nation that no limit would become an obstacle for the Government



India and Pakistan issue multiple notifications for simultaneous naval firing exercises across various zones in the Arabian Sea. Courtesy: Damien Symon (X: @detresfa_)

"In Operation Sindoor, nine terror camps were destroyed in Pakistan and PoK, and a good number of terrorists were killed. It shows the crucial role 'quality' plays in securing national interests," said Mr. Rajnath

in protecting India's sovereignty. "We are fully prepared for such responsible responses in the future as well," he further said.


The Indian EXPRESS

JOURNALISM OF COURAGE

India counters Pak attacks on west and north fronts, long night in over 15 cities

DRONES, MISSILES TARGET JAMMU, PATHANKOT, UDHAMPUR

HEAVY EXCHANGE OF ARTILLERY IN AKHNOOR, RAJOURI, POONCH

PAK BID TO ATTACK JAISALMER, BIKANER DISTRICTS FOILED

SEND THEM PAKKING!

PROUDLY INDIAN

Lahore air defence neutralised after Pak targets Indian military sites: Govt

Srinagar to Chandigarh to Bhuj: Blackouts & sirens mark sharp escalation in standoff

Mr. Rajnath Singh stated that fast tracking quality assessment was the need of the hour in view of the disruptive changes and new transformations being witnessed in the defence sector across the globe.


hindustantimes.com

NEW DELHI/METRO

Saturday, May 10, 2025

Hindustan Times @100

FIRST VOICE. LAST WORD.

India repels Pak attacks for 2nd night in a row

Forces down drones that attacked 26 spots; 3 injured in attack on civilian area in Ferozepur; New Delhi retaliates against Pak proportionally

In the clear light of day

300-400 Turkish-made Pak drones attacked India; all shot down

36 Indian locations Pakistan targeted

4 Pakistan locations that India hit; 1 air defence system destroyed

In darkness, the following wave

Blackouts enforced

U.S. WILL NOT GET INVOLVED IN INDIA-PAKISTAN CONFLICT: VANCE

Pak used civilian flight cover amid drone swarm to hit India

MODI REVIEWS OP SINDOOR PROGRESS IN HIGH-LEVEL MEET

IPL suspended amid heightened tension

frontlines

Headlines from 10 May.

Raksha Mantri voiced the Government's emphasis on the empowerment of the defence production sector since 2014, based on Prime Minister Narendra Modi's philosophy of Defence Sovereignty. He said: "Defence Sovereignty means that until a country is capable and self–reliant in its defence needs, its independence cannot be considered complete. If we buy weapons and other defence equipment from abroad, we are outsourcing our security and leaving it at the mercy of someone else. Our government thought over it seriously and took a decisive step to achieve self–reliance. The expanding defence industrial ecosystem is providing an unprecedented strength to India".

Meanwhile, India's air defence systems on 9 and 10 May destroyed several hostile drones spotted over Amritsar's Khasa Cantt and said that Pakistan's "blatant attempt to violate India's sovereignty and endanger civilians was unacceptable", the Army said.

In a press conference on 10 May morning, the central government 'completely rejected' Pakistan's "false" claims of having destroyed India's S–400 system and damaged airbases in Sirsa and Surat. At the press briefing on Operation Sindoor, Foreign Secretary Vikram Misri said it was Pakistani actions that had constituted "provocations and escalations". Colonel Sofiya Qureshi said that India neutralised many dangers and Pakistan's attempt to infiltrate the country at more than 26 places. She said that Pakistani troops were repeatedly attacking western borders, and were using drones, long range weapons and fighter jets to attack India's military sites.

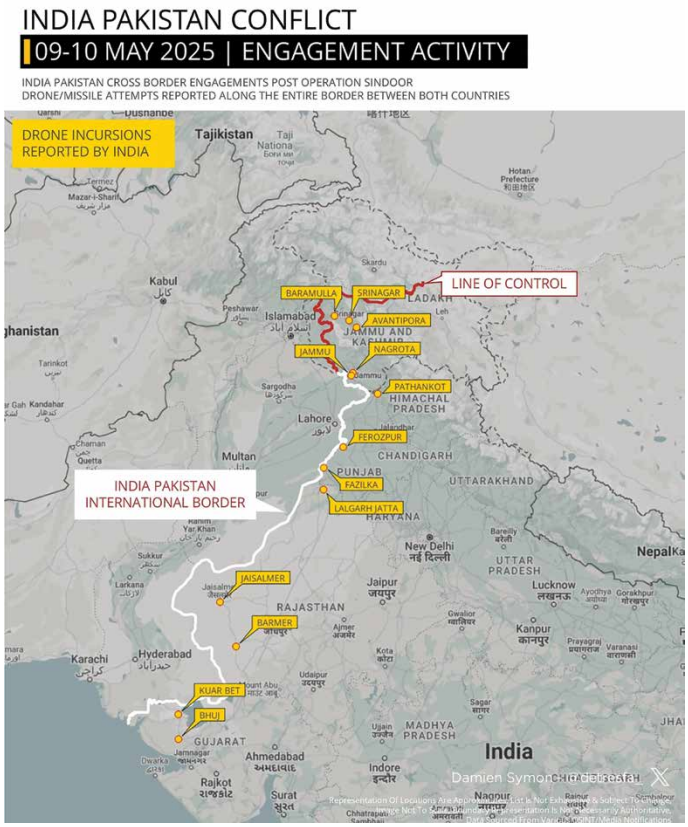
Additionally, Wing Commander Vyomika Singh said that Pakistani army had been observed to moving its troops towards forward areas, "indicating an offensive intent to further escalation". "Indian armed forces remain in a high state of operational readiness, and all hostile actions have been effectively countered and responded proportionately," she added.

In the early hours of the same day, multiple explosions were heard in several Indian cities, including Jammu, Srinagar and Udhampur in Jammu and Kashmir. Pakistan shelling in Rajouri resulted in the demise of the region's additional district development commissioner Raj Kumar Thapa. Jammu and Kashmir Chief Minister Omar Abdullah later visited the affected the civilian areas in Jammu, as well as Thapa's residence.

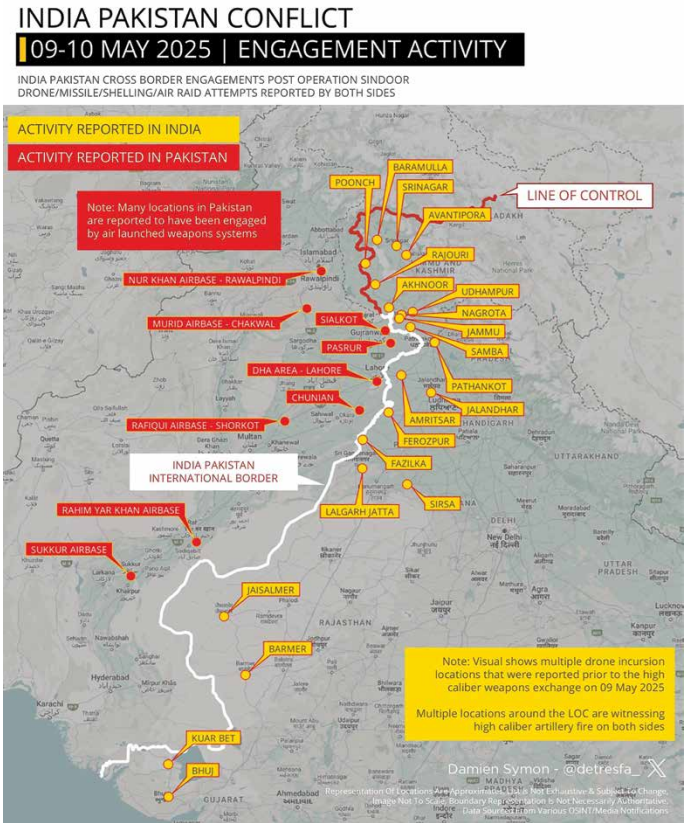
The ministry of civil aviation also announced that 32 airports would be closed till 5:29 am on 15 May for all civil flight operations. The Airports Authority of India also extended the temporary closure of 25 segments of Air Traffic Service (ATS) routes within the Delhi and Mumbai Flight Information Regions (FIRs) due to operational reasons.

Earlier on 9 May, the Indian armed forces once again tackled Pakistan's fresh wave of drone attacks targeted at dozens of locations ranging from North's Baramulla to South's Bhuj. The Indian Army said that the forces were maintaining a high state of alert, adding that all such aerial threats were being tracked and engaged using counter–drone systems.

US Secretary of State Marco Rubio spoke with Pakistani army chief Asim Munir earlier on 10 May and urged both countries to de–escalate the situation. He also offered the US' assistance in opening "constructive talks" to avoid future conflicts.



Engagement activity 9–10 May.
Courtesy: Damien Symon (X: @detresfa_)



Engagement activity 9–10 May.
Courtesy: Damien Symon (X: @detresfa_)

As the morning on 10 May progressed: Addressing a government briefing with Foreign Secretary Vikram Misri and Colonel Sofiya Qureshi, Wing Commander Vyomika Singh said Pakistan continued to provoke India through aggressive actions along India's western border.

Pakistan used unmanned combat aerial vehicles, long range weapons, loitering munitions and fighter jets to target civilian areas and military infrastructure, she said. "Indian Armed Forces successfully neutralised these threats and majority of the vectors.

However, limited damage was sustained to equipment and personnel at Indian air force stations at Udhampur, Pathankot, Adampur and Bhuj," the officer added.

"In a swift and calibrated response, Indian Air Force carried out precision attacks only on identified military targets. These included technical infrastructure, command and control centres, radar sites and weapon storage areas. Pakistan military targets at Rafiqui, Murid, Chaklala, Rahim Yar Khan, Sukkur and Chunia were engaged using air–launched precision weapons from our fighter aircraft. Radar site at Pasrur and Sialkot aviation base were also targeted using precision munitions. While carrying out these responses, India ensured minimum collateral damage," Wing Commander Singh said.

Flagging Pakistan's malicious misinformation campaign, the Air Force officer mentioned claims such as the destruction of India's S–400 air defence system at Adampur, airfields at Suratgarh and Sirsa, Brahmos base at Nagrota and the forward ammunition depot at Chandigarh. "India unequivocally rejects these false narratives being spread by Pakistan," she said. The officer said Pakistan had been carrying out heavy shelling along the Line of Control and targeting civilian areas. Indian Army, she said, has responded "effectively and proportionately". Wing Commander Singh also showed time–stamp images of military facilities that fly in the face of Pakistan's claims of having targeted these air force bases.

On 9 May, the Indian Army destroyed multiple terrorist launchpads located near the Line of Control (LoC) in Jammu and Kashmir. The targeted strikes came in response to a wave of drone attacks and cross–border escalations initiated by Pakistan in the recent days. The Army shared video footage of the precision strikes conducted. The targeted sites had long been under surveillance for their role in enabling infiltration and planning terror attacks against civilians and security forces in India. "The Indian Army's swift and decisive action has dealt a significant blow to terrorist infrastructure and capabilities," the Army said in a statement.

The military response followed a series of attempted drone strikes by Pakistan across cities in Punjab and Jammu and Kashmir. The drones, identified as Turkish–origin kamikaze drones, were launched with high explosive payloads aimed at inflicting civilian casualties in densely populated urban zones, including Amritsar. India's integrated Air Defence (AAD) grid neutralised the drones mid–air within seconds of crossing into Indian airspace.

MoD on 10 May said the Pakistani officials were making "lame attempts" to "divide India" by claiming that Indian missiles were being fired at Shri Amritsar Sahib. Addressing a press conference after Pakistan launched multiple attacks again, Foreign Secretary Vikram Misri said that Pakistani officials were continuing to make "ludicrous" claims about India firing missiles towards religious sites. "Pakistani officials continue to make ludicrous claims about India firing missiles towards Shri Amritsar Sahib. As I said, these lame attempts to divide India are doomed to failure". He also said it was a "totally frivolous allegation" that Indian missiles have hit Afghanistan.

"I only want to point out that Afghan people don't need to be reminded about which country it is that has on multiple occasions in just the last one and a half years targeted civilian populations and civilian infrastructure in Afghanistan," he said during the press conference alongside Army Colonel Sofiya Qureshi and Air Force Wing Commander Vyomika Singh.

How India chose which Pak airbases to strike

Fighter jets of the India Air Force targeted Pakistan Air Force's bases at Rafiqui, Murid and Chaklala early on 10 May morning to counter Pakistan's reckless drone and missile attacks targeting civilian areas and military infrastructure in India's western sector. In a government briefing, Wing Commander Vyomika Singh said India's precision attacks only targeted military targets. "Pakistan military targets at Rafiqui, Murid, Chaklala, Rahim Yar Khan, Sukkur and Chunian were engaged using air–launched precision weapons from our fighter aircraft. Radar sites at Pasrur and Sialkot aviation base were also targeted using precision munitions. While carrying out these responses, India ensured minimum collateral damage," she said.

India chose targets carefully. The objective was to cripple Pakistan's capability to launch aerial attacks using drones and fighter jets. The attack on these key air force centres has likely hit Pakistan's air reconnaissance and long–range strike capabilities.

Pakistan Air Force Base, Nur Khan: The Nur Khan air base, earlier known as PAF base, Chaklala, is located at Rawalpindi. This airbase is the nerve centre of Pakistan's aerial mobility and serves as the headquarters of its Air Mobility Command. According to officials in the Indian Air Force, the Nur Khan airbase played a key role in coordinating the cross–border drone and missile attacks by Pakistan in the previous 72 hours. This airbase houses a Saab 2000 airborne early warning and control aircraft that is believed to have played a key role in Pakistan's aerial attacks on Indian cities.

Pakistan Air Force Base, Rafiqui: The Pakistan Air Force base at Rafiqui is in Punjab province. It is home to advanced fighter squadrons of Mirage and JF–17 aircraft and is a training centre for missions in Punjab and Kashmir. "The past few days have been frenetic air activity involving fighter jets of the two countries and the Rafiqui airbase is likely to have played a key role in Pakistan's aerial attacks on India", said officials. Targeting this airbase was aimed at disrupting Pakistan's attack capabilities. Rafiqui, like Murid and Chaklala, was targeted with air–launched precision weapons.

Pakistan Air Force Base, Murid: The Murid airbase, located in Pakistan's Punjab, is the headquarters of Pakistan's drone operations. This airbase houses Pakistan's homemade drone Shahpar–I, and the Turkish–made Bayraktar TB2 and Akinci. Over the days, Pakistan had sent hundreds of drones across the border. Many of these were unarmed, ostensibly sent for intelligence gathering and to identify Indian positions. Some of them were, however, armed. Most of these drones were taken down by the Indian air defence system.

13 Updates on Op Sindoor (as of 3:30pm, 10 May 2025)

1. India's Prime Minister holds high–level meet with Union Defence Minister, National Security Advisor Ajit Doval, Chief of Defence Staff General Anil Chauhan and Chiefs of all three Services.

2. A 2nd MoD briefing expected today for an update.

3. India confirms air strikes on PAF bases Nur Khan, Rahamiyar Khan, Rafiqui, Murid, Sialkot with precision weapons.

@detresfa_ image of Indian missile hit and runway damage at Pakistan's airbase, PAF Mushaf.

4. India also confirms air strikes on PAF base Sukkur and radar sites at Pasrur & Sialkot.

5. Intense air activity around Srinagar, multiple raid attempts by PAF jets– major skirmishes going on currently.

6. Between 2–3 PAF jets shot down in the same sector– according to some reports.

7. Heavy air activity over/around Pokhran, Jodhpur, Jammu, Samba, Pathankot and Amritsar going on right now.

8. Multiple attempts of Pak sending drones (throughout the past 2 days) across border thwarted all along the IB.

9. Indian Army releases footage of destruction of Pakistan Army and terrorist launchpads along the LoC. Video shows mortars, artillery, RPGs, ATGMs, etc being used.

10. Multiple Pak Army posts the border destroyed by the Army and BSF.

11. "Pakistan forward deploying troops—not clear if MBT/APCs etc being moved".

12. Fake reports of S–400 systems being destroyed or Indian pilots being captured.

13. Temporary suspension of Civil Flight Operations at select Airports and Air Routes.

10 May (late evening): Surprise ceasefire

After four days of precision missile strikes, drone incursions and artillery battles across the Line of Control (LoC), India and Pakistan agreed to halt all military actions on land, air and sea, with effect from the evening of May 10. Hours later, Pakistani drones were sighted and intercepted in various locations in Jammu and Kashmir, including Srinagar, and parts of Gujarat.

India said Pakistan had violated the ceasefire, adding that the armed forces were giving an "adequate and appropriate response". Foreign Secretary Vikram Misri, in a press briefing, stressed that India took "very, very serious notice of these violations".

11 May

Sixteen hours after his surprise announcement about a ceasefire agreement between India and Pakistan, US President Donald Trump offered to work with the two neighbours to find a solution to the Kashmir issue. It must be pointed out that New Delhi has always stressed that Kashmir is an integral part of India and opposed third–party mediation. An Indian government response to the Trump offer is awaited.

"I am very proud of the strong and unwaveringly powerful leadership of India and Pakistan for having the strength, wisdom, and fortitude to fully know and understand that it was time to stop the current aggression that could have led to the death and destruction of so many, and so much. Millions of good and innocent people could have died! Your legacy is greatly enhanced by your brave actions," the US President posted on Truth Social, a social media platform he owns.

Soon after, US Secretary of State Marco Rubio said he and US Vice President had been talking to Prime Minister Narendra Modi, his Pakistani counterpart Shehbaz Sharif, External Affairs Minister S Jaishankar, Pakistan's Army chief Asim Munir and National Security Advisors of the two countries Ajit Doval and Asim Malik. "I am pleased to announce the Governments of India and Pakistan have agreed to an immediate ceasefire and to start talks on a broad set of issues at a neutral site," he said.

Foreign Secretary Vikram Misri confirmed the ceasefire. He said India's Director General of Military Operations received a call from his Pakistan counterpart 10 May afternoon. "It was agreed between them that both sides would stop all firing and military action on land, and in the air and sea, with effect from 1700 hours IST," he said. "Instructions have been given on both sides to give effect to this understanding. The DGMOs will talk again on 12 May at 1200 hours," he added.

External Affairs Minister Dr S Jaishankar stated, "India has consistently maintained a firm and uncompromising stance against terrorism in all its forms and manifestations. It will continue to do so." Prime Minister Narendra Modi is yet to speak on the development. Significantly, none of the official responses from the Indian leadership highlighted

the US role or detailed the terms based on which the ceasefire was agreed upon.


Sunday
Hindustan Times
@100
FIRST VOICE LAST WORD
Sunday, May 11, 2025
87 hours, 56 minutes... and counting?
India, Pakistan announce halt in hostilities as Trump claims role in brokering ceasefire; hours later, shelling and drone sightings sow doubts over Islamabad's commitment
Window of peace
How it played out
DGMOs of India and Pakistan spoke and worked out a ceasefire on Saturday.
FRIDAY around 10.00PM
SATURDAY
01.40AM
03.35PM
05.25PM
05:00PM CEASEFIRE COMES INTO EFFECT
05.41PM
05.42PM
05.50PM
05.57PM
STOP BREACHING CEASEFIRE, INDIA TELLS PAKISTAN
How India, Pak, hammered out surprise pause

From the Pakistan side, Deputy Prime Minister and Foreign Minister Ishaq Dar said Pakistan and India had agreed to a ceasefire with immediate effect. "Pakistan has always strived for peace and security in the region, without compromising on its sovereignty and territorial integrity," he said.

Pakistan Prime Minister Shehbaz Sharif thanked US President Trump for his 'leadership and proactive role for peace'. "Pakistan appreciates the United States for facilitating this outcome, which we have accepted in the interest of regional peace and stability. We also thank Vice President JD Vance and Secretary of State Marco Rubio for their valuable contributions for peace in South Asia. Pakistan believes this marks a new beginning in the resolution of issues that have plagued the region and prevented its journey toward peace, prosperity and stability," he stated.


Sunday Times
Suspension Of Indus Waters Treaty, Measures On Trade And Visas Remain In Place ■ Drone Attacks & Firing As Pak Violates Stoppage Within Hours
From Near-War To Pause To Violation
Trump Claims Credit: Agreement After Pak Reached Out, Says Govt
LONG NIGHT AND A SUDDEN TURNAROUND
Behind the scenes: Calls from Pak, Washington
India: Any terror incident will be seen as act of war

Later, representatives of the Army, the Navy and the Air Force addressed a briefing and said that while they would adhere to the ceasefire, they remained "fully prepared and ever–vigilant and committed to defending the sovereignty and integrity of the motherland. Every misadventure by Pakistan had been met with strength and every future escalation will invite a decisive response," they further said.

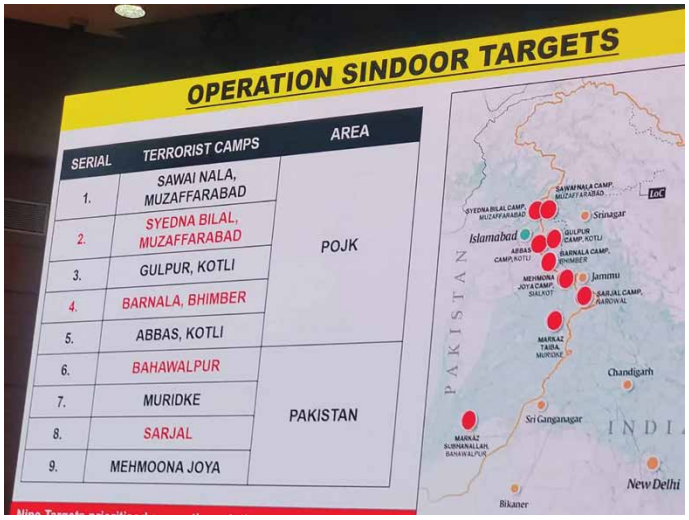
According to NDTV, these developments followed a sequence of escalating military exchanges. But what exactly unfolded?

Here's a timeline:

1. According to government sources, at dawn on 10 May, Indian Air Force aircraft launched BrahMos–A (air–launched) cruise missiles targeting key Pakistan Air Force (PAF) bases. The first confirmed impacts were at Chaklala near Rawalpindi and Sargodha in Punjab province. Both installations hold strategic aviation and logistics value for the Pakistan military. Confirmation of strikes on additional bases in Pakistan and Pakistan–occupied Kashmir (PoK) – Jacobabad, Bholari and Skardu – came only later in the evening after agencies concluded damage assessments through human and open source intelligence.
2. Shortly after the strikes, Indian intelligence agencies detected high alert messages flashing across Pakistani defence networks indicating a belief that India might next target Pakistan's nuclear command and control infrastructure. Strategic installations in Rawalpindi, including offices linked to Pakistan's Strategic Plans Division, reportedly heightened security protocols.
3. It was at this juncture that Pakistan reached out to the United States for urgent intervention. According to government sources, US officials had already been in contact with both sides in anticipation of escalating tensions. But the alert around strategic assets led Washington to step in more decisively.
4. The US, while maintaining a neutral posture in public, is understood to have conveyed a firm message to Islamabad: use the official military hotline and de–escalate without further delay. The US "practically ordered" the Pakistani side to activate its direct line to the Indian Army and avoid any delay.
5. By the afternoon of 10 May, after several of Pakistan's more aggressive tactical postures had been repelled by India, Major General Kashif Abdullah, Pakistan's DGMO, placed a direct call to his Indian counterpart, Lieutenant General Rajiv Ghai. The timing of the call, 1535 hrs IST, was later confirmed by Foreign Secretary Vikram Misri at a press briefing.
6. India continued to stand by its position of not engaging in any formal diplomatic or military negotiation with Pakistan outside of protocol. This meant that despite international pressure, New Delhi did not engage in mediation and instead signalled that the Indian armed forces were prepared for the next phase of escalation, which would have reportedly involved coordinated strikes on energy and economic targets, as well as deeper strategic command structures, government sources said.
7. India confirmed that its decisions taken after the 22 April Pahalgam terror attack – including the temporary suspension of the Indus Waters Treaty (IWT) – would remain unaffected by the ceasefire.

11 May (6:30pm)

At a joint press conference and briefing on 11 May at 6:30pm, the Indian Armed Forces shared satellite images that revealed visual evidence of the destruction caused by Operation Sindoor at terror sites across Pakistan and Pakistan–Occupied Kashmir (PoK). The visuals showed before–and–after comparisons of two prominent targets: Muridke and Bhawalpur, as well as India's retaliatory strikes on Pakistan's air defence radars and airfields.



(Photo: NDTV)

India's calibrated military response to the April 22 Pahalgam terror attack targeted terror infrastructure across Pakistan and Pakistan–Occupied Jammu and Kashmir (PoJK) – which were home to operational centres for Lashkar–e–Taiba (LeT), Jaish–e–Mohammed (JeM), and Hizbul Mujahideen. In an overnight attack a few days before, the Indian Armed Forces carried out the missile strikes on nine terrorist facilities – four in Pakistan (Bhawalpur, Muridke, Sarjal and Mehmoona Joya), and five in PoK (Sawai Nala, Muzaffarabad, Syedna Bilal, Muzaffarabad, Gulpur, Kotli, Barnala, Bhimber, and Abbas, Kotli).

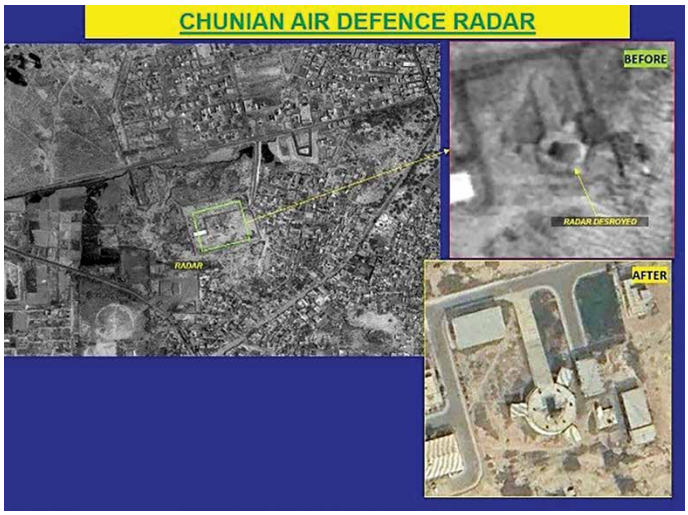
Bhawalpur—before and after. There are many more images from the same and other area but we aren't putting any more in this article for the sake of brevity.

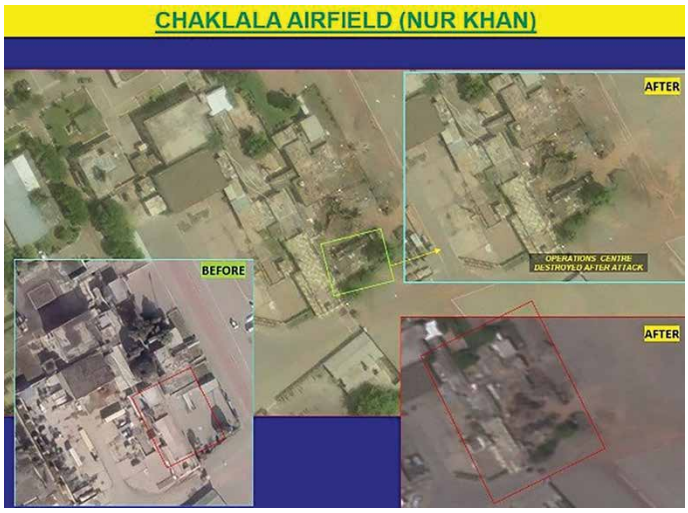
Operation Sindoor on Pakistan's airfields

After India launched precision cruise missile strikes at terror infrastructure to avenge the Pahalgam attack, Pakistan escalated the situation by attacking civilian areas in India with drones. In response, India hit selected military targets deep inside Pakistani territory such as radar installations, command and control centres, and ammunition depots in Rafiqui, Chaklala, Rahim Yar Khan,

Before and after pictures of Operation Sindoor in Murdike – Point 1 and 2. Murdike, a major commercial hub, is home to the headquarters of the Lashkar–e–Taiba. It is known as the "terror nursery" of Pakistan. LeT's headquarters is reportedly spread over approximately 200 acres and houses a terror training camp and other infrastructure.

Sukkur and Sialkot among others. According to the Indian military, the country's actions on the nights of 9 and 10 May were the first instance of a country damaging air force camps of a nuclear country. "Within three hours, 11 bases were attacked, including Nur Khan, Rafiqui, Murid, Sukkur, Sialkot, Pasrur, Chunian, Sargodha, Skardu, Bholari, and Jacobabad," Air Marshal AK Bharti stated at a press conference on 11 May. "It was time to convey some message to the adversary... hit where it would hurt. India's retaliation though was precise, and measured. We have the ability to target every system in the air bases, but we showed restraint to avoid escalation," he added.





(All images of damaged PAF bases courtesy MoD during their briefings)

11 May night was the "first calm" night along the Line of Control (LoC) in the recent days, the Indian Army said. "The night remained largely peaceful across Jammu and Kashmir and other areas along the International Border. No incidents have been reported, marking the first calm night in recent days," stated the Army. The Indian government has clarified, both for the world and Pakistan, that it went for the "snake's head and not foot soldiers" this time, demonstrating its new approach to kill terrorists within Pakistan. "India showed the world that it will not wait for permission to defend its people. Terror will be punished – anytime, anywhere. It also showed that terrorists and their masterminds have no place to hide," said officials at the briefing.

12 May (Daytime)

At 6pm, Indian DGMO Lt Gen Rajiv Ghai and his Pak counterpart Maj Gen Kashif Abdullah held their scheduled hotline chat (3rd time in 3 days). Both acknowledged first night without hostilities. This came after the first 'peaceful' night since beginning of hostilities. Meanwhile, Indian PM Modi chaired a high level meeting at his residence. EAM Jaishankar, Defence Minister Rajnath Singh, NSA Ajit Doval, CDS, 3 Service Chiefs, foreign Secretary Vikram Misri, top officials were present.


THE TIMES OF INDIA

Pounding Of Pak Airbases Was Turning Point

India Agreed To Pause As 'Main Objectives Had Already Been Achieved'

RAHIM YAR KHAN PUT OUT OF ACTION

DOWNING OF PAK PLANES CONFIRMED

Navy still forward deployed to strike, even at Karachi

If Pak does anything more, our response will be far stronger, Modi told US VP

Our fury reached Pindi HQ: Rajnath

Losses are part of combat, all our pilots are back, says IAF

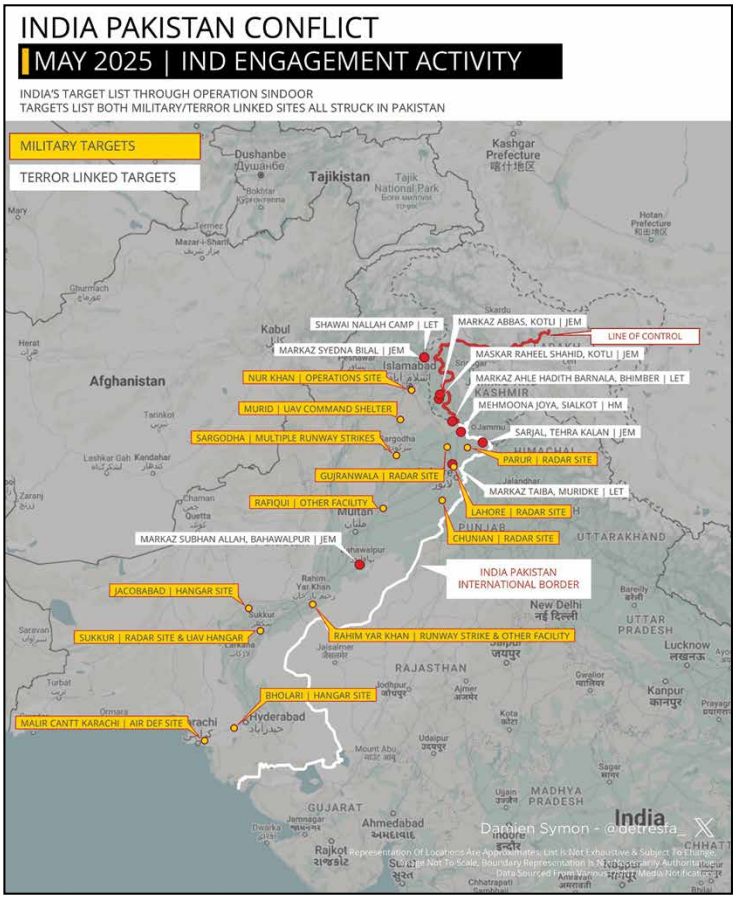
At 3pm, a Press Conference on OP Sindoor by the Indian Armed Forces was conducted where further updates and presentations were given on enemy losses and images of downed UAVs, AAMs, destroyed radar sites, badly damaged airbases and airfields etc were shown. During the Q&A, regarding the Indian Air Force, "All our pilots are back home. We don't want to discuss losses to platforms as we don't want to give any advantage to our adversary"

Left image: "Clearer imagery released by an Indian firm (KAWASPACE) spotlights damage at Pakistan's Bholari Airbase – the Indian Air Force strike appears to have severely damaged a hangar, debris visible along with structural damage, runway proximity = possible quick reaction role for the hangar (?). On the right, Chinese Firm MAZARVISION also released an image showing the same damage to Bholari". (Images and text courtesy: Damien Symon @detresfa_)

The IAF confirmed it has shot down Pak air assets on Pak side of the IB. "Whatever loss they suffered, it was their own responsibility", stated Air Marshal Bharti in a detailed response to Pak aggression. Air Marshal AK Bharti further said, "This was a different kind of warfare and is bound to happen. God forbid, but if we fight another war, that would be completely different from this one. It is a cat–and–mouse game, and we need to be ahead of the curve to beat the adversary. Our battle proven systems stood the test of time and take them head on. Another highlight has been the stellar performance of the indigenous air defence system, the Akash system. Putting together and operationalising the potent AD environment has been possible only because of budgetary and policy support from the government of India in the last decade". When asked if India hit Kirana Hills, Air Marshal AK Bharti said, "Thank you for telling us that Kirana Hills houses some nuclear installation, we did not know about it. We have not hit Kirana Hills, whatever is there".

12 May (Afternoon)

At the 2nd press conference for the day, DG Air Ops Air Marshal AK Bharti stated: "Yesterday, we had a detailed brief on the successful joint operations that were carried out to destroy the terror infrastructure in POJK as well as in Pakistan itself. We have also iterated that our fight was with terrorists and their support infrastructure. However, it is a pity that the Pakistan military chose to intervene and bat for the terrorists, which compelled us to



"From India's latest briefing on Operation Sindoor, here is an updated list of military/terror–affiliated sites targeted by New Delhi in Pakistan, some over 165–km inside", according to Damien Symon of @detresfa_ .

respond in kind. This brings me to the point – how have Indian Forces managed to minimise the damage to both civilian and military infra in the country, in spite of the and unrelenting efforts by Pakistani forces. Most of you and the majority populace, have had a lot to say about the layered and integrated AD system put in place by Indian Armed Forces, which includes assets of the Army and Navy, in addition to the primary AD assets of the IAF".

DG Air Ops Air Marshal AK Bharti at the daily briefing.

"As you are all aware, this robust AD system comprises of a large variety of AD sensors, and weapon systems– from point defence weapons like the LLAD guns, shoulder fired MANPADS and short–range SAMS, to area defence weapons like the AD fighter aircraft, and longer range SAMs held in our inventory. Additionally, the numerous waves of drones and UCAVs employed by Pakistan were also thwarted by the indigenously developed soft and hard–kill Counter–UAS systems and the well trained Indian AD personnel. All this was brought together as an efficient and effective AD environment, by the Integrated Air Command & Control System (IACCS) of the IAF, which accords us Net–Centric Op capability".

"While much has been said and written about the newer systems, I would like to place on record the performance and efficacy demonstrated by even the older and battle proven AD weapons like the Pechora, OSA–AK and the LLAD guns, in countering the Pakistani threat vectors in the current operations. Another highlight has been the stellar performance of indigenous AD weapons like the Akash system. I would like to also mention that, putting together and operationalisation of this potent AD environment has been possible over the last decade, due to unwavering budgetary and policy support provided by the GoI, in acquiring state–of–the art equipment and weapon systems".

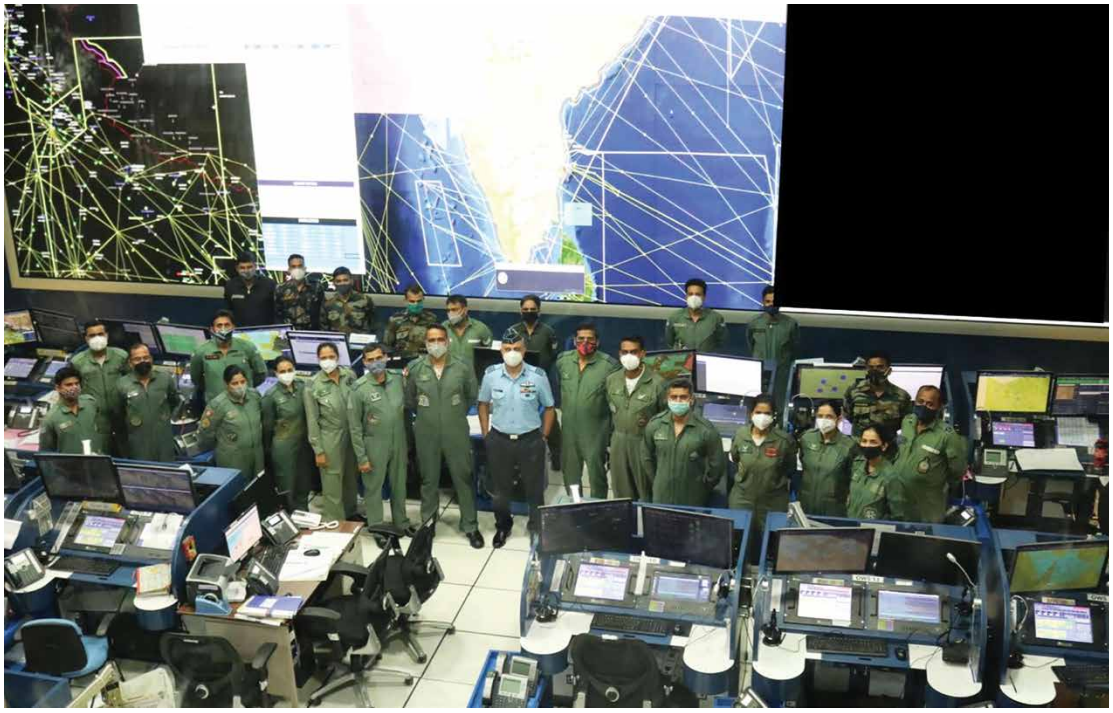
"Some of the results achieved in countering the enemy threat vectors, over the last week, are now being shown on the screen. This is only a small sample which is being put up, and not the entire range of threats neutralised. As far as our offensive actions are concerned, yesterday I had already shared some details about the targets engaged by the IAF. The composite picture of the IAF targeting so far is now shown on the screen. I am sure most of you would have already seen the effect of these strikes on ground, courtesy the large number of videos and photographs being circulated in the media. A few representative examples, from open sources, are now being shown on the screen. In the end, I would like to emphatically state that, in spite of some minor damage incurred, all our military bases and systems continue to remain fully operational, and ready to undertake any further missions, should the need so arise".

12 May (Evening)

The Prime Minister Mr. Narendra Modi addressed the nation via video conference in the evening. In his address, he remarked that the nation had witnessed both India's strength and restraint in recent days. He extended his salute to the country's formidable armed forces, intelligence agencies and scientists on behalf of every Indian citizen.

The Prime Minister highlighted the unwavering courage displayed by India's brave soldiers in achieving the objectives of Operation Sindoor, acknowledging their valor, resilience and indomitable spirit. He dedicated this unparalleled bravery to every mother, sister and daughter of the nation.

Remnants of loitering munitions used by Pak forces.



An officially released photo of the Integrated Air Command & Control System (IACCS) that executed India's air defence during Op Sindoor.

"Operation Sindoor is not just a name but a reflection of the emotions of millions of Indians", emphasised the Prime Minister, describing it as an unwavering pledge to justice, one that the world witnessed being fulfilled on May 6–7. The Prime Minister highlighted that the Indian armed forces executed precise strikes on terrorist hideouts and training centers in Pakistan, delivering a decisive blow. He remarked that "the terrorists never imagined India would make such a bold move, but when the nation stands united with Nation First as its guiding principle, firm decisions are taken and impactful results are delivered". He stated that India's missile and drone strikes on terrorist hubs in Pakistan shattered not only their infrastructure but also their morale. The Prime Minister pointed out that locations like Bahawalpur and Muridke had long

A prize catch! Chinese supplied weaponry including the PL–15 AAM lying unexploded shown at a formal Indian military briefing.

Remnants of loitering munitions used by debris of Pak long range rockets.

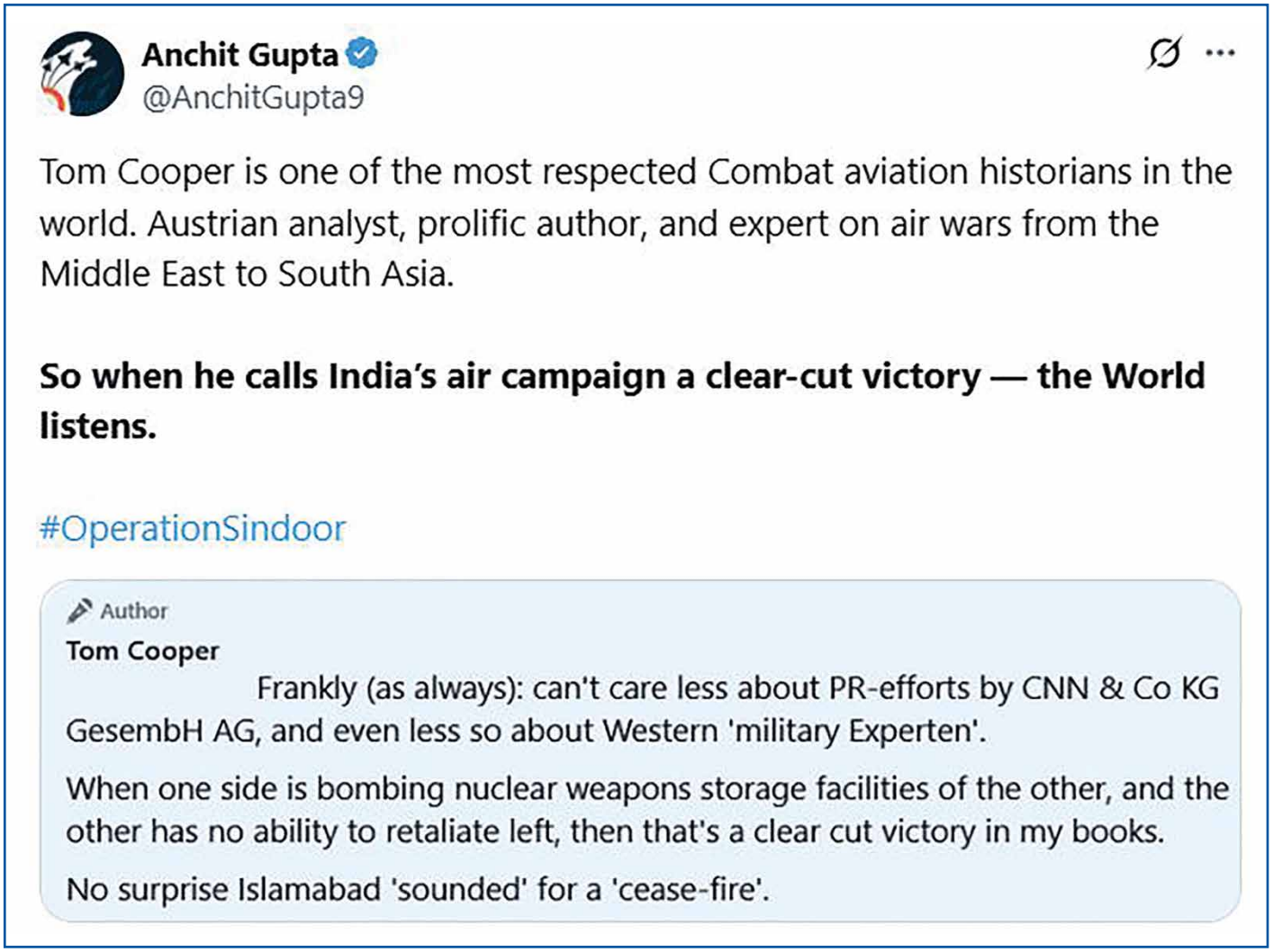
operated as centers of global terrorism, linking them to major attacks worldwide, including 9/11 attacks of US, the London Tube bombings and decades of terrorist incidents in India.

13 May (morning)

The Prime Minister, Mr. Narendra Modi visited AFS Adampur on 13 May, to meet "our brave air warriors and soldiers. It was a very special experience to be with those who epitomise courage, determination and fearlessness," the PM stated.

He highlighted how this aggression exposed Pakistan's vulnerabilities, as its drones and missiles crumbled like straw before India's advanced air defence systems, which neutralised them in the sky.

He remarked that while Pakistan had prepared to strike India's borders, India delivered a decisive blow to Pakistan's core. Indian drones and missiles executed highly accurate strikes, severely damaging Pakistani airbases that it had long boasted about.



Screengrab from X. Anchit Gupta says, "Tom Cooper is one of the most respected combat aviation historians in the world. Austrian analyst, prolific author, and expert on air wars from the Middle East to South Asia. So when he calls India's air campaign a clear–cut victory — the World listens".

Mr. Modi stated that India's precise and forceful strikes had left Pakistan in deep frustration, pushing it into desperation. In its agitation, Pakistan resorted to a reckless act instead of joining the global fight against terrorism–it launched attacks on Indian schools, colleges, gurdwaras, temples, and civilian homes, also targeting military bases, he added.

Within the first three days of India's response, Pakistan suffered destruction far beyond its expectations. Following India's aggressive countermeasures, Pakistan began seeking ways to de–escalate, appealing to the global community for relief from rising tensions.

He revealed that, after suffering severe losses, Pakistan's military reached out to India's DGMO on the afternoon of 10 May. By then, India had already dismantled large scale terrorist infrastructure, eliminated key militants and reduced Pakistan's terror hubs to ruins.

The Prime Minister emphasised that India's Armed Forces—the Army, Air Force, Navy, Border Security Force (BSF) and paramilitary units—remain on high alert, ensuring national security at all times. "Operation Sindoor is now India's established policy in the fight against terrorism, marking a decisive shift in India's strategic approach", he declared, stating that the operation had set a new standard, a new normal in counter–terrorism measures.

Before and after images of Nur Khan airbase. @detresfa_ points out that the structures destroyed or damaged include two long trailer trucks with awnings on the sides. This may have been some sort of Pak Command and Control facility. Photo: @Maxar

IAF MiG–29UPG and S–400 in the background. PM Modi: "Earlier this morning, I went to AFS Adampur and met our brave air warriors and soldiers. It was a very special experience to be with those who epitomise courage, determination and fearlessness. India is eternally grateful to our armed forces for everything they do for our nation".

Operation Sindoor: The Rise of Aatmanirbhar Innovation in National Security

Operation Sindoor emerged as a calibrated military response to an evolving pattern of asymmetric warfare, one that increasingly targets unarmed civilians along with military personnel. The terrorist attack on tourists in Pahalgam in April 2025 served as grim reminder of this shift. India's response was deliberate, precise and strategic. Without crossing the Line of Control or international boundary, Indian forces struck terrorist infrastructure and eliminated multiple threats. However, beyond tactical brilliance, what stood out was the seamless integration of indigenous hi–tech systems into national defence. Whether in drone warfare, layered air defence or electronic warfare, Operation Sindoor marked a milestone in India's journey towards technological self–reliance in military operations.

Air defence capabilities: Tech as the first line of protection

On the night of 7–8 May 2025, Pakistan attempted to engage a number of military targets in Northern and Western India including Awantipura, Srinagar, Jammu, Pathankot, Amritsar, Kapurthala, Jalandhar, Ludhiana, Adampur, Bhatinda, Chandigarh, Nal, Phalodi, Uttarlai and Bhuj, using drones and missiles. These were neutralised by the Integrated Counter UAS (Unmanned Aerial Systems) Grid and air defence systems. On the morning of 8 May, the Indian Armed Forces targeted air defence radars and systems at a number of locations in Pakistan. An air defence system at Lahore was neutralised. As part of Operation Sindoor, the following were used: Battle–proven AD (Air Defence) systems like the Pechora, OSA–AK and LLAD guns (Low–level air defence guns). Indigenous systems such as the Akash, which demonstrated stellar performance.

India's air defence systems, combining assets from the Army, Navy and primarily the Air Force, performed with exceptional synergy. These systems created an impenetrable wall, foiling multiple attempts by Pakistan to retaliate. The Integrated Air Command and Control System (IACCS) of the Indian Air Force brought all these elements together, providing the net–centric operational capability vital for modern warfare.

Offensive actions with pinpoint accuracy

India's offensive strikes targeted key Pakistani airbases– Noor Khan and Rahimyar Khan with surgical precision. Loitering munitions were used to devastating effect, each finding and destroying high value targets, including enemy radar and missile systems. All strikes were executed without loss of Indian assets, underscoring the effectiveness of our surveillance, planning, and delivery systems. The use of modern indigenous technology, from long range drones to guided munitions, made these strikes highly effective and politically calibrated.

Evidence of neutralised threats

Operation Sindoor also produced concrete evidence of hostile technologies neutralised by Indian systems: Pieces of PL–15 missiles (of Chinese origin), Turkish–origin UAVs, named "Yiha" or "Yeehaw" and long–range rockets, quadcopters and commercial drones. These were recovered and identified, showing that despite Pakistan's attempts to exploit advanced foreign supplied weaponry, India's indigenous air defence and electronic warfare networks remained superior.

Performance of systems: Air defence measures of the Indian Army

On 12 May, Lt Gen Rajiv Ghai, Director General Military Operations, in the Operation Sindoor press briefing highlighted the excellent performance of a mix of legacy and modern systems.

Since precise strikes on terrorists were conducted without crossing the Line of Control or International Boundary, it was anticipated Pakistan's response would come from across the border. A unique blend of counter unmanned aerial systems, electronic warfare assets and air defence weapons from both Army and Air Force were utilised which included counter unmanned aerial systems, shoulder fired weapons, legacy air defence weapons and modern air defence weapon systems.

This multi–tier defence prevented Pakistan Air Force attacks on our airfields and logistic installations during the night of 9/10 May. These systems, built over the last decade with continuous government investment, proved to be force

multipliers during the operation. They played a crucial role in ensuring that both civilian and military infrastructure across India remained largely unaffected during enemy retaliation attempts.

ISRO's contribution

At an event on May 11, ISRO Chairman V Narayanan mentioned that atleast 10 satellites were continuously working round–the–clock for the strategic purpose to ensure the safety and security of the citizens of the country. "To ensure the safety of the country, the nation has to serve through its satellites. It has to monitor its 7,000 km seashore areas. It has to monitor the entire Northern part continuously. Without satellite and drone technology, the country can't achieve that", stated ISRO.

"Indian Air Force bypassed and jammed Pakistan's Chinese supplied air defence systems, completing the mission in just 23 minutes, demonstrating India's technological edge".

Conclusion

"Operation Sindoor is not just a story of tactical success. It is a validation of India's defence indigenisation policies. From air defence systems to drones, from counter–UAS capabilities to net–centric warfare platforms, indigenous technology delivered when it mattered most. The fusion of private–sector innovation, public–sector execution and military vision has enabled India to not only defend its people and territory but also assert its role as a hi–tech military power in the 21st century. In future conflicts, the battlefield will increasingly be shaped by technology. And India, as shown in Operation Sindoor, is ready, armed with its own innovations, backed by a determined state, and powered by the ingenuity of its people", stated India's MoD.

Courtesy: MoD

Photos: Vayu Aerospace Review

Thank you, Dr. Prahlada

India's indigenously developed Akash surface–to–air missile stood tall and earned a name for itself neutralising multiple air threats in waves of attack by Pakistan against India. And India is indebted to Dr. Prahlada Ramarao, the former project director for the Akash programme, chosen by none other than the former President Dr. APJ Abdul Kalam. Dr. Prahlada didn't back out with the initial setback and rather pushed so aggressively that he made Akash one of the biggest successes in the indigenous missile development of India. So Dr. Prahlada has undoubtedly played a key role in protecting thousands of Indian lives amidst the large scale attack. The astonishing performance will pave the way for Akash in the export market.

Akash is a Short Range Surface to Air Missile system to protect vulnerable areas and vulnerable points from air attacks. The Akash Weapon System can simultaneously engage multiple targets in group mode or autonomous mode. It has built in electronic counter–counter measures (ECCM) features. The entire weapon system has been configured on mobile platforms.

By Sankalan Chattopadhyay (X: @vinoddx9)

Since this edition of our magazine closes tonight (after a week's delay due to Operation Sindoor), further details as they unravel, will be revealed/ discussed in our next issue that will be out in July 2025.

Information collected and collated courtesy: The Vayu Team. Additionally, special thanks to PIB/ MoD, Shiv Aroor and Vishnu Som from NDTV, Snehesh Alex Philip, The Times of India, Indian Express, Hindustan Times and Damien Symon.

India's Hammer Blow: What it Means, What Next.

Foreign Secretary Vikram Misri (centre) with Indian Army officer Colonel Sofiya Qureshi (left) and Indian Air Force officer Wing Commander Vyomika Singh address the media after 'Operation Sindoor'. (AP Photo).

In the military domain naming an operation is as important as the operation itself. Thus, Op Sindoor bears the symbolism of response to the anger which gripped India on 22 April after the Pahalgam attack. However, it doesn't end here and could even be the beginning of a new season of confrontation.

After February 2019 when the Balakot operation was executed post Pulwama terror attack, we always knew that another attack of serious proportions would be repeated someday. The Balakot strike was not an act of deterrence but a strategic message; it was controlled escalation at a lower rung. I had wondered then what would be our response the next time some big terror attack took place. Six years later Pahalgam happened against the run of play. It was even more serious than Uri or Pulwama and demanded an Indian response of higher proportion.

We knew that an Indian military response would come sooner than later, although I continued to wonder whether India would finally hit where it hurts Pakistan most: Pakistan's Punjab heartland. And finally, GOI and the armed forces did, and did so effectively. The decision to hit Pakistan's heartland and the choice of targets may have been finally decided by the preliminary findings of NIA that mentioned the conspiracy between Pak army, ISI and Lashkar–e–Taiba; the deepest of the deep state that runs Pakistan's security and foreign policy interests.

The nine targets selected were a mix of those in PoJK and in Pakistan's Punjab. They were terror holding and training facilities, camps and launch pads in the vicinity

Images of terrorist camp destruction at various sites. (Photos by ANI)

of both LoC and Pak Punjab heartland. The selection was apt because it included headquarters of both Hafiz Saeed's LeT at Muridke and JeM at Bahawalpur. Although Azhar Masood's JeM may not have had a hand in Pahalgam, nevertheless its involvement in the larger terror machinery demanded that it too be brought into the ambit of response. Camps in Sialkot, earlier involved with the Pathankot attack, were also targeted.

What's important to note is that Muridke, Sialkot and Bahawalpur facilities are close to prominent headquarters of the Pak army. The strikes, therefore, signify India now has the capability to target even these should the need arise.

The location of the terror camps had been known for long. What India's strikes demonstrate is the vulnerability of the terrorist leadership to such targeted operations. It is something akin to Israeli capabilities acquired over time. This introduces a different dimension to the entire gamut of counterterror operations of a strategic nature.

In Op Sindoor, it's known that joint operation munitions of all three services were used through different modes of launch. Kamikaze drones, launched from standoff distances without crossing borders, became the final weapons of delivery. More on the weapons systems will be known as details unravel, but it's clear that India's efforts in the employment of a new generation of weapons systems have successfully come into being.

The final damage assessment is a part of detail and to my mind not so relevant. In Balakot, we were more focused on the results of the strike. It's quite clear this time that counting bodies is un–important. It's the event itself, the decision, the multiple targets and their nature, the depth of strikes and the choice of the geographical focus that have made the difference.

More high–resolution post–strike images: domes of the JeM Jamia Masjid Subhan Allah compound and associated buildings on the outskirts of Bahawalpur destroyed. Photos: @Maxar.

As usual, Pakistan's mastery over the domain of fake news has ensured attempts at manipulated narratives that should just be ignored. But we do need to be concerned about two things.

First, the likelihood of a response from the Pakistani deep state. It appears to be unlikely in the conventional domain; Pakistan does not have it in it, despite all analyses of its irrationality. It's in the sub–conventional domain that this cannot be restricted by any of the effects of Op Sindoor. Already, LoC has become hot with the ceasefire of 2021 no longer in existence. Heavy casualties have been sustained by our civilian population in J&K's Poonch sector. This is Pakistan's frustration at play.

The army must now ensure that it uses its tech superiority to neutralise all Pak assets involved in cross–LoC firing. There are several areas where we have domination due to terrain configuration; this must be exploited. However, we also need to safeguard our internal security to ensure that events such as Shri Amarnath Ji Yatra and the Char Dham Yatra are conducted safely. Pakistan, after all, has no remorse about the targets it chooses.

Courtesy: The Times of India

By Lieutenant General (Retd) Syed Ata Hasnain
Photos above: DFFSS/ HQ–IDS

Operation Sindoor is an apt and timely response to Pahalgam

(Graphic courtesy NDTV).

The kinetic strikes delivered by the Indian armed forces on the night of May 6–7 on targets in proximate Pakistan–Occupied Kashmir (PoK), as well as deeper in Pakistan, should have served to fulfil two underlying objectives in the larger framework of the India–Pakistan power play.

First, this was an overdue act of "retribution" to assuage justified public and political outrage at the barbaric and faith–based gunning down of 26 tourists in Pahalgam, Kashmir. It could have happened earlier but "revenge" as the old French adage goes, "is a dish, best, served cold," because it is the assurance and inevitability of response, rather than its swiftness, that sends an appropriate message to the attacker and establishes the credibility of the victim.

Here, it bears mention that the euphemism "cross–border terrorism" coined by India's national security establishment to describe what were clearly "acts of war" has repeatedly come back to haunt us. Training and arming fighters in Pakistan/PoK territory and then launching them across recognised boundaries to wreak death and destruction had always constituted acts of war and demanded an appropriate riposte. This was compounded by describing the perpetrators as "non–state actors", providing an alibi for Pakistan, which claimed that they were Kashmiri "freedom fighters". Let us also recall that following the 9/11 attacks on the World Trade Centre in 2001, then US President Bush declared that the terrorists' actions were acts of war and gave America the right to act in self–defence under Article 51 of the UN Charter.

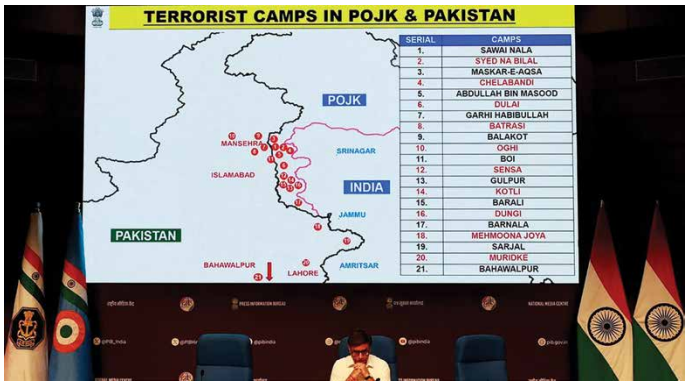
Secondly, no matter how spectacular or satisfying an act of "retribution" may seem to the public, it can only be classified as a tactical level response. What the Indian state actually needs to establish (or re–establish) vis–a–vis Pakistan is "conventional deterrence" as part of a well thought out strategy. Mutual nuclear deterrence has held for 26 years on the subcontinent (despite India's "no–first–use" commitment), since neither side has employed nuclear weapons. But India's significant conventional superiority over Pakistan was eroded when, (a) A "second front" became a reality, with the emergence of the China–Pak axis and (b) Pakistan deployed tactical nuclear weapons and switched to a doctrine of "flexible response" as a response to India's putative "Cold Start" doctrine. In this context, it became apparent in the wake of India's post–Uri surgical strike of 2016 and the post–Pulwama air strike of 2019, that although we had called Pakistan's bluff of a lowered nuclear threshold, we had failed to deter it in the conventional domain.

Colonel Sofiya Qureshi addresses the media regarding 'Operation Sindoor' missile strike after Pahalgam terror attack, at National Media Centre in New Delhi on 7 May 2025. (Photo Credit: ANI)

Consequently, Pakistan has continued to raise, train and infiltrate terrorists across the LoC from Kathua to Kupwara and everywhere in between. Infiltrated under Pakistan army's cover into the challenging wooded and mountainous terrain of the Pir Panjal and Karakoram ranges, small, mobile, teams of armed Pakistani intruders have managed to survive for long periods with minimal sustenance. Employing hit–and–run tactics, these mobile terror modules have been able to evade and tie down large numbers of Indian troops.

The only way of re–establishing conventional deterrence at the level of this so–called "asymmetric warfare" is to inflict pain and punishment on those who conceive, support and operationalise it – the Pakistani "deep state". This is the unholy nexus of the army's General Headquarters (GHQ) and the Inter–Service Intelligence (ISI) Directorate, which exercises oversight and full control of Pakistan's dummy political executive. Having incarcerated popular politician Imran Khan, the military/deep state guides the foreign and domestic policies of this benighted country. Lately, Pakistan's public has demonstrated increasing evidence of its deep resentment against the military's involvement in governance, contributing to a fast deteriorating economy and mishandled domestic insurgencies.

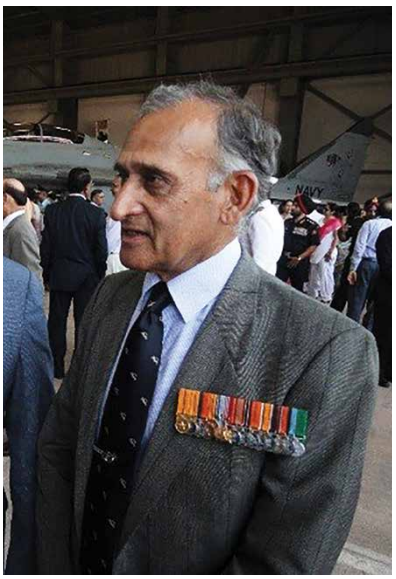
An inflammatory and unsoldierly public talk recently delivered by the Pakistan army chief General Asim Munir seems to be evidence of the military's hope that a showdown with India may serve to restore some of its lost sheen. Against this backdrop, India's response to the Pahalgam carnage has been apt and timely. When General Munir inappropriately referred to Kashmir as "Pakistan's jugular vein", he obviously forgot that its actual jugular vein are the five rivers controlled by an upper–riparian India.



India said the sites were used to organise attacks against it. (Photo: Reuters).

India can thus re–establish conventional deterrence vis–a–vis Pak provided Indian security planners are mindful of two factors. First, the initial wave of kinetic strikes may need to be followed up with more, and the public should be prepared for attrition, loss of life and the distinct possibility of escalation. At the same time, while public opinion may demand a "jaw for a tooth", our military leadership should remain wary of the "escalation" ladder — easy to step on but difficult to jump off. Given the nuclear shadow that hangs over the subcontinent, Indian planners have taken care to send clear signals of India's non–escalatory intent by using only aircraft launched weapons and not ballistic missiles, and also, by avoiding Pak military units/establishments and targeting only terrorist hubs. Additionally, we must convey — internationally as well as across the border — that our aim is limited to a commitment from the Pakistan deep state to dismantle the terror network, and guarantee cessation of cross–border armed activity.

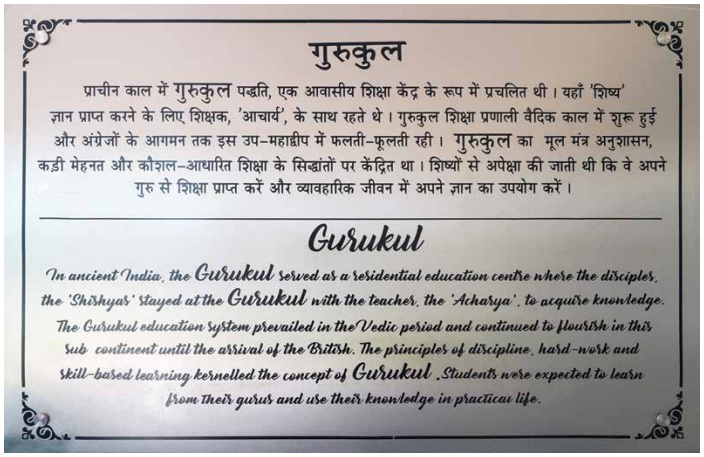
However, such threats need to be firmly rejected for a number of reasons. Any nuclear detonation on the sub–continent will have grave regional and even worldwide environmental implications. Therefore, Pak nuclear forces would be under close scrutiny, and major powers may take early action to pre–empt any nuclear adventurism by Pakistan. We should also believe that, notwithstanding their maladroitness in past Indo–Pak wars, Pak generals are smart enough to duck being incinerated in a retaliatory Indian nuclear second strike.



The last word: It is the dream of every DG ISI to exploit India's ethno–religious fault–lines, in an effort to reduce it to a mirror–image of the Islamic Republic. We must not let that happen.

Analysis by Admiral (Retd) Arun Prakash

Air Force Training College



"Bhartiya Vayu Sena Gurukul"

Air Force Training College, Bangalore: History and Achievements

The Air Force Training College (AFTC), located in Bangalore, is one of the premier training institutions for the Indian Air Force (IAF). Established with the aim of producing highly skilled officers who would serve in various branches of the IAF, the AFTC has a rich legacy of excellence in training military personnel. With its diverse history and a series of significant milestones, AFTC continues to play a pivotal role in shaping the future of the Indian Air Force.

History of Air Force Training College

The journey of the Air Force Training College traces back to the early years of the Indian Air Force, which was established in 1932. Initially, training for the Air Force personnel was conducted through various scattered initiatives and courses. However, as the demands for professional and comprehensive training increased, the IAF recognised the need for a centralised institution.

In 1949, the Indian Air Force Training College was officially established in Bangalore, Karnataka. The city of Bangalore, which is known for its pleasant weather and growing defence infrastructure, was chosen as the location due to its strategic advantages. The college's primary objective was to provide professional education and rigorous training to officers in various specialisations, ensuring they were well prepared to serve in the rapidly expanding IAF.

The initial focus of the AFTC was to offer basic training to officers, as well as specialised courses in flying, ground training, and technical expertise. Over time, the institution expanded its scope and evolved into a comprehensive training facility that catered to both young recruits and

experienced officers, helping them to hone their skills and acquire leadership abilities.

The Role of AFTC in Officer Training

The Air Force Training College has always been at the forefront of training IAF officers, including those who will go on to serve in senior positions within the Air Force. Its role has significantly broadened over the years, and it now encompasses multiple training programmes for officers, including the Short Service Commission (SSC) courses, Permanent Commission (PC) courses, ground training and leadership training.

One of the key programmes offered by AFTC is the Air Force Administrative Course (AFAC). This course provides comprehensive training in leadership, management and operational skills for officers who will be involved in various administrative and staff roles. The AFAC is instrumental in shaping the managerial skills of officers, ensuring they are able to effectively manage the complex systems and infrastructure of the Air Force.

Moreover, the Basic Air Staff Course (BASC) is another vital component of the training at AFTC. This course is designed to enhance the knowledge and understanding of officers in strategic planning, operational command, and policy–making. It ensures that the officers are not only equipped with military knowledge but also the intellectual capabilities to contribute meaningfully to the IAF's broader objectives.

Key Achievements of AFTC

Over the years, AFTC has achieved several milestones in the field of military training and education. Some of its most notable achievements are:

Excellence in Training: AFTC has consistently delivered top–tier training programmes for Air Force officers, contributing significantly to the overall effectiveness of the Indian Air Force. Its training approach emphasises discipline, teamwork, leadership and strategic thinking, all of which are crucial for the success of the IAF in its missions.

Collaboration with International Institutions: AFTC has fostered strategic partnerships with various international training institutions, allowing its officers to gain a global perspective on air operations. Many officers from allied countries also attend courses at AFTC, further enhancing its reputation as a world class training institution.

Leadership Development: The college has been at the forefront of shaping the future leadership of the Indian Air Force. A significant portion of its training focuses on developing leadership qualities and managerial skills among officers, ensuring that they are prepared to take on higher responsibilities within the Air Force.

Operational Efficiency: Many of the training programmes at AFTC are designed to improve the operational efficiency of the IAF. Officers who complete their training at AFTC are better equipped to handle complex operations, whether in combat, logistics or air defence.

Alumni Success: The graduates of AFTC have gone on to serve in various prestigious roles within the Indian Air Force. Many of them have risen through the ranks and taken up leadership positions in critical operations. Some have also contributed to the academic field by taking on instructor roles at the college itself, perpetuating the cycle of excellence in training.

Innovative Training Programmes: The college has consistently innovated its training programmes to align with the changing nature of warfare, especially in terms of air combat and defence technologies. With the advent of unmanned aerial vehicles (UAVs), cyber warfare and advanced air combat tactics, AFTC has incorporated these elements into its curriculum to ensure that officers are well prepared for modern challenges.

Promoting Professionalism and Discipline: The core philosophy of the AFTC is to cultivate a sense of professionalism and discipline in its officers. This is achieved through a carefully designed blend of theoretical instruction and hands–on practical training, ensuring a well–rounded approach to military education.

Conclusion

The Air Force Training College in Bangalore stands as a symbol of excellence and tradition within the Indian Air Force. From its humble beginnings in 1949, it has grown into a world class institution dedicated to producing well–trained, highly capable officers who are critical to the success of India's defence efforts.

With a rich history of achievement and a commitment to ongoing innovation, the AFTC continues to evolve and adapt to the ever changing nature of modern warfare. The college remains a cornerstone of the Indian Air Force's success, playing an indispensable role in ensuring that the IAF's personnel are well–equipped to face the challenges of the future.

As the Indian Air Force continues to modernise and expand its capabilities, the Air Force Training College in Bangalore will undoubtedly remain a key institution in shaping the future of air defence in India.

Article and two lead photos by Mayyank Kaul
(Twitter/X: ThrustVectorNeo @MayyankK3246)
Photos: AFTC

Interview: Air Force Training College

***VAYU**: How does AFTC structure its training programme to ensure a comprehensive development of Officers?*

Air Force Technical College has crafted its training programme for a trainee centered mandate. The training approach integrates development of both the professional and personal aspects of Officers. Various key components of the training programme are elucidated below:

Academics: The college offers a wide range of subjects pertaining to Aeronautical Engineering. Theoretical classes are being conducted to ensure continuous learning and professional development. Emphasis is made on practical training and hands–on experience by conducting Tech visits and conduct of simulations/practical classes in state of the art laboratories. Visits to nearby Air Force units, DRDO labs and DPSUs are arranged to enhance the awareness on emerging technologies and new inductions in to Armed Forces. Adequate academic focus in terms of theoretical and practical training is given on major Enterprise Resource Planning (ERP) platforms such as eMMS and IMMOLS to all ab–initio and in service course officers of AE branch undergoing training at AFTC.

Personality development: Various activities like sports, drills, public speaking exercise, social interactions and inter squadron cultural competitions are organised to ensure personality development. The trainee officers are assigned with various responsibilities during conduct of college events to hone their interpersonal skills and equip them with adequate skill sets required at field units.

Leadership and ethics: The training programme includes modules on leadership, Military ethics and code of conduct. The Officers are taught the importance of integrity, discipline and ethical behaviour in their professional and personal front. Eminent speakers from different civil organisations are invited to deliver lectures on Lleadership and personality development/management topics. General Service Knowledge is imparted to all trainee officers by the instructors of the College. Counsellors periodically counsel the trainee officers to inculcate these qualities.

By combining these elements, the College ensures that its Officers are not only technically sound but also well prepared to lead the air warriors placed below them in the Indian Air Force.

***VAYU**: What are the key components of the academic curriculum at AFTC?*

The key components of the academic curriculum at Air Force Technical College includes:

Theory classes on professional subjects: Theory classes are being conducted to train the Officers on various subjects in Aeronautical Engineering domain. General Service Knowledge is also imparted during both stages of training at AFTC.

Practical training: Demonstration classes using simulators and practical classes in modern labs/aircraft are being conducted to provide hands on experience to the Officers. Hands–on practical classes are conducted in eMMS Lab/IMMOLS lab to familiarise the trainee officers on important ERPs operated in IAF.

Tech visit and internship visits: Visits to important organisations/establishments such as Indian Space Research Organisation (ISRO), Software Development Institute (SDI), Aircraft and Systems Testing Establishment (ASTE), DRDO labs and DPSUs are organised for trainees to enhance their awareness on newer systems and also provide them field exposure. To improve their practical appreciation on the subjects covered, two weeks internship visit is undertaken to major Air Force stations of IAF during their Stage–III training.

Tech quiz and guest lectures: Tech quiz is arranged for the trainees to assess and reinforce their technical knowledge and overall awareness on latest technologies in aviation and aeronautical engineering. In addition, guest lectures by eminent speakers are arranged to impart knowledge and enhance exposure on latest military technologies.

***VAYU**: How does AFTC integrate physical training with academic and technical education?*

The physical training as part of Out Door Training is included in the syllabus for all courses conducted at AFTC. Morning health runs, PT and games are conducted on a daily basis supervised by Ground Training Instructors and Instructors from faculties. The Out Door Training plays a crucial role in ensuring/developing physical fitness and stamina amongst the trainee officers. Activities like inter–squadron sports, athletics, games, cycling, trekking and cross–country are organised at periodic intervals for improving team spirit and sportsmanship amongst the trainee officers/cadets. Theory classes are generally scheduled in the morning hours and physical activities like sports, PT, and games are conducted in the evening hours. Health runs are conducted in the early morning hours of the day. The ODT activities are also supervised by senior functionaries of the College such as HoFs, CI and Comdt.

***VAYU**: What facilities and resources does AFTC provide to support cadet training?*

Facilities and resources provided at AFTC to support cadet training are:

State of the art infrastructure: The College inaugurated the new Academic Block 'Gurukul' in the year 2023. The College is equipped with modern infrastructure that includes well equipped classrooms, demo labs, practical labs, simulators, briefing halls, computer centre, internet lab etc. A new auditorium has been recently inaugurated at this College for conducting seminars, workshops, college level competitions, cultural programmes etc. The College has a spacious library housing comprehensive collection of books, journals, magazines and other resources covering disciplines related to aeronautical engineering,

military leadership, personality development and general knowledge. The College has a museum which chronicles the annals of Air Force Technical College since its formation.

Sports Facilities: The College has facilities such as volleyball court, basketball court, squash court, badminton courts, football ground and tennis court. A separate gymnasium for trainees has been established at the College for improving the physical fitness and stamina of the trainee officers. The trainees also have access to modern running track and swimming pool located at AFS, Jalahalli.

Accommodation: AFTC has adequate accommodation to provide single occupancy to all trainee officers undergoing training at AFTC.

VAYU: How does AFTC ensure the mental well–being of its Officers/Cadets?

AFTC has established a conducive training atmosphere which nurtures the mental wellbeing of the trainee officers. Hobby clubs have been setup for music, cycling, star gazing, aerospace safety corner, robotics and aero modelling for pursuing their interests and passions in their respective fields of interests. They are constantly encouraged to play their favourite sports, games and to participate in various co–curricular activities. Further, the College has implemented following aspects towards ensuring the mental well–being of its trainees:

Counselling: Each Instructor held on the posted strength of the College has been assigned with the responsibility of taking care of the overall personality development and mental well–being of a group of the trainees. Periodic counselling is carried out by the Instructor Counsellor to assess the growth of the trainee, problem being faced by him, physical and mental fitness, family issues etc. These formal interactive sessions give an opportunity to the trainee officers to express their concerns/issues faced during training and resolving the problems by suitable solutions suggested by their respective counsellors. The College has employed a professional counsellor who conducts counselling sessions to these trainees at regular intervals and the counsellor is available within the College campus during working hours. Open and free communication is promoted at the College wherein trainees are encouraged

to express their views and suggestions without any apprehension to their counsellors/College counsellor and Sqn Cdrs. All trainee officers of the College get to meet the CI and Comdt of the College once in three months and get an opportunity to interact with the senior functionaries to bring out unresolved issues if any, which get addressed on highest priority.

Guest lectures: Guest lectures from domain experts on mental health and wellbeing are arranged periodically to help the trainees to manage stress, build resilience and improve their mental health. The College counsellor also trainee officers through conduct of organised lectures and interactive sessions.

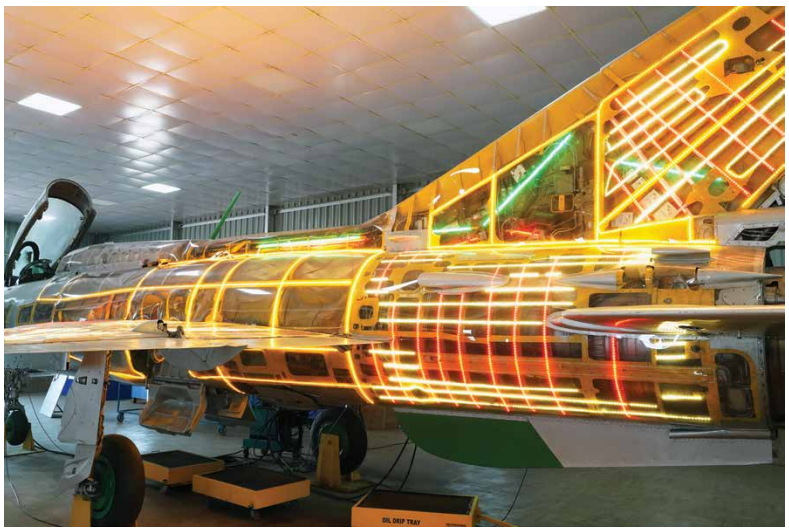
VAYU: How is AFTC preparing Officers for future based wars using AI & ML?

Air Force Technical College is preparing Officers for future wars by integrating Artificial Intelligence and Machine Learning into their training programme in several ways:

Incorporation of 71 hours of curriculum on AI & ML in the 62 weeks of Aeronautical Engineering Syllabus (AEC), which includes both theoretical and practical training.

State–of–the–art Artificial Intelligence Lab with high end PCs loaded with all the latest AI tools and applications. The College is conducting exploratory and advance research and undertakes projects based on AI & ML to develop innovative solutions to the problems faced at field units.

Instructors having domain expertise in AI & ML are conducting classes to train the trainee officers to integrate AI & ML in aspects of Military Operations and enhance their overall effectiveness and efficiency. Projects having operational impact which are based on AI & ML are assigned to the trainee officers as part of the training. The completed prototypes are being shared with the field units/Base Repair Depots for further development and op deployment. AI/ML based parking management system, ML based aircrew fatigue monitoring, AI/ML based automatic drone activation are some of the projects executed in the recent past at AFTC.



VAYU: How does AFTC foster leadership qualities among its Officers/Cadets?

The training curriculum implemented at Air Force Technical College for all courses has incorporated training activities to foster leadership qualities among trainees. The Officers/Cadets undergoing training are regularly assessed for their participation in group/ team building activities. Their leadership qualities are regularly assessed by their respective counsellors and endorsed in their dossiers. The College arranges workshops, seminars and guest lectures towards developing leadership skills. To inculcate team building, camaraderie and leadership qualities at the budding stage, the trainee officers have been divided into three squadrons. A concept of appointments for each squadron has been implemented wherein the best performing and suitable Officers/Cadets are conferred with the appointments for leading their respective squadrons in all courses. During conduct of cultural programmes, seminars, workshops etc at the College, the trainee officers are given independent charge of handling various tasks which can hone their leadership skills.

VAYU: How does AFTC prepare Officers/Cadets for their specific roles in the Air Force?

The existing training curriculum implemented at the College has been designed in a manner which prepares the young officers/cadets for their future roles they will be playing once they get posted to the field units in their respective systems. The areas of the training include professional training wherein theoretical, practical and hands on training are covered. The trainees after their Stage II training are divided into four streams like Aircraft, Guided weapon, System–I and System–II. During their Stage–III training, Stream specific training is conducted which prepares them well for the next stage of their training at TETTRA Schools. As part of the military training, drill practice, range firing and physical and mental toughening exercises are included. For ensuring physical fitness, PT and games are regularly conducted. College focuses on improving Officer Like Qualities by emphasising on integrity, discipline, loyalty and diligence. Regular social gathering conducted for the trainee officers ensure that their socialisation skills and inter personal skills are honed. During the training, the trainees/ cadets participate in public speaking exercises, tech quiz, dramatic competitions etc which prepare them well for their actual field deployment.

By Mayyank Kaul
(Twitter/X: ThrustVectorNeo @MayyankK3246)
Photos: Mayyank Kaul

The charioteers of Iniochos 2025

In Greece it is not hard to find traces which refer to many of the traditional stories and myths which takes you back to ancient times of the life of the gods in this Mediterranean country. Fantastic tales about wonderful events as well as intrigues and ancient battles, continue to live on in nowadays society. Such references can also be found with the Hellenic Air Force, like with their annual exercise "Iniochos" which has been held here since 1980 and now more than ever very much alive. The symbol of Iniochos, which refers to an old statue of a charioteer found in an ancient complex in Delphi, is proudly displayed at the fighter jets' exercise badges. So again in 2025, where the first 2 weeks of April were reserved for 12 international air force units and a wide variety of aircraft types to train together over the Peloponnesus peninsula.

2025 edition

The organisation of the Hellenic AF exercise is executed by the Air Tactics Centre (ATC), part of the 116th Combat Wing, at Andravida air base. Iniochos, which was originally set up as a national, small scale tactical level exercise, has grown through the years into an INVITEX (invitation exercise, open to international participation) and medium scale exercise, while striving to become the most competitive exercise in Europe and Mediterranean region. With that in mind it was no surprise that this years edition had been the biggest in Iniochos' history. 12 nations had their aircraft flown multiple times a day resulting into 1300 conducted exercise missions. The exercise growth was also displayed by the fact that the original exercises Single Base Concept, where all participants fly from Andravida, had been left as for example the nearby base of Araxos was hosting many of the Hellenic fighter aircraft. The exercise mission scenarios were described as complex and

intense, which is certainly demonstrated in the variety of missions integrated into a realistic battle scenario. The types of missions included operations against Integrated Air Defence System (IADS), Offensive Counter Air (OCA) and Defensive Counter Air (DCA), Air Interdiction (AI), Anti–Surface Warfare (ASW), Slow Mover Protection (SLOMO), Combat Search and Rescue (CSAR), Dynamic Targeting (DT), Strike Coordination and Reconnaissance (SCAR), Close Air Support (CAS), Time Sensitive Targets (TST) and High Value Airborne Asset (HVAA). A normal exercise day could show 3 massive aircraft wave launches for a morning, an afternoon and a night flight. However the types of missions or scenarios could also cause launches of smaller groups of aircraft throughout the day. In this way the flight crews were called upon their flexibility and skills to adapt quickly to new situations. Long before a new group of aircraft is taking off for a mission, the preparations already have started.

A mission lead and the fellow pilots appointed for this mission, receive their briefing or Air Tasking Order (ATO) from the White Cell, the exercise operational planning centre. This briefing gives clarity if you will be Blue or Red (opposing forces) Air and further directives like on timings, locations, target information and mission goals. The mission lead uses this information to make a tactical plan for his formation of aircraft and makes decision on weapon selection etc.

Iniochos makes use of the Athens Flight Information Region (FIR) in which dedicated air spaces are reserved for the aircraft of the exercise. Especially the air space over sea is of interest as there is hardly any conflict with air routes for civil aviation. Other areas of interest are some low fly zones, like the mountains in the north–west of the Peloponnesus where you can see spectacular fighter jet passes through several canyons, of pilots practicing their flight skills at low level. This year the low level flights appeared to be reduced, mainly caused by several days of a low cloud base in the mountains with forecasted rain and snow, reducing sight to unsafe and therefore unacceptable flight conditions.

In the exercises all types of air operations were executed in an intense combat pace, both day and night They covered

the full spectrum of modern air warfare through a series of complex and highly realistic scenarios. In parallel, missions were carried out using F–16 Tactical Simulators of the Operational Synthetic Training Squadron of the Hellenic Air Tactics Centre, extending the exercise into the digital domain.

International participants of Iniochos 2025

Country	Type	Quantity	Unit
France	Mirage 2000D	6	EC 1/2/3–003
India	Su–30MKI	4	8 sqn / 15 W
Israel	G–550	1	
Italy	Tornado IDS / ECR	6	6 Stormo
Montenegro	Bell 412EPi	1	Helikopterska Esk.
Poland	F–16C	6	3 / 6 ELT
Qatar	F–15QA	4	FW 5
Slovenia	PC–9M	2	152 LEESK
Spain	F/A–18A+	6	Ala 46
UAE	Mirage 2000–9E/DAD	6	
USA	F–16C	10	482 FW
USA	KC–46	1	
USA	KC–135	1	
NATO	AWACS A–3	1	

Participants

Although Greece is a full member of NATO, the Iniochos exercise is also open to other nations to participate than only those of the treaty. For example, this year you could see aircraft out of India, Qatar, United Arab Emirates and Israel next to observers out of Bahrain.

Very interesting was the presence of India which forwarded 4 Su–30MKI "Flanker" aircraft belonging to 15th Wing, No 8th squadron based at Bareilly Air Force Station. The Su–30's, which reached Greece by Il–78 tanker support, were the only Russian developed aircraft at Iniochos. Qatar contributed to the exercise with their rather new F–15QA "Eagles" from Flying Wing 5. Pre–exercise information disclosed the attendance of Saudi Arabian F–15's as well, but some time before the exercise they cancelled their participation for unknown reasons, leaving the Qatar Emiri Air Force as the only Eagle flying participant in Iniochos 25. The Mirage 2000–9AED's from the United Arab Emirate Air Force, which have been participating in earlier Iniochos editions as well, could be seen flying together with their delta flying colleagues of France and Greece. The UAE Mirage 2000's, which contributed with single and dual seated models, have been in the news lately due to their possible sale to Morocco. This has to do with the newly acquired 80 Rafales for UAE, which are expected to be delivered from 2027 on.

Host nation Greece had all its current fighters acting in Iniochos, being Mirage 2000's and Rafales from 331 and 332 MPK (Sqn), F–16's from many different units and the still going strong F–4E Phantom from Andravida based 338th. Also other transport, electronic, supporting aircraft and helicopters of Hellenic wide defence units had roles in this year's exercise.

The list of Iniochos 2025 aircraft furthermore included Spanish F/A–18's from the Canary Islands, Italian Tornado's, Polish F–16's, French Mirage 2000's, Slovenian PC–9's, a Montenegro Bell–412, an Israeli G–550 (1st week only) and last but not

least the US Air Force Reserve Command (AFRESC) 482 Fighter Wing with a detachment of F–16's. The US F–16's were believed to be at the beginning of a longer stay in the Middle East region after their Iniochos appearance.

Several exercise participants flew their Iniochos missions out of other air bases and included USAF KC–46 and KC–135 tanker aircraft for aerial refuelling and a NATO AWACS platform for Command & Control (C2) duties.

Hellenic AF Commander, Lieutenant–General Demosthenes Grigoriadis told at the Distinguished Visitor Day that Greece will continue with its annual Iniochos exercises. Iniochos provides added value in the skill development of HAF pilots next to the participant perspectives as they see their ambitious trainings goals being realised in the Iniochos environment and space. Although next year preparational construction work will start at Andravida, making the base capable for the future F–35 operations, Lt–Gen Grigoriadis expects that Iniochos can take place at the base in 2026. After that year the exercise may temporary re–locate to nearby Araxos, before it will return again to Andravida.

Text and photos by Peter ten Berg

Ramstein Flag 2025

By late March a high number of aircraft of NATO allies gathered at bases around the North Sea, North-West Europe. They came together for the 2nd edition of NATO exercise "Ramstein Flag" (RAFL) to train together in several scenarios in a 2 weeks drill. We visited the exercise Main Operating Base Leeuwarden in the Netherlands to see the fighter aircraft as well as Dutch supporting base Eindhoven, from where tanker support missions were conducted.

RAFL

The first Ramstein Flag exercise took place les than a year ago at Andravida, Greece, for 2 weeks during September. NATO Allied Air Command (AIRCOM) had the Hellenic Air Force base selected for their new multinational exercise. One of the basic elements of the exercise is the flexibility and being able to adapt quickly to new environments. This is in contrary to exercises like Cobra Warrior, Red Flag and Iniochos which are annually, or even more frequently, conducted out of one specific base, often close to a dedicated training air space. The set-up of Ramstein Flag 2024 with a Main Operating Base and several supporting bases was also visible in Greece. At the Mediterranean Peloponnesus peninsula located

MOB Andravida, the majority of international fighter participants were based, while the nearby air base of Araxos had the majority of Greece fighters. Additionally the nearby Athens located Elefsis, hosted tanker and electronic aircraft, while some participants joined from their home bases, like Romanian F-16s and Italian F-35's.

2025 edition

Due to the changing world situation and the NATO need to increase its training accordingly, Ramstein Flag

2025 was already planned for springtime, where it saw opportunities to integrate with the annual Frisian Flag exercise. This annual Dutch organised exercise has its training air space over the North Sea and therefore it was clear that other Ramstein Flag 2025 exercise participants were hosted at air bases with similar easy access to the training area. Samples were Italian F-35's and Hungarian Gripens from Skrydstrup AB, Denmark. Furthermore the UK hosted Romanian and Turkish F-16's at RAF Fairford and Spanish F/A-18's from Ala 12 at RAF Marham. Next to these international temporary detached participants, the overall list was completed with aircraft from home based units out of surrounding countries, like British F-35's and Typhoons and Danish F-35's. Aerial refuelling was for also for this large exercise an essential element to the complex and lasting mission scenarios. The main and daily tanker support was conducted with several MRTT's out of Eindhoven AB and USAFE KC-135's from RAF Mildenhall, UK. Additional assets contributed regularly out of RAF Fairford (Turkish KC-135), Istres, France (MRTT) and Pratica di Mare, Italy (KC-767).

The 2025 edition of RAFL had its priorities focused on training Agile Combat Employment (ACE) missions, Counter Anti-Access/Area Denial (C-A2AD), Integrated Air and Missile Defence (IAMD) and sharing information seamlessly across Allied nations. The AIRCOM's focus on these objectives, reflect on ensuring the air component's readiness to respond rapidly in Article 5 scenarios, where NATO's collective defence commitments are invoked. In that respect RAFL trained the air component's agile and immediate ability to execute the first five days of an Air Tasking Order (ATO) during such a scenario. During a visit to Leeuwarden of Deputy Commander NATO AIRCOM, Air Marshal Johnny Stringer, he addressed the key of RAFL25: "So this is bringing together, 15 or so NATO nations, actually operating from this base and 11 others, practising key high-end missions which we would have to do to defend Europe in any Article 5 confrontation but most importantly, to do the credibility and the capability that underpins our deterrence posture. Well, what I would like to say is, you should feel assured, you should feel reassured. You've got 32 nations, here you've got 15 nations of high-end air power capability operating together to keep them safe and that's the way we intend to keep it."

Concept change

Where Frisian Flag has its missions flown in the morning and afternoon, the RAFL25 exercise showed a complete different flight schedule as the first aircraft only took off very late afternoon, to return just before sunset. Roughly an hour later the second wave was launched for a night mission of some hours under dark conditions. This late schedule seems to approach missions in realistic conflict scenarios, where flight crews are taken out of their daily

daytime patterns. The adjusted flight times consequently also impacted the working patterns of ground crews, which were working full force on the jets turn-around cycles in the dark, to have them in time again available for the 2nd wave. After return of the last mission, shortly before midnight, the ground crews carried on with their regular aircraft maintenance deep into the night, to secure the availability of the aircraft for the next day.

Leeuwarden AB itself was host for a variety of international fighter aircraft next to its own residents and RAFL participants being the F-35's of 322 sqn and MQ-9's of 306 sqn. The air bases' flight lines were filled with French Rafales, USAFE F-35's, German Eurofighters, Hellenic F-16's, Swedish Gripens next to several additional Dutch F-35's from Volkel AB units. Finland who had participate before in previous editions of Frisian Flag as an invited nation, now joined the exercise as a full NATO member with 6 F/A-18's from HavLLv 31 at Rissala AB. As the Finnish AF is working towards introduction of the F-35 fighter and in the preparation process how to integrate at best its 4th gen Hornet together with the 5th gen F-35 platform for the years they operate together, it was no surprise that the Finnish detachment shared the flight line together with the Dutch and USAF F-35's. "Operating closely together is beneficial and of high worth in this process" as Finnish Air Combat Centre (ACC) commander Lt Col Jaakko "AVERELL" Salomaki declared earlier. The ACC at Tampere AB, Finland, is playing a major role in the preparational process towards the entry of the new fighter in its defence force.

Tanker support

Aerial refuelling for fighter aircraft is nowadays essential for operations and exercises. That applied certainly to RAFL 2025, with about 100 aircraft flying out of 12 different bases and having them in "theatre" for a specific period of time. Only by refuelling them from time to time, they were capable to contribute to the RAFL Combined Air Operations (COMAO). A main role in this process was addressed to the Multinational MRTT Unit (MMU) at Eindhoven AB, which had in both daily RAFL missions tankers flying, next to the other regularly supporting international tankers.

The MMU operates currently a total of 9 Airbus A-330 Multi Role Transport Tanker (MRTT) aircraft and a 10th scheduled for delivery in 2026. The aircraft, which are

Dutch registered, are owned by NATO, but financed by 6 nations. Each of these countries, being Germany, The Netherlands, Belgium, Luxembourg, Norway and Czech Republic, have obtained with their investment a specific quantity of MRTT flight hours to make use of MRTT aircraft, as MMU commander Colonel Ludger Bette explains. "Since some time we also see that the interest for European based tanker/transport capacity is growing. This can be seen in the light of the current unstable world situation and the recent NATO member expansion as Finland and Sweden joined the treaty". Col. Bette continued. "Every new future requirement of another 1100 flight hours, will justify the acquisition of a new MRTT". The new interest is said to come from 1 or more Scandinavian countries. With the near future fleet of 10 MRTT's operational, the MMU MOB at Eindhoven (6) and Forward Operating Location (FOL) Cologne (4), Germany will reach their full capacity. "Knowing this, the consequence of acquiring additional MRTT's will implicate an additional FOL. To have the MRTT capacity available nearby the participating countries, one can expect that a new FOL may be located in Scandinavia", according commander Bette. For now the MMU commander, who has accumulated about 4,500 flying hours, and his unit concentrate to support exercises like RAFL and the other "common flow of operations". "For us it is an excellent opportunity to participate in international exercises to see if we are ready and see if we have all our tools in our toolbox, as our MMU management has been addressed to be ready for a possible large scale conflict in Europe no later than 2029. It is also perfect to exchange experiences and fine tune further on refuelling procedures with other units. For RAFL 25 we work together with French, Italian, British and American colleagues flying from elsewhere and at Eindhoven we are glad to host a Royal Canadian AF CC-150 Polaris, which is based here for the exercise", as Col. Bette concludes.

Commander of NATO Allied Air Command, General

James Hecker, who visited the exercise together with the Dutch prime minister and other guests, concluded that "Ramstein Flag 2025 underscored the Alliance's determination to adapt, evolve, and deter potential threats across the Euro-Atlantic region. Air superiority is a premise, for the Air Force and for all domains". After 2 weeks of training and conducting more than 1800 sorties, RAFL25 came to an end at April 11th.

Text and photos by Peter ten Berg

CC–150 Polaris: An inconspicuous but vital role

Early morning at a still empty platform, waiting for things to come.

During Exercise Ramstein Flag 2025, flying operations at Leeuwarden AB in the Northern part of The Netherlands attracted lots of spectators. Dozens of jet aircraft taking off and landing every day was a spectacular sight for locals and aviation enthusiast alike. However the casual observer wouldn't have noticed that other aircraft than fighter jets also played a very important role in the exercise. A Royal Canadian Air Force (RCAF) Airbus CC–150 Polaris tanker aircraft was one of those.

This aircraft was based at Eindhoven AB for the duration of the exercise, some 3,700 miles (5,900 km) from its homebase CFB Borden. Asked why flying such a distance for an exercise was worth the effort, Air Task Force Commander Major Scott Woods explained: "Participating in Ramstein Flag 2025 enhanced the RCAF's ability to operate in high–intensity, large–force tactical air combat scenarios and strengthened our global response capabilities. While most of our exercises take place in Canada or the United States, Ramstein Flag offered a

Some thirsty Swedish and French participants go through refuelling operations alongside the Canadian CC–150 Polaris.

valuable opportunity to operate in a complex, multinational NATO environment."

Together with the CC–150 the RCAF deployed no less than 35 personnel. Apart from the flying crew these included support personnel from 8 Wing, 437 Transport Squadron at Trenton and Air Battle Managers (ABM) from 22 Wing at CFB North Bay. Intelligence personnel and other support trade such as logisticians were also deployed.

The CC–150 Polaris carried out aerial refueling missions throughout the exercise. Major Woods: "We supported every mission where our capabilities were required, in total offloading over 650,000 pounds of fuel to allied aircraft. The Polaris use drogue refueler, which is compatible with specific aircraft. During the exercise, we refueled Hungarian and Swedish Gripens, Finnish and Spanish F/A–18 Hornets, French Rafales, and German and British Eurofighters."

The CC–150 returning to its temporary home Eindhoven AB.

As is common in military aviation, before and after every mission an extensive briefing was held. While preparing for this, each crew member had his or her own responsibilities:

–the Aircraft Commander (AC): responsible for the overall execution and safety of the mission;

–the Flight Refuelling Specialist (FRS): responsible for the air–to–air refuelling portion of this mission;

–the First Officer (FO): responsible for flight–specific detail, such as weather, NOTAMs, airport conditions etc.;

–the Load Master (LM): responsible for the safe loading of fuel and also cargo and passengers if applicable.

A Finnish F/A–18 Hornet takes in fuel while the sun sets.

Prior to aircraft engines start the crew met, with each crew member briefing their portion of the mission plan. This provided a detailed overview of the entire mission and allowed for the opportunity to confirm any details with respect to how the mission would be executed. Once the mission had been completed, the crew met again to discuss the overall execution of the mission and raise any points (positive or negative) that were recognised during mission execution.

For the duration of the exercise a large tanker task force was formed by several NATO nations. Next to 437 squadron's CC–150 this consisted of NATO's own Multinational MRTT Unit (MMU) A330's based at Eindhoven, a Turkish KC–135 temporarily operating from RAF Fairford in the United Kingdom plus British, French, Italian and USAF tankers flying from their respective homebases. The size of the tanker task force underlined the importance of the ability to refuel in flight during large scale operational missions. This importance is emphasised by the fact that the two Canadian CC–150s that have been converted to tanker aircraft will in the near future be replaced by no less than nine CC–330 Huskies, an Airbus A330–based Multi–Role Tanker Transport (MRTT) jet. But before that happens, Major Woods promised, Europe should be able to see the CC–150 at least once more during an international exercise. He concluded: "Ramstein Flag 2025 was a great experience for all RCAF members involved. The exercise advanced training opportunities in mission planning, execution and operational procedures, and thus contributed toward ensuring seamless integration and interoperability with our NATO allies and partners for the future."

Text: Patrick Dirksen & Frank Mink of Tristar Aviation

Photographs provided by the RCAF

During the Second World War, 437 Squadron was formed in the United Kingdom as part of the RCAF. Their first operational mission, flying Dakotas, was towing gliders and hauling cargo as part of operation Market Garden over Arnhem, The Netherlands. The casualties they suffered are buried at Groesbeek Canadian War Cemetery, the Commonwealth War Graves Commission cemetery containing the largest number of Canadian war dead in the Netherlands. Canadian airmen of multiple squadrons rest in 141 of the graves. Two of them were shot down in 1942, but not discovered until 20 years later. During their stay at Eindhoven AB, the RCAF visited the Groesbeek cemetery. The visit was a deeply emotional experience for all involved and it provided an opportunity to honour and reflect on the sacrifices made by Canadian and Allied forces during the conflict.

Part of the detachment at Groesbeek.

IAF No. 8 Squadron in Greece

Exercise Iniochos'25 from

the lens of Cem Dogut

(Instagram: cem_dogut and twitter/X: DogutCem)

The French Eurocopter AS550 Fennec helicopters

The Eurocopter AS550 Fennec helicopters (today named Airbus Helicopter H125M) of the French Air and Space Force (Armee de l'Air et de l'Espace, AAE) are used in various roles by 2 squadrons in France. EH 1/65 and EH3/67 belong to Brigade Aerienne d'Appui et de Projection (BAAP, Air Support and Transportation Brigade) of the l'Armee de l'Air et de l'Espace. In this Transportation Brigade, all transport and helicopter units are organised. There are 4 helicopter units in this Brigade: Escadron d'helicopteres 1/44 Solenzara (Base Aerienne Solenzara) flying the SA 330 Puma; Escadron d'helicopteres 1/65 Alpilles (Base Aerienne Orange) flying the AS555 Fennec; Escadron d'helicopteres 1/67 Pyrenees (Base Aerienne Cazaux) flying the EC725 Caracal and Escadron d'helicopteres 3/67 Parisis (Base Aerienne Villacoublay) flying the AS555 Fennec.

EH 1/65 "Alpilles"

Escadron d'Helicopteres 1/65 Alpilles was originally formed on 1 May 1975, as Escadron d'Helicopteres 5/67 "Alpilles". It was renamed EH 1/65 Alpilles on 4 May 2022, to continue the traditions of the 65th Helicopter Wing. This squadron is based at Base Aerienne Orange (ICAO: LFMO). The squadron's roots can be traced back to the permanent helicopter detachment of EH 02.068 Maurienne, which previously operated from Base Aerienne 125 Istres.

EH 3/67 "Parisis"

Escadron d'Helicopteres 3/67 was officially created on 1 October 1964 on Base Aerienne 107 Velizy–Villacoublay (ICAO: LFPV). The squadron takes its name the "Parisis" as heir to prestigious World War One squadron SPA 99, whose emblem, the Pegasus, has spanned the decades from the Great War until now. The Pegasus comes from the N99/SPA99 squadron created in 1918, whose traditions are taken up by the EH 3/67 "Parisis". Coming from the Celtic tribe who populated the banks of the Seine, the Parisis gave its name to the Paris region, over which the squadron has been watching night and day for more than

30 years. On 17 October 2024, EH3/67 celebrated its 60th anniversary at its homebase BA Villacoublay, on a very rainy day.

Roles

The AS555 Fennec helicopters of the 2 squadrons have 3 main roles in France: SAR, RESCO and MASA.

SAR

The AS555 Fennec helicopters are used for Search and Rescue (SAR) missions, particularly in peacetime operations and domestic emergency responses. While not the primary SAR platform, the Fennec plays a valuable supporting role in the French Air Force's rescue capabilities.

Primary SAR Missions: Peacetime SAR (Sauvetage en Temps de Paix – STP), Emergency Medical Evacuations (MEDEVAC), Coordination and Surveillance.

Capabilities and Equipment: Light, maneuverable and fast, making it ideal for short range SAR operations; Thermal imaging and night vision for nighttime or low visibility rescues; Winch system (on some versions) for hoisting personnel in difficult terrain; Radio communication systems to coordinate with ground and air units; Machine guns (FN MAG 7.62mm) for self–defence in case of operations in hostile areas.

Operational Use: Provides SAR coverage near French Air Force bases; Supports civilian search and rescue efforts in coordination with Securite Civile and Gendarmerie; Deployed to French overseas territories where heavier SAR helicopters may not be available; Used in natural disaster response, assisting in search efforts after floods, earthquakes or cyclones; Used for pilot ejection recovery drills and live training for SAR teams.

Limitations: Shorter range compared to larger SAR helicopters (e.g., Caracal, Super Puma); Limited payload capacity, making it unsuitable for mass rescues; Less equipped for extreme weather conditions or rough sea rescues (compared to dedicated SAR helicopters like the NH90 or Super Puma).

RESCO

The RESCO (Recherche et Sauvetage au Combat, or Combat Search and Rescue – CSAR) role is a critical mission aimed at recovering downed pilots and personnel in hostile environments.

Key Aspects of the Fennec in RESCO Operations are: Primary Role: The AS555 Fennec is a light, multi–role helicopter used mainly for training, liaison, and light attack missions. However, in the RESCO role, it provides supporting capabilities rather than being the primary rescue platform; The EC725 Caracal, a more heavily armed and armoured helicopter, is the AAE's primary RESCO asset. The Fennec often operates in a complementary role, offering reconnaissance, escort and coordination.

Mission Support: Close Air Support (CAS) and Escort: Fennecs equipped with FN MAG 7.62mm machine guns provide cover for rescue teams and protect the extraction of personnel; Reconnaissance and Coordination: They help locate the downed personnel and guide heavier

assets (Caracal or other helicopters) to the rescue site; Forward Air Controller (FAC): Some versions are used for directing strikes and coordinating with fighter aircraft for overwatch.

Operational Use: Deployed within mainland France for quick response to training incidents; Used in overseas territories and operations, including combat zones where France has air assets deployed; They often operate alongside Special Forces in hostage rescue and extraction missions.

Limitations: Lacks the armour, range, and heavy firepower of larger CSAR helicopters like the Caracal; More effective in low–intensity environments rather than contested, high–threat areas.

MASA

The two helicopter squadrons EH 1/65 and EH 3/67 execute the MASA (Mesures Actives de Surete Aerienne) These tasks focus on ensuring airspace security, particularly against slow–moving aerial threats like light aircraft, ultralights, and drones that may evade traditional jet fighter intercepts.

Deployment and Readiness: Quick Reaction Alert (QRA): The squadron maintains a constant state of readiness, allowing rapid deployment of Fennec helicopters

to respond to airspace intrusions or potential threats; Strategic Base: Operating from BA 107 Villacoublay and BA 115 Orange provides quick access to critical areas, including urban and sensitive zones like airports and governmental buildings.

Interception Capabilities: Engaging slow movers, the Fennec helicopters are equipped with high–precision optical sensors and surveillance systems for identifying targets; Communication equipment to establish contact with the intruding aircraft, assess intent, and guide them if necessary; The helicopters can fly at speeds and altitudes matching those of slow moving targets, unlike fighter jets, making them more effective for this role.

Coordinated Operations: In Air Traffic Coordination, the squadron works closely with civilian air traffic control and military radar stations to detect and track unauthorised or suspicious aircraft. In cases requiring escalation, the Fennecs coordinate with fighter jets (e.g., Rafale or Mirage) to manage a more significant threat.

Active Engagement: If an aircraft is deemed suspicious but non–hostile, the Fennecs escort it to a safe location. If necessary, visual and radio warnings are given. The Fennec crew can use non–lethal measures like firing flares to signal a non–compliant aircraft to land.

Training and Adaptation: The squadron conducts regular training for MASA operations, including mock intercepts and coordination drills with other military and civil units; They adapt to evolving threats, such as drones or ultralights used in criminal or terrorist activities.

Night and Adverse Conditions: The Fennecs are equipped for night operations and adverse weather, ensuring mission capability around the clock.

Future

As the AS555 Fennec is reaching the end of its operational life, the Airbus Helicopter H160M Guepard helicopter programme will prepare for the arrival of the new helicopter type around 2027.

Commander Gregoire of EH3/67 said that the upcoming AIrbus Helicopters H160M "Guepard" helicopter will revolutionise their operations. This advanced aircraft, set for delivery in a few years, promises greater speed, altitude and range. Equipped with cutting–edge technology such as tactical data links, state–of–the–art radars and next–generation thermal cameras, the Guepard will enhance the squadron's ability to detect and intercept targets quickly and support aerial operations more effectively. The unit is already preparing for this transition, including infrastructure upgrades to accommodate the new fleet.

The squadron's buildings at BA Villacoublay will undergo significant renovations to support the H160M Guepard's integration in a few years. These improvements are part of broader efforts to ensure the unit is fully equipped to meet the demands of modern air defence and operational support missions. Commander Gregoire

Forces, aims to unify fleet operations across various military branches. Although the H160 is still in its early stages, with deliveries expected around 2027, its potential has already sparked preparation and adaptation efforts. The squadron's infrastructure is set to evolve alongside these advancements. While the squadron's location may remain unchanged, its facilities and organisation will undergo substantial upgrades to meet the demands of the new programmes.

EH3/67 Vice Commander: Commander Gregoire, the second–in–command at his unit, shared insights into the training, operations, and future advancements of the squadron. As a leader, he highlighted the unit's dedication to operational readiness and their plans for modernisation. The squadron conducts approximately 2,800 flight hours annually. Out of this, around 500 hours are devoted to operational air defence missions, with the remainder focused on preparation and training. Training is rigorous and includes weekly and even daily exercises such as hoist operations, stretcher drills, and deployments in complex zones with medical teams. This constant training ensures seamless synergy among team members.

Discussing mission scenarios, Commander Gregoire outlined three primary types of air defence operations: aerial assistance, air policing and counterterrorism. Fortunately, the squadron has not had to engage in real–world counterterrorism missions but remains prepared through extensive training. In air policing and assistance missions, they have successfully intercepted and addressed infractions, such as unauthorised entries into restricted airspace, especially during high profile events like the Olympic Games. Their proactive measures have consistently resolved situations without the need for force.

Pilot/planner: Captain Sandy, a distinguished pilot, expressed confidence in the team's readiness and the strategic planning underway to embrace these advancements.

Interviews EH3/67

In October 2024, I had some interviews with EH3/67 personnel, during their 60th anniversary.

EH3/67 Commander: Lieutenant Colonel Francois, commanding officer of the EH 3/67 Parisis helicopter unit emphasised the importance of inter–army coordination in aligning the fleet's capabilities. One of the significant advancements is the introduction of the Airbus Helicopter H160M Guepard helicopter programme. This initiative, spearheaded by the Ministry of the Armed

shared her journey and experiences within her unit, highlighting significant milestones and operational details. As the deputy head of operations in her squadron, Sandy expressed pride in being part of her first unit as a pilot, a place she considers her "home unit." She began her military career in the French Air Force as a non–commissioned officer specialising in intelligence operations. In 2015, she seized the opportunity to transition into a pilot role after passing the military air exam. With determination, she fulfilled her dream of becoming a helicopter pilot and joining this prestigious unit. Over the past five years, she has accumulated over 1,000 flight hours.

Helicopter gunner: Corporal Chef Jorge is the gunner embedded in the Fennec helicopter, He spent a few years in the Special Forces of the French Air Force before joining EH3/67 as the board gunner. Georges highlighted the pathway for individuals to join the MASA, including a screening process, a sniper training course, and the MASAs integration programme. This openness ensures that skilled personnel from various backgrounds, including those in protection units, can transition into the MASA, provided they meet the rigorous standards.

Text and photos:
Joris van Boven and Alex van Noije

The old US Navy C–47 in the Netherlands

On 3 May 2025, a historic aircraft visited Eindhoven air base. To commemorate the 80th anniversary of the Allied victory in World War II, a Douglas R4D–6S nicknamed 'Ready 4 Duty' and registration N151ZE undertakes a transatlantic voyage from Texas to Europe. This is a historic World War II US Navy aircraft operated by the Dallas, Texas, USA–based Commemorative Air Force (CAF). This trip is made to honour the sacrifice of American and Allied sailors during World War II.

Ready 4 Duty's ambitious 12–week "Navy to Victory Tour," running from April through July 2025, includes performances at more than a dozen aviation and ceremonial events in the southern and eastern US, Iceland, the United Kingdom, France and the Netherlands.

"Safely operating an 80 year–old aircraft for such a long journey is no small feat," stated Christopher Volpe, chief coordinator of the Navy to Victory Tour. "But helping build a lasting legacy for veterans makes all the preparation and sacrifice worth it." According to Volpe, the advanced age of World War II veterans, the youngest of whom are now ninety seven, played a major role in the decision to organise this intercontinental tour. "The window to honour these men and women while they are still with us is closing quickly," Volpe said. "For them, their families and society as a whole, we are committed to honouring them on this 80th anniversary of the Allied victory."

The iconic aircraft will also carry artifacts from surviving World War II American warships such as the USS Yorktown, Battleship Texas and USS Laffey during the Navy to Victory Tour. The exhibition, specially curated for this tour, marks the first time that artifacts from so many American warships from World War II have been publicly displayed together.

Built in 1944, 'Ready 4 Duty' is a Douglas R4D–6S, the US Navy version of the legendary DC–3 and C–47. As the last flying example, the aircraft is a showpiece of the Dallas/Fort Worth Wing of the Commemorative Air Force, a nonprofit organisation dedicated to preserving and celebrating the history of World War II aviation.

The N151ZE (c/n 26408/14963) was ordered by the USAAF, but delivered to the US Navy in 1944 as BuNo 50783. The aircraft was converted into an R4D–6S in 1953. Four years later the aircraft was withdrawn from service and sold to the United States Department of Agriculture as N151Z. The next owner was the Florida Department of Forestry, where it served as N151ZL from 1976 and as N151ZE since 1980. In 1983 the Commemorative Air Force acquired the rare Navy Dakota for preservation, still as N151ZE.

Commemorative Air Force (CAF)

Founded in 1957, the Commemorative Air Force (CAF) is a non–profit organisation dedicated to preserving and exhibiting the history of military aviation. With an airworthy fleet of more than 180 vintage military aircraft – the largest flying collection in the world – the CAF brings history to life through flights and immersive experiences. Based in Dallas, Texas, United States of America, the CAF operates numerous locations across the country, all united by a shared mission: Educate, Inspire and Honour.

Each year, through the efforts of thousands of volunteers, CAF's educational programmes engage an estimated 20 million Americans and provide hands–on access to history.

Eindhoven AB

On 3 May 2025, the 'Ready 4 Duty' landed at Eindhoven Air Base and then provided several sightseeing flights on 3 and 4 May. These sightseeing flights were organised by the Royal Netherlands Air Force Historical Flight, based at Gilze–Rijen Air Base. Due to operational circumstances, these sightseeing flights were not possible from Gilze–Rijen Air Base and the sightseeing flights on Saturdays and Sundays were operated from Eindhoven AB. On 5 May, the 'Ready 4 Duty' flew to Gilze–Rijen Air Base. In 1985, this special aircraft also visited Eindhoven AB once, for the commemoration of the 40th anniversary of the end of the Second World War.

Photos and text: Joris van Boven

Ramstein Flag 2025: Showcasing European Deterrence

Ramstein Flag 2025 is an international NATO exercise held at Leeuwarden Air Base in the Netherlands, involving multiple airbases across Europe, including Denmark and the United Kingdom. The exercise, which began on 31 March 2025, involved over ninety fighters from various NATO countries and focussed on preparing units for a major war scenario to defend European territory. The exercise included air defence missions, tactical information exchange, and night flying, emphasising the importance of integration, cooperation, leadership and realistic training scenarios.

Key Locations and Participants:

Leeuwarden Air Base: Central hub with 45 aircraft, including F–35A, Eurofighter EF2000, F/A–18, Rafale B/C, F–16C, MQ–9 and JAS–39 Gripen. The base supports around 700 to 900 military personnel from various detachments.

Other airbases: Operations also take place from Skrydstrup (Denmark), RAF Marham and RAF Fairford

(UK). Additional support comes from tankers and surveillance aircraft operating from various European bases.

Participating countries: United States (Europe), Germany, Finland, France, Greece, the Netherlands and Sweden.

Objectives and Missions:

Air Defence: Denying enemy fighter aircraft access to certain areas and keeping the airspace free of missiles. This includes both air and missile defence missions.

Tactical Information Exchange: Exchanging tactical information and being able to quickly move combat units to respond to developments.

Night Flying: Training in realistic scenarios, including night operations, to ensure readiness for any situation.

Adapting to a Changing World: The exercise reflects the changing geopolitical landscape, particularly the conflict in Ukraine. NATO's focus has shifted from global peacekeeping to defending European territory. The exercise emphasises the importance of training together to develop integration, cooperation, leadership, and night flying skills. Lieutenant General Andre Steur and Commodore Marcel van Egmond highlighted the significance of adapting to new threats and the importance of exercises like Ramstein Flag in maintaining readiness and deterrence.

Forming the Winning Team: The exercise aims to demonstrate NATO's determination and ability to operate as a cohesive unit. Training together helps participants understand each other's strengths and weaknesses, making the alliance stronger and more effective. The exercise included coordination through multiple locations,

planning missions at a distance, and executing and debriefing together. This approach ensures that all participants are well prepared and can operate seamlessly as a team.

In 2022, the invasion of Ukraine marked a significant turning point in European history regarding the common feeling of safety. Van Egmond explained that NATO's response involved flying missions from home bases to Poland to support deterrence efforts. The exercise at Leeuwarden demonstrated NATO's determination and the importance of training together in realistic scenarios, including night operations. The airspace used for the exercise is limited, but the alliance utilises multiple airbases to coordinate missions effectively.

Defending by Deterrence: Missions focus on integrated air missile defence and counter A2/AD (Anti–Access/Area Denial) operations. Air power is crucial for projecting force quickly and accurately, using information sharing to detect, locate and attack enemy assets. The exercise demonstrated the capacity of air power and the ability to operate in a multi–disciplinary environment, integrating assets from space, sea and land. Van Egmond emphasised the importance of air power in projecting force over distance and concentrating it at specific points. This approach allows NATO forces to put pressure on opposing forces quickly and accurately. The exercise aims to demonstrate NATO's capabilities and deter potential threats by showing the alliance's strength and readiness.

Frisian Flag vs. Ramstein Flag: Ramstein Flag is larger and more complex than Frisian Flag, involving multiple airbases and night flying. The exercise includes over 90 aircraft and emphasises communication and coordination across different locations. The transition from Frisian Flag to Ramstein Flag reflects the evolving nature of NATO exercises and the need for more comprehensive and realistic training scenarios.

Andre Steur explained that Ramstein Flag replaces Frisian Flag and involves more participants and airbases across Europe. The exercise includes night flying, which is more realistic and necessary for current geopolitical developments. The coordination required for missions from multiple locations is a key aspect of the training.

Objectives of Ramstein Flag: The exercise aims to train allied air forces and test their responses to Article 5 scenarios. Key focus areas include Counter Anti–Access/Area Denial (C–A2AD), Integrated Air and Missile Defence (IAMD), Agile Combat Employment (ACE), and information sharing. The integration of these efforts ensures that NATO forces are prepared to respond to any threat effectively.

Lieutenant Colonel Wim van Kampen and Lieutenant Colonel Martin Friis were responsible for planning and executing the exercise. They emphasised the importance of integrating air, land, maritime, cyber and space operations to ensure effective responses to threats. The exercise involved over 2000 personnel and 90 aircraft

from 15 NATO nations, demonstrating the scale and complexity of the training.

Counter Anti–Access/Area Denial: C–A2AD measures neutralise adversary military infrastructure, allowing friendly forces to move freely. The exercise trains participants in this discipline, integrating air, land, maritime, cyber, and space operations. This approach ensures that NATO forces can operate effectively in contested environments and maintain freedom of movement.

Integrated Air and Missile Defence: IAMD unites multiple capabilities to protect against air and missile threats. The exercise involves defending airspace with a

mix of aircraft and ground based or sea based air defence capabilities. This multi–layered defence approach ensures that NATO forces can respond to rapidly advancing threats and maintain control of the airspace.

Agile Combat Employment: ACE improves resilience and survivability by generating air combat power from dispersed locations. Although not executed in this edition, ACE involves moving aircraft to different locations to stay unpredictable. This approach ensures that NATO forces can operate flexibly and remain resilient in the face of threats.

Friis explains that ACE involves moving aircraft to different locations to stay unpredictable and avoid targeting by opponents. This approach requires coordination and

training to ensure that aircraft can be serviced and re–armed at various locations. The exercise aims to implement ACE in future editions to enhance resilience and survivability.

Built–up of Ramstein Flag: The exercise builds up intensity over two weeks, starting with IAMD, followed by C–A2AD, and ending with Air Zero, supporting ground operations. Participants play roles in both 'Blue Force' and 'Red Force,' emphasising communication and teamwork. This progression ensures that all participants are well prepared for a range of scenarios and can operate effectively as a cohesive unit.

Great Results on the Scene: The exercise was successful, with nearly all missions flown and few aborted flights. Lessons learned included improving tactics, training levels, and threats for training purposes. The exercise demonstrated the effectiveness of NATO's training and the ability to operate as a cohesive unit.

Van Egmond reflected on the success of the exercise, highlighting the importance of continuous improvement in tactics and training levels.

The exercise provided valuable lessons and demonstrated the effectiveness of integrated air missile defence and counter A2/AD operations.

The exercise also highlighteded areas for improvement, such as better threats for training purposes and more tankers and assets available during training.

Aircraft type	Country	Based	Remarks
F-35	The Netherlands	Leeuwarden AB (NL)	
JAS39 Gripen	Sweden	Leeuwarden AB (NL)	
F-18	Finland	Leeuwarden AB (NL)	
EF2000 Eurofighter	Germany	Leeuwarden AB (NL)	
F-16	Greece	Leeuwarden AB (NL)	
F-35	United States	Leeuwarden AB (NL)	
Rafale	France	Leeuwarden AB (NL)	
Falcon 20	United Kingdom	Leeuwarden AB (NL)	Draken international
F-35	Denmark	Skrydstrup AB (DK)	
F-35	Italy	Skrydstrup AB (DK)	
JAS39 Gripen	Hungary	Skrydstrup AB (DK)	
E-550 CAEW	Italy	Skrydstrup AB (DK)	
F-18	Spain	Marham AB (UK)	
F-16	Turkey	Fairford AB (UK)	
KC-135	Turkey	Fairford AB (UK)	
F-16	Romania	Fairford AB (UK)	
CC-150	Canada	Eindhoven AB (NL)	
Typhoon	United Kingdom	Lossiemouth AB (UK)	homebase
E-3 AWACS	NATO	Geilenkirchen AB (DE)	homebase
E-7 Wedgetail	Turkey	Geilenkirchen AB (DE)	
A330MRTT	MMU	Eindhoven AB (NL) Cologne AB (DE)	homebase
A330MRTT KC-135	France	Istres AB (FR)	homebase
A330	United Kingdom	Brize Norton AB (UK)	homebase
KC-767	Italy	Pratica di Mare (IT)	homebase

Article and photos: Joris van Boven and Alex van Noye

USAF selects Boeing for next–gen fighter platform

The US Air Force announced Boeing has been awarded a contract to design, build and deliver its next generation fighter aircraft. Next Generation Air Dominance (NGAD) Platform will usher in a new generation of United States fighter jets that brings leap ahead capability in range, survivability, lethality and adaptability. The NGAD Platform is the central node in the NGAD Family of Systems. For nearly a century, Boeing has produced many of the most advanced combat aircraft for military customers around the globe including the P–51 Mustang, F–4 Phantom, F–15 Eagle, F/A–18 Hornet and EA–18G Growler, among others.

Saab and Radionix MoU

Saab and the Ukrainian defence company Radionix have signed a Memorandum of Understanding (MoU) regarding the intention to form a strategic collaboration relating to sensors and defence electronics, aiming to strengthen Ukraine's defence capabilities. The collaboration aims to focus on areas within sensors and defence electronics development and maintenance across all domains, leveraging the strengths of both companies.

Jetstream delivers 1st Saab 340B(F)

Jetstream Aviation Capital, LLC delivered one Saab 340B(F) cargo aircraft to Pascan Aviation of Montreal, Canada. The aircraft, serial number 340B–219, is the first Saab 340B(F) cargo aircraft to be operated in Canada since the approval of the Taby Air Maintenance Saab 340B(F) cargo conversion by Transport Canada in December 2024. It is the ninth of a multi–aircraft Saab 340 commitment between Jetstream and Pascan, and will be used for Pascan's scheduled cargo operations on behalf of a global integrator within eastern Canada, as well as for ad hoc charters.

Saudi Arabia for 2000 APKWS

Saudi Arabia has requested to buy two thousand (2,000) Advanced Precision Kill Weapon Systems (APKWS). The following non–MDE items will be included: APKWS spare parts; support equipment; missile software; training; US Government and contractor engineering, technical, and logistics support services; and other related elements of logistics and programme support. The estimated total cost is $100 million.

DRF Luftrettung for 10 H140s

DRF Luftrettung and Airbus Helicopters have signed a Letter of Intent (LoI) for the purchase of ten H140 helicopters. The German helicopter emergency medical services operator agreed to be one of the launch customers for the new H140 helicopter that was unveiled at the vertical lift industry show, VERTICON, in Dallas, Texas.

New York Police for H160 and 3 H145's

New York State Police has placed an order for an Airbus H160 and three H145 helicopters, making them the first law enforcement agency in the US to add an H160 to their fleet. This announcement follows the agency's order of two H145s in 2024 as New York State Police moves to replace their existing helicopters.

Navantia's 2nd S80 starts tests

The S–82 'Narciso Monturiol' submarine, second of the series of four that Navantia is building for the Spanish Navy, has successfully accomplished its first safety milestone: the "power up" of the equipment. The "power up" consists of the start–up of the main and emergency electrical distribution networks. From the completion of this milestone, the various equipment can be safely powered from their distribution panel.

BAE naval gun for Colombian Navy

BAE Systems has received a contract from Damen Naval for a Bofors 40 Mk4 naval gun system to be installed for anti–aircraft and anti–surface operations on the PES frigate of the Colombian Navy – a Damen Naval SIGMA class ship. With more than 70 systems sold to eight countries since 2015, Colombia is the second Latin American customer "to adopt the highly versatile and multi–target naval gun". Brazil also selected the Bofors 40 Mk4 as their standard primary gun system for small to medium–sized vessels.

JSA orders 50 A320neo's

Jackson Square Aviation (JSA), has placed a firm order for 50 A320neo Family aircraft. The agreement is JSA's first direct order with Airbus, making the lessor a new Airbus customer.

Gray Eagle ER makes 1st PLEO flights

General Atomics conducted its first flight test series of the Gray Eagle Extended Range (GE–ER) Unmanned Aircraft System (UAS) using a Proliferated Low Earth Orbit (PLEO) satellite constellation for aircraft communications. Contracted by the US Army, the flight tests began in January 2025 and mark a significant milestone, making GE–ER the first US Army aircraft to be controlled over the new satellite service.

Indra and Rheinmetall cooperation for Leopard 2E

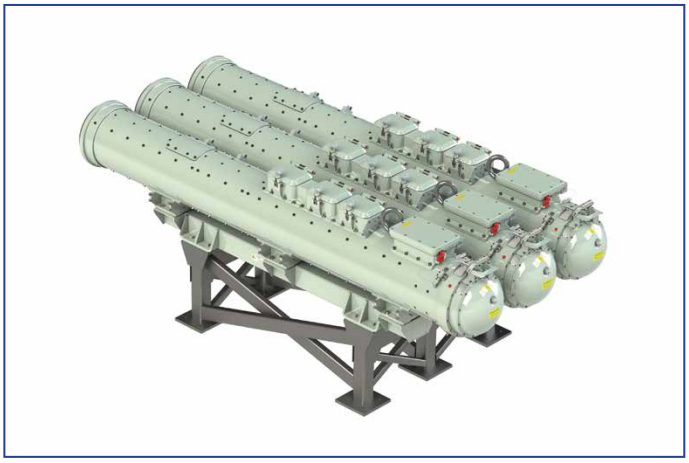
Indra and Rheinmetall Electronics have signed an agreement to propose an upgrade of the Spanish Leopard 2 E Combat System and incorporating state–of–the–art technologies that are compliant with future C4I solutions in combat platforms to come.

Airbus wraps up VERTICON

Airbus Helicopters wrapped up the 2025 edition of VERTICON with 118 commitments, including 63 firm orders, from customers worldwide for a variety of its multi–mission helicopters. Major highlights included more than 74 commitments for the H140, the new light twin engined multi–mission helicopter that was unveiled at the show.

SEA torpedo launcher system for RMN

SEA has secured a contract extension with Lumut Naval Shipyard (LUNAS) to supply its fixed triple configuration Torpedo Launcher System (TLS) to the Royal Malaysian Navy (RMN). The agreement will see five Maharaja Lela–class Littoral Combat Ships (LCS) equipped with the advanced lightweight torpedo launcher capability, significantly enhancing the littoral water defences of the RMN.



Anduril CUAS systems for USMC

Anduril has been awarded a $642 million, 10 year Indefinite Delivery/Indefinite Quantity (IDIQ) Programme of Record by the US Marine Corps to deliver, install and sustain Installation–Counter small Unmanned Aircraft Systems (I–CsUAS). Anduril's comprehensive I–CsUAS solution leverages the power of AI and advanced autonomy, equipping the US Marine Corps with hardware and software capabilities required "to address evolving aerial threats and protect installations worldwide over the next decade".

Thales sonar suite for Orka

Thales, a long standing partner of both Naval Group and the Royal Netherlands Navy, will provide a comprehensive suite of high performance sonar systems for the future class of submarines that will replace the Walrus class vessels in service today. The sonar suite features high performance acoustic sensors, including bow, flank and obstacle avoidance sonars, an intercept array, a passive towed array sonar, an underwater voice communication system, an echo–sounder and signal processing racks.

Electra secures 2,200 pre–orders for EL–9

Electra has secured 2,200 pre–orders for its EL9 Ultra Short hybrid–electric aircraft. Valued at nearly $9 billion, Electra's order pipeline is one of the largest in the Advanced Air Mobility industry. Electra's Ultra Short, which integrates blown lift and hybrid–electric propulsion to take off and land in just 150 feet, enables air operators to connect communities that lack aviation infrastructure, fly into airports with strict noise restrictions, create new opportunities and business models for cargo services, and save travelers significant time and hassle.

JAL orders 17 additional Boeing 737 MAXs

Boeing and Japan Airlines (JAL) have finalised an order for 17 737–8s to "leverage the fuel efficiency and flexibility of the 737 MAX". The airline aims to launch the new 737 MAX jets on its robust domestic network, amid continued record breaking tourism. This marks JAL's second order for the 737–8 and nearly doubles its 737 MAX backlog to 38 firm orders.

Patriot seeker deliveries hit record highs

Boeing's production of Patriot Advanced Capability–3 (PAC–3) seekers reached an all–time high in 2024, resulting in more than 500 deliveries. In early 2025, the company also set new monthly and 12 month rolling average production records. The seeker component enables the most advanced interceptors used by the Patriot air defence system to identify, track and defeat threats ranging from hostile aircraft to advanced ballistic and cruise missiles.

Sweden for four C–390s

Sweden officially committed to acquiring from Embraer four C–390 Millennium multi–mission aircraft, securing the necessary production slots. The official announcement of this commitment took place during LAAD Defence & Security 2025 in the presence of Peter Sandwall, State Secretary to Minister for Defence from Sweden and Bosco da Costa Junior, president and CEO of Embraer Defense & Security. This announcement follows the recent official signing of an agreement that stipulates that Sweden joins the Netherlands and Austria in the C–390 programme.

Portuguese AF in studies for KC–390 and ISR

The Portuguese Air Force officially announced its intention to join Embraer and the Brazilian Air Force (FAB) in collaborative studies to identify potential adaptations to the current KC–390 Millennium multi–mission tactical airlift to perform Intelligence, Surveillance and Reconnaissance (ISR) missions.

Philippines for 16 F–16s

Philippines has requested to buy sixteen (16) F–16 C Block 70/72 aircraft; four (4) F–16 D Block 70/72 aircraft; twenty–four (24) F110–GE–129D or F100–PW–229 Engines (20 installed, 4 spares); twenty–two (22)

Improved Programmable Display Generators (iPDG) (20 installed, 2 spares); twenty–two (22) AN/APG–83 Active Electronically Scanned Array (AESA) Scalable Agile Beam Radars (SABR) (20 installed, 2 spares), etc.

V2500 surpasses 300 million FH

IAE International Aero Engines AG (IAE) announced that the V2500 engine had surpassed 300 million engine flight hours of operational experience. Powering approximately 2,800 aircraft and serving more than 150 operators, the V2500 engine operates passenger, cargo, and military missions around the world. The engine currently powers the Airbus A320ceo family, including A321F passenger–to–cargo conversions, as well as the Embraer C–390 Millennium multi–mission military transport aircraft.

Sweden for 18 Archer's

This news was recently announced by Swedish Minister for Defence, Dr. Pal Jonson, in conjunction with a visit to the BAE Systems Bofors site in Karlskoga, Sweden. The Archer's are part of an artillery package, with five additional artillery location radar systems and funding, worth approximately $300 million.

Australia for AIM–120C and AIM–120D AAMs

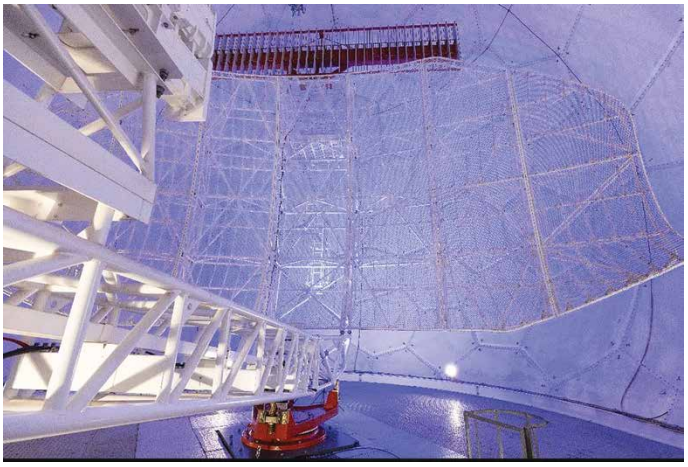
Australia has requested to buy up to two hundred (200) AIM–120C–8 Advanced Medium Range Air–to–Air Missiles (AMRAAM); and up to two hundred (200) AIM–120D–3 AMRAAMs.

785 IDV trucks for Dutch armed forces

IDV has been awarded, by the Materiel and IT Command (COMMIT) of the Dutch Ministry of Defence, the WTB tender for the supply and logistic support of 785 military logistic trucks. The trucks will enhance the capabilities of the Dutch Armed Forces and will be delivered between 2027 and 2029.

Thales launches TRAC SIGMA

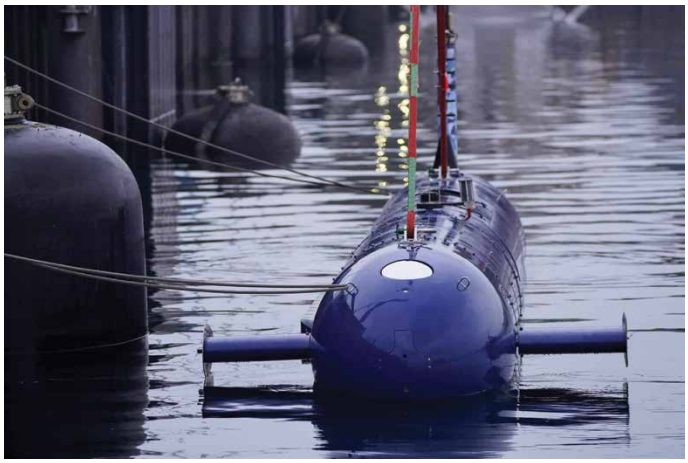
Thales unveiled its new multi–mission Primary Surveillance Radar, the TRAC SIGMA with



simultaneous capacity for Approach and Long–Range Air surveillance for both civil and military Air Traffic Control. In an increasingly congested air traffic environment, the new TRAC SIGMA L–Band radar is the only radar of its class to discriminate small aircraft at an extended range (300 km), helping ensure the 3 NM distance separation over the entire airspace and not just for final approach.

IAI and HAI sign strategic MoU

During the DEFEA exhibition, IAI (Israel Aerospace Industries) and Hellenic Aerospace Industry (HAI) signed a Memorandum of Understanding (MoU) to offer IAI's BlueWhale autonomous submarine system to the Hellenic Navy. This unique collaboration between the Hellenic and Israeli Aerospace Industries represents a significant milestone in the mutual defence and business cooperation between the two Nations.



UAE for 6 CH–47F Chinooks

United Arab Emirates has requested to buy six CH–47F Block II Chinook helicopters with air–to–air refuel probe capability and extended range fuel tanks; sixteen (16) T–55–GA–714A engines, (12 installed, 4 spares); fourteen (14) Embedded Global Positioning System (GPS)/Inertial Navigation System (INS) (EGI) devices with M–Code (12 installed, 2 spares); eight (8) AN/AAR–57 Common Missile Warning Systems (CMWS) (6 installed, 2 spares); twenty (20) AN/ARC–231A communications security (COMSEC) radios (18 installed, 2 spares); and twenty (20) M–240 machine guns (18 installed, 2 spares).

UK certifies Protector as 1st of its kind RPA

The UK's Military Aviation Authority has issued a Military Type Certificate to the Royal Air Force's Protector RG Mk1 uncrewed aircraft, also designated the MQ–9B, certifying that it has passed a rigorous airworthiness assessment and verifying it's safe to operate without geographic restrictions, including over populous areas. GA–ASI is the first manufacturer of large, unmanned aircraft to receive an MTC based on rigorous compliance with STANAG 4671, the NATO standard for unmanned aircraft system airworthiness.

Saab in lightweight torpedo order

Saab has received an order from the Swedish Defence Materiel Administration (FMV) for the delivery of Saab Lightweight Torpedoes (SLWT) and torpedo tubes. The order value is approximately SEK 1.3 billion, with the start of deliveries during 2026. Saab Lightweight Torpedo, named Torped 47 by the Swedish Armed Forces, is Sweden's new light torpedo system aimed at strengthening Sweden's naval defence capabilities. The torpedo is intended primarily to be used from submarines and surface ships, but it is also prepared for integration on helicopters.

Moog missile CAS performs flawlessly

Moog has successfully developed and delivered custom fin Control Actuation System (CAS) shipsets to Leidos in support of the Black Arrow Small Cruise Missile (SCM).

Leidos integrated Moog CAS shipsets into Black Arrow, an affordable mission adaptable delivery platform in the 200–lb class which is designed to support both kinetic and non–kinetic missions. In November, Leidos conducted a guided end–to–end flight test of Black Arrow from an AC–130J aircraft with Moog hardware accurately steering the missile throughout the test.

Turkiye for 53 AIM–120C–8's

Turkey has requested to buy fifty–three (53) AIM–120C–8 Advanced Medium Range Air–to–Air Missiles (AMRAAM); and six (6) AIM–120C–8 AMRAAM guidance sections. The following non–MDE items will be included: AMRAAM containers and support equipment; Common Munitions Built–in–Test (BIT) Reprogramming Equipment (CMBRE); spare parts, consumables and accessories, repair and return support; weapons system support and software, etc. The estimated total cost is $225 million.

Turkiye for 60 AIM–9X Sidewinder Block IIs

Turkey has requested to buy sixty (60) AIM–9X Sidewinder Block II All Up Round (AUR) missiles and eleven (11) AIM–9X Block II Tactical guidance units. The following non–MDE items will be included: missile containers and support equipment; spare parts, and missile support, US Government and contractor engineering, technical, and logistics support services; and other related elements of logistics and programme support. The estimated total cost is $79 million.

Qatar Airways for 210 Boeing's

Qatar Airways and Boeing announced that the carrier will purchase up to 210 widebody jets, which sets new records as the largest widebody order for Boeing, including the largest order for 787 Dreamliners and Qatar Airways largest ever order.

GE Aerospace and Qatar for 400+ GE9X and GEnx engines

GE Aerospace and Qatar Airways announced a significant expansion of their long standing partnership with the signing of multiple deals for new GE9X and GEnx engines during US President Donald J. Trump's visit to Doha. As part of the visit, Qatar Airways signed an agreement for more than 400 engines, including 60 GE9X and 260 GEnx engines, with additional options and spares, to power its next generation Boeing 777–9 and Boeing 787 aircraft; the largest widebody engine purchase in the history of GE Aerospace.

Europe ramps up missile production

The MBDA Annual Report press conference, presented in Paris by CEO Eric Beranger, provided a comprehensive update and general overview of European complex weapons business in recent times. This was hardly surprising in the context of the war in Ukraine, fears of China's expansion in Asia Pacific, and the repercussions emanating from the arrival of Donald Trump in the White House in Washington. The impact all this is having on the immediate plans and future aspirations of Europe's largest and most important supplier of missiles and other advanced weapons were described in some detail, despite the fast moving and complex eco–political backdrop, which now also may have to include the introduction of selected trade tariffs by the US. The close international relationships established over many decades between the US and its defence and industrial partners has been subject to unprecedented scrutiny over the short period since the new US President has arrived, leading to serious questioning in Europe on fundamental aspects of defence procurement. Freedom of action and the protection of sovereign capabilities is in the spotlight as never before.

The US has been warning European leaders for years that they must bear a bigger share of their collective defence burden, and following the increase in global insecurity this is now at last being recognised as a top priority. Within NATO a new realism has emerged, which translates into widespread pledges of increased defence spending and restoration of defence capabilities which have been allowed to fall behind the re–emerging threats from Russia and China. The efforts within MBDA to address the undoubted challenges facing industry in ramping up at speed and in depth for a long term enhanced capability were outlined at the press conference. As a fully integrated advanced weapons manufacturer, operating across many national countries, MBDA is well placed to help forge a new era in European defence with an outstanding product line, well suited to the biggest challenges facing Western defence forces globally, and now the task of increasing the flow of products, speeding up new developments and integrating them into service can be seen to be well on–track.

The company is the only European group that is actively engaged in delivering a comprehensive portfolio of sovereign complex weapon capabilities and this now really matters as over–reliance on US supplied weapons has introduced, under ITAR restrictions, programme delays and imposed dependence on US deep support for maintenance and integration on many cutting edge aircraft and operational systems. Beranger highlighted the importance of retaining design authority on key complex weapons to preserve maximum flexibility in how new weapons are designed, tested, developed, manufactured, and delivered and sustained in service, with regular upgrades. He said, "We didn't have to ask anyone else to adapt Storm Shadow and Scalp strike weapons to be integrated on Ukrainian Sukhoi aircraft, and we did it in weeks."

This new sense of urgency is now being applied to speeding up production rates across a broad range of complex weapons as more NATO nations expand their force levels to meet the agreed higher defence budget targets. Attacks on Western commercial shipping and warships in the Red Sea has resulted in extensive firings of Aster and, Sea Ceptor and capabilities as well as numbers are rising. Aster production is 50% up and the monthly missile production rate for Mistral has risen four–fold. Overall MBDA has raised missile production by 33% compared to the 2023 rate and by the end of 2025 the group will have doubled it. He pointed out that close cooperation with all the production partners in the supply chain were part of the expansion plan and they were responding very well, including making new facilities available and increasing work forces. Over 2,000 supplier companies are involved. This year 2,600 more skilled people will be hired by MBDA. Efforts were well in hand throughout the group to reduce timescales by half and as a part of this anticipation of future needs, such actions as preparing in advance sub–systems, are taking place ready for new urgent requirements that may arise.

Turning to new activities, the CEO said that together with customers the group was looking carefully at future needs both in terms of products and what numbers will be needed. The steady evolution of existing weapons will continue alongside new programmes and this will reflect the rapidly evolving nature of modern warfare in all domains. Air defence is a major area of development activity and improved Aster and Aquila will provide defence against hypersonic threats and for deep strike the FC/ASW will provide a true next generation AI–assisted air asset to follow Storm Shadow and Scalp. New loitering weapons, remotely controlled ammunitions, and directed energy laser weapons, such as Dragonfire, will help counter new threats that have been seen in the Ukraine conflict, such as mass drone and hypersonic missile attacks, and these will have multiple applications for air, land and sea defence. He said that we were all living in historic times and the nature of warfare is changing rapidly all around us. "Our job is to meet whatever governments decide they need and to make the means to gain operational superiority across all domains, and that includes space. Assets in space also need to be protected. In 2024 we had a 13.8 billion Euro order intake to bring our current backlog to 37 billion Euros, while new investment total will reach 2.4 billion Euros over the next five years."

Asked if the group will enter other areas of activity to expand the range of weapons on offer he stated, "We are always examining new developments and asking themselves if the company should be involved, but the key factor is there is no dogma involved here and it all depends on what the markets want and if it makes sense for us to develop these ideas or not." He pointed out that no other advanced weapons competitor had such a full range of solutions on offer, covering all aspects complex weapons requirements, and this provided a wealth of experience to meet currently anticipated customer needs well out into the next decade, and the recognised priority now was to increase production capacity which they are doing.

Article by Richard Gardner

Air Marshal (R) Harish Masand says...

.....Clearing the air: Lessons on accidents from the past

(Representational image of IAF MiG–29. Photo by Simon Watson)

On 24 January 2015, we celebrated 29 years of the MiG–29 in the IAF with a reunion of the people who had served in the MiG–29 units, organised by the Dy C–in–C, SFC, Air Marshal KP Nair under the guidance of the current chief, Air Chief Marshal Arup Raha, who was one of the 12 pilots trained in the Soviet Union on the aircraft and thus a pioneer in the fleet. A very large percentage of the officers, pilots as well as engineers, attended the event in the WAC Mess though some did miss out and were sorely missed. I was particularly delighted to be there to renew old friendships as also to meet many younger officers who had served in the MiG–29 units after I had left the fleet and even after I had retired from the Air Force. Their energy and enthusiasm in making the evening a memorable one touched us older folks while the music made even old bones move easily. First lesson, therefore, was to spend more time with younger folks to let their youth rub off on you.

Some of the younger pilots, whom I had never met earlier, came up to me in the course of evening amidst the din of the great music and loud chatter and wanted to know more about the early days of the 29 in the IAF and my views on the issues, usually with reference to being the surviving CO of the first two squadrons and on my flying the 29 that they had heard about. It was during these conversations that I realised the myths that had developed around my flying, particularly display flying, over the years through word of mouth. I finally came to the conclusion that it was best to put the facts straight for the sake of posterity and history. The other issue that came up but on which I have written in some places and would write some more separately is the reliability and employment of the MiG–29 and its systems.

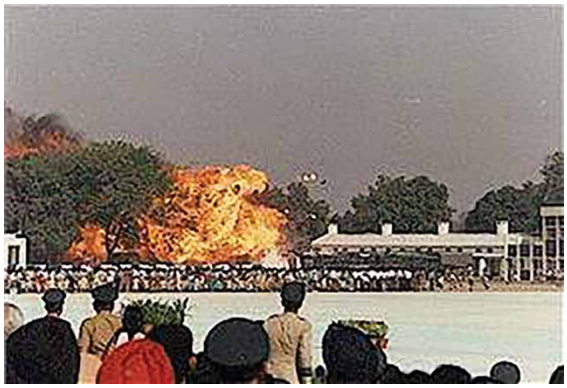
The most surprising issue was the story doing the rounds in the younger circles which led to a belief that I had flown the displays on the MiG–29 in a manner that somehow pushed Joe Bakshi on the Mirage 2000 and Rakesh Madan on the MiG–29 to try and emulate my performance which, unfortunately, led to the untimely loss of their lives. As a matter of fact, one of the bolder younger officers asked me directly if I had done this pushing on purpose. Nothing could be further from the truth because in both the cases I had talked to them on different occasions and cautioned them, going to the extent of telling them that, in my opinion, if they did not desist, things may go wrong one day. I had written this piece earlier and sent it out but it obviously did not get read by many. One of them who had been in the first lot on the MiG–29s and had served with me in many tenures recently even asked me if I had trained Rakesh Madan for low–level aerobatics and why he crashed. That has prompted me to publish this article so that the aviation community, and particularly the MiG–29 community, knows the true story.

I would take the case of Joe Bakshi first.

The Joe Bakshi Story

In 1987, I was commanding 28 Sqn. However, we received our new aircraft only in October 1987 after 47 Sqn received its full complement of aircraft. Apart from organising the squadron in this time from June 1987 while the other pilots were doing their pre–conversion course in the MCF, I was doing a couple of sorties with 47 Sqn to keep my hand in and had also been selected by C–in–C SWAC, then Air Mshl "Polly" Mehra, for low level aerobatics on the aircraft. On 25 September 1987, I was loaned two aircraft from 47 Sqn and flew to Hindon from Poona with Rathindranath as my No. 2 to do the MiG–29 display over Palam for the Air Force Day Parade on 8 October 1987. Soon thereafter, Joe Bakshi arrived with his Mirage–2000, also for the display. Almost everyone remarked that it was rather unusual to have both aircraft perform in the same event at the same time for a variety of reasons that I need not go into here. In any case, such decisions were not taken at our level.

Joe and I went back a long time, having served together in Adampur earlier in the 70s when he was in 1 Sqn and I was in 101. We had also competed against each other for the best FCL in 1984 in Jamnagar and were good friends. This was the first time when both the MiG–29 and the Mirage were parked together in the dispersal in Hindon. The difference between the size, lines and finish of the aircraft was so strikingly obvious that I coined the term DD or "Delicate Darling" for the Mirage. Joe laughed at the nomenclature and took it in good spirit. However, some others did not, as was obvious when the two aircraft came together again in Poona for performance evaluation and joint exercise. But that is a separate story and I have already narrated it in an earlier article in VAYU entitled "Rivals from the Same Team".



Wing Commander Ramesh 'Joe' Bakshi was an outstanding pilot and then CO No.7 Squadron 'BattleAxe'. He lost his life in a fatal Mirage 2000 crash on 8 October 1989, during the 57th Air Force Day celebration at Palam, New Delhi. (Images from Twitter/X)

Joe was a non–drinker but, the day he arrived, we met in the Mess and spent a good evening together filled with Joe cracking his latest jokes with his usual panache. During the course of the evening, I took the lead in dwelling on both of us performing during the AF Day Parade and the rivalry it could generate with the natural tendency to outdo the other. I told him that I only had about 25 hours on the MiG–29 and barely 30 total hours of flying since we had parted in Jamnagar in September 1984, as I had been in Staff College after that, while he had over 400 hours on the Mirage–2000. It was, therefore, natural that he would be able to do much better than me in taking the aircraft to its limits. On top of that, the Mirage had a fly–by–wire system claiming a sharper response to control inputs and safety at high angles of attack or "alpha" while the MiG–29 had the normal hydraulic controls and depended on the pilot's ability to manoeuvre and control it well.

On the flip side, the MiG–29 had tremendous thrust and a much better power to weight ratio, which, in conjunction with its aerodynamic configuration, enabled it to do certain manoeuvres that a Mirage could not do or sustain. As a good friend, therefore, I suggested to him that we should avoid copying each other's display profile; actually just stick to what we had practiced at our home bases and avoid the tendency to out–perform the other. As a matter of fact, I told him that I would even avoid watching his rehearsals to avoid the temptation of copying a little here and there and he should try to do the same. Joe agreed with me and we continued with our distinct display profiles in the rehearsals over Hindon as well as over Palam. As it happened, Joe used to take off for his rehearsal over base as I landed and by the time I taxied back to dispersal, most of his display used to be over and I would walk back from the aircraft without watching his display.

One day, I got talking to the technical airmen after switching off when one of the men pointed at the Mirage and asked me what the Mirage was doing so far away. I could not help but look in that direction and saw that Joe was obviously in the finishing manoeuvres. I found him in a downward Charlie but 3–4 km away across the runway in the far right corner of the airfield where the aircraft would have been barely visible to an average spectator from the viewing area. Though Joe must have finished this manoeuvre and pulled out at a safe height, the aircraft disappeared behind the trees on the other side of the runway for a few seconds before it emerged running in towards the spectator stand for a pull up, Vertical Charlie and exit.

That night, I sat down with Joe again and told him how I happened to see his downward Charlie and what I felt about the manoeuvre. I clearly remember telling him that, in my opinion, the spectator is there for the thrill and to enjoy the show. Even the professional is looking for the capabilities of the aircraft and the finesse with which the aircraft is flown but nobody is looking for a scare. I elaborated by saying that while he must have pulled out by a safe height after the downward Charlie, the way the aircraft disappeared behind the trees because of the distance and the angle of view, it was scary and the manoeuvre was not worthwhile. I also told him that if he must do this manoeuvre, he should do it a little closer to the audience where the aircraft would be bigger and visible all the time and fix the number of rolls and the height, say 3000 feet, from where the aircraft was capable of pulling out by 1000 feet even though our minimum height in the display was 300 feet. Thereafter, with a controlled descent in the last 20 degrees of the pull out, he could ease the aircraft down to 300 feet while accelerating for the next manoeuvre. Joe took this advice well and without any rancour while agreeing to keep it in mind.

IAF Mirage 2000. Photo by PSC for representational purposes only.

As it happened, soon after this conversation, I was called by the AOC–in–C WAC, Air Marshal MM Singh, on 7 October 1987 at the Hindon sports complex and told to go back to Poona whenever I wanted since they had decided to cancel the MiG–29 display for the AF Day function next day. The C–in–C told me that the reason was some objections on displaying the MiG–29 in the Air Force Day parade when it had not yet been formally inducted into the Air Force.

The formal induction ceremony finally took place in the first week of December in Poona where the Defence Minister, Mr. KC Pant, was the chief guest. There were no further rehearsals and I never saw Joe perform the manoeuvre again till the final fatal day on 8 October 1989. For the two years in between, all the low–level aerobatic displays for the Air Force Day parade, visiting delegations as well as Air Power Demonstration in March 1989 were performed by the MiG–29 in any case, as decided by Air HQ.

I think the way Joe performed that manoeuvre on 8 October 1989 is reasonably well known and the display itself should be available on video with Air HQ for those interested in reviewing it. I was in the audience that day, from Adampur, to receive my Vayu Sena Medal (VM). Joe flew the display exceptionally well and we all enjoyed it till the penultimate manoeuvre where he performed the downward Charlie about 1.5 km to the left and about 300m in front of the audience almost along Palam Road, placing him at around 10 O'clock to us. In this manoeuvre, after two full turns, he hesitated for a fraction of a second and then went for a third turn.

As he initiated that third turn, I popped out of my chair and muttered, "OMG, he is gone". My wife, Malini, pulled me and sat me down in my chair so as not to alarm the rest of the audience. I am sure many professionals in the audience had realised by now what was to come next. By the time Joe finished the third turn he was too low and, despite a sharp high "G" pull out, could not avoid hitting the ground about a kilometre short of the display area with splinters from his aircraft hitting some of the aircraft on static display right in front of the audience.

The tea after the show was naturally somber and people spoke in hushed tones with most of us having lost our appetite for any of the eats that were laid out. That afternoon, at the customary High Tea in the Air House, the Prime Minister, Mr. Rajiv Gandhi, came over and spoke to Malini and me including on this accident and Anatoly Kvotchor's ejection from the MiG–29 in the last Paris Air Show. I said very little on Joe's accident saying that Joe, perhaps, misjudged the altitude and the Inquiry would soon show what had really gone wrong but gave him my best analysis on the claimed bird–hit on Kvotchor's MiG–29 based on the 5 second clip shown on TV by Doordarshan. Remember, there was no cable or YouTube those days and Doordarshan's reception depended on the day, met conditions and the signal strength put out by the local TV transmitter based on the mood of the guy in charge.

IAF Mirage 2000. Photo by PSC for representational purposes only

Later that evening, while drying my sweat from the afternoon tea on a warm October day in WAC Mess room, without air conditioning for us lesser mortals, I got a call from Air Cmde SR Deshpande, then AOC Hindon and who was now the Presiding Officer of the CoI into Joe's accident, to tell me to delay my departure from Delhi to Adampur, where I was COO, by a couple of days and come and see him at Palam the next morning at 0900h. The first thing Deshu Sir asked me, when I reported to him the next morning, was to describe to him how I would perform such a manoeuvre in the MiG–29 since I was doing such displays, with the heights, number of turns and "G" during pull out etc. I told him that while I did not do a downward Charlie as a display manoeuvre, I normally did half a turn after recovery from the tail slide to face the audience since I performed the tail slide and the hammer stall for recovery heading away from the audience. The rate at which I rolled depended on the height at which I recovered from the hammer stall with 3000 feet or 900m as the cut off for my pull out from the vertical dive. Thereafter, I eased the aircraft down to 100m while positioning for the next manoeuvre. In the MiG–29, since the HUD was comparatively crude and the display was not always clearly legible particularly for an analogue man like me, I referred head–down to the pressure altimeter with a quick glance as I settled into a vertical dive after the hammer stall. In the case of the Mirage, most pilots I knew relied more on the HUD. So, in Joe's case, I asked Deshu Sir to presume that he had set his cut off altitude to, say, 2500 feet. In a vertical dive, depending on the sun's position and the glare on the HUD, it would not be too difficult to misread a 2 for a 3, particularly when things were happening fast, and think that the altitude was 3000 something when it was actually just 2000 something. Based on my visuals, I had estimated that Joe was just above 2500 feet when he hesitated and close to 1500 feet when he started the pull out that day.

Deshu Sir asked me to accompany him to the crash site thereafter and we had the FDR recovered. Sometime later, Deshu Sir was gracious enough to tell me that the hesitation in rolls was at about 2600 feet and the pull out commencement was at 1543 feet to be exact, if I remember correctly after all these years. At the speed Joe was at, it was impossible to pull out from a vertical dive in just 1500 feet. So, was it trying to emulate me or just a simple misread of a 2 for a 3 on the HUD that cost Joe his life that day in a manoeuvre that should have been avoided?

The Madan Story

In Rakesh Madan's case, I will need to give a little more background. Rakesh Madan joined 47 Sqn sometime in late 1987, I think, and was Day Ops by mid–1988. Air Cmde IS Bindra had taken over Air Force Station Poona from Air Cmde JP Singh in April 1988 and made it very clear that he did not like me on the very day he took over, for reasons I still don't know since I had never served under or with him before. But, that's another story. Anyway, sometime in 1988, the AOC called for a meeting on the visit of NDA cadets to the base. Therein, he announced that this time, 47 Squadron would put up an aerobatic display for the visit since my 28 Sqn, was hogging all the limelight doing such displays so far. Even a cat has only nine lives, as they say, and I had no desire to keep overdoing such displays so I was quite okay with this break. On the day of the visit, we watched the display from the squadron tarmac, like everyone else on the base. It was very obvious to me that Rakesh Madan had neither planned his low–level display nor practiced it. In one manoeuvre, while doing a roll along the runway, he barrelled and lost a significant amount of height barely managing to avoid hitting the ground.

IAF MiG–29. Photo by Simon Watson for representational purposes only.

That evening, I was in the Mess library picking up some books when Rakesh also came in. I sat him down with me for a few minutes and told him that while I had no authority to tell him anything since he didn't belong to my squadron, I felt that I had to speak on the display issue with him, as a senior, elder brother and more experienced person in this area. Rakesh did not object and listened to me. I explained to him that there were two kinds of pilots in my opinion; combat pilots and display pilots, and it was not necessary that a good combat pilot could also be a good display pilot. I further told him that he had a good reputation as a hardworking combat pilot but what he did that morning in the display scared me and had, perhaps, scared him too. Rakesh was honest enough to admit this and I advised him to lay off display flying for his own safety. Rakesh agreed and I didn't see him try and do any displays thereafter, at least till I got posted out as COO Adampur in June 1989. Unfortunately, he did write off one aircraft, KB 714 if I remember correctly, by going off the runway during the landing run in June 1989 just before I left on posting. The aircraft was written off and has been with the MiG–29 MCF/TETTRA ever since. I was told the reason given by Rakesh was that during the landing run, his hand accidentally moved one of the throttles to max causing an adverse yaw and the aircraft to swerve off the runway. Whatever be the cause, it did indicate that Rakesh had some problems and needed to be watched.

On 16 November 1990, I flew with Sqn Ldr Ravi Kumar in a MiG–23 trainer from Adampur to Jodhpur to attend the funeral of Wg Cdr Chakravorty, a dear friend of ours, in Uttarlai. "Chaks" had just lost his life in a night accident in a MiG–21Bis in the Sqn that he was commanding. On the return from Uttarlai, I got a ride in Air Mshl Ramachandran's, then SASO, SWAC, helicopter back to Jodhpur. Ramu Sir had earlier commanded 28 Sqn and I had the honour of hosting him along with many other senior officers during the silver jubilee celebrations of 28 Sqn in Poona in early 1988. Before we landed in Jodhpur, Ramu Sir asked me to read something he would send me overnight, have idli–dosas with "Amma", as his wife was popularly known, and him the next morning for breakfast and then leave for Adampur. Ramu Sir's wish was my command, not only because he was SASO but also a professional and a man I respected highly. Accordingly, I sat up till 0330h rapid reading through the Inquiry proceedings, presided by AVM Milind Shankar, on Rakesh Madan's fatal accident in Poona on 10 October 1990, if I remember the date correctly after all these years.

It transpired that during the Air Force Day parade of October 1990, Rakesh Madan was detailed as the main pilot with KT Sebastian as the stand–by for the low–level aerobatics display by a MiG–29. Rakesh had obviously gotten back into the display game. Reportedly, on the first day of the rehearsals in Delhi, Western Air Command decided to put KT as the main with Rakesh as the stand–by. The second rehearsal was reportedly watched by the C–in–C WAC, Air Marshal Prithi Singh, who ordered that Rakesh would not do any further rehearsals and accordingly informed the VCAS in Air HQ, then Air Mshl "Nimmi" Suri. Unfortunately, none at any level took further action on this. The recipe for disaster was already in place. Rakesh may still have escaped since he was posted out to DSSC as DS and supposed to leave Poona around mid–October. On 8/9 of October, immediately after his return from Delhi, he was inexplicably pushed onto the stage one last time to do a display for the visiting Russian delegation before leaving for DSSC, Wellington. It also emerged from the Inquiry that the AOC–in–C,

Air Mshl Babi Dey, visited Poona to inspect the arrangements being made for the Russian visit on the 9th of October, witnessed the rehearsal put up by Rakesh, and asked for some improvements.

IAF MiG–29. Photo by Simon Watson for representational purposes only

Hereafter comes an amazing tale. The COO, Gp Capt Adi Ghandhi, claimed in the Inquiry that he took the decision to add a then prohibited manoeuvre, a derry turn, to improve the horizontal display without informing the AOC, then Air Cmde S Krishnaswamy or "Kicha", as he was better known in the Air Force. Kicha claimed that he was not even aware of the inclusion of this manoeuvre and, at the time of the rehearsal, he was in the Officers' Mess supervising the layout of the dining table for the sit–down dinner. After I had left Poona in June 1989 for Adampur, Air HQ had banned both the derry turn as well as the tail slide that I used to display. Be that as it may, the briefing and parameters for this manoeuvre were also strange. KT stated in the Inquiry that he still followed the briefing and guidelines left behind by then Wg Cdr, you guessed it, the author and villain of this piece, Harish Masand with Arup Raha who was trained by me before I left for Adampur.

Going back a little further, around December 1988, I had verbally mentioned to Adi Ghandhi that I would finish two years of my command of the Sqn in mid–1989 and my stand–by aerobatic pilot, Ramesh Goyal, would also go to Staff College for the course in June 1989. So, could I train two other pilots for aerobatics displays on the 29 before I leave? Adi and I had a good equation. He was my elder brother's course–mate and I always treated him like an elder brother. When nothing happened till about February 1989, I sent this proposal in writing to him.

In early June 1989, I was told by Adi to train one pilot. This time, then Sqn Ldr Arup Raha, later CAS, volunteered to do such displays and I took up his training in the poor weather of Poona around that time of the year due to approaching monsoons and regular low clouds. I had planned a syllabus of around 10 sorties, dual and solo included, with progressively reducing heights for "Aru" but apart from about 2 duals and 2 other solos that I watched till he was brought down to 500 meters, I couldn't do anymore due to worsening weather. So, I left Aru with long talks on all possible facets of low–level displays that I could think of and my notes, of course. It so transpired that Aru soon left the squadron and left these notes, or a copy, with the next chosen display pilot, KT Sebastian.

The Inquiry proceedings had tabulated the recommended parameters of AF Poona for each manoeuvre against my notes. I had recommended an IAS of 750 km/h for the derry turn with a minimum of 650 km/h since the aircraft rolled better at higher speeds with a reduced tendency to drop its nose and barrel. Against this, AF Station Poona's current brief indicated a speed of 550–650 km/h. No explanation was given as to the reason why the recommended speed had been reduced. As I saw from the Inquiry proceedings, Rakesh initiated the derry turn at around 450 km/h. Fortunately, he was at a height of 450m AGL so that gave him some margin of error, though not enough as it turned out in this case. From a cursory read of the voluminous Inquiry proceedings that night, including the FDR readings, it was obvious that the cause of the accident was human error since the manoeuvre had not been performed correctly, and was also unauthorised at that time, as the Inquiry had established. I conveyed this to Ramu Sir the next morning over the sumptuous breakfast Amma had laid out but declined to comment on the statements made by various people involved, including the one by Kicha on the aircraft not behaving as per its design characteristics. Once I got back to Adampur, I replicated the manoeuvre at 1 km, to replicate the same height as in Poona, in the manner and with the same initial control inputs as Rakesh had done and found that the aircraft still went through the manoeuvre in 450m provided the controls were just held in that position without any further contrary movements.

Around Christmas of 1990, I was summoned by the CAS, Air Chief Marshal "Polly" Mehra, to Air HQ. As soon as I sat down, Polly Sir shoved the Inquiry proceedings in front of me and asked me to go through it and give him my opinion. I submitted that I didn't want to do it and that he had adequate number of MiG–29 qualified staff in his HQs for the job. I went on to say that the very fact he wanted me to look at it indicated that he did not agree with what the C–in–C had said or recommended. And who was that C–in–C; none other than Babi Sir who was supposed to take over from him as CAS on 1 August 1991, going by the DoB in the AF List. Therefore, if I did find something to counter what the C–in–C had said, on 1 August 1991 I would be hanging by the tree that came up to the 5th floor in Air HQ and was visible from his office. Polly Sir got pretty angry with my submissions and said things like how it was my duty to look at the Inquiry being the Godfather, expert and demo pilot on the 29, how he always had great confidence in my abilities and how he couldn't go to the GoI or the Russians with a claim that the aircraft had not behaved as per its design characteristics and make a fool of himself, particularly since Kicha had confused him with all kinds of TP language to support his contention. He also said that nobody would know I had been asked to study the Inquiry and that I could use a room where no one else would be allowed. I apprised him that everyone who mattered

in Air HQ, and perhaps the whole of WAC, already knew I was in his office and why, and that such things couldn't be hidden. He finally accepted my submission that I would only look at the technical portions and give him draft comments in that area without commenting on the other statements and issues, including action to be taken.

A detailed perusal of the Inquiry over the next 4 or 5 days in Air HQ helped reconstruct the entire fatal manoeuvre that Rakesh had performed. As must be apparent from the foregoing, Rakesh was in a turn, and if I remember correctly now a left turn, at about 450m AGL and at an IAS of 454 Km/h when he initiated the entry into a derry turn. Turning level at that speed, his alpha or angle of attack was about 22. Unfortunately, while initiating the derry turn, he did not relax his backward pressure and applied slight inward rudder to roll faster. With the stick moving further backwards, opposite to where it should have been moved, the aircraft promptly dropped its nose with the alpha increasing beyond the clock to 32 plus by the time it had rolled about 170 degrees, almost on its back with the nose about 20 degrees below the horizon and the stick almost in the gut. The aircraft was now completely stalled and, as was being demonstrated to every rookie pilot in slow speed handling sorties from 10 km, it went into a falling leaf phase on its back refusing to roll further as per its design characteristics clearly stated in the flight manual. Even then, the aircraft showed signs of recovery with the slightest positive movement of controls. Rakesh first reduced throttles to idle and reversed the ailerons, probably to try and roll upright. While moving the stick from left to right, the stick moved somewhat forward thus unloading the alpha. The aircraft immediately started rolling right but then Rakesh pulled the stick back and left, stalling the aircraft again and engaged afterburners while the aircraft went on its back hitting the ground in this attitude.

Accordingly, I made the draft technical comments of the CAS in about two paragraphs proving that the aircraft had behaved as per the design characteristics and that pilot error was the cause of the accident. When I put this in front of the CAS, Polly Sir blew his top and, with a lot of profanity, said things like, "Those sons of ————, the liars who don't want to take responsibility, I'm going to court martial and kill the b————" or words to that effect. I think Kicha had served under Polly Mehra in 28 Sqn of MiG–21 days in Tezpur or someplace and Polly was very fond of Kich and Adi and was disappointed at their statements which he considered as lies. I just stood in front of him quietly till he stopped frothing and then said, "Sir, I know I am now going beyond my brief but may I say something?" Prompt came a dirty look and a curt "What"? I then asked Polly Sir why he was presuming that people were lying. I added that anyone who is under an Inquiry would try to defend himself to the best of his ability and perhaps they didn't know the aircraft as well as I did. To all this, Polly Sir retorted with, "who the f—— asked you for your opinion?" I withdrew with polite murmurs of what I had already said, that I was exceeding my brief and stepping into areas that shouldn't concern me but since I was there when he was reacting angrily to the findings, I thought it was my duty to put things in the correct perspective. I then headed back to Adampur without narrating this episode to anyone. However, I do believe that my words had some calming effect on Polly Sir because both Kicha and Adi got away lightly with administrative action and rose to Chief and C–in–C levels respectively. Well, I didn't hang on the 1 August 1991 but much later due to my draft comments to the CAS in this Inquiry. But, that is another story.

Long stories but perhaps the only way I could put all the facts before people who may hear or believe otherwise. The fact remains that there are lessons to be drawn from these accidents on how to prevent mishaps in the future. I personally believe that there are always warning signs before any accident. The trick is to be watchful and tuned in, know the pulse of people around you, through various means of interaction and act on them in time. In both 1 Sqn as flight Commander and later in 28 Sqn as the CO, I had some people moved to other streams or out of flying. At the risk of being immodest, I also want to mention what one of my pupils reminded me of when I was debating whether I should fight my promotion case in 2003–04. He asked me to look around and see that none who had served with/under me, because of what I had taught them, was dead yet. I always did believe that I would be doing a disservice, both to the Air Force and to the individuals as well as their families, if I were to let people continue if they did not have the necessary skills or ability to do the job, and often said "I'd rather have empty cockpits on the tarmac than have no pilots or cockpits left". Perhaps, that also contributed to the zero accidents in every unit that I have been in since my supervisory days in the early 1970s.

May the legends be based on the truth and the right lessons be learnt.

The author of this series: Air Marshal (R) Harish Masand seen here at Aero India 2009 at Yelahanka, Bangalore.

25 Years Back

From Vayu Aerospace Review Issue III/2000

Acquisitions for IAF: AJT/AWACS

Amidst much behind–the–scenes activity during the on–going Thirteenth Budget session of Parliament, the Ministry of Defence's Standing Committee tabled reports on the Demands for Grants (2000–2001) on 19 April. The foremost, and also by far the longest pending, requirement is for the AJT, 66 of which are to be required for the IAF.

"Exercise Brahmastra"

The extremely sensitive and top secret 3–day "Exercise Brahmastra" which took place during the first week of May at Chandimandir Cantonment focused on the country's nuclear strategy and examined multiple scenarios. Chiefs of the Indian Army, Navy and Air Force, with their senior staff, were at the joint exercise.

French Defence Minister's visit

Reports from Paris point to the long pending Mirage 2000 buy being on top of the agenda to be discussed by French Defence Minister Alain Richard with the Indian authorities during his forthcoming visit to India on 18 May.

Navy to commission more ships

Eight more ships of the Indian Navy would be commissioned during the year according to the Defence Minister George Fernandes speaking at Calcutta on 14 April. The first in the series was the fleet tanker INS Aditya which was commissioned in Calcutta recently.

IN expertise for Thai Navy

The Indian Navy has offered to train marine aviators of the Royal Thailand Navy, this move following Thailand's acquisition of an aircraft carrier, the Chakri Narubet, from Spain. The Royal Thai Navy's aircraft carrier will embark ex–Spanish Harrier V/STOL fighters and Sea King ASW helicopters.

AI and "Poaching Into" IA market

The tables may soon be reversed, with Air India's still phantom strategic partner "simply using India as a feeder, using its rights to gain a foothold in the country and smother Indian Airline's network" according to airline analysts in New Delhi.

SIA request additional capacity

Singapore Airlines are keen to operate to new points in India, including Bangalore and Hyderabad, in addition to adding capacity on existing routes in the country. Having concluded that the growth in the Singapore–India air services sector was unlikely to slow down, SIA has requested early talks since the existing air service entitlements have been exhausted.

PHLs Dauphins

At the end of 1999, Pawan Hans topped 200,000 flight hours with their fleet of Dauphin helicopters. Pawan Hans was founded in 1985 under the authority of the Indian Civil Aviation Ministry and remains Europcoter's most important customer in India. Today, this company operates a fleet of over 30 helicopters.

British Airways to increase frequency

British Airways has announced two major changes to its services to India with effect from 30 October 2000, with Delhi getting a direct daily service, providing this market with a much needed 25% increase in capacity. As a result, the five–a–week service from Delhi to Dhaka will terminate in Delhi.

SESAT over India

The first of Eutelsat's three new Siberia Europe Satellites (SESAT) has been shipped to the Baikonur Cosmodrome in Kazakhstan. The satellite was launched by a Proton DM booster on 17 April. The satellite was built by Russia's NPO–PM company with an 18 Ku–band transponder communications payload provided by Alcatel Space.

Lufthansa Cargo drops Hinduja Link

Lufthansa Cargo has suspended its cooperation with Hinduja Cargo Services covering flights to the Indian subcontinent from its Sharjah hub in favour of direct services from Frankfurt. The agreement is being terminated because demand for cargo flights to the region has "grown beyond expectations".

The IAF and Sri Lanka

During the 33–month long involvement of the Indian Peace Keeping Force (IPKF) in Sri Lanka, the Indian Air Force's transport and helicopter force flew over 70,000 sorties in the island, primarily in support of the Indian Army engaged on the Island (peak of 100,000 troops).

Tale Spin

Long live the tractor

India's love affair with the good ol' rugged and reliable tractor continues. And why not! Since it has been in the news recently, here are some interesting images showing the fondness by the Indian Army/Paramilitary/Police. The one modified by the Punjab Police is especially interesting.

I "love" epidemic continues

In our previous issue, we had talked about the "I love" epidemic that has spread across the country. From "loving" cities, towns and villages, it had moved on to bars and events. Now, it seems, the Armed Forces are keen they are not left behind!

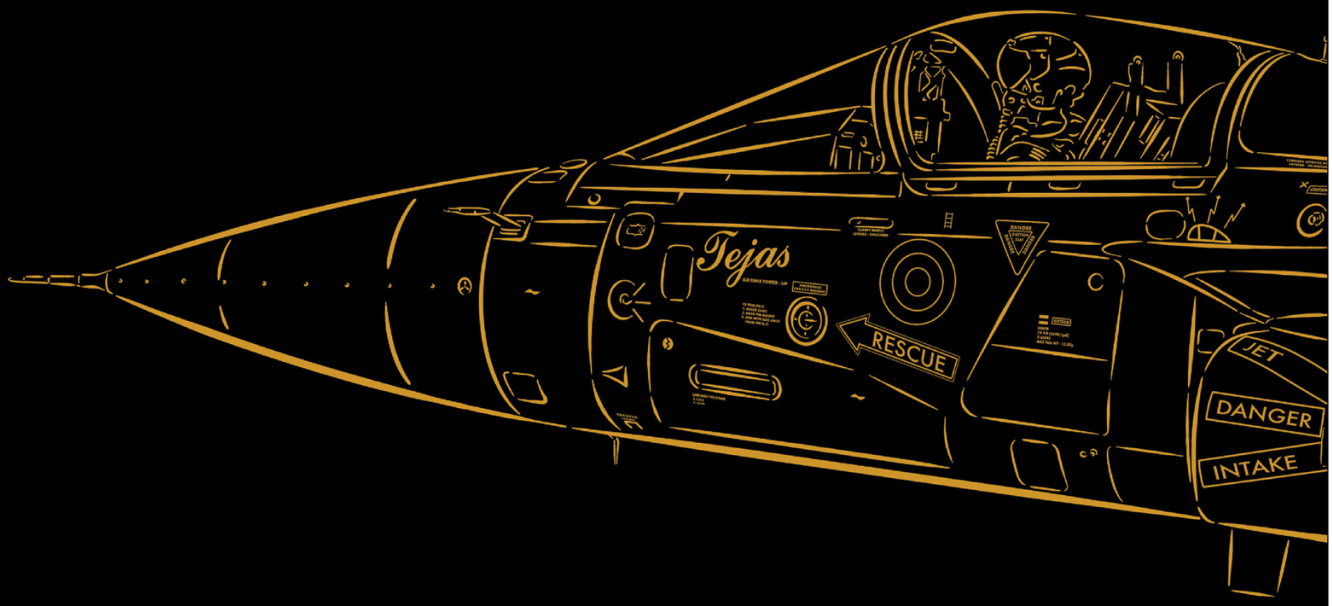
Kiss and make up

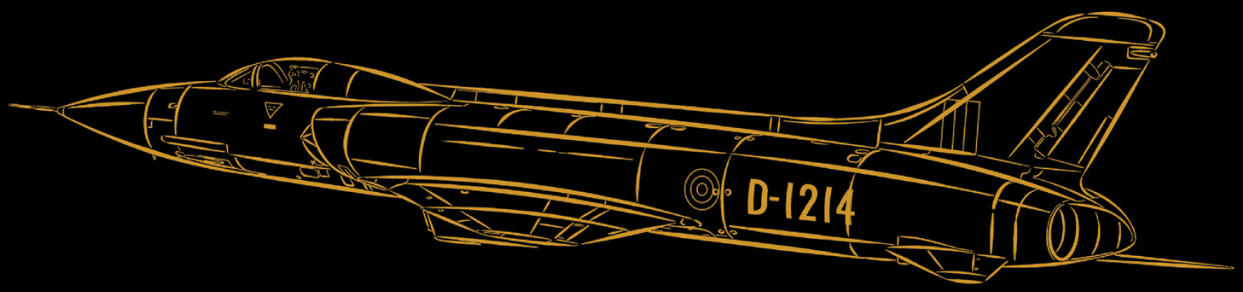
After the public spat involving the CAS and HAL, all was well when the 1st rear fuselage for LCA Mk.1A was handed over to HAL by Indian private industry in March this year. At the gathering and ceremony, it seems the Defence Minister played mediator between the two organisations. Hope this continues now.

Afterburner

VAYU

Aerospace & Defence Review





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