VAYU

Aerospace & Defence Review

I/2026

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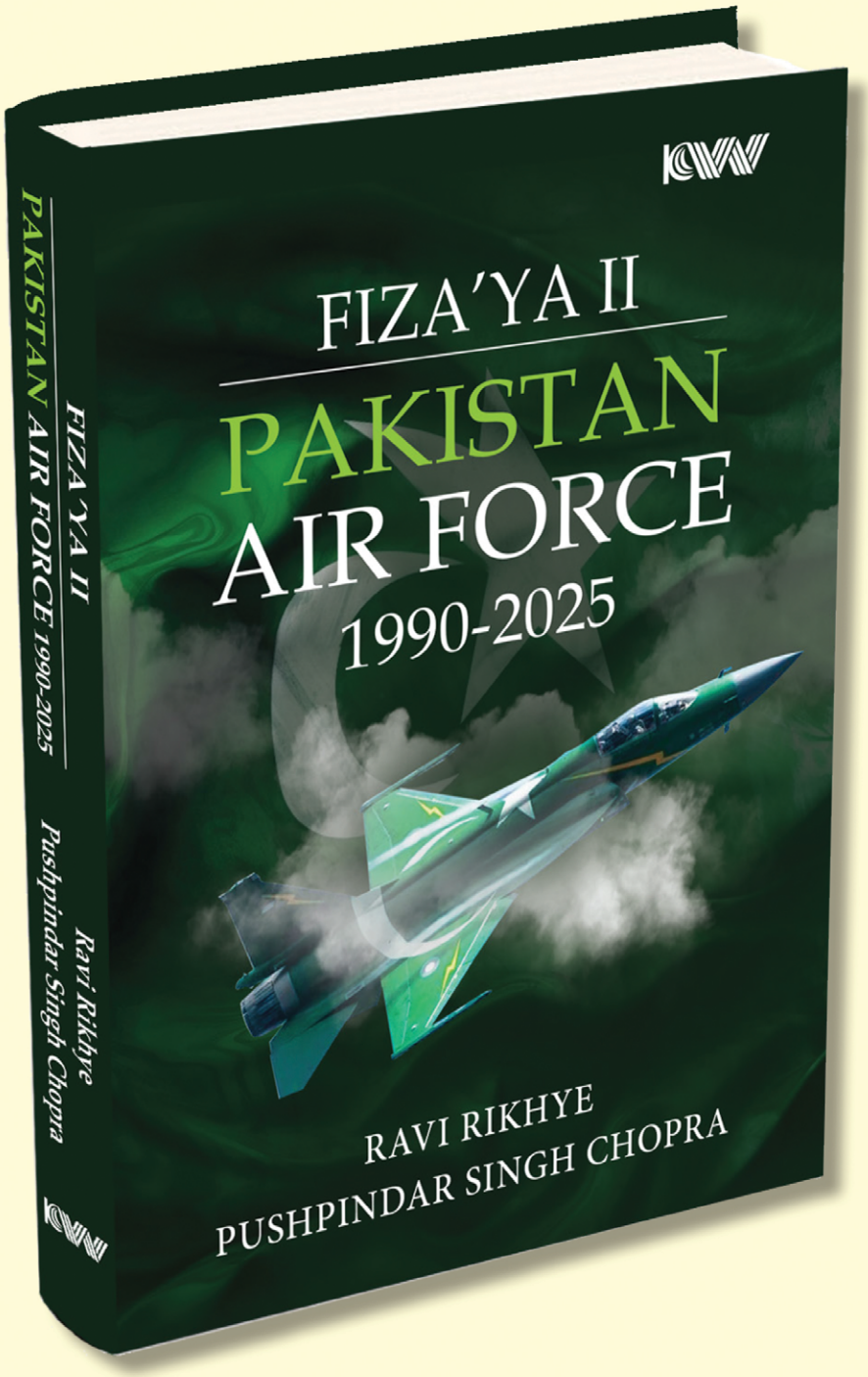

This is a long-delayed follow-up to Fiza'ya: The Pakistan Air Force 1947-1990, by Pushpindar Singh Chopra and Ravi Rikhye. The delay was occasioned by Ravi's departure in 1989 for home in the US, and then the unfortunate and much-too-early death of Pushpindar Singh.

The book covers the PAF 1990-2025; its successes and failures; and particularly its orders of battle during this period. It covers PAF operations, modernisation, and the growth of Pakistan Air Force co-operations with a variety of allies and like-minded nations. The book particularly emphasises the growth of Pakistan-China air nexus.

Though direct comparison with the Indian Air Force is avoided, it becomes clear meanwhile India has failed in its air modernisation to the point it is barely superior to the PAF as opposed to the former's historic 3-1 superiority. Factor in the rise of China as a co-belligerent against India, and the salient point of this book is India is totally outclassed in the air.

978-81-975190-4-8 | Rs 1480 | 310 pp | HB | 2025

KW PUBLISHERS
PRIVATE LIMITED
4676/21, First Floor, Ansari Road, Daryaganj New Delhi 110002
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E: sanjeev@kwpub.in • +91 98104 83435 W: www.kwpub.in
Online: www.kwpub.in www.amazon.in www.flipkart.com

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Cover : Photo by Shrey Chopra of India's first A321 XLR seen in IndiGo livery.
(Instagram and Twitter/X: @captchops)

Published By

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Printed by Advantage Offset, New Delhi

SUBSCRIPTION DETAILS

1 year/6 issues	Rs 700/– (incl postage)
2 years/12 issues	Rs 1200/– (incl postage)
3 years/18 issues	Rs 1800/– (incl postage)

BANK TRANSFER DETAILS

Account Name	:	Vayu Aerospace Private Limited
Account no.	:	52505132156
Type	:	Current Account
IFSC Code	:	SCBL0036027
Bank Name	:	Standard Chartered Bank
Branch	:	10, Sansad Marg, New Delhi 110001 (India)
PAN	:	AAFCV1240H
GSTIN	:	07AAFCV1240H1ZK

The above rates are valid for delivery within India only.
For international deliveries, please visit website.

HAL agreement with GE for F404

Hindustan Aeronautics Limited (HAL) entered into an agreement with General Electric Company, USA, on 7 November 2025 for the supply of 113 F404–GE–IN20 engines and support package for execution of 97 LCA Mk.1A programme. The engine deliveries would be from 2027 to 2032. The contract for 97 LCA Mk.1A was signed in September 2025.

BDL contract for INVAR

Ministry of Defence has inked a contract with Bharat Dynamics Limited (BDL) for the procurement of INVAR anti–tank missiles at a total cost of Rs 2,096 crore, under the 'Buy (Indian)' category. The contract was signed by senior officials of the Ministry of Defence and representatives of BDL in the presence of Defence Secretary Rajesh Kumar Singh on 13 November 2025.

India for 100 Javelin's

India has requested the US State Department to buy one hundred (100) FGM–148 Javelin rounds; one (1) Javelin FGM–148 missile, fly–to–buy; and twenty–five (25) Javelin Lightweight Command Launch Units (LwCLU) or Javelin Block 1 Command Launch Units (CLU). The estimated total cost is $45.7 million.

India for 216 Excalibur projectiles

India has also requested the State Department to buy up to two hundred sixteen (216) M982A1 Excalibur tactical projectiles. The estimated total cost is $47.1 million.

Contracts for CQB and HWT

A contract for over 4.25 lakh CQB Carbine along with accessories, worth Rs 2,770 crore, for the Indian Army and the Indian Navy were signed with Bharat Forge Ltd and PLR Systems Pvt Ltd. The contract for the procurement and integration of 48 Black Shark Advanced (BSA) Heavy Weight Torpedoes along with associated equipment for Kalvari Class Submarines (P–75) of the Indian Navy at an approximate cost of Rs 1,896 crore was signed with WASS Submarine Systems SRL, Fincantieri, Italy. The delivery of torpedoes will commence from April 2028 and will be completed by early 2030.

Year–end review 2025: Record defence production

The annual defence production soared to a record high figure of Rs 1.51 lakh crore in Financial Year 2024–25. The milestone represents a robust 18% growth over the previous fiscal's output of Rs 1.27 lakh crore, and a staggering 90% increase since FY 2019–20, when the figure was Rs 79,071 crore. Defence Public Sector Undertakings (DPSUs) and other PSUs accounted for approx 77% of total production, while the private sector contributed 23%. The share of the private sector, which increased from 21% in FY 2023–24 to 23% in FY 2024–25, reflects the sector's growing role in the

defence ecosystem of the country. A target has been set to increase defence manufacturing to Rs 3 lakh crore by 2029.

Year–end review 2025: All–time high defence exports

Defence exports touched an all–time high figure of Rs 23,622 crore in FY 2024–25. A growth of Rs 2,539 crore or 12.04% was registered over the defence exports figures of FY 2023–24, which were Rs 21,083 crore. The private sector and DPSUs contributed with Rs 15,233 crore and Rs 8,389 crore respectively, whereas the corresponding figures for FY 2023–24 were Rs 15,209 crore and Rs 5,874 crore respectively. The defence exports target for 2029 has been set to Rs 50,000 crore.

Year–end review 2025: Record defence budget

Ministry of Defence has been allocated Rs 6.81 lakh crore in the Union Budget 2025–26, in pursuance of PM Modi led Government's vision of Viksit Bharat@2047 with a technologically advanced and Aatmanirbhar Armed Forces. This allocation is 9.53% more than the Budgetary Estimate of FY 2024–25 and stands at 13.45% of the Union Budget, which is the highest among the Ministries. Out of the total defence budget, Rs 1.80 lakh crore have been allocated for Capital Outlay. Rs 1.12 lakh crore i.e. 75% of modernisation budget has been earmarked for procurement through domestic sources and 25% of domestic share i.e. around Rs 28,000 crore has been provisioned for procurement through domestic private industries.

Sustainment support for MH–60R's

The Ministry of Defence signed Letters of Offer and Acceptance (LOAs) with the United States for sustainment support of the Indian Navy's fleet of MH–60R helicopters through Follow–on Support and Follow–on Supply Support for a period of five years at an approximate value of Rs 7,995 crore. The LOAs were inked under the Foreign Military Sales programme of the US on 28 November 2025.

More Indian Army Apache's

The Indian Army's final lot of AH–64E Apache attack helicopters arrived in India on 17 December 2025. "They are going to be deployed in Jodhpur after inspections and other formalities", stated the Indian Army. "This milestone reflects the reliable and growing US–India defence partnership and fulfills commitments made by the USA. With its cutting edge capabilities, the Apache strengthens our shared vision for regional security and deepens cooperation in co–production, training and technology exchange", stated US officials.

Bharat Forge Limited in contract for CQB Carbine (5.56 x 45 mm)

The Indian MoD has awarded Bharat Forge Limited (BFL) a Rs. 1,661.9 crores contract for supply of 255,128 CQB Carbines (5.56 x 45 mm) to the Indian Army. The contract signed on 30 December 2025, sets forth order execution within five years. The 5.56 x 45 mm CQB Carbine is an indigenously designed, developed, and manufactured (IDDM) compact firearm jointly developed by Armament Research & Development Establishment (ARDE), DRDO and Bharat Forge Ltd, Pune.

DRDO conducts test of fighter aircraft escape system

Defence Research and Development Organisation (DRDO) conducted a successful high speed rocket sled test of fighter aircraft escape system at controlled velocity. The test at Rail Track Rocket Sled facility of the Terminal Ballistics Research Laboratory, Chandigarh, validated canopy severance, ejection sequencing and complete aircrew recovery. The test was conducted in collaboration with Aeronautical Development Agency (ADA) and Hindustan Aeronautics Limited (HAL).

DRDO hands over seven technologies

Defence Research and Development Organisation handed over seven technologies developed under the Technology Development Fund (TDF) scheme to the three Services. The technologies are: an indigenous high voltage power supply for airborne self–protection jammers; a tide efficient gangway for naval jetties; advanced very low frequency–high frequency switching matrix systems; VLF loop aerials for underwater platforms; indigenous waterjet propulsion system for fast interceptor craft; a novel process for recovery of lithium precursors from used lithium–ion batteries and a long life seawater battery system for sustained underwater sensing and surveillance applications.

DRDO completes trials of Akash–NG

DRDO completed the User Evaluation Trials (UET) of Next Generation Akash missile (Akash–NG) system on 23 December 2025. During the trials, the missiles successfully intercepted aerial targets at different range and altitude including the near–boundary–low–altitude and long range, high altitude scenarios.

DRDO in maiden test of Pinaka LRGR

The maiden flight test of Pinaka Long Range Guided Rocket (LRGR 120) was conducted successfully at Integrated Test Range, Chandipur on 29 December 2025. The rocket was tested for its maximum range of 120 kms demonstrating all in–flight manoeuvres as planned. The LRGR impacted on the target with textbook precision.

DRDO conducts salvo launch of Pralay

Defence Research & Development Organisation conducted salvo launch of two Pralay missiles in quick succession from the same launcher off the coast of Odisha on 31 December 2025. The test was conducted as part of user evaluation trials. Both the missiles followed the intended trajectory meeting all flight objectives as confirmed by tracking sensors deployed by the Integrated Test Range, Chandipur. Pralay is an indigenously developed solid propellant quasi–ballistic missile employing state–of–the–art guidance and navigation to ensure high precision.

22nd India–Russia IRIGC–M&MTC

Raksha Mantri Rajnath Singh and the Defence Minister of Russia Mr Andrei Belousov co–chaired the 22nd session of India–Russia Inter–Governmental Commission on Military & Military Technical Cooperation (IRIGC–M&MTC) at Manekshaw Centre, New Delhi on 4 December 2025. Both sides reiterated that the India–Russia relationship is based on a deep sense of trust, common principles and mutual respect. This meeting preceded the 23rd India–Russia Annual Summit between Prime Minister Narendra Modi and President of Russia Vladimir Putin.

2nd HTT–40 in maiden flight

The second of HAL's Hindustan Turbo Trainer 40 (HTT–40) series production aircraft, TH 4002 successfully completed its maiden flight at Aircraft Manufacturing Division, Nasik on 5 December 2025. This is the first aircraft produced at HAL's Nasik facility.

President's trip in INS Vaghsheer

The President of India, Smt Droupadi Murmu undertook a dived sortie onboard submarine INS Vaghsheer on Western Seaboard. Chief of the Naval Staff Admiral Dinesh K. Tripathi accompanied the President. She embarked the submarine at Karwar Naval Harbour, Karnataka on 28 December 2025. During over 2 hour long sortie, she interacted with the submarine crew and witnessed the operational demonstrations. President Droupadi Murmu is the second President to take sortie in a submarine after President Dr APJ Abdul Kalam.

Commanders' Conference–2025 WAC

A two day Commanders' Conference of Western Air Command (WAC) was held on 27 and 28 November 2025 at New Delhi with Air Chief Marshal AP Singh, Chief of the Air Staff (CAS), presiding over the proceedings as the Chief Guest. On arrival, he was received by Air Marshal Jeetendra Mishra, Air Officer Commanding–in–Chief, WAC and accorded a ceremonial Guard of Honour.

DRDO develops new generation MP–AUVs

A new generation of Man–portable Autonomous Underwater Vehicles (MP–AUVs) has been successfully developed by the Naval Science & Technological Laboratory (NSTL), Visakhapatnam of Defence Research and Development Organisation (DRDO) for mine countermeasure missions. The system comprises multiple AUVs equipped with side scan sonar and under water cameras as primary payloads for real–time detection and classification of mine–like objects.

DRDO and DGA, France ink Technical Agreement

A Technical Agreement has been signed between Defence Research & Development Organisation and

Directorate General of Armaments (DGA), France to deepen collaboration in defence research and development. Under the agreement, the transfer of equipment, know–how and technologies will be available to both the countries. Key areas of cooperation outlined in this agreement include aeronautical platforms, unmanned vehicles, advanced materials for defence applications, cyber security, AI, space, navigation, advanced propulsion, advanced sensors, quantum technologies, underwater technologies and other areas of mutual interest.

Combined Graduation Parade

The IAF Combined Graduation Parade (CGP) of the 216th Course was reviewed by General Anil Chauhan, Chief of Defence Staff, at the Air Force Academy on 13 December 2025. A total of 244 Flight Cadets (including 29 women cadets) were commissioned into the IAF. Six Indian Navy officers, eight Indian Coast Guard officers, and two officers from Vietnam were awarded the Aviators Wings. In a historic first, the Chief of the Air Staff led the three aircraft 'Kiran' formation flypast. The parade concluded with a flying display by the Sarang Helicopter display team and the Suryakiran Aerobatic team.

BEL and Safran JV for HAMMER production

Bharat Electronics Ltd (BEL) and Safran Electronics and Defense (SED), France, signed a Joint Venture Cooperation Agreement (JVCA) for the production of Highly Agile Modular Munition Extended Range (HAMMER) smart precision guided air–to–ground weapon in India, marking a momentous moment for the 'Make in India' initiative. The agreement confirms the two parties' willingness to incorporate a potential Joint Venture Company (JVC) in India. The JVC shall be formed as a private limited company with 50:50 shareholding. It will localise the manufacturing, supply and maintenance of HAMMER to meet the operational needs of Indian Air Force and Indian Navy.

IOL collaboration with Safran

India Optel Limited (IOL), a Mini Navratna Defence Public Sector Undertaking, has signed a collaboration agreement with Safran Electronics & Defense for transfer of production of two high precision, combat proven systems, paving the way for their local manufacturing. The systems are: SIGMA 30N Digital Ring Laser Gyro Inertial Navigation System, used in artillery guns, air defence systems, missiles and radars; and CM3–MR Direct Firing Sight, designed for artillery guns and anti–drone systems.

Thales awards SFO Technologies RBE2 wired structures contract

Thales, in partnership with SFO Technologies, has taken a significant step forward in supporting India's strategic vision for self–reliance in defence manufacturing. The latest contract, awarded for the production of high value, technically advanced complex wired structures of the RBE2 AESA radar of the Indian Rafale, "reinforces SFO Technologies' long – standing expertise and enduring partnership with Thales across multiple major programmes".

SMPP agreement with KNDS for KATANA

SMPP, one of India's leading defence and aerospace companies, has entered into a teaming agreement through its subsidiary SMPP Ammunition with KNDS for the KATANA range of precision guided artillery ammunition. The KATANA is a 155mm precision guided munition designed to deliver high accuracy and extended range, addressing critical operational needs of modern artillery systems. The KATANA family product includes KATANA Ballistic Range (BR), Extended Range (ER) and High Precision (HP) with laser seeker ammunition.

HAL and Hensoldt in partnership for OAS

HAL signed a contract with Hensoldt Sensors GmbH, Germany for the Transfer of Design ToT and Intellectual Property Rights (IPR) including manufacturing and repair capability for Obstacle Avoidance System (OAS) and Degraded Visual Environment (DVE) for helicopter platforms.

Prime Minister inaugurates Skyroot's Infinity Campus

Prime Minister Narendra Modi, on 27 November 2025, inaugurated the Skyroot's Infinity Campus in Hyderabad, Telangana via video conferencing. The PM emphasised that Skyroot's Infinity Campus reflected India's new thinking, innovation, and youth power, and underlined that the innovation, risk–taking ability, and entrepreneurship of the country's youth were reaching new heights.

ISRO's LVM3–M6 mission successful

ISRO's LVM3–M6 mission successfully placed the BlueBird Block–2 satellite into its intended orbit on 24 December 2025. The LVM3–M6/BlueBird Block–2 Mission is a dedicated commercial mission onboard the LVM3 launch vehicle, which launched the BlueBird Block–2 communication satellite of AST SpaceMobile, USA. This mission marks the 6th operational flight of LVM3. LVM3, developed by ISRO, is a three stage launch vehicle comprising two solid strap–on motors (S200), a liquid core

stage (L110), and a cryogenic upper stage (C25). It has a lift–off mass of 640 tonnes, a height of 43.5 m, and a payload capability of 4,200 kg to Geosynchronous Transfer Orbit (GTO).

ISRO's LVM3–M6 and Godrej Enterprises

"The successful launch of the BlueBird Block–2 satellite aboard ISRO's LVM3–M6 represents a defining moment in India's journey as a global spacefaring nation. At Godrej Enterprises Group, our aerospace business is proud to contribute to ISRO's successful mission, manufacturing mission critical propulsion systems – from the L110 Vikas engine in the core stage to the CE–20 cryogenic engine thrust chamber in the upper stage, enabling reliable performance and precise orbital insertion" stated Mr. Maneck Behramkamdin, EVP & Business Head, Aerospace business of Godrej Enterprises Group.

AXISCADES and MBDA strengthen partnership

AXISCADES Aerospace & Technologies Private Limited announced the strengthening of their longstanding partnership with MBDA, for Make in India Programmes. In a major step forward, the partnership marks a significant milestone with the inauguration of an expanded test bench facility at the AXISCADES' Aeroland campus in Devanahalli, Bengaluru. This state–of–the–art facility is dedicated to the mass production of advanced test benches, specifically designed to support MBDA's diverse range of missile and missile launcher platforms. The new centre is equipped with large infrastructure to scale up production activities.

Paras Defence to supply counter drone systems and RF jammers

Paras Defence and Space Technologies Ltd has secured a major domestic order worth Rs. 35.68 crore from the Ministry of Defence for the supply of Portable Counter–Drone Systems (PCDS). In addition to this, Paras Anti–Drone Technologies Pvt. Ltd, a subsidiary of Paras Defence and Space Technologies Ltd, has also received a separate order valued at Rs. 3.95 crore from the Ministry of Defence for Radio Frequency (RF) Jammers (Integrated Drone Detector and Jammer).

Paras Defence order from DRDO for Optronic Periscopes

Paras Defence and Space Technologies Limited announced a Rs 71.68 crore order from Defence Research and Development Organisation's (DRDO). The order entails the supply of two Optronic Periscopes for submarine applications is to be executed by September 2026. Optronic Periscopes are critical components in modern submarines, providing enhanced surveillance and targeting capabilities, which bolsters the operational effectiveness of the Indian Navy.

JSW Defence commences construction of next–gen UAS

JSW Defence Pvt. Ltd, part of the US$ 23 billion JSW Group, has commenced construction of its facility for the next generation Unmanned Aerial Systems (UAS) at EMC Maheshwaram, Hyderabad. JSW has entered into a strategic partnership with Shield AI – a leading US–based defence technology company – to manufacture their Group 3 UAS – VBAT, under a long term licensing arrangement for Transfer of Technology (ToT). As part of the partnership, the JSW Group will invest around US$ 90 million to establish JSW's global compliance programme, a manufacturing facility to ensure proper technology licensing, and training of manpower. This investment will enable JSW to establish a local supply chain and create an advanced facility in India for manufacturing, assembling and testing V–BAT.

Sagar Defence inaugurates Pune facility

Sagar Defence Engineering Pvt. Ltd, inaugurated its new plant in Pune, India. The plant will manufacture

Uncrewed Surface Vehicles (USVs), marking a major step forward in the partnership with Liquid Robotics, a Boeing company, that was announced earlier in 2025 to co–develop and co–produce advanced maritime systems. The USVs manufactured at this facility will enhance undersea domain awareness through local production and will build capacity for the Wave Glider platform.

Avantel's order from BEL

Avantel Limited has received a purchase order worth Rs. 2.56 crore from Bharat Electronics Limited (BEL). The contract entails the manufacturing and supply of Antenna Switching Units, which are integral components in advanced communication systems. The order is scheduled for execution by March 2026.

BonV Aero's heavy–lift UAV

BonV Aero, the homegrown deep–tech aerospace company, has developed the 'Air Orca', a heavy lift unmanned aerial vehicle (UAV) designed for operations in extreme altitudes and freezing temperatures. The aircraft, which set a world record by lifting a 30 kg payload at 19,024 feet at Umling La Pass, is currently being deployed by the armed forces for high altitude logistics. Discussions are underway to explore a dual–use framework that would allow the same drones to serve both military and civilian operations.

KSSL to supply unmanned and marine systems

The Indian MoD has awarded Kalyani Strategic Systems Ltd (KSSL) contracts valued at more than Rs. 2,500 Mn for supply of underwater systems. The contract signed on 10 November 2025, stipulates delivery within a year (i.e. by November 2026) aligned with Fast Track procurement norms. KSSL has built capabilities for design, development and production in unmanned marine systems over the past 5 years, having supplied autonomous underwater vehicles which are already in service with Indian Navy.

L&T and BAE Systems collaborate

The Indian Army has signed a contract for the procurement of BvS10 Sindhu vehicles from Larsen & Toubro Limited (L&T), who teamed with BAE Systems on the programme. Under the contract, L&T will indigenously produce the BvS10 Sindhu at its Armoured Systems Complex in Hazira with technical and design support from BAE Systems Hagglunds, the original manufacturer of the BvS10 platform. The contract also includes a comprehensive integrated logistics support package for initial deployment, maintenance and life–cycle sustainment.

ideaForge in Indian Army order

ideaForge Technology Ltd, an Indian UAV manufacturer, has secured Rs. 100 crore worth of orders from the Indian Army for its next–generation platforms Zolt Tactical UAV and the VTOL Hybrid Switch V2.

Zen Technologies order for tank simulators

Zen Technologies, an IDDM–compliant indigenous defence technology company, has been awarded a major contract from the Ministry of Defence totalling Rs. 108 crores for tank crew gunnery training simulators. This procurement is a direct outcome of the Ministry of Defence's Simulation Framework released in September 2021, which recognised simulation based training as a strategic priority for force modernisation.

Zen Technologies to set up Combat Training Node

Zen Technologies has been awarded a contract from the Ministry of Defence totaling Rs. 120 crores to set up India's first Combat Training Node (CTN), at the Infantry School, the alma mater of the Infantry located at Mhow, Madhya Pradesh. The Combat Training Node comprises of 60+ simulators and solutions, for weapons training, drone drills and target systems for live firing ranges. This procurement is a result of the policy on Simulation Framework crafted by the Ministry of Defence and released in September 2021.

Zuppa Signs MoU with Eighth Dimension

Zuppa announced the signing of a Memorandum of Understanding with Eighth Dimension, a Germany based deep–tech startup specialising in advanced AI algorithms for autonomous systems. This strategic collaboration aims to develop next generation AI–based teaming algorithms for swarm drones, along with real time, context based object recognition and identification capabilities across Zuppa's existing UAV offerings.

DroneAcharya in order from the Indian Army

DroneAcharya Aerial Innovations Limited announced that the Company had received consolidated work orders

valued at Rs. 7.12 crore from the Indian Army for the supply of First–Person View (FPV) drones. DroneAcharya was the "only company to successfully qualify in the rigorous technical and field trials conducted by the Indian Army under challenging operational conditions".

BEL in orders worth Rs. 792 cr and 569 cr

Major orders received by BEL include defence network upgrade, radio communication network, radars, communication equipment, drones, combat management system, gun sighting system, upgrades, spares, services, etc. A month later, more orders received included communication equipment, medical electronics, instant fire detection and suppression system, upgrades, spares, services, etc.

BEL in MoU with Astra Microwave Products

Bharat Electronics Limited and Astra Microwave Products Ltd (AMPL) signed a Memorandum of Understanding to collaborate on the design, development and manufacturing of advanced electronic modules, subsystems, and systems for defence electronics and aerospace, specifically targeting critical technology domains such as Electronic Warfare (EW), radar systems and satellites.

Integrated Main Parachute Airdrop Test for Gaganyaan

ISRO successfully conducted an important test on Main Parachutes for the Gaganyaan Crew Module at the Babina Field Firing Range (BFFR), Jhansi, UP on 3 November 2025. This test is the part of the ongoing series of Integrated Main Parachute Airdrop Tests (IMAT) for the qualification of parachute system for Gaganyaan Mission. For the Gaganyaan Crew Module, the parachute system comprises a total of 10 parachutes of 4 types. The descent sequence begins with two apex cover separation parachutes that remove the protective cover of the parachute compartment, followed by two drogue parachutes that stabilise and decelerate the module.

Godrej Enterprises' engine for Gaganyaan

Godrej Enterprises Group's Aerospace business announced that it had delivered the first–of–its–kind human–rated L110 Stage Vikas Engine to the Liquid Propulsion Systems Centre (LPSC, ISRO), marking a significant milestone in its support of India's ambitious Gaganyaan Human Spaceflight Programme. The LVM3 Gaganyaan Launch Vehicle, developed by ISRO, is a human–rated launch vehicle designed to carry Indian astronauts into space. In this mission, the Crew Module (Gaganyaan Capsule) will re–enter Earth's atmosphere safely after completing its planned experiments.

RTX's Collins Aerospace new manufacturing site in Bengaluru

Collins Aerospace has opened its new Collins India Operations Centre (CIOC), a 26 acre manufacturing facility at KIADB Aerospace Park in Bengaluru, enhancing the company's capability to manufacture advanced aerospace products for global markets. The facility will be equipped with advanced manufacturing technologies such as artificial intelligence, additive manufacturing and robotics, and will initially be used to manufacture seats, lighting and cargo systems, temperature sensors, communication and navigation systems, water solutions and evacuation slides.

CoreEL Technologies acquires Lekha Wireless division

CoreEL Technologies India Private Limited (CoreEL) announced the acquisition of Aerospace and Defence System (ADS) division of Lekha Wireless, a Bangalore based wireless communications company. The acquisition "brings proven wireless communication technologies, indigenous IP and a specialised engineering team, strengthening CoreEL's position in military communication domain".

Balu Forge launches automated empty shell production line

Balu Forge Industries Ltd has commenced operations of its empty shell production line – one of the first 100% indigenously built production line in India – at its greenfield manufacturing campus in Belgaum, Karnataka. The line with an annual production capacity of 360,000 shells has an advanced forging and machining line for large calibre ammunition projectiles.

Raghu Vamsi expands defence capabilities

Raghu Vamsi Aerospace Group inaugurated its new defence manufacturing campus at Hardware Park, Hyderabad, under its DeepTech brand 'Arrobot'. The 25,000 sq ft facility will house end–to–end capabilities for the design, integration, assembly and testing of UAVs, engines, and advanced autonomous defence systems. During the inauguration, the Group also unveiled six indigenously developed defence systems, designed and manufactured entirely in India.

Belrise and Plasan Sasa for ATEMM

Belrise Industries and Plasan Sasa announced a strategic agreement to jointly pursue opportunities in the Indian military market with the ATEMM systems. The ATEMM (All–Terrain Electric Mission Module) is a self–propelled electric platform.

RRP Defense Ltd and Meprolight collaboration

RRP Defense Limited and Meprolight (Israel) announced a Strategic Collaboration for advanced electro–optics and weapon sights in India. The collaboration enables RRP Defense to sell Meprolight's advanced electro–optics, night vision systems, and weapon sights in India, while also undertaking pricing strategy, payment structuring and technology transfer under the Make in India framework.

INAS 335 (Ospreys) commissioned

INAS 335 'The Ospreys', the second Indian Naval Air Squadron to operate MH–60R helicopters, was commissioned at INS Hansa, Goa, in a ceremony presided over by Adm Dinesh K Tripathi, the Chief of the Naval Staff (CNS) on 17 December 25. This landmark event

follows the commissioning of the first MH–60R Naval Air Squadron in Kochi, Kerala, in March 2024. The MH–60R is an all–weather, day and night capable helicopter designed for anti–submarine warfare (ASW), anti–surface warfare (ASuW), search and rescue (SAR), medical evacuation (MEDEVAC) and vertical replenishment (VERTREP).

Indian Navy commissions Mahe

The Indian Navy commissioned Mahe, the first of the Mahe class Anti–Submarine Warfare Shallow Water Craft (ASW–SWC), at the Naval Dockyard, Mumbai, on 24 November 2025. Built by Cochin Shipyard Limited (CSL), Kochi, Mahe represents the cutting edge of India's Aatmanirbhar Bharat initiative in naval ship design and construction.

Delivery of 'Taragiri', the fourth Nilgiri Class (Project 17A)

Taragiri (Yard 12653), the fourth ship of Nilgiri Class (Project 17A) and the third built by Mazagon Dock Shipbuilding Ltd (MDL), was delivered to the Indian Navy on 28 November 2025 at MDL, Mumbai, marking a major milestone in achieving self–reliance in warship design and construction. The potent weapon and sensors suite comprises BrahMos SSM, MFSTAR and MRSAM complex, 76mm SRGM, and a combination of 30 mm and 12.7 mm close–in weapon systems, along with rockets and torpedoes for anti–submarine warfare.

IN photo of the Nilgiri class INS Nilgiri (F33), Himgiri (F34) and Udaygiri (F35).

GSL hands over ICGS Amulya (Yard 1272)

Goa Shipyard Limited (GSL) achieved yet another significant milestone with the First Reading Ceremony and formal Handing Over of ICGS Amulya (YARD 1272) — the third vessel in the series of eight Fast Patrol Vessels (FPVs) being built for the Indian Coast Guard. Measuring 51.43 m in length and 8 m in breadth, with a displacement of 330 tons at a draught of 2.5 m, the vessel is powered by twin marine diesel engines driving controllable pitch propellers (CPP) — a first in this class of FPVs.

Indian Navy commissions first 'DSC A20'

The Indian Navy commissioned DSC A20, the first vessel of the indigenously designed and constructed Diving Support Craft (DSC), at Kochi on 16 December 2025 under the aegis of Southern Naval Command. DSC A20 is the lead ship in a series of five Diving Support Craft being built by Titagarh Rail Systems Limited (TRSL), Kolkata.

Delivery of 'Anjadip' ASW SWC

'Anjadip', the third of eight ASW SWC (Anti–Submarine Warfare Shallow Water Craft), indigenously designed and built by Garden Reach Shipbuilders and Engineers (GRSE), Kolkata, was delivered to the Indian Navy on 22 December 2025 at Chennai. The ASW SWC ships have been designed and constructed as per the Classification

Rules of Indian Register of Shipping (IRS) under a Public–Private–Partnership (PPP) of GRSE with L&T Shipyard, Kattupalli.

ICG inducts first PCV 'Samudra Pratap'

The Indian Coast Guard (ICG) on 23 December 2025 inducted its first Pollution Control Vessel (PCV), Yard 1267 Samudra Pratap, under the 2 PCV Project at Goa Shipyard Limited (GSL). The vessel is equipped with state–of–the–art technology, including a 30mm CRN–91 gun, two 12.7mm stabilised remote–controlled guns with integrated fire control systems, an indigenously developed Integrated Bridge System, Integrated Platform Management System, Automated Power Management System, shaft generator, Sea boat davit, PR boat with davit, and a high capacity external firefighting system.

IndiaOne Air for 10 Twin Otter Series 300–G's

De Havilland Aircraft of Canada Limited (De Havilland Canada) announced that IndiaOne Air, a regional airline based in India, has signed a Letter of Intent (LoI) to acquire up to ten Twin Otter Series 300–G aircraft. The new 300–G is the latest generation of the Twin Otter platform and will enable the airline to further expand connectivity across the country, particularly in areas with limited established airport infrastructure.

NMIA begins commercial operations

Navi Mumbai International Airport commenced its airside operations on 25 December 2025 with the arrival of its first commercial flight. The aircraft was accorded a ceremonial water cannon salute on arrival, a time honoured aviation tradition marking NMIA's first commercial touchdown and departure. The inaugural arrival, IndiGo flight 6E460 from Bengaluru, touched down at 08:00 hrs and was welcomed with the traditional water salute. This was followed by the airport's first departure IndiGo flight 6E882 to Hyderabad, which took off at 08:40 hrs, completing NMIA's inaugural arrival and departure cycle.

APPOINTMENTS

Air Marshal Nagesh Kapoor is new VCAS, IAF

Air Marshal Nagesh Kapoor took charge as the Vice Chief of the Air Staff, Indian Air Force on 1 January 2026. The Air Marshal graduated from the National Defence Academy in December 1985 and was commissioned in the Indian Air Force in the fighter stream of the Flying Branch on 6 December 1986. He is an experienced fighter pilot, a Qualified Flying Instructor and a Fighter Combat Leader. During his distinguished flying career, he has flown all variants of the MiG–21 and the MiG–29 and has accumulated over 3400 hours of flying experience on a variety of combat and trainer aircraft.

Air Marshal Tejbir Singh is DG (Inspection & Safety), IAF

Air Marshal Tejbir Singh assumed the appointment of Director General (Inspection and Safety) at Air HQ on 1 December 2025. In his illustrious career spanning 37 years, the Air Officer has held varied command and staff assignments including our Air Attaché to Bangladesh, Senior Directing Staff (Air), National Defence College, New Delhi and Assistant Chief of Air Staff Operations (T&H) at Air HQ. He is an alumnus of the Royal College of Defence Studies, UK. Air Marshal Tejbir Singh has vast operational experience and has over 7000 hrs of flying to his credit. He has been a pioneer in induction of the C–130J 'Super Hercules' aircraft in the Indian Air Force and establishing the first 'Special Ops' Squadron aimed towards joint operations.

Air Marshal S. Shrinivas is AOC–in–C, IAF

Air Marshal Seethepalli Shrinivas took over as Air Officer Commanding–in–Chief (AOC–in–C), Training Command, Indian Air Force on 1 January 2026. An alumnus of National Defence Academy, Air Marshal Shrinivas was commissioned in the fighter stream of IAF on 13 June 1987. He is a 'Category A' Qualified Flying Instructor with over 4200 hours of flying experience on MiG–21, Iskra, Kiran, PC–7 Mk.II, HPT–32 and Microlite amongst other aircraft. He is also qualified as a 2nd pilot on Chetak/Cheetah helicopter and a categorised Operations Officer on the Pechora missile system.

Vice Admiral Sanjay Sadhu is CWP&A, Indian Navy

Vice Admiral Sanjay Sadhu assumed charge as the Controller of Warship Production & Acquisition on 28 November 2025. Commissioned in the Indian Navy in 1987, the VAdm is a Post Graduate in Mechanical Engineering and MPhil in Defence and Strategic Studies. During his illustrious career spanning more than 38 years, the Flag Officer has tenanted several key Operational, Staff, and Yard appointments. He has served onboard the aircraft carrier INS Viraat in different capacities and onboard front line frigates INS Brahmaputra and INS Dunagiri.

Air Marshal Tejinder Singh is AOC–in–C SWAC, IAF

Air Marshal Tejinder Singh took over as Air Officer Commanding–in–Chief (AOC–in–C), South Western Air Command on 1 January 2026. An alumnus of the National Defence Academy, Air Marshal Tejinder Singh 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.

Interview with Admiral Dinesh K Tripathi, Chief of the Naval Staff, Indian Navy

The Chief of the Naval Staff.

***VAYU**: With all the talk about another aircraft carrier, the IAC–2, is there any substance to this?*

Considering the indigenous expertise available with respect to design and construction of IAC–1, a repeat order of IAC–1 with suitable modifications to incorporate lessons learnt from IAC–1 and future capabilities envisaged, is being explored. The repeat order would consolidate the expertise gained by CSL, reduce acquisition period compared to IAC–1, and help generate employment opportunities and revenue for local industries/MSMEs. Needless to say, this would also bolster the 'Make in India' vision of GoI.

***VAYU**: When can we expect the first of 15 MQ–9 Sea Guardians through FMS for the Indian Navy? What are the Indian Navy's plans for the Drishti/Hermes 900 MALE UAVs being manufactured in India?*

MQ–9B: Letter of Acceptance (LoA) for tri–services procurement of MQ–9B UAVs was signed with USG in October 2024 under the FMS (Foreign Military Sales) route, with IN being the lead service. Delivery of first two RPAs (Remotely Piloted Aircraft) are scheduled to commence wef Q1/2029.

MALE: 10 Drishti MALE (Medium Altitude Long Endurance) RPAs are presently under induction into the IN. One RPA has been operationalised and is being flown by IN crew towards consolidation and undertaking Intelligence, Surveillance and Reconnaissance missions.

***VAYU**: Following up to the above question, what is the status of another 6 P–8Is?*

IN has been progressing a case for procurement of six additional P8I LRMRASW from the US, under Buy 'Global' category, through Foreign Military Sales (FMS) Route. The case is being progressed IAW the laid down procurement process.

***VAYU**: How many more ALHs and MH–60Rs are yet to be delivered? Plus the status of the Navy ordering LUH's from HAL?*

MH 60R: Out of the total 24 MH–60R helicopters being procured, three are being utilised in the USA to undertake 'Follow–On Training' of Indian crew from August 2025 till July 2027. Three more MH60Rs are planned for delivery to India end 2025/early 2026, while three helicopters are undertaking trials of India Unique Equipment (IUE) in the USA, and would be delivered subsequent to the completion of the same.

Utility Helicopters: To overcome the critical capability gap in ship–borne utility helicopters, IN is progressing and Design and Development (D&D) case for 'Utility Helicopter – Marine (UH–M)' with HAL.

Light Utility Helicopter (LUH): The LUH does not meet the Qualitative Requirements of the Navy and, therefore, is not being considered for procurement.

***VAYU**: Finally, can you update us on the two projects from HAL for the IN, i.e., DBMRH and TEDBF?*

DBMRH: A Joint case for Design and Development of IMRH (for IAF) and DBMRH (for IN) by HAL is being progressed with IAF as lead service. The case is presently at Pre–AoN stage. As part of the case, IN is seeking development of DBMRH in three variants covering all three dimensions of maritime domain. This will bring India on the global map of select countries having the capability to design and develop multirole helicopters in medium lift capability, furthering the Aatmanirbhar vision of the Government.

TEDBF: In order to meet the IN's long–term requirement of a next generation deck–based fighter, IN is pursuing the Twin Engine Deck Based Fighter (TEDBF), a 4++ generation carrier borne fighter aircraft with ADA (Aeronautical Development Agency). Niche technologies mastered in the process of developing LCA (Navy) prototypes and the industrial base set up in the process are being utilised to meet the challenging timelines of the first flight.

DAC clears proposals worth Rs 79,000 crore for the Armed Forces

The Defence Acquisition Council (DAC), chaired by Raksha Mantri Rajnath Singh, has accorded Acceptance of Necessity (AoN) for various proposals of the three Services amounting to a total of about Rs 79,000 crore. During the meeting held on 29 December 2025, AoN was approved for the procurement of Loiter Munition System for Artillery Regiments, Low Level Light Weight Radars, Long Range Guided Rocket Ammunition for Pinaka Multiple Launch Rocket System (MRLS), and Integrated Drone Detection & Interdiction System Mk–II for the Indian Army.

Loiter Munition will be used for precision strike of tactical targets, whereas Low Level Light Weight Radars will detect and track small size, low flying Unmanned Aerial Systems. Long Range Guided Rockets will enhance the range and accuracy of Pinaka MRLS for effective engagement of high value targets. Integrated Drone Detection & Interdiction System Mk–II with enhanced range will protect the vital assets of the Indian Army in Tactical Battle Area and Hinterland.

For the Indian Navy, AoN was accorded for procurement of Bollard Pull (BP) Tugs, High Frequency Software Defined Radios (HF SDR) Manpack and for leasing High Altitude Long Range (HALE) Remotely Piloted Aircraft System (RPAS). Induction of BP Tugs will assist naval ships and submarines in berthing, unberthing and maneuvering in confined waters/ harbor. The HF SDR will enhance long range secured communication during boarding and landing operations, whereas HALE RPAS will ensure continuous Intelligence, Surveillance and Reconnaissance and credible Maritime Domain Awareness over the Indian Ocean Region.

For the Indian Air Force, AoN was approved for procurement of Automatic Take–off Landing Recording System, Astra Mk–II Missiles, Full Mission Simulator and Spice–1000 Long Range Guidance Kits etc. Induction of the Automatic Take–off Landing Recording System will fill the gaps in the aerospace safety environment by providing high definition all weather automatic recording of landing and take–off. Astra Mk–II Missiles with enhanced range will increase the capability of the fighter aircraft to neutralise adversary aircraft from large standoff range. Full Mission Simulator for Light Combat Aircraft Tejas will augment pilots' training in a cost effective and safe manner, while Spice–1000 will enhance long range precision strike capability of the Indian Air Force.

HAL's Dhruv New Generation (NG) helicopter makes inaugural flight

Dhruv NG receiving water cannon salute.

Minister of Civil Aviation addressing the audience.

Minister of Civil Aviation at the static display.

HAL's Dhruv New Generation (NG) helicopter successfully completed its inaugural flight on 30 December 2025, marking HAL's firm entry into the civil aviation helicopter sector and a significant milestone in India's journey towards 'Aatmanirbharta' in civil aviation. Mr. Kinjarapu Ram Mohan Naidu, Minister of Civil Aviation, flagged off the inaugural flight in the presence of Dr D K Sunil, CMD, HAL, Maneesh Kumar, JDG, DGCA, Sanjeev Razdan, CMD, Pawan Hans Ltd and senior HAL officials at Helicopter Division, Bengaluru.

During the event, HAL also received the Certification of 'Indigenous manufacturing of Shakti Civil Engine' from the Directorate General of Civil Aviation (DGCA). This is the first time that an aero engine has been certified by DGCA for indigenous production, representing a major leap forward in India's self–reliance in critical technologies. This landmark achievement has been made possible with the participation of Safran Engines and the close coordination of the DGCA. Dhruv NG is progressing well towards full civil certification in the next three to four months.

Terming it as a flight of Aatmanirbhar Bharat, Mr. Ram Mohan Naidu stated, "This flight marks an important milestone in Indian aviation. I can see the Sankalp of a Viksit Bharat taking wings. HAL has successfully conducted the inaugural flight within a year of showcasing the demo. Dhruv NG has emerged as a platform for several operators. The 'Make in India' is now a seal of global quality."

Dr D K Sunil, CMD, HAL, stated, "Dhruv 'New Gen' helicopter is the cornerstone of HAL's civil expansion. The Dhruv Mk.1 Civil platform has already clocked over 24,000 hours and has been specifically upgraded to meet the rigorous demands of the global civil aviation market, marking a milestone in India's indigenous rotary–wing capability. The Dhruv NG offers enhanced safety, high performance and cost–effectiveness, making it a strong alternative to imported helicopters. We are working closely with the DGCA to ensure globally aligned certification standards."

Designed and manufactured by HAL, the Dhruv NG is a 5.5–tonne, light twin–engine, multi–role helicopter engineered to master the diverse and demanding requirements of the Indian terrain.

Equipped with twin Shakti 1H1C engines, the helicopter features a world–class, civil–certified Glass Cockpit (compliant to AS4 requirements) and a modern avionics suite for situational awareness. To enhance safety and reliability, Dhruv NG incorporates crashworthy seats, self–sealing fuel tanks, and a proven twin–engine configuration for high redundancy. The advanced vibration control systems ensure a smooth ride, tailored for VIP and medical transport.

HAL offers a "One–Stop Solution" for manufacturing, maintenance, and upgrades. Operational support is provided through integrated logistics models, including Power–By–Hour (PBH) and Performance–Based Logistics (PBL), ensuring high fleet serviceability.

Inaugural flight of Dhruv NG.

Text and images: HAL

Year-end review 2025

Major Defence Acquisition Council approvals

The Defence Acquisition Council (DAC), under the chairmanship of Raksha Mantri Mr. Rajnath Singh, approved capital acquisition proposals worth a total cost of over Rs 3.84 lakh crore since January 2025, to enhance the country's defence readiness, with focus on modernisation through indigenisation.

- On July 3, 2025, DAC accorded Acceptance of Necessity (AoNs) for 10 capital acquisition proposals amounting to approx. Rs 1.05 lakh crore through indigenous sourcing. These were accorded for procurement of Armoured Recovery Vehicles, Electronic Warfare System, Integrated Common Inventory Management System for the Tri–Services and Surface–to–Air Missiles. These procurements will provide higher mobility, effective air defence, better supply chain management and augment the operational preparedness of the Armed Forces. AoNs were also accorded for procurement of Moored Mines, Mine Counter Measure Vessels, Super Rapid Gun Mount and Submersible Autonomous Vessels. These procurements will enable mitigation of potential risks posed to the Naval and Merchant Vessels. To provide further impetus to indigenous design and development, AoNs were accorded under the Buy (Indian–Indigenously Designed Developed and Manufactured) category.
- On December 29, 2025, DAC cleared capital acquisition proposals worth about Rs 79,000 crore to enhance the capabilities of the Armed Forces. These include Loiter Munition System for Artillery Regiments, Low Level Light Weight Radars, Long Range Guided Rocket Ammunition for Pinaka Multiple Launch Rocket System & Integrated Drone Detection & Interdiction System Mk–II for Indian Army; Bollard Pull Tugs, High Frequency Software Defined Radios Manpack and for leasing High Altitude Long Range Remotely Piloted Aircraft System for the Indian Navy; and Automatic Take–off Landing Recording System, Astra Mk–II Missiles, Full Mission Simulator and Spice–1000 Long Range Guidance Kits for the Indian Air Force.
- On October 23, 2025, DAC approved various proposals amounting to a total of about Rs 79,000 crore. These include Nag Missile System (Tracked) Mk–II, Ground Based Mobile ELINT System, and High Mobility Vehicles with Material Handling Crane for Indian Army; Landing Platform Docks, 30mm Naval Surface Gun, Advanced Light Weight Torpedoes; Electro Optical Infra–Red Search and Track System, and Smart Ammunition for 76mm Super Rapid Gun Mount for Indian Navy; and Collaborative Long Range Target Saturation/Destruction System and other proposals for the Indian Air Force.
- On August 5, 2025, DAC cleared various proposals amounting to a total cost of about Rs 67,000 crore. These include Thermal Imager–based Driver Night Sight for BMP for the Indian Army; Compact Autonomous Surface Craft, BrahMos Fire Control System & Launchers and Upgradation of Barak–1 Point Defence Missile System of the Indian Navy; Mountain Radars and upgradation of Saksham/Spyder Weapon System for the Indian Air Force; Medium Altitude Long Endurance Remotely Piloted Aircraft for the three Services; and sustenance of C–17 and C–130J fleets and comprehensive annual maintenance contract of S–400 Long Range Air Defence Missile System.
- On March 20, 2025, DAC gave nod to eight capital acquisition proposals amounting to over Rs 54,000 crore. These include 1350 HP Engine to upgrade the present 1000 HP Engine for the T–90 Tanks of the Indian Army; Varunastra Torpedoes (Combat) for the Indian Navy; Airborne Early Warning & Control (AEW&C) Aircraft Systems for the Indian Air Force; and guidelines for reducing the timelines at various stages of the Capital Acquisition Process to make it faster, more effective & efficient as part of 'Year of Reforms'.

Major Contracts/Agreements

- **LCA Mk.1A:** Ministry of Defence signed a contract with HAL for procurement of 97 Light Combat Aircraft (LCA) Mk.1A, including 68 fighters and 29 twin seaters, along with associated equipment, for the Indian Air Force, at a cost of over Rs 62,370 crore (excluding taxes), on September 25, 2025. The delivery of these aircraft would commence during 2027–28 and be completed over a period of six years. The aircraft will have an indigenous content of over 64%, with 67 additional items incorporated, over and above the previous LCA Mk.1A contract signed in January 2021. The integration of advanced indigenously developed systems such as the Uttam Active Electronically Scanned Array (AESA) Radar, Swayam Raksha Kavach, and control surface actuators will further strengthen the Aatmanirbharta initiatives. HAL entered into an agreement with General Electric Company, USA, on November 7, 2025 for the supply of 113 F404–GE–IN20 engines and support package for the execution of 97 LCA Mk.1A programme. The engine deliveries would be from 2027 to 2032.
- **Rafale–M:** In April 2025, the Governments of India and France signed an Inter–Governmental Agreement (IGA) for the procurement of 26 Rafale Aircraft (22 Single–Seater and four Twin–Seater) for the Indian Navy. It includes Training, Simulator, Associated Equipment, Weapons and Performance Based Logistics. It also includes additional equipment for

the existing Rafale fleet of the Indian Air Force. In line with the Government's thrust on Aatmanirbhar Bharat, the agreement includes Transfer of Technology for integration of indigenous weapons in India. It also includes setting up of production facility for Rafale Fuselage as well as Maintenance, Repair and Overhaul facilities for aircraft engine, sensors and weapons in India. The delivery of these aircraft would be completed by 2030, with the crew undergoing training in France and India.

- **LCH Prachand:** Ministry of Defence, on March 28, 2025, signed two contracts with 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 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 the Armed Forces at high altitudes. 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. MoD also signed a contract with Metrea Management for Wet Leasing of one Flight Refuelling Aircraft for providing air to air refuelling training to pilots of IAF and Indian Navy. Metrea will provide FRA (KC135 aircraft) within six months which will be the first FRA to be wet leased by IAF. With signing of these three contracts, the total number of contracts signed by MoD 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%).
- **Bharat Electronics Limited:** The contracts were signed for upgrades in Shakti Software; EON–51 (Electro Optical Fire Control systems) for New Generation Offshore Patrol Vessels and Cadet Training Ships for Indian Navy; Software Defined Radios for Indian Coast Guard; and Air Defence Fire Control Radars for the Indian Army.
- **Bharat Dynamics Limited:** A contract was inked for Medium–Range Surface–to–Air Missiles for Indian Navy.
- **Armoured Vehicle Nigam Limited:** Contracts were signed for Tank–72 Bridge Laying Tanks and Nag Missile System (NAMIS) Tracked version of anti–tank weapon platform for the Indian Army.
- **Economic Explosive Limited:** A contract was inked for Area Denial Munition (ADM) Type–1 (DPICM) for PINAKA Multiple Launch Rocket System of Indian Army.
- **Munitions India Limited:** A contract was signed for High Explosive Pre Fragmented (HEPF) Mk–1 (Enhanced) rockets for PINAKA Multiple Launch Rocket System of Indian Army.
- **Private sector:** The contracts include 155mm/52 Calibre Advanced Towed Artillery Gun Systems (ATAGS) with Bharat Forge Limited; Rough Terrain Fork Lift Trucks with ACE Limited and JCB India Limited for the three Services; 5,000 Light Vehicles for the Armed Forces with Force Motors Ltd and Mahindra & Mahindra Ltd; Joint Venture Cooperation Agreement for production of HAMMER Smart Precision Guided Air–to–Ground Weapon and local manufacturing of two high–precision, combat–proven systems–SIGMA 30N Digital Ring Laser Gyro Inertial Navigation System, used in artillery guns, air defence systems, missiles & radars and CM3–MR Direct Firing Sight, designed for artillery guns and anti–drone systems–with Safran; CQB Carbine with Bharat Forge Ltd and PLR Systems Pvt Ltd and procurement and integration of 48 Heavy Weight Torpedoes with WASS Submarine Systems S.R.L., Italy.

Aatmanirbharta in Ammunition Manufacturing

32 variants of ammunition have been offered to the Indian Industry for long term contracts under 'Manufacturing of Ammunition for IA by Indian Industry, a Government of India Initiative'. These are being progressed as 12 procurement cases (clubbed based on calibre/ platform) amounting to Rs. 15,899 Crore. Four cases worth Rs. 5,696 Cr have been placed with DPSUs & Private players and balance cases are at advance stages of evaluation and likely to fructify during the next six to twelve months. Most of these ammunition are likely to be indigenised by 2027–28.

Indian Army has a clear roadmap as part of the Aatmanirbharta vision for 10 years. In the Phase–I (2025–26), indigenisation (including private industry) for all import dependent ammunition for major platforms is underway for a total of 32 variants amounting to Rs. 15,899 Cr. In Phase–II (2026–27), five additional ammunition have been identified for production through Indian Industry to expand vendor base and secure stock affected by supply chain disruption. In Phase–III (2027 onwards), the experience and expertise gained in first two Phases would provide the requisite wherewithal in terms of infrastructure and technology, laying the foundation for indigenous development of next generation of hi–tech ammunition based on indigenous R&D in niche technology and Indian IPR for the world market. The aim of the Aatmanirbhar project is to build up ammunition stocks to desired levels, minimise imports and achieve self–sufficiency in the country as also establish at least two sources for each type of ammunition, obtain critical technologies and set up manufacturing infrastructure and capability.

The Indian Army has a large inventory of ammunition, currently comprising 175 scaled in–service variants ranging from ammunition for vintage platforms to advance precision guided munitions. Through concerted efforts and close coordination with DRDO, DPSUs and Private Industry, 159 ammunition variants (90.85%) have been indigenised and are being sourced from indigenous source (single source – 110 and more than one source – 49).

Year-end review 2025

Indian Navy and Indian Air Force in 2025

The Indian Navy continued its strident and purposeful drive towards Aatmanirbharta and capability development with commissioning of 12 ships/submarines and delivery of a number of Yardcraft in 2025. With over 177 ships/submarine having been built and commissioned in India to date, the Navy continues to propel the domestic shipbuilding industry's growth by supporting self–reliance in defence manufacturing. The Indian Navy remains the key pillar that supports the growth of Indian shipbuilding sector, with all 52 warships planned to be inducted in the Navy being built in India, orders for 75 more ships and submarines being in the final stages of approval, and steadfast focus on achieving higher indigenisation content across weapons, sensors and equipment.

A total of 12 ships have been delivered this year, as follows:

- INS Surat, 4th and last ship of P15B, was commissioned on 15 Jan 2025 by the Prime Minister at Naval Dockyard, Mumbai. INS Surat is the fastest constructed indigenous warship (frigate and above) built in only 31 months from launch to delivery.
- INS Nilgiri, first ship of P17A stealth frigates, was commissioned by Prime Minister, on 15 Jan 2025 at Naval Dockyard, Mumbai. INS Nilgiri, is the 100th indigenously designed naval platform, steered by the Warship Design Bureau, premier warship design organisation of IN.
- INS Vaghsheer, sixth and last submarine of P75 project, was commissioned by Prime Minister, on 15 Jan 2025 at Naval Dockyard, Mumbai. Post commissioning of INS Vaghsheer, all six submarines of the Project 75 have been delivered and commissioned into Indian Navy.
- INS Arnala built by GRSE, Kolkata was delivered on May 8, 2025 and commissioned on 18 Jun 2025.
- INS Tamal was commissioned on 1 Jul 2025 at Yantar Shipyard, Kaliningrad, Russia.
- INS Nistar built by HSL, Visakhapatnam was delivered on 8 Jul 2025 and commissioned on 18 Jul 2025.
- INS Udaygiri, second ship of P17A stealth frigates, was delivered by MDL to IN on 1 Jul 2025 and commissioned by RM, on 26 Aug 2025 at Naval Dockyard, Mumbai.
- INS Himgiri, first ship of P17A stealth frigates built at GRSE was delivered to IN on 30 Jul 2025 and commissioned by RM, on 26 Aug 2025 at Naval Dockyard, Mumbai.
- INS Androth built by GRSE, Kolkata was delivered on 13 Sep 2025 and commissioned on 6 Oct 2025.
- INS Ikshak, third ship of Survey Vessel (Large) project was delivered by GRSE to IN on 14 Aug 2025 and commissioned by the Chief of Naval Staff, on 6 Nov 2025 at Naval Dockyard, Mumbai.
- INS Mahe, the first ship of ASW Shallow Water Craft, was delivered by CSL to IN on 23 Oct 2025 and commissioned by the Chief of Army Staff, on 24 Nov 2025 at Naval Dockyard, Mumbai.
- The first ship of DSC project – A20 was delivered on 16 Sep 2025 and commissioned on 16 Dec 25.

A total of five warships have been launched this year, as follows:

- The second ship Utkarsh, was launched on 13 Jan 2025.
- Tavasya was launched on 22 Mar 2025.
- The 8th ship, Ajay was launched on July 21, 2025.
- The 3rd ship DSC A22 was launched on 12 Sep 2025.
- The 6th ship, Magdala, ex–CSL, was launched on 18 Oct 2025.

A total of three Yardcraft have been delivered this year, as follows:

- The 8th, 9th and 10th barges of Ammunition Cum Torpedo Cum Missile Barges were delivered on 6 Jan 2025, 12 Mar 2025 and 22 Apr 2025 respectively (MSME Shipyard).
- The 7th and 8th Barges of Missile Cum Ammunition Barge project were delivered on 7 Jan 2025 and 4 Mar 2025 by SECON Engineering Projects Pvt Ltd, Visakhapatnam (MSME Shipyard).
- The 3rd, 4th, 5th and 6th Bollard Pull Tugs of 6 x 25 Ton Bollard Pull Tug project were delivered on 12 Feb 2025, 26 Mar 2025, 27 Jun 2025 and 4 Sep 2025 by Titagarh Rail System Limited, Kolkata.

Indian Air Force

The IAF remained fully committed to enhancing aerospace power while acquitting itself with flying colours during Op Sindoor that demonstrated its all–round capability to decisively shape military outcomes with precision and speed. Mindful of ongoing technology revolution, IAF has focussed on innovation and adaptability while adhering to the principle of 'Train Like We Fight', emphasising inter–Service cooperation and joint planning. Successful integration and exploitation of new systems, weapons and equipment is testament to the IAF's sustained focus on logistics, maintenance and Aatmanirbharta.

Air Defence

Radars were deployed for active monitoring of Indian airspace. ORPs by fighters were manned round the clock.

Additionally, ORP by transport aircraft and helicopters were also maintained to tackle unusual air activity (slow mover). Air Defence operations witnessed a substantial increase during the months of April and May 25 and the details are as under:

- Integrated Air Command and Control System worked flawlessly and was instrumental in integrating air surveillance picture from all sensors in the country and the same was provided to Army and IN through Akashteer and IMSAS respectively. The fused picture was instrumental in building up Air Situation Picture across the country and ensured seamless and effective air defence activities across the Western front.
- C–UAS assets from across the country were mobilised along the borders within short span of time. These indigenous C–UAS equipment were effective during the operation and were extensively utilised along the Western front preventing serious damage to IAF bases.

International Exercises/Airlift

- An air exercise was conducted between the IAF and aircraft on board the French Navy Carrier Strike Group 'Charles De Gaulle' on 9 Jan 25 in IOR (off the coast of Goa). The engagement involved fighter aircraft and force enablers of the IAF and the French Carrier Strike Group. In addition, 2 x IL–78 in AAR role and 1 x C–130 in SAR (ARK) role participated in an exercise with French CSG on 9 Jan 25 off Goa coast. The AAR was carried out for IAF fighter ac (4 x Jag of 6 Sqn and 4 x Su–30 of 22 Sqn). One aircrew each from 78 Sqn and 87 Sqn participated in the interaction with French team on 8 Jan 25.
- One C–295 was utilised for airlift of IA contingent and load to Maldives for participation in Ex Ekuverin. Induction of IA contingent (45 personnel and 2.0T load) was carried out on 1 Feb 25 and de–induction on 16 Feb 25.
- Two IL–78 participated in TROPEX (Joint Work–up Phase) from 3 to 6 Feb 25. These were utilised to provide AAR to IAF receivers. One Il–78 participated in the main phase of the exercise from 18 Feb to 2 Mar 25 while operating from Sulur. Another IL–78 participated in the main phase of the exercise from 24 Feb to 2 Mar 25 while operating from Goa. AAR was carried out for both IAF and IN receivers.
- One C–17 was tasked for airlift of IA contingent to Japan for participation in Ex Dharma Guardian–25. Induction of IA contingent (120 personnel and 22.0T load) was carried out on 22–24 Feb 25. De–induction was carried out on 8–10 Mar 25.
- IAF successfully participated in Ex Iniochos–25 in Andravida, Greece from 31 Mar to 11 Apr 25. 2 x Il–78 aircraft were utilised for AAR support for ferry of 4 x Su–30 of 8 Sqn from Jamnagar to Cairo (West) on 24 Apr 25. 1 x Il–78 operated from Abu Dhabi as pull tanker while 1 x Il–78 operated from Naliya as push tanker. 2 x C–17 were utilised for airlift of load and exercise contingent from Adampur to Andravida, Greece from 21 Mar to 26 Mar 25.
- India–Uzbekistan Joint Ex Dustlik–2025 was conducted at FTN Aundh, Pune from 15–28 April 2025. Mi–17 and Garud participated in the exercise.
- IAF participated in Ex Tiger Triumph (tri–Service HADR exercise with US with IN as Lead Service) at Vishakhapatnam from 1 to 14 Apr 25. C–130J and Mi–17 V5 along with Garuds and Rapid Air Medical Team participated in the exercise. IAF also participated in two SMEEs.
- IAF successfully participated in Ex Desert Flag–10 at Al–Dhafra, UAE from 17 Apr–12 May 25 with MiG–29 and Jaguar aircraft along with 159 IAF personnel.
- India and US Air Forces Special Forces Joint Exercise named Ex Tiger Claw 25 was conducted at various locations in North India from 26 May to 9 Jun 25. It is the first ever independent Air Forces SF Exercise between India and the USA. A total 113 jumps were carried out by C–130J of IAF and USAF.
- Indian Army participated in Exercise YudhAbhyas in USA, from 27 Aug 25 to 19 Sep 25. One C–17 aircraft was utilised for induction of the Indian Army contingent and cargo, comprising 50 personnel and 24 tons of load. Ferry in and de–induction was completed on 21 Sep 25.
- A Tri–service contingent from India participated in Ex Bright Star at Egypt from 28 Aug 25 to 10 Sep 25. IAF participated with Su–30 MKI and C–130–J aircraft along with 227 personnel. C–130J aircraft participated in the exercise for airborne ops (static line and Combat Free Fall). Two Il–78, two C–17 and one Il–76 aircraft were tasked for induction and de–induction of the contingent.
- IAF participated in the exercise Ex Desert Knight 25.1 with UAE and France on 2 Sep 25 in IOR.

National Exercises

- One Il–76 was utilised to airlift the AFSOD team from Yelahanka to Goa on 3 Mar 25. Two An–32 of SAC participated in the exercise at Goa and carried out air landed operations on 5 Mar 25 at Agatti and CFF at Kavaratti on 6 Mar 25. The de–induction of AFSOD team to Yelahanka was carried out by 1 x C–17 on 8 Mar 25.
- In pursuit of operational excellence and joint preparedness, IAF conducted the exercise MahaGujRaj–25 from 28 Oct to 11 Nov 25 in the Western Sector.

Procurements/Inductions

- IAF has contracted for C–295 MW aircraft from Airbus Defence and Space. Two squadrons have been equipped with the aircraft. The first domestically manufactured C–295 is likely to be delivered in 2026. The C–295 simulator has also been operationalised.
- During FY 2025–26 MoD has allocated Rs. 64,811.68 Cr towards IAF Capital Budget. Out of which Capital Acquisition is Rs. 59,646.83 Cr and Capital Works is Rs. 5,164.85 Cr.
- During FY 2025–26, MoD has allocated Rs. 55,000.00 Cr towards IAF Revenue Budget. Out of this Rs. 24,000.00 Cr is for Salary Head and Rs. 31,000.00Cr is for other than Salary (OTS) segment.

Year-end review 2025

Some major achievements of DRDO in 2025

- The maiden flight test of Pinaka Long Range Guided Rocket (LRGR 120) was successfully conducted at Integrated Test Range, Chandipur on December 29, 2025. The rocket was tested for its maximum range of 120 kms demonstrating all in–flight manoeuvres as planned. The LRGR impacted on the target with textbook precision. It was launched from the in–service Pinaka launcher demonstrating its versatility and providing launch capability of Pinaka variants of different range from the same launcher.
- DRDO successfully conducted salvo launch of two Pralay missiles in quick succession from the same launcher off the coast of Odisha on December 31, 2025. The flight test was conducted as part of user evaluation trials.
- Aeronautical Development Agency (ADA) successfully conducted test launch of Astra, Beyond Visual Range Air–to–Air Missile (BVRAAM) from LCA AF MK1 prototype fighter aircraft on March 12, 2025. The test–firing demonstrated the direct hit of the missile on flying target.
- DRDO and the Indian Navy conducted successful flight–test of indigenously developed Vertically–Launched Short–Range Surface–to–Air Missile (VLSRSAM) on March 26, 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 the Indian Army conducted four successful flight–tests of the Army version of Medium–Range Surface–to–Air Missile on April 3 and 4, 2025 against high–speed aerial targets.
- Release Trials of Long–Range Glide Bomb (LRGB) 'Gaurav' in April 2025 from the Su–30MKI aircraft. The trials successfully demonstrated range close to 100 kms with pin–point accuracy.
- DRDO's Hyderabad–based laboratory DRDL achieved a significant milestone in field of Hypersonic Weapon Technology by conducting 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.
- DRDO successfully carried out maiden flight–trials of Stratospheric Airship Platform from Sheopur Trial site on May 3, 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.

- DRDO and the Indian Navy successfully undertook combat firing (with reduced explosive) of indigenously designed and developed Multi–Influence Ground Mine (MIGM).
- User trials of Extended Range Anti–Submarine Rocket (ERASR) were successfully carried out from INS Kavaratti. ERASR is a totally indigenous anti–submarine rocket used to combat submarine and fired from onboard IRL of Indian Naval Ships.
- A significant milestone was achieved by successfully destroying two Aerial High Speed Unmanned targets at high–altitude in Ladakh by Akash Prime, the upgraded variant of Akash Weapon System for the Indian Army.
- DRDO successfully conducted the maiden flight tests of Integrated Air Defence Weapon System (IADWS), a multi–layered air defence system comprising all

indigenous Quick Reaction Surface to Air Missiles (QRSAM), Advanced Very Short Range Air Defence System (VSHORADS) missiles and a high–power laser–based Directed Energy Weapon (DEW).

- Successful launch of Intermediate Range Agni–Prime Missile from a Rail based Mobile launcher system, under a full operational scenario on 24 Sep 2025. The first–of–its–kind launch was carried out from a specially designed Rail based Mobile Launcher having the capability to move on Rail network without any pre–conditions.
- DRDO conducted a successful flight–trial of India's first long–range hypersonic missile on November 16, 2024. This hypersonic missile is designed to carry various payloads for ranges greater than 1,500 kms for the Armed Forces.
- DRDO has conducted a successful high–speed rocket–sled test of fighter aircraft escape system at controlled velocity on 2 Dec 2025. The test validated canopy severance, ejection sequencing and complete aircrew–recovery.

Exercise Garuda 25: IAF and FASF

The Indian Air Force (IAF) participated in the 8th edition of the bilateral air exercise 'Garuda 25' with the French Air and Space Force (FASF) at Mont–de–Marsan, France, from 16–27 November 2025. The IAF contingent arrived in France on 10 November 2025, and participated with its Su–30MKI fighter aircraft. The airlift support was provided by the C–17 Globemaster III, for the induction and de–induction phases of the exercise, while the IL–78 air–to–air refuelling tankers were utilised for extending the range and endurance of the participating fighters.

During the exercise, the IAF's Su–30MKI aircraft operated alongside the French multirole fighters in complex simulated air combat scenarios, focusing on air–to–air combat, air defence and joint strike operations. This exercise aimed to refine tactics and procedures in a realistic

operational environment, enabling mutual learning and fostering interoperability between the IAF and the FASF.

Exercise Garuda 25 also provided an opportunity for professional interaction, exchange of operational knowledge and sharing of best practices between the two Air Forces. Participation in this exercise "underscored the IAF's commitment to engage constructively with friendly foreign Air Forces through multi–lateral exercises, promoting mutual understanding and cooperation in the field of air operations".

Photos: IAF and FASF

IAF dazzles Guwahati

Continuing with its 93rd Anniversary celebrations, the Indian Air Force (IAF) showcased a spectacular flying display on 9 November 2025, over the majestic Brahmaputra River at Guwahati. The chief guest of the event was the Governor of Assam Mr. Lakshman Prasad Acharya. Distinguished dignitaries included the CM of Assam Dr Himanta Biswa Sarma, CAS Air Chief Marshal AP Singh, AOC–in–C Eastern Air Command Air Marshal Surat Singh and senior officers of the Indian Air Force and State Govt also graced the event.

An array of fighter, transport and helicopter aircraft flying past the Lachit Ghat added to the vibrant hues of Guwahati. The line–up reflected IAF's wide array of aircraft–from helicopters, transport and fighter jets. Highlights included the Tejas, Light Combat Helicopter Prachand, C–295 and Hawks, symbolising the pathway to national resilience. The Harvard, Sukhoi 30 and Rafale enthralled the audience with breathtaking low level aerobatics. The performance concluded with synchronised manoeuvring by the Suryakiran Aerobatics Team and Sarang helicopter display team, leaving the audience spellbound.

The flying display left an indelible impression on the spectators, particularly the youth of the Northeast, who were visibly inspired by the display of courage and discipline. The seamless coordination of the men and women in blue instilled a sense of pride and inspiration among young viewers, motivating many to explore career in the Indian Air Force and contribute to the service of the nation.

Text and images: IAF

Tri–Services Exercise 2025 (TSE–2025) 'Trishul'

Tri–Services Exercise (TSE–2025) 'Trishul' was conducted by the Indian Navy as the lead service jointly with the Indian Army and Indian Air Force, in early November 2025. TSE–2025 was led by the Western Naval Command of the Indian Navy along with the Southern Command of the Indian Army and the South Western Air Command of the Indian Air Force as the principal participating formations.

The exercise featured large scale operations across the creek and desert sectors of Rajasthan and Gujarat, and in the maritime domain including amphibious operations in the North Arabian Sea. The Indian Coast Guard, Border Security Force and other central agencies also participated in the exercise, reinforcing inter–agency coordination and integrated operations. The major focus of the exercise was to enhance synergy between the armed forces and validate and synchronise multi–domain integrated operational procedures across the three Services, enabling joint effect–based operations. Key objectives included enhancing interoperability of platforms and infrastructure, strengthening network integration across the Services, and advancing jointness in operations. The exercise also validated joint Intelligence, Surveillance and Reconnaissance (ISR) procedures, Electronic Warfare (EW) and Cyber Warfare plans. The exercise included Indian Navy carrier operations conducted jointly with shore–based assets of the Indian Air Force to facilitate exchange of Best Practices and validation of joint SOPs for air operations.

Exercise Trishul highlighted the effective employment of indigenous systems and absorption of the tenets of Aatmanirbhar Bharat. Additionally, it focused on the refinement of procedures and techniques tailored to address emerging threats and the evolving character of contemporary and future warfare.

Text and images: Indian Navy

Indian Navy's operational demonstration

The Indian Navy displayed its operational prowess and maritime capabilities through a spectacular 'Operational Demonstration' at Shangumugham beach, Thiruvananthapuram on 3 December 2025. The mega event brought alive the Navy's formidable combat capabilities, technological excellence, and operational readiness, while reflecting the nation's growing maritime strength and self–reliance. The President was hosted by Adm Dinesh K Tripathi, Chief of the Naval Staff. Upon arrival, a 150 men ceremonial Guard of Honour was presented to the Chief Guest. Amongst various dignitaries, the Governor of Kerala Mr. Rajendra Vishwanath Arlekar, and Chief Minister of Kerala Mr. Pinarayi Vijayan witnessed the event along with other senior Central and State Government officials, military dignitaries, and the local populace.

The Op Demo featured a thrilling display of coordinated manoeuvres by frontline platforms symbolising the Navy's ability to deliver power and precision across the maritime spectrum. More than twenty naval ships and submarines, including indigenous aircraft carrier INS Vikrant, along with a formidable array of air assets and elite Marine Commandos (MARCOS) presented a spectacular display of Naval strength and operational excellence. Additionally, Hornpipe dance by the Sea Cadet Corps, cultural performance, and Continuity Drill by naval personnel undertaking fast sequenced drills also enthralled the spectators. The event culminated with a Beating Retreat by Indian Naval band and traditional sunset ceremony with illumination of naval ships.

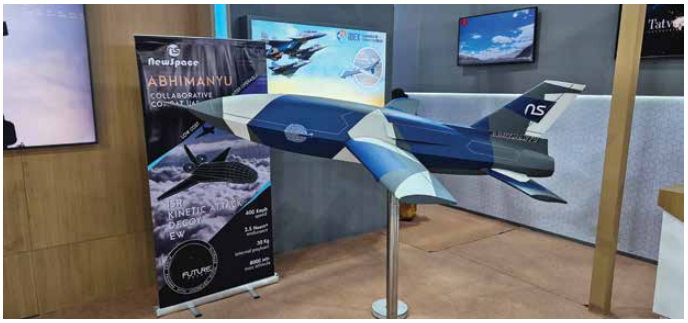
The Navy Day marks an important day in the annals of Indian history commemorating the Indian Navy's defining role in 'Operation Trident' during the 1971 war. Over the decades, the Indian Navy has grown from strength to strength, and has stood firm and resilient, continuously evolving to meet the emerging challenges to the country's maritime interests. Building on this legacy, under the guiding vision of Aatmanirbhar Bharat, Indian Navy is moving towards rapid modernisation of force and has fully transformed from a Buyer's Navy to a Builder's Navy.

Text and images: Indian Navy

DDP Pavilion at the 44th IITF

Raksha Rajya Mantri Sanjay Seth and Union Minister of State for Commerce & Industry, Electronics & IT, Jitin Prasada, jointly inaugurated the dedicated Pavilion set up by Department of Defence Production, Ministry of Defence, at the 44th India International Trade Fair (IITF–2025) which was held from 14–27 November 2025 at Bharat Mandapam, New Delhi.

Mr. Sanjeev Kumar, Secretary (Defence Production) briefed the dignitaries on the latest advancements in India's indigenous defence production ecosystem and the



significant progress made under the Aatmanirbhar Bharat initiative. A total of 16 Defence Public Sector Undertakings (DPSUs), along with cutting edge defence startups from the Innovations for Defence Excellence (iDEX) programme, participated in the Pavilion.

The DDP Pavilion highlighted the growing strength, technological innovation, and expanding self–reliance of India's defence manufacturing ecosystem. The exhibits included a wide range of state–of–the–art defence products, advanced technologies, and innovative solutions across land systems, naval platforms, aerospace and emerging technology domains.

The Pavilion aimed to deepen public awareness of India's indigenous defence capabilities, promote industry engagement, and foster collaborations across the defence and aerospace sectors.

Safran steps up expansion in India

At a ceremony in Hyderabad on 26 November 2025 with the participation of Prime Minister Narendra Modi of India; in presence of Ross McInnes, Chairman of Safran's Board of Directors; and Olivier Andries, Chief Executive Officer; Safran inaugurated its largest MRO (maintenance, repair, overhaul) centre for the CFM International LEAP engine. The Group also announced two defence investments to support the Rafale programme in India. These moves underscore Safran's deepening commitment to "Make in India," bolstering local manufacturing and creating jobs in the civil and military aerospace sectors.

Safran CEO Olivier Andries stated, "I want to thank Prime Minister Narendra Modi and the Indian Government for their support and trust, which makes our growth in India possible. The two new MRO centres in Hyderabad dedicated to the LEAP and M88 engines — and our new joint venture with BEL — underscore India's importance to our Group. We're proud to support the rapid growth of India's civil and defence aerospace markets and actively contribute to the country's Make in India policy and strategic autonomy. Safran will triple its revenue in India to exceed 3 billion euros by 2030, of which half will be generated by our sites in India. At the same time, Safran will multiply by five its sourcing in the country."

The new LEAP engine MRO centre represents a total investment of €200 million and will be operational in 2026. The 45,000 square meter facility will ramp up to a capacity of 300 LEAP shop visits a year and boast a next generation test bench. It will support the rapid growth in the region of the CFM International LEAP fleet, which powers the latest generation narrowbody aircraft, including the Airbus A320neo and Boeing 737 MAX. India is CFM's third largest market, with five Indian carriers operating more than 400 LEAP powered aircraft and 2,000 engines on order. The new site will employ more than 250 people at launch and up to 1,100 at full capacity. An on–site training centre will train more than 100 Indian technicians and engineers each year, building skills and driving operational excellence.

Safran also officially announced a new MRO shop dedicated to the M88 engine powering the Dassault Aviation Rafale fighter jet. Located in Hyderabad, adjacent to the LEAP engine centre, the 5,000 square metre facility represents an investment of over €40 million. It will provide MRO services for more than 600 engine modules a year and will employ up to 150 people at full capacity. Prioritising engines on aircraft operated by the Indian Air Force (IAF), it will also perform MRO for other M88 export customers. India is a long standing customer for Safran's military engines. The country recently ordered 26 Rafale M naval variants and already operates 36 Rafale and 47 Mirage 2000 fighters.

In addition, on 24 November 2025 in New Delhi, Safran signed a Joint Venture and Cooperation Agreement with Bharat Electronics Limited to manufacture Safran Electronics & Defense's "Hammer" modular air–to–surface weapon. The Hammer can be integrated on multiple aircraft types, including the Rafale and India's single–seat HAL Tejas.

During the visit, Safran CEO Olivier Andries also flagged two additional investments announced in February 2025, totaling more than €30 million: An engineering centre in Bangalore specialising in avionics and actuators, now operational and growing to 250 employees plus an electronics and actuation manufacturing facility in Bangalore with 400 employees, starting operations in 2026.

Safran has been a strategic partner to the Indian Armed Forces for 70 years, notably in helicopter engines with Hindustan Aeronautics Limited (HAL). Defence cooperation has deepened in recent years, as illustrated by SAFHAL, the joint venture between Safran Helicopter Engines and HAL. In 2024, SAFHAL began designing the Aravalli engine for two future heavy helicopters for the Indian Armed Forces.

Safran has operated in India for more than 70 years and today has 18 sites and employs 3,000 people in the country.

TASL's MRO facility for Lockheed Martin's C–130J

Tata Advanced Systems and Lockheed Martin on 8 December 2025 announced the groundbreaking of a new Defence Maintenance, Repair and Overhaul (MRO) facility in India, developed to support Lockheed Martin's C–130J Super Hercules aircraft. This milestone builds on the companies' long–standing industrial partnership and will significantly enhance in–country sustainment for the Indian Air Force, while also creating opportunities for broader regional and global support.

The groundbreaking ceremony brought together senior officials from the Indian Air Force (IAF), government dignitaries, industry leaders and senior executives from Lockheed Martin and Tata Advanced Systems.

"Today's groundbreaking reflects how far our collaboration with Tata Advanced Systems and India has come, and where we're headed together," stated Lockheed Martin's Chief Operating Officer Frank St. John. "For more than seven decades, we've grown alongside India's expanding aerospace and defence industrial base. This new C–130 MRO facility strengthens that foundation. It brings world class sustainment capability into India, improves readiness for the Indian Air Force, and creates opportunities that will support regional and global C–130 operators. We remain committed to building capability for India and from India for decades to come."

The state–of–the–art C–130 MRO facility will provide depot level and heavy maintenance; component repair, overhaul and structural checks and testing; Structural restoration and avionics upgrades; expanded training for Indian engineers and maintainers and new opportunities for Indian suppliers across the C–130 supply chain.

Sukaran Singh, Chief Executive Officer & Managing Director, Tata Advanced Systems and Frank St. John, Chief Operating Officer, Lockheed Martin

Tata Advanced Systems, Lockheed Martin's long–standing partner in manufacturing C–130 empennages and other aerostructure assemblies in India, will play a central role in operating the new facility. Earlier in December 2025, Tata Lockheed Martin Aerostructures Limited (TLMAL) celebrated the delivery of its 250th C–130J tail, marking another achievement in the US–India relationship and decades long investment commitment. The Defence MRO facility will join the existing global network of Lockheed Martin Certified Service Centres and will be strategically located to service the C–130J Super Hercules, KC–130J and C–130 B–H legacy aircraft in the future.

"The C–130J Super Hercules is a proven workhorse for India's military and humanitarian missions," stated Rod McLean, vice president and general manager, Lockheed Martin Air Mobility and Maritime Missions. "This Defence MRO facility will bolster response time and security in the Pacific, ensure world class sustainment capability within India aligning with the country's ambitions while advancing sustainment capability for the C–130J fleet across the globe. "The C–130J and India have repeatedly achieved firsts together," said McLean. "The C–130 completed a world–record breaking and unprecedented high altitude landing at Daulat Beg Oldi. More recently, it touched down at Nayoma Air Base in eastern Ladakh, marking the inauguration of the world's highest operational fighter base. This new MRO represents another historic first and a unique opportunity to lay the groundwork for a generational partnership between the C–130 platform and India."

With a presence that spans more than three decades, Lockheed Martin has been a trusted partner to India's defence and aerospace ecosystem accelerating its manufacturing, skilling and technical capabilities while demonstrating existing support of "Make in India" initiatives and the vision of the Indian Government. The construction finishes by end 2026 and the facility expects to receive the first C130 for MRO operations in early 2027.

Text and images: LM

Tata / Lockheed Martin celebrate delivery of the 250th C–130 empennage assembly

Lockheed Martin marked the delivery of the 250th C–130J Super Hercules tail component manufactured by Tata Lockheed Martin Aerostructures Limited

(TLMAL) on 4 December 2025, a major milestone in the long standing aerospace partnership between India and the United States. TLMAL, a joint venture between Tata Advanced Systems Limited (TASL) and Lockheed Martin was established in 2010 in Hyderabad.

The empennage, the complete C–130J tail assembly and horizontal and vertical stabilisers essential for aircraft stability and control, is a critical component of the iconic C–130 Hercules, the world's most versatile and operationally proven military airlifter. Produced in India by TLMAL at its advanced aerospace facility in Hyderabad, the C–130J tail or empennage is shipped to the United States for integration into C–130J aircraft built at Lockheed Martin's facility in Marietta, Georgia.

"This 250th delivery highlights the deep collaboration between Lockheed Martin and Indian industry and reinforces India's growing role in the global aerospace supply chain," stated Rod McLean, vice president, Air Mobility & Maritime Missions. "The quality, precision and reliability demonstrated by our Indian partners directly support the C–130J fleet that serves 23 nations around the world for 20 missions ranging from humanitarian aid to special operations. It is a product that is built to deliver and built to last."

Lockheed Martin's supply chain relies on a diversified, global network of vetted suppliers and the TLMAL facility in Hyderabad is a strong testament to it built on decades of partnership with India. Since the inception of the empennage program, Lockheed Martin and TLMAL have collaborated on advanced manufacturing, quality control and workforce development. This partnership contributes significantly to India's "Make in India" goals and expanding aerospace and defence manufacturing capabilities while supporting Lockheed Martin's global production requirements for the C–130.

The delivery of the 250th empennage marks a major step forward in the strategic industrial relationship between India and the United States, reflecting a shared commitment to innovation, durability, and long–term global–security cooperation. "Our teamwork and ability to deliver have set us apart, and set the standard for tactical airlifters," said McLean. "The world benefits from what we build together."

The C–130J–30 delivers unmatched interoperability with global air forces, robust industrial partnerships, and verified low lifecycle costs with significant fuel savings resulting in a reduced carbon footprint compared to other medium–sized jet airlifters. Since the arrival of India's first C–130J–30 in 2011, Indian Air Force crews have demonstrated the capabilities found only on a Super Hercules — from landing at the world's highest airfield to daring night operations in inclement weather.

The global C–130J fleet spans 23 nations with more than 20 air worthiness certifications. More than 3 million flight hours have been logged by more than 560 C–130Js in support of 20 different mission requirements, including critical worldwide search and rescue, peacekeeping, combat delivery, maritime patrol, special operations, aerial refueling, commercial cargo transport, medevac and humanitarian response missions.

Text: LM
Photos: Vayu

India–Sri Lanka Mitra Shakti XI 2025

The Eleventh edition of Joint Military exercise "Exercise Mitra Shakti–2025" took place at Foreign Training Node, Belagavi, Karnataka. The exercise was conducted from 10 to 23 November 2025. The Indian contingent, of 170 personnel, was represented mainly by troops from the Rajput Regiment. The Sri Lankan side was represented by 135 personnel represented mainly by troops from the Gajaba Regiment. 20 personnel from Indian Air Force and 10 personnel from Sri Lankan Air Force also participated in the exercise.

INS Savitri arrives in Mozambique

Indian Naval Ship INS Savitri, an Offshore Patrol Vessel (OPV) of the Indian Navy, arrived at Port Beira, Mozambique, as part of its ongoing deployment in the Indian Ocean Region (IOR) on 10 November 2025. The ship received a warm and ceremonial welcome from personnel of the Mozambique Navy, reflecting "the deep historical ties and the strong maritime cooperation between the two nations".

Indian Army Exercise Maru Jwala

Exercise Maru Jwala, conducted by the Sudarshan Chakra Corps under the aegis of Southern Command in November 2025, showcased integrated combat manoeuvres and joint operational capabilities in the forward areas of Ramgarh Sector, Jaisalmer, Rajasthan. During Exercise Maru Jwala, troops of Sudarshan Chakra Corps operated seamlessly in darkness; a "testament to their skill, technology and unflinching resolve".

India–US air exercise

The Indian Air Force and United States Air Force engaged in a bilateral exercise from 10–13 November

2025, aimed at fostering mutual learning and enhancing interoperability. USAF participated with the B–1B Lancer.

IAF at the Dubai Airshow 2025

An IAF contingent comprising of Suryakiran Aerobatic Team and Tejas fighters landed at Al Maktoum Airbase, Dubai for the Dubai Air Show. The global event, with participation from over 100 air forces, aims "to enhance interoperability, operational edge and foster military as well as business cooperation". The event took place at Al Maktoum Airbase from 17 to 21 November 2025.

India–UK 'Ajeya Warrior–25'

The eighth edition of the India–UK Joint Military Exercise "Ajeya Warrior–25" took place at the Foreign Training Node, Mahajan Field Firing Ranges, Rajasthan from 17 to 30 November 2025. The exercise brought together 240 personnel with equal representation from Indian Army and the British Army. The Indian Army was represented by troops of the Sikh Regiment. Held biennially since 2011, Ajeya Warrior has evolved into a flagship engagement between the Indian Army and the British Army. The 2025 edition "further reinforces shared values of professionalism, cooperation and commitment to regional stability and global peace".

ICG's Sagar Kavach

The Indian Coast Guard (ICG) successfully conducted the comprehensive Coastal Security Exercise Sagar Kavach along the Maharashtra and Goa coastline from 19–20 November 2025, demonstrating high inter–agency coordination, strong operational readiness and robust

capabilities to counter maritime security contingencies, including threats posed by Anti–National Elements (ANEs) targeting critical coastal assets. The two day exercise witnessed the participation of over 6,000 personnel, more than 115 sea and air assets and a wide spectrum of central and state agencies, ports and coastal authorities. A wide range of maritime and aerial assets were mobilised, including Indian Navy and ICG ships, ICG Dornier aircraft, Chetak helicopters and air cushion vehicles (ACVs).

INS Savitri at Seychelles

Indian Naval Ship (INS) Savitri, an Offshore Patrol Vessel (OPV) of the Indian Navy arrived at Port Victoria, Seychelles as part of its Operational Deployment to the Indian Ocean Region on 22 November 2025. The ship was accorded warm welcome by the personnel of the Seychelles Coast Guard underscoring "the deep mutual respect and strong bilateral relationship between the two nations".

Indian LCUs visit Sri Lanka

Three Indian Naval Ships – Landing Craft Utility (LCU 51, LCU 54 and LCU 57) visited Colombo, Sri Lanka, from 22 to 25 November 2025 as part of a port call. Upon arrival, the ships were accorded a ceremonial welcome by the Sri Lanka Navy (SLN). During the Operational Turnaround (OTR), the Commanding Officers of the three LCUs called on the High Commissioner of India to Sri Lanka, and the Commander Western Naval Area (CWNA), Sri Lanka Navy. Discussions during the visit centered on operational interoperability, ongoing maritime initiatives and avenues for future collaborative engagements between the two navies.

INS Sahyadri at Philippines

Indian Naval Ship (INS) Sahyadri, an indigenously designed and built stealth frigate of the Indian Navy, undertook an exercise with Philippine Navy prior to making port call at Manila, Philippines, for the harbour phase of the deployment in November 2025. The ship is currently on an operational deployment in the Indo–Pacific, participating in various multilateral and bilateral naval exercises with Friendly Foreign Countries that include MALABAR–2025, AUSINDEX–2025, JAIMEX–25, and maiden bilateral exercise with the Republic of Korea Navy.

India–Maldives Exercise Ekuverin

The 14th edition of the Joint Military Exercise Ekuverin between the Indian Army and the Maldives National Defence Force (MNDF) took place at Thiruvananthapuram, Kerala; the exercise was conducted from 2 to 15 December 2025. The Indian Army contingent of 45 personnel, represented by a battalion of the Garhwal Rifles, participated alongside an equal strength Maldivian contingent represented by the MNDF.

ICGS Vigraha in Jakarta

Indian Coast Guard Ship (ICGS) Vigraha undertook an operational visit to Jakarta, Indonesia, from 2–5 December 2025 as part of its Overseas Deployment to ASEAN countries. The port call "reaffirms India's commitment to enhancing maritime cooperation with regional partners

in line with the Act East Policy, SAGAR (Security and Growth for All in the Region), and the Indo–Pacific Oceans Initiative (IPOI)".

INS Vikrant and INS Udaygiri at IFR, Sri Lanka

India's first indigenous aircraft carrier INS Vikrant, along with the indigenously built frigate INS Udaygiri, represented the Indian Navy at the International Fleet Review (IFR) 2025 hosted by the Sri Lanka Navy in Colombo from 27 to 29 November 2025. The event was part of the Sri Lanka Navy's 75th anniversary celebrations and featured participation from naval ships, delegations and observers from several countries.

India– Indonesia 'Garuda Shakti'

The 10th edition of the India–Indonesia Joint Special Forces Exercise Garuda Shakti took place at the Special Forces Training School, Bakloh, Himachal Pradesh; the exercise was conducted from 3 to 12 December 2025. The Indian contingent was represented by troops from The Parachute Regiment (Special Forces), while the Indonesian contingent comprised personnel from the Indonesian Special Forces.

India–Malaysia 'Harimau Shakti'

The Fifth edition of Joint Military exercise "Exercise Harimau Shakti 2025" took place in Mahajan Field Firing Range, Rajasthan from 5 to 18 December 2025. The Indian contingent was represented mainly by troops from the Dogra Regiment. The Malaysian side was represented by troops from the 25th Battalion Royal Malaysian Army.

ICGS Sarthak in Kuwait

Indian Coast Guard (ICG) Ship Sarthak, an indigenously designed and built Offshore Patrol Vessel (OPV), arrived at Suwaikh Port in Kuwait on 9 December 2025, as part of its Overseas Deployment (OSD) to the Gulf region. During the four day stay in Kuwait, the ship's crew undertook a series of professional interactions with the Kuwait Coast Guard and other maritime stakeholders.

IAF and RFASF AviaIndra'25

The IAF hosted Exercise AviaIndra–2025, a joint exercise with the Russian Federation Aerospace Force

(RFASF) from 15–22 December 2025. "The exercise reflects the long–standing Indo–Russian relationship and continues the AviaIndra series which began in 2014". Personnel from both forces conducted joint flying operations on Su–30MKI, Tejas, Il–78 and Mi–17 helicopters, sharing best practices and lessons learnt. "It provides an opportunity to enhance bilateral cooperation, mutual understanding and aerospace synergy".

India–UAE Desert Cyclone'25

An Indian Army contingent departed for the United Arab Emirates (UAE) to participate in the second edition of the India–UAE Joint Military Exercise Desert Cyclone–II, which was conducted at Abu Dhabi, UAE, from 18 to 30 December 2025. The Indian contingent comprised 45 personnel, primarily from a battalion of The Mechanised Infantry Regiment. The UAE Land Forces contingent, of similar strength, was represented by the 53 Mechanised Infantry Battalion.

Over nearly two weeks, troops from both countries jointly trained on a wide spectrum of tactical drills including fighting in built–up areas, heliborne operations and detailed mission planning. In addition, the integration of UAS and counter–UAS techniques were carried out for conduct of operations in built–up areas.

ICGS Sarthak at Chabahar, Iran

The Indian Coast Guard (ICG) Ship Sarthak, an Offshore Patrol Vessel, entered the strategic port of Chabahar, Iran, on 16 December 2025 as part of its ongoing overseas deployment to Gulf countries. This landmark visit marks the first ever visit of an ICG Ship to the port of Chabahar, underscoring "India's growing maritime engagement in the region and strengthens New Delhi's ability to project economic influence, secure supply lines to Afghanistan and Central Asia, and present a competing development model in the region, consistent with India's SAGAR and MAHASAGAR vision of secure, cooperative maritime engagements".

India–Indonesia CORPAT

Naval Component of Andaman & Nicobar Command participated in 45th edition of Ind–Indo CORPAT from 10–16 December 2025, further strengthening India–Indonesia maritime cooperation. ANC ships, Dornier aircraft from Andaman & Nicobar Command and units of Indonesian Navy undertook wide ranging sea exercises.

Made in India Submarines– A history of 50 years (Part 1)

In the quest of becoming a twenty first century blue water navy, India has taken a number of initiatives to exponentially expand its naval assets. This can only be successful with a powerful fleet of modern submarines, a large fleet of which will not only protect Indian interests in the Bay of Bengal, the Indian Ocean region, and the Arabian Sea but also maintain dominance from the Malacca Strait or beyond to the East Coast of Africa, ensuring India's strategic autonomy. Post India's independence, the charismatic, brilliant heads of the Indian Navy correctly comprehended the requirements of both aircraft carriers and submarines. India's submarine arm was born in 1967, when the Soviet-origin 'Foxtrot Class' entered into service as the 'Kalvari Class' with the commissioning of the INS Kalvari (S23). While India inducted eight submarines from 1967 to 1974, all of them were manufactured at a Soviet facility.

Project Type 1500 – German Type 209

The Bangladesh Liberation War of 1971 propelled India's quest for a made-in-India submarine. Post the war, a staff requirement of a 1500 ton platform was drafted. While the Mazagon Docks (MDL) of Mumbai (then Bombay) was picked up as the preferred manufacturing facility, the Indian Navy evaluated five contenders in great detail. Quite interestingly, the Soviet Union at that time did not have any feasible platform to meet the Indian requirements. Finally, the Type 209-1 of Howal Deutsch Werke (HDW) of Germany (then FRG) was selected, and a contract was signed on 11 December 1981. Eventually, the Type 1500 model (also known as Type 209/1500) was developed by IKL (Ingenieurkontor Lubeck) to meet the Indian staff requirement. According to the agreements, two submarines would be manufactured at Germany's HDW facility, followed by four (originally two, but in 1985 the decision for two additional ones was taken) boats in an Indian shipyard (MDL) under transfer of technology (ToT). The Type 209/1500 submarine came to be known as the 'Shishumar' class in the Indian Navy. The first boat of the class, INS Shishumar (S44), was commissioned on 22 September 1986, followed by the INS Shankush (S45) on 20 November 1986.

Meanwhile, work was progressing at full pace in India as well. In 1982, HDW commenced delivery of drawings and material packages. The MDL submarine construction facility was inaugurated in 1984. Though the construction of the indigenous Type 1500 started in the same year, the conclusion took a little longer time. These two boats, INS Shalki and INS Shankul, were commissioned in 1992 and in 1994, respectively. A proposal to procure the fifth and sixth submarines was raised in 1985. Till 1985, everything was running smoothly, but then came the bolt from the blue! The decision of further construction of two additional boats had to be deferred. While the allegations about payment of commissions by HDW undoubtedly shocked the nation (in 1987), according to the navy, it had little to do with such a decision. For various reasons, MDL could not complete construction of the third and fourth boats within the stipulated timeline. The slippages are steering much longer time for construction and delay, eventually leading to a steep incline in the price for construction, the key factors behind the derailment of the progress. So, the Indian Navy ended up with only four 'Shishumar' class submarines. However, the Soviets came to the rescue of the Indian Navy's dwindling submarine fleet.

Soviet Type 877EKM

While the Soviet Union was not able to offer India a suitable platform in the 1970s, it made an entry with a proposal for the Type 877EKM in 1981. While the Indian Navy showed interest in it, it was only in 1983 that an evaluation of the platform was possible. This delay was also a reason behind the final selection of the Type 209/1500 class for the SSK project. But when finally the evaluation was concluded, the Navy was amazed to find the Kilo Class being in the similar capabilities of the Type 1500. Having a requirement of more than eight boats, the navy signed a contract for six platforms in 1984. Later, two additional boats were ordered by 1988. By that type, India's Type 1500 project already hit a hiatus. The Kilo class entered into service with India as the 'Sindhughosh' class. The first submarine, INS Sindhughosh (S55), was commissioned into the service on 30 April 1986. The last one of the family, INS Sindhushastra, witnessed the commissioning in 2000. Quite interestingly, the Indian Navy officers undergoing the rigorous training for the operation of the Kilo class envisaged that the Type 877EKM had been originally

developed as a nuclear powered attack submarine (SSN) powered by a small nuclear reactor, which had never been materialised. Coming to the 'Sindhughosh' class, all platforms were upgraded eventually with tube launched missile (TLM) capabilities by the integration of 3M-54E Klub-S.

Project 75

In 1992, Naval Headquarters (NHQ) formulated a new staff requirement under 'Project 75' (P-75). An improved technology over the existing in-service was sought. Along with a lesser acoustic signature, TLM for an improved anti-ship capability was sought. At that point, MDL had established manufacturing facilities specifically for the Type 1500 class. Besides, the Submarine Design Group (SDG) was familiar with the Type 1500 hull for necessary improvements. So in 1997, once again a decision was taken to resume the construction of the two Type 1500s at MDL but with the collaboration of a non-German foreign agency to validate the design to be developed by SDG of the Indian Navy. The Letter of Intent (LoI) was sent to four firms for design assurance and consultancy, but only TCSF of France responded. However, they put a condition that the submarines would be integrated with the French combat suite. The French agreed to facilitate integration of the SM 39 Exocet submarine launched missile. In 1999, the 'Project for Series Construction of Submarines for the Indian Navy and Acquisition of National Competence in Submarine Building' was launched. It was a 30-year plan

for the construction of twenty four conventionally powered submarines.

The programme was envisioned with two phases. Phase I would oversee the construction of twelve platforms, six each in two different production lines, by absorbing technology. It would commence from 2000 to 2012. While twelve completely indigenous submarines were to be manufactured under Phase II beyond 2012. At that critical juncture, India was offered advanced Scorpene class submarines by France. This changed the future plan drastically.

French Scorpene

Initially, under P-75, construction of two Type 1500 at MDL was planned with the TCSF combat suite, only to be followed by two Scorpene designs for additional requirements. But later the plan changed to induction of an all Scorpene-class fleet under P-75. By the way, France was not alone in the race. Russia also offered the latest 'Amur Class' to the navy. While India found it a feasible platform meeting the requirements, the issues related to the ToT and necessary changes for the construction in India were not solved, and negotiation with the French deepened. A Request for Proposal (RFP) was forwarded to TCSF in 2000 seeking their technical and budgetary proposal. Finally, in 2001, the Cabinet Committee on Security (CCS) approved the construction of six Scorpene Class submarines under P-75 (though originally twelve boats were needed at two different production lines, as said earlier).

Approval for the project was accorded in 2005. Finally, in the same year, on 6 October, multiple contracts were signed between concerned Indian and French firms for the series construction of six Scorpene class boats under ToT. In India, the class came to be known as the new 'Kalvari.' The construction of the first boat commenced in December 2006, and it was commissioned as INS Kalvari (S21) on 27 October 2015. The sixth and last of the family, INS Vagsheer (S26), was commissioned on 15 January 2025.

On 13 July 2023, the Defence Acquisition Council (DAC) granted Acceptance of Necessity (AoN) for the procurement of three additional boats, with higher indigenous content. But as of 2025, the Indian Navy focuses primarily on the 'Project 75 India' (P-75I) only to return to the additional Kalvari acquisition later. As the Kalvari programme progressed, India realised the need for the integration of the Air Independent Propulsion (AIP) system, which will allow the boats to remain underwater for a much longer time, escaping easy detection by the adversaries during a critical mission. To meet the Indian requirement, the Naval Materials Research Laboratory (NMRL) of DRDO developed an indigenous solution. On 8 March 2021, a land based prototype was successfully tested to meet the user requirements. The Ministry of Defence (MoD), on 30 December 2024, signed two contracts for the AIP plug for the DRDO-AIP system, integration onboard Indian submarines, and the integration of the Electronic Heavy Weight Torpedo (EHWT) onboard the Kalvari class. Unfortunately, as of 2025, the system has yet to be readied for integration.

Sankalan Chattopadhyay
(Twitter/X- @vinoddx9)

Exocet's in Indian Navy service

The Indian Ministry of Defence and MBDA signed an agreement on 6 October 2005 in New Delhi for the purchase of thirty six Exocet SM39 torpedo launched anti–ship missiles to arm the Indian Navy's six Scorpene conventional–powered hunter–killer submarines (SSK). Exocet's guidance system consists of an Inertial Navigation System (INS) and an Active Radar Homing (ARH) seeker for the terminal phase to provide fire–and–forget capability. Target destruction is achieved by 165 kg shaped charge warhead.

The SM39 is the submarine torpedo tube launched version of the Exocet (flying fish in French) missile incorporating improvements of the Block 2 programme. The basic body design is based on the Nord AS–30 air–to–ground tactical missile. Encapsulated in an underwater vehicle Vehicule Sous Marin (VSM) that manoeuvres before surfacing so as not to reveal the position of the submarine, the target information is downloaded to the Exocet missile prior launching. After reaching surface Exocet SM39 is ejected from the VSM to initiate high subsonic (Mach 0.93) and sea–skimming flight. As a countermeasure against air defence around the target, the missile maintains a very low altitude while inbound, staying just one to two meters above the sea surface. Due to the effect of the radar horizon, the target may not detect an incoming attack until the missile is only 6 km from impact.

The 780 kg missile has a range of 50 km (perhaps a very conservative figure), which enables the submarine to go into action while remaining out of range of the adversary's detection equipment and the retaliatory capability. The air launched version of Exocet, the 70 km ranged Exocet AM39 was initially combat proven in 1982 Falklands conflict where in hands of daring Argentine pilots on Super Etendard strike fighters it inflicted considerable damage on British shipping. Exocet AM39 Block 2 Mod2 versions are projected to enter Indian Navy service aboard Dassault Rafale M multi–role strike fighters and likely to operate from aircraft carrier INS Vikrant.

By Sayan Majumdar

All images for representational purposes only

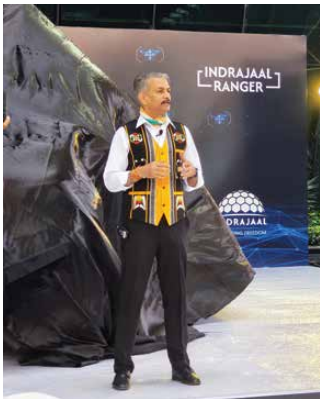
Indrajaal unveils mobile Ranger ADPV

Indrajaal Drone Defence, a Hyderabad based defence technology firm, unveiled the "Ranger" on 26 November 2025. Referred to as world's first Anti–Drone Patrol Vehicle (ADPV), Ranger is a fully mobile counter drone platform designed for active, in–motion surveillance and interdiction. It diverges from conventional vehicle mounted anti–drone units by operating as an independent, mobile combat solution capable of detecting, tracking and mitigating drones while on the move.

Indrajaal Ranger Anti–Drone Patrol Vehicle (ADPV).

The company stated that the development of the ADPV was driven by recent incidents along India's borders, where drones have been used to transport weapons, narcotics and other contraband. One incident involved an ISI–linked network using cross–border drones to deliver weapons deep inside Indian territory. In another set of cases, the Border Security Force reported neutralising over 250 Pakistani drones within a year, many allegedly linked to drug–trafficking operations. These events highlighted the growing use of drones in bypassing ground security systems and prompted a push for mobile counter–drone capabilities.

At the launch event attended by Vayu, Lieutenant General Devendra Pratap Pandey (Retd), former General Officer Commanding of the Chinar Corps, noted that emerging drone threats required newer technological responses. Indrajaal's Founder and CEO, Kiran Raju, said



Lt. Gen. Devendra Pratap Pandey (Retd), former GOC, Chinar Corps and (Right) Kiran Raju, Founder and CEO, Indrajaal.

the company's approach was centred around reducing the impact of drone based infiltration on internal security.

Shift from fixed anti–drone systems to mobile response

Traditional anti–drone systems mounted on vehicles are largely meant for relocation between static points and generally require the vehicle to remain stationary to operate. Their primary use cases involve checkpoints, gate security and fixed perimeter protection. Indrajaal's ADPV differs by integrating sensors, communication systems, electronic warfare modules and mitigation tools directly into the vehicle chassis. The company positions the Ranger as a purpose built platform engineered for continuous patrolling across borders, urban areas and high risk corridors.

According to Indrajaal, the system enables "on–the–move" drone detection, autonomous threat classification, real–time surveillance and immediate interception options. The mobile configuration allows it to operate in varied environments, from border roads and agricultural belts to dense city neighbourhoods and areas near critical infrastructure.

Operational purpose and claimed capabilities

Indrajaal positions the Ranger as a system aimed at supporting law enforcement agencies, border management teams and security forces dealing with drone enabled smuggling and surveillance. The company claims the vehicle offers long range detection, autonomous tracking and multiple mitigation tools, including cyber takeover, soft–kill options as well as hard kill solution with drone interceptor, called "Zombee". Powered by the company's proprietary SkyOS autonomy engine, the Ranger is designed to integrate sensor data, classify threats through AI, and execute automated responses where required.

The vehicle operates on a 4×4 Toyota Hilux (customised) platform with battery backed electronics for off grid deployments. Indrajaal states that the system can detect drones at distances up to 10 km and mitigate threats within approximately 4 km, though actual performance would depend on environmental factors, drone characteristics and regulatory clearances.

Rear profile of Ranger, with Zombee Interceptor and roof mounted drone detection system.

The company also confirmed that the Ranger has been validated in field deployments, including a six day border operation during which the system reportedly intercepted 40 drones.

Technical overview of the Indrajaal Ranger

Key features described by the company include:

- Multi–sensor detection using RF analytics, protocol intelligence and computer vision identification.
- AI–enabled track–lock for sustained monitoring.
- Retractor, a system designed for cyber takeover and controlled landing of hostile drones.
- Repulsor, an electronic soft–kill suite intended to disrupt drone capabilities without causing collateral damage.
- Zombee, an optional interceptor drone for hard–kill scenarios or aerial pursuit.
- Integration with command centres for coordinated operations.
- Two–operator configuration for streamlined field use.
- All–terrain mobility enabling deployment in rural, urban and border environments.

By combining these systems with the SkyOS autonomy engine, the Ranger is designed to function as a mobile command unit capable of patrolling sensitive zones and responding to unauthorised aerial activity without the need for fixed installations.

Use cases highlighted by Indrajaal

The company outlines three primary areas where the Ranger is intended to be deployed:

Border Management and Counter–terrorism: The ADPV is designed to support border forces in detecting

Unveiling of Indrajaal Ranger.

cross–border drone movement, intercepting hostile drones and disrupting smuggling operations. Its mitigation systems, including cyber takeover and interceptor drones, are intended for use against drones transporting contraband or conducting surveillance.

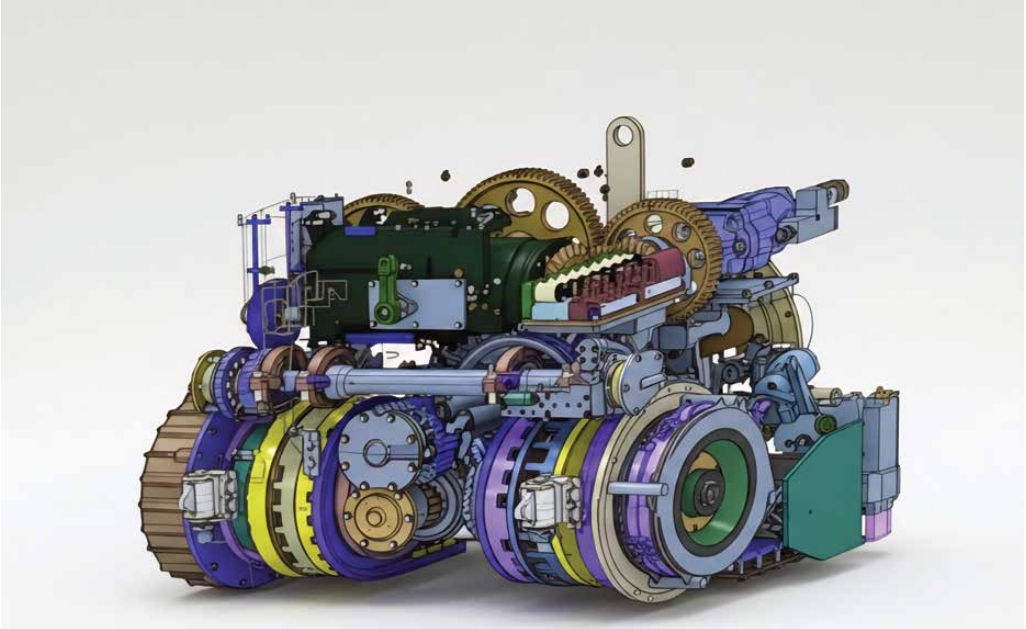
Urban Policing and Event Security: For metropolitan environments, the system provides digital geofencing, violation recording and automated alerts for unauthorised drones near critical locations. Integration with police command centres enables coordinated enforcement and monitoring during large events or in restricted airspace.

Critical Infrastructure and Convoy Protection: The system can be deployed around refineries, ports, airports, power plants, religious sites and government facilities. It can also be used for securing VIP convoys or high–value movement routes, where mobile airspace protection is required.

The company has previously run pilot deployments with Indian security agencies and holds ARDTC certification for certain Counter–UAS systems.

Article and photos: Rishav Gupta
Twitter/X: @connect_rishav

The Heart of the Beast: Inside DRDO's new powerpacks for India's next–gen armour



600 hp transmission system

"True sovereignty needs self–reliance in critical technologies," stated Dr. A.P.J. Abdul Kalam. As the quote suggests, self–reliance and major breakthroughs in critical technology are essential today in military research and development. One such niche domain is the propulsion and transmission of the platform. Modern geopolitics and the monopoly over this domain have raised significant concerns in the Strategic Indian military programme.

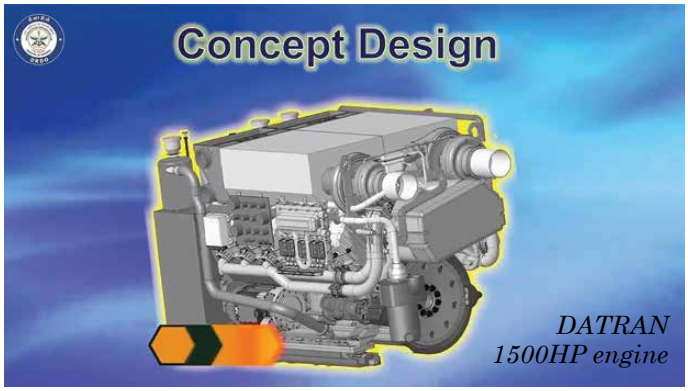
When it comes to land systems in particular, the majority of India's main battle tank fleet consists of thousands of T–72 and T–90 tanks that utilise Russian designed engines. Many of these engines are made under license in India, which allows for some industrial capacity, but it doesn't lead to true self–sufficiency. The licensed production model still depends on the original equipment manufacturer for essential parts, raw materials and technical updates. As a result, the Indian Army often encounters ongoing but minor issues with these systems. These problems appear as lower–than–expected mean time between failures (MTBF), maintenance heavy service cycles, and performance limits under the tough and diverse conditions along India's borders, from the hot deserts of Rajasthan to the high altitude plateaus of Ladakh.

This reliance becomes even more apparent with India's leading homegrown tank, the Arjun Mk–1A. Created to showcase India's design and manufacturing skills, the "Hunter Killer" is ironically powered by a foreign engine—the powerful German 1400 hp MTU 838 Ka–501 diesel engine. Choosing this engine was a practical decision at the time, based on its proven reliability and excellent power–to–weight ratio.

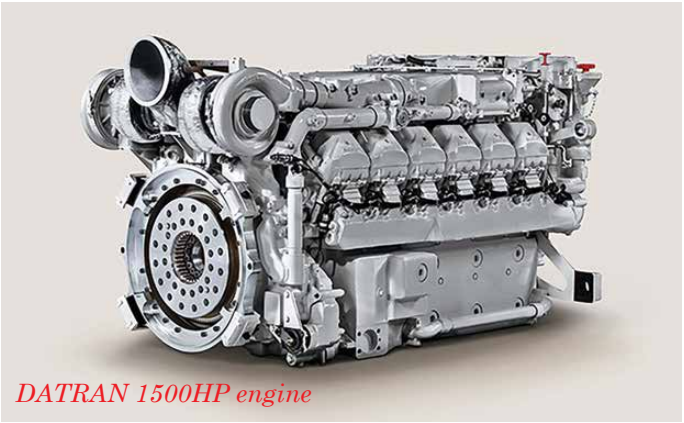
However, this choice has turned into a major issue. The German manufacturer has shut down the original production line for this engine model due to changing global demands for newer technologies. To meet the Indian Army's order for 118 new Arjun Mk.1A tanks, this inactive production line must be restarted, which is a complicated and very costly process. It requires re–establishing supply chains for hundreds of sub–components, retooling equipment, and reallocating skilled workers, resulting in significant delays for the Indian Army. This situation clearly shows the risk of relying on foreign sources; the defence procurement schedule of a sovereign nation now depends on the production logistics of a foreign company.

Having the future in mind, DRDO labs, along with private players, have put in a significant amount of work to develop a whole new spectrum of power plants and transmission for the future combat platforms of the Indian Army.

600 hp transmission system



DATRAN 1500HP engine


DATRAN 1500HP engine

The engines

DRDO's lab, Combat Vehicles Research and Development Establishment (CVRDE), flagship projects indicate that a full half of their main programmes for land systems – four of eight – are focused on power plants and transmission technology.

This particular focus is reflected in the development systems like: a powerful 1500hp DATRAN powerpack and an automatic transmission system intended for our next generation main battle tank, as well as 600 hp and 800 hp varied engine transmission systems for other combat vehicles.

DATRAN, a twin turbocharged 15–cylinder, V–90 engine, capable of generating 1500hp of peak power, incorporates state–of–the–art features such as a high power–to–weight ratio and operability in extreme conditions, including altitudes of up to 5000 m, temperatures ranging from –40°C to +55°C, and desert environments. Equipped with cutting edge technologies like electronic control with CRDi fuel injection systems, self–cleaning air filters and electronic warning control, these engines rival the most advanced engines globally. Currently, the engine is undergoing ground run and is soon to be fitted onboard a modified Arjun tank for further testing. This powerpack features a fully automatic transmission, capable of 4 forward and 2 reverse gears. A prototype has been developed and is already undergoing ground testing. Private players involved in this programme are BEML and L&T, respectively. The system developed here will finally make itself into the FRCV Programme of the Indian Army.

At the same time, CVRDE, along with Ashok Leyland, has developed 600 hp engines to meet the requirements of the FICV Programme. It's a single turbocharged 8–cylinder V90 configuration engine. This is the first engine to be tuned completely in India. This engine has better high altitude performance and better track performance in the desert, covering totally spectrum of Indian conditions. More than 100 hours of ground testing have been completed on this engine. This engine is committed to programmes like FICV, TATA WhAP and AAP, which recently went under metal cutting. The automatic transmission system for this engine is being produced by L&T.

The derivative of the 600hp would be the 800hp engine, which currently has major application in our light tank programme, which is currently powered by a foreign OEM engine. CVRDE, along with private players, Ashok Leyland and L&T, are bringing this engine and the automatic transmission system into reality within the next 2 years.

To sum up, the DRDO labs have developed a diverse range of engines for our upcoming platforms precisely at the right moment. All these programmes are planned to be completed by this decade and enter operationalisation status by the next decade. This strategic foresight comes as the risks of dependence on foreign sources have become very apparent in the past. The powerpacks of 1500 hp, 800 hp and 600 hp are more than just engineering wonders; they are a direct response to these obstacles. Through the collaboration with private industry, India is not only safeguarding its armoured vehicle programmes from geopolitics and external supply chain disruptions but also creating a domestic ecosystem and fulfilling the demand of more than 5000 engines. This project states that the core of India's future combat vehicles will be energised by Indian ingenuity, thereby providing the country with military independence for the next generation.


DATRAN 1500HP engine

Article by D.Rethik
(X: @Rethik_D)

Seventy six years of India: Sovereignty, autonomy and the new architecture of power

Shield AI's V–BAT: V–BAT delivers combat proven, expeditionary, strategic and tactical–level ISR and targeting at a fraction of both the cost and logistical footprint of larger Group 4 and 5 drones with similar capabilities. Designed, tested and deployed for the electronic warfare battlefield, V–BAT has demonstrated real–world mission impact in GNSS–denied and comms–contested environments.

On 26 January 1950, India adopted its Constitution and began the great experiment of building not only a vast democratic state, but a sovereign one. As our nation approaches the seventy sixth anniversary of that momentous day, it is only natural to reflect on how a polity as large, diverse, argumentative and aspirational as ours has not merely survived but strengthened with time. That endurance, however, cannot be attributed solely to the foresight of a constitution that set us on firm institutional footing. It is equally the result of a country that has evolved in tandem with a world transforming around it. For, sovereignty itself does not mean what it once did. Its definition has shifted, its demands have multiplied, and its substance now lies in realms the drafters of our Constitution could scarcely have imagined.

If the mid–twentieth century conception of sovereignty was primarily political, the twenty first century version is decisively technological. It is no longer enough to govern oneself; the real test is whether a nation possesses meaningful control over the architectures, whether industrial, digital, military or economic, that determine its freedom to act. Yet the paradox of our age is that this form of sovereignty is rarely won alone. It often emerges through precisely the kind of partnerships that allow nations to master, rather than depend upon, complex capability stacks.

A nation that attempts to build every technology alone risks becoming slower, more brittle and less adaptive. But a nation that enters thoughtful co–development arrangements, where the foundations of the system are shared, but the mission layer is sovereign, can achieve a degree of capability that neither autarky nor one sided dependence allows. Within the defence industry, some of India's emerging collaborations in autonomy, advanced aircraft, and AI–enabled teaming reflect precisely this pattern: a disciplined technical architecture that preserves Indian freedom of action while ensuring predictability and trust in coalition environments. This is the modern expression of sovereignty.

The hardware imperative

Modern defence sovereignty begins with credible hardware underpinned by strong propulsion, sensing and materials technologies. No country builds all this alone; even technological superpowers absorb inputs from multiple geographies. The question is not whether a nation touches every component, but whether it shapes the architecture, performance, adaptation cycles and mission relevance of the finished platform.

This is exactly where co–development becomes not merely useful, but essential. Joint hardware programmes allow India to incorporate global engineering expertise while simultaneously deepening domestic capability in assembly, integration, simulation, testing, sustainment and certification. Instead of insulated, linear, self–contained development cycles, co–development creates iterative feedback loops between foreign partners and

Indian industry, enabling hardware to evolve in ways consistent with India's doctrinal and operational needs and laying the foundations for later domestic production. Sovereign capability, in this sense, is built not through isolation but through shared platforms that India helps define, adapt and mature. Co–development does not compromise hardware sovereignty; it accelerates it by giving India both ownership of critical layers and influence over the system's trajectory.

The evolving need for sovereign autonomy

Across Ukraine, the Red Sea and the Indo–Pacific, the battlespace has become transparent, sensor–rich, contested by algorithms and dominated by drones, networked intelligence, surveillance and reconnaissance (ISR), and AI–enabled teaming. With the emergence of AI–enabled unmanned vehicles, sovereignty depends not just on deterrent hardware but on autonomous technology that can withstand the evolving threat landscape. In this environment, mission software, rather than platform size or even speed, determines survivability, lethality, coordination and strategic tempo.

Here too, co–development is indispensable. The most advanced autonomy architectures now emerging globally follow a common design philosophy: protect the flight critical core, while enabling nations to sovereignly reprogramme mission behavior. This separation allows India to build, modify and certify its own mission logic, from ISR reasoning to electronic warfare responses to teaming behaviors and navigation choices, without altering the safety critical base that keeps the aircraft airworthy.

Co–development is what makes this possible at scale. When India collaborates on shared autonomy frameworks rather than attempting to build every layer alone, it gains access to proven safety architectures while retaining control over mission level decision making. This combination of shared foundations with sovereign mission logic is the most powerful model for autonomy currently available. It ensures that India can operate advanced systems within coalitions while still determining, independently, how those systems behave on the battlefield. In the realm of autonomy, co–development is the mechanism through which India gains the freedom to innovate, adapt and command in real time.

Co–development as an avenue for sovereignty

Once autonomy and hardware are recognised as complementary pillars for modern defence sovereignty, the case for co–development becomes clear. India gains the most sovereignty when it gains the ability to define its autonomy software while selectively partnering on foundational systems that benefit from scale, maturity and global certification.

Co–development strengthens sovereignty by accelerating India's access to advanced hardware, ensuring that our nation is not held back by long development cycles or reinvented wheels. It enables sovereign mission autonomy by giving India control over mission behavior even when the underlying platform is shared. It expands the industrial base by creating enduring roles across the development lifecycle rather than transient work tied to final assembly. And it ensures interoperability where India needs it, without compromising national control over how its systems behave in the air or at sea. Partnerships of this kind grant India genuine control over the technology that drives real–world results.

If India embraces this moment with confidence, building hardware with global partners while owning mission autonomy and core operational logic, then the next seventy six years will be defined by authorship rather than adaptation. India will not merely navigate the world; it will shape it.

About the Author

Mr. Sarjan Shah is the strategic lead for all of Shield AI's operations in India and is committed to bringing cutting edge advanced unmanned systems and AI–pilot technology to bear for the Indian warfighter. Mr. Shah has more than 17 years' experience managing large complex businesses across the defence, real estate and finance sectors. Mr. Shah holds a BSc in International Relations & History from the London School of Economics & Political Science, where he specialised in information centric warfare and hard power in international relations. He also holds an ADP in Philosophy from the University of Cambridge and an MBA from Harvard Business School, where he focused on the dynamics of cross–border defence technology transactions. Mr. Shah is based in Mumbai.

Wings India 2026: A preview

The Boeing 777X at Wings India 2024. Vayu's Rishav Gupta and Durgesh Singh will be present at Wings India 2026 to cover the event just like they did for the previous edition of the show. Full report in our next edition of the magazine.

Wings India 2026 is Asia's largest civil aviation organised by the Ministry of Civil Aviation in collaboration with the Federation of Indian Chambers of Commerce & Industry (FICCI). The event will take place 28–31 January 2026 at Hyderabad, India.

Wings India 2026 will be the most comprehensive event on the Civil Aviation Industry calendar that includes the Inaugural Ceremony, Global Ministerial Conference, Global CEOs' Forum, B2B/B2G meetings, awards ceremony, cultural evening and business networking dinner. Also, the event will include exhibitions, chalets, demonstration flights, static displays, media conferences, one–to–one business meetings and many more.

India is one of the fastest growing aviation markets and currently the third largest civil aviation market in the world. 1748 foreign airlines flights and 1440 domestic airlines flights are connecting India globally and 1000 new aircraft have been estimated to be added to the Indian civil aviation sector. International tourist arrivals are expected to reach 30.5 million by 2028 and freight traffic at Indian airports is expected to cross 11.4 MT by 2032. By 2026, Government of India aims to operationalise more than 220 airports from the current 184 airports (including operational and non–operational). 29 States are covered under the Krishi Udan 2.0 Scheme and the medical tourism sector is predicted to increase at a CAGR of 21.1% from 2020–27. Fifty airports under a low cost model are to be developed all over the country, including under PPP and the Travel and Tourism market is forecasted to grow 7.9% to USD 270.5 billion in 2023 from USD 119.4 billion in 2012. For last mile connectivity, under UDAN 4.2, 184 routes have been awarded: 16 for helicopters, 50 for seaplanes and 118 routes for small aircraft.

Union Minister for Civil Aviation Mr. Kinjarapu Rammohan Naidu said that India is poised to soon become the third–largest overall air passenger market. Speaking at the curtain raiser event for 'Wings India 2026', Naidu said that the country had become the third largest domestic aviation market. "India has become the third largest domestic aviation market and is poised to soon become the third largest overall air passenger market. The government was working with a clear roadmap to achieve the vision of Viksit Bharat @2047, focusing on modernisation, adoption of future technologies and last mile connectivity," Naidu further said.

Union Minister for Civil Aviation K. Ram Mohan Naidu speaking at the Wings India 2026 curtain raiser in New Delhi. (Photo credit: thehindu.com)

Reaffirming India's commitment to global aviation with skies full of opportunities, fair policies and sincere partnerships, the minister stated, "I am confident that Wings 2026 will build on its legacy, drawing even greater participation from industry partners and aviation enthusiasts from India and across the globe. I perceive Wings India 2026 as more than an event, it is a vision statement, a bold declaration of India's ambition to not merely participate in global aviation but to lead it".

Speaking at the event, Murlidhar Mohol, Minister of State for Civil Aviation, said that India's aviation growth story which is powered not just by national policy but by the active involvement of states across the country. "From enabling new airports to supporting regional airlines, states have played a key role in strengthening connectivity and unlocking local economic potential," he stated. Under the UDAN scheme, Tier 2 and Tier 3 cities are now part of the national aviation grid, boosting tourism, trade, and employment. To further enhance regional coordination, the Ministry is organising a series of Regional Ministerial Conferences—platforms for states to share ideas, address local challenges, and align on common goals. "Together, we are building a more inclusive and connected aviation ecosystem for all," the minister added.

Samir Kumar Sinha, Secretary, Ministry of Civil Aviation, in his special address, underscored the Ministry's focus on sustainability and innovation to shape the future of Indian aviation. He highlighted that India was

well positioned to emerge as a global leader in Sustainable Aviation Fuel (SAF), supporting international climate goals. He also noted that Wings India 2026 would act as a catalyst for Advanced Air Mobility (AAM), including drones and eVTOLs, ushering in a new era of urban and regional connectivity.

A short recap from Wings India 2024: Some excerpts

This year's Wings India event was special as this one happened just after India's two biggest record breaking civil aviation deals. As we know Air India purchased 470 aircraft for their fleet which has a combination of both Airbus and Boeing aircraft, as well as Indigo also purchased 500 narrowbody aircraft from Airbus, which was the most aircraft ever bought by a single airline.

Boeing 777X is Boeing's latest long range, widebody twin engine jetliner which has new composite wings (longer than previous versions), General Electric's GE9X engines (more fuel efficient version of GE90), bigger cabin width, more seating capacity than previous Boeing 777s, and a folding wingtip (automatic, as well as it can be controlled from the cockpit also) which ensures that this aircraft can be parked in most of the commercial runways around the globe. The aircraft was launched in November 2013 and can carry a maximum of 426 passengers for a range of 13,500 km. The aircraft borrows technologies from the Boeing 787 Dreamliner, and the cockpit layout is almost

the same as that of a Dreamliner. The Boeing 777X–9 first flew in 2020 and the deliveries are expected from 2025.

The second star of the show was Air India's newly inducted Airbus A350–900. It was Air India's first Airbus A350–900 with a new livery, as well as a new crew uniform. The aircraft is in direct competition with Boeing's 777, and they are already flying since 2010, with almost 585 aircraft delivered in various configurations.

Both aircraft were purchased by Air India, but only the A350–900 belonged to Air India and it was India's first A350 aircraft, whereas Boeing bought their experimental Boeing 777X–9, on which they performed different tests before the aircraft was ready to be inducted into service. For reference, Air India ordered 34 A350–1000, 6 A350–900 and 10 Boeing 777X.

Akasa Air also showcased its Boeing 737 Max–8 aircraft. This showcase was interesting as Akasa Air signed an aircraft order of 150 Boeing 737 Max aircraft in this very Wings India event, taking their total order book to 226 aircraft. Air India Express also showcased their Boeing 737 Max–8 aircraft, but the special thing about this 737, was its livery, this was Air India's new livery on the express, and the aircraft was looking beautiful. HAL showcased their ALH Dhruv Mk.III Civil variant where in features it was shown that this helicopter can carry 9/14 passengers where 9 is the seating for VIP configuration and 14 is for

the utility roles. The cockpit is completely glass cockpit, and the helicopter can fly for a max range of 630 km with 20 min reserve fuel. The helicopter can be used in different roles, such as tourism, disaster management, mining exploration, search and rescue, casualty evacuation etc. HAL also showcased their civil variant of Dornier's Do–228 aircraft, this one is called the Hindustan 228 Aircraft and it has a maximum take–off weight of 5,695 kg with 19 passengers. This aircraft was approved by DGCA for civil use in 2023 only. This aircraft has immense potential as an affordable regional aircraft, especially under the Indian government's UDAN scheme. Bombardier showcased their Global 6500 private jet, with a range of 12,223 km and maximum speed of 956 km/h. The Global 6500 has the widest cabin in its class, supporting a maximum of 17 passengers, the interior is comfortable and sophisticated.

The Mark Jefferies Global Stars Aerobatic team provided spectacular formation air display and solo display on their Extra 330SC aircraft. The EXTRA 330 SC is a single seat, low wing aerobatic monoplane with a conventional (taildragger) landing gear design. The team painted the skies with tricolour themed smoke and flares in their respective time slots. The Indian Air Force premier helicopter display team, Sarang also flaunted the agility of the indigenous ALH Dhruv helicopters in front of the home crowd.

Wings India 2024 allowed various firms to sign MoUs and contracts. Akasa Air finally announced its three digit order for Boeing 737 MAX narrowbody aircraft valued around $20 billion, with deliveries to begin in 2027. Airbus formed a JV with Air India to launch a pilot training centre, and partnered with GMR to train maintenance crew. The Haryana government signed MoUs for three aviation projects. The agreements involved the Airports Authority of India managing equipment at Hisar airport, Pawan Hans establishing a heli–hub Dwarka Expressway in Gurugram, and Alliance Air operating flights from Hisar under the VGF (Viability Gap Funding) scheme. MEHAIR, India's first seaplane company, signed an MoU with ZeroAvia for ZA600 hydrogen electric engines. Noida International Airport (NIA) signed an MoU with Akasa, second after IndiGo, for international and domestic operations. JetSetGo, a private plane experience provider based in Mumbai, signed agreements worth $780 million which also included 150 aircraft acquisitions.

Press conferences always offer an interactive platform for media and firms. Boeing and Airbus in their respective industry outlook programmes described the current status of their performance in the Indian market, and what kind of growth was expected in the coming time. Both were optimistic to see significant nourishment of civil aviation in India due to rising demand. Hence, both aerospace giants were looking to secure more orders and support for their products from their Indian customers. Contributing to the "Make in India" initiative, Airbus signed contracts with Tata Advanced Systems Limited (TASL) and Mahindra Aerostructures to manufacture metallic detail parts,

components and assemblies for Airbus' A320neo, A330neo and A350 platforms.

Wings India had a great range of interesting elements to dazzle the visitors and among them were key indigenous product showcases and concept demonstrations. The HAL not only displayed their civil version of Dornier Do–228 as Hindustan 228 but also showcased further potential of this platform as an amphibian aircraft, which can not only be useful for the military but also can find its use case as a civil carrier. The Govt of India is working on creating more sea aerodromes, opening the door for seaplanes to be a new means of transport in this country using rivers and dams as the water airdromes and has huge potential in the coming future. In that regard, this indigenous aircraft has huge potential. Then there was 2.5m X 2.5m Continuous Wind Tunnel as a joint project by CSIR, DRDO and ISRO and it is India's first and largest trisonic continuous tunnel. This tunnel can support tests up to Mach 0.1 to 1.8, and for an Angle of Attack of range –45 degrees to +45 degrees, ensuring non–stop testing for complex parameters. Along with the updated Regional Transport Aircraft (RTA) cockpit replica, National Aerospace Laboratories (NAL) has also showcased their all–electric Hybrid UAV which is capable of autonomous vertical take–off and landing while having fixed wings. This drone can fly for a duration of 120 minutes, in which it can hover for 10 minutes and can fly for a duration of 110 minutes in a fixed wing configuration. The structure is all composite and this platform has a ceiling limit of 5 km, while the range sits out at 30 km, this UAV can carry a 5 kg of max payload. The Austrian company Schiebel showcased their unmanned rotorcraft Camcopter S–100. This aircraft was recently inducted by the Indian Navy. The S–100 has a maximum take–off weight of 200 kg with 6 hours endurance which can be extended up to 10 hours with optional external AVCAT fuel tanks. The maximum speed here is of 220 km/hr and the ceiling limit is at 5,500 m. It can carry a host of multiple payloads which are surveillance as well as tactical in nature.

In summary, Wings India 2024 emerged as a pivotal event for the Indian aviation industry, showcasing innovations, fostering partnerships, spectacular static displays and overall highlighting the country's civil aviation potential. Aerial displays by the Global Stars Aerobatic team and Sarang helicopters added excitement, along with the evening drone show. Overall, Wings India 2024 served as a platform for networking, knowledge exchange, and celebration of India's aviation advancements.

All photos (and recap of the previous edition) of Wings India 2024 by Rishav Gupta and Durgesh Singh

IndiGo reflects on a year of progress and learnings

IndiGo concluded 2025 as a landmark year in its journey towards becoming a truly global carrier. The year saw accelerated network expansion, the launch of long haul service, consistent passenger growth, international recognition and important operational learnings for IndiGo. The airline aims to focus on building on the momentum and continuing its growth path as it enters the new year.

Guided by IndiGo's customer promises "of on–time performance, courteous and hassle–free service, affordable fares, unparalleled network, and unwavering commitment to safety", the airline expects to close the calendar year 2025 by welcoming over 123mn customers, an addition of over 10mn compared to 113 million customers in calendar year 2024, reinforcing its position in the Top 10 global airlines.

The operating environment presented periods of industry wide challenges this year, including IndiGo's major operational disruption (3–5 December 2025) regrettably impacting the airline's valued customers for which IndiGo has profusely apologised. The airline rapidly restored its network and operations to normal and continues to focus on further strengthening its operational processes and resilience. Meanwhile, IndiGo is fully collaborating and providing requested information to the regulator's committee.

Across new frontiers: Entering the long haul era

In line with its strategy of internationalisation, IndiGo made significant progress during the year by entering the long haul operations. The airline launched non–stop, direct flights connecting India with Manchester and Amsterdam, followed by services to Copenhagen and London, substantially enhancing direct connectivity between India and Europe. Over the course of the year, IndiGo launched 10 new international destinations and 30 new international routes.

These long–haul operations were enabled through the induction of widebody Boeing 787–9 aircraft in partnership with Norse Atlantic Airways and marked an important milestone in IndiGo's growth journey. The long haul launches were

complemented by an enhanced onboard experience, including the introduction of complimentary hot meals on select international flights, reflecting IndiGo's evolving product proposition for longer–duration travel.

During the year, IndiGo further expanded its international footprint with the addition of Seychelles, Krabi, Madinah, Fujairah and Siem Reap. Leading the restart of direct flights between India and China, IndiGo resumed services to Guangzhou from Kolkata and launched flights from Delhi.

Looking ahead, IndiGo is set to launch non–stop services to Athens starting 23 January 2026, which will also mark the international debut of India's first Airbus A321XLR, unlocking the huge potential for connecting to new medium–to–long–haul markets from the country.

Strength at home: Deepening domestic connectivity

While international growth accelerated, the domestic market continued to remain core to IndiGo's network strategy. During the year, IndiGo commenced operations as the launch carrier at Navi Mumbai International Airport, and new airports in Purnea and Rewa, strengthening connectivity to emerging regional centres. The airline further added Hindon, Adampur (Jalandhar), Kishangarh and Bikaner to its domestic network and is preparing to commence operations from Noida International Airport (Jewar) in due course, reinforcing its commitment to India's evolving aviation infrastructure.

Together, that brings IndiGo's network to a total of 139 destinations at year end with 97 domestic and 42 international destinations.

Powering scale: Fleet, products and customer engagement

IndiGo reinforced its long term fleet strategy by doubling its order for Airbus A350–900 widebody aircraft to 60, reflecting confidence in the long term growth of international travel from India.

The airline also marked one year of IndiGoStretch, its tailor–made dual–class cabin product, which continues to be progressively expanded across key domestic and international routes, with a total of 42 aircraft operating with the dual class offering. In parallel, IndiGo completed one year of BluChip, its loyalty programme, which has grown to over 9 million members, strengthening customer engagement and brand affinity.

Stronger together: Partnerships and codeshare alliances

Recognising that strong partnerships are a cornerstone of international growth, IndiGo continued to expand and deepen its global alliances during the year. The airline signed and strengthened codeshare partnerships with leading international carriers, unlocking seamless connectivity across North America, Europe and Asia.

Steady operational excellence

Flying more than one million customers every 3 days, the airline expects to welcome over 123 million customers and transport more than 55,000 tonnes of cargo in the calendar year 2025. IndiGo operated over 2,200 flights per day, on an average, while maintaining industry leading OTP for the vast majority of the year (10 out of 12 months) with a steadfast focus on safety. IndiGo also signed an MoU with the Bangalore International Airport Ltd. (BIAL) for building a world class maintenance, repair and overhaul (MRO) infrastructure which will help in shaping the future of Indian aviation by developing a holistic, self–reliant aviation ecosystem in the nation.

Looking Ahead

Anchored with a sharper focus on future growth, IndiGo is all set to induct India's first Airbus A321XLR, launch non–stop services to Athens and continue international expansion in the new year, while densifying its domestic network. The learnings from the year gone–by enables IndiGo to enhance its operational reliability, delivering on its strategy of "Towards New Heights and Across New Frontiers" and staying true to its purpose of giving wings to the nation.

Dubai Airshow 2025
(17–18 November 2025)

Vayu's Samarth Mahajan was in Dubai for the show and reports on the events

Under the patronage of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, His Excellency Mohamed bin Mubarak bin Fadhel Al Mazrouei, UAE Minister of State for Defence Affairs, inaugurated the 12th edition of the Dubai International Air Chiefs Conference. The opening ceremony was attended by His Excellency Dr. Ahmad Belhoul Al Falasi, Minister of Sports and Chairman of the UAE Space Agency; His Excellency Lt. General (Staff) Ibrahim Nasser Al Alawi, Undersecretary of the Ministry of Defence; and Major General Rashid Mohammed Al Shamsi, Commander of the UAE Air Force and Air Defence.

The opening ceremony at Atlantis – The Palm, Dubai, witnessed the participation of more than 100 official delegations from around the world alongside senior officers from the Ministry of Defence, Air Force commanders, Chiefs of Staff from friendly and allied nations, as well decision makers and chief executives from major national, regional, and international companies specialising in defence, aviation, advanced technologies, space sciences, and artificial intelligence.

The conference was organised by the UAE Ministry of Defence in strategic partnership with ADNEC Group, under the theme 'Hypersonic Edge: Re-Envisioning Airpower Across Asymmetric Spaces.' Held ahead of the Dubai Airshow 2025, the event continues to strengthen its position as one of the leading global strategic forums in the fields of air and space defence.

HE Al Mazrouei said in his opening speech: "The UAE is positioned today as a global partner, a capability builder and a place where both leading giants and aspiring start-ups can grow their business with confidence. We are all here because we know that we can together build an enterprising ecosystem for the long haul in the UAE." He added: "Over the past two years, the UAE has committed huge investments in defence procurement and technology partnerships. These investments build localised capability, create high value employment, and strengthen the UAE's role as a regional hub for advanced defence manufacturing. Today, we are at a technology inflection point. We are living through a shift as significant as the arrival of jet propulsion.

"The UAE's value proposition is simple: we move decisively, execute efficiently, and honour our commitments. Bring technology, innovation, capital and talent – and you'll find no better environment to build and scale."

Major General Mohammed Salem Ali Al Hameli, Deputy Commander of the UAE Air Force and Air Defence, delivered a welcome address in which he emphasised the importance of the international gathering in enhancing strategic dialogue and exchanging perspectives on the future of air defence amid rapid global changes. "The Dubai International Air Chiefs' Conference stands as a cornerstone of global air and space power, uniting commanders, strategists, and industry leaders. More than a conference, DIACC is a trusted community where experience meets innovation, and nations collaborate through shared purpose and interoperability," he said.

He added: "This year's theme highlights a clear reality: airpower is changing, and we must change with it. The hypersonic edge is both a technology and a mindset – driving us to move faster and think smarter. Speed and AI sharpen awareness, but true advantage still depends on vision, discipline, and clear strategy. The United Arab Emirates is honoured to host this vital dialogue, where global airpower leadership meets innovation and partnership. Together, we carry the responsibility of preparing future generations with advanced capabilities and the enduring values of our profession: integrity and discipline."

India at DAS

Raksha Rajya Mantri (RRM) Sanjay Seth led an Indian delegation to the Dubai Air Show 2025, which was held 17–18 November 2025, in the United Arab Emirates. The delegation included senior officers from the Department of Defence, Department of Defence Production, the Ministry of External Affairs, and the Armed Forces. A bilateral meeting between RRM and his UAE counterpart took place on the sidelines of the

Air Show. RRM also chaired an industry round table with around 50 companies from India, UAE, Australia, USA, Brazil, UK and Italy to enhance cooperation in defence technology and manufacturing in India.

The RRM also inaugurated the India Pavilion set up at the Dubai Air Show. The Pavilion featured stalls from HAL, DRDO, Corel Technologies, Dantal Hydraulics, Image Synergy Ekxplor, SFO Technologies etc.

Apart from the Pavilion, 19 Indian industries including Bharat Forge, BrahMos, Tech Mahindra, and HBL Engineering showcased their capabilities independently. In addition, 15 Indian startups exhibited their products and solutions. The Indian Air Force participated at the Show with the Suryakiran Aerobatic Team and LCA Tejas.

In a tragic course of events, LCA pilot Wing Commander Namansh Syal lost his life when his aircraft crashed during an air display. More details on this at the end of this edition in the section "Talespin". May he rest in peace,

Pakistan at DAS

JF-17 Block III on outdoor display.

A view of the PAC stand and FSDC's simulator of the Super Mushshak trainer.

Super Mushshak trainer in the static area.

All photos: Samarth Mahajan (in the image above)

Sig Sauer launches SIG516 G3

Sig Sauer has introduced the Sig516 G3. "Designed as the ultimate battle rifle, the Sig Sauer Sig516 G3 extends the legacy of the 516 series, bringing new technology to the venerable weapons system. Tested around the world and perfected in New Hampshire, the Sig516 G3 brings a decade of internal engineering know–how on similar rifle projects to create the most rugged, durable platform in its class".

96 AH–64E's for Poland

Boeing will produce AH–64E Apache attack helicopters for international customers, including 96 for the Polish Armed Forces, under a Foreign Military Sales contract awarded by the US Army valued at nearly $4.7 billion.

Ukraine and Rafale

"Dassault Aviation would like to thank the Ukrainian and French authorities for the declaration of intent to acquire the Rafale fighter jet, which they have just signed, and for the confidence they have placed in the operational capabilities of this aircraft".

Dassault Aviation and cortAIx

Dassault Aviation and Thales, through cortAIx, its artificial intelligence (AI) accelerator, have entered into a strategic partnership for the development of controlled and supervised AI for defence aeronautics. Dassault Aviation, an architect of collaborative air combat systems, and cortAIx, Thales' AI accelerator, are teaming up to develop sovereign AI solutions. These cover the functions for manned and unmanned aircraft, for observation, situation analysis, decision making, planning and control during military operations.

Combat system capability for SSN–AUKUS

Four major Defence companies have proposed the establishment of an AUKUS Combat Systems Collaborative Team in contemplation of a potential role for Australia's SSN–AUKUS conventionally armed nuclear powered submarines, under a Memorandum of Understanding signed. BAE Systems, Raytheon Australia, General Dynamics Mission Systems and Thales propose to lead the design and lay the foundations for manufacture and integration of combat systems for SSN–AUKUS.

Boeing boosts RAAF P–8A capability

Boeing is strengthening Australia's maritime surveillance and anti–submarine capability with the first Royal Australian Air Force (RAAF) P–8A Poseidon inducted into an upgrade programme as the service also begins to integrate its 13th aircraft into the fleet.

Ghost Shark factory opens

A short time after the Royal Australian Navy awarded a A$1.7 billion Programme of Record, Anduril officially opened its new Ghost Shark manufacturing facility in Sydney. The first Ghost Shark Extra Large Autonomous Underwater Vehicle (XL–AUV) has rolled off the line ahead of schedule and is ready for sea acceptance testing ahead of planned delivery to the Royal Australian Navy in January 2026.

Vietjet orders 100 A321neo's

Vietjet, Vietnam's largest private airline, has converted its Memorandum of Understanding signed in June, into a firm order for 100 A321neo aircraft. The finalisation of this contract underscores Vietjet's commitment to its network expansion and fleet modernisation strategy, bringing its total orders for the A321neo to 280 aircraft.

Airbus delivers 1st A400M to Indonesia

Airbus Defence and Space has delivered to the Indonesia Ministry of Defence its first A400M, marking a major milestone in the country's efforts to modernise its military transport capabilities. The heavy tactical airlift will be operated by the Indonesian Air Force.

Norway for more NASAMS

The Norwegian government has ordered more NASAMS air defence components from Kongsberg Defence & Aerospace which will strengthen the country's defence capabilities to combat aerial threats. The contract has a value of about NOK 1 billion.

Anduril's YFQ–44A begins flight testing

Our path forward into this new era is led by a critical programme and fueled a critical milestone: we recently began flight testing for Anduril's YFQ–44A Collaborative Combat Aircraft. YFQ–44A is designed to gain and maintain air superiority in highly contested environments through a focus on autonomy and affordable mass; a paradigm shift in how the United States will employ and project combat airpower this decade and beyond".

GE Aerospace and Shield AI to collaborate

GE Aerospace and Shield AI have agreed to collaborate on propulsion technologies for Shield AI's new X–BAT vehicle programme. Through the Memorandum of Understanding, the F110–GE–129 engine, featuring the advanced Axisymmetric Vectoring Exhaust Nozzle (AVEN), has been selected to power the X–BAT. GE Aerospace will provide propulsion and testing support for the X–BAT programme.

Germany and Netherlands for Boxer RCT 30

KNDS Deutschland (KNDS) has been subcontracted by ARTEC (OEM of the BOXER system and a joint venture between KNDS Deutschland and Rheinmetall Landsysteme) to supply Boxer RCT 30 wheeled infantry fighting vehicles to the German Army. The Bundeswehr is fielding a total of 150 systems under the name 'Schakal'. The Dutch armed forces will receive a further 72 Boxer RCT 30.

Denmark for 340 AIM–9X Block II's

Denmark has requested to buy up to three–hundred forty (340) AIM–9X Block II Sidewinder tactical missiles and up to thirty–four (34) AIM–9X Block II tactical guidance units, etc.

MBDA order for CAMM from Sweden

MBDA has signed a contract amendment with the Swedish Defence Materiel Administration – FMV to enable follow–on deliveries of the Common Anti–air Modular Missiles (CAMM). This latest contract follows an initial one placed by the FMV in 2023, for use in MBDA's Sea Ceptor air defence system, which Sweden is integrating onto its domestically made Visby class corvettes.

BAE to deliver 44 CV90 to Denmark

BAE Systems has been awarded a contract by the Danish Ministry of Defence Acquisition and Logistics Organisation to deliver 44 additional CV90MkIIIC infantry fighting vehicles at a value of approximately $450 million including spares, support, logistics and training.

MBDA signs 1st Sky Warden export contract

MBDA has signed its first export contract with a Middle Eastern country to provide its Sky Warden counter–UAV solution. Sky Warden for which MBDA has been awarded, by the European Border and Coast Guard Agency (Frontex), the Frontex C–UAS

Prize 2025 and declared "best system to protect the EU's borders" is a comprehensive multi–layer system that protects an area from micro to tactical drones, up to eight kilometers away.

Roll–out of KNDS Leopard 2A8 and PzH 2000

In the presence of German Federal Minister of Defence Boris Pistorius, Norwegian State Secretary of Defence Marte Gerhardsen, and Bavarian Minister–President Markus Soder, the rollout of the KNDS Leopard 2A8 and PzH 2000 systems for the German Armed Forces and the Norwegian Armed Forces took place at the Munich site.

2nd Navantia S–80 in testing phase

The S–82 'Narciso Monturiol' submarine, the second of the S–80 class, is now afloat in Navantia's shipyard in Cartagena as it prepares for the final stages of its construction and commissioning, including harbour and sea trials.

Brazilian Scorpene submarines

The Tonelero, the third Brazilian Scorpene class submarine built in Brazil with support of Naval Group, was delivered to the Brazilian Navy at the Itaguai naval base. On the same day, the fourth Scorpene submarine, the Almirante Karam, was officially launched.

Serco and Canada

Serco, the international provider of critical services to governments, has been awarded a 25 year contract by SkyAlyne to support its Future Aircrew Training (FAcT) programme for the Royal Canadian Air Force (RCAF). The win is part of Serco's support of SkyAlyne, of which Serco is a key subcontractor.

P&W in F135 sustainment contract

Pratt & Whitney has been awarded a $1.6 billion undefinitised contract action for sustainment of F135 engines, which power all three variants of the F–35 Lightning II.

Italy for 100 JASSM–ER's

Italy has requested to buy one hundred (100) AGM–158B/B–2 Joint Air–to–Surface Standoff Missiles with Extended Range (JASSM–ER).

Denmark for 200 AIM–120C–8's

Denmark has requested to buy two hundred (200) AIM–120C–8 Advanced Medium Range Air–to–Air Missiles (AMRAAM) and three (3) AIM–120–C8 AMRAAM guidance sections.

Canada for 750 air strike weapons

Canada has requested to buy up to seven hundred fifty (750) GBU–39 practice bombs inert with fuzes; up to one hundred (100) GBU–39 Guided Test Vehicles (GTVs); up to one hundred (100) MK–82 inert filled bombs; up to two hundred twenty (220) 2,000–lb BLU–117 General Purpose (GP) bombs, etc.

Korea for 624 GBU–39/B (SDB–I)

Korea has requested to buy an additional six hundred twenty–four (624) GBU–39/B Small Diameter Bombs (SDB–I) that will be added to a previously implemented case whose value was under the congressional notification threshold.

NGC reveals 'Project Talon'

Northrop Grumman unveiled Project Talon, an autonomous aircraft built to fly alongside crewed fighters. As the latest addition to the company's autonomous portfolio, Project Talon represents a "paradigm shift in air dominance as an adaptive, collaborative teammate for combat missions".

Meteor and F–35A

MBDA, Lockheed Martin and the F–35 Joint Programme Office recently completed a series of critical ground based integration tests with Meteor and F–35A, bringing the pair closer to operational readiness.

Rheinmetall to supply Skyranger 30

The Dutch Ministry of Defence has commissioned Rheinmetall Air Defence to supply a two digit number of Skyranger air defence systems for the Dutch armed forces. The first Skyranger weapon platforms are to be delivered at the end of 2028, with the final delivery scheduled before the end of 2029.

Denmark selects LM TPY–4

The Danish Acquisition and Logistics Organisation (DALO) has selected Lockheed Martin's TPY–4 next generation ground based air surveillance radar to enhance Denmark's long range air defence capabilities. Denmark is the fifth nation to adopt the system, joining a growing group of NATO partners integrating advanced radar technology.

Rheinmetall demos drone defence capabilities

Rheinmetall successfully demonstrated its capabilities in counter measures against small unmanned aerial systems (c–sUAS) at the Ground based Air Defence (GBAD) Demo Days at the firing range in Lohtaja, Finland.

Elbit PULS for Greece

Elbit Systems announced that it was notified that the Hellenic Parliament and KYSEA (Government Council for National Security) have approved a budget for the purchase of the Company's PULS rocket artillery system for the Hellenic Armed Forces.

Debut of Finland's 1st F–35A

In a ceremony at Lockheed Martin's F–35 production facility, government and military leaders from the United States and Finland celebrated the rollout of the first F–35A Lightning II for the Finnish Air Force.

Brazilian Army receives 1st of 12 UH–60M's

The Brazilian Army took delivery of its first UH–60M Black Hawk helicopter, initiating a 12 helicopter fleet upgrade that "strengthens Brazil's multi–mission airlift and humanitarian assistance capabilities".

NGC Bushmaster chain guns

Northrop Grumman has entered full rate production to deliver Mk44 Stretch Bushmaster Chain Guns for the US Marine Corps' new Amphibious Combat Vehicles (ACVs). The Mk44S will be integrated into the Kongsberg remote turret used on the Amphibious Combat Vehicle 30mm programme (ACV–30), significantly improving firepower for the Marines.

Successful firings with the SAMP/T NG

Two successful firings of the SAMP/T New Generation (SAMP/T NG) were performed in France and Italy. They demonstrated once more the high level of performance of this long range capability developed by Eurosam, for the armed forces of the two nations in the frame of the historical trilateral Air Defence FSAF–PAAMS cooperation managed by OCCAR (Organisation for Joint Armament Co–operation) on behalf of France, Italy and the UK.

1st NH90 Sea Tiger delivered to German Navy

NHIndustries has officially delivered the first NH90 Sea Tiger to the German Navy, marking the beginning of a 31 aircraft fleet scheduled for completion by 2030. The Sea Tiger represents the newest naval evolution of the NH90 platform and has been tailored specifically to meet the German Navy's requirements for advanced anti–submarine warfare.

Spanish MoD orders 100 Airbus helicopters

Spain is placing orders for 100 Airbus helicopters through the Directorate General for Armament and Material (DGAM) of the Ministry of Defence. This includes 13 H135 helicopters, 50 H145M's, 6 H175M's and 31 NH90 helicopters.

Denmark acquires CDS from Kongsberg

Kongsberg has signed a contract with the Danish government for the supply of the Naval Strike Missile Coastal Defence System (NSM CDS). The contract, which has a value of more than EUR 100 million, will provide Denmark with the latest technology and the most modern coastal artillery system in the world.

Embraer A–29N for Portugal

Embraer has delivered the first five A–29N Super Tucanos to the Portuguese Air Force (PRT AF) during a ceremony held at OGMA's facilities, attended by authorities, The acquisition of these aircraft – part of an order for 12 units – represents a significant milestone in Portugal's process to modernise its air capabilities.

12 M–346 F Block 20's for Austria

The contract includes aircraft, simulation systems for pilots and maintenance technician training, spare parts and equipment, and logistical support for six years following the delivery of the first aircraft in 2028. The M–346's international success grows stronger, with orders totalling almost 160 aircraft; the type has been chosen by 20 countries for advanced training or as a light multirole fighter.

MBDA JV receives TAURUS NEO

TAURUS Systems GmbH (TSG), an MBDA/SAAB Joint Venture, and the Federal Office of Bundeswehr Equipment, Information Technology and In–Service Support (BAAINBw) signed a contract preparing a serial production line to produce a capability enhanced TAURUS NEO stand off guided missile system. Against this backdrop, MBDA plans to produce large quantities in Germany.

TECRO for 60 M109A7's

TECRO has requested to buy sixty (60) M109A7 Self–Propelled Howitzers (SPH); sixty (60) M992A3 Carrier Ammunition Tracked (CAT) Vehicles; thirteen (13) M88A2 Recovery Vehicles (RV); four thousand and eighty (4,080) Precision Guidance Kits (PGK); and forty two (42) International Field Artillery Tactical Data Systems (IFATDS), etc. The estimated total cost is $4.03 billion.

Rubin Design Bureau's 3rd Lada submarine joins the Russian Navy

On 12 December 2025, the third Project 677 Lada conventional submarine named after town Velikiye Luki joined the Russian Navy. It has been designed by Rubin Design Bureau and built at the Admiralty Shipyard (both the entities are under the United Shipbuilding Corporation).

The ship successfully underwent Shipyard's Sea Trials and State Trials in the Baltic Sea. During the trials, all ship systems including electric power system, radio electronics and torpedo missile armament were subjected to checks. Based on the results of trials, high tactical and technical characteristics of the non–nuclear submarine were proven.

Rubin's designers supported the construction of submarine Velikiye Luki at all stages – from Project development to participation in the State Trials. At present, Rubin Design Bureau is rendering assistance in further construction of Project 677 boats.

Project 677 submarines are the most state–of–the–art and advanced Russian non–nuclear underwater ships. Low noise characteristics, means of acoustic protection and extremely powerful sonar system ensure Lada's advantage over similar foreign ships. Lada is equipped with torpedo missile armament capable of firing at marine and shore targets.

Rubin Design Bureau is among the global leaders in design of nuclear and conventional submarines and the largest marine engineering company offering design services in Russia. More than 1000 submarines in 124 years of our work have been built to Rubin designs, including more than 900 submarines commissioned by the Russian Navy. Totally 116 submarines designed by Rubin have been exported to 16 countries. Rubin also develops marine robotic systems and designs the facilities for offshore oil and gas field development. The company is a subsidiary of the state–owned United Shipbuilding Corporation.

Text and photos: Rubin Design Bureau

WB Group news

New contracts for Warmate

WB Group has signed new contracts for the supply of the latest version of the Warmate family of loitering munitions. Polish made strike systems will soon be delivered to users in Asia. The new Warmate 3 variants feature an extended operational range, enhanced warheads, improved performance in GNSS denied and jamming environments, and full interoperability with other WB Group unmanned platforms. Under the agreements, WB Group will deliver a total of 1,000 Warmate 3 loitering munitions to non-European armed forces. The orders include the newest variants of the Warmate 3, characterised by upgraded capabilities and larger warheads. Warmate 3 stands out with extended operational range, upgraded NATO compliant warheads, and advanced signal relay capabilities, enabling operation in GNSS denied and heavily jammed environments. The system is fully interoperable with other unmanned platforms developed by WB Group, allowing seamless integration within a unified battlefield management ecosystem.

WB Group systems demonstrated to NATO representatives

WB Group's solutions were presented to members of the NATO Parliamentary Assembly's Defence and Security Committee during a live demonstration at the Wesoła training ground. The spotlight was on the company's unmanned aerial systems and the Future Task Force manned-unmanned platoon, which made its debut at the International Defence Industry Exhibition (MSPO) 2025.

The demonstration, held on 28 October at the Wesoła range, was part of the NATO delegation's three day visit to Poland and provided an opportunity for a first hand assessment of the capabilities of Poland's defence industry. Particular attention was drawn to the Future Task Force vehicles – a concept developed by WB Group to integrate manned and unmanned platforms into a cohesive platoon capable of supporting mechanised, motorised or armoured battalions through remotely operated land systems. The Future Task Force includes an armoured command vehicle equipped with advanced communication, command, and battlefield management systems, as well as the ZMU-05 remotely controlled weapon station for self-defence. The formation also features unmanned ground platforms fitted with mission-specific payload modules.

Depending on mission requirements, the unmanned ground platforms can carry various payloads. The NATO Defence and Security Committee delegation observed platforms equipped with ZMU-05 remote weapon modules, Warmate TL loitering munition launchers and MN light scatterable mine launchers.

Delivery of SmartEye ST-1 units

In 2025, Croatian authorities took delivery of nearly one hundred advanced SmartEye ST-1 speed-enforcement systems, along with additional equipment. These devices were developed by PolCam Systems-WB Group's competence centre for traffic safety technologies. SmartEye ST-1 speed-enforcement systems have repeatedly demonstrated their effectiveness in protecting road users. Strong operational performance and close cooperation with the Croatian police have led to a planned modernisation of the 50 systems supplied in 2019, upgrading them to the current capability standard.

Rosoboronexport at Dubai Airshow 2025

Rosoboronexport JSC (part of the Rostec State Corporation) organised the single Russian exhibit at the Dubai Airshow 2025. The Russian pavilion, covering a total area of 1,000 square meters, featured defence, dual use and civilian products from the country's major defence holding companies, including Rostec's United Aircraft Corporation, United Engine Corporation, Radio–Electronic Technologies Concern and others. Products from the Almaz–Antey Air and Space Defence Corporation and the Tactical Missiles Corporation were also on display.

"The Dubai Airshow is a global platform where trends in the aerospace and defence industries are shaped. In 2025, Rosoboronexport will showcase more than 850 Russian products here – highly intelligent systems capable of dramatically enhancing our partners' defence capabilities. Of these, 30+ most in–demand ones in a full scale version will be on static display on the ground and in a pavilion," stated Rosoboronexport Director General Alexander Mikheev. "In Dubai, we will demonstrate the latest achievements of the Russian defence industry in aviation, space exploration and air defence. During the business programme, we will hold talks with delegations from the armed forces of countries in the Middle East and North Africa, as well as other regions, regarding the supply of Russian products and the establishment of technology cooperation."

Most of the presented products have experience of use in combat conditions and have been developed and modified to meet the realities of modern high intensity conflict. The Su–57E fifth generation fighter developed and produced by UAC was unveiled in the Middle East for the first time. The Su–57E was on static display along with the latest air weapons developed and manufactured by the Tactical Missiles Corporation. The advanced RVV–MD2 air–to–air missiles, Kh–38MLE, Kh–69 and Grom–E1 air–to–surface missiles and the Kh–58UShKE air–to–radar missiles, integrated into the fifth generation fighter's weapons suite, are designed for internal carriage.

The Russian Knights aerobatic team, always acclaimed by spectators worldwide, performed aerobatic maneuvers on Su–35S fighters.

In the aircraft engine segment, Rosoboronexport showcased the new generation Item 177S turbojet engine, which boasts improved performance (thrust, fuel consumption and service life) compared to previous generation aircraft engines. The modernised Yak–130M combat trainer aircraft, featuring an updated avionics suite and a new aircraft armament system, made its world premiere.

On static display Rosoboronexport presented the IL–76MD–90A(E) military transport aircraft capable of performing a wide range of missions during special operations, including transportation of equipment, cargo and personnel of airborne units and combat vehicles, evacuation, firefighting and disaster relief.

The Ka–52 recon/attack helicopter, a recognised leader in its market segment, participated in the airshow's flight programme.

Rosoboronexport's stand featured Russian loitering munitions, including the upgraded Lancet–E system, which currently has the most extensive combat experience in the world, and the KUB–2–2E loitering munition with an automatic guidance system.

Rosoboronexport at EDEX 2025 in Egypt

Rosoboronexport organised Russia's single exhibit at the Egypt Defence Expo (EDEX) 2025, which was held from 1–4 December 2025 in Cairo. The Company showcased the most in–demand Russian products in Africa for the air force, air defence, land forces and navy, as well as security equipment.

"EDEX 2025 occupies a special place in Rosoboronexport's exhibition campaign. This year we celebrate a significant event – the 70th anniversary of military–technical cooperation between Russia and Egypt. Our countries have developed strategic partnership relations based on mutual respect, trust and shared interests. Today Rosoboronexport offers Egypt not just weapons, but comprehensive solutions for national security, including for the development of the country's Defence industry through technology cooperation projects," stated Alexander Mikheev, Director General of Rosoboronexport.

The EDEX exhibition is held under the patronage of Abdel Fattah el–Sisi, President of the Arab Republic of Egypt and Supreme Commander–in–Chief of the Egyptian Armed Forces. Rosoboronexport, which has participated in all previous forums, traditionally showcases the most advanced battle proven Russian weapons.

For the Air Force, Rosoboronexport showcased the Su–57E multirole fighter at its booth. The special aviation segment featured the Il–78MK–90A tanker, which can be quickly converted into transport, ambulance and firefighting versions, as well as even in a "flying hospital". The Ka–52 reconnaissance/attack helicopter, which was on display, is equipped with a defensive aids suite and a unique crew ejection system. It is armed with advanced air–to–air weapons, including extended range precision guided weapons.

In the air defence segment, the Company showcased the S–350E Vityaz anti–aircraft missile system, which has demonstrated its high capabilities to engage a wide range of aerial targets in real combat conditions, including in fully automatic mode. The Verba MANPADS is the world's only man–portable air defence system equipped with a three spectrum target seeker. It boasts high jamming immunity and enhanced capabilities against aerial targets having a low infrared signature. A wide range of long, medium and short–range air defence systems were also on display at the Almaz–Antey Air and Space Defence Concern booth.

Rosoboronexport presented Russian weapons for the Land Forces, developed or upgraded based on the experience of modern combat operations. These included the T–90MS MBT in a new configuration, BMP–3 infantry fighting vehicle, Kornet–EM remote–controlled ATGM system and loitering munitions, including the upgraded Lancet–E.

News from Saab

Order for launch system for Gripen

Saab has received an order from the Swedish Defence Materiel Agency (FMV) for a new launch system for Gripen C/D and Gripen E. The order value is approximately SEK 1 billion. This is a series production order for the launchers which was included as an option within an existing contract for the development and integration of the launcher system.

Carl–Gustaf order from Denmark

Saab has signed a contract with the Danish Ministry of Defence Acquisition and Logistics Organisation for deliveries of the Carl–Gustaf M4 weapon, ammunition and training equipment. The order value is SEK 510 million and deliveries will take place 2026–2028.

Contract for Gripen E/F with Colombia

Saab signed a contract with the Colombian Government and received an order for 17 Gripen E/F fighter aircraft. The order value is EUR 3.1 billion and deliveries will take place 2026–2032. The contract includes 15 Gripen E one–seater and two Gripen F two–seater fighter aircraft as well as associated equipment and weapons, training and services.

Arexis System for German Eurofighter

Saab has received two orders from Airbus Defence and Space for the Arexis Electronic Warfare (EW) sensor suite to equip German Eurofighters. The total order value is approximately EUR 549 million. The delivery period is 2025–2028. The second order includes AI technology by both Saab and its strategic partner Helsing. The order value is approximately EUR 258 million and is subject to authority approval.

Gripen E and KC–390 in refuelling certification flights

Saab and Embraer, in cooperation with the Brazilian Air Force (FAB), have successfully completed the certification flight test campaign for in–flight refuelling of the F–39 E Gripen fighter by the KC–390 Millennium multi–mission aircraft. The flight test campaign consisted of two objectives. The first involved qualifying Gripen E as a receiver for in–flight refuelling — a key step in validating the fighter's performance, stability and structural integrity throughout the operation. The second focused on verifying the compatibility of both aircraft across the KC–390's entire flight envelope, for high–speed refuelling under both day and night conditions.

GA–ASI and Saab to demo AEW&C on MQ–9B

Following their announcement to bring Airborne Early Warning and Control (AEW&C) capability to the Remotely Piloted Aircraft (RPA) platform, General Atomics Aeronautical Systems and Saab will now team up to demonstrate the capability in the summer of 2026. The demo will be conducted at GA–ASI's Desert Horizon flight operations facility in Southern California using a GA–ASI MQ–9B equipped with AEW&C supplied by Saab.

Saab, Boeing and BAE for next gen pilot training

Saab, Boeing and BAE Systems have signed a Letter of Intent to collaborate on the Royal Air Force fast–jet trainer programme, leveraging T–7 as the core of the training system and creating a path for three companies to support future international pilot training opportunities. The requirement for a new UK Advanced Jet Trainer was set out in the 2025 Strategic Defence Review. BAE Systems will lead the activity, which will include a UK–based final assembly, creating high–value jobs in the UK.

CAE agreement with Saab for GlobalEye

CAE announced the signing of a worldwide cooperation agreement that positions CAE as Saab's preferred supplier for select training and simulation requirements related to its GlobalEye Airborne Early Warning and Control (AEW&C) aircraft and other platforms. This partnership also includes an agreement specific to Canada to jointly pursue Canada's AEW&C programme.

Order for ground based air defence solution

Saab has received an order from the Swedish Defence Materiel Administration (FMV) on sensors and command–and–control systems for a ground–based air defence system solution for brigades. The order value is approximately SEK 2.1 billion. Deliveries will take place 2027–2028. The command and control and the sensor systems continue to build on previous deliveries to FMV to strengthen the Swedish ground based air defence. In addition to the command–and–control system (LSS Lv) and the Giraffe 1X radar, the order consists of weapon system integration, studies and spare parts.

Order for mobile air defence from Lithuania

Saab has received a third order for the Mobile Short Range Air Defence (MSHORAD) system from the Lithuanian Defence Materiel Agency. The order value is approximately SEK 1.4 billion with deliveries 2026–2030. Saab will deliver a third battery of the MSHORAD to the Lithuanian Armed Forces. The system will be integrated by Saab into the JLTV 4x4 vehicles manufactured by Oshkosh.

Saab selected for Poland's submarines?

The Swedish government's offer of Saab's A26 submarines to Poland has been selected by the Polish government to replace the current Kilo class submarine. At this point, Saab has not signed any contract nor received any order. The Swedish offer comprises advanced A26 submarines from Saab, equipped with the latest innovations and technologies. The proposal includes cooperation with the Polish industry and knowledge transfer, securing a strategic partnership between Poland and Sweden.

Meteor firings with Gripen E

In November 2025, the Brazilian Air Force (FAB) achieved a major milestone by completing the first firings of the Meteor BVRAAM from Gripen E, strengthening Brazil's air defence deterrent power. Two missiles precisely hit their designated targets, while demonstrating the weapon's accuracy against long–range threats. With the participation of the First Air Defence Group, the Technical Exercise brought together four Gripen E fighters in a large scale operation that, for the first time, allowed FAB technicians and pilots to handle and employ the Meteor in combat like conditions.

Contract with Spanish Army

Saab has received a first order from the Spanish Army for Individual Duel Simulation systems. This entails a mix of supply and services and includes Saab's advanced infantry soldier systems and exercise control to be used in different units within the Spanish Army. This is the first order within a framework agreement between the Spanish Army and Saab, with a potential maximum total value of approximately EUR 34 million. The agreement includes Saab's Gamer live training equipment including Personal Detection Devices (PDDs), weapon kits and Manpack systems.

TLP goes Navy

Finally, after an interim period of 7 months, the second Flying Course (FC) of the Tactical Leadership Programme took place during late September 2025. After the cancellation of FC25–2, which was planned to take place during spring 2025, FC25–3 became actually the second course. On 22 September, an impressive line–up of fighters, as well as some supporting aircraft, started the 2 weeks training. During the first week of FC25–3, TLP commander Colonel Cesar Oscar Acebes Puertas invited media at the Spanish Air Force Base of Albacete – Los Llanos to be informed about the running course which had a strong presence with naval assets and other TLP news.

The TLP course aims at educating tactical fast jet aircrews in the joint environment of Composite Air Operations (COMAO), as Colonel Acebes explained. The TLP lectures and missions are designed for the junior tactical aircrew or individuals with limited COMAO experience, especially senior First Lieutenant or young Captain level with more than 500 flight hours on type and/or in role. The course is also designed for support personnel which is likely to be involved in a COMAO in the future, including intelligence officers, fighter controllers and Command Control Intelligence Surveillance Reconnaissance (C2ISR) operators. The common TLP

route progression of the courses starts with the Support Course, followed by the COMAO Synthetics Course and finally the COMAO Flying Course (FC). Edition FC25–3 had 22 pilots/aircrew, 6 Intelligence Officers and 6 Ground Control Interception Officers to run the course towards graduation.

The 22 participating pilots came from various European based NATO units, but saw an important naval aviation

presence with the Italian navy (Marine Militare Italiana–MMI) with Harriers, F–35B's and an P–72 Maritime Patrol Aircraft and France with Rafale Marine fighter aircraft. Furthermore the USN was present with 2 MH–60 Sea Hawk helicopters from Rota Naval Air Station. The planned participation of Spanish Armada Harriers had to be cancelled due to operational obligations. The Spanish Harriers are now expected to join in FC25–4. Colonel Acebes explained that there was no clear reason for the higher naval show–up, however he knew that when the French navy Rafale unit heard about the large Italian navy presence, they decided to join as well. With all the navy assets in this flying course and the availability of a maritime patrol aircraft, some of the available variety of scenarios saw some more focus towards maritime oriented exercise operations, then other flying courses.

Additional, air force, participants came from Greece with F–16 Viper's, France with Rafale C's, Italy with F–35A and B's, while Spain had Eurofighters and EF–18M Hornets present at Albacete.

TLP supporting aircraft included a French E–3F AWACS platform operating out of Albacete. Several other supporting aircraft which flew from another or their home base, were Italian KC–767 and French A–330MRTT aircraft for aerial refuelling, Spanish MQ–9A Remotely Piloted Aircraft System (RPAS) and a Danish C–130.

GRUPAER

The dominating aircraft presence of Italy with about 16 aircraft was showing clearly in FC25–3. 11 of these aircraft belonged to the Gruppo Aerei Imbarcati (GRUPAER), embarked air group, from home base Grottaglie NAS, Italy. Unit commander Captain Gian "GIAMBA" Battista Molteni and F–35B pilot Lieutenant Erika "DUMBO" Rabalia, explained that the TLP is an important and logic step in the flying career of Marine Militare Italiana fighter pilots. Meanwhile the GRUPAER unit, nick named "Wolves", operates still the AV–8B+ "Harrier II" while transition to F–35B operations is ongoing.

Late last year the unit was with both fighter aircraft embarked at Italian carrier Cavour (C550) for a 5 month

cruise through the Indo–Pacific region. This year saw shorter regional embarkments while training for pilots on the F–35B continued. To maintain the units operability at strength and fulfil their tasks, a dedicated number of experienced pilots are kept current to fly both the Harriers and F–35B. The newer pilots are dedicated for F–35B operations only. Although no exact information was available until when the Harriers remain operational for GRUPAER, it will be with the gradual ongoing deliveries of the new 5th gen F–35 aircraft, undoubtedly getting closer. Knowing that, it was interesting to see that the GRUPAER showed up at the TLP with no less than 5 single seater Harriers and a two seater, a TAV–8B+. The unit completed its TLP contribution with 5 Marina and "4" coded F–35B's and some co–shared F–35's of air force units 101 and 102 Gruppo. To mark the occasion, special TLP FC25–3 badges "Joint Italian Air Force/Navy Team 101Gr–102Gr–GRUPAER" were made for all crew.

Developments

After the new entry of Portugal as one of the 11 TLP "Memorandum of Understanding" (MoU) signed countries per the beginning of 2025, Colonel Acebes could mention current talks with Sweden about expected TLP entry during 2026.

Furthermore the TLP organisation is investigating together with the European Personnel Recovery Centre (ERPC) if their Air Centric Personnel Recovery Operatives Course (APROC) can be combined with the TLP courses in the future. Current planning mentions that analyses will take place in 2025 and conclusion of the findings are expected during 2026.

Text and photos: Peter ten Berg

4th Gen rules in last TLP 2025 Flying Course

November 2025 was having, as in previous years, the final Tactical Leadership Programme (TLP) Flying course (FC). Around 45 aircraft, including reserve assets, gathered at Albacete Air Force Base, Spain, for the final course of the year to deliver another batch of TLP graduates. Remarkable fact was that, although many nations have started to operate 5th generation aircraft, which have been participating already several times in previous TLP courses, this edition was dominated by 4th gen aircraft. TLP commander Colonel Cesar Oscar Acebes Puertas, wrapped up the year and looked ahead during a media session with our reporter, while the last FC of 2025 was running.

Matador

FC2025–4 was again a course with interesting participants, of which the Spanish Navy Harriers, being in the autumn of their technical life, were probably the highlight. The AV–8B "Matadors" from No. 9 squadron based at Rota Naval Air Station, were originally planned for Flying Course 25–3, which in fact was dominated by naval aircraft like French Rafale M's, together with Italian Gruppo Aerei Imbarcati (GRUPAER), embarked air group, Harriers and F–35B's from Grottaglie. The Spanish Harriers were forced, due to operational obligations, to shift their participation to the last FC of 2025. Here they

worked together with a large number of French Mirage 2000's, being D models from Nancy and 5F types from Luxueil. Other fighters included German Tornado IDS's, Turkish F–16C/D's from 132 Filo at Konya, Turkey, Italian Eurofighters representing 4, 36 and 37 Stormo and a trio of F–16AM's belonging to 53rd squadron based at Fetesti air base, Romania.

Spain, as the host nation, was present with EF–18M+'s from the 12th wing from Torrejon and an F/A–18A from 46th wing at Gando. Albacete's home based 14th wing Eurofighters completed the group of fighter aircraft. As usual a Flying Course has several other aircraft participating in supporting roles, like for Command & Control, High Value Asset Escorting, Combat Search and Rescue and Medical Evacuation. Therefore a NATO A–3E AWACS, an Italian C–27, Spanish CN–295, a German civilian Learjet 35 and NH–90TTH helicopter deployed to Albacete for the duration of the course. Supporting aircraft operating from their home base included a French A–330 MRTT and an Italian KC–767 for aerial refuelling as well as a British MQ–9B "Predator" Remotely Piloted Aerial Vehicle (RPAS).

Graduate & MIT

Commander Acebes mentioned that the number of personnel acting in the TLP training in the November 2025 course, totalised around 550, of which 38 of them graduating. The FC25–4 graduates included 26 flight crew members, 6 intelligence officers, and 6 tactical air controllers. During the 3 Flying Course held in 2025, a total of 100 crews graduated.

In 2025 the TLP also started to foster aircraft X–servicing activities for ground crews during a Flying Course. In FC25–4 the so called Maintainers Interactivity Training (MIT) took place for the 2nd time and was for example executed between French Mirage 2000 and Spanish Eurofighter crews. The MIT activities will be further rolled out in all future courses.

FC routine

A regular TLP fly day starts at 09.30 with a briefing on the weather followed by a mission scenario brief and the appointing of a mission commander for that day. At 10.00 the planning of the mission starts until 14.00 when "stepping" is scheduled. Stepping is the phase were the aircrews reach their aircraft and do all their pre–work together with the ground crew to finally start–up their engines and be ready for take–of scheduled by 15.00. Around 16.45 the recovery starts, when aircraft return in pairs to Albacete after their mission. As the final FC took place late November, about the half of the aircraft returned as the sun already had set below the horizon. Although the mission has been finalised, the day is not over before the participants had their mission debrief that evening. A FC includes a total of 12 missions; 3 in flight simulators and 9 live flying missions. The TLP makes use of a dedicated airspace covering approximately 150 x 95 nautical miles, which includes areas for low–level flying and allowing supersonic flights. Finally, the TLP FC25–4 continued to make use of the MACE flight simulators, which allowed pilots and controllers to train not only in a virtual environment, but also to interact with aircraft on real missions through advanced communication protocols (Link 16).

Eastern flank

Over the last years the TLP calendar included normally 4 Flying Courses a year, but as commander Acebes looks back, it became an almost re–occurring event that during the year one of the FC's had to be cancelled. Main reason for this, excluding the Covid pandemic timeframe, lays within the increased presence of nations to rotate with their fighter aircraft in ongoing deployments to strengthen the eastern flank of NATO's territory in Europe. As these additional tasks remain to continue, it was inevitable according to commander Acebes, to adjust the TLP FC planning accordingly and resulted into a new realistic

schedule of 3 FC's a year. The current planning for 2026 now includes a first FC in the January–February time frame, while the 2 others are scheduled for September–October and November–December timeframes.

Future

While looking at the future, commander Acebes explained the further focus at modern flight integration with the transition to new generation platforms. TLP will provide F–35 support for multi nation usage, which will request additional F–35 instructor capacity. The commander expects to have it running within a few years, while the initial strive ambition mentioned 2027 as a possible option.

While Portugal was only welcomed in the beginning of 2025 as a new member to the TLP organisation, initial accession talks were started with Sweden during the year. Commander Acebes was therefore happy to mention that on 20 November, during a distinguished visitors day, member nations ratified with their signatures the approval for Sweden to officially join the Programme as of 1 January 2026. On request commander Acebes also

confirmed the interest of Finland in the TLP programme, however no immediate steps were undertaken as Finland now primarily focusses at the first arrivals of the F–35's and their implementation in their air force.

Ramstein Flag

The TLP commander could furthermore announce the TLP cooperation to exercise 'Ramstein Flag" in June 2026. NATO Allied Air Command (AIRCOM) organised Ramstein Flag exercise will cover in 2026 NATO's European operational areas, also called "Air North" and Air South". The TLP command has been asked to support the Air South activities during Ramstein Flag as a hub with their (TLP) infrastructure, resources and accommodation facilities. RF26 is scheduled to take place from 8–19 June 2026.

Text and photos: Peter ten Berg

“Falcon Strike 2025”

A Greek F–16C lands while an F–35A taxis to its hangar. Operational integration between fourth and fifth–generation jets was a focus of the Falcon Strike 2025 exercise.

The Italian Air Force’s most important training event of 2025, the exercise “Falcon Strike”, took place from 3–14 November 2025. The exercise’s main hub was Amendola Air Base, Puglia, in Southern Italy, home of 32 Stormo (32nd Wing), but half a dozen other air bases supported the air operations, which generated over 1,000 flight hours in 460 sorties, involving approximately 1,000 military personnel and over 50 aircraft belonging to the Italian Air Force, Italian Naval Aviation, USAF in Europe, French Air Force, Greek Air Force and Royal Air Force. Various ships from the Italian Navy and from the Royal Navy were also involved in the drills.

Exercise goals were multiple and reflected the increasing sophistication in the deployment of advanced military assets within rapidly evolving and complex international scenarios. These environments were meticulously designed to simulate confrontations with peer adversaries who possess comparable capabilities.

Key concepts of NATO doctrine, such as Agile Combat Employment (ACE) – the ability to deploy forces flexibly and rapidly – increasing operational readiness, integrating specialised units in joint operations, and the ability to cooperate in multinational missions, were also implemented during the exercise.

General Antonio Conserva, Chief of Staff of the Italian Air Force, explains: “We operate in multi–domain scenarios where there are air, land, naval and cyber threats, as well as what we might call space threats. Our crews train to address this complexity and the resulting technological challenges. With “Falcon Strike 2025” we have achieved another significant milestone in operational capability and force readiness.”

Another pivotal objective of the exercise was the ongoing integration of fourth and fifth generation aircraft. With more and more NATO air forces introducing the stealth fighter–bomber F–35 Lightning II and with many advanced fourth generation fighters expected to remain in service for decades, it is crucial to jointly utilise both aircraft generations to maximise their respective strengths.

General Silvano Frigerio, Commander of the Air Force Operational Command, stated, “We must aim for maximum integration between fourth and fifth generation

F–35B is STOVL version of the 5th generation stealth fighter

platforms and maximum interoperability among crews from different nations. Within NATO we've been doing this for over 70 years – the challenge now is to push these capabilities to their highest level."

The combat aircraft deployed during the exercise perfectly reflected this necessity.

The main protagonist was undoubtedly the F–35, with around 30 aircraft present. Twelve F–35As belonging to the 493rd Fighter Squadron of the 48th Fighter Wing of USAFE stationed at Lakenheath operated from Amendola, along with a dozen from the Italian Air Force (with both CTOL F–35A and V/STOL F–35B versions from both the 32 Stormo and the 6 Stormo in Ghedi) and 5 F–35Bs from the Italian Navy. The latter also deployed 5 AV–8B+ Harriers.

The other foreigner 4th generation assets were 5 multirole fighter Dassault Rafale Cs from the French Armee de l'Air et de l'Espace (from EC 01.005 Vendee based in Orange/Caritat) and 4 F–16C/Ds from the 340 Mira (from Chania) of the Greek's Polemiki Aeroporia.

As part of "Red Air", the Eurofighter Typhoons of the 4 and 36 Stormo and the Tornados of the 6 Stormo operated from Gioia del Colle and Decimomannu respectively.

Another four British F–35B Lightning aircraft operated directly from the aircraft carrier HMS Prince of Wales, which was cruising in the Mediterranean with its Carrier Strike Group as part of "Operation Highmast", the UK's strategic deployment initiative that has seen British air and naval assets operating in various theaters since early 2025. Falcon Strike was the conclusive chapter in Operation Highmast.

About the latter point, Air Marshal Allan Marshall, RAF Air and Space Commander, stated, "Exercise Falcon Strike is another outstanding demonstration of how far our collaboration with the Italian Air Force has come. Training side–by–side with our Italian colleagues strengthens interoperability, deepens mutual understanding and ensures that both nations remain ready to deliver decisive

Italian Navy's Harriers and French Rafales returning from a Falcon Strike mission

The Dassault Rafale is one of the most advanced fourth–generation fighters that will remain in service in Europe for decades to come.

With around 30 jets, F-35 was the most numerous type taking part at Falcon Strike 25.

air power whenever and wherever it's needed. This exercise showcased not only fifth generation capability but also the trust and professionalism that underpins every mission we fly together".

Given the scope and complexity of the exercise, a wide array of support aircraft operated from several other bases. Among the tanker fleet were an Italian KC–767A and a KC–130J (operating from Pratica di Mare and Pisa respectively), an RAF Voyager KC2 operating from Brindisi, a French A330 MRTT Phenix from Istres, and a KC–135R Stratotanker belonging to the 100th Air Refueling Wing, operating out of Sigonella. Equally critical was the participation of electronic warfare, command and control (C2), and ISR (Intelligence, Surveillance, and Reconnaissance) assets. These included the Italian G–550 CAEW, Beechcraft KA–350ER King Air, P–72A and the MALE MQ–9 Reapers. A single French E–3F Sentry operated directly from its home base in Avord. In close coordination with the exercise direction (DIREX), led by the Air and Space Operations Command (COA) in Poggio Renatico, these platforms ensured the protection of high value targets by creating robust anti–access (A2) zones.

The PISQ (Salto di Quirra Joint Test Range) on Sardinia's east coast played a major role, falling within one of the two vast airspaces reserved for the exercise–a 180×180–nm area stretching east of the island over the Tyrrhenian Sea. The second training area covered the airspace over Calabria, Basilicata, and Apulia and extended across much of the Ionian Sea, measuring roughly 180×120 nm. The range generated the Live, Virtual and Constructive (LVC) scenarios and managed a network of sensors, radars, optics and EW systems responsible for simulated threats during the various sorties. Ground activity included tactical convoys, Smokey SAM launches and Mirach 100/5 target drones fired from the coastline to simulate missile threats. The range also hosted JTAC teams from the Italian Air Force and the Italian Navy's Brigata San Marco, tasked with designating high–value targets during dedicated training events. General Conserva concluded: "The value of this type of training is evident every day with aircraft ready to take off along the Alliance's entire eastern flank to identify aircraft approaching our borders. This exercise demonstrates NATO's cohesion and the ability of allied air forces to operate in unison, regardless of the roundel or the flag painted on the tail."

Refueling operation on a F-35A.

Text by Simone Marcato and Fabrizio Capenti

Photos by Matteo Buono

Tigers at Beja

During late 2025 a large tiger population could be found in the countryside of southern Portugal. This was no unique wildlife story, however a more than common sight as normally once a year, NATO flying units with a tiger symbol in their squadron badges gather in a NATO Tiger Meet (NTM) somewhere in Europe to execute flying training in large mission scenarios. For NTM25, Portuguese Air Force Base Beja, "Base Aerea 11", was host for the annual exercise of the NATO tiger community.

Beja

"Base Aerea 11" Beja has been a regular place for tiger meets during the history of this event, which goes back to 1961. The base was host for the annual meets in 1987, 1996, 2002 and, more recent, in 2021. The base attracted the Tiger meets automatically as in previous times Beja was home base for Portuguese AF Tiger squadron Escuadra 301 "Jaguares", first flying the Fiat G–91 and later on the Alpha Jet. Since the squadron replaced its Alpha Jets by F–16 Fighting Falcons, the unit re–located to Monte Real, "Base Aerea 5", north of Lisboa. Nevertheless the latest Tiger Meets hosted by 301 squadron, still took place at Beja, which may lay in the fact of the very wide infrastructure of the base, its more remote location away

from heavy populated areas and easy access to exercise air space over the Atlantic. The current based units at Beja which include 101 sqn flying the TB–30 trainer, 506 sqn

with the KC–390 transporter, 552 sqn with their AW–119 helicopters and 601 sqn with their Orion maritime patrol aircraft. They all adapted their daily schedules in such a way that they came not into conflict with the 2 daily planned Tiger Meet missions.

NTM25

The NATO Tiger community has a wide variety of different aircraft types and roles, which makes them complementary to large exercises with multi mission scenarios. Although the majority of the members are flying fast fighter aircraft, they also include Airborne Early Warning and Command Aircraft and a range of SAR, transport and attack helicopters. When a NATO Tiger Meet requires a specific aircraft and/or role to support certain mission scenarios, other non–tiger units are invited to join the exercise. In 2025 for example an A–330 MRTT of the MMU, was temporarily detached to Moron, Spain to provide air refuelling capacity during NTM25. Another sample was a German AF A–400M supporting the missions with (tactical) transport duties out of Beja.

Participants

The variety of fighter aircraft during NTM25 at Beja included Eurofighters from Germany, Italy, Spain and Austria, F–16's from Turkey, Poland, Greece and Portugal, Gripens from Czech Republic, Tornado's from Germany and Hornets from Switzerland. Helicopters came from Italy and the UK with H–101's, France with Tigres, Gazelles and a NH–90, while Germany showed up with a naval Super Lynx. The AEW&C duties were as always covered by an E–3A Sentry from the NATO squadron

at Geilenkirchen, Germany and this time assisted by an invited French Aeronavale E–2C Hawkeye. As host country, Portugal had made a variety of assets available for the duration of the exercise to support the missions, whenever a scenario required additional support. These assets included AW–119, Lynx and H–101 helicopters, C–130 and KC–390 transporters and a P–3C Orion patrol aircraft.

Tiger routines

The morning launch of the main fighter force started around 10.00, after that the AWACS had taken off 25 minutes earlier. During the so called AM wave the fighter jets taxied in numerous groups towards the runway to await their take–off slots as set earlier in the overall mission planning. These launches continued until almost 12.00, after which it took not that long before the first aircraft presented themselves on "finals" to return to Beja after they finished their mission. The complete landing cycle was finished around 14.00 and around 16.00 the first aircraft for the PM wave already took off again. The afternoon Tiger Meet mission was less big than the main mission of the morning and saw the last aircraft touching down at Beja normally before 18.00.

Trophy

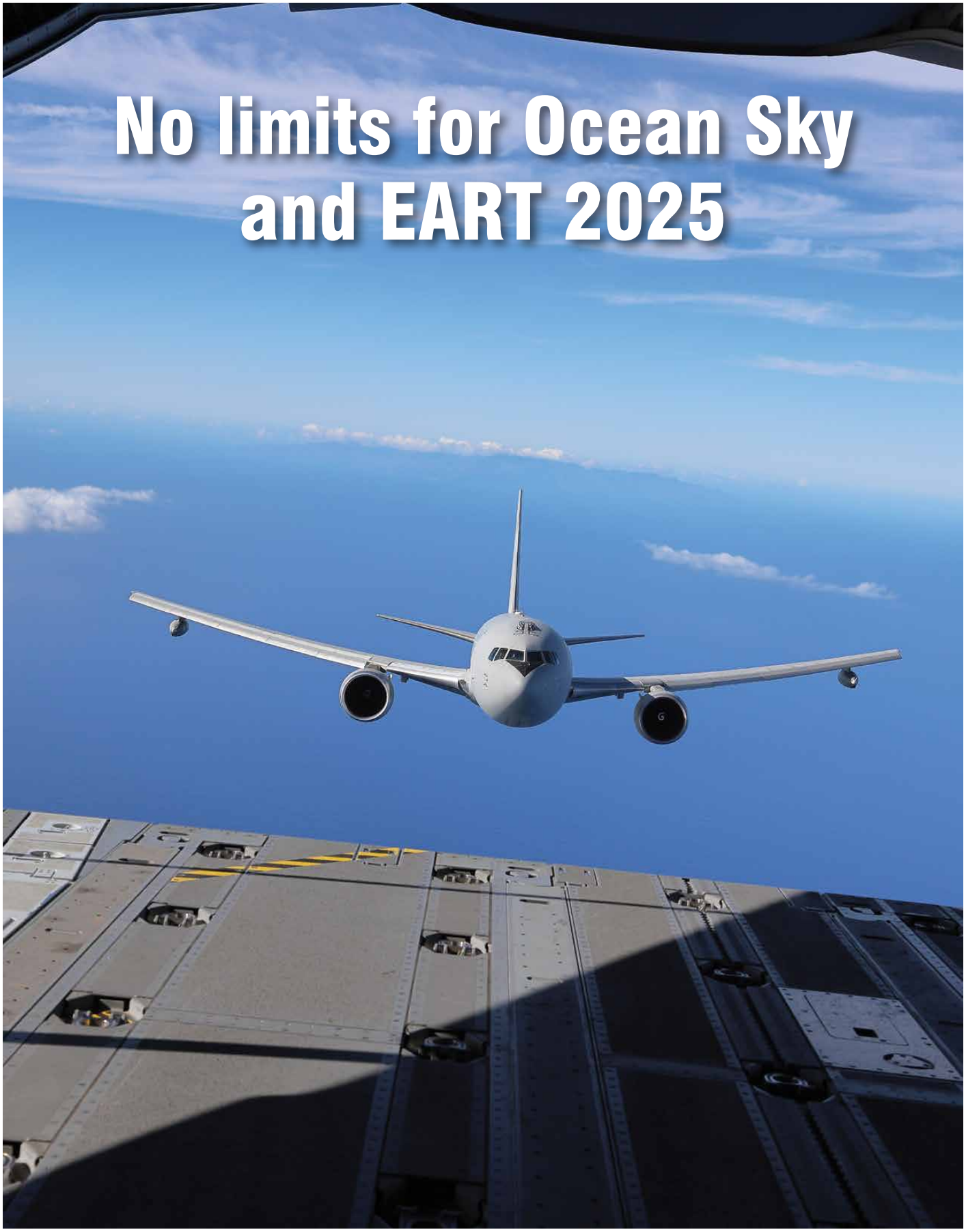
Although there is no obligation, it has become more or less usance that a participating NTM member unit applies additional colourful tiger markings, or even up to an overall tiger livery scheme, to one of its aircraft. Therefore one can see each year unique decorated aircraft flying during the NTM mission for 2 weeks. Each NTM there are several competitions, of which the winner is awarded by a trophy. That the award for the best Tiger Aircraft during NTM25 at Beja was granted to the F–16's of 301 sqn was hardly a surprise. The appearance of their overall tiger livery on of their F–16AM's was stunning and a huge eye–catcher.

To look for mutual understanding, as well as expanding each ones network and promote friendship within the tiger meet community, there are several social activities for the participants organised, which can have beneficial effects in the aircrews future careers. One of the activities is an NTM dinner party where the annual trophies are awarded.

The next NATO Tiger Meet will be at Hellenic F–16 squadron 335 home base Araxos, Greece in May 2026.

Text and photos: Peter ten Berg

No limits for Ocean Sky and EART 2025



More than 60 aircraft gathered at the Canary Islands during October 2025 for 2 weeks of realistic air combat training. At the Spanish Air Force bases at Gran Canaria and Lanzarote, the bi–annual exercise "Ocean Sky" (OS) and the annual exercise "European Aerial Refuelling Training" (EART) combined their means and assets to create a large scale international setting, providing beneficial training circumstances for all participants. An unique element for these exercises was the availability of a reserved training airspace of around 200 x 200 nautical miles, resulting in 40,000 square miles reaching of 2000ft Above Main Sea Level (ASML) to an unlimited altitude. Throughout Europe there are more dedicated airspaces for exercises like Cobra Warrior or Ramstein Flag, however due to the intense civilian air traffic, they are more limited in size and also on time slots. The availability of the enormous exercise area over the Canary Islands provides plenty of options for the aircraft to practice realistic scenarios, with no risk to disturb the civilian timetables, so for 2025 again the place to be for Ocean Sky and EART.

Ocean Sky

Every year in October the Spanish Air Force organises training for their fighter pilots, which is called Sirio when it is a national exercise or Ocean Sky when it is open for international participation. In 2025 it was again time for the international Ocean Sky edition, which resulted in an interesting overview of participating units. The USAFE 492 Fighter Squadron of RAF Lakenheath, UK, came with no less than 14 F–15E Strike Eagles to Gando AFB, the main fighter base at Gran Canaria. This unit has recently been mentioned to de–activate because of USA defence restructuring plans. The current plan indicates that the 492FS F–15's start to leave RAF Lakenheath during 2027.

Portugal and Greece were re–presented in OS with several of their F–16's. The Portuguese AF had 5 F–16AM and BM's from 201 "Falcoes", which included also some 301 sqn aircraft identified by their jaguar–tiger markings. At the end of the 1st exercise week a C–390 and a C–130 came to Gando to support the return of the Portuguese F–16's to their home base Monte Real, as their exercise time was limited due to other operational obligations. The other F–16 operator in OS, Greece came with 4 F–16C and D models from the Hellenic Air Force 347 squadron from Nea Anchialos. The Greek F–16's and all the other OS participants, remained for the full 2 weeks. German Eurofighter squadron JG74, based at Neuburg, showed up at Gando after a non–stop flight supported by a MMU A–330MRTT tanker with 6 aircraft.

The highlight of OS25 came from India being the first non–NATO nation participating in OS. India was invited by Spain to join the exercise after that Spain had participated in several exercises and visits in India over the past few years. IAF OS25 Team Leader Capt. Ashish Dhankar informed that their contingent included 4 SU–30 MKI "Flankers", together with 96 servicemen from 24 squadron "Hawks". The SU–30's, which included serials SB–124, SB–147, SB–150 and SB–333, made the transit from Indian home base Bareilly AFS in 2 days with a night stop at Cairo–West, Egypt. For aerial refuelling the jets were escorted by 2 IL–78MKI's which arrived at Istres, France and Moron, Spain after the Flankers had received their last fuel, west of the Strait of Gibraltar, for their final leg into Gando.

Two IAF C–17A Globemasters took care of the logistic flights into the Canaries. During OS25 the SU–30's flew combined fighter missions with all participants and for aerial refuelling they were supported by the participants of the European Aerial Refuelling Training (EART) exercise, which ran in parallel at Lanzarote. In particular the present Dutch and French A–330 MRTT's were tasked for the Flankers, as they both had obtained their Flanker AAR clearances during earlier (Asian) exercises.

Ala in OS

Spanish fighter wings, the so called "Ala's" which were contributing to OS with F/A–18 Hornets, came from the 12th wing at Torrejon AFB, the 15th wing from Zaragoza AFB and the local Canary unit, the 46th wing, based at Gando. Furthermore the "Ejercito del Aire y del Espacio", The Spanish Air and Space forces, had both its Eurofighter wings at Ocean Sky, namely the 11th wing from Moron and the 14th wing from Albacete. One of the 11th wing coded Eurofighters was mentioned to be also the first delivery for the 46th wing as their old US Navy originated F/A–18A's will be taken out of service and replaced by Eurofighters in the coming time.

EART

The "European Aerial Refuelling Training" (EART) exercise was executing its 2025 missions once more in Europe, after its American adventure in Alaska in support of exercise "Arctic Defender" at Eielson Air Force Base in 2024. The 2025 edition of EART found its area of operations over the Spanish Canary Islands in the Atlantic, where the tanker aircraft supported the fighter aircraft operations of, the in parallel running, exercise "Ocean Sky 25". Where the fighters were based at Gando, the tanker aircraft had their temporary home at Lanzarote Air Base.

Lanzarote

Lanzarote base commander Colonel Carlos Jimenez Andres, acting as host for EART25, is not that surprised that the exercise returns to its base, as under the NATO Host Nation Support programme his team also supported the EART exercise 2 years before. "This airspace over the Atlantic offers a wide training area and there is much less (civilian) air traffic compared to other parts in Europe". The trainings air space is, with its roughly 200 x 200 nautical miles, cannot be compared to other European areas. Also the stable moderate climate and good weather circumstances are normally ideal to execute the daily operations as planned. European Air Transport Command (EATC) commander, Major–General Frank Mollard, confirmed the optimal settings at Lanzarote, also to accommodate the about 140 international flight and ground crews who came along to the air base for the exercise.

EATC

The EATC with its headquarters at Eindhoven AB, The Netherlands, is the organising command of this annual aerial refuelling exercise. The EATC manages a large fleet

of transport, tanker, liaison and medical aircraft for its member nations being Belgium, France, Germany, Italy, Spain, Luxembourg and The Netherlands. Coordinating the aircraft capacity towards the flight requirements of the member nations, the assets are generally used in a more efficient way, as Maj–Gen Mollard explains the role of the EATC.

EART is one of the regular trainings exercises of the EATC to share experiences and to come to common rules and regulations for understanding and to optimise international operations. Running this exercise on an annual base allows crews to become familiar with operating

in international settings. This matches within the overall EATC strategic objectives like encouraging cross–national collaboration in aircraft maintenance and reinforcing the resilience of deployed operations. With their focus on Combined Air Terminal Operations, supporting exercise's logistical framework and optimising throughput and coordination among nations, exercises like EART are of great interest.

With all the along coming beneficial trainings circumstances, the Ocean Sky exercise is followed with high interest by the EATC for the planning of its EART exercises. As Ocean Sky is a bi–annual exercise the EATC is now negotiating with another, still undisclosed, NATO exercise for aerial refuelling support by EART exercise in 2026, according info from Maj–Gen Mollard.

Edition 25

The EART 25 participants included an Aeronautica Militare Italiana (AMI), Italian Air Force KC–767 tanker, a Dutch A–330 MRTT from the Multinational MRTT Unit (MMU) as well as a French "Phenix" sample of "Bretagne" unit 01.031. The list was completed with a Ejercito del Aire, Spanish Air Force TK.23, an Airbus A–400M from Zaragoza 31st Wing. A–400 pilot Lt Millan explained that their team was built up by 311 and 312 squadron crew members for the 2 weeks exercise. During Ocean Sky 2025 they had AAR clearance for the German and Spanish Eurofighters, as well as the Spanish F/A–18's.

EART exercise director Colonel Guido Henrich, explained that furthermore the Australian Air Force had shown interest in the exercise but finally were not able to include a KC–30A (in fact an Australian A–330 MRTT) in the planning. The Royal Canadian Air Force was forced to cancel their intended CC–150 "Polaris" participation, shortly before the exercise started. Lanzarote air base was mentioned to be close to its maximum capacity of housing (tanker) aircraft. The military share the base with 2 civilian terminals which are heavily used by commercial airliners due to the popularity of the island by tourists to spend their holidays. Therefore the planning of EART requires to be done thoroughly, as it is preferred to have all participants at the same base, simplifying communication and team process as flight briefing and de–briefings. In that perspective EART25 now also uses a civilian part of the air base, which can only be arranged by in–time planning.

Matrix

Col. Henrich explains that EART supports twice a day the operations for exercise Ocean Sky. Any time between 9 and 10 AM the EART tankers take of from Lanzarote to position themselves in various dedicated Air–to–Air Refuelling (AAR) tracks south of the Canary Islands. From

10 AM the fighters take off from Gando in multiple waves during the morning mission, being the main mission of the day, which sees the final recoveries around 1.30 PM. During the training a pre–determined matrix was in place to see which tankers had clearance for the specific fighter aircraft types of the participants, the so–called receivers.

For example, the 2025 AAR matrix showed that the Indian AF SU–30 Flankers where cleared for the Dutch and French A–330 MRTT's, which were already obtained during Asian exercises the years before. Remarkable was the fact that the USAFE F–15E's from Lakenheath were not included in the AAR matrix. Nevertheless, equipped with their fast–pack tanks and additional wing tanks, the Eagles easily performed their full missions without being refuelled. Around 4 PM the tankers started again for their afternoon mission support. This afternoon wave, which is also called the shadow mission, provides some more flexibility for the EART tankers to train on their specific objectives. By the time the afternoon mission has finished, the tankers returned to Lanzarote when the sun already had disappeared below the horizon between 6–7 PM. While flight crews went in the mission de–briefs, the ground crew carried out the necessary maintenance to have the aircraft available for next day's morning mission.

Scenario

The scenario used for Ocean Sky 25 and therefore also for EART25 was built around fictional but realistic developments between the democratic country of Bluceronia (BLU), the totalitarian state of Feroxia (FER) and the non–alliance state of Neutinex (NEU). A crisis between the 3 countries is evolving when established economic zones, including mining of oil deposits, are contended and leading to the use of violence, which also marks the moment where the exercises Ocean Sky and EART are stepping in.

Facts and figures

The planning of EART25, which already started 8 months prior to the exercise, showed some interesting and ambitious numbers for the 2 weeks exercise in which 58 sorties were planned with an offload of more than 600 tons. The frequency of 2 flights planned a day with 3.5 flight hours minimum, accumulated to 200 exercise flight hours. With 51 fighters available for exercise Ocean Sky, the daily tasking capacity was ready for 40, balanced into 25 bleu forces and 15 red. Additionally EART 25 looked after achieving a minimum combat ready qualification of 2 crews. The EATC key personnel for EART25 consisted out of 1 training supervisor, 5 mentors and 5 liaison officers. The mentors came from the participating nations but during EART they all rotated to other nations aircraft.

EART 25 was the 11th edition of the annual refuelling exercise. In a few months' time it is expected that EATC will announce where the 12th edition, EART 26, will take place. In 2026 the "national Ocean Sky" edition "Sirio" will again take place as in 2027 a full international Ocean Sky exercise will return to Gando, likely to be supported by EART 2027.

Article and photos: Peter ten Berg

Exercise Agile Tiger

The Royal Netherlands Air Force (Koninklijke Luchtmacht) is conducting Agile Tiger Gilze–Rijen Air Base from 8–12 December and this exercise marks the development of integrated air defence capabilities against unmanned aerial systems. The exercise brings together F–35A Lightning II fighter aircraft and AH–64E Apache attack helicopters in a coordinated training environment designed to establish effective counter–drone procedures through multi–platform collaboration. Exercise Agile Tiger represents the Netherlands' operational response to a series of unauthorised drone incursions over military installations that have occurred in recent months. Volkel Airbase, Eindhoven Air Base and Gilze–Rijen Air Base itself have all experienced drone overflights, highlighting a critical vulnerability in base security and airspace protection protocols. The exercise Agile Tiger demonstrates the seriousness with which the Royal Netherlands Air Force is addressing this emerging threat vector.

The exercise architecture centers on the integration of multiple weapon systems operating across different altitude bands and tactical roles. During Agile Tiger, F–35A aircraft and Apache helicopters conduct coordinated sorties twice daily, with launches scheduled at 1800 hours and 2100 hours local time. This operational tempo allows participating aircrews to conduct training scenarios in night operations, replicating the conditions under which unauthorised drone operations frequently occur.

The tactical employment concept places the F–35A Lightning II in an overwatch role, leveraging its advanced sensor suite and extended detection range capabilities. Operating at altitude and standoff distance, the F–35A conducts wide area surveillance of the threat zone, providing early warning and precision tracking information on the simulated hostile drone. The aircraft's AN/APG–81 active electronically scanned array radar and distributed aperture system enable detection and tracking of small radar crosssection targets at ranges that would challenge conventional fighter sensors.

The Apache attack helicopters function as the direct action element in the engagement chain. Operating at lower altitudes and in closer proximity to the simulated threat, the AH–64E platforms conduct pursuit operations against

the target drone, utilising guidance information provided by the F–35A aircraft through Link 16 tactical data exchange. This networked approach creates a cooperative engagement capability in which the high altitude sensor platform provides targeting quality track data to the low altitude chasing platform, optimising the engagement geometry and increasing probability of successful intercept. The Link 16 tactical data link serves as the critical enabling technology for this multi–platform engagement concept. By exchanging real time positional data, track files, and engagement coordination information over a secure, jam–resistant waveform, the F–35A and Apache crews function as components of an integrated fire control system rather than as independent platforms. This information exchange occurs continuously throughout the engagement sequence, allowing the Apache crews to receive updated target vectors as they maneuver for intercept while the F–35A maintains persistent surveillance of the battlespace.

The Dutch Diamond DA62 aircraft played a role in the Exercise Agile Tiger. The DA62 is a twin engine general aviation aircraft not typically associated with combat training exercises. Since early 2025, the Royal Netherlands Marechaussee (KMar) has been deploying Diamond DA–62 MPP aircraft from Gilze–Rijen Air Base for Intelligence, Surveillance and Reconnaissance (ISR) missions.

This initiative is part of a three year experimental programme aimed at safeguarding the rule of law through specialised observation and reconnaissance flights. The aircraft, leased from QinetiQ and operated by experienced (often former Air Force) pilots, complement existing tasks such as border security and support for other agencies. The DA–62 MPP, a versatile multi–purpose platform, is equipped for intelligence gathering and surveillance and can perform missions lasting over nine hours. Its adaptability for various configurations makes it an ideal choice for strengthening KMar's capabilities in border control, security, and law enforcement.

Counter drone doctrines in development

The Royal Netherlands Air Force maintains operational security regarding specific details of the counter–drone procedures being developed through Exercise Agile Tiger, an appropriate measure given the tactical sensitivity of such capabilities. However, defence officials have acknowledged that the exercise forms part of a broader effort to establish improved drone interception processes across the air force. This initiative recognises that unauthorised drone operations over military installations represent not merely

a security concern but a potential harbinger of future operational challenges in which adversaries may employ unmanned systems for reconnaissance, targeting, or even direct attack missions.

Exercise Agile Tiger reflects the evolving nature of air defence requirements in the contemporary security environment. As unmanned aerial systems become increasingly accessible and capable, military forces worldwide are adapting their operational concepts and training programmes to address threats that did not exist in previous decades. The Royal Netherlands Air Force's approach of integrating high end combat aircraft with tactical rotary wing platforms demonstrates sophisticated thinking about how to employ existing capabilities against emerging threats, developing procedures that maintain combat effectiveness while operating within a framework of integrated air operations.

The lessons learned from Agile Tiger will inform future counter–drone doctrine and contribute to the operational readiness of Dutch air defence forces in an increasingly complex airspace environment. Unmanned platforms are a new treat on the operational scene and it is a method which will stay for the future. Therefore all Air Forces in Europe need to adapt to these threats.

Article by Joris van Boven and Alex van Noye
Photos by Alex van Noye

Danish Air Force leads multinational beach landing exercise on Rømø

A Danish C–130J–30, emergency response crews, and beachgoers all share the shoreline as military and civilian worlds briefly converge during STOL operations on Rømø Beach.

In a striking display of tactical airlift capability, the Royal Danish Air Force (RDAF) led a rare multinational beach landing exercise on the island of Rømø, Denmark. Over the course of three days, a coalition of NATO air forces carried out a series of landings and take–offs on the firm sands of Lakolk Beach, showcasing their ability to operate from austere, non–traditional runways.

Planning for the exercise began in the spring, with invitations sent out to allied nations. According to the RDAF mission manager, the entire operation was executed on a modest budget of just 500,000 Danish Krone—approximately €67,000. "We're hoping to expand the scope of the exercise in future editions," the officer noted, "potentially incorporating wartime scenarios and even involving (special) forces for airborne insertions and tactical drops."

Conducted under NATO's Agile Combat Employment (ACE) concept, the exercise focused on dispersed operations and survivability in contested or degraded environments. The main objective: to test and validate Short Take–Off and Landing (STOL) procedures on unprepared surfaces—conditions often encountered during humanitarian relief efforts, Arctic missions, or forward resupply operations.

Participating air forces fielded a diverse lineup of tactical transport aircraft: Denmark C–130J–30 Super Hercules, Norway C–130J Super Hercules, Sweden C–130H Hercules (TP 84), Germany (Luftwaffe) KC–130J Super Hercules and Airbus A400M plus Belgium Airbus A400M.

This marked the first time in two years that such a broad coalition of allied tactical airlifters conducted

beach landings in Denmark. The 2024 edition was cancelled due to poor weather conditions that left the beach waterlogged and unsuitable for operations.

Each aircraft was assigned a minimum 30 minute slot to perform multiple landings, maximising training value. When one aircraft had to cancel, other aircrews quickly took the opportunity to extend their sortie times. In some cases, crews were swapped mid–mission while aircraft held in patterns over the sea—allowing each nation to make the most of its allocated time. On a typical day, more than 50 landings and take–offs were recorded.

Joint Terminal Attack Controllers (J–TACs) were deployed on the beach to manage aircraft movements and ensure safety during simulated tactical scenarios. These ground–based specialists played a critical role in maintaining communication between the flight crews and the improvised landing zone. In addition to Danish J–TACs, observers and J–TAC teams from several NATO nations—including France and the Netherlands—were present, underscoring the multinational interest in developing expeditionary capabilities.

Royal Danish Air Force C–130J–30 B–583, from Eskadrille 721 based at Aalborg, takes off from Rømø Beach LZ displaying a special tail flag commemorating the Danish resistance during World War II.

Airspace deconfliction and traffic control over the Rømø peninsula were handled by Skrydstrup Air Traffic Control (ATC), ensuring the safe coordination of military and

Belgian Air Force A400M passes the J–TAC and observers' enclosure near the outer runway designated for A400 operations at Rømø Beach.

Belgian Air Force A400M CT–03 touches down on the outer runway at Rømø Beach and kicking up a dust cloud of sand. Aircraft had to land between markers spaced 500 feet apart – otherwise, a go–around was mandatory.

civilian airspace and the efficient sequencing of arrivals and departures.

Preparing the beach for flight operations required detailed groundwork. One day prior to the exercise, which started on August 12, RDAF engineers probed the sand up to one metre deep to assess its load–bearing capability. Once deemed safe and compact, two improvised runways were marked out using orange indicators. The A400Ms operated from the runway closer to the shoreline, while C–130s used the strip located near the dunes.

The realism and complexity of the exercise highlighted its operational relevance. The ability to operate from beaches, highways, or other semi–prepared surfaces significantly enhances the flexibility and survivability of NATO's tactical airlift assets–particularly in scenarios where conventional runways are unavailable or compromised.

For Denmark, the exercise aligns with its broader strategic emphasis on military mobility in the High North and Arctic regions. The participation of Belgium, Sweden, Norway and Germany–as well as the presence of observers from France and the Netherlands–reflects a growing spirit of regional cooperation in the face of shifting security dynamics in Europe.

Though conducted as a training event, the Rømø beach landing exercise offered a realistic glimpse into NATO's evolving expeditionary posture. With six nations, multiple aircraft types, J–TACs in the field and a single strip of sand, the exercise clearly demonstrated that tactical air mobility remains a cornerstone of modern European defence planning.

As global tensions rise and the need for rapid deployment capabilities increases, exercises like these may no longer be the exception–but the new norm.

Article and photos: Willem Sander Termorshuizen & Tieme Festner, DAPPA

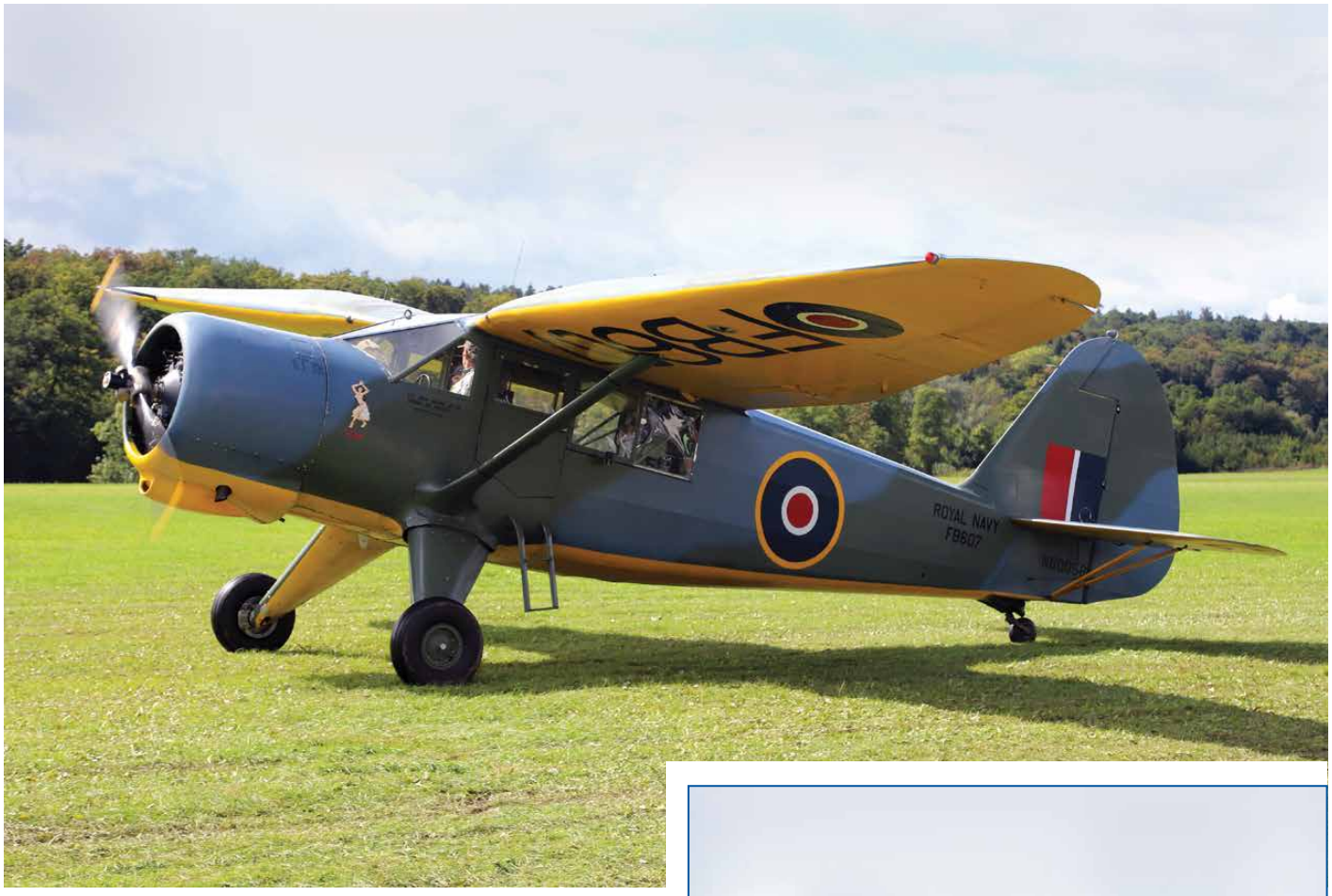
Hahnweide: a treasure trove for old timer lovers

This is not an actual Yak–11, but a Czechoslovakian licence–built Let C–11. The Yak–11 Moose (as it was known by NATO) was developed from the Yak–3 fighter to serve as an advanced trainer. The 4.500 aircraft built were used by the former Soviet Union and many of its satellite states, but also by quite a few African and Asian countries. This particular example did serve in the Czechoslovak air force, but not much is known about its operational history. In the nineties it surfaced in the United Kingdom where it was restored to flying condition. It was sold to Germany, where it was repainted in the current Soviet AF colours as 15 white.

The aircraft taking off in the background is a PZL–106A 'Kruk' (Crow), a dedicated crop duster built in Poland.

The airfield is just a grass strip of maybe 1000 meters long, of which there are literally hundreds in Germany. But mention the name Hahnweide to an aviation enthusiast, and he will get shivers down the spine. Hahnweide stands for the biggest gathering of vintage aircraft in Europe: the Oldtimer Fliegertreffen!

Organised by the Fliegergruppe Wolf Hirth for the first time in 1981, this year after a rather long break the 20th edition was held. Usually the fly–in is held roughly every three years. However in 2019 Covid threw a spanner in the wheel, and the following years the situation was too unsure. Only this year the



Painted in the colours of the Royal Navy, this Stinson AT–19 (or Reliant I as the British called it) only moved to Europe in 2023. Built in 1944, it was delivered directly to the British Royal Navy under a lend–lease contract. It spent its military life in India, or Ceylon as it was called at the time. After being demobbed it returned to the USA where it spent over 60 years with multiple owners, before moving to Europe. It is now based at Altenrhein in Switzerland and is adorned with a small nose art and nickname 'Dot'.

organisation was confident enough to arrange the much longed for next edition. Unfortunately bad weather the days before the start of the event meant that quite a few of the 380 aircraft that had been registered cancelled their participation. But in the end still 247 aircraft from 12 different countries showed up, including many very rare oldies. It is hard to choose, but some of the highlights are shown here.

The tens of thousands spectators, almost 40,000 over the three days, proved again that the love and fascination for aviation in general and the historical treasures and rarities in particular still remain very high. Luckily, although no date is fixed yet for the next edition, the organisation is confident another Oldtimer Treffen will be held in a few years' time. We will be there!

The amount of Messerschmitt Bf.109's that have been built is only surpassed by the Cessna Ce.172 and the Ilyushin Il–2: some 35,000 in total. It formed the backbone of the German Luftwaffe during World War II, but today only a handful are left. Airworthy ones are even rarer, but the number rose when the restoration of Werk Nummer 1983, an E–version or 'Emil' as it was called, was finished earlier this year.

Built in 1939, the aircraft was shot down on January 14th, 1942 over Murmansk, Russia. In 1993 the wreck was recovered and restoration started. Only in 2023 restoration had progressed so far a second 'first flight' could be made, with well–known British pilot Charlie Brown at the stick. And here at Hahnweide the beautifully restored aircraft was finally shown to the public for the first time, where it arguably stole the show.

Not surprisingly, for an airshow in Germany, multiple Buckers were present. Here a Bu.131 Jungmann does a nice fly–by, and also quite a few Bu.133 Jungmeisters showed their shape on the ground and in the air. Both types were designed and built before World War II, with the Bu.131 as basic trainer and the Bu.133 as advanced trainer. Most numerous was the Jungmann, both in Germany and abroad. Yugoslavia operated over 400 aircraft, in Spain hundreds of aircraft were built under licence as Casa 1.131 and also in Japan over 1,000 examples were license built as Ki–86 for the army and as K–9 for the navy.

This specific example was license built in Switzerland by Dornier for the Swiss air force, where it served as primary trainer.

Maybe not as old as many other participants, but still exactly 50 years old this year, is this Cessna 337 EC–MYM. Together with sistership EC–IPL the push–pull aircraft displayed as the "Quixote Patrol", named after Don Quichot. Although both Cessnas are painted as Vietnam era USAF O–2 Skymasters, they are actually Cessna FTB.337G Super Skymasters. Both served in the Portuguese air force before being sold on the civilian market in 2007. This one ended up in storage in Valencia, Spain, but some 10 years later it returned to the air. Both Cessna 337s are part of the Fundación Aeronáutica Antonio Quintana at Madrid–Cuatro Vientos.

Although it doesn't look like a warbird, this Spartan 7W Executive actually is! Built in 1937, during World War II it was impressed with US military designation UC–71. After serving for 2.5 years it was returned to its owner and reverted back to its original civil registration, which it carries to this day.

The Spartan Executive was, as the name suggests, meant for the upper class. It was fully handmade and made to order only. The aircraft was built entirely of metal, with retractable landing gear, and the powerful Pratt & Whitney engine made it a fast aircraft as well. The spacious cabin had four or five luxury seats, heating, ventilation, mood lighting, sound insulation and, of course still normal in those days, ashtrays. Everything a gentleman needed while on a business trip.

Well–known vintage is the T–6 Texan or Harvard. This particular example is based in Sweden and is painted in US Navy colours. Its last military operator though was the Swedish Air Force, where it got the type designation Sk.16A. The Swedes have their own aircraft designation system based on the role of the aircraft, in this case Sk for Skolan (meaning school) which implies a training aircraft. The number 16 means it is the sixteenth training type in service and follow up letter A is used to differentiate subtypes.

Its life began in 1942 when it was delivered to the Royal Canadian Air Force, where it served until 1946. It was then sold to Sweden where it served for 25 years before being decommissioned in 1972. It was destined to be scrapped, but instead it was sold to a collector. It changed hands a few times and in 2002 restoration to flying status started. That would take until the spring of 2025, with a first flight on May 30th, only some three months before making its big public debut at Hahnweide.

Also abundantly present at Hahnweide were Piper J–3 Cubs. Designed just before World War II as a trainer aircraft for the general aviation community, the American military also quickly embraced the simple but effective design of the J–3. Many thousands were constructed during the war under the designation L–4 Grasshopper, with one rolling out of the factory every 20 minutes during the peak of the war! They were especially used for training new pilots in the USA, but many were also sent over to the European and African front where reconnaissance and liaison duties were their main tasks. After the war ended, hundreds were left behind and they were happily adopted by locals. Nowadays worldwide thousands of L–4s and J–3s still fly, proving the concept of simplicity compared with usefulness.

The one depicted here, nowadays in the well–known Cub–yellow, was one of those left behind in Europe. It came over from Denmark for the Oldtimer Treffen, and the pilots stayed in their tents under the wing during the event. They even used the wing strut for their laundry!

The Dornier Do.27 is the first German built aircraft that was produced in large numbers since World War II. Over 600 have been built, with the German air force as largest customer with 428 aircraft, but also the Swiss air force used 7 and in Spain 50 aircraft were licence built by CASA as C.127 for their Esercito del air. Many have ended up in civilian hands and in Germany alone some 60 are still airworthy. Only 185 meters of runway are sufficient to land a Do.27, so it can operate from almost every sports airfield.

No less than 9 were present at Hahnweide. Two of them, including this D–EQXG, belong to QUAX Flieger, an association that operate a few dozen oldtimers from different airfields scattered through the country.

In total 15,495 Texans and Harvards have been built. Biggest users were the US Air Force and Navy, the Royal Canadian Air Force and the British Royal Air Force. However also South Africa was a major user, with over 700 aircraft. They were operated for 55 years, from 1940 until 1995. After World War II ended, some 300 aircraft that had been supplied under the lend–lease conditions were shipped back to the USA. A few different versions were operated, both US built AT–6D and T–6G and Canadian built Harvard IIA and III. D–FASS is one of the latter. Although primarily a training aircraft, in 1976 a dozen Harvards were painted in camouflage colours and equipped with rocket pods for operations in Angola, during the so–called Border War between Angola and South Africa. 7429 was one of them, making it a rare one.

To finish the overview, because it is so rare and beautiful, one more shot of the Bf.109. Here it is seen taxiing in after its display, with Charlie Brown at the stick. The aircraft proudly displays the markings rote 12 (12 red) and the badge of 5./JG5 or 5 Staffel, Jagdgeschwader 5 (5th squadron of Fighter Wing 5), the unit it was operated by when it was shot down in Russia in 1942.

This flaming red beauty is a Beechcraft model 17, nicknamed Staggerwing. This name comes from the rare position of the wings. Unlike with most biplanes, the upper wing is positioned behind the lower one, what is called a 'negative wing stagger'.

This example is flown by Filip Rochette and is based in Belgium. He discovered it in a barn in the USA, where it had been standing for 17 years. The aircraft was originally delivered in 1938, making it a real old–timer at 87 by now. During World War II there was a big shortage of aircraft, and many civilian aircraft were impressed. This example was taken into service with the United States Army Air Force as UC–43D. When the war ended, it was returned to its owner and converted back to its civilian registration. The aircraft is in immaculate condition and is definitely not showing its age!

With a Bf.109 participating, of course there had to be a Spitfire as well. And not just any Spitfire, but a real war veteran. Built by Vickers–Armstrong in 1943, this fighter was heavily involved in World War II. After that it was sold to the Royal Netherlands Air Force where it served another ten years. Next was target tug duty in Belgium followed by a movie career! MH415 flew in the movies 'The Longest Day' (1962) and 'The Battle of Britain (1968). Famous stunt pilot Connie Edwards then took it with him to his ranch in Texas as payment for his work in the last movie. It spent the next 46 years there, mostly in a barn. Only in 2014 a part of his collection was sold, including MH415. After restoration the classic fighter was bought by Flying Legends in Germany.

Text and photos: Patrick Dirksen & Frank Mink (Tristar Aviation)

Exercise Cobra Warrior 2025–2

Exercise Cobra Warrior 2025–2 represents the Royal Air Force's flagship multinational air combat training exercise, conducted biannually under the Air Warfare Center at RAF Waddington. The three week exercise in September 2025 integrates NATO and partner nation air forces in high intensity scenarios designed to test coalition interoperability across contested, degraded and operationally limited environments. Participating nations include the United Kingdom, Canada, Italy, Germany, and the United States, deploying approximately 60–70 aircraft.

Operational framework

Group Captain Paul Hanson (OF–5), Exercise Director, emphasises the unprecedented scope: "Cobra Warrior is one of the largest exercises that we run in the UK. It's probably one of the largest and most complicated in the world. We're not just talking air forces, we're talking in the land and the maritime and also forces that do electronic warfare and other things, to be able to bring all of those together and to create a series of training scenarios that are safe and tactically relevant."

The exercise qualifies personnel across multiple specialised roles: Qualified Weapons Instructors, Multi–Engine Tactics Instructors, Intelligence, Surveillance and Reconnaissance, and Space Instructor certifications. Squadron Leader John McFadden describes it as "a challenging air–led multi–domain exercise focused on pitting our NATO, JEF and International partners against a capable peer adversary within a contested degraded and operationally limited threat environment."

Training architecture

The exercise operates on a carefully structured progression. "Each participating nation has their own areas that they'd like to do. And we, as the RAF, as the exercise owner, we'll take those and we'll build scenarios to make sure that everybody can get their own objectives satisfied," Hanson explains. Training begins with familiarisation operations, transitions into two weeks of daylight missions, and culminates in night operations during the final week.

Mission complexity extends to "enormous 60 or 70 ship missions," requiring detailed pre–mission planning. "It is one mission but it's so complicated and lengthy that it

requires a detailed plan beforehand to be able to execute," Hanson notes.

Geographic advantages

The UK's extensive airspace provides distinctive training advantages. "We're very blessed in the UK to have such a large bit of airspace, which goes out across the whole of the North Sea, incorporates a lot of Northern England and Southern Scotland as well, where we can exercise some really brilliant training, air, land, maritime, and put in the full suite of electronic warfare and other effects," Hanson explains.

The Exercise Director emphasises Cobra Warrior's unique focus: "The difference, I think, comes from the emphasis it puts on integration, as opposed to just on air fighting and force elements. If they don't integrate themselves properly, and in order to be able to make sure that not only as air fighters, but also on the land and in the non–kinetic areas, if they don't think about that and put the puzzle together in a way that's going to work, then they'll fail in the air as well."

Coalition integration

Hanson's assessment reveals collective capability through coordination: "I think if you look at the amount of Typhoons that we've got here, and the amount of F–35s that European nations have on order, when you come together and in an exercise like this, when you're watching the fly through, and there's so much combat air, but also so much high end intelligence assets as well going into preparing that battle space, all of which gets fused together, you really sense that coming together, there's quite a big punch that's sat there, ready for action."

Royal Canadian Air Force participation

Lieutenant–Colonel Maxime Renaud (OF–4), Canadian Air Task Force Commander, leads composite forces from multiple squadrons. "I am the commander of the 425th Tactical Fighter Squadron in Canada, and we're here to participate in Exercise Cobra Warrior 25–2 as part of Operation Reassurance for Canada. It includes more than just the 425th Squadron. It includes people from the sister squadron, the 433 Tactical Fighter Squadron, people from our tanker squadron in Winnipeg, 435 Transport and Rescue Squadron with the CC–130HT, and we have a lot of support trades as well from all over Canada."

Operation Reassurance provides strategic context. "It is Canada's contribution or response to what happened in Crimea in 2014. The first thing is to reassure our allies, mostly in the Central and Eastern European countries, that we are there for them as part of NATO. But also to prove to Russia that we can actually deploy and project force to Europe from Canada, which is not a small feat," Renaud explains.

Recent CF–188 modernisation has enhanced capabilities. "Better capabilities overall. It's a much better radar. The APG–79 is a more modern radar. To us, it's a brand new way of thinking in the cockpit. With new capabilities always come new tactics. Yes, we are definitely more lethal with the APG–79," Renaud confirms.

Mission Commander qualification represents a critical objective. "We're trying to qualify three mission commanders for this exercise. Three of our pilots will upgrade to mission commander qualified, which means they can lead large force employment packages. In Canada, we started doing some training, some ground school, which are like academic lectures initially. We did a smaller scale exercise just before we came here, and this is their graduation exercise," Renaud notes.

Major Kevin Prior (OF–3), CC–130HT detachment commander, explains tanker operations: "This is a CC–130HT. We have a large internal fuel tank and the ability to give away gas right now to any Coalition NATO partner if they are probe and drogue. The biggest thing here is we're essentially a force multiplier for the fighters. They can stay airborne longer, they can do more training because now they are not having to land in order to get more gas."

Italian Air Force participation

Major Cavallo (OF–3), leading six F–2000 Typhoons from four Italian wings, emphasises instructor development: "We are here to upgrade and train and qualify weapons instructors that then, after qualification, will be back in their respective unit and squadron. There they will be the key element representative for the unit in the role of tactical mentor to ensure also standardisation among all the units."

Selection criteria extend beyond technical proficiency. "Weapons instructor is a qualification that is not for all the pilots. The selection is based on specific criteria that start from characteristics like attitude and commitment. Additionally, the performance, both on the ground and fly–wise is key. You need to be good on the ground, in the air, be humble, approachable. The most important is to share this knowledge," Cavallo explains.

Training objectives encompass multi–domain integration: "The main objective is to train and qualify these guys and test their ability to plan, brief, conduct and debrief complex missions in a high intensity scenario that requires analysis of a tactical problem in a multi–domain scenario in order to be ready tomorrow to counter or to deter any evolving threat."

Report: Joris van Boven and Alex van Noije
Photos by: Joris van Boven

Falcon Strike 2025

The third edition of the most sophisticated "live" exercise organised by the Italian Air Force took place from 3–14 November 2025, once again centered on the Apulian base of Amendola, home of the 32nd Wing. In this iteration—attended by over 1,000 military personnel and more than 50 aircraft from Italy, the United States, the United Kingdom, France, and Greece–the usual key concepts of "Interoperability" and "Multi–Domain Operations" were joined forcefully by the concept of "Deterrence."

Since the last edition of "Falcon Strike," held from November 14 to 25, 2022, much has changed. The increasingly unstable international geopolitical situation, with the continuation of the war in Ukraine–which in 2022 had begun only a few months earlier–and with growing threats along NATO's eastern flank, not to mention persistent instability on the Alliance's southern flank that has escalated into a humanitarian crisis, have substantially changed the paradigm of the exercise. Not so much in the substance of the missions, which for years have focused on specific types of operations, but certainly in the statements made by military representatives. At "Falcon Strike 25," there was explicit discussion of a "Peer Opponent" scenario, with missions focused on operations

such as Counter A2/AD (Anti–Access/Area Denial), ISR (Intelligence, Surveillance, and Reconnaissance), TST (Time Sensitive Targeting), and Tactical Command and Control (Tactical C2).

Agile Combat Employment (ACE), as in the previous editions of 2021 and 2022, was again one of the areas of focus, with "Cross–Servicing" and "Rapid Refueling" activities made possible specifically by the F–35 line.

"Falcon Strike," created in 2021 as a training event specifically for 5th generation assets, adopted in this edition a format more closely aligned with the Alliance's current training needs, whose combat forces consist of a mix of different generations of aircraft. Thus, during the first week, COMAO and Shadow Wave missions focused on integrating 4th and 5th generation assets through daytime and afternoon missions. During the second week, missions were dedicated exclusively to 5th generation assets, with predominantly nighttime flight activities.

If we exclude the presence of the Aviano F–16Cs in 2021–likely a prerequisite for US participation—this is the first time that 4th generation assets from Allied Forces have taken part in "Falcon Strike," including Rafale F4s from the French Air and Space Force, F–16V Block 72s from the Hellenic Air Force, and AV–8B Harrier IIs from the Italian Navy, integrated into the Blue Force directly from Amendola Air Base.

As for 5th generation assets, the exercise included the participation of F–35A and B aircraft from the Italian Air Force's 32nd Wing, F–35As from the 6th Wing, F–35As from the US Air Force 48th Fighter Wing at RAF Lakenheath–regular participants at Falcon Strike–F–35Bs from the Italian Navy's GRUPAER, and finally F–35Bs from the Royal Navy's Carrier Strike Group, operating directly from HMS Prince of Wales in the Mediterranean. Notably, during the exercise, a Royal Navy press release announced that the Prince of Wales had embarked the largest number of F–35Bs ever–24 aircraft.

In general, each nation flew 75% of its missions as "Blue Force" and 25% as "Red Force." Naturally, the Italian Air Force made a major contribution, employing nearly all available assets, mostly operating from their home bases. Only the SPYDR aircraft was temporarily deployed to Amendola during our visit.

Equally essential to the exercise's objectives were the electronic systems, radars and EW suites, Mirach drones, and SAM assets–real or simulated–available within the Salto di Quirra Joint Test Range (PISQ), which recreated an "A2/AD Bubble" to train SEAD capabilities considered fundamental in a hypothetical "Peer–to–Peer" conflict.

"Operating together," stated the Chief of Staff of the Italian Air Force, Air Squadron General Antonio Conserva, "has always been the strength of the Atlantic Alliance, which for over seventy years has ensured the defence of Europe. Using fifth generation assets is fundamental because they can process vast amounts of information, remain stealthy thanks to low observability, and therefore

increase both our defensive capabilities and our ability to present ourselves as united—thus ensuring a deterrent effect against potential adversaries. Today we have seen many assets—over 50 aircraft involved. We also have colleagues from the Italian Navy, who also fly the F–35, and with whom we operate in unison. And also American, French, Greek and British assets. This is truly a moment in which we demonstrate that we are able to train together, and also operate together, with a very high degree of readiness. I believe this is the most important message of this exercise: Italian defence is ready, we are united with our partners, and we are fully capable of ensuring the defence of NATO territory."

Deterrence

In a recent interview with Rivista Aeronautica, the Chief of Staff of the Air Force stated: "…without the F–35 our level of deterrence would be lower. With the F–35 we represent a serious problem for any potential aggressor. This is why it is essential to continue developing this capability, both in terms of potential and in terms of numbers."

The Italian Air Force currently has five operational flight groups equipped with 5th–generation aircraft:

- the 156th OCU Group deployed at the Pilot Training Center at Luke AFB in Arizona;
- the 102nd and 154th Groups based at Ghedi with the 6th Wing;
- the 13th and 101st Groups based at Amendola with the 32nd Wing.

From our sources, approximately 35 aircraft have been delivered to the Air Force so far, including the two F–35Bs assigned to the 101st Group. Six F–35Bs are assigned to the Navy's GRUPAER. Overall, Italy is committed to purchasing 75 F–35As and 40 F–35Bs (20 for the Air Force and 20 for the Navy).

Considering that a significant portion of aircraft are based in the United States, the project to establish the first F–35 training centre outside the US at Trapani Air Base stems not only from obvious national prestige but from concrete operational needs—namely, having all available aircraft on hand for potential national defence requirements. This need is likely shared by other European air forces equipped with, or planning to equip themselves with, the F–35.

An exercise looking toward the future

While "Falcon Strike" was underway, the 25th edition of the International Fighter Conference (IFC) was held in Rome for the first time in Italy. The event—organised by Defence IQ with the support of the Italian Air Force—is one of the most important international venues for analyzing strategic developments in aerospace power.

Among the scheduled speakers was the Deputy Chief of Staff of the Italian Air Force, Air Squadron General Giovanni Balestri, with a presentation titled

"Demonstrating the F–35 fleet's Joint Air Power capabilities and growing proficiency with large scale and international exercises."

The General stated that the level of defence is no longer defined by individual platforms, but by the ability to integrate domains and transform data into strategic cognitive and decision making advantage. Operational superiority has shifted from the mere control of physical airspace to the control of the decision making space. In this regard, he explicitly referred to the "Falcon Strike 2025" exercise simultaneously underway at the 32nd Wing in Amendola.

The exercise, focused also on improving the operational capabilities of 5th generation fighters in a joint, multinational and multi–domain context, served as a "testing ground" for the integration of the Air, Sea, Land and Cyber domains with Decision Superiority. "The optimisation of data flow and Command and Control (C2) management in high density scenarios, as planned in Falcon Strike 2025, makes the exercise a fundamental laboratory for the data driven operational concepts that will form the backbone of the GCAP future Combat Cloud."

FS 2025, conducted by the Italian Air Force, concluded with over 1,000 military personnel involved, more than 50 aircraft deployed, approximately 460 sorties, and more than 1,000 flight hours logged in two weeks of operations, from 3–14 November.

Undoubtedly, the primary (but not only) objective was to achieve maximum integration between fourth and fifth generation aircraft and maximum interoperability between crews from different NATO nations.

The authors wish to thank for the opportunity the Italian Air Force, the CSM AM Gen. SA Antonio Conserva, the Public Information Office, Col. Francesco De Vincenti, Ten.col. Stefano Testa and the men and women of the assets involved in the exercise.

Text by Gian Carlo Vecchi and Sergio Lanna

Photos by Gian Carlo Vecchi, Sergio Lanna and Pier Paolo Lazzarin

Twilight of the Gazelle: The 3RHC's agile warrior in a modern age

On a sunny Monday morning, a sleek helicopter takes off from Etain–Rouvres airfield in northern France. Its silhouette is unmistakable: a small fuselage, a large cockpit canopy, and a distinctive fenestron tail boom. It is the SA342 Gazelle, a loyal companion of the French Army Aviation (ALAT) for over fifty years. While newer models like the Tigre and the NH90 Caiman are taking over the skies, Gazelles still operate with the 3rd Combat Helicopter Regiment (3RHC). Although their days are numbered, they still soldier on performing a variety of duties.

Roelof–Jan Gort visited Etain Air Base and spoke with Captain Kevin, who has been the Squadron Commander of the Escadrille d'Helicopteres de Reconnaissance et d'Attaque n°3 (EHRA 3) "Tigers" since 2024. In addition, he also spoke with Lieutenant Rudi, a Gazelle pilot; caporal–chef Cham a gunner and observer on the Gazelle helicopter; and at least with Adjutant Jimmy, the Chief of Maintenance.

This morning, Captain Kevin, Squadron Commander of the EHRA 3, is sitting behind his desk while the ground personnel prepare some Gazelle helicopters in the hangar and move some of them outside. "It will be a busy day again today with various training missions with the Gazelle helicopters," says Captain Kevin as he reviews today's schedule.

As Squadron Commander, Captain Kevin is responsible for the personnel under his command. This includes overseeing their career development, such as annual evaluations, training opportunities, and promotions to higher ranks. He has also issued training and instruction directives aligned with current requirements, such as preparing for major engagements while maintaining the ability to conduct counterinsurgency operations, as seen in Africa. In these operations, his tactical role is to take command of an aviation task force, which can comprise up to twelve helicopters, primarily consisting of attack helicopters but also potentially including utility helicopters.

As Squadron Commander, he continues to pilot the Gazelle helicopter. He explains: "I continue to fly the Gazelle helicopter and employ its weapon systems. If I am to lead

an aviation task force in operations, I can command either from a Gazelle or from the rear of a utility helicopter." He continues: "The Gazelle and its personnel have provided–and will continue to provide–outstanding service despite the aircraft's age. The Gazelle has participated in every French operation since it entered service, making it truly combat proven. If one example had to be cited, it would be the operation Harmattan in Libya, during which Gazelles fired 425 HOT missiles. Today, we look to the future and embrace the shift toward drone integration. And indeed, we are conducting experiments to enable, in the future, the launch of FPV suicide drones from the Gazelle to enhance our combat capabilities.

A revolutionary design

The Gazelle was developed in the 1960s through a partnership between the French company Aerospatiale and the British company Westland Helicopters. France was looking for a successor to the Alouette II and III: a light helicopter that would need to be faster, more maneuverable, and more versatile. The result was a sleek aircraft with a turbine engine, a spacious glass cockpit, and a new feature: the fenestron. This enclosed tail rotor offered increased safety and reduced noise.

From 1973 onward, the Gazelle was used by the ALAT. It appeared in various versions, including reconnaissance, light transport duties, an anti–tank version armed with HOT missiles, and even a light armament for close combat attack. For its era, the combination of agility and firepower represented a significant advancement. Notably, the ability to launch anti–tank missiles from small helicopters made the Gazelle a tactical weapon capable of threatening enemy armored units.

Etain–Rouvres and the 3RHC

The Etain–Rouvres air base, located near Verdun, has a rich history. Originally used by the US Air Force after World War II, the airfield was transferred to the French Army aviation in the 1960s. Since then, Etain has become a significant base for helicopter regiments.

The 3rd Combat Helicopter Regiment (3RHC) was established in 1977 and has been permanently based in Etain since then. The regiment operates various helicopter types to carry out a range of missions, including transport, reconnaissance, close combat attack, and anti–tank operations. For decades, the Gazelle was one of the primary aircraft in this regiment, alongside the Puma and later the NH90.

The 3RHC is divided into twelve squadrons: three attack squadrons (Gazelles), three utility squadrons (NH90s and Pumas), two support and command squadrons, two maintenance squadrons, one airfield services squadron (firefighters, ATC), and one reserve defense squadron.

At EHRA 3 they have 35 staff members, these include; 17 pilots, 13 mechanics, 3 gunners, and two support staff. They operate five Gazelles at EHRA 3 right now.

Etain's strategic location enables French forces to quickly deploy to Germany, the Ardennes, or other areas in Europe. It also serves as a logistical hub for overseas

operations, a role that the Gazelle has repeatedly supported.

The Gazelle helicopter has built an impressive operational record over the past decades, with the 3RHC often playing a key role:

- Balkans (1990s): During missions in Bosnia and Kosovo, the Gazelle was used for reconnaissance, observation, and escorting troop movements. Its small size and quiet flight profile made the aircraft suitable for missions in densely populated or hilly areas.
- Africa (2000–present): In the Ivory Coast, and especially in Mali (Operation Serval and later Barkhane), the Gazelle has proven its value as a reconnaissance and light attack helicopter. It can quickly respond to ambushes, escort troops into difficult terrain, and destroy enemy vehicles with HOT missiles or embedded shooter.
- Gazelles were also deployed during Desert Storm (1990–1991) or Libya (2011).

Despite the aircraft's age, it has maintained its effectiveness in modern conflicts, often through close cooperation with drones and heavier helicopters. These operations demonstrate that the Gazelle helicopter, despite being light and vulnerable, can still be utilized effectively through tactical maneuvers and cooperation.

The Gazelle's unique role

What makes the Gazelle special, even in an era of high–tech helicopters? First, its maneuverability. With its lightweight design and powerful turbine, the Gazelle can accelerate quickly, make sharp turns, and fly low over terrain. This is essential for reconnaissance and surprise attacks. Next is the armament. In the anti–tank version, the Gazelle could carry four HOT missiles, capable of destroying a tank up to a range of four kilometers. Later, it was also equipped with light machine guns or gun pods, suitable for close combat attack for the benefit of ground troops. Third, the Gazelle helicopter also serves as a training platform. Many French helicopter pilots gained their first combat experience on this aircraft before transitioning to the more complex Tiger or NH90. This makes the Gazelle helicopter a training ground within the ALAT.

Since the arrival of the EC665 Tiger Helicopter, there are no longer any Gazelle Cannon or Gazelle Mistral versions. Now, the Gazelle HOT has been renamed Gazelle VIVIANE, featuring a thermal sensor for nighttime missile firing. Additionally, they have Gazelles equipped with GE M134 7,62x51mm Minigun for anti–infantry combat. The main difference between these two versions is as follows: the SA342M1 is used for the VIVIANE system and HOT missiles, while the SA342Ma is used for the Minigun. Furthermore, they have the option to remove the Minigun or the missile system, allowing a sharpshooter to be carried in the rear of the Gazelle. In that configuration, he can operate either a 7.62mm or a 12.7mm rifle, stabilised on a mount. This type of equipment was mainly used during their past operations in the Sahel.

Caporal–chef Cham, who is a gunner and observer, explains what each type of mission looks like as a gunner/observer on the Gazelle: "The first type of mission is reconnaissance, which is silent observation without using the minigun, reporting troops or movement. The second type is 'Target designation,' where I use laser or visual confirmation for artillery or other aircraft. The third type is Escort; here we are protecting convoys, ground troops, or helicopters. The fourth type is Light attack; during these missions, we engage lightly armored or exposed targets with on–board shooting. And finally, our fifth and last mission is Anti–armour; for these missions, we are using the HOT missiles."

Today's roles of the Gazelles at 3RHC

At Etain, several Gazelles remain active within the 3RHC. Their current tasks mainly include:

- Training and education: young pilots learn basic tactics, conduct reconnaissance flights, and collaborate in small formations.
- Reconnaissance and support: during exercises, the Gazelles continue to perform realistic tasks, often alongside Tigre and NH90 units.
- Maintenance and heritage: technicians diligently maintain the aircraft's airworthiness, often with limited parts.

But their primary missions are to gather intelligence on the enemy and carry out targeted strikes with missiles or Minigun, day and night. Gazelle helicopters also assist in fighting forest fires during the summer by monitoring sensitive areas.

Within the regiment, there is a strong pride in the Gazelle. Pilots praise its intuitive control and the feeling of "flying with your fingers," while technicians value its simplicity and durability. For many, the aircraft symbolizes decades of service.

Lieutenant Rudi, who is thirty years old and has been a pilot on the Gazelle helicopter since 2022, is sharing his experiences: "As a pilot on the SA342 Gazelle, my role is to take care of the aircraft from the pre–flight to the post–flight phase. I'm responsible for the paperwork; I ensure the aircraft is ready to fly. During the flight, I'm

also in charge of the trajectory, ensuring every parameter is within limits and that we have enough fuel to complete the mission, etc." He continues: "If I'm not flying, I handle my secondary duties in the squadron's operations, which include preparing flight orders, planning incoming flights, and ensuring everyone's qualifications are current. I also need to keep my body in good physical condition and train other skills, like shooting with firearms."

Maintenance, life cycle, and the move to newer types

Recent regional reports from 2025 describe multi–million–euro investments in facilities at Etain to host NH90 Caiman helicopters and related infrastructure — a clear sign that the regiment's fleet is being modernised and that Gazelle's role is gradually being reshaped or phased out as capabilities are replaced. In short, Gazelles remain part of Etain's heritage and training, but the regiment is being prepared to operate more modern rotorcraft. Adjudant Jimmy shares his experience with maintaining the Gazelle helicopter: "This Gazelle is quite old but dependable and pleasant to repair. For us, the Gazelle has reached the status of a warbird, and there is a lot of pride in working on this beautiful aircraft. With ten people in total, we have three types of specialties: Mechanics: the engine and mechanical assemblies; Avionics: responsible for electronic elements, radio communications, and weaponry; Coppersmiths: responsible for the structure.

Adjudant Jimmy about the maintenance schedule for the Gazelle: "The current maintenance schedule is 25 flight hours and 1 month. So, it progresses to 25–50–100–200–400 flight hours, 1 month, 6 months, 1 year, and 2 years for calendar intervals. We must follow the specific schedule, inspections, and replacement of each spare part."

Every available Gazelle can be deployed in any part of the world, whether for operations in sandy, sea or cold environments. The Gazelle is an extremely simple aircraft that doesn't require specialised equipment or technicians to operate effectively in challenging conditions. Its a few electronic and older systems that are easy to support in difficult locations, unlike new generation helicopters, which demand more in terms of logistics. While new generation helicopters, such as the NH90 offer greater operational capabilities, the main challenge is the occasional difficulty in obtaining specific spare parts and a shortage of qualified and experienced technicians.

Legacy of a light warrior

The Gazelle's story is one of endurance. Introduced at a time when helicopters were still finding their place on the modern battlefield, it redefined what a light platform could achieve. From the Balkans to the Sahel, it offered agility, precision and dependability. It trained generations of pilots and gunners, honed the skills of countless technicians, and provided commanders with a versatile tool for operations that ranged from counterinsurgency to high–intensity conflict.

When the last Gazelle departs Etain's skies probably in the late 2030s, it will leave behind more than empty hangars. It will leave behind the memories of aviators who learned to trust its quick responses, of gunners who relied on its agility in combat, and of technicians who kept its turbines spinning in the harshest environments. For the French Army Aviation, it will remain as iconic as the Alouette III is to the French Navy—a symbol of ingenuity, resilience, and service.

At Etain, the Gazelle is not merely a helicopter. It is a heritage, a teacher, and a warrior whose twilight years shine as brightly as its youth.

Final thoughts

Today, it still flies—more modestly than before—but remains relevant. The plan is to keep the Gazelle helicopters in service until 2035. Starting in 2030, the first H160M Guepard will be delivered to the 3RHC. Approximately twenty of these H160M Guepard helicopters are expected to be delivered to the 3RHC. From 2035, the Guepard helicopters will replace the Gazelle helicopters. However, the Gazelle will be remembered as an icon of the French ALAT, just as the Alouette III is for the Navy.

At Etain, Gazelle's sleek silhouette will be missed, but its legacy will live on through the generations of pilots and technicians who learned their craft with this aircraft. Twilight has begun, but the Gazelle will not fade into obscurity.

Roelof–Jan Gort would like to thank Major Ariane from the COM ALAT, Major Franck from the 3RHC, and the communication section at Etain Air Base for making this article possible.

Roelof–Jan Gort
Fly High Aeromedia.com, Facebook.com/FlyHighAe

2025 Bastille Parade aircraft

The 2025 Bastille Day military parade in Paris commemorated the 80th anniversary of the French Air and Space Force's air defense branch. The ceremony opened with the Patrouille de France, flying eight Alphajets in formation over the Champs–Elysées.

The air defense section followed, featuring a French E–3F AWACS, two Rafale Cs, one Rafale B, and a Mirage 2000–5. Allied participation included a Swiss F/A–18, a Belgian F–16, and five Eurofighter Typhoons from Germany, Spain, the UK and Italy. This diverse display emphasised joint operational readiness and multinational air cooperation.

The airborne nuclear deterrence segment was represented by a KC–135 tanker, flanked by four Rafale Bs. The KC–135, soon to be retired, is being replaced by the A330 MRTT Phenix, which participated in the air superiority section along with two Mirage 2000Ds, one Rafale C and one Rafale B. These aircraft symbolise France's strategic and tactical aerial capabilities.

Military innovation was presented by the Military Air Expertise Centre (CEAM), which flew an A400M Atlas, two Rafale Bs and a Mirage 2000D. Fighter pilot training was represented by a group of two Alphajets, two PC–21s, two Mirage 2000Bs and two Rafale Bs.

Naval aviation had two segments. The first, the carrier air group, included five Rafale Ms, one E–2C Hawkeye and one Falcon 10. The second showcased maritime patrol with an Atlantique 2 and a Falcon 50, reflecting the French Navy's role in air–maritime control and surveillance.

The force projection table featured three A400Ms, including one Spanish aircraft. The "Assaut et appui outre–mer" (Overseas Assault and Support) section flew a KC–130J Hercules, two CASA CN–235s and a Falcon 900. These aircraft are used for operations in remote or rugged areas, such as cyclone relief or medical evacuations. The CASA CN–235s operate from overseas territories and are suited for rough runways. The KC–130J is equipped for tactical transport, parachute delivery and aerial refueling. The Falcon 900, outfitted for medical use, is used in long range evacuations to mainland France.

The transport aviation training segment included two TBM 700s, one Xingu and two Cirrus SR22s. The reconnaissance and intelligence section featured an ALSR VADOR surveillance aircraft and an MQ–9 Reaper drone. Civil Security participated with one Dash 8 aircraft used for firefighting.

One highlight of the parade was the "Assaut et appui outre–mer" flight over Paris. The aircraft launched from Evreux Air Base, held a racetrack pattern west of Paris, then flew over the Champs–Elysées before continuing over several cities in northern France. The formation was led by a KC–130J Hercules and included two CASA 235s and a Falcon 900.

Major Pierrick, a pilot in the French Air and Space Force and formation leader of this section, flew the KC–130J. He serves with the binational Rhin–Rhein Squadron at Evreux and is the squadron's Standardisation and Evaluation (STANEVAL) officer. He has about 2,500 flight hours, including 1,500 on the C–130J, and is responsible for maintaining training standards across the unit. He joined the Air and Space Force in 2010. Before flying the Hercules, he flew the CASA 235.

Major Pierrick explained that preparations began months in advance at the staff level, and the crews were informed about two months prior. They participated in briefings in Paris and completed two rehearsal flights. The formation flew at 300 kilometers per hour and 300 meters above the ground during the Bastille flypast. He flew alongside a German co–pilot in a tight tactical formation. Though the cargo ramp could not be opened during the parade, photos through cockpit windows were planned, and the ramp would be opened after the final overflight for photographers.

The co–pilot was "Tom," a German pilot serving in the Franco–German Binational Air Transport Squadron. Tom is in the final stages of his training toward becoming Combat Ready (CR) and has logged 500 to 600 flight hours on the C–130J. He joined the Bundeswehr at age 25 after civilian university studies and officer training. His assignment to Evreux came in 2023, where he began specialised Hercules training.

Although CR status is required for participation in such tactical flights, Tom was granted special permission to fly the parade mission, reflecting confidence in his progress and abilities. He emphasised the difficulty of formation flying due to the close proximity and need for precision, calling it very different from solo flight.

The air mission required careful sequencing among nearly 100 aircraft in about ten holding patterns. Each group had a time slot to exit the holding zone and join the parade. Weather forced the formation to descend from 2,500 to 1,300 feet to stay beneath cloud cover. Tom clarified that while a Falcon aircraft was visually first, his KC–130J led the formation in terms of navigation and command, demonstrating the difference between physical position and lead authority.

A separate CASA 235 aircraft joined the KC–130J over the Normandy coast between Abbeville and Le Havre for formation photography. While the goal was imagery, the flight followed standard tactical procedures, including changes in position and use of the cargo ramp.

The Binational Air Transport Squadron "Rhin–Rhein," stationed at Evreux, is a joint French–German unit operating C–130J and KC–130J aircraft. The partnership began in 2017, and the unit was officially formed in 2021 after deliveries from the United States. The squadron currently operates seven aircraft and includes shared command, facilities and operations.

The successful execution of the Bastille Day flypast demonstrated France's airpower capabilities, strategic deterrence, training capacity and multinational cooperation. The participation of the Rhin–Rhein Squadron reflected a high level of integration rarely seen in military aviation and illustrated the deepening operational ties between France and Germany.

Photo and text by: Alex van Noye & Joris van Boven

Bastille Day 2025: The final flight of the Puma and the rise of the NH90 Caiman

On 14 July 2025, France celebrated Bastille Day with its traditional military parade in Paris, where a significant helicopter flypast was staged above the Champs–Elysees. The event featured aircraft from all branches of the French Armed Forces, including the Army's ALAT (Aviation Legere de l'Armee de Terre), the Navy, the Air and Space Force, and internal security agencies. It was especially historic due to the ceremonial farewell of the SA 330 Puma, marking its retirement after more than five decades of service.

Although ceremonial, the parade serves operational purposes—training for precise formation flying, coordination between services, and demonstrating the armed forces' readiness. The helicopter display was carefully planned and rehearsed throughout the year, culminating in a full–scale rehearsal near Chartres. Crews flew from the west of Paris to the east, passing over landmarks like the Arc de Triomphe and Place de la Concorde.

Pilot insight: Lt. Simon (ALAT)

Lieutenant Simon of the 3rd Combat Helicopter Regiment (3RHC), based in Etain–Rouvres, shared his experience flying the NH90 Caïman. With five years of experience, Simon stressed the importance of discipline, leadership and teamwork in executing such missions. He noted that the parade is a representation of operational precision and pilot culture, not just a visual display.

Structure of the flypast

The helicopter flypast followed the fixed–wing aircraft block and was divided by service: Air and Space Force helicopters: Fennec, Puma, Caracal–focused on air security, SAR, and medevac; Navy helicopters: NH90 Caiman Marine, Panther, Dauphin supporting maritime operations, ASW, and commando support. An Italian Navy Caiman highlighted European cooperation; ALAT helicopters: Calliope, Fennec (training), Gazelle and Tigre (recon/attack), Puma, Cougar, Caiman (maneuver/transport); Internal security and civil agencies like Gendarmerie (EC135, EC145), Civil Protection (H145 "Dragon"), and Customs (EC135, H160)–focused on counter–terrorism, border control, SAR and firefighting.

ALAT's capabilities

The 3RHC represents ALAT's airmobile strength. The regiment is experienced in joint and multinational deployments in Djibouti, Cote d'Ivoire, New Caledonia and the Sahel. In the flypast, the Gazelle and Tigre showcased the attack component. Despite its age, the Gazelle remains effective for light attack and observation. The Tigre, with guided missiles and a 30 mm cannon, represents advanced rotary–wing firepower. Support and transport duties were carried out by Puma, Cougar, and Caiman helicopters. EALAT, ALAT's helicopter training school, participated in the parade with Calliope and Fennec helicopters. Founded in 1957, EALAT also trains pilots from the Gendarmerie, Customs, Civil Aviation, and Belgium.

The Puma's legacy

The SA 330 Puma's flypast was its last in ALAT service. The Puma family led to more advanced versions such as the AS 332 Super Puma, AS 532 Cougar and EC 725 Caracal. Crews praised the Puma's simplicity, ruggedness and reliability, even as it was gradually replaced by the NH90.

Transition to NH90 Caiman

The NH90 Caiman, developed by NH Industries (Airbus, Leonardo, Fokker), now replaces the Puma in ALAT. It offers advanced capabilities: digital fly–by–wire controls, composite structure, superior survivability, NATO–standard communications, FLIR, and night vision compatibility. As of mid–2025, ALAT had received 63

NH90 TTH helicopters. The Caiman is used by 1RHC, 3RHC, and 5RHC. Eighteen "Standard 2" NH90s with enhanced special operations capability are due for delivery from 2026 to 2029 for the 4RHFS (special forces regiment). These helicopters will include upgraded sensors, secure communications, and precision weapon capabilities.

Navy Caiman Role – Interview with Lt. de Vaisseau Jeremy

Lt. de Vaisseau Jeremy, a pilot with Flottille 31F of the French Navy, discussed his eight years flying the Caïman. His primary mission is anti–submarine warfare (ASW), using onboard sonar and radar to detect and track submarines. A standard crew includes pilot (right seat, commander), TACO (Tactical Officer, left seat) and SENSO (Sensor Operator, rear). The mission begins with planning and involves dynamic, real–time coordination.

Remaining Puma units

As of 2025, the Puma remained operational in 3RHC (mainland France), last conventional ALAT unit with active Pumas, alongside NH90s and Gazelles; 5RIAOM/DETALAT (Djibouti): Pumas retired in June 2025, replaced by NH90s; Groupement Interarmees d'Helicopteres (GIH): operating near Paris for domestic tasks. GIH may transition to H225M Caracal or NH90 in coming years.

Conclusion

The Bastille Day 2025 parade symbolised a turning point in French rotary wing aviation. The Puma, once the workhorse of ALAT, bowed out with honours, while the NH90 Caiman took centre stage as the foundation of France's modern helicopter force. This transition reflects broader trends toward digitisation, networked operations and multi–role flexibility. As France prepares for the challenges of future combat and humanitarian missions, the NH90 Caiman is poised to carry forward not only technological capability but also the legacy of those who flew before.

All text by: Alex van Noye & Joris van Boven

Photos of all ALAT helicopters by: Alex van Noye & Joris van Boven

Photos of French Navy helicopters: French Navy and Ambroise Le Corre

Hungarian Defence Forces Jozsef Kiss 86th Helicopter Wing

Szolnok Helicopter Base was a former German base until the base was captured by the Soviet Red Army during the Second World War and Szolnok became a Russian medical base for injured soldiers in 1944. When the Soviet Union fell apart, Hungary declared itself independent. In the early 90s at Szolnok the 89. 'Szolnok' Vegyes Szallito Repulo was based, and it was a mixed transport regiment with one squadron equipped with the An–26 Curl transport aircraft and two squadrons with Mi–8S and Mi–8T helicopters. At Szentkiralyszabadja the 87. 'Bakony' Harcihelikopter Ezred was based with two squadrons Mi–24D and Mi–24Vs, one squadron with Mi–8T helicopters and one squadron with Mi–17 transport and a small number of special mission equipped Mi–17PP helicopters. At Borgond was the 'Asboth Oszkar' helicopter regiment based with the Mi–2 helicopters.

During the nineties several reorganisations took place within the Hungarian Air Force, Borgond airbase was closed and the based Mi–2's were relocated to Szolnok airbase. Followed by the closure of Szentkiralyszabadja a few years later and all the Mi–8s, Mi–17s and Mi–24s also transferred to Szolnok. The An–26 Curl transport aircraft transferred from Szolnok to Kecskemet Air Base. From that moment the unit at Szolnok was renamed from 89.

'Szolnok Vegyes Szallitorepulo–Ezred to MH 86. 'Szolnok' Helikopter Ezred. During the years the Mi–2s were withdrawn from use and a lot, but luckily not all, Mi–8s, Mi–17s and Mi–24s were also withdrawn from use. Also, an Air Academy was established within the Hungarian Air Force at Kecskemet Air Base. For this purpose twelve IAR–52's were acquired from Aerostar in Romania but were based at Szolnok, and twenty L–39ZO's were bought from former East Germany and they were based at Kecskemet. In 2009 all the L–39s were withdrawn from use and the Yak–52s were replaced by Zlin training aircraft in 2020. In 2018 Szolnok helicopter base was completely renewed due to the delivery of new helicopters and more training aircraft and the wing changed its name to MH Kiss Jozsef 86. Helikopterdandar which means 86th Helicopter Base.

The Zrinyi 2026 programme

At the end of 2016 the Hungarian Government launched the ambitious "Zrinyi 2026" modernisation programme, now called the National Defence and Armed Forces Development Programme, as a response to evolving security dynamics and increasing instability along NATO's eastern borders. Hungary enhanced focus on strengthening defensive capabilities and recognized the need to modernise its largely Soviet–era military equipment and align its capabilities with NATO standards.

For the ground forces the programme contained the acquisition of 218 Lynx KF41 Infantry Fighting Vehicles (IFV), 44 Leopard 2A7+ main battle tanks and 24 PzH 2000 self–propelled howitzers.

For Air Defence and Electronic Warfare, the Hungarian Government invested significantly with the acquisition of National Advanced Surface–to–Air Missile System (NASAMS), medium–range air defence systems, Mistral MANPADS and 11 ELM–2084 radars, ensuring effective integration into NATO's integrated air defence network and enhancing protection for critical infrastructure.

The programme also included comprehensive digitalisation of command–and–control systems, implementing NATO–standard communications equipment and battlefield management systems including the development of cyber defence capabilities and the establishment of a dedicated cyber defence centre. For training and personnel development, the programme includes significant investment in new simulation centres, modernisation of training ranges and enhanced cooperation with NATO allies for joint training exercises.

A key aspect for the programme is its focus on developing Hungary's domestic defence industrial base which saw further expansion through partnerships with international firms, supporting long–term industrial growth.

For the Air Force, the programme involved the overhaul of eight Mi–24s and the acquisition of two Airbus A–319, two Falcon 7 and two KC–390 transport aircraft, two Zlin

143, six Zlin 242 and twelve L–39NG training aircraft and twenty H–145 and sixteen H–225 helicopters.

Modernisation of MH 86

The first part of the Zrinyi 2026 programme that was executed was the large overhaul of eight Mi–24 attack helicopters in Russia. This large overhaul, which extended the lifespan of the helicopters, started in 2017 and was completed in 2019. For pilot training eight Zlin training aircraft were ordered and the first four were delivered in 2018 followed by the other four in 2020. In June 2018 the Hungarian Ministry of Defence purchased twenty H–145 helicopters which were delivered between November 2019 and December 2021. These helicopters are equipped with HForce Modular Weapon Systems which offers the option to arm the helicopter with 70mm rockets, a 12.7 mm machine gun or a 20mm gun. Besides armament, the helicopters have a missile protection package, a fast–roping system, an electronic countermeasures system and an electro–optical targeting camera. These helicopters will be used for HForce, transport, Search and Rescue (SAR) and VIP tasks. The last part of the Zrinyi 2026 programme for MH 86 was the acquisition of sixteen H–225 helicopters by the Hungarian Ministry of Defence at the end of 2018 which were delivered between July 2023 and July 2025. These multi–role helicopters are equipped with state–of–the–art communication capabilities and have an all–weather capability supported by its night vision goggle compatibility. They will be used for transport, Combat Search and Rescue (CSAR) and special operations. For the special operations six helicopters are equipped with HForce Modular Weapon Systems.

Due to the delivery of the twenty H–145s and sixteen H225 helicopters with accompanying equipment, there is also a need for more hangar space and platforms, and work is currently underway. A brand new state of the art facility is currently being built at the base with a massive platform and several hangars so that all of the helicopters can be parked inside, work on this new facility is well underway and will be finished soon, ones finished the H145M's and H225's will move to their new facility and will operate from here,while the Mi–17 and Mi–24's will not relocate the new facility they will operate from the dispersal area until the will be withdrawn from active service.

Present

At this moment MH Kiss Jozsef 86. Helikopterdandar (86th Helicopter Base) consists of three squadrons. The first is Szallito Helikopter Zaszloalj (Transport Helicopter Battalion) which are flying with the Mi–17, H–145 and H–225. The second is Phoenix Harchihelikopter Zaszloalj (Phoenix Attack Helicopter Battalion) and they are flying with the Mi–24 and H–145. The third squadron is Vegyes Kikepzo Repuloszazad (Mixed Training Aviation Squadron) and is also operating out of Szolnok but is on paper based at MH Vitez Szentgyorgyi Dezso 101. Repulodandar (101st

Tactical Airbase) Kecskemet Air Base. They are flying with the AS–350, Zlin 143 and Zlin 242 from Szolnok Air Base. The main difference between Zlin Z 143 and Zlin Z 242 is that Zlin Z 143 has a place for two people and Zlin Z 242 has a place for four people.

All the Zlin Z 143, Zlin Z 242, H–145 and H–225 are newly built, and the Hungarian Air Force will be able to operate with them in the coming decades, but this cannot be said of the ageing Russian built Mi–17 and Mi–24 helicopters. Only a handful of Mi–17s and Mi–24s are still operational but the question is, how long can they maintain operational? Due to lack of spare parts and an increasingly reduced number of crew members the days of the Mi–17s and Mi–24s are numbered. On paper they will be in service until the summer of 2026 if they have enough spare parts and crew to fly them. Due to the war between Russia and Ukraine it's now impossible to receive spare parts from the Russians, and due to lack of pilots, all pilots fly on two types, on the Mi–17 and H–145 or on the Mi–24 and H–225.

The Airbus Helicopters H–145 is built in Germany and is compact in size, easily flyable with a built–in mission capability and flexibility, especially in high and hot operating conditions and has a large and flexible cabin. The future pilots must follow a two–week study followed by two weeks flying in the simulator and then two weeks practice flights. The first pilots had their education in Germany, nowadays the education is done at Szolnok itself by the Hungarians itself.

Missions and exercises

In 2023 two H–145 helped in Slovenia with the massive floodings. From January 2024 one Mi–17 served EUFOR in Bosnia Herzegovina together with two H–145s. In the same year two Mi–17s, equipped with Bambi buckets, helped in Slovakia with large forest fires. In March 2025 one H–145 served KFOR in Kosovo as a recce element.

Currently, extensive training is being conducted with the H–225 helicopters, but they have also already been deployed to help in their own country as well as in other countries. The first deployment was in August 2024 to North Macedonia to help with forest fires and in September 2024 there were forest fires in Hungary itself where the H–225 helped. In October 2024 one H–225 replaced the Mi–17 in the EUFOR mission in Bosnia Herzegovina. In February 2025 the H–225 conducted the first life firing at the Bakony range. In June 2025 the exercises Fire Blade and Sabre Guardian took place at Papa Air Base to which four H–225s participated. Two H–225 helicopters were deployed to Albania in July 2025 to help with forest fires and a total of 568,000 litre water was dropped during 300 Bambi Bucket drops. In the same month one H–225 was deployed to Bulgaria to help with forest fire and for three days a total of 277,000 litre water was dropped by 146 Bambi Bucket drops. In August 2025 one H–225 was deployed to Montenegro to help with forest fires and there was a total of 132,000 litre water dropped by 66 Bambi Bucket drops.

Maintenance

A technical employee, responsible for the maintenance planning: "I started my military career in 2015 and was a mechanic for the engine and airframe shop until 2020, then I became the maintenance planner. The first mechanics for the H–145 went to Donauworth, Germany and the first mechanics for the H–225 went to Marseille, France. Their education lasted around 6 weeks and is not only study but also practical training. Mechanics for the Mi–17 and Mi–24 are now being retrained for the H–145 and H–225. These mechanics can follow their study at Szolnok itself but can also go to Donauworth, Germany or Marseille, France, that depends on what is the best for that person. The new H–145 and H–225 helicopters look different compared to the ageing Mi–17 and Mi–24, but the maintenance is the same, the only thing that is different is the avionics which are fully digital in the H–145 and H–225 and are not in the Mi–17 and Mi–24. Every 100 flight hours the H–145 and H–225 need small maintenance which lasts around three till four weeks and is done here at Szolnok. Every 600 flight hours they need a bigger inspection which takes more time. The maintenance on the Mi–17 and Mi–24 is simpler, the H–145 and H–225 have a lot of background compared to the Mi–17 and Mi–24. The only problem with these Russian made helicopters is to get spare parts from Russia. That's why the Mi–8s aren't flying anymore because they need spare parts. LOM Praha in Czechia can also deliver spare parts but then the guarantees from Russia will expire. We also had a problem with the language, every document of the Mi–17 and Mi–24 was translated by the Russians into Hungarian but on the H–145 and H–225 everything is in English, so the personnel needed to understand the English language but Airbus is supporting us very good and our personnel, around 60 people, are very satisfied.

The Squadron Commander with a total of 3000 flight hours on the Yak–52, Mi–2 and Mi–8/Mi–17 and Deputy Commander with a total of 2500 flight hours on the Yak–52, Mi–2, Mi–8/Mi17 and Mi–24 were classmates, and both graduated in 1988 and came to Szolnok after graduation. Nowadays he doesn't fly much but will lose his license if he doesn't fly for 1.5 years so he flies the H–145 sometimes and his colleague has been flying the H–145 since 2021 and is now in conversion to the H–225.

The commander had his type conversion in Marseille, France. The study consists of three sections, 3 weeks study on the ground, 2.5 weeks training in the simulator and 2 weeks training flights. For maintenance there was another 1.5 weeks of training. The flight training has now been done at Szolnok itself. The cockpits from the H–145 are like the cockpit of the H–225.

According to the Deputy Commander the big difference between the Mi–17/Mi–24 and the H–145/H225 is that the pedals are the other way around due to the circulation of the rotor blades, this is not a big problem, but you must be aware of it during the flight, if you use the pedals wrong it will be a very big problem. The biggest gap between the old and the new helicopters are the old and new cockpits and the mapping systems. Also, the H–145 is very light compared to the Mi–17, the H–145 ways 3,5 tons and the Mi–17 13 tons and that was in the beginning very difficult for the pilots. The Mi–17 has more space for troops than the H–225 and that will be missed so hopefully the Mi–17s will be operational in the next years.

The pilots of the Mi–17 and Mi–24s did not have a choice on which helicopter they wanted to fly but we looked at where we needed pilots and told the pilots on which helicopter they were going to fly. The H–225 is not yet operational capable due to the many tasks the H–225 can do but we are on our way, now we are between initial and operational capability. Airbus is training our personnel so we can teach future pilots ourselves.

The authors of Lowpass Aviation.com would like to thank the personnel of the Hungarian Air Force for their hospitality and help during our visits at Szolnok Air Base!

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VOLFA 2025

From 22 September to 10 October 2025, the French Air and Space Force conducted VOLFA 2025, its annual major operational readiness exercise. Organised by the Air Defence and Air Operations Command (CDAOA), this high intensity training mobilised more than 1,000 airmen and approximately fifty aircraft across French territory, representing the most complex level of training for French air forces.

Conducted from airbase 118 at Mont–de–Marsan, VOLFA 2025 was designed as a genuine air campaign to simulate realistic conditions of high intensity conflict. Colonel Jean–Christophe, head of the operational readiness division, emphasised that "VOLFA is the annual major synthesis exercise of the Air and Space Force, at an expert level. It is the highest level of complexity in training."

The exercise aimed to train and reinforce the resilience of French air forces while adapting capabilities to high–intensity warfare models. Inspired by lessons from recent conflicts, VOLFA 2025 integrated complex air raids conducted day and night, implementing the full spectrum of air operations including air superiority missions, reconnaissance, agile deployment, force protection, and operations under degraded conditions.

The exercise was conducted in coordination with the French Army, French Navy and foreign partners. Air forces from Canada, the United Kingdom, Greece and Italy participated, strengthening interoperability. The international contingent included Italian Tornado aircraft, Greek F–16 fighters, Canadian CC–130J Super Hercules and British A400M Atlas transport aircraft.

This multinational participation reflected France's role as framework nation for NATO's Allied Reaction Force in 2026. Colonel Jean–Christophe noted that "in a major conflict, France will fight alongside its allies," underscoring that all stakeholders must operate together as a single force.

VOLFA 2025 operated within a multi–domain framework, integrating cyber, space, electromagnetic warfare, information operations and very high altitude operations alongside traditional air, land and maritime domains.

Electromagnetic warfare environment

The exercise emphasised electromagnetic spectrum operations. Colonel Jean–Christophe explained, "We confront our aviators with a very dense electromagnetic environment, inspired by current conflicts. If we want a sharp blade, we must sharpen it regularly. Training incorporated jamming, degraded communications and counter–drone operations as integral components of modern air combat".

Complex scenario architecture

The 2025 scenario was inspired by recent conflicts in Eastern Europe and the Middle East, featuring large scale operations in heavily contested zones. Crews operated within a scenario involving aggression against an allied nation, requiring them to neutralise naval vessels, secure airspace and contain adversary ground–based air defence systems.

Complementary exercises added realism: WILDFIRE 25, a NATO counter–drone exercise conducted by the French Navy, and AEGIS, a French Army ground based air defence exercise. The French Army contribution included air defence assets, attack helicopters and paratroopers from the 11th Parachute Brigade.

Geographic distribution and assets

Three strategic French airbases anchored the exercise: Mont–de–Marsan concentrated fighter aircraft and coordination, Orleans–Bricy hosted tactical transport aircraft and Cazaux hosted helicopters. Beyond these, the

entire national network was mobilised, including tanker aircraft from Istres, E–3F AWACS from Avord and Reaper drones from Cognac.

The exercise engaged twelve airbases total, with units covering the entire spectrum of air capabilities. Crews conducted approximately twenty complex air raids within a high–intensity, multi–domain and allied framework.

FRA–ACE deployment at Solenzara

From 2–6 October 2025, airbase 126 at Solenzara hosted the FRA–ACE maneuver, implementing the French Agile Combat Employment concept. Six Rafale aircraft from Mont–de–Marsan deployed to prove units' capacity to deploy, sustain and rapidly redeploy combat devices within complex operational environments with reduced logistical footprints.

Advanced training methodologies

Innovations included low altitude refueling operations between A400M transport aircraft and Rafale fighters, conducted day and night. Dynamic targeting operations—rapid destruction of high–value mobile targets controlled from the command center in Lyon—represented another key training focus.

JEANETTE System

The JEANETTE software system, developed by the Centre d'Expertise Aerienne Militaire, provides real time mission tracking and simulation. Operational since 2018 with first capability in April 2020, it connects multiple actors through the Link 16 tactical datalink network. "L16 is an encrypted information transmission network," explains Lieutenant Colonel Nicolas. "It allows aircraft to communicate with each other securely".

Strategic significance

VOLFA 2025 demonstrated France's commitment to maintaining high–level operational readiness aligned with modern combat realities. By incorporating recent conflict lessons, testing advanced concepts and emphasising multi–domain integration, the exercise prepared French air forces for future operational challenges in an increasingly contested strategic environment.

Article by: Joris van Boven and Alex van Noye.
Photos by Joris van Boven.

EXERCISE POGGIO DART 2025

In the contemporary international security landscape, marked by an increasing complexity of threats and the constant evolution of military technologies, joint training represents an indispensable tool to ensure credibility and operational readiness. Within this framework lies the Poggio Dart 2025 exercise (PODA25), one of NATO's most significant training events of the year in the field of integrated air defence.

Held in Italy between late November and early December 2025, Poggio Dart 25 involved numerous allied forces and a wide range of air, land and naval assets. The exercise was centered on the Deployable Air Command and Control Centre (DACCC) at Poggio Renatico, a centre of excellence of the Italian Air Force and a strategic hub for the command and control of allied air operations.

The conceptual core of Poggio Dart 2025 was the development and validation of IAMD (Integrated Air and Missile Defence) capabilities—an approach that integrates sensors, platforms and weapons systems of different types into a single operational architecture. The objective is not merely to intercept a threat, but to detect, recognise, classify and neutralise it in a timely manner by coordinating multiple domains and multiple nations.

Unlike large scale exercises focused on air–to–air or air–to–ground combat, Poggio Dart concentrates on a less visible yet essential level: command and control. Here, training is not limited to pilots, but also involves analysts, radar operators, planners and all the personnel working behind the scenes who make coordinated air operations possible. The simulated scenario required the simultaneous management of multiple threats, complex air traffic, and rapid decision–making, in a context

reflecting contemporary tensions. The aim was not to win a fictional battle, but to test the system, stress its limits and assess how quickly information can be transformed into operational decisions.

Italy played a leading role, not only as the host nation but also as a provider of advanced operational capabilities. The Italian Air Force deployed a wide range of aircraft and systems representative of the full spectrum of modern air operations. Among these, a prominent role was played by the F–35 Lightning II aircraft of the 6th and 32nd Wings, fifth generation platforms capable of integrating sensors, communications and stealth features, acting as true force multipliers. Alongside them operated Eurofighter EF–2000s from the 51st Wing at Istrana and Tornado aircraft from the 6th Wing at Ghedi, employed in support and interdiction missions. Equally essential was the contribution of support assets such as KC–767A aerial refueling tankers, C–130J aircraft for logistical transport, P–72A aircraft for maritime patrol and E–550A CAEW aircraft, crucial for airspace surveillance and control. Completing the picture, the use of General Atomics MQ–9A Reaper remotely piloted aircraft highlighted the growing importance of ISR (Intelligence, Surveillance and Reconnaissance) capabilities. The Italian Navy's Carrier Air Group also took part in PODA activities with its iconic AV–8B Harrier II+ aircraft operating from Grottaglie.

Poggio Dart 2025 stood out for its strong multinational character, with the participation of personnel and assets from several Allied nations. Alongside Italian forces, units from the United States and Turkey operated together, demonstrating a high level of interoperability despite doctrinal and technological differences. Particularly

noteworthy was the employment of F–16 Fighting Falcon aircraft from the 510th Fighter Squadron "Buzzards", operating from their home base at Aviano and working in close integration with Italian forces.

Furthermore, as already occurred during the 2023 edition of the exercise, a Turkish contingent was present, deploying three F–4E Phantom II aircraft from the 111th Squadron "Panterler," based at Eskisehir. Among the last of their type still in service, these aircraft added an additional element of interest, highlighting the Alliance's ability to integrate platforms of different generations within a single operational system.

Land and naval components also made substantial contributions. The Italian Army provided JTAC operators,

crucial for coordination between air forces and ground units, while the Italian Navy participated with assets and personnel specialised in joint operations.

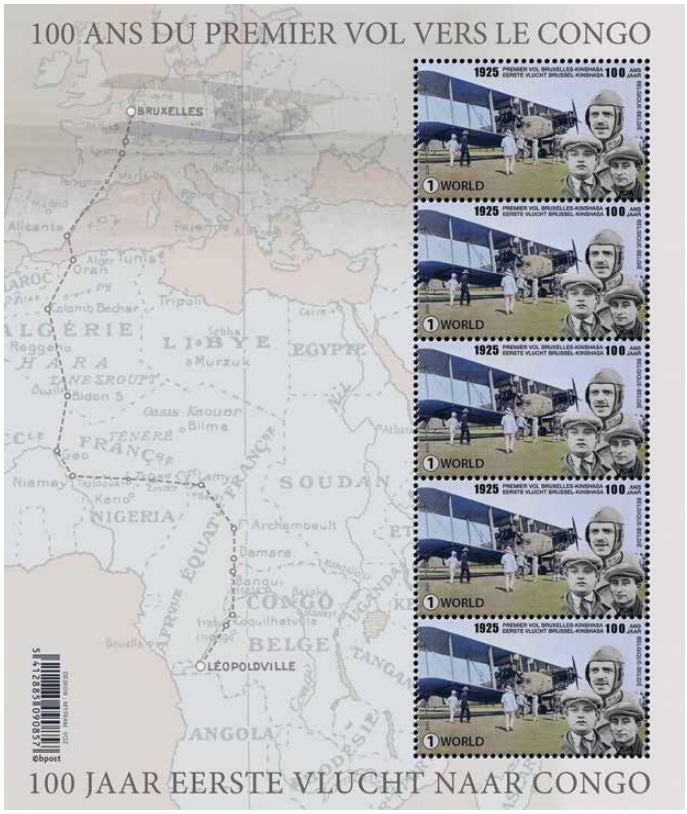
One of the most relevant aspects of Poggio Dart 2025 was the application of the Agile Combat Employment (ACE) concept. This approach emphasises the ability to rapidly disperse personnel and assets across different bases, even those with limited infrastructure, reducing vulnerability and increasing the resilience of air forces. Through ACE, the exercise demonstrated how logistical and organisational flexibility is now just as important as technological superiority. The ability to operate from multiple locations and quickly adapt to an evolving scenario represents one of the pillars of modern deterrence.

At the conclusion of the activities, the value of Poggio Dart 2025 is not measured solely in flight hours or systems tested, but in the level of operational trust built among the allies. In an international environment where control of the airspace is increasingly contested, the ability to operate together, speak the same operational language, and share common procedures becomes a form of deterrence as significant as the assets employed.

Poggio Dart is not an exercise designed for the spotlight. Rather, it is a quiet and methodical effort that prepares for rapid decision making in complex situations. And it is precisely in this discretion that its importance lies–training today for what tomorrow could make the difference.

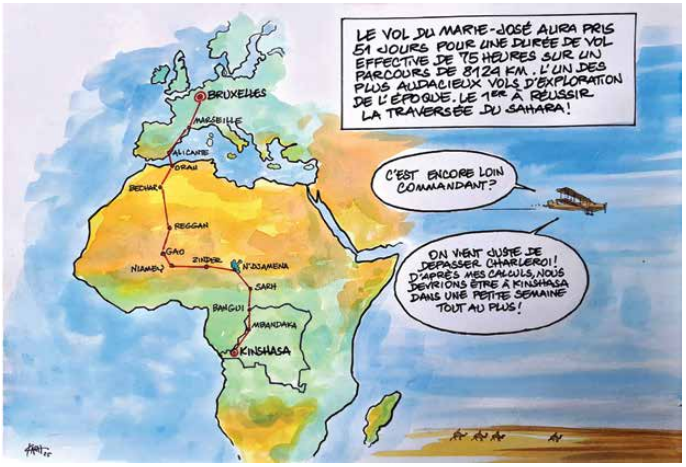
Article and photos: Marco Papa

100 years of the first flight to Congo



On 12 February 1925, at five minutes to eight in the morning, Edmond Thieffry, Léopold Roger and Joseph De Bruycker took off for the first flight to the Congo with their plane Princesse Marie–José. They arrived in Léopoldville on 3 April. The 100th anniversary of the first flight from Belgium to the Congo was celebrated on 12 February 2025, marking the milestone of a 1925 journey. This was a 51 day flight from Brussels to Léopoldville (now Kinshasa, the capital of the Democratic Republic of Congo) by aviators Léopold Roger (Pilot), Edmond Thieffry (Pilot), and Jef de Bruycker (Mechanic) in a Handley Page W.8F aircraft called the "Princesse Marie–José". The 1925 first flight took 51 days to complete, covering over 8,000 kilometers. This flight laid the groundwork for long distance air travel, with Sabena, Belgium's former national airline, later launching the first regular passenger service in 1935.

Brussels Airlines, which carries on the legacy of Belgian aviation to Africa, and Belgian postal service, bpost, celebrated the 100th anniversary on 12 February 2025, by releasing a commemorative stamp to celebrate the anniversary on 27 January 2025. The stamp sheet consists of the plane 'Princesse Marie–José' on which the journey was made, combined with the portrait of Edmond Thieffry, Léopold Roger, mechanic Joseph De Bruycker. Map of the route followed, from Brussels to Leopoldville (now Kinshasa), combined with an image of the plane 'Marie–José'.



The Belgian crew became the first to successfully fly over the Sahara, despite getting lost twice in the desert. They outperformed their French and British counterparts but faced numerous challenges along the way. The aircraft was forced to make five emergency landings, and at one point, a propeller broke off. To avoid sandstorms, they flew at altitudes of up to 2,500m, higher than their usual 2,000m.

Sabena only established a regular flight connection to Congo in the mid–1930s, and even then, the journey still took several days. The airline's African network remained a key part of its operations until its bankruptcy in 2001.

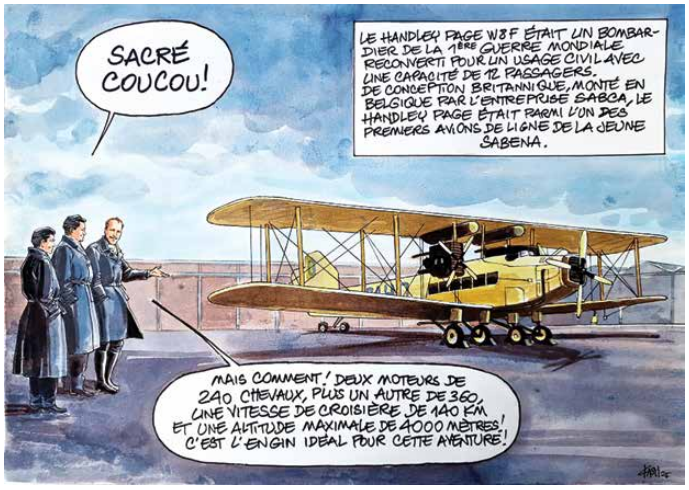
In 1928, Thieffry attempted two more flights to Congo with a sports plane. The first attempt failed in Philippeville, now part of Namur province, and the second ended in Montpellier, France. Undeterred, he pursued plans to develop a domestic air service within the colony.

Tragically, during a test flight near Lake Tanganyika, he and a fellow pilot crashed. Thieffry was just 36 years old. His body was found near Lake Tanganyika. Today, Brussels Airlines continues the legacy of Belgian–African aviation. During the summer season, it operates 56 flights a week from Brussels to Africa, including a daily direct flight to Kinshasa. "Brussels Airlines still uses the same route to fly to Kinshasa as my grandfather did 100 years ago," stated Bernard Hanin–Thieffry, Edmond's grandson. Edmond Thieffry's legacy also lives on in Brussels, where a metro station in Etterbeek bears his name.

A world first

Together with mechanic Joseph De Bruycker and pilot Léopold Roger, navigator and pilot Edmond Thieffry left Brussels for Congo on 12 February 1925, for an 8,000 km flight. What made this feat all the more groundbreaking was the fact that the 'little Belgians' were the first to successfully fly across the Sahara, beating countries like France and Great Britain, despite the fact that the Princess Marie–José got lost in the desert twice.

51 days after their departure, our compatriots landed at the airport of Leopoldville, today's Kinshasa. Thus was born the very first connection by air between Belgium and DRC, a connection that today still occupies an important strategic place in the Brussels Airlines offer. In addition, the African Competence Centre, based in Brussels, draws



on almost a century of experience, from which the entire Lufthansa Group can benefit. From summer 2025, Brussels Airlines will have 56 flights to the continent every week, up 10% from summer 2024.

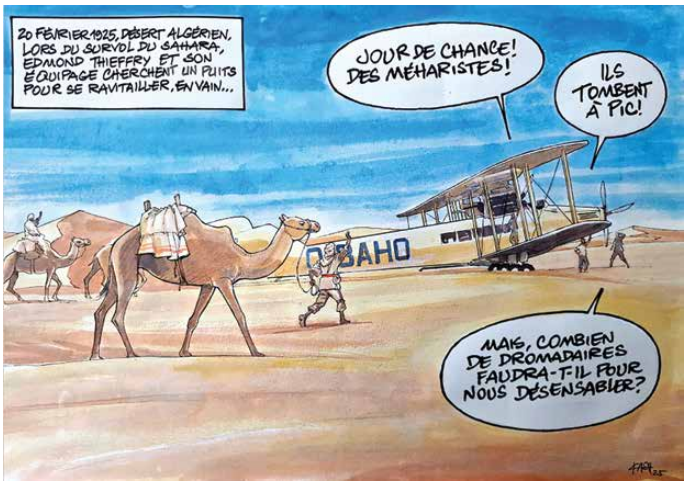
"This milestone is more than a celebration of aviation history. It is also a testament to our enduring bond with Africa, which has become an integral part of our identity and our future. That bond has only grown stronger over the years, as we have not only mapped out routes, but also built relationships and trust.

The African continent is part of our DNA," stated Kenechi Ugwoke, Head of Africa Competence Centre, Lufthansa Group.

For letters around the world. Each sheet of five of these brand new stamps, with a 1WORLD value and therefore suitable for sending mail worldwide, features a map of the route followed, from Brussels to Kinshasa, combined with an image of the aircraft, the Princess Marie–José. The new stamp issue costs 15 euros (for a sheet of 5 stamps) and is available from today on bpost's e–shop, as well as in the Philaboutiques of Brussels and Mechelen.

The Belgium embassy celebrates 100 years of air connectivity between Brussels and Kinshasa One of the drawings by Kash: the plane makes an emergency landing in the Sahara to resupply.

With 10 drawings by Congolese illustrator Kash, our embassy in Kinshasa commemorated the heroic pioneering flight from Brussels to Léopoldville in 1925.

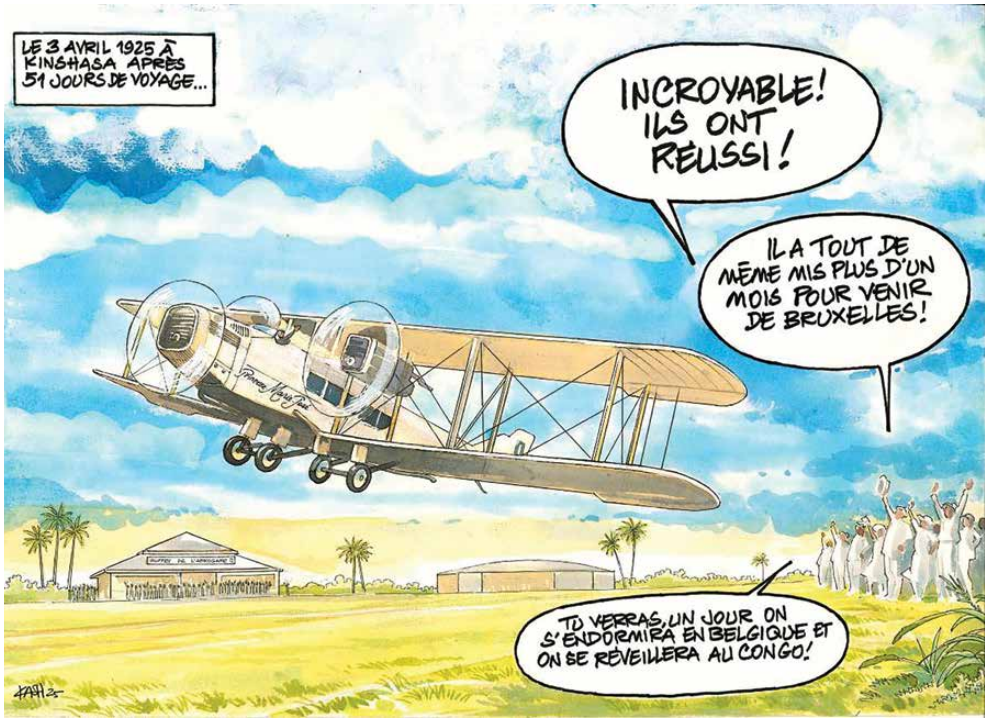


Although it took 51 days at the time, it paved the way for today's busy air route between Belgium and Congo. On 3 April 2025, it was exactly 100 years since the first flight from Brussels to Kinshasa, then known as Léopoldville. But don't picture a well organised passenger flight. No, it was an epic journey that stretched over 51 days.

Edmond Thieffry

In 1925, air travel was still in its pioneering days. However, our source of national pride Sabena – an acronym for the 'Société Anonyme Belge d'Exploitation de la Navigation Aérienne' – had already been established for two years. It was in commission of Sabena that Belgian aviation ace Edmond Thieffry embarked on the perilous journey. Thieffry was a heroic WWI pilot who co–founded

Sabena. He led the flight to Kinshasa, accompanied by pilot Léopold Roger and engineer Jef Debruycker.



The aircraft was a converted bomber originally meant to transport food, fuel, and equipment. The cockpit of the three engined propeller plane was open, leaving the pilot exposed to wind and rain. They usually flew at around 2,000 meters, but over the Sahara, they ascended to 2,500 metres to avoid sandstorms. They had to make five emergency landings, and at one point, a propeller even broke. Twice, they found themselves lost in the desert.

But eventually, they landed safely and amid great interest at Kinshasa airport after an 8,200 kilometre journey. Remarkably, their flight path is still followed today by Brussels Airlines, Sabena's successor: over France, Algeria, Mali, Chad and the Central African Republic to the Democratic Republic of Congo.

Our embassy in Kinshasa could not let this occasion go unnoticed. This very first flight to Kinshasa was nothing short of a world first: it was the first successful flight over the Sahara. Moreover, that flight laid the foundation for a busy air route between Belgium and Congo, and by extension, the whole of Africa. In 1935, Sabena introduced a regular flight between the two countries, which still took several days back then. Today, Brussels Airlines operates a daily direct flight from Brussels to the Congolese capital.

Caricaturist Kash

Our colleagues in Kinshasa asked the renowned Congolese illustrator and caricaturist Kash to create 10 drawings depicting the heroic flight. In the embassy building, they organised a drink to inaugurate the works of art, on the occasion of the visit of Minister of Foreign Affairs Maxime Prévot on 28 April 2025. Numerous partners of our embassy attended the inauguration.

On social media, the drawings were widely showcased in the form of a quiz. After the reception, they will be permanently displayed in the embassy building. The plan is to create a numbered series of 10 reproductions that would be used, among other things, to decorate the airports in Zaventem and Kinshasa, and the headquarters of our Federal Public Service in Brussels.

This initiative successfully strengthened the ties between the two countries. Moreover, it did so through comic strips, an emblematic heritage of both Belgian and Congolese culture. It was also a tribute to the pioneering work of Sabena. To this day, Brussels Airlines remains one of the largest employers in Belgium.

By Vijay Seth
Aerospace Heritage Trust

75th Anniversary of The Falkland Islands Government Air Service

The Falkland Islands Government Air Service (FIGAS) was established in November 1948 with the arrival of two Auster aircraft to provide the community with an air ambulance service.

The first flight, a post assembly flight check, was performed on 19 December of that year. The first air ambulance flight took place six days later on Christmas Eve when a young girl, Sandra Short, was airlifted to hospital in Stanley. The aircraft used for the flight was an Auster, Mk.5, registration G–AJCH piloted by Vic Spencer. In 1950 the Auster aircraft were supplemented by a Noorduyn Norseman float equipped aircraft to provide increased capacity enabling the air service to begin passenger services on a more regular basis. By 1953, the Auster and Norseman aircraft had been replaced by DH Canadian Beaver aircraft, also on floats. A review of the air service was carried out in 1977 which initiated a move from floats to wheels in an attempt to mitigate against salt water corrosion which is the scourge of float plane operators.

The aircraft selected to replace the DHC Beaver was the Britten Norman BN2 Islander aircraft; the first Islander, registration VP–FAY arrived in the Falkland Islands on 4 October 1979 after a long ferry flight from the United Kingdom across the North Atlantic, down the Americas and on to the Falklands.

The 1982 war and inclement weather destroyed the existing FIGAS fleet effectively stopping operations for a period. The 1982 war claimed two of the fleet; Islander aircraft VP–FAY was destroyed at Stanley Airport during a bombing raid and one of the Beaver aircraft was wrecked by naval gunfire; the remaining beaver was blown over during a strong gale and declared a write–off. FIGAS operations recommenced in January 1983 with a second hand float equipped DHC Beaver and further strengthened by the arrival of two new BN2 Islander aircraft.

The Islands relationship with the Beaver aircraft finally ended in January 1985 when it was withdrawn from use, dismantled and shipped to the UK for storage, eventually being sold to a customer in Canada. FIGAS continues to operate BN2 Islanders across the archipelago providing the community with an essential communications network. In recent years the fleet has been upgraded with modern digital cockpits, autopilots, satellite tracking and new cabin interiors. Currently, FIGAS operate five BN2 Islanders, four of which are configured for passenger and cargo transportation. The fifth aircraft is primarily an aerial surveillance aircraft but used occasionally on passenger duties when required.

Over the last decade, domestic and international passenger traffic have increased year–on–year despite dipping slightly in 2019/2020 due to the pandemic. This consistent growth prompted the purchase of a sixth aircraft which is scheduled to arrive in the first quarter of 2024, thus providing FIGAS with additional resilience to meet future demand. The Islander aircraft depicted on the first day cover, registration VP–FBD, is the oldest in the fleet at 38 years in operation; the aircraft has logged over 19,800 flight hours and 48,500 landings.

VP–FBN is pictured on the 35p stamp; one of two aircraft originally purchased in 1989 for fishery surveillance duties, was eventually converted to a passenger transport aircraft in 2009 due to a reduction in surveillance requirements. Also purchased in 1989 was VP–FBO, shown on the 80p stamp, and remains the sole fishery surveillance aircraft. VP–FBO is regularly tasked for passenger transport. VP–FBR features on the stamp valued at £1.09; purchased in 1991 this aircraft has accumulated nearly 17,000 flying hours and 38,000 landings. The newest aircraft, VP–FMC, portrayed on the £1.40 stamp arrived on the islands in December 2020 and has been very busy, amassing over 2,000 flying hours. The set of four stamps was released on 19 December 2023.

By Vijay Seth
Aerospace Heritage Trust

Letters to the Editor

Dear Vayu Team,

Thanks for the info and for the opportunity once again. I must also share this plaque I received from the CO of INS Virat when I was in my first job. I'm not sure whether I shared this with you earlier.

We manufactured Coles hydraulic telescopic mobile cranes and one of them was stationed on the Virat for handling Harriers. She was supposed to sail that day for an exercise but faced a last minute delay because of a hydraulic problem with the crane.

My Service head and me responded to the CO's SOS and within 15mins attended to a minor assembly glitch carried out by the crew on board after which the ship embarked for its exercise. A month later we were invited by the CO to come aboard for a formal lunch and a tour of the Virat from head to toe. It was then that I learnt that there were 2 heads one for flight deck and one for the carrier! The mess was like a 5 star hotel with polished wooden panels and a fairy tale like experience interacting with such a great set of people.

This was a glimpse of the type of gratitude that I've ever experienced in my career. I was presented with a laminated crystal clear shot of my crane on deck with other material handling equipment like forklifts, tuggers etc. taken by a Seaking chopper and a Copper Plaque which I've attached in this mail.

This is one aspect of the armed forces that I can never forget including my experience with VRDE Ahmednagar and R&D Dighi during development and trials of equipment.

Wish I were young again!

Warm Regards,
Palak Bhattacharyya

Dear Vayu Team,

Here is the completed static model of the MiG–21 from my twin brother Alak.

I understand his next project is the Tejas.

Hope you like the model.

Best regards,
Palak Bhattacharyya

Dear Vayu Team,

Thank you so much Sir, for the latest magazine and we are so delighted to see our article covered in "The History Issue". Though you did mention that the picture quality could be an issue, but it's come out very well thanks to your editorial team at Vayu! Excellent reading matter and lots of information to carry us through to the next issue.

We were very depressed when we heard about the unfortunate incident at the Dubai Air Show 2025, and pray for the departed soul of our brave warrior Wing Commander Namansh Syal and our heartfelt condolences to his family.

Thanks for the 2026 calendar pull outs. It's on display in every room of the house!!

Alak just finished two aircraft models in the news, the Tejas and the MiG–21. Both dedicated to protectors of our skies. I am working on a Su–30MKI model, in wood and my biceps are showing with all the sawing and filing that's required to shape it. It gives one a good perspective of how complex geometrical surfaces and boundary layer separations contribute to performance of this aircraft.

Lots of help from illustrations in Vayu to help understand the profiles.

Thanks once again for all the encouragement you have given us and seriously this euphoria in being featured in your prestigious magazine, will forever be remembered by us. We look forward to a life long association with Vayu and will keep on informing you of our little way of show casing Indian Aviation.

With best regards,
Palak Bhattacharyya

Dear Vayu Team,

As promised, here's an on going update on additions to the model IAF livery.

Alak just finished adding the Su–30MKI, without armaments to his collection of the IAF line up. I actually started before him on a similar model but due to "force majeure" conditions involving an eye problem, I'm lagging behind. We had a short break in between with Alak spending Christmas with his son in Goa and me spending an overnight stay in Pune with my 1972 batchmates.

I had the opportunity to visit my old school Loyola's and was amazed at the changes since the 60's. We had two lovely Christmas trees that used to adorn the front of our house in the NCL colony nearby school. So when we left Pune to go North and continue studies in Dehradun, we donated them to our school.

I was amazed at the size of those trees and felt a deep sense of attachment to them. It was like hugging long lost family members, and I'm sure if trees have feelings it must have had reciprocal affections!

Thanks for your continued interest in our hobby, and you won't find us lacking in that department, you "twinspire" us!!

Till the next one, cheers and have a great 2026.

Warm Regards
Palak Bhattacharyya

Dear Vayu Team,

Just read the book review with a cryptic title "Because of this" and the actual sentence by Gen Niazi which completed the heading with "you the Air Force". Congratulations!!!

I saw remnants of some action from Kalaikunda Air base (we had many friendly hockey matches with the AFS) when a piece of a crashed PAF with "an ejection seat" circulated around our hall at IIT Kgp. I suppose EPAK had F86s too those days. It must be still doing the rounds to this day, like a rolling trophy in Azad Hall of Residence! In the 60s I also remember sadly looking at our jawans boarding DH Packet aircraft at Barrackpore aerodrome as a kid during the Chinese War.

One of my uncles Group Capt Dhar was in the air force and was stationed there at that time, and another Major General K Bhattacharyya retired from Fort William. He was from the AFMC and stationed for a long time in Kirkee Pune which is our birth place. I have been associated in many development projects for the armed forces after my BTech. I really enjoyed the company of senior officers during that time.

As promised, the pics of the Tejas and MiG–21 by Alak are attached. Hope you like them.

With best wishes,
Palak Bhattacharyya

25 Years Back

From Vayu Aerospace Review
Issue I/2001

IAPO gives HAL licence to build Su–30MKI

On 28 December 2000, an agreement was signed between the Irkutz Aircraft Production Organisation (IAPO) in Siberia and Hindustan Aeronautics Limited (HAL) for licence production of 140 Sukhoi Su–30MKI multi–role combat aircraft in India, the programme to span 17 years according to the Interfax news agency of Moscow.

"Breakthrough year in Indo–Russian ties"

With several massive defence contracts signed during the year, officials in Moscow state that the year 2000 had been a breakthrough year in relations between Russia and India. "It has been about the best year in our relations since the breakup of the Soviet Union", according to a senior Russian Foreign Ministry official.

PSC critical of delays

The Parliamentary Standing Committee (PSC) on Defence has expressed concern over slippages in the development of the prestigious light combat aircraft (LCA) and the Akash and Trishul air defence missile programmes. In its report tabled in Parliament on 18 December 2000, the committee noted that the slippages were triggering a threat of "technological obsolescence".

The MiG–21bis UPG programme

According to a Russian spokesman (for NIIR Phazotron), flight tests of the two IAF MiG–21bis fighters, upgraded to the MiG–21bis UPG standard (earlier Russian designation was MiG–21–93) have now been completed. Russia is expected to shortly deliver these two upgraded fighters to HAL at Nasik.

GSLV launch preparations

Focus is set on the launch of the country's biggest rocket, the Geostationary Launch Vehicle (GSLV), with the Chairman of the Space Commission. Mr K Kasturirangan, stating that the rocket would be launched early in February. The flight was originally scheduled for October 1999, but was postponed twice.

Jet Airways to place Rs 1,600 crore PTCs

The Life Insurance Corporation is likely to subscribe to one fourth of the Rs 1,600 crore private placement that is being worked out by Jet Airways for purchase of 10 new Boeing 737–200 aircraft. The airline is raising about $400 million through a special purpose vehicle (SPV).

BIAAL Formed

The Karnataka Government has floated the Bangalore International Airports Authority Limited with Infosys Chief NR Narayana Murthy as its Chairman, to implement the new airport project. The other two directors of the company are BPL (Telecom) chief executive Rajiv Chandrashekhar and Principal Secretary (Infrastructure) B.K. Das.

IAF Mi–25/–35s with HMOSP

The Indian Air Force's inventory of Mil Mi–25 attack helicopters are to be equipped with the Israel Aircraft Industries Helicopter Multimission Optronic Stablised Payload (HMOSP). Two Mi–25s were equipped a year ago with the Israeli system testing began in September 2000 and series installation would begin in March 2001.

IA to acquire "New" aircraft

So as to augment the mature fleet of Airbus A.300s and A.320s (plus Boeing 737–200s) of its subsidiary Alliance Air). Indian Airlines is in the process of acquiring seven aircraft, the first "new acquisitions" after 1996, and will comprise five Boeings 737–400s and two A.320s on lease.

New IAF command appointments

Air Marshal SG Inamdar has been appointed as the Air Officer Commanding–in–Chief of Eastern Air Command at Shillong, succeeding Air Marshal KN Nair. Air Marshal TM Asthana has succeeded Air Marshal Inamdar as Deputy Chief of Air Staff while Air Marshal SP Tyagi, has on promotion, succeeded Asthana as SASO of the Central Air Command at Allahabad.

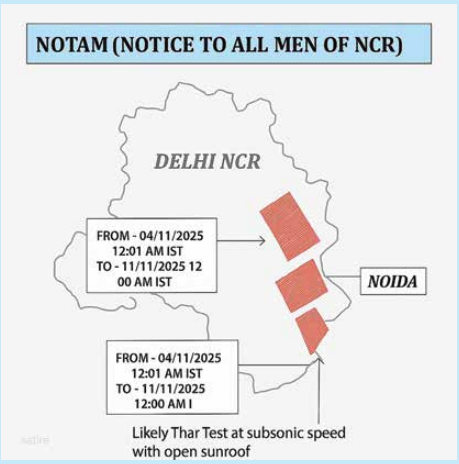
HAL to join A.380 consortium

In a major initiative, and unprecedented in terms of financial commitment, is HAL's planned involvement with the Airbus Industrie's A.380 mega jetliner programme, with some Rs. 500 crore (US $100) initially stated. Finance director A.K. Zutshi has said that this was likely to be HAL's share of the estimated $12 billion Airbus Industry project.

HAL Lancers for the Army

According to HAL Chairman Dr CG Krishnadas Nair, HAL will deliver the first 12 Lancer helicopters to the Indian Army by September 2001. The Lancer is a low cost light attack helicopter developed by HAL from the basic Cheetah, large numbers of which serve with R&O squadrons.

Cloud seeding over NCR—a flop

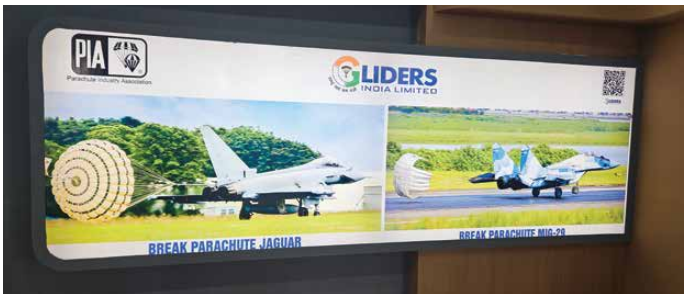


On 28 October 2025, in a brilliant meme on Twitter, Raghav Sarawagi posted this NOTAM calling it a 'Notice To All Men in NCR' for "probably a Thar vehicle driver test at subsonic speeds with open sunroofs"; itself a spoof on the bad reputation these owners have. The cloud seeding attempt by a Cessna was a complete failure. "Attempts to induce rain through cloud seeding in parts of Delhi were not completely successful because the moisture content in the clouds was low and the process is not a magic bullet for the problem of pollution, but an SOS solution", IIT Kanpur Director Manindra Agarwal stated. Is the government missing the woods for the trees?

Kids having fun? No!

As part of Special Campaign 5.0, IAF's Air Force Station Nalia transformed discarded drop tanks of Hunter Aircraft into vibrant canvases. "This initiative breathes new life in Station environment, showcasing the creative spirit of Air Warriors", stated their Twitter handle. Well, OK. If you insist!

Gaffes galore both sides of the border



Obviously separated at birth. Literally speaking. At the Dubai Airshow in November 2025, the Pakistan Aeronautical Complex stand was misspelled with "Compelx". At the same time, in India at the Indian MoD exhibition at Bharat Mandapam at New Delhi, a DPSU showed a Eurofighter instead of the Jaguar and doubly wrong was the spelling of 'Brake' misspelled as 'Break'. Seems proof readers are urgently needed both sides of the border.

Soldier to soldier

In times of tragedy, sane voices prevail irrespective of bitterness

Wing Commander Namansh Syal was the pilot of the Indian Air Force (IAF) Tejas that crashed at the Dubai Airshow on 21 November 2025 and who lost his life. This was followed by disgusting comments across social media. However, there were many sane voices (across the border) amongst a barrage of gutter comments by insensitive trolls.

Usman (Twitter @usman_cph) tweet quoting PAF's Air Cdre Pervez Akhtar Khan (Retd) itself sent by PAF's Wg Cdr Perci took the world by storm and was widely appreciated by the Indian community. We at Vayu also highlighted this response with our headlining comment "An Officer and a Gentleman". Air Cdre Pervez Akhtar Khan's message via Twitter goes as following: "IAF's Tejas: A Salute Across Skies".

"The news of an Indian Air Force Tejas crashing during an aerobatic display at the Dubai Air Show is heartbreaking beyond words. Aerobatics are flown on the razor's edge of the flight envelope, where skill, courage, and precision exist in unforgiving margins. These are not stunts; they are acts of professional mastery, performed by men and women who accept personal risk in the service of national pride and technological confidence.

To the Indian Air Force and to the grieving family of the fallen airman: I offer my deepest and sincerest condolences. A pilot is not merely lost; a guardian of the sky is silenced.

What pains me further is the disgraceful reaction of a few on our side of the border who choose mockery over empathy. This is not patriotism; this is moral illiteracy. One may question policies, decisions, even doctrines, but never the courage of a fellow aviator doing his duty. He flew not for applause, but for his flag, just as we fly for ours. That deserves honour, not ridicule.

I too have lost brothers in uniform under similar unforgiving circumstances; Sherdil Leader Flt Lt Alamdar and Sqn Ldr Hasnat — men who lived and died at the far edge of performance. There are no nationalities in the moment an aircraft goes quiet. There is only loss, and a family left in shattered silence.

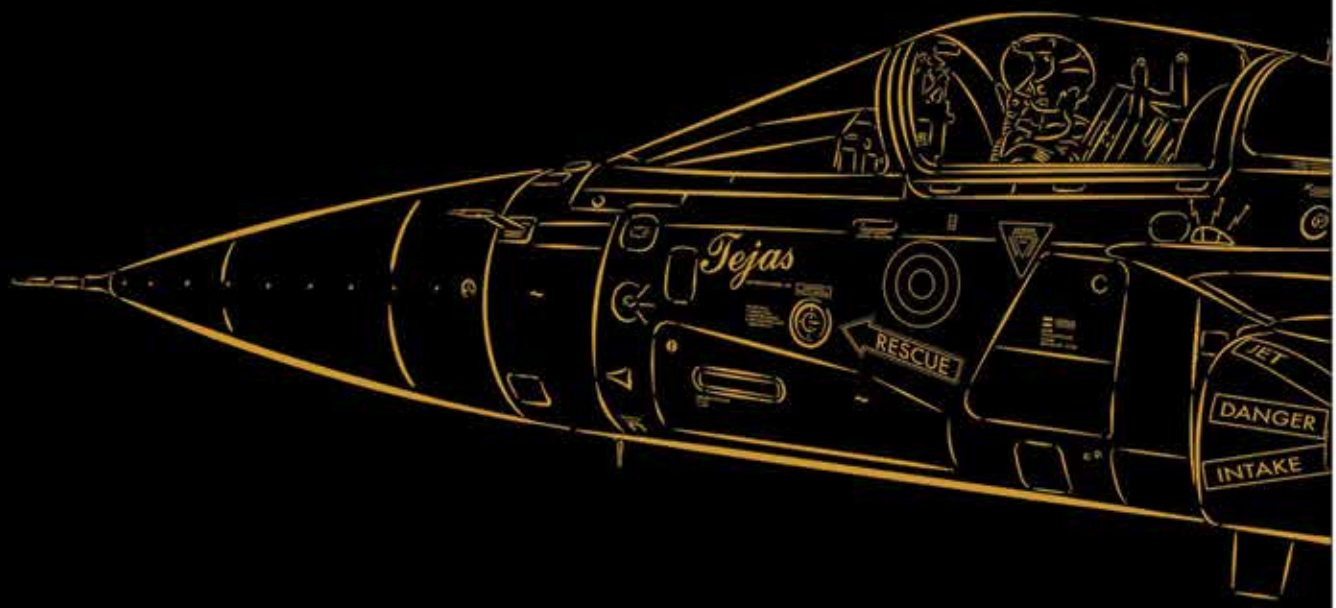
A true professional respects another professional. A true warrior salutes another warrior, even across enemy lines. Anything less stains our own uniform. May the departed pilot find eternal blue skies beyond turbulence. May his family find strength where words fail. And may we, on both sides, find the maturity to honour courage".

Fiasco at Indigo

In early December 2025, problems and complications (for multiple reasons) at Indigo Airlines brought operations of the airline to a standstill causing extreme discomfort and chaos at airports and for passengers. "The Government of India has decided to institute a high level inquiry into this disruption. The inquiry will examine what went wrong at Indigo, determine accountability wherever required for appropriate actions, and recommend measures to prevent similar disruptions in the future, ensuring that passengers do not face such hardships again". Meanwhile, social media went crazy with memes and poked fun at the airline.

VAYU

Aerospace & Defence Review



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