

VAYU

V/2026

Aerospace & Defence Review



Indian Air Force on its 94th Anniversary

LOCKHEED MARTIN 

CELEBRATING THE INDIAN AIR FORCE AND OUR PARTNERSHIP.

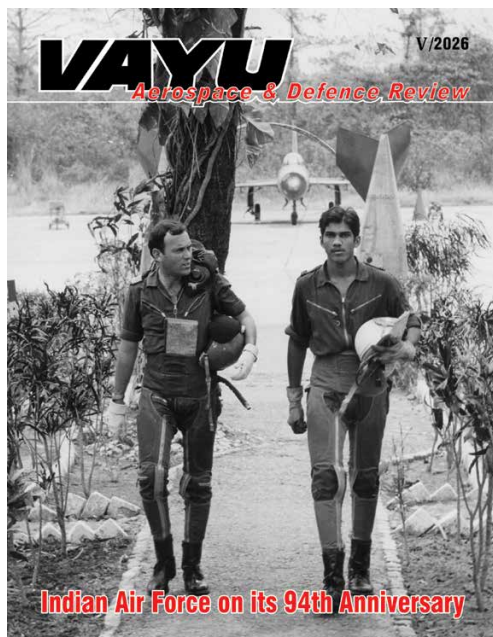


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Cover : IAF MiG-21 pilots post sortie. Photographer unknown as well as location and timeline unknown. Photo from the Vayu Aerospace Review archives.

19/20

ISRO and Skyroot

We cover the latest news from ISRO and their successful launch of GSLV-F17 as well as the historic launch from the Indian private player Skyroot and their Vikam-1 in a successful debut.



28 Interview with Frederico Lemos, CCO, Embraer

In our interview with Frederico Lemos, he says that "Right now, we are focussed on the Indian Air Force's Medium Transport Aircraft (MTA) programme and we believe that the C-390 Millennium is the right strategic choice for the MTA".



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Interview with IAF squadron No's 126 HU, 44, 17 and 14

On the occasion of IAF Day and its 94th Anniversary, we interviewed four IAF squadrons namely No's 126 HU, 44, 17 and 14. Between helicopter, transport, bomber and combat jet squadrons, one gets a great firsthand view of their functioning, goals, past successes and their future plans.



46

IAF in Exercises Pitch Black and Udara Shakti 2026

The Indian Air Force successfully concluded its participation in two pivotal international flight engagements: Exercise Pitch Black 2026 in Australia and Exercise Udara Shakti 2026 in Malaysia on 23 August 2026. The dual-nation deployment underscored the IAF's operational reach, advanced tactical coordination, and commitment to strengthening strategic defence partnerships across the Indo-Pacific region.



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48 IAF at at Darwin, Australia

The Indian Air Force was at Exercise Pitch Black 2026 at the Royal Australian Air Force (RAAF) Base Darwin which took place from 20 July 2026 to 7 August 2026. Exercise Pitch Black is the RAAF's premier biennial multinational air combat exercise. The IAF contingent comprised of the Rafale multirole fighter aircraft, supported by the C-17 Globemaster III and the Il-78 air-to-air refuelling aircraft.



50 IAF-JASDF 'Exercise Veer Guardian 2026'

The bilateral air exercise 'Veer Guardian 2026' between the Indian Air Force and Japan Air Self Defence Force (JASDF) concluded at Air Force Station Jodhpur on 22 September 2026. The IAF deployed a mix of aircraft, including Su-30MKI, Rafale and indigenous Light Combat Aircraft (LCA) Tejas. The JASDF participated with the F-2A fighter aircraft.



52 Exercise Tarang Shakti 2026 at Jodhpur

The Indian Air Force commenced the operational phase of Exercise Tarang Shakti 2026 at Air Force Station Jodhpur; it is being conducted from 26 September to 12 October 2026. Seven Friendly Foreign Countries (FFCs) – Australia, the United States of America, the United Arab Emirates, France, Germany, Sri Lanka and Bangladesh – are participating in the exercise. The foreign aircraft taking part include the F-35 Lightning II, Rafale, F-16, A400M, MRTT, C-130, C-130J and KC-30A.



54 Suryakiran Aerobatic Team at Meerut

Arindam Nandy who was at Meerut to cover the event says, "The Suryakiran Aerobatic Team (SKAT) of the Indian Air Force took to the skies of Meerut for the first time on 19 and 20 September 2026, captivating spectators with a breathtaking display". Over 1 lakh people, including students, National Cadet Corps (NCC) cadets and National Service Scheme (NSS) volunteers turned up over two days to witness the display. Notably, three members of the SKAT team, including two pilots who performed aerobatics, are from Meerut!



63 Indigenous high thrust class engine for AMCA

Sankalan Chattopadhyay says the Indian Air Force is gearing up for the next generation, ever evolving, multi-domain collaborative combat environment. And for that, many highly ambitious programmes have been initiated to meet critical requirements. Of all these, undoubtedly, an initiative for a high thrust class engine for the next generation combat platforms is the most pivotal.



94 Farnborough International 2026 report

Richard Gardner reports from the event and says Farnborough International '26 attracted over 140,000 industry professionals, and military visitors, nearly double the previous UK aerospace trade show figures with orders worth over \$80 billion announced during the week. With six huge exhibition halls with 1,600 company stands, chalets and display areas there were also national pavilions including a sizable Indian presence.



Regular features:

Opinion, Viewpoint, Aviation & Defence in India, World Aviation & Defence News, Vayu 25 Years Back, Tale Spin.

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C-390 MILLENNIUM

THE STANDARD SETTER

FOR INDIA'S MTA PROGRAM

Congratulations to the Indian Air Force on celebrating its 94th anniversary.

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 **EMBRAER**

Lt Gen Kamal Davar says....

.... Why Agniveers need longer service, higher retention and better career prospects



One prominent measure, touted as a major transformative effort in the armed forces, was introduction of the Agniveer scheme in 2022, ostensibly for the three services to improve their age profile. Since its inception, the scheme was beset with differing views regarding duration of service, pay structure and other issues. In the last 2 yrs, GoI took stock, and is now reportedly listening to the views of not only the three services but also of state governments and veterans. So, here goes one.

The Agniveer scheme as part of the Agnipath programme was launched for young Indians of both genders aged 17.5–21 yrs for a 4-yr service tenure in the three services. They were to have a salary of Rs. 30,000 a month, rising to Rs. 40,000 in their last year of service. Adequate medical and insurance provision arrangements were also ensured.

On completion of 4 yrs of service, they would receive a tax free Seva Nidhi package of Rs. 11.71 lakh. 25% of Agniveers (likely to be raised to 50%) would be back in the armed forces, and be entitled to the same

scales of pay and allowances and other terms of service as regular members in the army.

As of now, after their 4 yrs of service as Agniveers, several states and central organisations provide prioritised horizontal reservations (10–20%) for Agniveers in state police forces and paramilitary units like CRPF, BSF and CISF. Disaster management forces, forest and firefighting departments in several states also have earmarked job quotas for former Agniveers.

One of the reasons considered by many analysts for GoI having taken this step is to reduce the burgeoning defence revenue bill. No matter the veracity of this point of view, there are many other ways to trim budgets, including drastically reducing the many civilian appointments in the defence ministry.

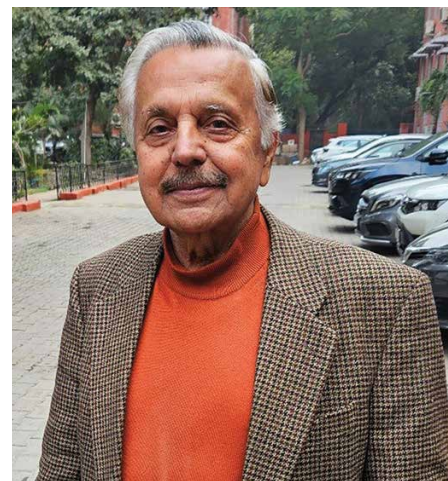
GoI could consider appointing a high powered committee to go into the entire gamut of measures to reduce defence expenditure. Adequate capital and revenue expenditure for security imperatives has to be ensured in these challenging times. So, cutting down on recruitment of soldiers will just not be prudent. According to some media reports, Indian Army is over a lakh soldiers deficient.

An important reason to eliminate the ceiling of a 4 year limit tenure for

soldiers is that this period does not give adequate time for them to master their soldierly skills. This problem gets further accentuated when it comes to handling technical arms, with hi-tech weaponry skills often taking years to master.

Fighting prowess of the forces is also greatly dependent on the morale, motivation and the unit spirit of its soldiers. This spirit takes many years to cultivate and imbibe before it becomes a battle winning factor. So, time is needed for any young recruit to become a highly motivated and skillful soldier for his or her unit.

GoI should modify the scheme suitably to give Agniveers at least 8 yrs in active service, and retention be upped to 50–75% from the present 25%. ➡



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



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Admiral Arun Prakash says....Mecca accord raises the stakes for India



Saudi Crown Prince Mohammed bin Salman with Turkish President Tayyip Erdogan and Pakistan PM Shehbaz Sharif after signing the joint defence agreement on 7 August 2026. (All photos: Reuters)

The Mecca Joint Defence Agreement signed by Türkiye, Saudi Arabia and Pakistan on August 7 continues to be in the spotlight. Against the backdrop of the ongoing US/Israel–Iran conflict, its geopolitical and military ramifications are being closely examined in the context of West Asia. For India, however, strategic prudence demands that this pact be viewed through the lens of Operation Sindoor.

Following India's May 2025 missile strikes against Pakistan's terror infrastructure, the latter avoided a prolonged, conventional escalation by engaging in high intensity drone and electronic warfare before seeking an early ceasefire. During this conflict, while the bulk of Pakistan's hardware and technical support came from China, Türkiye's supply of unmanned aerial vehicles and electronic warfare devices underscored Ankara's willingness to back Islamabad against New Delhi. Four months after Op Sindoor, Pakistan formalised a mutual defence pact with Saudi Arabia, guaranteeing that aggression against either country would be considered aggression against both.

On the diplomatic front, Pakistan, notwithstanding its severe domestic political fragmentation

and fragile economy, has adroitly leveraged recent security crises into political capital. Its alignment with Washington and its high risk role as a key mediator between the US and Iran have demonstrated Islamabad's knack for exploiting its geopolitical weight.

India's security planners need to focus on two imponderables. First, would a future Indian military strike against terrorist infrastructure or military targets in Pakistan enable Islamabad to invoke the collective defence provisions of its pacts? Second, could this agreement pave the way for a viable, long term Türkiye–Pakistan military–industrial axis, underwritten by Saudi Arabia? The answers would have a crucial bearing on India's strategic calculus.

For decades, India maintained a decisive conventional military edge over Pakistan on land, in the air and at sea, and it was Islamabad's desperation to bridge this gap that drove its relentless pursuit of nuclear weapons. After the 1998 tests, while mutual nuclear deterrence held firm, India's edge in conventional deterrence steadily eroded due to two main factors: the rise of the China–Pakistan axis – posing a two-front threat – and Islamabad's deployment

of tactical nuclear weapons under a "Flexible Response" doctrine designed to counter India's putative "Cold Start" strategy. India's post–Uri surgical strikes (2016) and post–Pulwama airstrikes (2019) showed that while New Delhi could call Pakistan's nuclear bluff, it had yet to re-establish effective conventional military deterrence. The destruction inflicted on Pakistan's military by Op Sindoor was intended to project "deterrence by punishment", but before its efficacy could be confirmed, the Mecca Agreement may have disturbed the balance of power in the subcontinent and given encouragement to hotheads in Islamabad.

India's strategic planners must now formulate doctrines and acquire capabilities tailored to this emerging reality. Deterrence relies on certitude: India's response must guarantee punishment so swift and so severe that neither of its two adversaries (China and Pakistan) ever doubts the cost of provocation and the accompanying loss of face in the international arena.

Rebuilding credible conventional deterrence will require heavy investment in creating war reserves for extended conflicts by quickly absorbing technological, logistic and operational lessons from the Ukrainian

OPINION



and Iranian battlefields. Awaiting urgent redressal is our government's flawed and lethargic decision making mechanism that has resulted in severe capability gaps in recent decades. Examples: the progressive erosion in the IAF's combat aircraft strength; the inordinately delayed development of an indigenous jet engine that will impact its 5th and 6th generation aircraft projects; imposition of the ill-conceived and debilitating Agniveer recruitment/training scheme on the military; slippages in the Navy's diesel submarine and aircraft carrier projects, and many others.

India's uniquely hazardous security predicament is embodied in having two nuclear armed adversaries as well as strained relations with others in the neighbourhood. Moreover, while its own defence-industrial base may take a decade or more to reach maturity, it remains substantially import dependent. The ongoing geopolitical turmoil should leave us under no illusion that dependence on external sources for military hardware can be perilous for national security.

Thus, the urgent question that needs New Delhi's focus is not whether India can prevail in a two-front confrontation, but how it can find a "breathing spell" of stability/tranquillity to allow uninterrupted

progress towards technological self-reliance. The threats posed by China and Pakistan are qualitatively different, and each deserves the closest attention of our highly regarded diplomatic corps.

For Islamabad, Kashmir is not merely a territorial dispute; it serves as a pivot on which the military establishment's domestic credibility rests. A settlement of Indo-Pak disputes by eliminating the so-called "existential threat" posed by India would demolish the military's *raison d'être*. As for Beijing, it views the unresolved Line of Actual Control as a strategic lever to keep India geopolitically boxed into South Asia. The settlement of territorial issues would permit India to bring strategic focus on maritime capabilities and the Indo-Pacific, where China is most vulnerable.

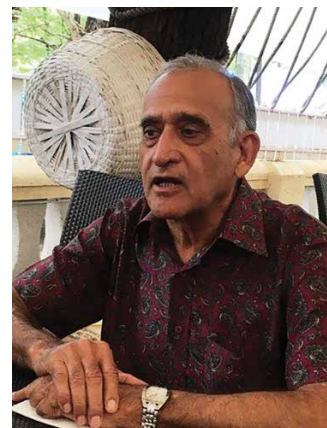
India cannot match China's defence spending or technological prowess overnight, but it can manage the border to avoid unintended escalation. Achieving this demands three priorities: active diplomatic and

military contact, relentless infrastructure building, and a forward leaning military posture that will ensure that — unlike the past — any future Chinese incursions incur painful costs. On this front, the goal is steady stabilisation for the long haul.

With regard to Pakistan, India should maintain a firm military posture and a zero tolerance policy on terrorism, while quietly exploring back channel diplomacy to test whether the Generals can be incentivised to shun cross-border terrorism. With senior RSS leaders such as Mohan Bhagwat and Dattatreya Hosabale signalling support for people-to-people dialogue, such outreach is unlikely to trigger domestic backlash and could pave the way for a viable *modus vivendi* on the western front.

This dual-track approach rests on a clear strategic calculus: while Pakistan remains bogged down by economic distress, tensions on the Durand Line and ethnic unrest, its enhanced international standing and newly minted security alliances could embolden renewed adventurism. India must strategise to enforce stability in its neighbourhood. 🐦

In the photos below is Admiral (Retd) Arun Prakash
First published in The Tribune



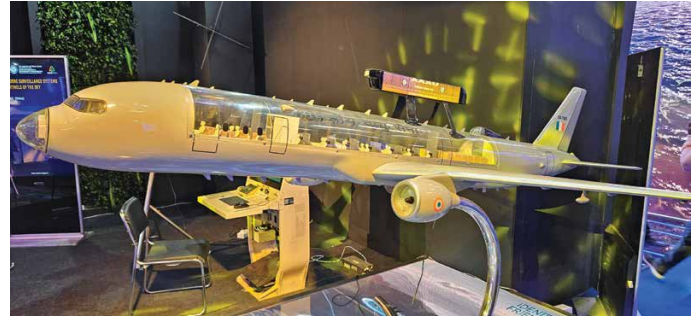
DRDO test of 'Kusha' LRSAM

Defence Research & Development Organisation (DRDO) successfully conducted the maiden flight test of 'Kusha' long range surface-to-air missile from the APJ Abdul Kalam Island off the coast of Odisha on 23 July 2026. This maiden test was conducted against an electronic target simulating high speed and high altitude aerial threat which was successfully intercepted by the missile system. The 'Kusha' missile system is capable of neutralising a wide variety of aerial threats including fighter jets, missiles, unmanned aerial vehicles and large enemy aircraft within a wide range and altitude envelope.



DRDO contract to industry partners for AEW&C MK-II

Centre for Air Borne Systems (CABS), DRDO signed a contract on 22 July 2026 with AI Engineering Services Limited (AIESL), New Delhi for the conversion of six A321 aircraft from commercial to green configuration, further leading to the development and production of Airborne Early Warning & Control (AEW&C) MK.II programme. A separate contract was inked with Adani Defence Systems and Technologies (ADSTL), Ahmedabad to engage with the company as Development Cum Production Partner (DePP) for Mission Systems designed for the AEW&C MK.II programme.



Agni-4 successfully tested

Medium Range Ballistic Missile 'Agni-4' was successfully test fired from the Integrated Test Range, Chandipur in Odisha on 6 August 2026. The launch "validated all operational and technical parameters. The test was carried out under the aegis of the Strategic Forces Command".

Khagantak-243 tested

A significant milestone for the IAF and Indian industry on 2 September 2026 when the former successfully conducted the drop of an indigenously designed and developed Long Range Glide Bomb (Khagantak-243). The trials met all objectives "scaling new peaks of lethality through AtmanirbharBharat".



MoD contracts for loiter munitions for Indian Army

The Ministry of Defence has signed contracts with Tata Advanced Systems Limited and NIBE Private Limited for the procurement of Loiter Munition Systems, along with munitions and other accessories, at an approximate cost of Rs 1,577 crore for the Indian Army. The contracts were inked in the presence of Defence Secretary Rajesh Kumar Singh in New Delhi on 14 August 2026.

MoD floats Rs. 1 lakh crore tender for MTA

As reported by Rahul Singh of Hindustan Times, the defence ministry has issued a tender worth around Rs. 1 lakh crore to buy up to 60 medium transport aircraft (MTA) to boost the Indian Air Force's (IAF) airlift capabilities. The tender has been issued to five Indian companies, including Tata Advanced Systems Limited

(TASL), Mahindra Group, Adani Defence & Aerospace, Hindustan Aeronautics Limited and Reliance Defence, the officials said, asking not to be named. TASL has tied up with US firm Lockheed Martin, which has offered its C-130J Super Hercules aircraft for the MTA contest, and the Mahindra Group has teamed up with Brazilian plane maker Embraer, which has pitched its KC-390 Millennium aircraft to India. The three other Indian firms have not yet announced partnerships to advance the project.

MoD contract with GA-ASI for leasing two MQ-9B's

The Ministry of Defence has signed a contract with General Atomics Aeronautical Systems for leasing of two MQ-9B Sea Guardian High Altitude Long Endurance (HALE) Remotely Piloted Aircraft Systems (RPAS) for the Indian Navy for a period of 30 months. The contract is valued at approximately Rs 1,943 crore.



ToT of DRDO missile systems to Indian defence industry

Raksha Mantri Mr. Rajnath Singh has approved the transfer of DRDO developed technologies of all conventional missile systems to the Indian defence industry for production within the country. The provision will enable successful transition of missile system development to industrial production, reflecting the continued efforts of DRDO to leverage the capabilities of the Indian industry for the development and manufacture of advanced defence systems.



DAC clears acquisition proposals worth Rs 1.10 lakh crores

The Defence Acquisition Council (DAC), under the chairmanship of Raksha Mantri Rajnath Singh on 7 September 2026 accorded Acceptance of Necessity (AoN) i.e., in-principle administrative approval to various acquisition proposals of the Defence Forces at an estimated cost of about Rs 1,10,000 crore. For the Indian Army, approval was granted for the procurement of Chemical

Biological Radiological and Nuclear Recce Vehicles, High Mobility Vehicles, Self-Propelled Mechanical Mine Layers (MML), Advanced Light Helicopters (ALHs), Trawl Tanks and Sarvatra Bridge System. For the Indian Navy, AoN was accorded for the procurement of Arudhra Radars, design & development and subsequent procurement of Marine Gas Turbines (MGT). For the Indian Air Force, approval was granted to various proposals to enhance the war fighting capability of fighters, transports and helicopters. Approval was also accorded for procuring Ground-Based Multi-Purpose Jammer (GBMPJ) and installing Defence Forces Secure Access Card (DEFSAC) System.

India/France and FCAS?

“The Indian Ministry of Defence has initiated efforts in a concerted manner to co-join the 6th Generation Fighter Aircraft Development Programme viz. Future Combat Air System (FCAS) spearheaded by the French Government”: Ministry of Defence to Standing Committee on Defence (2025–26) on the issue of sixth generation fighter aircraft.

HAL partners with Adani Defence, BEML to make LCH fuselages

HAL on 14 August 2026 said it had entered into partnerships with the Indian industry—Adani Defence Systems and Technologies Ltd and BEML for manufacturing fuselage structures for the ‘Prachand’ Light Combat Helicopter (LCH), further expanding India’s indigenous helicopter production ecosystem. Under the agreements, Bharat Earth Movers Limited (BEML) and Adani Defence will manufacture 48 and 42 fuselage structures, respectively. HAL has augmented the capacity and already commenced production of the 156 Prachand LCHs ordered for the Indian Armed Forces at its new helicopter manufacturing facility in Tumakuru, Karnataka.

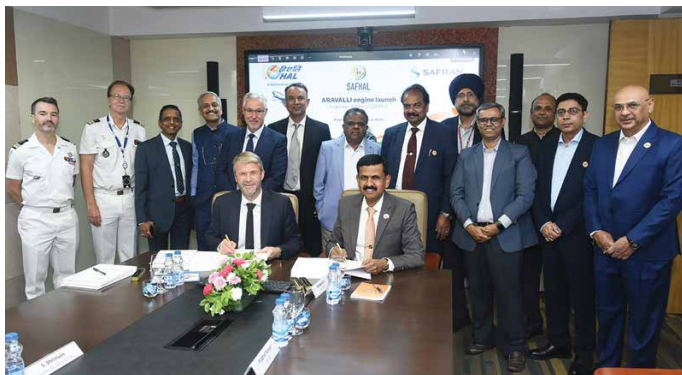


HAL and Safran sign contract with SAFHAL

Hindustan Aeronautics Limited (HAL) and Safran Helicopter Engines have signed a contract with SAFHAL Helicopter Engines Pvt Ltd (SAFHAL) for the design, development, manufacture, supply and lifecycle support of a new generation high power helicopter engine in the 3,500 to 4,000 shp power class, named “Aravalli”. Mr. Ravi K, CMD, HAL, stated, “The signing of this contract marks a significant step forward in India’s pursuit of

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self-reliance in aero-engine technologies. Through this collaborative programme with SAFHAL and Safran Helicopter Engines, we are creating a strong foundation for powering next generation Indian helicopter platforms. The Aravalli engine programme will not only support the operational requirements of the IMRH and DBMRH but will also contribute meaningfully to the development of a robust domestic aerospace industrial ecosystem.”



Historic first in India-UK defence cooperation

On 11 September 2026, three Indian Air Force Qualified Flying Instructors (QFIs) joined RAF Valley, Wales, to instruct Royal Air Force pilots — marking the first deployment of Indian QFIs to the UK. “A landmark step in strengthening our shared commitment to professional excellence, interoperability and enduring India-UK ties”, stated the IAF.



Samtel HAL Display Systems facility inaugurated

Samtel HAL Display Systems Limited (SHDS), a joint venture between Samtel Avionics and Hindustan Aeronautics Limited (HAL), on 27 August 2026, inaugurated its new facility at Udyog Vihar, Phase IV, Gurugram. The facility was formally opened by Mr. Ravi K, Chairman & Managing Director of HAL. SHDS was established to address avionics requirements – including test benches and systems – across HAL’s fixed and rotary wing platforms. The joint venture holds the unique distinction of being India’s first public-private partnership in the defence avionics sector to indigenously design, qualify and serially produce a multifunction display (MFD) for induction on a fighter aircraft.



KSSL partners with FN Herstal

Kalyani Strategic Systems Ltd. (KSSL), a wholly owned subsidiary of Bharat Forge Limited, and FN Herstal, a wholly owned subsidiary of FN Browning Group, have signed a Memorandum of Understanding to pursue local manufacturing and industrial cooperation in support of India’s defence requirements. Under the MoU, KSSL and FN Herstal will evaluate the establishment of a dedicated production centre in India and a Strategic Alliance/Joint Venture covering a range of FN Herstal defence solutions for the Indian market, spanning small arms, integrated weapon systems and counter-unmanned aerial system (C-UAS) solutions.



Thales and KSSL in alliance for 70 mm rocket systems

During the Belgian state visit to India, Thales and Kalyani Strategic Systems Limited (KSSL) signed a Strategic Alliance Agreement to explore collaboration on both the unguided and laser guided variants of Thales' 70 mm rocket systems, which are already in use by the Indian Armed Forces. As part of this collaboration, Thales will leverage its long standing partnership with India and contribute its global expertise in 2.75 inch/70 mm rockets and launchers developed in Belgium, while KSSL will utilise its local manufacturing and testing facilities to support production and integration of components from Thales' supply chain.



Strategic partnership for unmanned mine countermeasure solutions

Spry Technocon Private Limited, an Indian deep-tech Startup focused on maritime and underwater technologies, announced a strategic partnership with Teledyne Marine, Klein Marine Systems, and VideoRay, an AV compay to jointly address emerging opportunities in advanced Unmanned Mine Countermeasure (MCM) Systems for the Indian Navy. The collaboration brings together capabilities in underwater sensing, imaging and remotely operated systems with indigenous engineering, integration, and life cycle support capabilities in India. The partnership aims to offer a comprehensive and modular Unmanned MCM Suite, supporting the Indian Navy's future Mine

Countermeasure Vessel (MCMV) and autonomous mine warfare requirements.



Tata Boeing Aerospace delivers 400 "Made in India" Apache fuselages

Tata Boeing Aerospace Limited (TBAL), a joint venture between Boeing and Tata Advanced Systems Limited (TASL), has successfully rolled out the 400th fuselage for the AH-64E Apache from its 52,000 sq.m. facility at Hyderabad. These fuselages are manufactured in India and integrated into final aircraft supplied worldwide, including to the US Army and the six Apaches delivered to the Indian Army in 2025. The Indian Air Force operates a fleet of 22 AH-64E Apaches.



Bharat Forge and Flying Whales in MoU

Bharat Forge Limited, through its Aerospace Division, has signed a Memorandum of Understanding with Flying Whales, a French-Canadian global pioneer in heavy-lift airship technology, to jointly develop, manufacture and field, advanced airships for India's defence and strategic



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operational requirements. At the core of the collaboration is the LCA60T platform—Flying Whales next generation heavylift airship capable of transporting up to 60 tonnes of cargo with vertical take-off and landing capability, minimal ground infrastructure requirements, and hybrid electric propulsion.

Airbus A320 fuselage skin contract for Mahindra Aerostructures

Airbus has awarded a contract for the manufacturing of the A320 aircraft fuselage skins to Mahindra Aerostructures. Under the contract, Mahindra Aerostructures will manufacture and supply fuselage skins for Sections 18 and 19, the rear fuselage and tail sections of the Airbus A320neo Family aircraft, from its facility in Bengaluru to Airbus Aerostructures' manufacturing facility in Augsburg, Germany. The scope includes the manufacture of eight fuselage skins for Section 18 and three fuselage skins for Section 19 of the aircraft.



Sigma Advanced Systems in export order

Sigma Advanced Systems Limited has secured a USD 104.9 million export order from a North American customer for the manufacture and supply of 147,000 units of 155mm base bleed artillery shell bodies which are in massive demand worldwide. The order will be executed in the next 6 to 12 months. The programme involves manufacturing of precision engineered artillery projectile casings designed for integration into extended range ammunition systems.



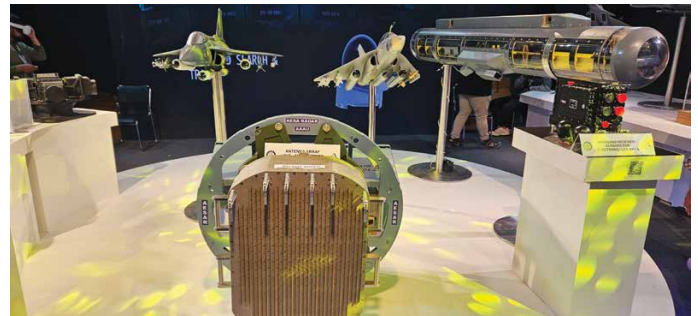
D-Propulse moves forward

Defence propulsion startup D-Propulse has successfully demonstrated India's first indigenous 5 kN air breathing Rotating Detonation Engine (RDE) integrated with an aerospike nozzle, marking a significant milestone in the country's advanced propulsion capabilities. Conducted at a DRDO government test facility, the hot fire demonstration achieved stable 5 kN thrust, validating the technology at Technology Readiness Level (TRL)-5, which signifies validation in a relevant operational environment. The TRL-5 milestone positions the indigenous engine for future applications in cruise missiles, target drones and high speed UAVs.



AMP order for Uttam AESA AAUs

Astra Microwave Products has secured its largest ever contract 122 AAUs for the Uttam AESA Radar programme for LCA Mk1A. "A proud milestone for Team Astra and another step towards strengthening India's defence self-reliance", stated officials.

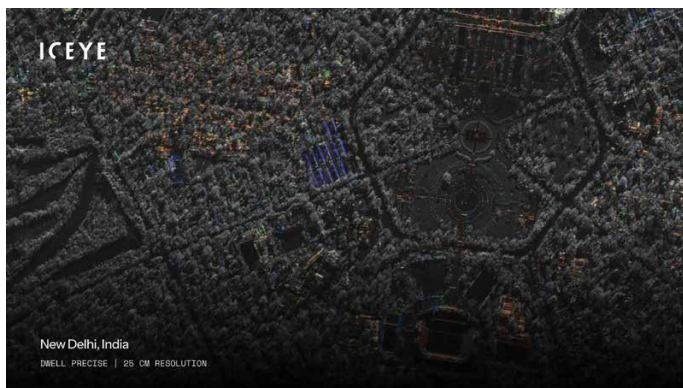


ICEYE establishes Indian entity

ICEYE, the world leader in sovereign intelligence from space, has announced the formal establishment of ICEYE India, operating from New Delhi. The establishment of ICEYE India comes as the country marked National Space Day in August 2026, highlighting the growing strategic importance of space based capabilities to India's national security, resilience and technology ambitions. ICEYE's expanding presence in India reflects the increasing relevance of advanced Earth observation and sovereign

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intelligence capabilities to the country's evolving space and defence ecosystem.



IG Defence and KAL drone

As geopolitical developments across the Gulf continue to reshape global defence priorities, demand for long range autonomous strike systems is accelerating. Against this backdrop, IG Defence is positioning KAL, India's indigenous Shahed class long range one way attack drone, for international export opportunities, subject to applicable Government of India approvals.

Designed and developed in India, KAL is the country's first indigenous 1,000 km class drone, engineered for deep penetration missions against high value strategic targets.



Sagar Defence in license for unmanned sea drones



India's Sagar Defence Engineering Limited, a vertically integrated deep-tech startup has been granted an industrial license for the manufacturing of "surface and underwater vessels of war". The license enables the company, subject to applicable regulatory approvals and license conditions, to undertake activities relating to the design, manufacture, construction, integration, assembly, testing and supply of specified naval defence platforms and associated systems.

Avantel secures contract from DRDO

Avantel Limited, a provider of technology solutions for the defence and communication sectors, has secured a contract worth Rs. 117.88 crore from the Defence Electronics Applications Laboratory (DEAL), Defence Research and Development Organisation (DRDO), for the development, installation and commissioning of a Ground Segment Hub for voice and data communication using an Indian geostationary satellite.

Indian Navy commissions INS Mahendragiri

The Indian Navy inducted the indigenously built advanced stealth frigate 'INS Mahendragiri' into its Eastern Fleet during a ceremony presided over by Raksha Mantri Shri Rajnath Singh at Visakhapatnam, Andhra Pradesh on 11 July 2026. 'INS Mahendragiri' is the sixth Project 17A indigenous stealth frigate to be inducted into the Indian Navy in a span of just 1.5 years. The first ship of the series 'INS Nilgiri' was commissioned in January 2025, followed by 'INS Udaygiri' and 'INS Himgiri' in August, 'INS Taragiri' in April this year and 'INS Dunagiri' in August.



Rolls-Royce powers INS Mahendragiri



Rolls–Royce, on 14 July 2026, announced that four mtu 12V 396 TE54 generator sets had been installed on INS Mahendragiri, the sixth indigenous Nilgiri class stealth frigate commissioned by the Indian Navy. INS Mahendragiri, designed by the Indian Navy's Warship Design Bureau, features over 75% indigenous content, advanced stealth technology, and modern weapons and sensors. The ship is equipped with four Rolls–Royce's mtu 12V 396 TE54 generator sets, each providing 1 MW of electrical power to "support complex operational requirements and ensure high mission availability".

Indian Navy commissions ASW–SWC Malvan

The Indian Navy commissioned Malvan, the second of the Mahe class Anti–Submarine Warfare Shallow Water Craft (ASW–SWC) on 22 July 2026. Built at Cochin Shipyard Limited (CSL), Kochi, Malvan epitomises "India's Aatmanirbhar Bharat vision in modern naval shipbuilding and design". With over 80 percent indigenous content, the ship "exemplifies India's growing mastery in warship design, construction and integration".



Launch of Machilipatnam, 7th of Mahe class ASW SWC

Machilipatnam (BY 529), the seventh of eight Anti–Submarine Warfare Shallow Water Craft (ASW SWC), being built by Cochin Shipyard Limited (CSL) for the Indian Navy, was launched on 29 July 2026. The ship is equipped for Underwater Surveillance, Anti–Submarine Warfare (ASW) operations, and Low Intensity Maritime Operations (LIMO), along with Mine Warfare capability.



Delivery of Mangrol – 3rd ASW SWC

Mangrol', the third Anti–Submarine Warfare Shallow Water Craft built by Cochin Shipyard Limited (CSL), Kochi, was delivered to Indian Navy on 21 Aug 2026. The ship comprises of over 80 percent indigenous content and is equipped for underwater surveillance, Anti–Submarine Warfare (ASW) operations in coastal waters, Low–Intensity Maritime Operations (LIMO), along with mine warfare capabilities. The ship is propelled by waterjets and equipped with state-of-the-art torpedoes, anti–submarine rockets, along with advanced radars and sonars.



Launch of DSC A24 (Yard 329)

DSC A24, the fifth ship of five Diving Support Craft (DSC) Project, was launched on 1 August 2026 at Titagarh, Kolkata (WB) by Mrs Kamal Singh in presence of Vice Admiral Gurcharan Singh, Chief of Personnel. The construction of Diving Support Craft is being undertaken by TRSL, Kolkata. Featuring a catamaran hull form and an approximate displacement in range of 300 to 400 tons, these ships offer superior stability, enhanced deck area and improved sea–keeping characteristics, which make them suitable for undertaking diving operations.

IN commissions 2nd DSV 'Nipun'

The Indian Navy commissioned Nipun, the second Diving Support Vessel (DSV) of the Nistar class, on 31 August 2026 at Naval Dockyard, Mumbai. The induction of the specialised vessel marked an important addition to the Navy's deep sea diving and underwater support



AEROSPACE IN INDIA

capabilities and herald the beginning of a new chapter in the ship's journey from construction to operational service. Nipun is a purpose built platform designed to support a wide spectrum of diving and underwater operations.

Launch of NGOPV Shruti

Yard 3037 (Shruti), Next Generation Offshore Patrol Vessel (NGOPV), was launched at GRSE, Kolkata on 11 August 2026 by Mrs Manika Sadhu, in the presence of Vice Admiral Sanjay Sadhu, Controller of Warship Production & Acquisition. The construction of NGOPVs is concurrently being undertaken at two shipyards (GSL, Goa and GRSE, Kolkata). These indigenously designed and built ships will augment the existing OPVs/NOPVs for multi domain operations, such as maritime surveillance, search and rescue, protection of offshore assets, HADR and anti-piracy missions.

GSL hands over ICGS Ajit

Goa Shipyard Limited has handed over ICGS Ajit (Yard 1277), a Fast Patrol Vessel (FPV), to the Indian Coast Guard on 25 August 2026. The 51.43 metre long and 8 metre wide vessel has a displacement of 330 tonnes at a draught of 2.5 metres. It is powered by twin marine diesel engines driving controllable pitch propellers (CPP), a first-of-its-kind feature in this class of FPV, providing improved propulsion efficiency and operational performance.

Delivery of Samarthak

Samarthak, the first Multi-Purpose Vessel (MPV), built by Larsen & Toubro Ltd. (L&T), Kattupalli, was delivered to the Indian Navy on 27 August 2026. The ship comprises over 75 percent indigenous content and has been conceived as a versatile trial and evaluation platform. Further, the ship is engineered to perform maritime surveillance and reconnaissance, offshore patrolling and support Humanitarian Assistance and Disaster Relief operations, when required.



IndiGo and CFM sign MoU for over 1,000 CFM engines

IndiGo announced it has signed an MoU with CFM International for an order of 1,000+ LEAP-1A engines to power 510 Airbus A320neo Family aircraft. This will

be the largest single order ever placed for LEAP engines and a record for CFM International. The MoU also includes CFM's extensive support in establishing IndiGo's upcoming engine MRO facility (maintenance, repair and overhaul) and support IndiGo's rapidly growing fleet through long term material services agreement, including supply of spare parts, ensuring high dispatch reliability, predictable costs and support as the airline further scales its operations.



IndiGo selects Honeywell avionics/APUs for 810 new Airbus aircraft

Honeywell Aerospace has announced that IndiGo had selected Honeywell Aerospace's flagship avionics and power systems for its record breaking order of 810 new Airbus A320neo family aircraft. This agreement represents the largest new aircraft selectable equipment win in Honeywell Aerospace history, accelerating the company's expansion. Alongside the new equipment, Honeywell

AEROSPACE IN INDIA

Aerospace will deliver comprehensive aftermarket support to ensure long term reliability and efficiency.



Loft Dynamics brings VR pilot training with Indocopters

Loft Dynamics, involved in virtual reality (VR) pilot training, has announced that Indocopters Private Limited will install the first Loft Dynamics Airbus H125 TXi VR full motion simulator in India. The installation will create South Asia's first dedicated H125 VR training site, expanding pilot training capacity across the region. The installation also comes as Airbus Helicopters and Tata Advanced Systems begin producing the H125 in India at the country's first private sector helicopter final assembly line in Vemagal, Karnataka.



Air India, SkyDrive and Suzuki sign MoU



Air India, SkyDrive Inc, a company engaged in the development, manufacture and sales of eVTOL aircraft, and Suzuki Motor Corporation have signed a memorandum of understanding (MoU) to conduct a joint feasibility study on the use of eVTOL aircraft for medical air logistics in India. "By combining SkyDrive's eVTOL technology, Air India's operational expertise and Suzuki's India market insight, the three companies will take on the challenge of realising last mile emergency medical logistics, contributing to the advancement of India's medical infrastructure".

Hensoldt integrates avionics suite into India's first electric air taxi

The ePlane Company (Ubify Technologies), India's leading developer of electric vertical take-off and landing (eVTOL) aircraft, has placed a firm order with Hensoldt for its flagship "e200X". For Hensoldt, the order confirms the shift from joint development to series maturity, moving the avionics into firm procurement. The "e200X" now enters an extensive ground test campaign ahead of flight trials and type certification with India's Directorate General of Civil Aviation (DGCA).



FLY91 places order for 40 ATR 72-600s

FLY91 and ATR announced the purchase of 40 ATR 72-600 aircraft for around \$1 billion, marking the largest ATR firm order in almost a decade, and the largest ever by a regional airline. Deliveries are scheduled from 2027 to 2032. The landmark agreement lifts ATR's 2026 order intake to 54 aircraft, already surpassing the company's total net orders for the whole of 2025, with more than three months still remaining in the year. Less than three years after launching operations, pure regional player FLY91 is set to grow its fleet from six aircraft to 60 in the next five years.



Airbus selects Indamer Technics to set up radome repair facility

Airbus has selected Indamer Technics to set up South Asia region's first comprehensive radome repair facility

in Nagpur, India, strengthening its regional aftermarket support. Under this service agreement, Airbus has designated Indamer Technics as an authorised facility for the extensive repair, storage and exchange of the Airbus A320, A330, A350 and A380 aircraft radomes in the region.

APPOINTMENTS

Air Marshal Tejpal Singh is DCAS, IAF

Air Marshal Tejpal Singh assumed the appointment of Deputy Chief of the Air Staff on 1 August 2026. Commissioned on 16 June 1990 as a fighter pilot, the Air Marshal has over 3500 hours of flying experience. He is a Cat A Qualified Flying Instructor and an Experimental Test Pilot. The Air Mshl has held key operational, command and staff appointments in the Indian Air Force. In recognition of his distinguished service, the Air Marshal was awarded Vayu Sena Medal in January 2011 and Ati Vishisht Seva Medal in January 2021 by the President of India.



Air Marshal Sandeep Thareja appointed as next DGAFMS



Medical College (AFMC), Pune, Air Marshal Sandeep

Government has appointed Air Marshal Sandeep Thareja, SM, VSM & Bar, presently serving as the Director General Medical Services (Air), as the Director General Armed Forces Medical Services (DGAFMS). An alumnus of the Armed Forces

Vice Admiral AN Pramod is DCNS, Indian Navy

Vice Admiral AN Pramod assumed charge as the Deputy Chief of Naval Staff on 1 August 2026. An alumnus of the 38th Integrated Cadet Course, Naval Academy, Goa, Vice Admiral AN Pramod was commissioned into the Indian Navy on 1 July 1990. The Flag Officer is a CAT 'A' Sea King Air Operations



Officer and a Communication and Electronic Warfare Specialist. He is an alumnus of the Defence Services Staff College, Wellington, and the Naval Higher Command Course at the Naval War College, Goa.

In a career spanning over 36 years, the Flag Officer has held a wide range of command, operational, instructional, and staff appointments, both afloat and ashore. His key afloat appointments include Executive Officer of INS Rajput, a guided missile destroyer, and command of INS Abhay, an anti-submarine warfare patrol vessel, INS Shardul, a landing ship tank (Large) and INS Satpura, a guided missile frigate. The Flag Officer participated in Operation Vijay in 1999 and Operation Parakram in 2001.

Thareja was commissioned in December 1986. Over a distinguished career spanning nearly four decades, the officer has made significant contributions across the clinical, academic, operational and administrative domains of the AFMS. He has held several prestigious appointments including Senior Consultant (Medicine) at the Office of the DGAFMS, Commandant of Military Hospital Pathankot, Commandant of Command Hospital Lucknow, Director & Commandant of AFMC, Pune, in addition to Director General Medical Services (Air).

APPOINTMENTS

Vice Admiral Manish Chadha assumes charge as DGNO

Vice Admiral Manish Chadha assumed charge as the Director General Naval Operations on 3 August 2026. An alumnus of the 78th course of the National Defence Academy, Khadakwasla, Vice Admiral Manish Chadha was commissioned into the Indian Navy on 1 July 1991. The Flag Officer is a Communication and Electronic Warfare Specialist. He is an alumnus of the 61st Defence Services Staff College, Wellington, and completed the Higher Command Course at the National Defence University, Washington, USA. In a distinguished career spanning over 35 years, the Flag Officer has held a wide range of command, operational, instructional and staff appointments, both afloat and ashore. His key afloat appointments include command of Coast Guard Interceptor Boat CGS-05 and Indian Naval Ships Veer, Kirpan and Mysore.



Air Marshal KAA Sanjeeb takes over as Air Officer-in-Charge Maintenance

Air Marshal KAA Sanjeeb assumed the charge of Air Officer-in-Charge Maintenance of the Indian Air Force (IAF) on 1 September 2026. The Air Officer was



commissioned in the IAF on 3 September 1988 in the Aeronautical Engineering (Mechanical Branch). He has extensive field experience on Il-76, Airborne Warning and Control System (AWACS) and Boeing 737-200 aircraft. He was the Lead Engineer and Team leader of the Air HQ Project Management Team for induction of the first Il-78 Flight Refueller Aircraft (FRA) into IAF in 2003. In his distinguished career spanning more than three decades, the Air Officer has held various important field and staff appointments.

Air Marshal Vivek Hande takes over as DGMS (Air)

Air Marshal Vivek Hande took over as the Director General Medical Services (Air) on 1 September 2026 on permanent secondment to the Indian Air Force. An alumnus of Armed Forces Medical College, Pune; Tata Memorial Hospital, Mumbai and National Defence College, New Delhi, he was commissioned in December 1988. He is a gastroenterologist of national repute and has tenanted many specialist and administrative appointments in his illustrious career.

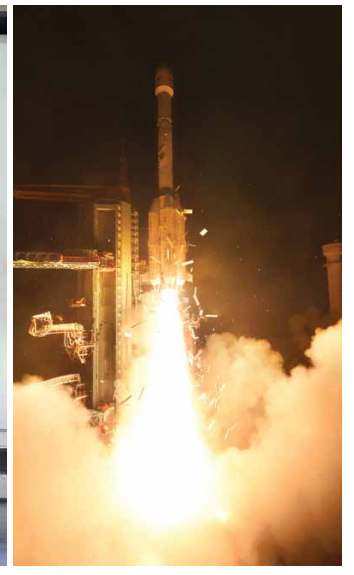
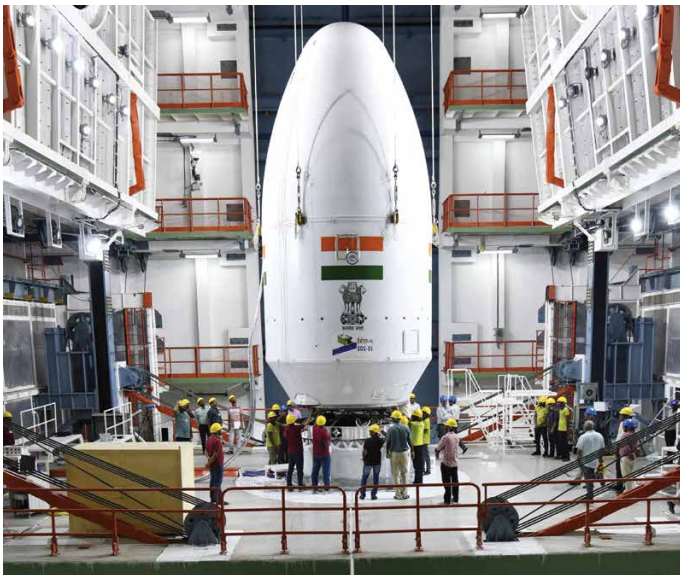
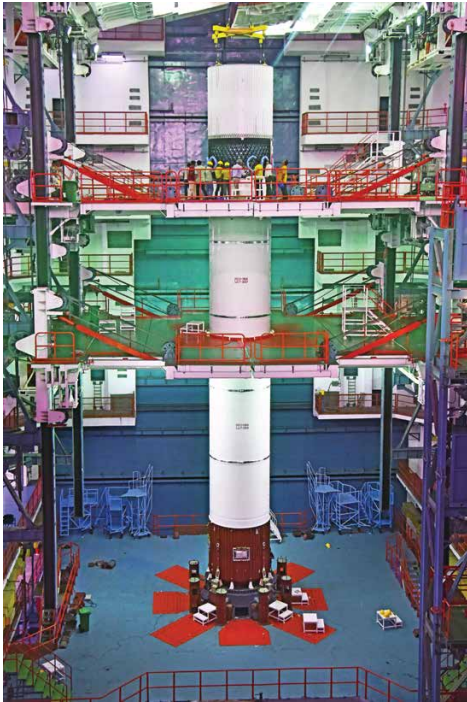


Surgeon Vice Admiral Dilip Raghavan is DG Hospital Services (AF)

Surgeon Vice Admiral Dilip Raghavan assumed the appointment of Director General Hospital Services (Armed Forces) on 1 September 2026. Born and educated in Chennai and Mumbai, Surg Vice Admiral Dilip Raghavan joined the Armed Forces Medical College (AFMC), Pune in 1985 and completed his MBBS in 1989.



Mission success for ISRO's GSLV-F17



ISRO's GSLV-F17 successfully accomplished its mission on 4 September 2026 placing EOS-05 into the intended orbit. GSLV-F17 is the 19th flight of India's Geosynchronous Satellite Launch Vehicle (GSLV) and the configuration of GSLV-F17 payload fairing is 4 m dia Ogive (composite) version. The GSLV-F17 vehicle has placed EOS-05 satellite into a Sub-Geosynchronous Transfer Orbit (Sub- GTO). Launch took place from the Second Launch Pad (SLP) at Satish Dhawan Space Centre, SHAR. EOS-05 is a state-of-the-art Earth observation spacecraft and is India's first ever imaging satellite from geosynchronous orbit. ➡

Text and images: ISRO

Skyroot's Vikram-1 succeeds in its maiden flight

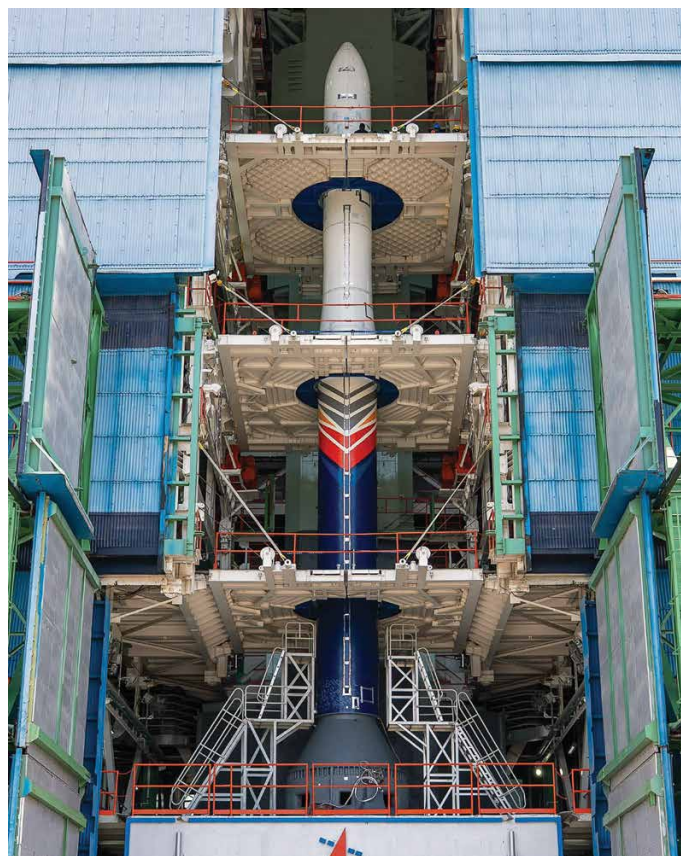


On 18 July 2026, Skyroot Aerospace made history, becoming the first private company to fly an Indian built rocket to orbit on its maiden attempt. Mission Aagaman, meaning 'arrival', lifted off from the First Launch Pad at the Satish Dhawan Space Centre, Sriharikota, and Vikram-1 flew a nominal profile to reach its target Low Earth Orbit of approximately 450 km at a 60 degree inclination, where it successfully deployed its payloads. In doing so, Skyroot joins the exclusive group of companies able to reach orbit.

In a moment the team called the honour of a lifetime, Prime Minister Narendra Modi personally called to congratulate the Skyroot team on Vikram-1's success. He has also sent a handwritten postcard inscribed with "Vande Mataram," on the Vikram-1 to space. "I extend my heartfelt congratulations to Team Skyroot on the successful accomplishment of the Vikram-1 mission. This achievement is the outcome of years of innovation, perseverance and engineering excellence, and reflects the growing maturity of India's private space sector. It is encouraging to see Indian industry translating technological capability into launch capability, complementing our national space programme. ISRO and IN-SPACe remains committed to working closely with industry partners to build a vibrant, globally competitive space ecosystem that advances India's space ambitions", stated the Prime Minister.

Pawan Kumar Chandana, Co-founder & CEO, Skyroot Aerospace stated, "During the flight, Vikram-1 completed every principal mission milestone, validating the performance of its propulsion, avionics, and guidance, navigation and control systems under true operational conditions. The vehicle deployed its customer payloads and generated a wealth of in-flight data that will directly inform future Vikram missions and the continued evolution of Skyroot's launch programme. Mission Aagaman is

the culmination of years of engineering, rigorous testing and an unwavering commitment to solving some of the hardest problems in Space. Every milestone today reflects the dedication of hundreds of engineers, technicians and mission specialists who believed in pushing the boundaries of what was possible. We are deeply grateful to ISRO, to IN-SPACe, and to every customer, investor





Kumar Chandana and Naga Bharath Daka, the company aims to democratise space access by designing, developing and launching a family of launch vehicles. Skyroot made history in 2022 with the launch of Vikram-S, India's first privately built rocket to reach space. In July 2026, the company successfully flew the maiden flight of Vikram-1, its orbital launch vehicle, marking India's first private orbital launch.

Vikram-1 is designed to deploy small satellites of up to 350 kg to low Earth orbit. Built with an all carbon composite structure and powered by in-

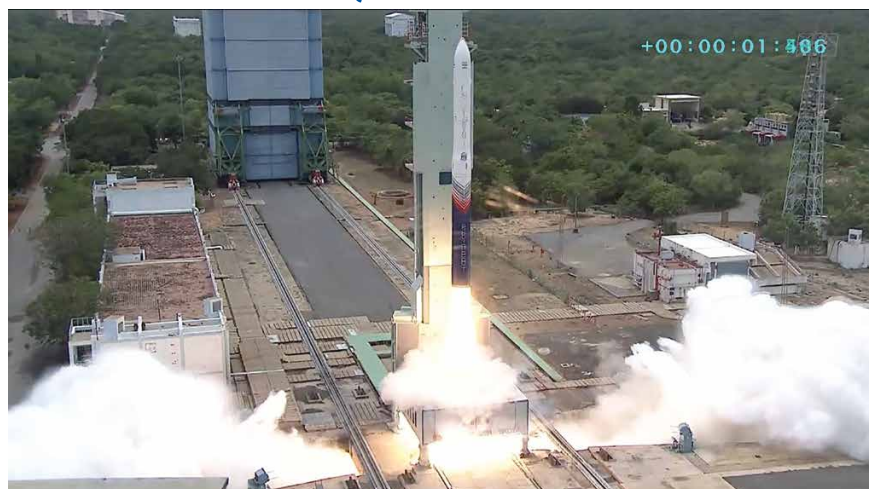
house developed solid and liquid propulsion systems, including 3D-printed engines, the rocket is engineered for rapid manufacturing and high launch cadence. Skyroot's technology stack spans carbon composite rocket structure, and solid (Kalam series), liquid (Raman series), and cryogenic (Dhawan series) propulsion systems, all developed in-house at its Max-Q (55,000 sq. ft.), Infinity (200,000 sq. ft.) campuses. Skyroot recently opened a campus in Aero Towers (10,000 sq. ft.) in Hyderabad, Telangana.

and partner who stood by us. Even as we celebrate, we are already applying today's learnings to the next chapter of the Vikram series and to building a world class launch capability from India, for the world."

On this flight, Vikram-1 carried technology demonstration payloads from Grahaa Space, Cosmoserve and DCubed, alongside Skyroot's own SCOPE satellite, together with Cosmos Diamonds' artwork 'Cosmic Bloom' and a micro-art piece — a small, human reminder of what access to space can carry. The success of Vikram-1 establishes the foundation for Skyroot's commercial launch programme and reinforces India's emergence as a major force in the global space economy. The company's roadmap includes Vikram-2, capable of carrying up to 1,000 kg to Low Earth Orbit, with its maiden flight targeted for 2027, and a fully reusable launch vehicle, with both booster and upper stage engineered for recovery and reuse, designed to lower the cost of reaching orbit still further.

Skyroot Aerospace is a private space launch company, building the Vikram-series of launch vehicles to provide on-demand and dedicated access to space for small satellite operators worldwide. Founded by Pawan

house developed solid and liquid propulsion systems, including 3D-printed engines, the rocket is engineered for rapid manufacturing and high launch cadence. Skyroot's technology stack spans carbon composite rocket structure, and solid (Kalam series), liquid (Raman series), and cryogenic (Dhawan series) propulsion systems, all developed in-house at its Max-Q (55,000 sq. ft.), Infinity (200,000 sq. ft.) campuses. Skyroot recently opened a campus in Aero Towers (10,000 sq. ft.) in Hyderabad, Telangana.



Javelin JJV and TASL for missile co-production in India



Tata Advanced Systems Limited and the Javelin Joint Venture (JJV), a partnership between Raytheon, an RTX business, and Lockheed Martin, on 31 August 2026, entered into an MoU for the co-production of the Javelin All Up Round (AUR) in India.

Tata Advanced Systems has been selected by JJV as the prime partner for future in-country co-production efforts following an evaluation of multiple companies based on capability and expertise. Under the industry MoU, Tata Advanced Systems Limited and the JJV will explore the establishment of a final assembly and integration facility for the Javelin AUR and component production capabilities in India. This agreement will support future production of

the Javelin system while providing unique opportunities for Indian industry and strengthen regional stability for the Indo-Pacific.

The Javelin co-production effort will be beneficial for the India and US partnership through creating, building and developing a strong defence workforce in India while sustaining American jobs in the domestic supply chain through multiyear production of sub-assembly kits at Lockheed Martin's Troy, Ala, facility and guidance electronics units (GEU) at Raytheon's Tucson, Ariz, facility. The sub-assembly kits and GEUs will be shipped to India for final assembly and integration.



Why it matters

The establishment of in-country co-production will strengthen India's defence industrial base by bringing final assembly and integration of the Javelin AUR to Indian facilities and suppliers, creating high-tech jobs, advancing local manufacturing expertise and supporting global supply chain resiliency due to increased worldwide demand. This agreement will also enhance regional security in the Indo-Pacific by ensuring a reliable, locally sourced supply of the proven Javelin weapon system, supporting faster fielding and sustained readiness for partner nations in the region.

This partnership demonstrates deeper strategic collaboration between the JJV and Indian partners, reinforcing interoperability and joint defence initiatives that align with broader Indo-Pacific partnership objectives. The larger volume from co-production can help the US government achieve economic order quantities, improving affordability and creating measurable cost-saving opportunities for programmes that support JJV production.

Expert perspectives

"Partnering with Tata Advanced Systems Limited to establish a dedicated Javelin final assembly and integration facility in India is a pivotal step in ensuring a resilient, supply chain for this critical anti-tank weapon system," stated Rich Liccion, vice president, JJV and programme director, Lockheed Martin Javelin. "This collaboration not

only expands India's high-tech manufacturing capabilities but also reinforces a stronger, more stable security architecture across the Indo-Pacific region, enabling our partners around the world to respond swiftly to emerging threats."

"This agreement with Tata Advanced Systems Limited establishes a foundation to strengthen the global supply chain for Javelin," stated Jenna Hunt Frazier, JJV president and Javelin programme director at Raytheon. "It supports faster fielding of the proven Javelin weapon system and sustained readiness for partner nations."

"We are pleased to partner with the Javelin Joint Venture on this important next step in our long-standing relationship with Lockheed Martin and Raytheon," stated Sukaran Singh, Chief Executive Officer & Managing Director, Tata Advanced Systems Limited. "This initiative brings critical assembly expertise and knowledge transfer into India's defence industrial ecosystem, while strengthening self-reliance. Local assembly of the Javelin All Up Round will enhance operational readiness and ensure timely access to proven, combat ready capability for the Indian Armed Forces."

Javelin is developed and produced by the JJV between Raytheon, in Tucson, Arizona, and Lockheed Martin in Orlando, Florida. To date, the JJV has produced more than 55,000 Javelin missiles and more than 12,000 reusable Command Launch Units. ➡

Text courtesy: Lockheed Martin



US Ambassador visits TLMAL, C-130J Empennage Production Line



On 24 August 2026, US Ambassador to India, Sergio Gor, visited the Tata Lockheed Martin Aerostructures Limited (TLMAL) facility in Hyderabad, Telangana, highlighting the commitment to industrial development and reinforcing the deepening strategic partnership and shared commitment to aerospace and defence industrial cooperation in India.

The proven partnership between Tata Advanced Systems and Lockheed Martin is stronger than ever and enters a new phase as the team works to fulfill the recently released Medium Transport Aircraft requirement and continues to grow India's aerospace and defence ecosystem.

During the visit, the Ambassador toured the production line that manufactures empennages for the C-130J Super Hercules. The Hyderabad plant is emblematic of the critical role Indian industry plays in supporting the world's most

versatile and proven airlifter. The joint venture reflects an existing, established, and proven ability to produce and scale production to meet MTA competition requirements.

The visit highlighted the longstanding collaboration between Lockheed Martin and Tata Advanced Systems Limited and the companies' shared commitment to expanding advanced aerospace manufacturing capabilities in India in support of the country's defence modernisation and "Make in India" initiatives.

"The decades long economic partnership between the United States and India continues to grow stronger through innovation, shared security interests, and economic cooperation," stated Sergio Gor, US Ambassador to India. "The production in India of critical structures for the C-130J, a platform operated by both our nations, is a strong example of the growing industrial and defence cooperation





between the United States and India. Partnerships like these support high skilled jobs, strengthen resilient supply chains, and advance our shared vision for a free, open, and secure Indo-Pacific.”

Sukaran Singh, Chief Executive Officer and Managing Director, Tata Advanced Systems Limited stated, “Tata Advanced Systems’ partnership with Lockheed Martin has proven over time to supply world class aerostructures for their key programmes including the C-130J. This partnership has now extended to MRO, which will be operational soon. Additionally, both parties are expanding cooperation on full platforms for Make in India, should we get the opportunity. Both sides will bring their existing world class capabilities to support the MoD.”



Photo by Alex van Noije

The Tata Advanced Systems’ MRO opening is planned for December of this year with aircraft arrival slated for Spring 2027.

“Through our collaboration with Indian industry, we have established world-class aerospace manufacturing capabilities that directly support the global network of C-130J operators,” stated Trish Pagan, vice president, Air Mobility and Maritime Missions. “We remain committed to supporting India’s aerospace vision and exploring opportunities to further expand advanced manufacturing, technology, and production capabilities in-country while delivering proven solutions worldwide. While others look to replicate, we demonstrate a proven capability and decades of results.”

Certified across 20 missions, the C-130J Super Hercules serves militaries around the globe and has become a cornerstone of tactical airlift operations, humanitarian assistance, disaster relief, and special mission operations. India’s contribution to the programme through the production of C-130J empennages reflects an existing integration of Indian industry into the global aerospace supply chain and the enduring strength of the US-India defence partnership. “We have invested significantly in our joint venture partnership for 15 plus years, and this Medium Transport Aircraft opportunity extends and strengthens an already established and proven relationship and capability,” said Pagan. “We’re excited for what’s next.”

HAL hands over 2 LCA FOC twin seat trainers & 3 HTT-40 basic trainers to IAF and 4 Dhruv NG's to PHL



Hindustan Aeronautics Limited (HAL) handed over two Light Combat Aircraft (LCA) Tejas Final Operational Clearance (FOC) Twin Seater Trainers and three HTT-40 Basic Trainers to the Indian Air Force, and four Dhruv Next Generation helicopters to Pawan Hans Limited in the presence of Raksha Mantri Rajnath Singh and Minister of Civil Aviation K Rammohan Naidu in Bengaluru, Karnataka on 18 September 2026.

Raksha Mantri highlighted HAL's expertise across aircraft manufacturing, helicopter development, overhaul, repair, maintenance and aerospace engineering, calling it a pillar in India's endeavour to build indigenous aerospace capabilities. He exhorted the DPSU to further expand its capabilities across the entire aerospace value chain, including design, development, manufacturing, certification, lifecycle support and global marketing.

Speaking on the occasion, Minister of Civil Aviation K Rammohan Naidu said that the certification and induction of the Dhruv NG into civil operations marked an important milestone for India's indigenous civil aviation ecosystem. He termed it as a reflection of the growing capability of Indian industry to develop and support advanced aerospace platforms for commercial applications.

CMD, HAL Ravi K stated that the handover of Tejas FOC twin seater trainers, HTT-40 basic trainers and Dhruv NG helicopters demonstrated HAL's ability to develop and deliver platforms for diverse civil and defence requirements. These two platforms, he added, reflected the depth of capability that HAL had built over the years and the strength of the indigenous aerospace ecosystem that supported them.

Chief of the Air Staff Air Chief Marshal AP Singh, Secretary (Defence Production) Sanjeev Kumar and Secretary, Ministry of Civil Aviation Samir Kumar Sinha attended the event.

The LCA twin seater trainers are the final two aircraft under the FOC contract. The aircraft will support the Indian Air Force's training requirements and provide pilots with an indigenous training continuum into frontline fighter operations. The Tejas Trainer retains the core



systems and combat capability of the frontline platform, enabling pilots to train on the aircraft they will eventually fly in service.

The HTT-40 (Hindustan Turbo Trainer-40) is an indigenously designed and developed basic trainer aircraft intended to meet the primary training requirements of the Defence Forces. The aircraft is built around a proven turboprop engine and is designed to provide good low speed handling characteristics and effective training for trainee pilots.

The Dhruv NG marks an important step in HAL's entry into the civil and commercial rotary wing segment. Configured for civil operations, the helicopter incorporates enhanced systems, modern avionics and a more powerful engine. It is intended for a range of applications including passenger transport, emergency medical services and offshore logistics support.



Engine news and developments in India

Reliance Industries and Rolls-Royce to develop engine for AMCA

Reliance Industries Limited and Rolls-Royce on 14 August 2026 announced their strategic intent to partner and offer capabilities for the design, development, manufacturing and delivery of a sovereign indigenous combat engine for India's Advanced Medium Combat Aircraft (AMCA) programme. As part of the partnership, Reliance and Rolls-Royce will explore the formation of a dedicated Aerospace Gas Turbine Complex that will be a centre of excellence for power and propulsion technology in India.

The partnership will offer "a compelling proposition for joint development of the AMCA engine in India, bringing together world leading technology and industrial execution capabilities". This marks a step towards realising the vision set out by the Prime Minister of India, Mr. Narendra Modi, for India's defence ecosystem to deliver an indigenous engine to power the country's fighter jet programme.

Mr. Anant Ambani, Executive Director, Reliance Industries Limited, stated, "India's strategic autonomy requires sovereign capability in critical technologies. Our intent with Rolls-Royce is to combine their world leading expertise in advanced propulsion with Reliance's technology, manufacturing, scale and execution capabilities to build an indigenous aero-engine ecosystem in India. Together, we aim to build an enduring national capability that can make India self-reliant and, over time, globally competitive in advanced propulsion technologies. This is our contribution to the Prime Minister Mr. Narendra Modi's vision of an Atmanirbhar Viksit Bharat."

Tufan Erginbilgic, CEO, Rolls-Royce plc, stated, "I welcome the opportunity to join forces with Reliance Industries, bringing together our century long heritage in advanced engineering and proven engine expertise with their

homegrown leadership in Indian industry. Together, with our existing partnerships and capabilities in India, this marks a major milestone towards building a robust, self-reliant aerospace ecosystem in the country."

"By combining Rolls-Royce's global leadership in engines with the established industrial strengths of Reliance, the Aero Gas Turbine Complex will build sovereign, end-to-end Indian capability across design, development, manufacturing, testing, production and through-life support. This will also unlock opportunities to explore wider collaborations across defence, civil aerospace, and new power and propulsion systems", stated the company.



DRDO/GTRE's expendable turbo jet engine of 350 kg thrust class

The first indigenous expendable turbo jet engine of 350 kg thrust class, designed by DRDO's Gas Turbine Research Establishment (GTRE), has been successfully developed. GTRE had identified Azad Engineering, Hyderabad as Industry partner for



the manufacturing and assembly of the engine. On 22 July 2026, the engine was successfully realised and delivered to GTRE by Azad Engineering, a landmark achievement for India's aerospace and defence ecosystem.

Paninian unveils Yantur 4.5 kN turbofan engine

Paninian India Private Limited has unveiled the Yantur 4.5 kN turbofan engine programme, believed to be India's first privately developed turbofan engine in its class. The programme represents a significant step towards establishing private sector capability in compact aerospace

propulsion for next generation autonomous systems. The Yantur engine is being developed to power Svayatt L1, Paninian's long range autonomous cruise missile platform, conceived to address the operational requirements of the Indian Ministry of Defence's Make-I programme for the Long-Range Land Attack Cruise Missile (LRLACM). It is worth noting that the same engine core could be expanded further up to 12.5 kN for powering the Svayatt CCAV platform.



Interview with Frederico Lemos, Chief Commercial Officer, Embraer Defense & Security



VAYU: *Embraer has had an active commercial and defence presence in the country, could you elaborate on how you are looking to expand on this legacy in the next few years?*

Embraer proudly joins the nation in celebrating Indian Air Force Day. We salute the courage, professionalism and operational excellence of the men and women of the Indian Air Force, who stand ready every day to protect India's skies and support the nation. Embraer has a strong legacy of collaboration in India with nearly 50 aircraft across 11 platforms operating in commercial, defence and business aviation. Our Legacy 600 jets support VIP transportation requirements for the Indian Government and Armed Forces, while the ERJ-145 platform serves as the foundation of the Indian Air Force's Netra AEW&C aircraft, developed with DRDO's Centre for Airborne Systems (CABS).

The Netra programme remains one of India's most successful examples of indigenous aerospace co-development and has demonstrated strong reliability and operational effectiveness in service.

Right now, we are focussed on the Indian Air Force's Medium Transport Aircraft (MTA) programme and we believe that the C-390 Millennium is the right strategic choice for the MTA. As one of India's most important defence acquisition programmes, the MTA must not only strengthen future airlift capability but also advance domestic aerospace manufacturing, technology development, and self-reliance. We believe our partnership and proposal with Mahindra is the right strategic choice to meet India's needs.

VAYU: *The Indian Air Force's Netra AEW&C aircraft which is on the Embraer ERJ-145 platform remains a flagship defence project for Embraer, will you be looking to expand the fleet in India?*

Embraer is honoured to have played a part in building the Netra AEW&C based on the Embraer ERJ-145 platform together with the Defence Research and Development Organisation (DRDO) through the Centre for Air Borne Systems (CABS). The AEW&C Mk.1 was among the early modern, collaborative and jointly developed projects in the defence and aerospace domain. A technically demanding programme; it involved structural modification of a baseline commercial aircraft to integrate radar and other mission systems. The platform was also equipped with aerial refuelling capability and a self-protection suite (SPS).

We are proud of the successful development of this system and the three Netra AEW&C aircraft in service have delivered proven performance and reliability in real time operations. The user feedback has been encouraging, and of course, we remain ready to support the Indian Air Force in any possible future requirements.



VAYU: *Why do you believe the C-390 Millennium is the right solution for the Indian Air Force's MTA requirement?*

Designed and built in the 21st century, the C-390 is the most modern military transport aircraft in its class. It carries more payload than comparable medium lift aircraft while flying higher, faster and farther. It is well suited to India's diverse operating environment, from high altitude Himalayan airfields and remote border regions to island territories and maritime areas. With a payload

of up to 26 tonnes, multi-mission capability, full fly-by-wire avionics, operation from semi-prepared runways, mission completion rates above 99%, and mission capable rates exceeding 93%, it delivers exceptional performance while offering lower operational and life-cycle costs. Embraer's C-390 can not only replace legacy transport aircraft like the An-32 but can be the platform to standardise the IAF's medium transport fleet for the next 50+ years.

VAYU: *In the past few years, the C-390 is gaining traction with air forces worldwide. Why are air forces preferring the C-390?*

The C-390's growing international adoption is a testament to its future ready capabilities. The C-390 combines capability, reliability, versatility and interoperability on a single platform. It can perform troop and cargo transport, airdrops, medical evacuation, search and rescue, humanitarian assistance, firefighting and air-to-air refuelling missions.

Increasingly seen as the modern military transport aircraft of choice for most NATO countries looking to renew their legacy fleet, the C-390 Millennium delivers unmatched capability, reliability, versatility and performance while offering seamless interoperability. Recent orders in 2026 from the UAE and Colombia demonstrate confidence in the aircraft's performance across diverse operational environments.

For India, the expanding operator community offers the added advantages of interoperability, shared best practices and long term fleet evolution.

VAYU: *Now that the RFP is out for the MTA, what makes Embraer's industrial proposal for India different?*

As the IAF evaluates options for the MTA programme, the decision is as much about strategic value as aircraft performance. The C-390 offers both: a modern, versatile aircraft and a long term industrial partnership designed to help build India's aerospace ecosystem. A key differentiator of our strategic proposal is our partnership with the Mahindra Group and our commitment to supporting Make in India and Atmanirbhar Bharat. If selected, the programme will establish India as Embraer's second C-390 assembly line and a regional MRO hub. Together, Embraer and Mahindra envision a comprehensive aerospace ecosystem around the proposed C-390's Final Assembly Line. We have already expanded our footprint through collaborations with companies such as Hindalco



and Bharat Forge and are engaging Indian Tier-1 suppliers and MSMEs across multiple capability areas.

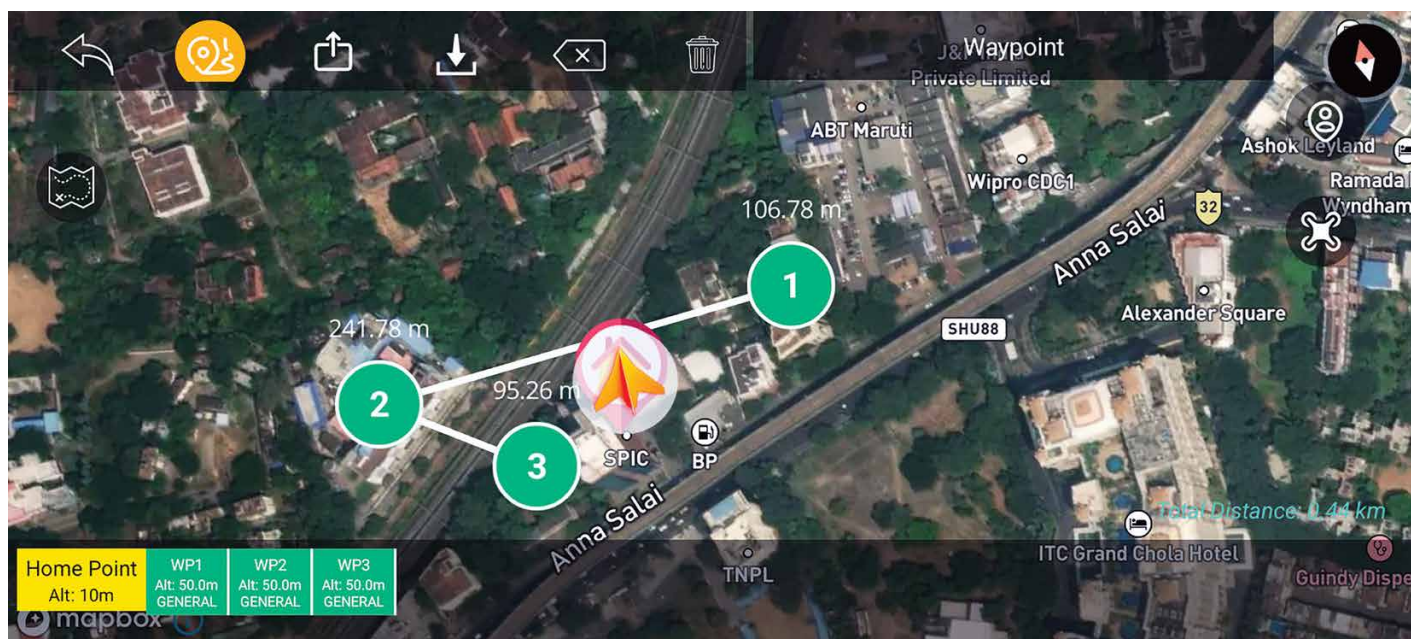
VAYU: *How much technology transfer and localisation can India expect from Embraer's proposal?*

Technology transfer is a central element of our proposal. In terms of capability, operational cost, life cycle cost, customisation, localisation and technology transfer, we believe the C-390 is the best solution for IAF's MTA programme. We are fully aligned with DAP 2020 and confident of meeting India's localisation and indigenisation requirements. India and Brazil are natural partners, and Embraer can offer a highly capable platform with significant technology partnership.

VAYU: *Beyond the MTA programme, how can Embraer support the future requirements of the Indian Armed Forces?*

With a range of modern and efficient aircraft in our portfolio, we remain open to supporting future requirements across ISR, VIP transport and other special mission platforms. Recent conflicts have highlighted the need for affordable counter-drone solutions. Our A-29 Super Tucano has expanded its mission portfolio to effectively counter unmanned aerial threats through hard-kill capabilities while maintaining low operating costs. Already proven in close air support, armed reconnaissance and training missions, the A-29 is an agile, rapidly deployable and cost-effective platform. ➡

Sovereign by Intent, Foreign by Supply Chain: The Zuppa Case for India's Drone Future



The liberalised Drone Rules of 2021 opened the skies for innovation, enterprise and new use cases across agriculture, mapping, logistics, infrastructure and security. But the policy architecture that followed did not build an indigenous manufacturing base with the same urgency. Instead, it created a powerful incentive to assemble in India while sourcing the technological heart of the drone from abroad.

This is where the roots of India's drone ecosystem's dependence on Chinese supply chains lie. Unlike the PLI schemes for white goods and mobile phones, where 4–5% incentives broadly matched extent of domestic value addition, the drone PLI offered an outsized 20% incentive despite India's weak component base. That single distortion turned policy support into a gold rush. Firms could import near complete drone kits from China, assemble them in India, and claim the mantle of domestic manufacturing. The February 2022 drone import ban deepened the problem: finished drones were blocked, but component imports remained unrestricted. The result was the rise of the 'trader with screwdriver' business model — investor backed companies built on Chinese airframes, electronics, propulsion systems, batteries and sub-assemblies, with final integration performed in India. Policy did not seed a deep manufacturing ecosystem; it entrenched an assembly economy dependent on China for its core inputs — exactly what it was structured to do like other PLI schemes but with disproportionate incentives for doing so unlike other programmes.

Add to this the lack of teeth in the implementation of the regulations and drone import ban, and you have the recipe for the perfect storm that the Indian defence forces and national security agencies woke up to during

Operation Sindoor, where tens of thousands of Indian drones were found wanting during actual combat.

The seeds of that failure had been sown years earlier, in a flawed drone PLI and drone import policy — with the Indian Army paying the price for offering the highest returns, thanks to the premium pricing its mission critical use cases commanded.

The Indian Army, for its part, had recognised the vulnerability of its drones to hacking and hijacking roughly a year before Operation Sindoor, and began work on its own cybersecurity framework after an Indian tactical drone was hacked on 23 August 2024.

The Indian Army's cybersecurity framework for drones borrows heavily from the one written for CCTV cameras. That reads like bureaucratic shorthand until you notice what the two devices have in common. Both are computers somebody else may have programmed, sitting inside a perimeter you care about.





The draft Cyber Security framework for drones was published by the Ministry of Defence in March 2025, a couple of months before Operation Sindoor, and has been in the approval process since — with Zuppa Geo Navigation Technologies, a Chennai firm, the only Indian company to have voluntarily submitted its products for testing and certification under it.

ZUPPA's cyber physical stack runs on its patented architecture, Disseminated Parallel Control Computing in Real Time, which handles planned navigation and reflexive obstacle response on parallel processors rather than in sequence. Zuppa owns the source code, the firmware and the control protocols. It designs and builds its own boards — NavGati for flight control and Drishya for vision processing — and has worked with C-DAC to run them on VEGA, India's homegrown RISC-V processor family. In Zuppa's case, sovereignty of the technology runs from the operator's screen down to the instruction set. The Army has validated the company's Ajeet Mini at altitudes above 11,000 feet, and this year Zuppa delivered more than 500 STQC certified Ajeet drones across a three month stretch. The underlying patent took close to a decade to clear.

That last figure is the most instructive one in the story. Ten years of a company's life to secure ownership of a computing architecture tells you what the design layer costs in India. It also tells you the problem is solvable — because somebody solved it. The conversation should have moved on by now, but it hasn't. While the CCTV cybersecurity framework has been in force since 1 April 2026, the equivalent for military drones — far more critical from a national security perspective — is still in the works.

Attrition is where this gets expensive. Drone heavy conflicts consume unmanned systems in the thousands per month, for the simple reason that the platform costs less than what it destroys, with cybersecurity as its most critical asset given the asymmetry it creates as a low cost missile equivalent. Against that arithmetic, 500 secure drones in three months is simultaneously a national record and a pilot batch. The gap is not a criticism of the supplier. It is the measurement nobody in the policy conversation wants to take, because a superior system that cannot be replaced at the rate it is lost will still lose to a cruder one that can.

Depth is not throughput. A firm that fabricates its own boards and runs them on cybersecurity certified silicon has proved it can build the hardest version of the product; it has not proved it can build ten thousand of them in a quarter — and those are different problems with different fixes. Scale needs PCB assembly at volume, a component ecosystem deep enough to absorb a surge



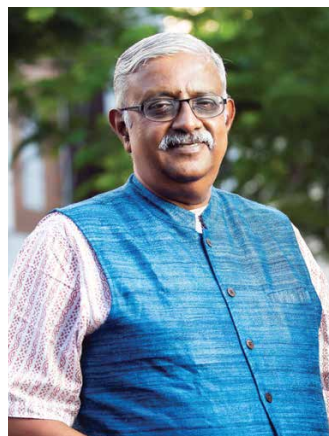
order, certification throughput that does not become the bottleneck, and steady enough demand to keep the lines warm between contracts.

The last of those is the binding constraint. India's peacetime consumption of military drones is too thin to finance the capacity that wartime consumption would demand, and no amount of PLI money fixes a volume problem by subsidising unit economics. Which is why exports stop being a revenue ambition and become an industrial necessity. The split over Chinese technology supply chains has produced a real market of governments that need drones and cannot politically or legally buy the cheapest ones going. Serving that market is how an Indian manufacturer buys the volume its domestic order book cannot fund.

So what would taking this seriously look like?

Start with the scorecard. Indigenisation measured as a single percentage flattens two claims that deserve separate evidence: source code ownership, which can be verified through auditable repositories or escrow, and assembly content, which is a supply chain documentation question. Procurement should ask for both, and ask for them separately. Contracts should buy surge capacity rather than units alone, with milestone payments tied to a demonstrated ability to go from hundreds to thousands inside ninety days. And the certification pipeline deserves to be treated as a defence bottleneck rather than an administrative step, since a queue measured in years is a production ceiling regardless of what capacity sits behind it.

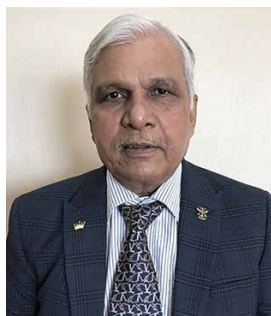
None of this argues against what firms like Zuppa



have built. It argues that the achievement has been misread. Owning the computing logic of a weapons platform is a real strategic advantage, and India should protect it, fund it, and stop conflating it with assembly. But the question that decides the next conflict is not whether the code is ours. It is whether, in the third month of a war, we can still build the thing.

Article by Sai Pattabiram, MD, Zuppa Geo Navigation Technologies Pvt Ltd

Interview with Vice Admiral Paras Nath (Retd), President, Crown Defence



VAYU: Crown Defence began in 1978 primarily in spare-parts sourcing. When did it transform into an integrated defence MRO and technology company, and what is your

vision for the future?

Crown Defence's transformation has been gradual and driven by the evolving requirements of our customers. From supplying critical spares and sustainment support, we expanded into MRO, systems integration, indigenous manufacturing, advanced engineering and lifecycle support across maritime, aerospace and land based systems.

Our vision is to build Crown Defence into a trusted Indian defence enterprise capable of delivering end-to-end support, from maintenance and upgrades to manufacturing and technology integration. We aim to strengthen indigenous capability while developing globally competitive products, services and partnerships.

VAYU: Crown has expanded into AI driven security and surveillance. Are these systems currently operational, and how do you ensure data security?

AI driven security and surveillance solutions are an area we continue to evaluate, particularly where they can improve situational awareness, decision making and operational efficiency. However, they do not currently constitute a core operational business vertical for Crown Defence.

Data security remains fundamental to all our engagements. We follow strict confidentiality, access control and cybersecurity protocols aligned with customer requirements. Sensitive information is handled strictly on a need-to-know basis, with appropriate safeguards to protect systems, networks and data.

VAYU: With facility expansions planned at Visakhapatnam, Karwar and Chennai, are these investments demand driven or aligned with anticipated naval force growth?

They are driven by both current requirements and anticipated growth in India's maritime defence ecosystem. The expansion of the Navy, indigenous shipbuilding programmes and the increasing emphasis on lifecycle support are creating sustained demand for high quality MRO and engineering infrastructure. Strengthening our presence at Visakhapatnam, Karwar and Chennai brings us closer to key customers, reduces response time and enables more efficient technical support. These investments will enhance our maintenance, engineering and manufacturing capabilities while contributing to a stronger domestic defence industrial base.

VAYU: Do you see Crown Defence evolving into an export focused MRO and manufacturing player? Which regions are strategic priorities?

Yes. Exports will be an important pillar of Crown Defence's

future growth. India's engineering capabilities, cost competitiveness and expanding defence manufacturing base provide a strong foundation for participation in global supply chains. Our focus will include MRO, manufacturing, sustainment, systems integration and lifecycle support. We see significant potential in Southeast Asia, the Middle East, Africa and the Indian Ocean Region, where there is growing demand for reliable and cost-effective defence support. Our approach will remain partnership led and aligned with India's strategic, diplomatic and export control framework.

VAYU: Where do you see the realistic limits of indigenisation in complex naval aviation systems? Which technologies will continue to require foreign collaboration?

India has made substantial progress in defence indigenisation, but self-reliance should not be equated with isolation. Advanced defence ecosystems are built through a combination of domestic capability and carefully structured international collaboration. Technologies such as advanced propulsion systems, specialised sensors, high performance materials, semiconductor dependent systems and certain niche aerospace subsystems may continue to require foreign collaboration over the next decade. The priority should be to increase indigenous design, manufacturing, integration, maintenance and upgrade capability. Genuine self-reliance comes from developing the ability to absorb, sustain and progressively improve critical technologies within India.

VAYU: Can you share indicative figures on the current order book, revenue growth or planned capital expenditure?

As a privately held organisation operating in a sensitive sector, we do not publicly disclose detailed commercial or programme-specific figures. However, Crown Defence has recorded consistent growth across its principal business verticals. Our continuing investments in infrastructure, technology, specialised equipment, talent and capability development reflect our confidence in the long-term outlook for India's defence sector. Our objective is to build sustainable and scalable capabilities that improve customer support, strengthen indigenous capacity and position Crown Defence for long term domestic and international growth.

VAYU: As a former Vice Admiral, how does your experience in the Navy shape your approach to private-sector leadership and execution?

The Navy instils a strong sense of professionalism, accountability, teamwork and mission focus. In defence, reliability and timely execution are not merely performance indicators; they are operational necessities. I bring the same principles to Crown Defence. We place considerable emphasis on integrity, customer commitment, operational excellence and long term capability development. Military and corporate organisations may operate differently, but the fundamentals of leadership remain consistent: building capable teams, maintaining high standards, making informed decisions and delivering on commitments. The enduring lesson is that strong institutions succeed by adapting to change without losing sight of their core purpose. ➡

INS Sudarshini in Baltimore, USA

Indian Navy's Sail Training Ship INS Sudarshini arrived at the Port of Baltimore, Maryland, USA, on 26 June 2026, as part of the landmark transoceanic expedition, Lokayan 26. The passage from Norfolk involved transit through the historic Chesapeake & Delaware (C&D) Canal beneath major mid-Atlantic bridges. INS Sudarshini's visit to Baltimore highlighted India's rich maritime heritage and the enduring bonds of friendship and cooperation between the Indian Navy and the United States Navy. During her stay, the ship undertook maritime engagement, and community outreach activities ahead of Sail250 Maryland celebrations commemorating the 250th anniversary of the United States.



INS Udaygiri, Kavaratti and Shakti at Sattahip, Thailand

Indian Naval Ships Udaygiri, Kavaratti and Shakti of the Eastern Fleet arrived at Sattahip, Thailand on 27 June



2026, as part of their operational deployment to the South East Asia Region. The ships, led by RAdm Alok Ananda, Flag Officer Commanding Eastern Fleet, were received by the Royal Thai Navy. The port call was part of India's continued maritime engagement with South East Asian nations and "reflects the close and long standing maritime partnership between India and Thailand".

INS Tarkash and Ikshak at Port Victoria, Seychelles

Indian Naval Ships Tarkash and Ikshak concluded their port call at Port Victoria, Seychelles, on 29 June 2026, marking the successful completion of a range of professional, ceremonial and community engagement activities undertaken during Seychelles' National Day and Golden Jubilee celebrations. During the visit, the marching contingent and Naval Band from INS Tarkash participated in the National Day Parade held on 28 June 2026 in the presence of Prime Minister of India, who was the Guest of Honour, reflecting "the close and longstanding maritime partnership between India and Seychelles".



Indian naval ships conclude visit to Singapore

Reinforcing the deep rooted strategic and maritime partnership between India and Singapore, Indian Naval Ships Udaygiri, Shakti and Kavaratti of the Eastern Fleet



led by Rear Admiral Alok Anand, Flag Officer Commanding Eastern Fleet, concluded their port call on 5 July 2026 at Changi Naval Base, Singapore as part of the Indian Navy's operational deployment. Aligned with the ASEAN-India Year of Maritime Cooperation and Government of India's Act East Policy, the three day engagement featured a wide range of professional interactions including cross-deck visits aimed at strengthening interoperability and naval cooperation between the two maritime forces.

INS Sudarshini in New York

Indian Naval Sail Training Ship INS Sudarshini sailed into New York Port on 4 July 2026 to represent India at the United States International Naval Review 250 and Sail4th 250 celebrations. During the spectacular Parade of Sail along the Hudson River, the iconic three masted barque proudly flew the Indian Tricolour, celebrating India's rich maritime heritage and old seafaring traditions. Set against the iconic New York skyline, INS Sudarshini stood as a proud symbol of India's maritime legacy.



INS Sudarshini at Boston, USA

INS Sudarshini arrived at Boston on 12 July 2026 after her successful participation in the Sail4th 250 celebrations



at New York. The ship took part in the Grand Parade of Sails, marking the commencement of Sail Boston 2026. Mr. Raghuram Sastry, Consul General of India in Boston, embarked INS Sudarshini for the Grand Parade of Sails and the ship's ceremonial entry into Boston.

INS Sudarshini at Ponta Delgada, Portugal

INS Sudarshini entered the port of Ponta Delgada in Azores, Portugal, on 13 August 2026, as part of the ongoing Lokayan 2026 voyage. The arrival marked successful completion of a challenging 19 day transoceanic passage across the Atlantic Ocean, originating from Boston, USA. This is INS Sudarshini's second Atlantic crossing, highlighting "the endurance, grit and seamanship skills of her crew".



INS Sudarshini in Lisbon, Portugal

The Indian Navy's sail training ship, INS Sudarshini, arrived at Lisbon, Portugal on 22 August 2026, as part of her ongoing Lokayan 26 transoceanic expedition. The three masted barque made a grand entry through the Tagus River, showcasing traditional sailing and seamanship skills.



Indian Navy–US Navy explosive ordnance disposal exercise

The Indian Navy–US Navy Explosive Ordnance Disposal (EOD) Exercise 2026 was conducted at Southern Naval Command, Kochi, from 10 to 14 August 2026. The bilateral exercise aimed to enhance interoperability and strengthen professional cooperation between the specialist diving and EOD teams of the two navies. The five day exercise comprised Subject Matter Expert Exchanges (SMEEs), cross-training, equipment demonstrations and scenario-based practical exercises.

India–Thailand Exercise Maitree–XV

The Indian Army contingent departed for Thailand to participate in the 15th edition of the India–Thailand Joint Military Exercise Maitree–XV (2026). The exercise was conducted from 18 to 31 August 2026 at Vibhavadi Rangsit Camp, Surat Thani, Thailand. Last edition of the same exercise was conducted at Foreign Training Node, Umroi, Meghalaya in September 2025.

The Indian Army and Royal Thai Army contingents comprised 85 personnel each. The Indian Army contingent was represented primarily by troops from 9 Gorkha Rifles, while the Royal Thai Army contingent comprised personnel from the 3rd Battalion, 25th Infantry Brigade, 5th Division.



Sarangs in Egypt

The Sarang Helicopter Display Team of the Indian Air Force arrived at El Alamein, Egypt on 31 August 2026 to participate in the 2nd edition of the El Alamein International Airshow, which was held from 8 to 10 September 2026. Flying the indigenously designed and manufactured ALH Dhruv, Sarang “showcased precision, synchronisation and flying skills; the world’s only helicopter aerobatic display team, Sarang enthralled audiences with its signature aerial displays”.



Interview with IAF's No. 126 HU

VAYU: *When did the No.126 Helicopter Unit come into existence?*

The 126 Helicopter Unit, also known as “The Featherweights”, was formally established on 15 May 1986, at 12 Wing, AF Chandigarh.



Photo by Simon Watson

VAYU: *For what role was the unit raised?*

Our unit was specifically created to provide heavy-lift capabilities, utilising the unique strengths of the Mi-26 helicopter. Our primary mission is to transport heavy equipment and essential supplies to remote and high altitude regions, where conventional road and rail connectivity is limited or non-existent.



Photo by Simon Watson

VAYU: *What rotary-wing aircraft did the unit initially operate?*

We initially operated the mighty Mi-26, the largest and heaviest helicopter ever inducted into the Indian Air Force. With its impressive lift capacity of up to 20 tonnes, it was ideal for transporting heavy equipment to forward and high altitude areas.



Photo by Simon Watson

VAYU: *What role did the unit perform during operations like Op Meghdoot, Op Pawan & Op Vijay?*

During these operations, our unit played a crucial role in strategic airlift and logistical support. We transported heavy equipment, troops and essential supplies to forward areas, including high altitude zones, often under challenging conditions. Our efforts ensured sustained operations and rapid mobility for ground forces.

VAYU: *How satisfied was the unit with the Mi-26s before getting the new CH-47(I) Chinooks from the US?*

The Mi-26 served us exceptionally well for decades and was highly reliable for heavy-lift missions in demanding terrains. We were fully satisfied with its performance, especially its unmatched lift capability. However, the induction of Chinooks has brought in state-of-the-art technology, enhancing our capabilities even further.

VAYU: *What new capabilities did the Chinook bring to the unit and IAF as an organisation?*

The Chinook has introduced enhanced agility, modern avionics, and all-weather, day-night operational



Photo by Mayyank Kaul

capability to our unit. It enables us to perform precision heavy lift missions at high altitudes with greater speed and safety. For the IAF, it significantly boosts logistical reach, rapid deployment and versatility across a wide range of operations.

VAYU: *How satisfied is the IAF with the Chinook?*

The IAF is highly satisfied with the Chinook's performance. It has proven its reliability in high altitude, all weather and complex lift missions. Its versatility and precision have made it a game-changer for heavy-lift operations across varied terrains.

VAYU: *Is the unit looking to acquire more Chinooks?*

The induction and deployment of assets like Chinook are based on operational requirements and planning by higher authorities. As a unit, we remain focused on effectively fulfilling our assigned missions with the resources provided.

VAYU: *Is there any possibility of seeing the Mi-26s back in service anytime soon?*

Decisions regarding the re-induction of platforms like the Mi-26 rest with the higher command and are based on broader operational assessments.



Photo by Mayyank Kaul

As the commanding officer, I take immense pride in the professionalism, dedication and resilience of the air warriors of 126 Helicopter Unit. They consistently perform under challenging conditions with unwavering commitment, upholding the highest standards of the Indian Air Force.

VAYU: *Can you please tell us about your most memorable operation as the CO of the unit?*

Operation Sindoor stands out as the most unforgettable experience during my command. The entire team came together seamlessly, and witnessing the intense conflict unfold before our very eyes left an indelible mark on me – a memory that will stay with me forever.

VAYU: *At last, I would like to ask you about your opinion on the role of helicopters in the current day scenario and how helpful will the Chinook be if inducted in larger numbers?*

Helicopters play a pivotal role in modern military operations, offering unmatched flexibility, speed and access to remote areas. The Chinook, with its heavy-lift and all-weather capabilities, greatly enhances our operational reach. While decisions on numbers rest with higher authorities, its expanded presence would certainly strengthen our strategic and tactical mobility. ➡

Interview by Mayyank Kaul (Instagram thrustvectorneo & Twitter/X @MayyankK3246) and Abhinav Negi (Instagram: that_article_guy & Twitter/X @ThatArticleGuy)



Photo by Mayyank Kaul

VAYU: *Can you give us a brief insight into the Unit's role in Special Operations?*

Our unit remains prepared to support a wide spectrum of missions, including those requiring rapid deployment and high operational readiness. Our training and capabilities ensure we can effectively contribute whenever tasked in specialised roles.

VAYU: *As the CO of the unit, what do you have to say about the Air Warriors under your command?*

Interview with IAF's No. 44 Squadron

VAYU: *What are the current mission roles of the Il-76 aircraft in 44 Squadron – strategic airlift, humanitarian aid or combat logistics?*

The current mission roles of Il-76 aircraft are air logistics support, air transportation, para drop of men and material, Humanitarian Aid and Disaster Relief (HADR) missions, ex-India tasks and participation in international exercises. Various operations by Sqn in the past including the recent Op Sindoor are a testament to the Sqn's operational capability.

VAYU: *How has the Il-76's performance adapted to India's high altitude and border specific operational needs, especially in Ladakh and the Northeast?*

Il-76 has proven to be a vital asset for IAF particularly in addressing the unique op challenges of high altitude such as Leh and Thoise. The four turbojet engines and rugged landing gear make Il-76 well suited for operations from high altitude airfields, where thinner air, shorter runway and rising terrain challenge many other aircraft. With good payload capacity, aircraft

is capable of carrying large amount of cargo and troops. Various weapon systems can also be carried in Il-76 over large distances.

VAYU: *What types of payloads and configurations can the Il-76 accommodate, and how quickly can it be reconfigured for various mission types?*

Il-76 is a Soviet era strategic airlifter designed for heavy cargo transport. It is widely used by military and civilian operators across the world. The general overview



Photos by Mayyank Kaul except where mentioned.



of its configuration capabilities are as follows: Cargo Transport—This role includes carriage of vehicles, heavy loads, disaster relief materials etc; Troop Transfer—The aircraft in this role can carry a large number of passengers; Paratroopers Deployment—In this configuration, the aircraft can carry a large number of combat ready paratroopers; Medical Evacuation—In this role the aircraft can carry a large number of stretchers with medical staff.

VAYU: *Can you describe a landmark operation or mission in 44 Squadron's history where the Il-76 played a decisive role?*

Op Cactus (1988) was a landmark operation in 44 Sqn's history. It demonstrated

India's rapid military response in the region. Troops were flown over 2000 km, parachuted and landed directly at Hulhule airport near Male. As a result, Indian Forces secured the airport, entered Male and rescued the President within hours of landing.

VAYU: *What are the most challenging aspects of flying or maintaining the Il-76 aircraft today, considering its Soviet-era design?*

The existing fleet of Il-76 aircraft is of Soviet era design. However, with regular upgrades on the aircraft, the IAF has ensured that the aircraft can perform all tasks in the dynamic flying environment of today.



VAYU: *What kind of training does a pilot or loadmaster undergo to operate within a heavy lift squadron like 44?*

Operating an Il-76 is a highly specialised task requiring both technical knowledge and practical experience. It can carry large and versatile cargo and has been used extensively in various military and humanitarian missions. Pilots and loadmasters go through extensive training to ensure they can handle the aircraft's systems and manage various types of payloads effectively which is akin to any other fleet in IAF/other Air Forces.

VAYU: *With newer platforms like the C-17 Globemaster in the IAF, what is the envisioned future for the Il-76 fleet and 44 squadron's role going forward?*

Photo by Karanjit Singh

The inclusion of C-17 hasn't affected the role of Il-76 aircraft. C-17 ac were 'inducted in IAF in 2013. These ac have augmented the heavy lift capability of the IAF. The C-17s along with the existing Il-76 fleet have proved their mettle as seen during various evacuations, HADR missions and rapid response situations. The fact that these two fleets have been used in tandem in various situations demonstrates that their unique strengths would continue to be used in the years to come. ➡

Interview by Mayyank Kaul (Instagram thrustvectorneo & Twitter/X @MayyankK3246) and Abhinav Negi (Instagram: that_article_guy & Twitter/X @ThatArticleGuy)

Photos by Mayyank Kaul except where mentioned.

Interview with IAF's No. 17 Squadron



Photo by Alex van Noije

VAYU: *The “Golden Arrows” have returned to the skies after a long gap – what did it mean to the IAF to see the squadron revived?*

The resurrection of 17 Squadron “The Golden Arrows” is a significant event for the Indian Air Force (IAF). It enhances the IAF’s air power capabilities, strengthens air defence, and provides operational flexibility. The re-formation of the squadron is a morale booster for IAF personnel and symbolises the IAF’s commitment to defending India’s skies and upholding its sovereignty. It also serves as a deterrent to potential adversaries, contributing to regional stability and security. The resurrection of 17 Squadron is part of the IAF’s ongoing efforts to build capacity and modernise its fleet, including upgrading existing aircraft and acquiring new ones. This development demonstrates India’s commitment to maintaining a strong and capable air force, essential for ensuring regional stability and security. The resurrection of 17 Squadron “The Golden Arrows” is a testament to the IAF’s proud history and tradition of excellence.

VAYU: *Looking back at the 1971 war, how did the squadron’s actions shape its legacy before the Rafale era?*

Reflecting on the 1971 war and the subsequent journey, which has been marked by the introduction of high performance aircraft, sophisticated weapon systems, and cutting edge avionics, as well as the development of highly

efficient tactics, it is clear that the Squadron’s legacy has been shaped by its experiences. The missions undertaken in 1999 and 2001 have also played a significant role in forming the traditions that continue to thrive to this day.

VAYU: *How did the transition from earlier aircraft to the Rafale reshape your operational doctrine?*

The transition from earlier aircraft to the Rafale significantly reshaped our operational doctrine by introducing a new era of situational awareness, network centric warfare and adaptive tactics. The Rafale’s advanced sensors and avionics allowed for a more accurate and comprehensive understanding of the battlefield. Furthermore, the Rafale’s advanced capabilities and versatility enabled us to develop more flexible and adaptive



Photo: The Vayu Team

tactics, allowing us to respond more effectively to changing situations and unexpected threats. Overall, the Rafale's integration has enhanced our operational effectiveness, allowing us to operate more safely and effectively in a rapidly changing threat environment.

VAYU: *What was the most challenging part of integrating a 4.5 generation fighter into an existing IAF structure?*

The integration of a 4.5 generation fighter, like Rafale, into the Indian Air Force (IAF) structure was a complex process. The most challenging part was the need to adapt to the advanced capabilities and technologies of the Rafale. In addition, tactical adjustments were needed to fully exploit the aircraft's potential. Overcoming these challenges required significant planning, coordination, and resources, but the end result is an integration that enhances the IAF's capabilities. The Rafale's advanced technologies have increased the IAF's operational effectiveness and strengthened its capabilities to a very large extent.

VAYU: *Can you describe the first live exercise where the Rafale demonstrated its full combat potential in IAF colours?*

The first international exercise where Rafales showed their full potential, after induction in IAF, was the 'Exercise Orion' in France, in 2023. The Rafale showcased its prowess in front of an international audience by its participation. The Rafales participated in offensive as well as air defence roles and carried out multiple missions during the exercise and brought laurels to the IAF.

VAYU: *How does the squadron train for both deep strike and air superiority missions with the same platform?*

The Rafale's avionics and weapons systems are highly advanced, making it an ideal platform for both precision strike and air superiority missions. The Rafale can carry a wide range of weapons optimised for precision strike against ground targets and long range air-to-air missiles for air superiority missions.



Photo by Karanjit Singh

VAYU: *In what ways has the Rafale changed the mindset and confidence level of the pilots compared to legacy aircraft?*

The Rafale has significantly boosted the confidence and mindset of pilots compared to legacy aircraft. With its

advanced avionics and sensors, pilots feel more connected to the battlefield, having a better understanding of the situation and making more informed decisions. The Rafale's ease of handling and high degree of automation allows pilots to focus on the mission rather than worrying about the aircraft's performance. This increased situational awareness and reduced workload have instilled a sense of trust and confidence in pilots, enabling them to push the aircraft to its limits and execute missions with greater precision and effectiveness.

VAYU: *Which traditions from the Golden Arrows' past have been revived alongside the induction of the Rafale?*

With the induction of the Rafale, we have sought to revive several traditions from the rich history of 17 Squadron. One such tradition is the restoration of the 'Golden Arrows' insignia, which was originally adopted by the squadron in 1951. This insignia symbolises the squadron's legacy of precision and excellence. The revival of traditions such as the 'Golden Arrows' insignia serves as a tangible link to our past, providing a sense of familiarity and comfort in an era of rapid change. This, in turn, enhances our performance, as a motivated and proud work force is more likely to be cohesive, focused, and driven to achieve excellence. This sense of legacy and continuity, boosts our morale, as we feel a deep sense of responsibility to uphold the standards set by our predecessors. By reviving these traditions, we aim to reconnect with our past, while embracing the cutting edge technology and capabilities of the Rafale. This blend of heritage and modernity will undoubtedly inspire our personnel to strive for excellence and carry forward the proud legacy of 17 Squadron.



Photo by Joris van Boven

VAYU: *If you could describe the "Golden Arrows" ethos in one real life mission from any era, which would you choose?*

The one real life mission, which would aptly highlight the ethos of "Golden arrows", would be Op Safed Sagar in May 1999. During Op Safed Sagar, the Squadron displayed an epitome of professional dedication and achieved all tasks. ➡

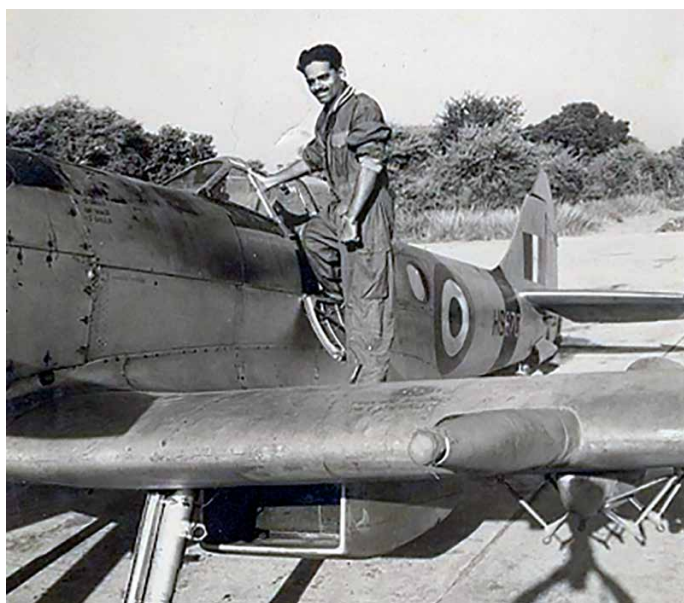
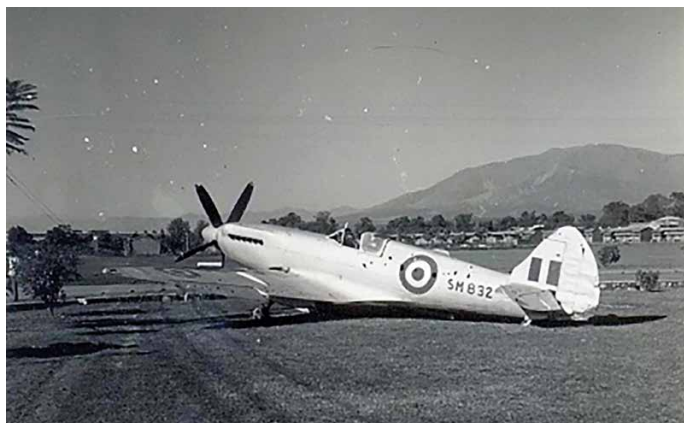
Interview by Mayyank Kaul (Instagram thrustvectorneo & Twitter/X @MayyankK3246) and Abhinav Negi (Instagram: that_article_guy & Twitter/X @ThatArticleGuy)

Interview with IAF's No. 14 Squadron

VAYU: *When and why was No.14 Squadron formed?*

No. 14 Squadron was formed on 15 August 1951 at Ambala, India. The squadron was initially equipped with the Spitfire aircraft. The role of Spitfire aircraft used by the Indian Air Force was primarily as follows: For air defence, Spitfires were used to provide Air defence for Indian cities and vital installations, protecting them from potential aerial threats. They were employed as interceptors, tasked with detecting and destroying enemy aircraft that entered Indian airspace. Spitfires were also used for ground attack missions, providing close air support to the Indian Army during various operations.

They were also used for reconnaissance missions, to gain intelligence on enemy dispositions and movements. Additionally, the Spitfire was used as a trainer to develop the skills of IAF pilots to execute the above mentioned role. The Spitfire played a significant role in the early years of the Indian Air Force. The Squadron was raised to strengthen India's air power and to provide a deterrent against potential threats in the post-Independence era.



VAYU: *Which aircraft did the squadron operate during the 1965 and 1971 wars, and what were its key missions?*

No. 14 Squadron operated the Hawker Hunter aircraft during the 1965 and 1971 wars. The squadron's key missions included providing close air support to the Indian Army, attacking enemy troop concentrations, artillery positions and bunkers. For air-to-air combat, it was to engage and destroy enemy aircraft, including F104 Starfighters and F-86 Sabres, to establish air superiority. The Hunters conducted reconnaissance missions to gather intelligence on enemy troop movements and installations. In 1965, tensions were rising on the western border, and the Indian Air Force was on high alert.



14 Squadron, under the command of Wg Cdr DA LaFontaine, who later became the Chief of Air Staff, was stationed at Dumdum airfield. As the situation escalated, the Bulls were tasked with maintaining a high state of vigilance and conducting armed patrols. On 7 Sep 1965, six Pakistani Sabres launched a surprise attack on Kalaikunda, targeting loaded Canberras and Vampires.



The Bulls were ready to defend their territory. That's when two brave pilots, Flt Lt Alfred Cooke and Fg Offr SC Mamgain, came into action. They were the first to engage the enemy Sabres, and their bravery will be

remembered forever. With exceptional skill and precision, they managed to shoot down two enemy aircraft, leaving their footprints in IAF history books. Their gallant act did not go unnoticed. Both Flt Lt Alfred Cooke and Fg Offr SC Mangain were awarded the Vir Chakra, one of India's highest military honours, for their bravery and selfless act. 14 Squadron's history is filled with such stories of courage and sacrifice.

VAYU: *Why is No. 14 Squadron significant in the history of Jaguar induction in the IAF?*

14 Squadron of the Indian Air Force (IAF) holds a significant place in the history of Jaguar induction in the IAF because it was the first squadron to operate Jaguar aircraft in India. In 1979, the IAF inducted the SEPECAT Jaguar, an Anglo-French twin engine, single seat fighter bomber, to replace the aging Hawker Hunter fleet. No. 14 Squadron, was chosen to be the first unit to operate the Jaguar.



The squadron, based at Ambala Air Force Station, received its first batch of Jaguars in October 1979. The squadron's pilots and technicians underwent training in UK to familiarise themselves with the new aircraft. No. 14 Squadron's significance in Jaguar induction lies in the fact that it:

Pioneered Jaguar operations: The squadron was the first to operate the Jaguar in India, paving the way for other IAF squadrons to induct the aircraft.



Developed operational procedures: The squadron's personnel developed and refined operational procedures, tactics, and techniques for Jaguar operations in the Indian environment.

Conducted Initial Operational Clearance: No. 14 Squadron carried out the initial operational clearance of the Jaguar, ensuring that the aircraft met the IAF's operational requirements.

Trained other Squadrons: The squadron's personnel played a key role in training pilots and technicians from other IAF squadrons, facilitating the rapid induction of Jaguars across the IAF.

No.14 Squadron's accomplishment marked a significant milestone in the IAF's modernisation efforts, and its legacy continues to inspire future generations of IAF personnel.

VAYU: *How has the squadron's aircraft inventory evolved from its inception to present day?*

14 Squadron has seen significant changes in its aircraft inventory since its inception in 1951. Here's an overview of the squadron's aircraft evolution:

Early Years (1951–1962): The squadron was initially equipped with the Spitfire aircraft and De Havilland Vampire, a British jet fighter bomber.



Hawker Hunter era (1965–1979): The squadron transitioned to the Hawker Hunter, a British fighter in 1965.

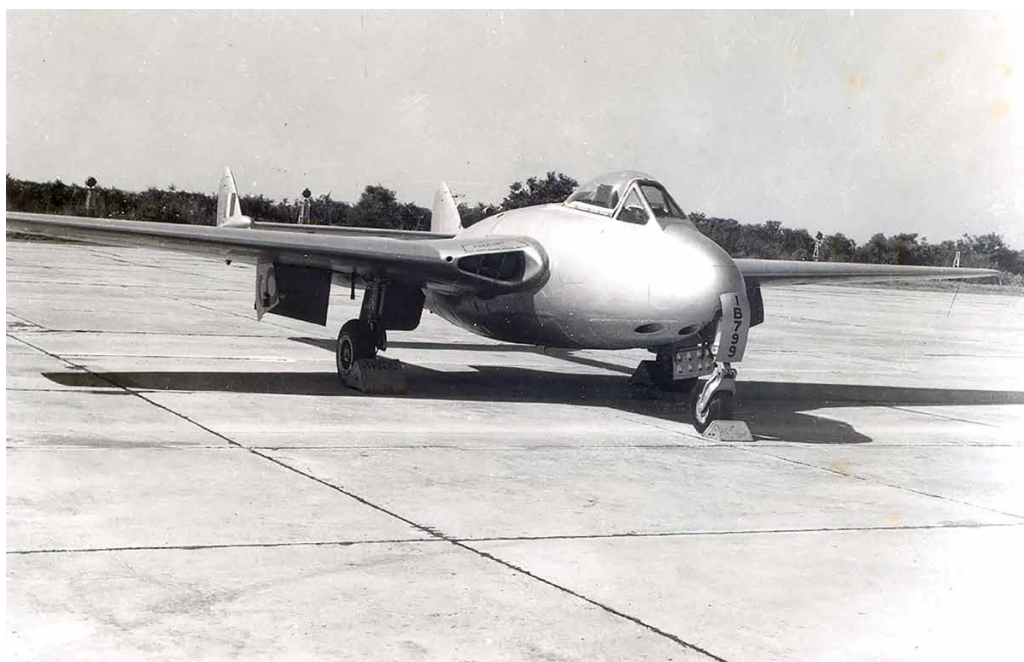
Jaguar induction (1979–till date): In 1979, the squadron became the first IAF unit to operate the SEPECAT Jaguar, an Anglo-French twin engine, single seat fighter bomber.

VAYU: *Where was the squadron based during the Bangladesh Liberation War, and what operations did it conduct?*

14 Squadron played a significant role during the Bangladesh Liberation War in 1971. Here are some key aspects of the Squadron's involvement:

Ground attack: The squadron, equipped with Hawker Hunter aircraft, conducted numerous ground attack missions against Pakistani military positions, airfields and supply lines in East Pakistan (now Bangladesh).

Close Air Support: The Squadron provided close air support to the Indian Army's advancing columns, attacking enemy strongpoints, bunkers and fortifications.



Destruction of Tezgaon Airfield: On 7 December 1971, the Squadron carried out a daring raid on Tezgaon Airfield, the main Pakistani airbase in East Pakistan, destroying several enemy aircraft and damaging the airfield infrastructure.

Attack and Operations from Jessore Airfield: The squadron also attacked Jessore Airfield, another key Pakistani airbase in East Pakistan, disrupting enemy air operations and supply lines. On 6 December, seven aircraft from the Squadron attacked Dhaka. On 7 December, a

hangar with 3 Sabres was blown up at Jessore airfield by the Bulls. On 9 December, Jessore fell into Indian hands and on 14 December the Squadron created history as it became the first ever IAF Squadron to occupy and operate from an enemy airfield i.e Jessore.

Support to Ground Forces: No. 14 Squadron provided close air support to Indian Army units during the battles of Boyra, Jamalpur and Hilli, helping to pave the way for the liberation of Bangladesh.

Significance:

Air superiority: No. 14 Squadron's operations played a crucial role in establishing

Indian air superiority over East Pakistan, enabling the IAF to control the skies and support ground forces.

Boost to morale: The squadron's successful missions boosted the morale of Indian troops and the people of Bangladesh, who were fighting for independence.

Tactical innovation: The squadron's pilots and commanders developed innovative tactics to counter the Pakistani Air Force, which were later adopted by other IAF squadrons.



No. 14 Squadron “The Bulls” played a vital role in the Bangladesh Liberation War, contributing significantly to the Indian military’s ultimate victory and the birth of Bangladesh as an independent nation.

VAYU: *What is the squadron’s nickname and motto, and what do they signify?*

No. 14 Squadron’s nickname is “The Bulls”. The squadron’s motto is “Balam Jayaya”, which is Sanskrit for “Strength leads to victory”.

The nickname “The Bulls” symbolises strength, courage, and ferocity reflecting the squadron’s role as a formidable fighting unit. The Bull is also a symbol of power and tenacity, reflecting the Squadron’s unwavering commitment to defend the nation.

The motto “Balam Jayaya” signifies the Squadron’s unwavering confidence in achieving victory and success in its operations. It reflects the squadron’s unshakeable resolve to overcome challenges and emerge triumphant, even in the face of adversity. Together, the nickname “The Bulls” and the motto “Balam Jayaya” embody the spirit of 14 Squadron, inspiring its personnel to uphold the highest standards of courage, professionalism and excellence in their pursuit of defending India’s skies. ➡

Interview by Mayyank Kaul (Instagram: [thrustvectorneo](#) & Twitter/X @MayyankK3246) and Abhinav Negi (Instagram: [that_article_guy](#) & Twitter/X @ThatArticleGuy)

All photos: IAF and Vayu archives.

75 years of No. 14 Squadron



Courtesy: IAF Akashganga Team

No. 14 Squadron of Indian Air Force, famously known as the ‘Bulls’, celebrated its Platinum Jubilee at a forward base under Western Air Command in September 2026. Raised in 1951, the Squadron has traversed four generations of fighter aircraft— from the legendary Spitfire to the formidable Jaguar Deep Penetration Strike Aircraft— carrying forward a proud legacy of courage, operational excellence and unwavering commitment to the Nation.



The commemorative celebrations paid tribute to the Squadron’s rich history and the supreme sacrifice of its martyrs, with flying operations and combat equipment showcased for the occasion. Generations of serving and veteran Air Warriors associated with the Squadron came together to celebrate its illustrious journey. The occasion was graced by Air Marshal George Thomas, Air Officer Commanding-in-Chief, Western Air Command, former Chiefs of the Air Staff, gallantry awardees, senior serving officers and veterans of the Squadron. (Text courtesy IAF from X)

IAF concludes multinational Exercises Pitch Black and Udara Shakti 2026



The Indian Air Force (IAF) has successfully concluded its participation in two pivotal international flight engagements: Exercise Pitch Black 2026 in Australia and Exercise Udara Shakti 2026 in Malaysia on 23 August 2026. The dual-nation deployment underscored the IAF's operational reach, advanced tactical coordination, and commitment to strengthening strategic defence partnerships across the Indo-Pacific region.

During Exercise Pitch Black 2026, hosted by the Royal Australian Air Force (RAAF), the IAF deployed its frontline Rafale aircraft to operate alongside Air Forces from over 20 participating nations. Executing complex Large Force Employment (LFE) missions in a high-threat, multi-domain environment, the exercise enabled seamless tactical integration, cross-learning, and enhanced interoperability among coalition partners.

Following the operations in Australia, the IAF contingent deployed directly to Subang, Malaysia, for Exercise Udara Shakti 2026. IAF aircrew executed high

intensity combat sorties and joint tactical manoeuvres alongside the Royal Malaysian Air Force (RMAF), flying with and against Su-30MKM and F/A-18 Hornet aircraft. The bilateral engagement focused on refining air combat tactics, subject matter expert exchanges (SMEE), and optimising combined operational flexibility.





Throughout both deployments, joint operations extended beyond the cockpit to include maintenance practices, mission planning exchanges, and cultural interactions, bolstering professional camaraderie across ranks. ➡

Text and photos: IAF

IAF at Ex Pitch Black 2026 at Darwin, Australia

INDIAN AIR FORCE AT 94th ANNIVERSARY



The Indian Air Force (IAF) was at Exercise Pitch Black 2026 at the Royal Australian Air Force (RAAF) Base Darwin which took place from 20 July 2026 to 7 August 2026. Exercise Pitch Black is the RAAF's premier biennial multinational air combat exercise. The exercise derives its name from its emphasis on night flying over the vast unpopulated areas of northern Australia. In

the exercise's 45 year long history, this edition featured large quantum of participating forces, bringing together military personnel for complex 'Large Force Employment' and multinational air combat operations.

The IAF contingent comprised of highly skilled Air Warriors including pilots, engineers, technicians, controllers and other subject matter experts. The



contingent operated the Rafale multirole fighter aircraft, supported by the C-17 Globemaster III and the Il-78 air-to-air refuelling aircraft in combat support roles. The exercise provided the participating forces with a valuable opportunity to enhance interoperability, strengthen force integration and exchange operational best practices towards a collaborative conduct of operations in the global scenarios.

The IAF has previously participated in the 2018, 2022 and 2024 editions of the exercise, reaffirming its commitment to strengthening defence cooperation and regional security.

The High Commission of India in Australia stated, “We are proud to welcome the Indian Air Force contingent of four Rafale and two C17 aircraft along with over 120 Air Warriors to Darwin to participate in Royal Australian Air Force’s premier air combat exercise Pitch Black 2026. Over the next three weeks, our Air Warriors will fly alongside counterparts from participating nations towards enhancing interoperability, sharpening combat flying skills, strengthening relationships and building everlasting bonds”.

Text and images: IAF/MoD



IAF–JASDF

‘Exercise Veer Guardian 2026’



The bilateral air exercise ‘Veer Guardian 2026’ between the Indian Air Force (IAF) and Japan Air Self Defence Force (JASDF) concluded at Air Force Station Jodhpur on 22 September 2026. The exercise served as a vital platform for enhancing interoperability and strengthening the strategic partnership between the two Air Forces. The IAF deployed a mix of aircraft, including Su-30MKI, Rafale and indigenous Light Combat Aircraft (LCA) Tejas. The JASDF participated with the F-2A fighter aircraft.

During the joint training spanning 14 days, IAF and JASDF engaged in wide range of advanced flying missions encompassing within visual range combat and coordinated multi-aircraft missions. On Distinguished Visitor’s Day, General Takehiro Morita, Chief of Staff, JASDF and Air Chief Marshal AP Singh, Chief of the Air Staff visited Air Force Station Jodhpur and flew the indigenous Tejas fighter aircraft.





The exercise also witnessed numerous ground interactions between IAF and JASDF personnel such as Subject Matter Expert Exchanges, operational discussions, missions planning conferences, engineering interactions, maintenance practice and aerospace safety briefings wherein various aspects were discussed by both the sides. This enabled the participating contingents to obtain an invaluable insight into each other's best practices and learn from each other's unique capabilities.

Exercise Veer Guardian 26 concluded as a testament to the enduring friendship and professional camaraderie between the two Air Forces. This engagement continues to pave the way for enhanced collaboration and strategic depth of the defence partnership between India and Japan.

Text and images: IAF

Exercise Tarang Shakti 2026 at Jodhpur



Following the inaugural ceremony, the Indian Air Force (IAF) commenced the operational phase of Exercise Tarang Shakti 2026 at Air Force Station Jodhpur. Being conducted from 26 September to 12 October 2026, the multilateral air exercise is themed “Power in Partnership”, underscoring the strength that comes from working together, sharing expertise and building interoperability among partner air forces.

Seven Friendly Foreign Countries (FFCs) — Australia, the United States of America, the United Arab Emirates, France, Germany, Sri Lanka and Bangladesh — are participating in the exercise. The foreign aircraft taking part include the F-35 Lightning II, Rafale, F-16, A400M, MRTT, C-130, C-130J and KC-30A, bringing together a diverse mix of combat, airlift and air-to-air refuelling capabilities.

Building on the successful inaugural edition in 2024, Exercise Tarang Shakti 2026 provides participating air forces an opportunity for advanced joint training, exchange of operational expertise and consolidation of professional experience. The participating contingents will operate alongside the IAF, employing frontline combat platforms and support elements across a range of missions. Several other FFCs will also participate as observers.

The exercise will facilitate professional interaction among aircrew, mission planners and operational support personnel, with emphasis on interoperability, mutual learning, aerospace safety and enhanced understanding of operational procedures. The interaction will provide participating forces an opportunity to operate together, share experiences and gain a better understanding of each other’s capabilities and operating philosophies.



This edition of Tarang Shakti has a wider canvas beyond flying operations, with a range of professional, cultural and outreach activities planned during the exercise. These include a dedicated seminar, industrial tour for the participating foreign contingents, Sekhon Marathon, heritage tours and yoga sessions. These engagements will provide opportunities for professional exchange, exposure to India’s aerospace and industrial ecosystem, and greater interaction and camaraderie among the participating contingents.

Exercise Tarang Shakti 2026 provides the IAF an opportunity to demonstrate its operational capabilities, professional standards and institutional ethos, while highlighting India’s growing indigenous aerospace and defence capabilities. The exercise, under the theme “Power in Partnership”, reinforces the importance of cooperation, interoperability and mutual trust in building enduring partnerships among participating air forces.

The exercise reaffirms India’s commitment to constructive defence engagement and enhanced military cooperation in support of regional peace, security and stability, while strengthening partnerships and fostering greater strategic cooperation through shared operational experience. ➡

Text and images: IAF

FASF at Exercise Tarang Shakti

The French Air and Space Force is conducting its seventh long range air projection exercise, Mission Pégase, from 8 September to 15 October 2026, with the aim of demonstrating the core capabilities of the force – rapidly project long range air power anywhere in the world and defend France's overseas territories or strategic interests. During the course of this mission, the force also took part in the high intensity multinational air combat exercise, Tarang Shakti, hosted by the Indian Air Force in Jodhpur, Rajasthan.

Initiated in 2018, the seventh edition of Mission Pégase deployed a 300 strong aircrew and four Rafale F4s, three A330 MRTT Phenix aircraft and two A400M Atlas aircraft. Starting from the Arctic, the mission covered a unique route of 40,000 kilometres with nine stopovers, flying to the Near and Middle East, via the Pacific, East Asia and the Indian Ocean. While developing international aerospace cooperation through its strategic partnerships with Japan, South Korea, Indonesia and India, France will consolidate its air force's support bases and reaffirm its commitment to contributing to freedom of access to shared airspace and collective security.

In India, following its maiden participation in 2024, the deployment, which arrived in Jodhpur, will participate



again in exercise Tarang Shakti from 28 September to 12 October to further enhance military cooperation and interoperability between the French and Indian air forces. Lt Gen Dominique Tardif, Vice Chief of the French Air and Space Force, and Head of Mission Pégase Maj Gen Julien Sabéné visited India to hold discussions with Indian Armed Forces authorities.

Looking forward to France's participation in exercise Tarang Shakti, H.E. Mr Thierry Mathou, Ambassador of France to India, remarked, "India is a core strategic defence partner of France. Regular participation in bilateral military exercises with India such as Varuna at sea, Garuda in the air and Shakti on land, as well as multinational exercises such as Tarang Shakti pave the way for greater Indo-French operational coordination and military interoperability. France's involvement in this exercise illustrates our shared commitment to ensuring regional and global security and upholding international law and freedom of navigation in the Indo-Pacific region, in which France is a resident power."

Pégase 26 embodies France's ability to maintain a decisive military presence across a vast strategic arc and serves as an instrument for France's political and diplomatic action in an uncertain and volatile geopolitical environment. ➡

Text and images: FASF



Suryakiran Aerobatic Team at Meerut



Arindam Nandy was at Meerut to cover the event

The Suryakiran Aerobatic Team (SKAT) of the Indian Air Force took to the skies of Meerut for the first time on 19 and 20 September 2026, captivating spectators with a breathtaking display. Over 1 lakh people, including students, National Cadet Corps (NCC) cadets and National Service Scheme (NSS) volunteers turned up over two days to witness the display. Notably, three members of the SKAT team, including two pilots who performed aerobatics, are from Meerut.

On 20 September 2026, the show was witnessed by Raksha Rajya Mantri Sanjay Seth. Posting on X, Mr. Sanjay Seth described the event as a remarkable blend of discipline, precision, teamwork, and professionalism, and a testament to the Indian Air Force's glorious capabilities. He commended the courage and dedication of SKAT which has performed in over 800 airshows, both in India and abroad, in its 30 year journey, so far.

Posting on X on the first day of the display, Chief Minister of Uttar Pradesh Mr. Yogi Adityanath praised the precision and courage of SKAT pilots who painted the sky in the colours of the Tricolour, showcasing breathtaking precision and courage. He called it a proud and inspiring moment for the state and a nation as a whole.

Other dignitaries who witnessed the show include Rajya Sabha MP Dr Laxmikant Bajpai, UP Minister of





State Somendra Tomar, and Members of the Legislative Council Ashwini Tyagi and Shri Dharmendra Bhardwaj.

About Meerut air display

Fresh from the successful conclusion of its 2026 training season, the Suryakiran Aerobatic Team unveiled its latest formation before the people of Meerut. Flying the nine distinctive red and white Hawk Mk.132 aircraft, licence manufactured in India by Hindustan Aeronautics Limited (HAL), the team performed breathtaking aerobatic



manoeuvres that left spectators spellbound. From the graceful loop and thrilling barrel roll to inverted flying and the iconic DNA manoeuvre, every movement is a spectacular demonstration of precision, skill and seamless coordination.

The aircraft fly in extremely close proximity, at a distance of less than five metres, making every manoeuvre a testament to exceptional flying skills, discipline and absolute trust within the formation. Adding another striking dimension to the display, the Hawk Mk.132 aircraft have undergone a significant indigenous modification involving the integration of smoke pods capable of producing coloured smoke. Developed in India at the Indian Air Force's Base Repair Depot, Nashik, the modification enables the aircraft to paint the sky in the colours of the national flag, ie, saffron, white and green.

Established in 1996, SKAT holds the distinction of being the only nine aircraft aerobatic team in Asia and is among the select few such teams in the world. Having enthralled audiences with more than 800 displays across India and represented the professionalism of the Indian Air Force at international air shows in China, Sri Lanka, Myanmar, Thailand, Singapore, the UAE and Dubai, Suryakiran has grown into far more than an aerobatic team. As the 'Ambassadors of the Indian Air Force', it carries the spirit of the Service wherever it flies, showcasing a rich legacy of excellence while inspiring the youth to aspire towards a career in the Defence Forces and offering them an opportunity to witness first-hand the professionalism, precision, discipline and dedication that define the Indian Air Force. ➡

Text: IAF

**All photos: Arindam Nandy
(Twitter/X @Arindamnandy18)**

The Westland Wapiti, history and its service with the IAF



Foreword by Marshal of the IAF Arjan Singh DFC

About eighty years ago, on the 1 April 1933, two RAF Officers, alongwith a couple of dozen Indian airmen formed No.1 Squadron, Indian Air Force. The Squadron was not more than a flight in size, equipped with four Westland Wapiti aircraft – and they welcomed the five newly commissioned Indian officers who had finished training at RAF Cranwell in the United Kingdom. Over the next eight years, they were joined by another dozen Indian officers, also trained at Cranwell. These officers operated on the North West Frontier flying this aircraft.

The joke, almost a fact, was that it took off, flew and landed at the same speed i.e. 75 mph. It had a radial, uncovered engine. Even if two plugs and flames came out,



it continued functioning. I was the last of the officers who graduated from Cranwell, finishing my training along with Prithipal Singh in December 1939. However, by the time I joined 'Q' Flight (formerly 'A' Flight) of No.1 Squadron at Drigh Road, the Wapitis had been replaced by the more marginally modern Hawker, Hart and Audax.





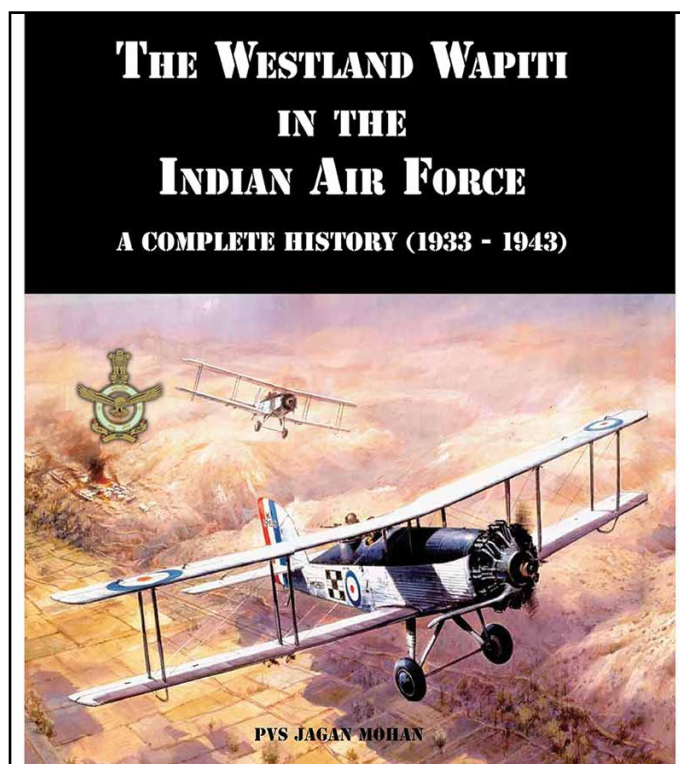
I had already flown these aircraft during my training in the UK. I would never have thought I would fly the same aircraft in No. 1 Squadron in 1940. From my logbook I see that my first flight in the aircraft was on the 16 August 1941. My Flight Commander, at that time, Jumbo Majumdar, flew with me on a check flight. After the check flight, I got to fly solo on this aircraft which was larger than any other biplane I had flown till then. Over the next year or so, I flew hundreds of hours on this aircraft. I operated it on the North West Frontier and went on detachment to southern India – Madras, Bangalore and Cannanore. I even had an accident in one of this type of aircraft; the aircraft was always very forgiving in such mishaps.

The Wapiti served not only with No.1 Squadron, but also No.2 Squadron raised in 1941 and with various IAF Coastal Defence and AA Flights. During the early years of the war, when the Indian Air Force expanded rapidly, dozens of pilots learnt flying on the Wapiti. However the days of the aircraft were numbered in the light of the Japanese invasion. By the time I had converted to Hawker Hurricanes and led No. 1 Squadron into operations based at Imphal in 1944. The Wapiti did yeoman service to the Indian Air Force in moulding the first generation of its officers and airmen.

Introduction by PVS Jagan Mohan

The Westland Wapiti was a general purpose military airplane that grew out of the practice current prevalent towards the tail end of World War I. At that time, a single type of aircraft was used for multiple roles and tactical duties. In 1927 the RAF floated a requirement for the replacement of the DH 9A under Air Ministry specification 26/27. The Westland Wapiti was the outcome.

The Wapiti was a conventional single engine equal span biplane accommodating a pilot and an observer/air-gunner. It had tandem open cockpits and a fixed main



The Westland Wapiti in the Indian Air Force (1933–1943)

undercarriage plus tail-skid. The forward fuselage was of metal tube structure with aluminum and fabric covering, while the rear fuselage was of fabric covered wooden construction. The wings and tail were standard wooden DH.9A components, although later models replaced the wooden parts with an all metal structure. The Wapiti was powered by a single Bristol Jupiter VIII radial engine, and was armed with a single forward firing Vickers machine gun and a Lewis gun for the observer. It could carry up to 580 lb (264 kg) of bombs under the wings and fuselage.

The prototype first flew on 6 March 1927, followed by further trials at the Aeroplane and Armament Experimental Establishment (A&AEE). It was during this time the aircraft acquired the name “Wapiti”, which was



derived from the American-Indian Cree word for a white deer that was prevalent in North America. In squadron service, the aircraft was simply referred to as "the Wop". After the trials, an initial contract for 25 Wapiti Mark 1 was placed in October 1927.

After initial production, the wooden fuselage, tail and wings were replaced by metal structures in the Wapiti II and IIA, and the original long fuselage was eventually re-instated in the Wapiti V and later versions.

The type entered service with No. 84 Squadron RAF in Iraq in June 1928. Many of the RAF squadrons based in India also re-equipped with the type. Some examples were sent to Canada and Australia as well. The type proved to be a very reliable and safe aircraft for the aircrews. In 1933, the Wapiti flew 52,458 hours in RAF and IAF service – and there were only 34 major accidents involving aircraft that needed to be replaced. The attrition rate was lower than that for other types in RAF service. It averaged 10,800 hours for every fatal accident. Most of the accidents occurred during landing phase. Less than 25% of all the major and minor accidents were in flight.

In India, seven RAF squadrons flew the type – Nos. 5, 11, 20, 27, 28, 31 and 60. Additionally, from 1933 till late 1939, No.1 Squadron was the only unit in the Indian Air Force, and the only one where Indian pilots were flying the Wapiti.



With the establishment of the Flying Training School at Risalpur, by converting No. 27 Squadron RAF, a wave of Indian Air Force Volunteer Reserve (IAFVR) pilots undertook training on the aircraft. In October 1940, several IAFVR Coastal Defence Flights were raised which were equipped with some Wapitis.

In April 1941, No. 2 Squadron, Indian Air Force was raised at Peshawar with the Wapiti forming their main equipment. This was followed by the raising of three Anti-Aircraft Co-operation (AAC) Flights, also flying the Wapiti in some numbers. By this time it became common for pilots to refer to them as "What a Pity" – the age of the aircraft and the effects of the tropics made it a difficult aircraft to maintain. In fact it would be these AAC Flights that would be the last pasture from which the Wapitis would gracefully fade away in late 1943.

A total of 553 Wapitis were built between 1927 and 1932 by Westland Aircraft of Yeovil, Somerset. Out of these, 68 (nearly 12%) served with various Indian Air Force units, or



were involved closely with Indian pilots. 56 of the Wapitis were Mk.IIAs, while 12 were the Mk.V variant, which was a long fuselage army co-operation version for the RAF.

History of the Wapiti by Vijay Seth

The Westland Wapiti was a British two seat general purpose military single engined biplane of the 1920s. It was designed and built by Westland Aircraft Works to replace the Airco DH.9A.

First flying in 1927, the Wapiti entered service with the RAF in 1928, and remained in production until 1932, a total of 565 being built. It equipped twenty squadrons of the RAF, both overseas (particularly in India and Iraq) and at home, remaining in RAF service until 1940, also being used by the Air Forces of Australia, Canada, South Africa and India. The Wapiti is named for the Wapiti, also known as elk, one of the largest species of the deer family and one of the largest land mammals in North America and eastern Asia.



In 1927, the British Air Ministry issued Specification 26/27 for a replacement of the elderly Airco DH.9A, designed during the First World War which still equipped the Royal Air Force's General Purpose squadrons. To save time and money, the specification called for the use of a high proportion of DH.9A components, (as the RAF still held large stores of DH.9A spares), while it encouraged the use of an all metal structure. A large number of types were tendered to meet this requirement from most of the major British aircraft manufacturers, including Westland,

who submitted the design that later became known as the Wapiti. Westland had an advantage in that it had carried out the detailed design work for the DH.9A, and was already a major contractor for the DH.9A.

The Wapiti was a conventional single engined equal span two bay biplane with slight stagger. It had tandem open cockpits and a fixed main undercarriage plus tail-skid. The forward fuselage was of metal tube structure with aluminum and fabric covering, while the rear fuselage was of fabric covered wooden construction. The wings and tail were standard wooden DH.9A components, although later models replaced the wooden parts with an all metal structure. The Wapiti was powered by a single Bristol Jupiter radial engine, and its crew of two were armed with a forward firing Vickers machine gun and a Lewis gun for the observer, while it could carry up to 580 lb (264 kg) of bombs under the wings and fuselage. It was also fitted with radio and photographic cameras, and like the DH.9A before it, could carry a spare wheel for operations in adverse terrain.



The prototype first flew on 7 March 1927. Initial tests showed poor control, and the prototype was modified with a much larger tail and horn balanced ailerons, solving these problems. The Wapiti performed well during RAF trials, while using significant amounts of DH.9A components, and was declared the winner of the competition, an initial contract for 25 aircraft being placed in October 1927. After initial production, the wooden fuselage, tail and wings were replaced by metal structures in the Wapiti II and IIA,



and the original long fuselage was eventually re-instated in the Wapiti V and later versions. In 1930, Westland produced an updated version of the Wapiti, the Wapiti VII, which differed so much that it was renamed the Westland Wallace.

The type entered service with No. 84 Squadron RAF in Iraq in June 1928. It was heavily used in Iraq and India in the Army Co-operation role, acting also sometimes as a bomber or reconnaissance aircraft. Wapitis of No. 20 squadron escorted Victoria troop carriers in the evacuation of Kabul (the Kabul Airlift) in December 1928. It was still in service in India until 1942. In Britain, Wapitis served with the Auxiliary Air Force from 1929 to 1937. It was also



flown by Australia and Canada, where it saw service at the start of the Second World War.

The prototype Wapiti V, registered G-AAWA, was used for demonstration flights in Argentina and Uruguay on floats, powered by a 550 hp Armstrong Siddeley Panther





IIA engine. It was later modified as the Bristol Pegasus powered Westland PV-6 or Wapiti VII, re-registered G-ACBR (also known as the Houston-Wallace after the patron Lucy, Lady Houston), for an attempt to fly over Mount Everest. Flown by Flt Lt David F. McIntyre and accompanied by a Westland PV-3 the two aircraft became the first to fly over Mount Everest on 3 April 1933. The PV-6 was later designated the Wallace Mk.I, bearing serial K3488 which introduced a number of improvements. A total of 68 Wapitis were converted to Wallace Mk.I standard.

A Westland Wapiti (S. No. K-813) survives at the Indian Air Force Museum, Palam, Delhi. It is the last surviving aircraft of the type. The fuselage and lower wing of another (S. No. K-811) reportedly survived at the museum's storage facility but in June 2012 it was

confirmed that only K-811's lower wing survives, albeit in a ruinous condition.

Specifications (Wapiti IIA)

General characteristics: Crew: 2; Length: 31 ft 8 in (9.65 m); Wingspan: 46 ft 5 in (14.15 m); Height: 13 ft (3.96 m); Wing area: 488 sq ft (45 m²); Empty weight: 3810 lb (1732 kg); Loaded weight: 5410 lb (2459 kg); Powerplant: 1 × Bristol Jupiter VI 9-cylinder air cooled radial engine, 420 hp (313 kW).

Performance

Maximum speed: 112 knots (129 mph, 208 km/h) at 6500ft (1980 m); Cruise speed: 96 knots (110 mph, [24] 177 km/h); Range: 313 nm (360 mi, 580 km); Service ceiling: 18,800 ft (5730 m); Rate of climb: 1140 ft/min [25] (5.8 m/s); Wing loading: 11.1 lb/ft² (57.9 kg/m²); Power/mass: 0.0776 hp/lb (0.127 kW/kg); Climb to 10,000 ft 15 minutes.

Armament

Guns: One 0.303 inch forward firing Vickers gun and one Lewis gun on Scarff ring on rear cockpit; Bombs: Up to 580 lb of bombs. ➡

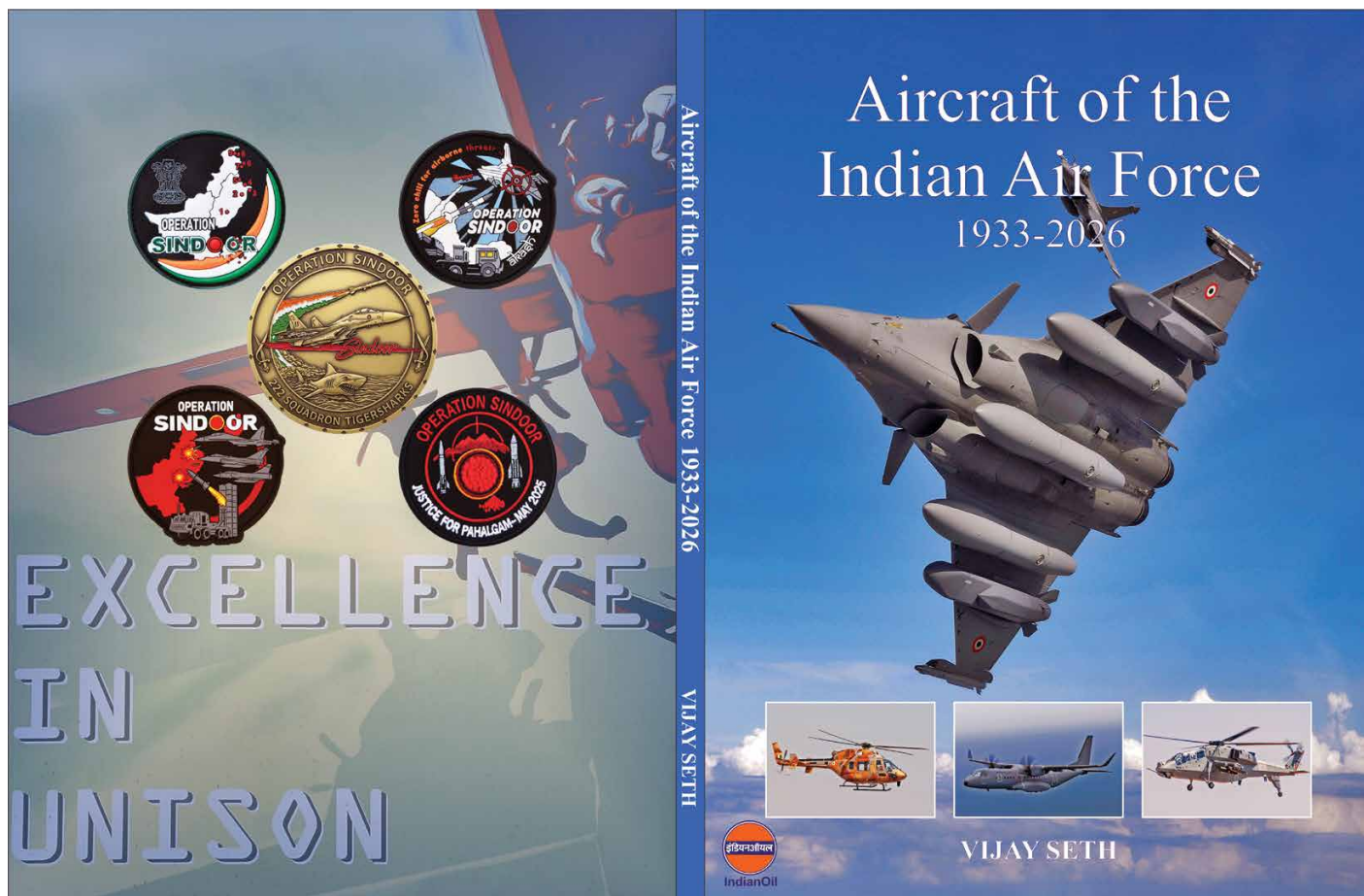
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Book review

Vijay Seth's Aircraft of the Indian Air Force 1933–2026



The Gnat fighter aircraft of the Indian Air Force first tasted blood and the pilots were declared heroes of the Battle of Boyra, much before the formal declaration of war by India on Pakistan in December 1971. The opportunity to sit in the Gnat aircraft at Dum Dum airport at Calcutta left a lifelong impression on a lad of eight. These memories never fade but kindle a spark, maybe after a



decade, when I had the opportunity to see and photograph military aircraft at the Air Force Day Parade at Palam for the first time in 1985. No opportunity was missed to shoot images as a freelance 16mm film cameraman, attached to Lucknow and later Delhi Doordarshan. The assignment came as a bonus to travel in the VIP Boeing with the CAS to Hashimara or the RRM to Vizag. Or a seven day trip via the IAF's air courier to the north-east in the Il-76. These were once-in-a-lifetime experiences.

Support was always provided by the publicity and public relations officers at the Ministry of Defence, who had considerable experience in filmmaking. I produced my first documentary film, "The Flying Tigers", about No. 1 Squadron, which operated the Mirage 2000. Our efforts finally paid and the film was telecast on DD National. This venture boosted my morale and by the end of the Ops Safed Sagar in 1999, I published a book on the IAF.

A collection of artefacts and memorabilia is the first thing that comes to mind when you see these on regular trips and visits to various air bases. In the last two decades, I have amassed a large collection of books on Indian military aviation, brochures, and all sorts of printed materials. The collection also included books and magazines on worldwide

aviation. This did not include any comprehensive book on the Indian Air Force, as none were available at bookshops.

With meagre resources, I started compiling a history book titled *Aircraft of the Indian Air Force* in 1999. Post-Kargil war, the post-war frenzy was high, and I managed to compile a semi-pictorial book, with support from Air HQ and the Photo Section, MoD. I finally decided to publish the book myself, with the support of Shri JR Nanda of Avi-Oil, my mentor, who has helped me publish aviation books for over two decades. The *Flying Machines 1933-1999* was released in 2000; this was followed by the second edition, "*The Indian Air Force at Eighty 1932-2012*" in 2013, in full colour, with updated sections and new chapters. This was the tenth book published under my name; this was followed by a score of squadron books, designed and produced. Air HQ facilitated photo shoots at numerous air stations, and the opportunity to document various



our journey publishing books, we have always been fortunate to have been supported by numerous public-sector and aviation companies, who have lent a helping hand in times of crisis.

The third edition of *Aircraft of the Indian Air Force*



air activities at operational air bases was captured. The data bank grew by leaps and bounds; old aviation images were sourced and used in numerous aviation publications. Exposure to activities at air bases gave rise to many new ideas for aviation publications. Every few years, new aircraft were being inducted into service, and the force level was being consolidated and expanded. Induction and phase-out ceremonies were a regular feature around the capital. Being a witness to numerous such occasions. My fascination was catching all types of military aircraft at as many air bases as possible; numerous opportunities arose when I witnessed many historic ceremonies. Throughout

1933-2026 is a thrilling and thoroughly refreshed volume that brings the IAF's storied past and dynamic present into sharp, vivid focus: numerous old sections have been comprehensively updated, thirty one new aircraft types have been added since the first edition, and the imagery across the IAF inventory since 1933 has been revitalised to reflect current knowledge and aesthetics. Exciting new additions like the Heritage Flight section and coverage of Ex Tarang Shakti 2024 enrich the book's narrative, while the Milestone section offers a unique, tightly compiled chronology of pivotal dates charting the IAF's evolution, including key post Ops Sindoor projects, underscoring how the force has grown into a vibrant, modern institution.

Over seven decades, many authors have contributed to the documentation of Indian military history, and this edition thoughtfully includes a compendium style bibliography that collates these valuable publications, making the book both an authoritative reference and a celebratory tribute to the Air Force's legacy. ➡

Text by the author Vijay Seth

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Aircraft of the Indian Air Force 1933-20

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In Thrust, We Trust!

India's race against time to develop an indigenous high thrust class engine for AMCA



The Indian Air Force is gearing up for the next generation, ever evolving, multi-domain collaborative combat environment. And for that, many highly ambitious programmes have been initiated to meet critical requirements. Of all these, undoubtedly, an initiative for a high thrust class engine for the next generation combat platforms is the most pivotal. The engine is the only thing that can make the customer at the mercy of the provider. So, for independence and self-reliance in the true sense, an indigenous engine with required capabilities is a must. Currently, only a few countries have successfully mastered the required technologies and are now thrusting towards the next generation one. But for India, it's the stepping stone, as the Kaveri programme didn't yield the necessary result.

Who is at fault for the failure of the Kaveri programme? It's not easy to give a simple one line answer. But yes, four points must be mentioned, which can be attributed as key reasons. One, discontinuity at a point of arguably good progress; two, minuscule funding compared to the investment by other nations; three, lack of critical technologies in metallurgy; and four, lack of critical infrastructure and test beds. But thankfully, a measure of course correction has been initiated.

For the AMCA and TEDBF, India will need a new generation advanced engine with high thrust. So, India has initiated the Advanced High Thrust Class Engine (AHTCE) programme, aiming to bridge the crucial gap with other countries leading in this front. It will be led

by the Gas Turbine Research Establishment (GTRE). But the biggest hindrance is India's limited prowess in some necessary leading edge technologies. And for the development of those crucial technologies, India is looking for a foreign partner for co-design and development. The idea is, with the help of the partner, India will be able to have a leap in the highly complex technologies in a comparatively shorter time than it would have taken in a solo journey. As India acquires proficiency through 100% transfer of technology, it will hold the intellectual property rights, or IPR, which will allow India to make further improvements when necessary and have a seamless export of indigenous platforms powered by indigenous engines without any restriction.

Meanwhile, GTRE has invited an Expressions of Interest (EoI) from Indian defence and aerospace companies to partner as Development cum Production Partner (DcPP) for the AHTCE programme. The selected partner will support



design, development, manufacturing, integration, testing and certification of the engine developed in partnership with the selected international house.

The GTRE has released an RFI as well for the establishment of a National Aero Engine Test Complex (NAETC), which will be the nerve centre of the complex development. NAETC will oversee extensive and crucial testing, performance validation, measurement of durability, ensuring safety, and certification at completion. The NAETC will be India's first single integrated testing facility consisting of multiple ranges for a thorough assessment. The most crucial one of these will be the High Altitude Engine Test Facility. It will ensure the engine's seamless performance at a very high altitude and at a very cold temperature. Other facilities, individually, will evaluate the fan and the compressor, turbine, combustor, and the afterburner. However, a decision to procure a flying test bed (FTB) is yet to be taken. Without the FTB, one cannot assess performance in real-time. Without an Indian FTB (not necessarily an indigenous one, but Indian owned), the dependence on a foreign equivalent will not end, and that will not allow seamless testing in a financially viable manner.

Currently, two parallel programmes are emerging for the development of the AHTCE. The first one is led by the GTRE with Safran as a partner. According to the reports, an investment of Rs. 61,000 crore (roughly \$7.44 billions) is planned. It aims to conclude the programme in a timeline of 12 years from the date of signing of the contract. Initially, an engine with an output of 120 kN is planned. 9 prototypes will be developed for the purpose. Once successful, India will push it for an even higher thrust of 140 kN for future requirements.

The second programme is a private initiative, and thus it's even more interesting. Recently, Reliance Industries and Rolls-Royce announced a strategic intent to partner and develop a high thrust engine. The partnership will also explore the formation of a dedicated Aerospace Gas Turbine Complex. Earlier, Rolls-Royce gave a timeline of 10 years for the successful development of a 120 kN engine. If a contract is signed by this year (2026), the engine core will be tested in 2030, followed by the first flight in 2034. The production can be expected by 2036. According to Rolls-Royce, it will be a new design to ensure 100% IPR to India. However, there has been no mention of the number of prototypes to be developed. Most possibly, a detailed road map will be published only after an official agreement.

On paper, having two parallel programmes is quite exciting. But one should wait for the official announcement for a clear picture. The concerns are quite real, as one should wonder why one seller would enable a customer to be independent, which will eventually affect their own business! One should ask two questions: What do they mean by 100% ToT, and what do they mean by 100%



IPR? According to analysts, the foreign design houses will develop the new engine based on already existing systems, which took them years to develop and mature. They are skeptical of their willingness to share the IPR in the true sense. But the fear of unsuccessful acquisition in some cases must not overshadow the opportunities awaiting. When an official agreement is concluded, much of the fog will get cleared.

At this moment there are reports of rejuvenation of the original Kaveri programme. One should not be confused with the Kaveri Derivative or Kaveri Dry Engine, which is being developed as a non-afterburner engine to power Ghatak (Future Unmanned Fighter Aircraft) UCAV. The revived Kaveri programme is reported to be a continuation of the existing Kaveri led by the GTRE, again, with an aim of generating an output of 90 kN and, if possible, pushing the envelope up to 100 kN. Thus, the GTRE is widely reported to have a two pronged strategy. However, this is still not officially asserted. But the voice for a completely indigenous engine programme, in parallel, is growing only louder. The Society of Indian Defence Manufacturers (SIDM) has urged the government to launch "Mission Aero Engine" to develop an indigenous 110 kN system.

The AHTCE programme is so crucial for India's sovereignty that India can't afford to fail it this time. AHTCE will not just ensure the success of future advanced fighter jet programmes like AMCA and TEDBF but also



push further into the next domain of complex power packs. And, with acquired knowledge, India can apply it in the development of high bypass turbofans of different classes for Indigenous civil or transport platforms in the future. Yes, one day they will be designed, developed, manufactured and flown by India. The challenges are huge, but the opportunities are limitless! ➡

Article by Sankalan Chattopadhyay
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Photos: VAYU

MBDA: Promoting “Make in India” for air delivered weapons

As India aggressively pursues Atmanirbharta (self-reliance) in defence, the focus has shifted to localised production and co-development of critical technologies from the earlier reliance on foreign procurement. In the high stakes domain of air-to-air and air-to-surface weaponry, MBDA—the European leader in missile systems—is positioning itself as a key facilitator of this transition.

By integrating itself into the Indian ecosystem to help the Indian Air Force (IAF) modernise its arsenal while building a domestic industrial base, MBDA is helping the realisation of the “Make in India” vision for air weapons.



Shifting from ‘Buy’ to ‘Make’: Strategic partnerships

MBDA’s strategy for India is pivoted on the transition from direct sales to strategic partnerships with large, local enterprises. Indian firms, including those under the Defence Industrial Corridors, are befitting from technology transfer and gaining manufacturing know-how through collaboration with MBDA.

Under the ‘Make in India’ framework, MBDA is exploring models where components are not just assembled in India, but manufactured locally. This reduces dependency on foreign Original Equipment Manufacturers (OEMs) and ensures that the supply chain for critical air weapons is resilient and localised.

Co-Development and Technology Transfer (ToT)

The “Make in India” initiative extends beyond assembly lines and into intellectual property by moving toward co-development models. By sharing technical



expertise in precision guidance, propulsion, and warhead technology, MBDA helps Indian engineers bridge the gap between legacy systems and next generation weaponry. This facilitation is critical for the IAF’s requirements for Beyond Visual Range (BVR) Missiles which can enhance the strike range and accuracy of Indian aircraft. Likewise, advanced targeting can reduce collateral damage from the use of Precision Guided Munitions (PGM).

Integrating with indigenous platforms

For a weapon to be truly “Made in India,” it must be seamlessly integrated into indigenous platforms like the Tejas LCA. MBDA is facilitating this by ensuring weapon systems are “platform agnostic” or specifically tailored for integration into Indian made aircraft. By providing the software hooks and integration protocols to Indian defence scientists (DRDO), MBDA ensures that the synergy between the airframe and the weapon is optimised locally, fostering a domestic capability to integrate complex electronics and weapon systems.

Enhancing the local supply chain (SMEs and MSMEs)

MBDA is committed to facilitate the growth of India’s Small and Medium Enterprises (SMEs). The production of a single missile requires thousands of precision components. By qualifying Indian vendors to meet global aerospace standards, MBDA is upgrading the quality of the local industrial base. This “trickle-down” effect means that even small scale Indian machine shops are being elevated to global standards of precision engineering.

A key pillar of ‘Make in India’ is the ability to maintain and upgrade equipment without sending it back to the country of origin. MBDA is facilitating the establishment of local Maintenance, Repair and Overhaul (MRO) hubs. By training Indian technicians and providing the necessary diagnostic tools, MBDA ensures that the IAF maintains high operational readiness while creating high skilled technical jobs within India.

MBDA is facilitating the “Make in India” vision by evolving from a supplier into a strategic partner. Through technology transfer, local partnership, and the integration of advanced weaponry into indigenous platforms, MBDA is helping India move beyond the role of an importer. In doing so, they are ensuring that the future of India’s aerial deterrence is not just bought, but built on Indian soil.



By Ludovic Dumont, General Delegate, MBDA India

Raytheon awarded 7 year contract for Tomahawks

Raytheon will dramatically accelerate the production of Tomahawk cruise missiles for the US Navy over the multi-year period under the terms of an unprecedented \$22.9 billion contract, awarded as part of the Department of War's Arsenal of Freedom. This contract follows the landmark agreements between Raytheon and the Department of War and supports the annual production ramp to more than 1,000 Tomahawk missiles and associated support, ensuring a stable, predictable supply for the Navy and allies.



Boeing to increase SM-3 production

Boeing has signed new seven year framework agreements with the US Department of War (DoW) and Raytheon to increase production of critical hardware for the Standard Missile-3 (SM-3), including avionics and ejector assemblies that support precise intercepts of missile threats outside Earth's atmosphere.



Colombia acquires the Embraer KC-390

Embraer announced that the Fuerza Aeroespacial Colombiana (FAC) had signed a contract for the acquisition of two KC-390 Millennium multi-mission aircraft, marking a significant milestone in the modernisation of Colombia's airlift and aerial refueling capabilities. The contract also includes mission equipment, an integrated services and support package,

and a comprehensive offset programme designed to meet Colombia's regulatory requirements.



Rafael trials advanced Spyder

Rafael Advanced Defense Systems Ltd has successfully completed a trial of the advanced Spyder air defence system, equipped with I-Derby ER and I-Derby LR missiles. The trial, conducted in Israel, involved several scenarios simulating current and future threats. During the trial, the system successfully intercepted multiple threats, including low radar signature unmanned aerial vehicles (UAVs), in a challenging operational scenario, achieving direct and precise hit-to-kill engagements.



NGC to accelerate missile interceptor production

Northrop Grumman has signed two multi-year framework agreements totaling over \$3 billion to



further power the Arsenal of Freedom. Working alongside the US Department of War and Lockheed Martin, the company is increasing production and accelerating delivery of critical munitions technologies and reinforcing the nation's integrated air and missile defence.

Rheinmetall unveils GMF 140

Rheinmetall has unveiled the GMF 140, a next generation 140 metre, 6,000+ tonne guided missile frigate designed to "deliver unmatched capability across the full spectrum of modern naval warfare". With the GMF 140, Rheinmetall is targeting international markets and intends to offer it initially as part of a procurement project in North America.



Airbus signs MoU for Eurodrone

Airbus has signed a Memorandum of Understanding with Kawasaki Heavy Industries. Under the MoU, Airbus, in cooperation with Kawasaki Heavy Industries, will analyse opportunities to work on a Japanese anti-submarine warfare variant of the U950 Eurodrone, Europe's first Large Long Endurance Remotely Piloted Aircraft System (RPAS). Japan has held observer status in the Eurodrone programme since 2023.



Raytheon awarded \$1.1bn by US Navy

Raytheon was awarded a \$1.1 billion contract from the US Navy to produce AIM-9X Block II missiles to bolster US military inventory and meet increased demand from allied nations. Under the contract, Raytheon will produce AIM-9X missiles along with associated hardware and software for US and Foreign Military Sales customers.



Naval Group delivers 4th Barracuda

On 24 June 2026, Naval Group delivered the De Grasse, fourth in a series of six nuclear powered attack submarines (SSNs) built in Cherbourg for the French Navy under the Barracuda programme managed by the French Defence Procurement Agency (DGA).



Romania orders Skyranger 35

Rheinmetall has achieved another significant success in the field of ground based air defence (G&AD) systems; the Romanian government has awarded the company a contract to supply Skyranger 35 air defence systems.



Boeing's MQ-28 flies with USAF in Indo Pacific

Boeing's MQ-28 Ghost Bat participated in Exercise Valiant Shield alongside F-35A, F-35B, F-15EX, HC-130, E-3, E-2D, EA-18G, RC-135, and various other joint and coalition aircraft becoming the first and only collaborative combat aircraft (CCA) deployed to a multinational, joint operational exercise. During Valiant Shield 2026 in June, the Australian-developed MQ-28 Ghost Bat integrated with forces from the US Pacific



Saudi Arabia has requested the US to buy up to ten thousand (10,000) Advanced Precision Kill Weapon System (APKWS-II) air-to-air guidance sections; and up to ten thousand (10,000) APKWS-II air-to-ground guidance sections. The following non-major defence equipment items will also be included: LAU-131 A/A launchers; Mk-152 high explosive warheads; MK66 rocket motors; proximity fuzes; WTU-1/B practice warheads; inert MK66 rocket motors; test support equipment, etc. The estimated total cost is \$1.96 billion.

BAE in 40Mk4 naval gun order from Brazil

Command to support the US Air Force's Experimental Operations Unit's CCA integration objectives.

Canada selects 212CD submarines

Canada has decided to proceed with Norway and Germany on the acquisition of the 212CD submarines, which are the same type of submarine that Norway and Germany are acquiring. The decision means the parties will now start contract negotiations on Canadian participation in the 212CD programme. By choosing to participate in the 212CD programme, Canada will become an equal partner in an established submarine cooperation with Norway and Germany. The programme facilitates joint development, standardisation and long term operational effect for allied nations.



Saudi Arabia for 10,000 APKWS



BAE Systems has received a contract for two Bofors 40Mk4 naval gun systems for the Brazilian Navy, forming part of the Patrol Vessel Construction Project (PRONAPA). The ammunition used by the 40Mk4 is a flexible and multipurpose round, suitable to defeat targets such as drones, missiles, helicopters, swarming boats, surface vessels and land targets.



Sikorsky eyes Europe for NGRC production

Sikorsky confirmed that it is actively pursuing the establishment of a Next Generation Rotorcraft (NGRC) production line in Europe. The move underscores Sikorsky's commitment to deepening its partnership with NATO and advancing collaborative research and development in Europe.



SMBC Aviation Capital orders 100 Boeing 737 MAXs

Boeing and SMBC Aviation Capital announced that the aviation finance platform and lessor had ordered 100 737 MAX airplanes, including 60 737-10 and 40 737-8 jets. The 737-10 order represents SMBC Aviation Capital's first purchase for the 737 MAX family's highest capacity variant. With this order, SMBC Aviation Capital increases its owned, managed and committed to portfolio for the 737 MAX family to 450 jets.



BA for P&W GTF to power 63 A320neo's

Pratt & Whitney announced that British Airways had selected GTF engines to power 33 firm and 30 option Airbus A320neo aircraft. Pratt & Whitney will also provide maintenance for the engines through a 12-year EngineWise Comprehensive services agreement, ensuring optimised fleet efficiency and cost of ownership.



CFM certification for LEAP-1B durability upgrades

CFM International has secured certification of the CFM LEAP-1B high-pressure turbine (HPT) durability kit from the US Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA). The system will double time on wing in hot and harsh environments like in Middle East and India. CFM is beginning to industrialise production of the hardware, with full production cutover expected in early 2027.



CFM LEAP-1B to power 60 Boeing 737 Max for Copa Airlines

At a ceremony with Panamanian President José Raúl Mulino, Copa Airlines and CFM International finalised an agreement for CFM LEAP-1B engines to power 40 firm and 20 option Boeing 737 MAX aircraft.



American Airlines selects CFM

American Airlines and CFM International announced that American's future deliveries of Airbus A321neo aircraft will continue to be powered by the CFM LEAP-1A engine. These engines will be installed on Airbus A321neo aircraft that American ordered two years ago. As part of the expanded partnership, CFM International will continue to provide long term maintenance for American's CFM LEAP-1A engines for years to come.



GKN Aerospace collaboration with P&W on PW1500G and PW1900G

GKN Aerospace has secured an agreement with Pratt & Whitney, an RTX business, to include low-pressure compressor (LPC) vanes for the Pratt & Whitney PW1500G and PW1900G GTF engines, powering the Airbus A220 and Embraer E-Jet E2 families, within the existing risk and revenue sharing programme (RRSP).



Eve Air Mobility and Moov in Lol for 30 eVTOLs



Eve Air Mobility and Moov have signed a Letter of Intent (LOI) for up to 30 electric vertical take-off and landing (eVTOL) aircraft, supporting the companies' joint exploration of advanced air mobility (AAM) opportunities in Cabo Verde and Europe. The initiative will evaluate how eVTOLs can expand tourism and regional mobility offerings across the African archipelago.

Riyadh Air commits to purchase 28 Dreamliners

Riyadh Air, the new national carrier of the Kingdom of Saudi Arabia, and Boeing announced that the airline was exercising options for 28 more 787 Dreamliner jets as part of its growth plan. The agreement to exercise most of the options from Riyadh Air's 2023 order also includes the conversion of 20 airplanes to the larger 787-10 variant.



Next gen drone and missile warheads unveiled

BAE Systems has unveiled BlackThorn, a new generation multi-role modular warhead designed specifically for autonomous platforms, one-way effectors, counter-drone systems, missiles and uncrewed ground vehicles. Designed to address the growing need for an assured, agile munition that can be easily integrated across platforms and systems, BlackThorn is tailored to meet the demands of modern conflict whilst also being capable of rapid manufacture at scale and low cost.



Voyageur for 1st Airbus U030 Flexrotor

Airbus Helicopters and Voyageur Aviation have signed an agreement for the first purchase order of the Airbus U030 Flexrotor uncrewed aerial system (UAS) in Canada. Signed at the Farnborough International Airshow, the contract marks Voyageur as the official Canadian launch customer for the platform, introducing a “highly advanced, mission proven capability to the Canadian market”.



USAF tests CCA at Creech AFB

The future of air combat is being forged in the Nevada desert as the Air Force’s Collaborative Combat Aircraft Experimental Operations Unit pushed the boundaries of semi-autonomous technology during a recent Agile Combat Employment exercise. A US Air Force YFQ-44A Fury aircraft assigned to the Collaborative Combat Aircraft Experimental Operations Unit, sits on the flightline during weapon loading procedures at Creech Air Force Base. The exercise was designed with a primary goal of building the foundational tactics, techniques and procedures that will define how CCA are integrated into the force. ➡



FORM IV

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Signature of Publisher

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Rosoboronexport's RVV-SDM for the Su-57E



Rosoboronexport (part of the Rostec State Corporation) is launching a global marketing campaign for Russia's new RVV-SDM medium-range air-to-air missile, developed and manufactured by Tactical Missiles Corporation.

The RVV-SDM missile is designed to equip the Su-57E fifth-generation fighter jets produced by UAC, a Rostec subsidiary, and delivered for export. It can also be used on other Russian made aircraft after their appropriate modifications, and can also be integrated into the armament systems of foreign made aircraft.

"Rosoboronexport notes a growing interest of the global market in the Su-57E fifth generation fighter. The aircraft has proved its superiority in actual combat conditions over the most advanced air defence and electronic warfare systems. It has engaged numerous air, ground and surface targets with Russian air launched munitions, including the latest RVV-SDM guided missile. The missile has a longer launch range, an increased power-to-weight ratio, higher effectiveness, as well as better aerodynamic performance. Furthermore, it incorporates a passive radar homing channel, providing complete stealth, high guidance accuracy, fire-and-forget effectiveness and resistance to jamming," stated Rosoboronexport Director General Alexander Mikheev.

The RVV-SDM air-to-air missile is designed to engage aircraft, helicopters, cruise missiles and UAVs around-the-clock and in an electronic countermeasures (ECM) environment. It is equipped with an active/passive radar seeker, an inertial control system and a radio update link. The missile can engage targets flying at altitudes from 15 m to 25 km, including at speeds up to Mach 3.

Rosoboronexport is offering its partners the latest RVV-MD2 short-range air-to-air missiles, the RVV-SDM medium-range air-to-air missiles, as well as the RVV-BD long-range missile, which has proven its combat capabilities, for equipping the Su-57E fighter.

In addition, the armament system of the Russian 5th generation fighter in the export version includes Kh-38MLE air-to-surface guided missiles, Kh-69 stealth precision-guided air-launched cruise missiles, Kh-58UShKE anti-radar missiles, Kh-35UE anti-ship



missiles, as well as KAB-250LG-E guided aerial bombs and UPAB-1500B-E guided glide bombs.

Air launched weapons for fifth generation fighters are designed for carriage both in internal weapons bays, which reduces the radar signature, and on external hardpoints. The Su-57E's low radar signature gives it an overwhelming tactical advantage over 4+ and 4++ generation fighters, both in air-to-air combat and when engaging ground and surface targets. The Su-57E fighter is the only 5th generation fighter in the world that, in a stealth configuration (with internal missile carriage), uses large-sized Kh-69 long range air-to-surface cruise missiles.

"Rosoboronexport is ready to negotiate contracts with countries friendly to Russia for the supply of both the Su-57E fighter and the air launched weapons designed for it. In its export activities, the Company prioritises the needs of the Russian Armed Forces for weapons and military equipment. At the same time, a high production level of Russian defence industry enterprises enables us to guarantee customers the production and delivery times that are on par with, and often exceed those of our global competitors," noted Alexander Mikheev.

Rosoboronexport is Russia's sole state agency for export of the full range of defence related and dual use products, services and technologies. It is part of Rostec State Corporation. Rosoboronexport is among leaders in the global arms market. Rosoboronexport accounts for over 85% of Russia's exports of arms and military equipment. Rosoboronexport cooperates with more than 700 Russian defence industrial enterprises and organizations. The geographical scope of Russia's military-technical cooperation encompasses more than 100 countries.

Rostec State Corporation is the largest industrial company in Russia, uniting over 800 research and production organisations across 60 regions of the country. The company plays a crucial role as a major supplier of armaments, military and special equipment through the state defense order. Additionally, Rostec focuses on the development of high-tech civilian production in strategically important industries, including aircraft engineering, engine building, transportation, power engineering, medical technologies, pharmaceuticals and innovative materials among others. ➡

Rosoboronexport promotes new Garpia-A1E loitering munition



JSC Rosoboronexport (part of the Rostec State Corporation) is launching a global marketing campaign for the Garpia-A1E, the latest long-range UAV system, developed and manufactured by the Almaz-Antey Air and Space Defence Corporation.

The Garpia-A1E system is designed to engage fixed targets with specified coordinates.

“Today, the Garpia-A1E is the only loitering munition on the global market with a range of up to 1000 km. It can carry a warhead weighing over 50 kg and its CEP does not exceed 4 meters,” stated Alexander Mikheev, Director General of Rosoboronexport and Deputy Chairman of the Union of Machine Builders of Russia (Soyuzmash of Russia). “Thanks to its performance characteristics that are unique for the market and the excellent results demonstrated during actual tactical employment, the export version of the UAV has already attracted interest from foreign customers and has been presented to a number of partners. Rosoboronexport is open to negotiations regarding the supply of the Garpia-A1E system and the localisation of its production in countries friendly to Russia.”

The BLA-D long-range attack drone, part of the Garpia-A1E system, utilises a flying wing configuration with a pusher propeller. It is powered by a gasoline engine. The BLA-D loitering munition can fly at altitudes ranging from 50 to 2,500 meters with a maximum speed of at least 170 km/h. Its maximum range is at least 1000 km, and its endurance is at least 6 hours. Flight is automatic. The length of the munition’s fuselage is 3.4 meters, the

wingspan is 3 meters and the takeoff weight is 250 kg.

“When conducting contract and supply work regarding Russian military products, Rosoboronexport primarily considers the need for the manufacturer to fulfill its obligations to the Russian Ministry of Defence. Currently, Almaz-Antey has mastered the series production of the Garpia-A1E system and reached a level that enables it to fulfill contracts with foreign customers within competitive timeframes without compromising the country’s defence capability,” added Alexander Mikheev.

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Embraer on a roll!

Embraer at Farnborough Airshow

Embraer once again had a strong presence at the Farnborough International Airshow in the United Kingdom, highlighting its continued growth momentum driven by increasing aircraft deliveries, a record backlog and business expansion across key global markets.



The biennial event, which took place from July 20 to 24 at the Farnborough International Exhibition & Conference Centre in Hampshire, England, had among its highlights on static display the E195-E2 and the KC-390 Millennium multi-mission airlifter and tanker. Also, Embraer showcased its forward looking vision for urban air mobility through Eve Air Mobility, including an eVTOL full-scale mock-up and a simulated flight experience.

“Embraer is set for a sustainable growth, supported by strong demand across our businesses, expanding global presence, and continued investments in efficiency and innovation,” stated Francisco Gomes Neto, President and CEO of Embraer. “We see consistent demand across all segments of the business, and Farnborough provides a unique opportunity to engage with customers, strengthen partnerships, and pursue new business opportunities around the world.”

In the first half of 2026, Embraer delivered 109 aircraft, up approximately 20% from the 91 aircraft delivered in the same period last year, reflecting continued progress in the company’s production leveling and operational efficiency initiatives. Combined with a record backlog, these results reinforce Embraer’s strong market position and provide significant visibility for future growth.

Embraer’s E195-E2, the largest member of the E-Jets E2 family, demonstrated “the company’s leadership in efficient and sustainable aviation and support ongoing commercial discussions with customers worldwide”. Known for its “advanced aerodynamics, reduced fuel consumption, and lower emissions, the E195-E2 continues to set new standards for operational performance and passenger comfort in its segment. Embraer’s E2 is the only small narrowbody aircraft family in operation across six continents”.

Also, Embraer showcased the KC-390 Millennium, the next generation tactical transport and multi-mission aircraft. Designed for versatility, the KC-390 “offers outstanding payload capacity, speed, and mission flexibility with seamless interoperability, supporting operations such as cargo and troop transport, aerial refueling, humanitarian missions, and firefighting”. The KC-390 continues to expand its international footprint, with a growing number of operators – including many NATO (North Atlantic Treaty Organisation) member countries – selecting the platform for its combination of performance, reliability, and lower life-cycle costs.

Complementing its commercial and defence presence, Embraer featured a dedicated space for Eve Air Mobility, its subsidiary focused on advancing urban air mobility solutions. Attendees had the opportunity to explore a full scale mock-up of Eve’s electric vertical takeoff and landing (eVTOL) aircraft. The exhibit reinforced Embraer’s commitment to innovation and highlighted how Eve was advancing the future of sustainable urban air mobility through a comprehensive portfolio of aircraft, services and operational solutions.

Embraer and Saab agreement for additional 20 Gripen

Embraer and Saab announced the signing of a Heads of Agreement (HoA) providing a framework for the potential production of 20 additional Gripen aircraft at Embraer’s industrial complex in Gaviao Peixoto, Sao Paulo State, Brazil. Embraer will take responsibility for assembling

these aircraft, serving as a complement to Saab's final assembly line located in Linköping, Sweden, to meet global demand for the Swedish fighter. "The expansion of this partnership with Saab reflects the mutual trust built over the past ten years and reinforces Embraer's strategic role in the Gripen programme. We are well positioned to support increased production capacity, if demand requires it", stated Bosco da Costa Junior, President and CEO of Embraer Defense & Security.

"The partnership between Saab and Embraer reinforces our long term commitment to Latin America. Together, we are strengthening our capabilities, securing additional capacity for future business opportunities, and taking a forward leaning approach to supporting the evolving needs of our customers across the region", stated Micael Johansson, President and CEO of Saab.

Embraer's Gaviao Peixoto facility (GPX) has established itself as a strategic industrial hub, recognised for its advanced manufacturing capabilities, skilled workforce and production capacity.

Through a comprehensive technology transfer and on-the-job training under the current Gripen programme for the Brazilian Air Force (FAB), engineers, test pilots, technicians, assembly operators, and maintenance specialists have been qualified in Sweden. This cooperation has strengthened expertise and best practices on both sides, and generated lasting benefits for the two companies, contributing to the development of advanced industrial capabilities and long term growth opportunities.



Embraer's backlog reaches US\$34.5 billion in 2Q26

Embraer reported a backlog of US\$34.5 billion in the second quarter of 2026 (2Q26). Continuing an upward trend for seven consecutive quarters, the figure set a new record once again, rising 7% from the level reported in 1Q26 and 16% higher than the level reached in the same period last year (2Q25).

In Commercial Aviation, the backlog totaled US\$15.1 billion, up 15% from a year earlier. The result was driven by Azorra's new order for 15 E195-E2 aircraft, pushing the E2 programme beyond the milestone of 500 firm orders, with customers across all continents. During the Farnborough Airshow, Embraer disclosed Fuji Dream Airlines as the customer behind an order for two E175 aircraft. The jets had already been included in the backlog and were previously listed as firm orders from an undisclosed customer.

In Executive Aviation, the order backlog increased to US\$7.8 billion, 5% above the level recorded in 2Q25. The business unit's outlook is further strengthened by the triple certification of the new Praetor 600E and Praetor 500E models by aviation regulators during the second quarter. Introduced to the market in 2026, both jets have now been certified by Brazil's Civil Aviation Authority (ANAC – Agencia Nacional de Aviacao Civil), the Federal Aviation Administration (FAA) of the United States, and the European Union Aviation Safety Agency (EASA).

In Defence & Security, the backlog totaled US\$6.1 billion, representing a 42% increase from a year earlier, driven by a landmark agreement with the United Arab Emirates involving the C-390 Millennium. The deal includes 10 firm orders and 10 options, representing the largest international order from a single country for the multi-mission aircraft and signaling its entry into the Middle East market.

Embraer launches the Phenom 300EV

Embraer has announced the Phenom 300EV, the "latest evolution of the world's best-selling light jet for 14 consecutive years". This light jet is now updated with intuitive safety technology, including Garmin Emergency Autoland, and incorporates a series of performance and interior enhancements designed to amplify its renowned



capabilities and refine the cabin's utility benefiting the customer experience.

As the largest business jet equipped with Garmin Emergency Autoland, the Phenom 300EV can execute a fully automated landing in the unlikely event of pilot incapacitation. Landings and takeoffs are also supported by class exclusive Autobrake, for further safety and comfort. Enabling these capabilities, a new Embraer developed Multi-Purpose Electronic Controller (MEC), integrates rudder-by-wire and other electronically controlled aircraft functions, contributing to reduced pilot workload and simplified maintenance. Performance updates include an extended range of up to 2,055 nautical miles and an increase in maximum zero fuel weight, adding approximately 430 pounds of payload capacity.

Cabin refinements focus on onboard functionality and environmental command for passengers and crew. The Phenom 300EV introduces line fit, state-of-the-art, worldwide connectivity via Low Earth Orbit (LEO) satellites, enabled by Gogo Galileo. Starlink connectivity will also be available as an aftermarket solution through a Supplemental Type Certificate (STC).

Embraer delivers first C-390 Millennium to Czech Air Force

Embraer has delivered the first C-390 Millennium multi mission transport aircraft to the Czech Air Force during an official ceremony held at Prague Kbely Air Base. This delivery comes just 20 months after the signing of the acquisition agreement, highlighting Embraer's ability to meet its customers' operational needs. With this first delivery, the Czech Republic joins a growing group of nations operating the C-390 Millennium, reinforcing the "aircraft's position as the new standard in medium tactical airlift".

Officials stated, "The C-390 Millennium, built and designed in the 21st century, is the most modern military transport aircraft in its class. It can carry more payload (26 tons) compared to other medium sized military transport aircraft, flying faster (470 knots) and farther. It can perform a wide range of missions, including cargo and troop transport, equipment and personnel airdrops, medical evacuation, search and rescue (SAR), firefighting, and humanitarian missions, operating from temporary



or unpaved runways. The aircraft, when configured with quick-installation air-to-air refueling equipment (AAR), can operate both as a tanker and as a receiver".

Besides the Brazilian Air Force, the air forces of Portugal, Hungary, the Republic of Korea, the Netherlands, Austria, the Czech Republic, the Republic of Uzbekistan, Sweden, the United Arab Emirates, Slovakia, and Lithuania have also selected this multi-mission platform.

E-Jets Family in Type Certification by India's DGCA



Embraer's family of E-Jets has received Type Certification from India's Directorate General of Civil Aviation (DGCA). The certification covers multiple aircraft from the E-Jets family, including the E190, E195, and the E195-E2. "We welcome the type certification of Embraer's aircraft and thank the DGCA for its thorough assessment," stated Raul Villaron, Senior Vice President Sales & Marketing, Head of Region Asia Pacific, Commercial Aviation. "With remarkable performance, economics, and passenger comfort, Embraer's E-Jets are set to reshape regional aviation in India and support the Indian government's UDAN vision."

"The E-Jets is one of the most successful aircraft programmes in commercial aviation with more than 1,900 deliveries and continues to operate worldwide with more than 80 airlines across more than 50 countries. The E195-

E2 has low operating cost and is the most fuel efficient small narrowbody aircraft in operation today. It features a modern cabin with 2x2 seating with no middle seats, large overhead bins and individual passenger service units”, stated the company.

The E175 is already type certified for India and is operated by Star Air. In February 2026, Adani Defence & Aerospace and Embraer announced an enhanced Memorandum of Understanding (MoU) aimed at establishing a Final Assembly Line (FAL) for the E175 regional jet, aligned to India’s Regional Transport Aircraft (RTA) programme.

Embraer has a strong and growing presence in India, with nearly 50 aircraft across 11 different Embraer models currently in operation spanning commercial aviation, defence and business aviation. Star Air operates a fleet of 11 Embraer E175 and ERJ145 aircraft.

Embraer forecasts demand for 8,500 new jets

Embraer has published the Market Outlook 2026, its annual 20 year forecast for commercial jet aircraft deliveries in the sub-150-seat category. ‘Market Outlook 2026’ estimates 8,500 orders valued at USD 650 billion for new jets through 2045. It also presents analyses of global influences and trends in seven world regions that impact the demand for new aircraft. The document also analyzes the standard body (< 40t) cargo segment.



C-390 training capabilities for Sweden and Austria

Embraer has announced an agreement to provide C-390 Millennium training devices to the air forces of Sweden and Austria. The Swedish Air Force will receive a comprehensive training package, including a Full Flight Simulator (FFS), a Cargo Handling Station Trainer (CHST) developed in partnership with Rheinmetall, and a Computer Based Training (CBT) solution developed with ETI. The Austrian Air Force will receive a Computer-Based Training (CBT) solution to support theoretical instruction and crew qualification. The set of training devices will provide pilots, loadmasters, crew members, and maintenance personnel with modern, high fidelity training environments designed to maximise operational

readiness and mission effectiveness across their C-390 Millennium fleets.



Fuji Dream Airlines for additional E175s

Embraer announced at the Farnborough Airshow that Fuji Dream Airlines (FDA) had placed a firm order for two E175 aircraft. FDA’s new E175 aircraft will be configured in a single class 84 seat layout, with deliveries scheduled for 2027 and 2028.



Embraer and Anduril in MoU to expand C-390 capabilities

Embraer announced at the Farnborough Airshow the



signing of a Memorandum of Understanding to jointly pursue the integration of Anduril's pallet launched Barracuda-500M (B-500M) stand-off cruise missile into the C-390 Millennium. Anduril positions the Barracuda-500M as an affordable, mass producible cruise missile designed to rapidly rebuild and enhance US and allied munitions inventories.

Embraer announces agreements for 28 E2 Jets at FIA

Embraer announced the sale of 20 E195-E2 aircraft to Abra Group, five E195-E2s to Binter, and three E190-E2s to Luxair, totaling 28 new orders that will be included in its third quarter 2026 backlog. Together, the three agreements also include 30 purchase options and purchase rights, which could increase the potential total value of the deals to 58 aircraft.



Embraer and Azorra agreement for 30 E-Freighters

Embraer and Azorra announced an agreement for purchasing 20 passenger-to-freighter conversions firm orders and 10 purchase rights, bringing the total agreement to up to 30 aircraft. The order follows the successful entry into service of the E190F in March. Built on the E-Jets platform with decades of operational success, the E-Freighter is designed to meet the fast evolving demands of the express air freight industry, which requires fast deliveries and decentralised operations to high yield



markets. Combining the lower and upper decks, the E190F offers more than 100 cubic meter of cargo volume and up to 13.5 tons of payload, enabling "the cost efficient transport of express cargo".

Embraer and SkyWest Airlines agreement

Embraer and SkyWest Airlines signed a long term extension for heavy maintenance services covering the airline's fleet of 271 E175 aircraft in the United States. Under the agreement, maintenance activities will be carried out at Embraer's Services & Support facilities in Nashville, Tennessee; Macon, Georgia; and Fort Worth, Texas. The extension expands the scope of the existing programme and increases available capacity, supporting SkyWest's long-term fleet planning and operational requirements.



Binter orders 5 Embraer E195-E2 aircraft

Embraer announced that Binter had placed an additional order for five E195-E2 aircraft, further strengthening "the long standing partnership between the two companies". The agreement also includes four purchase rights. The E195-E2 has played a key role in Binter's services by combining low operating costs with superior passenger experience. All of Binter's E2 aircraft feature a single class configuration with 132 seats. The cabin offers generous legroom and Embraer's signature 2X2 seating arrangement, ensuring that no passenger is assigned a middle seat. ➡



Updates from MBDA

Successful integration of Mistral 3 on the Tigre MK2 helicopter



Against a backdrop of evolving threats and growing operational requirements, the DGA (Directorate General of Armaments) called upon MBDA to rapidly integrate an anti-drone capability for the Tigre MK2 helicopter. MBDA rose to the challenge, delivering a solution that enabled the first use of the Mistral 3 on the Tigre MK2 in record time. This advancement strengthens the defence and interception capabilities of the French Armed Forces.

This integration test campaign for the Mistral 3 missile on the Tigre MK2 helicopter is a resounding success, having delivered under tight time constraints, a software and technical evolution of the Mistral 2 firing system already present on the Tigre MK2. This enabled both the carriage and the execution of a live fire!

Effective coordination between MBDA, the DGA, and the Armed Forces made it possible to overcome the technical challenges associated with integrating the Mistral 3 onto the Tigre MK2 helicopter within a record timeframe.

The Mistral is a versatile, multi-domain, multi-platform missile, perfectly adapted to current and future threats, offering comprehensive protection against a wide range of aerial dangers.

This integration test campaign for the Mistral 3 missile on the Tigre MK2 helicopter was successfully conducted, thereby confirming the missile's performance. The urgent need to increase French anti-drone capabilities, combined with the commitment of all parties involved, made it possible to accelerate the integration process and add new functionalities within a very short period.

This represents a significant improvement for the platform, as the Tigre MK2 was already using Mistral 2, the transition to Mistral 3 allows it to increase its interception capabilities to deal more effectively with a variety of emerging aerial threats.

MBDA partnership with Hybrid Drones Limited



Last year, MBDA invested in Hybrid Drones Ltd, a UK SME that produces the pioneering hybrid Jet-Electric Hydra-400 uncrewed aerial vehicle (UAV). This was one of the first investments by MBDA in a UK SME, demonstrating commitment to supporting national cutting edge defence technologies. In a second funding round this year, MBDA opted to follow-on its investment, retaining its stake as a shareholder of Hybrid Drones Limited.

MBDA's support for Hybrid Drones Ltd is not just financial – it is underpinned by a much more collaborative approach. Leveraging decades of experience within the defence sector, MBDA is working in partnership with Hybrid Drones Ltd to develop the business, navigating the complex defence ecosystem to achieve long term growth. This support has included sharing expertise from across MBDA's business, including, technical and engineering, commercial support, legal, and finance.

The summer of 2026 coincides with exciting developments in the partnership, not least the prominence of the platform as the backdrop for new Secretary of State for Defence, Dan Jarvis' speech at the Uncrewed Systems Centre on 12 June. With a history of collaboration, MBDA is seeking to demonstrate the model by which it can support UK SMEs as they develop innovative new technologies.

MBDA and Rheinmetall to develop a laser weapon system for German Navy



On 9 June 2026, the Federal Office for Equipment, Information Technology and Use of the Bundeswehr (BAAINBw) signed a contract with the Arbeitsgemeinschaft (ARGE) HEL of MBDA Deutschland GmbH und Rheinmetall Waffe Munition GmbH for the development of a high energy laser weapon system for the German Navy. A joint venture between MBDA Deutschland GmbH and Rheinmetall Waffe Munition GmbH is currently being established for this purpose. The laser weapon system will be operational in 2029. The contract covers the development of a complete system for maritime applications and will encompass the entire chain of operations, from reconnaissance and target tracking to engagement. In its development work, the joint venture is placing particular emphasis on German supply chains and domestic systems expertise in order to safeguard national sovereignty in this key technology.

“The laser weapon system from MBDA and Rheinmetall is a flagship technological project with a very high level of technological maturity. It meets the specific requirements of the Bundeswehr and will significantly strengthen the German Navy’s defence capabilities against air, sea and land targets. The containerised laser effector will also be cost-effective for port security as well as other applications”, emphasises Thomas Gottschild, Executive Vice President Strategy & Future Growth, MBDA and Managing Director of MBDA Deutschland GmbH.

The overall system is tailored to the requirements and needs of the Bundeswehr. In March 2026, the naval laser demonstrator repeatedly demonstrated its capabilities to high ranking German delegations at the Wehrtechnischen Dienststelle für Waffen und Munition (WTD91) in Meppen. The demonstrator has already covered 28,000 nautical miles across the North Sea, the Baltic Sea and the Mediterranean on board the frigate SACHSEN, proving its effectiveness even in adverse environmental conditions. During more than a year of testing and its deployment at WTD91, over 1,000 shots were successfully fired at air, sea and land targets.

The advanced beam quality and tracking capability enable the laser power to be focused with extreme precision, even on moving targets. The system developed by MBDA and Rheinmetall can focus the power onto an area measuring just a few centimetres. Thanks to its very high energy density, targets can therefore be engaged more quickly, more precisely and more effectively, whilst using lower laser power.

Experimentation contract for the Akeron RCX50



MBDA has signed a trial contract with the DGA for Akeron RCX50 remotely controlled ammunition (RCA), which includes experimentation and training phases for the Technical Section of the Army (STAT) and the French Navy. This latest contract is indicative of MBDA’s ability to meet the requirements of the armed forces and to adapt to changes on the battlefield. The Akeron RCX50 offers simplicity of use and operational flexibility, with an optimised cost for mass production and use. The development of the system, entirely self-financed, also highlights MBDA’s ability to adapt and innovate in the field of short range RCAs. The Akeron RCX50 is now ready for mass production.

Stéphane Reb, EVP Programmes and Managing Director France of MBDA, stated, “The signing of the Akeron RCX50 contract with the DGA highlights our ability to innovate quickly and to respond effectively to the operational needs expressed by the forces. This success demonstrates our agility and expertise, illustrated by the development of the Akeron RCX50, carried out in collaboration with Novadem, in less than two years. This ammunition represents an advance in terms of precision and effectiveness, thus contributing to the security and sovereignty of our nations.”

The Akeron RCX50 is MBDA’s short range remotely controlled ammunition, based on initial work on the Sphinx demonstrator carried out as part of the Colibri project. This RCA, designed from start to finish as a weapon system, is a tactical asset in the field and provides an advantage to the armed forces.

The Akeron RCX50 is the result of a successful collaboration with Novadem, an innovative SME specialising in aerial robotics, which has been designing and manufacturing drone solutions for civil and military markets for 20 years.

MBDA to develop Neptune2 cruise missile with LUCH

MBDA has signed a memorandum of understanding with Ukrainian defence company Luch. This further collaboration with a Ukrainian company in the field of deep strike underlines MBDA’s contribution to supporting Ukraine. The agreement will focus on further development of the Neptune cruise missile. Luch and MBDA will pursue disruptive innovation to develop the deep strike capability for Neptune2 while advancing strategic defence cooperation with Ukraine.

As the European leader in complex weapon systems, MBDA has the technologies, expertise and cross-border partnerships to deliver European-designed deep strike systems and technologies across partner nations, enabling our armed forces to defend our values and freedoms. Luch has specific knowledge, abilities and experience in the field of design, development, integration and production of complex weapon systems. ➡

Updates from GE Aerospace



GE Aerospace wraps up historic Farnborough Airshow

GE Aerospace wrapped up the 2026 Farnborough International Airshow with record engine demand, continued momentum across durability and services, and major advances in hybrid electric flight. H. Lawrence Culp, Jr., Chairman and CEO of GE Aerospace, stated, “At GE Aerospace, we are focused on delivering for our customers today while investing in the technologies that will shape the future of flight. This week at Farnborough reflected that commitment as we announced record orders, hardware enhancements to improve durability and a breakthrough hybrid electric milestone.”

Record engine agreements

GE Aerospace and CFM International, a 50/50 company of GE Aerospace and Safran Aircraft Engines, announced commitments for 1,800 engines, including:

LEAP: CFM announced a memorandum of understanding with IndiGo for more than 1,000 LEAP-1A engines to power 510 Airbus A320neo Family aircraft. The agreement will be the largest single order ever placed for LEAP engines and a record for CFM.

GENx: GE Aerospace announced additional GENx wins across the widebody market, including Philippine Airlines’ selection of GENx-1B engines to power 15 Boeing 787-10 aircraft and AerCap’s selection of GENx-1B engines to power 15 additional Boeing 787 Dreamliners. The GENx-1B surpassed 50 million flight hours in just over 14 years, the fastest rate ever for a GE Aerospace commercial widebody engine model.

Durability advancement

The US Federal Aviation Administration and the European Union Aviation Safety Agency certified the LEAP-1B high pressure turbine durability kit, designed to double time on wing in hot and harsh operating environments. Initial engine level certification of the LEAP-1B reverse bleed system was also secured, reducing on-wing fuel nozzle replacements and lowering maintenance burden.

Historic future of flight achievements

High Altitude Hybrid Electric: In collaboration with NASA, BETA Technologies, Inc. and Boeing, GE Aerospace

announced the completion of the first hybrid electric flight above 30,000 feet, reaching the same altitude levels of passenger commercial aircraft.

Open Fan: CFM announced it has now completed approximately 500 test campaigns and more than 3,000 endurance cycles on its RISE technology demonstration programme. Airbus and CFM revealed the livery design for the A380 flight test demonstration aircraft expected to support Open Fan flight testing later this decade.

MV250: GE Aerospace highlighted its collaboration with BETA Technologies on the newly unveiled MV250, an autonomous hybrid-electric VTOL aircraft designed for contested military logistics missions. The aircraft uses a hybrid-electric turbogenerator developed with BETA, extending operational range and adding mission flexibility for military customers.

Defence capabilities

F414: GE Aerospace signed a memorandum of understanding with Magellan Aerospace to explore the development of F414 sustainment capabilities in Canada for the Saab Gripen.

X-BAT: Shield AI and GE Aerospace announced successful integration, actuation, and engine light-off testing of the Axisymmetric Vectoring Exhaust Nozzle (AVEN) on the F110 engine for Shield AI’s X-BAT aircraft.

Turkish Technic: GE Aerospace and Turkish Technic signed an agreement to expand OEM-authorized MRO support for data link control and display units in Turkey.



GE Aerospace selected by Leonardo

GE Aerospace announced that Leonardo had selected the CT7-2E1 engine to power 23 AW149 helicopters for the UK Ministry of Defence’s New Medium Helicopter (NMH) Programme. The agreement also includes spare engines, spare parts, long-term services as well as other support.

“The CT7 engine’s track record as a highly reliable, workhorse powerplant is indisputable,” stated Breanne Escalante, general manager of Rotorcraft & Turboprop

Engines at GE Aerospace. “We are pleased that the CT7–2E1 has been selected to power the UK NMH helicopter fleet and look forward to providing world class support for these engines as well as all the T700/CT7 engines operated by the UK armed forces.”

The CT7–2E1 is used by most operators of the Leonardo AW149 and AW189 types. More than 300 CT7–2E1 engines have been delivered, accumulating more than 500,000 flight hours worldwide in all operating environments. The CT7–2E1 has demonstrated highly reliable performance across all demanding operational and environmental conditions, while offering lower engine weight, reduced fuel consumption, and maintenance cost advantages compared to other engines in its power class. As the only modular engine in its class, the CT7–2E1 allows operators to service individual modules in the field, reducing dependence on returning engines to a depot for maintenance.

The CT7–2E1 engine is part of GE Aerospace’s T700/CT7 engine family, which has accumulated more than 130 million flight hours. With more than 25,000 engines delivered worldwide, the T700/CT7 engines power 15 types of military and civilian helicopters and fixed wing aircraft. Introduction of the CT7–2E1 engine into the UK MoD’s inventory offers commonality with a large number of operators around the world and will also complement a T700 model already in service in the UK, which will help reduce operational costs.

As part of this programme, GE Aerospace will be supporting Leonardo to implement and deliver robust economic, social, and environmental benefit programmes under the UK’s Social Value Model Act. This includes building, maintaining, and overhauling CT7–2E1 engines and future exports from the UK at StandardAero’s Gosport facility for the UK NMH Programme, and the manufacture and export of GE Aerospace engine components at Barnes Aerospace’s Newton Abbott facility. GE Aerospace will also leverage its facilities in Cheltenham, Cardiff, Prestwick, and Gloucester, focusing on outreach to educational institutions, apprenticeship programmes, and employment equity and environmental sustainability programmes.



GEEnx–1B engines surpass 50 million flight hours

The GE Aerospace GEEnx–1B engine has surpassed the 50 million flight hour mark in just over 14 years, the

fastest rate ever for GE Aerospace commercial widebody engine model. The GEEnx–1B, which powers the Boeing 787 Dreamliner family, is currently in service with more than 50 operators around the world and is averaging a total of over 600,000 flight hours monthly. The engine boasts a 99.98% dispatch reliability rate and stays on–wing at a rate three times higher than competing engines.

Mohamed Ali, President & CEO, GE Aerospace Commercial Engines & Services, stated, “Airlines need engines that deliver reliability, durability, predictability, and efficiency across some of the world’s most demanding routes, and the GEEnx–1B continues to do exactly that. Reaching 50 million flight hours for the GEEnx–1B in less than 15 years is a remarkable milestone, and it reflects the trust our customers place in GE Aerospace every day.”

The GEEnx engine family has more than 2,700 engines in service, including spares. The GEEnx–2B has accumulated 24 million hours since entering service in 2011 on the Boeing 747–8. In total, the GEEnx engine family has nearly 75 million flight hours and nearly 12 million cycles.

The long–haul flights the GEEnx engine powers traverse some of Earth’s harshest environments. Over the last decade, GE Aerospace has upgraded the GEEnx engine’s high pressure turbine blades and combustor coating technology, more than doubling time on wing in harsh environments.

GE Aerospace is also investing \$1 billion this year across its US manufacturing sites and supply chain, with over \$100 million dedicated to enhancing supplier capabilities for programmes like the GEEnx engine. These investments focus on increasing engine production capacity, modernising facilities, and strengthening the supply chain to meet high demand.

Continued support through service innovation

GE Aerospace has implemented a number of on–wing technologies available for the GEEnx, including:

360 Foam Wash: designed to break down and remove dust and dirt particles. GE Aerospace’s 360 Foam Wash can help improve engine compressor efficiency, reduce fuel consumption, lower CO2 emissions and extend time between shop visits.

Blade Inspection Tool (BIT): This technology gives GEEnx–1B and –2B customers clear and consistent insight during HPT Stage 1 and Stage 2 blade inspections. Blade inspectors with integral cameras capture images with cutting edge AI technology, extracting and presenting them for review. BIT enables the user to measure both lines and areas on blade surfaces, to make an accurate assessment of the condition of hardware.

FlightPulse: A GE Aerospace application developed for pilots to measure their fuel use and other statistics against those of their peers or against their own previous flights so they can self–discover areas to optimise operations and efficiency.

GEEnx’s revenue sharing participants are IHI Corporation of Japan, GKN Aerospace Engine Systems of the UK, MTU of Germany, TechSpace Aero (Safran) of Belgium, Safran Aircraft Engines of France and Samsung Techwin of Korea. ➡

News from Thales

Thales and Aura Aero partner in ISR capabilities



This alliance represents a major step forward in strengthening sovereign ISR capabilities, in response to growing demand in France and around the world. Aura Aero designs, manufactures and industrialises next generation aerospace platforms, developed to address the mobility, security and sovereignty challenges. The AirMaster C airborne radar from Thales, a global leader in high technology and trusted partner of armed forces, has been selected for its performance and compact size, making it ideally suited for the Enbata drone. Developed in France, this next generation radar features a highly compact AESA (Active Electronically Scanned Array) architecture combined with onboard artificial intelligence capabilities. This advanced technology enables precise and autonomous target classification, facilitating the identification of objects of interest while reducing the volume of data transmitted to ground stations.

Thales unveils Bushmaster Mulga utility variant

As battlefields become more connected and threats such as drones become ubiquitous, military vehicles need to be capable of meeting multiple mission needs, including detecting threats, sharing information, supporting autonomous systems and integrating new technologies quickly. The Bushmaster 5.6 has been developed to fulfil this role, rapidly evolving into a highly connected sensor



and effector platform ready for the demands of modern and future warfare, by adding powerful offensive capabilities to its traditional defensive role, such as Thales laser guided rockets, for example.

Thales launches RapidStriker

RapidStriker is a comprehensive, coherent and scalable solution combining advanced 360 degree detection, automated fire control and drone neutralisation. It provides the forces with a mobile capacity for rapid, accurate and adaptable reaction, essential in the face of contemporary air threats of high intensity. It includes detection, fire control and effectors such as rockets, small calibre cannon and remotely operated ammunition allowing a complementarity of effects.



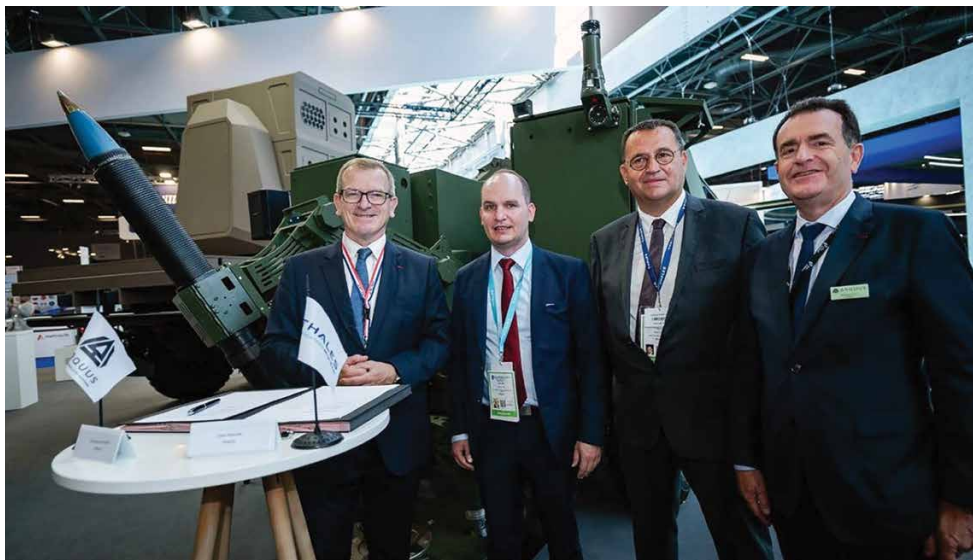
Thales launches next gen 70mm laser guided rocket

Thales has unveiled the LGR275 Proxy, a 70mm laser guided rocket specifically designed to effectively neutralise the threat posed by Unmanned Aerial Systems (UAS), one of the most dynamic and fastest evolving challenges facing modern armed forces. Suitable for both air-to-air and surface-to-air applications, the laser guided rocket, also demonstrates Thales Belgium's innovative capabilities and industrial agility with a tripling of production planned between 2026 and 2028.



Thales and Arquus sign MoU

Thales and Arquus have announced the signing of a



as its new generation night vision systems, which account for the vast majority of the commissioned delivery. XTRAIM is a day/night sight that combines reflex sighting and thermal imaging, enabling rapid and accurate target engagement in all visibility conditions while reducing the burden of equipment carried by the soldier. Building on the success of Thales' NightRise family of night vision binoculars, the new generation night vision system developed by Thales is designed to enhance soldiers' survivability by providing a superior understanding of the tactical environment. Featuring an open

Memorandum of Understanding to initiate exploratory discussions on the integration of the SpinFire mortar family, including the 120 mm rifled mortar, onto vehicles across the Arquus range. At a time when land forces are seeking fire support solutions that combine precision, robustness and adaptability, the availability of an intermediate system between the 120 RT (towed rifled mortar system) and the 2R2M, capable of being mounted on lighter vehicles, has become essential. To address this requirement, Thales is developing a generic portfolio based on its SpinFire range (120 RT, 120 MC and 2R2M), providing enhanced flexibility and modularity.

Thales and Hanwha sign MoU

Hanwha will support Thales's solution for deep strike systems by ensuring its Chunmoo guided missiles are compatible with Thales' X-Fire launcher platforms. The X-Fire ground based launcher, developed by Thales and Soframe, is versatile and interoperable, designed to fire any type of long range munition.



Thales signs a major frame contract with Germany

Rheinmetall as prime contractor for the programme has commissioned Thales to supply optronic systems in the mid-four figure range, including its combat-proven and readily available XTRAIM sighting systems, as well



architecture, the system facilitates interoperability and seamless connectivity with military equipment already in service, forming the core of the Optronic Soldier System. The German armed forces will be the first customer to field this new night vision system from Thales.

Thales and Destinus enter strategic partnership

Thales and Destinus have signed a cooperation agreement reinforcing their collaboration to support armed forces in Europe and internationally in long range strike, counter-UAS, and ground-based air interception. The partnership aims to address system integration and scalable production requirements.



Thales to strengthen Romania's airspace

In a context of growing collaboration between European nations to bolster collective security, the Romanian General Directorate for Armaments has just signed a landmark agreement with France's Direction Générale de l'Armement (DGA) to acquire twelve Thales Ground Master 200 Multi-Mission All-in-one (GM200 MM/A)



radars. The GM200 MM/A is a combat proven medium-range 4D AESA radar, already deployed in active conflict zones, designed to detect and track any target, from low flying drones to high altitude aircraft and missiles, up to 350 kilometres away.

Thales part of Belgium based industrial cooperation initiative

General Atomics Aeronautical Systems, Thales Belgium, Octave Intelligence plc (which includes Luciad NV), and dotOcean signed a Memorandum of Understanding to collaborate on integration and manufacturing-related activity for the operation of multi-domain Intelligence,



Surveillance and Reconnaissance (ISR) systems for the MQ-9B SkyGuardian and SeaGuardian Remotely Piloted Aircraft (RPA) manufactured by GA-ASI.

For MQ-9B operators, GA-ASI delivers unified, end-to-end ISR operations and Processing, Exploitation, and Dissemination (PED) framework. GA-ASI will look to integrate Thales Belgium's C4ISR software that connects stakeholders, enables real time information sharing and transforms data into a competitive advantage in decision-making through cutting-edge technologies such as AI, as well as Octave's Alto portfolio (formerly Luciad) for high performance geospatial visualisation and dotOcean's data processing capability that transforms sensor data into actionable intelligence ready for AI and system automation, with an anticipated demo of the capability later this year.

Thales and Eviden navigation capabilities for French Army vehicles

Eviden and Thales announced the integration of Thales' Galileo PRS capability into Eviden's P3TS military satellite navigation receiver, used by the French army. The solution will be available in two configurations. The first integrates the TopStar Galileo PRS Core Module, providing access to Galileo PRS signals alongside Galileo and GPS open service signals.

The second combines either GPS or the TopStar Smart Receiver, adding advanced anti-jamming capabilities to the latter. Both configurations feature a high precision clock that maintains synchronisation of tactical radios, even in the event of a loss of GNSS signals. ➡



News from Dassault



NAMIB completes a collaborative flight with a Rafale

Dassault Aviation and Harmattan AI announced the successful execution of a collaborative in-flight engagement between a Rafale F4 and an unmanned aerial system equipped with the NAMIB payload, a new electronic warfare device jointly developed by both companies.

NAMIB is an electronic warfare payload capable of detecting, identifying and geolocating electromagnetic emissions, in particular those from air defence systems. It can be carried by tactical drones, including quadcopters, as well as by longer endurance, fixed winged unmanned aircraft. During the flight, NAMIB discreetly detected and precisely geolocated a radar located several dozen kilometers away. The target's location was transmitted to the Rafale, which then simulated a strike on the target.

Reception of the first 2 Falcon Albatros by DGA

The Direction Generale de l'Armement (DGA – French Government Defense Procurement Agency) has taken delivery of the development and the first two Falcon 2000LXS Albatros aircraft as part of the AVSIMAR programme (Maritime Surveillance and Intervention Aircraft). Launched in 2020, this programme plans to deliver a total of twelve aircraft by 2031. The Falcon 2000 Albatros is equipped with a multifunction radar under the



fuselage, a high performance optronic turret, observation windows, a Search & Rescue (SAR) chain dropping system and dedicated communication systems. Based on the Falcon 2000LXS business jet, the latest model in the Falcon 2000 series, with hundreds of units sold worldwide is highly versatile. With a range of 7,400 km, high transit speed, and low speed flight characteristics, it can monitor vast areas and intervene quickly and precisely at long distances from its base.

Dassault's Falcon 10X makes maiden flight

Dassault Aviation's all new Falcon 10X has successfully completed its first flight, demonstrating the programme's maturity and marking the launch of the flight test campaign. The first aircraft will soon be followed into the air by a second test aircraft nearing completion, and by a third, that is being outfitted with a full interior and will be used mainly for systems and cabin functional and reliability testing. "Dassault Aviation is the only aircraft manufacturer in the world to have a completely new aircraft in flight in 2026 and the company's dual expertise in civil and defence is a long term strength for the company".



Dassault Aviation and OHB team up

Dassault Aviation and OHB announced that they are teaming up to propose to the European Space Agency (ESA) a multipurpose spaceplane VORTEX-S, capable of round transport to space stations and of autonomous orbital free flyer missions, together with a number of other European partners. Together, Dassault Aviation, as the VORTEX-S prime architect and global integrator of the spaceplane, and OHB, as the architect and integrator of the service module, will form the core team of the proposed ESA project. Discussions are underway with other major European space companies to expand the team for such a project that will advance Europe's future in space mobility.



Saab News



Saab receives order for GlobalEye

Saab has received an order for two GlobalEye aircraft from a country in the Middle East region. The order value is SEK 10.1 billion and deliveries will take place in 2030. GlobalEye is an advanced multi-domain AEW&C solution with an array of active and passive sensors that provide long range detection and identification of objects in the air, at sea and over land. By providing real time information to joint forces, GlobalEye enables enhanced situational awareness of the surrounding areas and early detection of threats.

Saab in order for 3 submarines for Poland



Saab has signed a contract with the Polish State Treasury Armaments Agency and received an order for the production and delivery of three A26-type submarines. The contract also encompasses a weapon package and a training and support package. The order value corresponds to approximately SEK 47 billion. Saab will deliver continuously with the final deliveries scheduled during 2038. To support the contract and the Polish Navy's operation of the submarines, Saab is committed to establishing maintenance, repair and overhaul (MRO) capabilities in Poland in close collaboration with Polish industry.

Brazil's Gripen E fighters participate in 1st multinational exercise outside Brazil



Six F-39E Gripen aircraft from the Brazilian Air Force took part in the multidomain exercise SALITRE 2026, marking the Brazilian fighter's first participation in a multinational operation outside Brazil. In Chile, six Brazilian Air Force fighters were carrying out air defence, escort and patrol missions alongside aircraft from five other countries. Operating from Cerro Moreno Air Base in Antofagasta, Chile, the exercise brought together more than 1,500 military personnel from the participating countries and around 60 aircraft, which completed more than 250 flight hours across different missions on site. In air defence missions, the F-39E Gripen aircraft were responsible for protecting allied aircraft against the simulated opposing force.

Saab to equip the German Navy's new frigates

Saab has signed a contract with the German naval defence company TKMS and received an order to deliver and integrate combat systems, composite structures and sensors onto four of the German Navy's new MEKO A-200 DEU class frigates. The order value is approximately SEK 8.7 billion and Saab's deliveries to TKMS will take place between 2029 and 2032. The order comprises equipping the frigates with composite superstructures, 9LV Combat Systems including the Fire Control System and Combat Management System, sensors such as the long range surveillance radar Sea Giraffe 4A Fixed Face, the lightweight multi-mission surveillance radar Sea Giraffe 1X, as well as passive sensors.



Saab and CAE MOU for Gripen in Canada

Saab and CAE announced the signing of a Memorandum of Understanding to deliver advanced fighter pilot training, mission systems engineering and support sustainment capabilities in Canada if the Government of Canada should add Gripen E to the Royal Canadian Air Force's future fighter capability. As part of this collaboration, CAE would be responsible to operate and sustain advanced Gripen training systems in Canada. This includes the development

of Canadian-specific simulator capabilities and the delivery of live aircraft and technical training by Canadian personnel. The collaboration would also establish CAE at the centre of critical sovereign capabilities in Canada for the development and management of sensitive operational and mission systems information.

Saab, BAE and Boeing to develop UK's next gen pilot training

BAE Systems, Boeing and Saab have signed a teaming agreement to advance their partnership on a next



generation pilot training offer for the UK, anchored by the Boeing T-7 system. The agreement marks a significant milestone in the partnership between the three companies and commits to a new UK based final assembly and integration facility. T 7 is undergoing flight testing with the US Air Force and an initial production order (Milestone C) was achieved in late April, signaling the Force's confidence in the aircraft's design and readiness. The training system combines flying with advanced simulation to enable training on the RAF's Typhoon and F-35 frontline jets. Its adaptable design will allow the platform and simulators to evolve alongside future aircraft and mission requirements, supporting the RAF as it prepares for future combat air capability including sixth generation platforms.

Jetstream delivers 1st Saab 340B(F) cargo to Ryan Air

Jetstream Aviation Capital has delivered one Saab 340B(F) cargo aircraft to Ryan Air of Anchorage, Alaska. It is the first Saab 340B(F) delivered by Jetstream to Ryan Air and will be used for their scheduled and chartered cargo operations throughout Western Alaska.



Rubin Design Bureau's 6th Lada submarine



The keel laying ceremony of conventional submarine Pr. 677 Lada for the Russian Navy was held recently. Rubin Design Bureau of the United Shipbuilding Corporation (USC) has developed the project, Admiralty shipyards of USC are building the submarine. The submarine is named Maloyaroslavets after a town in Kaluga region of Russia.

The batch of conventional Lada class submarines is built to an improved design developed by Rubin in accordance with the lead boat Pr. 677 Saint-Petersburg operational evaluation results. The first improved design boat, Kronstadt, was commissioned by the Navy in 2024. The second one, Velikiye Luki, joined the Navy in 2025. Trials have proven high performance of these boats. Two more submarines, Vologda and Yaroslavl, are under construction. Rubin's designers support the construction at all stages, from design to the sea trials.

Pr. 677 submarines are state-of-the-art Russian non-nuclear boats. Low noise signature, silencing features and extremely capable sonar system ensure Lada's advantage over her counterparts. Lada is equipped with torpedo and missile armament capable of striking marine and land targets. As well as Pr. 636 submarines for the Black Sea and the Pacific Fleets, the Russian Navy names Pr. 677 submarines after Russian towns with historical significance.

Maloyaroslavets, after which the sixth Lada is named, played a significant role in the Patriotic War



of 1812 and the Great Patriotic War. The battle for Maloyaroslavets became a turning point for the French army, which was repulsed by the Russian army and was to retreat from Russia by the war torn route. In 1941, near Maloyaroslavets the Red Army stopped the advance of the Nazi army on Moscow. The historical coat of arms of Maloyaroslavets represents a bear with risen poleaxe that symbolise readiness for defence. The heroic history of Maloyaroslavets and its symbol are in tune with the traditions of the Russian Navy, which serves the interests of the country for 330 years since July 1696. April 2026 marks 120th anniversary of Russian submarine force standing watch in underwater domain.

Rubin Design Bureau of the United Shipbuilding Corporation is among global leaders in the design of nuclear and conventional submarines and the largest marine engineering company offering design services in Russia. More than 1000 submarines in 125 years of our work have been built to Rubin designs, including more than 900 submarines commissioned by the Russian Navy. Over 100 export submarines designed by Rubin joined navies of 16 countries. ➡

Text and images: Rubin Design Bureau

Shield AI News

V-BAT achieves SORA SAIL III operational authorisation



Shield AI has announced that V-BAT achieved the highest European Union Aviation Safety Agency's (EASA) authorisation issued to date in Europe for unmanned maritime operations and completed a pilot project with Frontex, the European Border and Coast Guard Agency, and the Italian Coast Guard, flying from the patrol vessel Dattilo in the central Mediterranean. The authorisation, reaching SAIL III under the EASA Specific Category framework, was issued by ENAC, Italy's National Aviation Authority, to Global Sat Tech, the unmanned aircraft system (UAS) operator of record, with Shield AI providing technical documentation, crew training, and operational support toward the authorisation effort.

Two V-BATs, the largest drones in the 50 to 100 kilogramme class that Frontex has yet flown from a patrol ship, operated day and night as a fully integrated part of the vessel, completing 150 flight hours over 19 days at sea, two days ahead of the trial's official close. At the peak of the trial, the two aircraft were airborne simultaneously for a combined 20 hours a day, and flights reached a range of 150 kilometres from the ship, far beyond what its sensors alone could see. Results were demonstrated on 8 July, when senior Frontex and Italian Coast Guard representatives watched a live search and rescue simulation in which one of the V-BATs located a small inflatable boat and helped coordinate its rescue.

SAIL III is the highest Specific Operations Risk Assessment (SORA) approval level issued to date in Europe. The authorisation showed that V-BAT's safety case, operational procedures, and technical documentation met the requirements of an EASA Member State authority for beyond visual line of sight (BVLOS) maritime UAS operations.

V-BAT is a NATO Class I VTOL UAS featuring a ducted fan design, 12 hours of endurance, and a heavy fuel engine. Designed, tested, and deployed for contested electronic warfare environments, V-BAT delivers ISR and targeting capability at lower cost and logistical burden than larger NATO Class II and III systems. Its single engine, enclosed

rotor design enables launch and recovery from ship decks, urban rooftops, and austere environments, making it effective for maritime and expeditionary operations.

Shield AI and GE Aerospace light off X-BAT engine



GE Aerospace and Shield AI have successfully completed integration, actuation and engine light-off testing of the advanced Axisymmetric Vectoring Exhaust Nozzle (AVEN) for Shield AI's X-BAT aircraft, a critical milestone in the programmes path to vertical flight. Engineers from both companies modified and integrated the AVEN into GE Aerospace's F110-GE-129E engine, then completed functional checkouts and engine light-off to verify system performance at GE Aerospace's test operations site in Peebles, Ohio. This is the first fully integrated test campaign of its kind since the 1990s, bringing AVEN's hardware, controls, and engine systems together to execute coordinated nozzle movement sequences using defined test protocols.

The AVEN provides thrust vectoring capability for vertical flight, launch and landing. Originally designed for a multi-axis thrust vectoring programme that flew on an F-16 in the 1990s, the nozzle accumulated 73 hours of ground testing and 135 flight hours across 95 flights during its original development programme. As part of the X-BAT programme, the hardware was refurbished and returned to operation. Following refurbishment, AVEN is now undergoing ground testing in preparation for flight test aboard the X-BAT prototype.

X-BAT is built to solve the operational problems facing today's forces: contested airspace, vulnerable runways and the need for aircraft that can fly long distances while carrying a heavy weapons load. It's a long range, survivable, AI piloted strike fighter that takes off and lands vertically, so it can operate from ships, islands or remote sites without runways or support infrastructure. Powered by Shield AI's Hivemind autonomy software, X-BAT can fly independently or as part of a force package alongside crewed aircraft.

X-BAT is sized to carry weapons up to the 2,000 pound class internally in each bay, with bays comparable in size to the F-35's. It generates 80 kilowatts of electrical power, enough to run electronic warfare suites – allowing it to act autonomously as a jammer –along with intelligence, surveillance and reconnaissance (ISR) payloads and active and passive radar modes. With a combat radius of 1,000 nautical miles, X-BAT begins flight testing later this year.

In November 2025, Shield AI selected GE Aerospace to provide the engine, propulsion and testing support for the X-BAT programme.

Shield AI's V-BAT to support Polish naval operations

Shield AI announced that Poland's Armament Agency had signed a contract for the acquisition of V-BAT vertical takeoff and landing (VTOL) unmanned aerial vehicles (UAVs) intended to support Polish Navy operations. The V-BAT force will be deployed aboard a Polish Navy vessel, providing maritime domain awareness and intelligence, surveillance and reconnaissance (ISR) support. This added capability gives the Polish military a proven low-cost unmanned support system that improves commanders' visibility of activity and threats.

Shield AI awarded USAF production contract for CCA mission autonomy



Shield AI has been awarded a production contract by the US Air Force to implement Hivemind mission autonomy software for the Collaborative Combat Aircraft (CCA) programme. The production award reflects the Air Force's software first approach to autonomy and its decision to evaluate mission autonomy as a standalone capability within the CCA programme. Enabled by the Autonomy Government Reference Architecture (A-GRA), the Air Force can rapidly iterate mission autonomy software upgrades independent of the aircraft, accelerating innovation while reducing integration costs and programme risk.

By separating mission autonomy from the aircraft itself, the Air Force can integrate and upgrade software across multiple platforms without redesigning the airframe. This approach preserves competition, reduces integration risk, and enables Hivemind to be integrated across the Air Force's broader CCA ecosystem rather than being tied to a single aircraft platform.

Under the award, Shield AI will focus on implementing collaborative combat autonomy behaviors involving multiple autonomous aircraft operating together under human supervision, reducing operator workload and enabling coordinated operations at scale. Independent of this contract award, Shield AI will continue meeting all commitments for the Air Force's mission autonomy development efforts. Earlier this year, Shield AI was selected as a mission autonomy provider for the Air Force's

CCA programme following a competitive evaluation supporting Technology Maturation and Risk Reduction (TMRR) efforts. Hivemind is currently flying aboard Anduril's YFQ-44A aircraft as part of those ongoing development efforts.

Hivemind is Shield AI's platform agnostic, A-GRA compliant software that assumes the role of a human pilot or operator, enabling unmanned systems to sense, decide and act. Unlike traditional autopilots that simply follow preplanned routes, Hivemind can reroute around or engage dynamic obstacles, execute collaborative tactics with peer systems and piloted aircraft, respond to unexpected conditions, and complete missions safely and effectively as part of a human-machine team.

Shield AI and UAV Navigation-Grupo Oesia partner to expand Hivemind

Shield AI signed a strategic integration partnership with Spain's UAV Navigation-Grupo Oesía, part of the Spanish multinational technology company Grupo Oesía and a specialist in guidance, navigation and control (GNC) solutions for unmanned aerial vehicles. The partnership focuses on integrating Shield AI's Hivemind autonomy software with UAV Navigation-Grupo Oesía systems so European customers can field more capable autonomous aircraft faster and with less integration risk. The collaboration centres on validating compatibility between Hivemind, Shield AI's platform agnostic autonomy software, and UAV Navigation-Grupo Oesía's VECTOR autopilots and Mission Control Computer. The companies have already completed interoperability testing together with strong results, confirming that Hivemind can be configured to execute missions on platforms equipped with UAV Navigation-Grupo Oesía flight control systems. Future phases are expected to expand the autonomy envelope across additional platform families integrating the UAV Navigation-Grupo Oesía portfolio of systems.



FCAS/GCAP and CCA updates

The consortium for the GCAP power and propulsion system progresses

Avio Aero (Italy), IHI Corporation (Japan) and Rolls-Royce have moved a step closer to ground testing the engine demonstrator for the Global Combat Air Programme (GCAP), following a series of consortium design reviews. United by a shared vision, the consortium is driving the generational change in power and propulsion required to deliver the world's most advanced next generation combat aircraft. By strengthening their collaborative approach and reaching key technological milestones, the partners are advancing the capabilities that guarantee the future security of our nations.

The trilateral partnership is moving from strength to strength through enhanced consortium collaboration, uniting the partners into one truly collaborative international team. The past year has seen the opening of a dedicated Collaboration Hub in Reading, UK, creating a central location for partner co-location and closer collaboration with the GCAP Agency and Edgewing. More than a physical workspace, it represents a tangible demonstration of the long term commitment, trust and collaboration that underpins the international partnership.

Technology development also continues to advance. The consortium reviews have moved the programme towards final approval of the all new centre line engine demonstrator design, with continued progression of component manufacturing. Over 100 subscale component tests have been completed so far, bringing the consortium closer towards ground testing the trilaterally developed engine demonstrator, which will gather critical data to understand and shape the design and development of the full power and propulsion system for GCAP.

The engine demonstrator plays a crucial role in de-risking the programme, demonstrating maturity of innovative technology and integrated architecture, whilst being a mechanism to test and refine processes, tools and ways of working and contributing towards shortening the design and development cycle for GCAP.

First British designed Collaborative Combat Aircraft unveiled

BAE Systems has unveiled the UK's first uncrewed autonomous Collaborative Combat Aircraft (CCA). It is designed to extend combat mass for armed forces by

complementing existing and future crewed aircraft, delivering additional frontline capability at a lower cost. The prototype aircraft was designed and built by engineers at BAE Systems in Warton, Lancashire, home of the UK's sovereign combat air industrial capability. More than 500 BAE Systems employees have been involved in the aircraft's development to date, working with over 75 large companies and SMEs from across Britain's world leading aerospace sector.

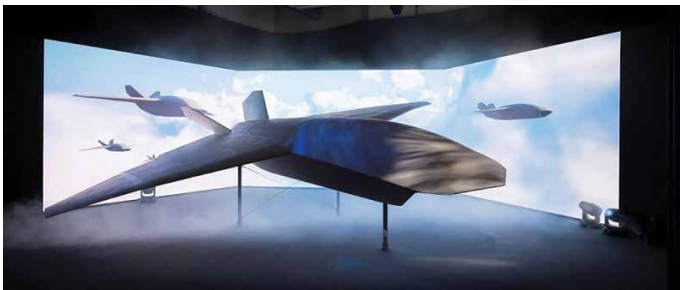
The first-of-its class CCA – named Brontanax – is intended to provide electronic warfare and precision strike capabilities against airborne and ground targets. Operating with frontline combat aircraft such as Typhoon it will enhance combat mass and operational effectiveness, with planned availability to enter service before the end of the decade.

Team Tempest partners accelerate next gen combat air technologies

Team Tempest partners announced significant progress across a series of advanced technology programmes that are helping to mature the critical capabilities required for the UK's Future Combat Air System (FCAS) and support the nation's leading role within the Global Combat Air Programme (GCAP). Team Tempest brings together the UK Ministry of Defence (MOD), BAE Systems, Leonardo, MBDA and Rolls-Royce in a unique partnership, combining government, industry and technological expertise to deliver the next generation of sovereign combat air capability.

Since its launch in 2018, Team Tempest has transformed UK combat air development by accelerating innovation, advancing collaboration and digital engineering approaches, and investing in the advanced skills need to maintain the UK's strategic advantage in air power.

The latest programme milestones demonstrate tangible progress across key technology areas which underpin the UK's future combat air capability, including the final assembly of around half of the main aircraft structure for the UK Combat Air Demonstrator – the first crewed combat aircraft in 40 years. Over 11,500 parts have been designed to date, totally around 90% of the aircraft's overall weight with many of these being developed through the UK supply chain. Completion of the first robotically assembled component in its Factory of the Future, representing a pioneering industry achievement. The component is scheduled to undergo structural testing later this year alongside one of the wings. ➡



10th Airbus A330 MRTT delivered to MMU



The 10th Airbus A330 Multi Role Tanker Transport (MRTT) (“the Belgian tanker”) T-063 has been delivered to Getafe airbase in Spain to Eindhoven airbase in the Netherlands. Within the Multinational MRTT Unit (MMU) fleet based at Eindhoven airbase, aircraft are shared assets designed to support coalition operations rather than national air forces. Yet, the tenth Airbus A330 Multi Role Tanker Transport (MRTT) delivered to the fleet routinely carries the moniker “the Belgian MRTT.” Behind this informal designation lies a story of strategic funding, operational capacity expansion and the mechanics of shared NATO defence capabilities.

The Multinational MRTT Fleet (MMF) programme was launched in 2016 by the Netherlands and Luxembourg to address a critical European shortage in strategic airlift, air-to-air refueling (AAR), and aeromedical evacuation (Medevac) capabilities. Over the following years, Germany, Norway, the Czech Republic and Belgium joined the initiative.

Under the management of the ‘NATO Support and Procurement Agency’ (NSPA) and the ‘Organisation Conjointe de Coopération en matière d’Armement’ (OCCAR), an initial fleet order of nine A330 MRTT aircraft was established.

Each nation contributed capital based on its operational requirements, purchasing a specific annual quota of flight hours. Germany stood as the largest user with 5500 annual hours, followed by the Netherlands (2000 hours), Belgium (originally 1000 hours), Luxembourg (200 hours), and Norway and the Czech Republic (100 hours each).

The initial nine aircraft fleet was divided between two operational hubs. Five aircraft were stationed at the Main Operating Base (MOB) in Eindhoven, Netherlands, while four were assigned to the Forward Operating Base (FOB) at Cologne-Bonn, Germany. One of the original fleet assets is kept on permanent standby in a dedicated medical evacuation configuration—capable of holding intensive care units and stretchers—ensuring zero operational delay during emergency deployments.



By 2023, increasing NATO operational demands prompted Belgium to significantly expand its participation. Recognising a growing need for strategic transport and tanking capacity, Brussels committed to purchasing an additional 1100 flight hours per year. To support this substantial increase, Belgium provided an additional investment of approximately €265 million. Rather than simply absorbing existing operational capacity from the original nine ship allotment, this financial injection directly enabled the procurement of a tenth A330 MRTT for the overall NATO owned fleet. Because Belgium’s capital contribution directly triggered the order for the additional airframe, the aircraft quickly inherited its informal title as the “Belgian” tanker.

The MMU formally marked the arrival of the tenth aircraft as a major operational milestone, noting that the fleet’s expansion was made possible specifically through Belgium’s sponsorship and increased financial commitment.

Despite the common reference, the tenth A330 MRTT is not a Belgian Air Force asset in the traditional sense. It is not owned exclusively by Belgium, nor is it restricted to Belgian sovereign missions. Like the original nine airframes, the tenth aircraft remains an integral part of the NATO MMF fleet, managed by the NSPA and operated by the MMU. All six participating nations share overall aircraft usage and operational expenditure based strictly on the total number of flight hours purchased. In accordance with programme agreements, the entire MMU fleet operates under Dutch military registration. As a result, the “Belgian” MRTT bears a Dutch military tail number, reinforcing its status as a shared multinational asset.

Belgium’s sponsorship of the tenth airframe illustrates the flexibility of pooled defence capabilities. While the nation secured the additional flight hours necessary for its

mission requirements, the physical aircraft acts as a force multiplier for the entire coalition, serving the collective operational footprint of all partner nations across the globe.

Article by Joris van Boven and Alex van Noye

Photos by: Alex van Noye

Farnborough International 2026 report



Farnborough International '26 attracted over 140,000 industry professionals, and military visitors, nearly double the previous UK aerospace trade show figures with orders worth over \$80 billion announced during the week. With six huge exhibition halls with 1,600 company stands, chalets and display areas there were also national pavilions including a sizable Indian presence. Although there was civil aerospace visible in the form of actual aircraft participation, and the latest E-VTOL designs were also on display in increasing numbers, the main focus this year was undoubtedly the highlights and main take-away news items were undoubtedly advanced air defence related programmes, all embracing evolving strategic realities and dominated by the new digital backdrop, many emerging in public for the first time. Autonomous military air platforms were a clear indicator of the direction that military aviation is taking at an increasing pace. But also announced were many up-date programmes designed to keep today's combat aircraft relevant well into the next two decades with new radars, new cockpit systems and greater inter-connectivity across the whole information spectrum embracing land, sea, sub-surface, air and space domains.

The UK, Italy and Japan are now moving ahead rapidly into an increasingly AI enabled future, and at the core is the tri-national Global Combat Air Programme. With the potential rival European (France, Germany, Spain) FCAS project abandoned, the GCAP partners are pressing ahead



at an unprecedented pace with not only the GCAP design itself but in-depth preparations to safeguard a long term sovereign advanced air defence capability embracing all aspects of the digital battlespace.

A full size replica GCAP made an impressive appearance standing outside a dedicated Edgewing exhibition hall. It was certainly eye-catching and its large size suggested a massive internal weapons bay as well as a likely extended range/endurance capability. During the show it was announced that Canada has become an official GCAP “observer” following the programme closely, and three weeks before the show it was confirmed that another commitment of £4.6 billion, to the end of 2027, had been signed towards further detailed design and development. Alongside the main national airframe partners, BAE Systems, Leonardo and Mitsubishi Heavy Industries, engine and related aircraft power systems involve Avio Aero, IHI and Rolls-Royce who have come together as a consortium to provide what is seen as a power-station in the sky.

A full scale engine demonstrator is underway combining digital systems design, additive manufacturing, active thermal management and unprecedented electrical generation capabilities. The GCAP Electronics Evolution (G2E) consortium comprises the defence electronic champions in the three partner nations, Leonardo UK, Italy, and Mitsubishi Electric and ELT Group. It will provide the Integrated Sensors and Non-Kinetic Effects and Communications Systems (ISANKE and ICS) to collect



and manage huge volumes of data to provide operators with information superiority in a complex and contested battlespace. There was clear evidence both in the joint partner briefings and individual company conference sessions that GCAP preparations are already well established with growing evidence of how the ambitious in-service target date of 2035 can be met, despite the extreme complexity of the task.

Experience from past multi-national defence programmes has been taken on board and a new approach adopted. The GCAP Agency is empowered to manage,



coordinate and execute all phases of the programme on behalf of the three governments, while Edgewing is a joint venture company empowered to act on behalf of the three national industries. It is rapidly scaling up to a fully capable engineering organisation with sites in the three countries and will be accountable for the design and development of the combat aircraft and will remain the design authority throughout the life of the product, from aircraft engineering to airworthiness and certification.

To speed up de-risking the development of GCAP, the UK is now independently funding and assembling a supersonic flying demonstrator, under Team Tempest, led by BAE Systems, which will enable early testing of key aspects and associated challenges that will accompany the full GCAS programme, including equipping the workforce with the knowledge, skills and confidence needed to deliver on schedule. The demonstrator is now under construction using the latest manufacturing techniques and is expected to be structurally completed next year and a flight test programme starting early in 2028. Also involved in the enormous task of developing and proving the advanced networked systems for GCAP is a highly modified Boeing 757, Excalibur, which is now a flying test platform and will play a key role in the evaluation, flight testing and integration of sensors and systems. Driving all this is the determination of the GCAP partner governments and air forces to create a cutting edge new combat platform that will allow complete freedom on systems and weapons selection and integration that has not been easy on the F-35 and other ITAR and FMS constrained US procurements.



The CCA revolution

A very theatrical unveiling of a new UK Collaborative Combat Aircraft (CCA) took place in the BAE Systems hall, when after just 48 hours in office, the UK's new Defence Secretary, Wes Streeting MP, appeared on stage with the RAF's Chief of the Air Staff, Air Chief Marshal Herv Smyth, to announce, accompanied with a light show and full scale model, a previously secret UK offering in the highly competitive CCA market called Brontanax (it's not known who thought up that name!). The week before the show the CAS had revealed the intention to make the RAF the first European nation to field an operational CCA capability by 2029/30 under the project name "Storm Fighter". The pre-production Brontanax CCA airframe, which is around the size of a Hawk aircraft, has already been built and will be prepared in the coming months for engine integration,





initially with a Williams International engine, for running tests leading to ground trials early next year. Although built as a concept demonstrator it has been constructed on production standard tooling and has two internal weapons bays and could be put into large scale production quickly. If chosen, the 5 tonnes CCA would be powered by a new Rolls-Royce supplied engine, the Orpheus, and initially

fly as a “Loyal Wingman” alongside RAF Typhoon and F-35 fighters. If this is achieved by 2030 it will pave the way ready for the expected 2035 in-service date for GCAP based on considerable operational experience.

Boeing and the RAAF were represented at the show and highly visible in the static park with a Block 1 MQ-28 Ghost Bat, alongside an MBDA Meteor AAM. This large CCA, produced in Toowoomba, Queensland, Australia is leading the pack of competitors to date with an accumulated 200 sorties flown and highly successful results from initial representative missions involving detecting and tracking targets and destroying one with an AIM-120 AAM. The improved Block 2 MQ-28 has an enlarged weapons bay and a payload of 4,500lbs. Boeing is highlighting its enthusiasm for local production in customer countries and is in talks with many nations including Germany.

Another exponent of CCAs and market leader in unmanned air systems is General Atomics Aeronautical Systems (GA-ASI), which was exhibiting a large scale model of its latest iteration of its best-selling MQ-9B Sea Guardian/Sky Guardian/Protector family. The ever-expanding roles now being offered include Airborne Early Warning and a C2 capability. Other attractive options include extended maritime patrol, anti-submarine warfare and a flying communications gateway. With a 30



hour endurance capability this platform seems assured of a long production life. The other new General Atomics product is the Gambit 6, a member of the Gambit family of CCA jet platform aircraft with potential for expanding combat mass alongside manned combat types as well as stand-alone capabilities on maritime patrol and multi-role exploitation from land bases or carrier decks. It can be fitted with folding wings and provision for EMALS launch and recovery systems – another company speciality that was on display at the show. In exhibition halls were full size mock-ups of the Anduril and GA-ASI CCA offerings. Two USAF contracts have been awarded – Anduril's Fury and GA-ASI's FQ-44A and critical mission software is being developed for an integrated fleet. The plan is to be able to have 150 combat ready aircraft in USAF service by 2030.

Jean-Brie Dumont, Head of Air Power at Airbus Defence (and this year to become CEO at MBDA) introduced the U950 Eurodrone, a new twin engine UAS, a potential competitor to the GA-ASI MQ-9B family. Designed to get to market quickly Dumont claimed it had an operational advantage with the twin engine configuration and an endurance of 40 hours. He told the Vayu magazine that quite a number of large UAS aircraft losses in war zones and routine operations had been due to single engine failures. He added that apart from the practical reassurance of two engines there was the benefit that one could be shut down on missions to extend endurance or range even further. Talks had taken place regarding possibly multi-national fleets as well as meeting single customer needs. Airbus was also showing images of proposed jet-powered CCA designs, the long range heavyweight Ravenstorm and the smaller Valkyrie. This is becoming a very crowded market, but clearly the route forward in the face of potential mass swarm air attacks is the development and deployment of suitable counter air platforms that can be built quickly and in large numbers. The FI26 show revealed a very large number of such programmes covering a wide range of offerings from established aerospace suppliers to relatively new start-ups.

BAE Systems also revealed at the show a new deployable stand-off air vehicle, Blizzard, that it is being jointly developed by its Falcon Works in conjunction with Lockheed Martin's Skunk Works. Powered by a small jet engine and featuring flip-out wings it has already undergone captive carry and release trials. It can cruise at 30,000ft with a range of up to 400 nautical miles and can be adapted for different electronic warfare tasks. Its present operational focus is aimed at disrupting and defeating surface-to-air threats using methods that include jamming and decoy measures. With an open system architecture it can be rapidly reconfigured for different missions and can be air launched by combat aircraft or in a palletised delivery format, released in large numbers from a rear loading cargo aircraft such as an A400M or the Embraer KC-390 both of which were prominent in the static park.

Attracting much potential customer attention is BAE Systems APKWS laser guidance kit modification to turn a standard 70mm rocket into a highly effective precision guided munition. An urgent UK operational requirement

was issued and in under six months brought forward a significant new precision weapons capability that was delivered for RAF aircraft operating in the Middle East. It has proved highly effective, and at extremely low cost compared to a conventional air launched missile. The rocket modifications added distributed aperture semi-active laser seeker optics on the four rocket guidance wings which lock onto the targets guiding the rocket with great accuracy and minimal collateral damage. The associated pilot controls and guidance system was developed and brought into combat use just two months after trials and tests were undertaken, transforming the capability of RAF Typhoons to intercept and destroy the small targets presented.

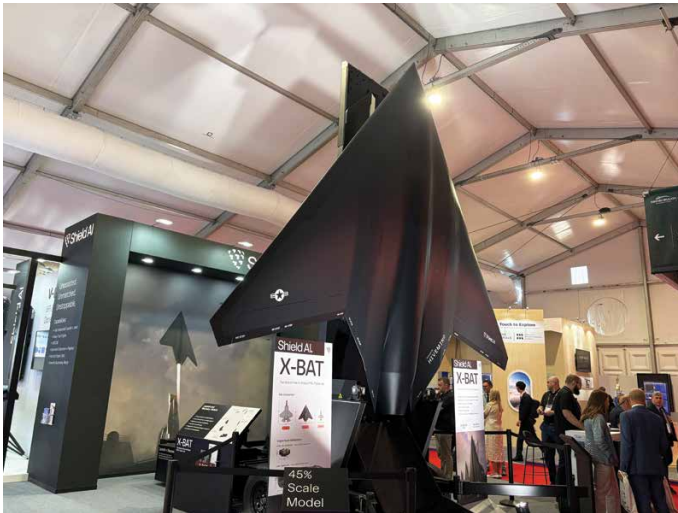
There was also a surge in interest in the multi-role capability of the BAE Systems Malloy T-150 UAS heavy lift platform, which can deliver a 68 kg load for battlefield use and is operationally proven in Ukraine and other regions. It has also been tested by the British Army in Estonia. Storm Shroud is a small ground launched autonomous collaborative platform developed from the Tekever AR3 UAS and used by the RAF to develop the carriage and use of easy to operate, compact electronic warfare air vehicles.

Tekever also displayed its new AR6 heavy-lift drone which can carry a 200kg load over 500kms and features an advanced sealed hydraulic power system that enables operations in super cold and super hot environments. It can also operate without any GNSS reliance with use in logistic, medical support, search and rescue and offshore patrol missions. It is another example of adopting disruptive technology and autonomous platforms ranging from mass produced one way effectors to long range hypersonic air launched missiles with a reach out to 2,000kms.

Leonardo and Baykar Technologies of Turkey displayed the latest folding wing iteration of the Astore Levante UAV. It's already in low level production for the Italian Air Force and planned to also be suitable for aircraft carrier use.

A particularly eye catching stand was presented by Shield AI with highly innovative new VTOL offerings. The most dramatic was a full size model of the X-Bat, claimed to be the world's first AI-piloted VTOL fighter jet. With a range of over 2,000 nautical miles it can be launched from





a variety of ships, islands and land sites. It is proposed for multi-use tasks including air superiority, counter-air, strike and suppression of enemy air defences. It is a delta wing vertical launch tail-sitter aircraft powered by a single jet engine which vectors thrust to return directly and precisely to latch onto its launcher, which is mounted on a flat-bed trailer. Completely autonomous in operation it is planned to make a first flight this year with production scheduled for 2029. No doubt with an eye on the Indo-Pacific region, the company claims that high survivability in conflict will come from using remote operating locations and it doesn't need extensive support infrastructure or big runway equipped bases. The company's much smaller V-Bat is another VTOL autonomous tail-sitter platform with a heavy fuel engine aimed at providing a multi-mission battlefield capability with unassisted launch and land operations, ability to fly in GNSS and communications contested battlespaces and with a 12 hour endurance with an 18 kg payload.

India had some interesting new developments, not all involved in combat systems. In the Tata chalet there were demonstrations of how they have developed a quadruped



inspection robot that can undertake most routine inspection tasks, paving the way for detailed analysis following up on the results from multiple sensors. As well as detailed close-up images of inspection-worthy systems and components thermal readings can be achieved providing further evidence from collected data. Checking

observations of equipment, often looking at hard-to-see areas, consolidating the information gathered, providing evidence of accuracy, the robotic inspector can indicate where preventative action might be needed, looking at root cause analysis. Clear linear defects can be revealed with hard evidence leading to verdicts and solutions being reached with confidence. Safety is enhanced along with higher inspection standards and saved timings.



A demonstration of rapid in-theatre assembly of a sizable new battlefield unmanned utility air vehicle was shown by British company Windracers. With an outstanding 2,000km maximum range the aircraft is very simple in form but is extremely rugged and resilient and has been designed with a no single point of failure philosophy featuring 15 redundant sensors and twin Hirth F23 fuel injected engines that can lift a load of 200 kilos in a roomy box section main wing spar. It can be delivered in a simple box for ease of assembly and can drop parachute loads as well as delivering essential re-supply stores, or can also be fitted out with various electronic systems. The UK has gifted many of these autonomous aircraft to Ukraine and they can operate in denied GPS environments. Major structural components are made in India by Bharat Forge.



Article and photos by Richard Gardner who was at the event.

The formations of Bastille Day

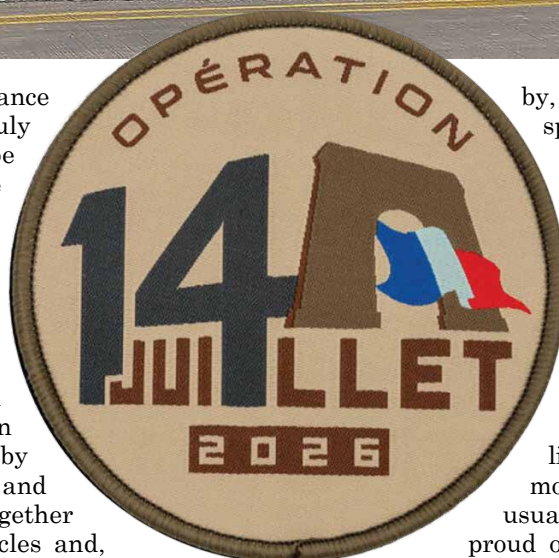


By honouring the past, France celebrates annually on 14 July its revolution of 1789, or maybe better known as “Bastille Day”. The military parades in and over Paris pay a tribute to all military and governmental “guardians” of the nowadays French republic.

Centre of the Bastille Day festivities is Paris’ main street, the Champs-Élysées, where you can see numerous troops marching in front of the French president joined by high rank officials, quests of honour and of course a large civilian crowd. Together with the troops, all kinds of vehicles and, often the newest types of, equipment are shown in a large parade to the gathered audience.

Air Defile

Maybe even more spectacular is the aerial part of the parade, the “Air Defile” where France shows its current military aircraft flying in various tight formations. Next to the impressive numbers of military aircraft passing



by, the defile is also used to put a spot light on the (semi) military and governmental public services like the “Sécurité Civile” (civil protection) which operates helicopters and fixed wing aircraft for services like fire-fighting and health care, but you can also see flying assets of customs and police.

The public may be already impressed by the sight of so many aircraft flying at low level in a long line over Paris, nevertheless there is more to discover in the air defile. As usual the aerial parade was opened by the proud of France, the aerial demonstration team “Patrouille de France” (PdF), flying with 9 of their red-white-blue coloured Alpha Jets. The Alpha Jets had only returned to France from their USA “Liberté 250” tour a few days earlier. PdF had visited the US for about a month, to take part in a number of celebrations for the country’s 250 years anniversary. For this occasion the Alpha Jets were additionally marked with elements of the USA “stars and stripes” flag on one side of the tail

and had also names applied of notable figures associated with Franco-American history, like George Washington, Benjamin Franklin and Joséphine Baker. During the Bastille Day parade over Paris, the Alpha Jets had still extra fuel tanks attached under their wings, needed for the trans-Atlantic crossing from the USA. Normally, Patrouille de France flies their displays without additional fuel tanks.

Ukraine

As France is highly committed to support Ukraine during its resistance against Russia, the French President Emmanuel Macron had directed to express his country's support in the air parade. Therefore on each side of the Patrouille de France formation a Mirage 2000B with a French-Ukraine mixed crew was aligned with the Alpha Jets. France has done Mirage 2000 donations to Ukraine and takes care of pilot training. At Evreux Air base, the French base where the majority of air defile aircraft gather, these crews were wearing face masks etc to protect their anonymity.

Formations

The air defile lead group of PdF was immediately followed by a 2nd formation with 4 sub-groups in which the French partnerships with international allies was expressed. In total 4 French Armée de l'Air et Espace (air and space forces) Rafales flew together with 2 Hellenic Rafales, a Swedish Gripen, a Polish F-16, a Spanish F/A-18, a RAF F-35B, a German Eurofighter and a Danish F-35A.

The 3rd formation was about the intervention role and had two groups. The 1st sub group was about the fighter force and consisted out of 10 Mirage 2000D's normally



based at Nancy and 2 Mirage 5F's from Luxeuil. The 2nd sub-group was about the supporting aerial refuelling role, where 3 Airbus A-330MRTT tankers flew together with 6 Rafales.

The French permanent security posture role was expressed in the 4th formation where 2 Rafale C's and 2 Mirage 2000 5F's flew alongside the leading E-3F AWACS.

A 5th formation showed the strategic air force elements of France with 7 Rafale B's of St.Dizier air base together with an A-330MRTT tanker,



which enables long distance strategic strikes. Another 12 Rafale M's together with an E-2C Hawkeye made up the 6th formation about the French naval aviation as a theme.

Intel and support

The intelligence and surveillance theme was for the 7th formation of aircraft with 2 sub-groups. The 1st had a Rafale (with an AREOS Reco NG reconnaissance pod) and 2 Mirage 2000D's (armed with missiles) flying with a navy Falcon 50M. The second group had 2 navy Atlantic II maritime patrol aircraft together with 2 air force Beech 350ER/ALSR aircraft.

With the theme "operational support" the larger airframes came insight for the 8th formation with 4 sub-groups. The 1st group was again paying respect to international partners, with 4 Airbus A-400 transport aircraft in tight formation, of which 1 British, 1 German and 2 French. The following group was French only with 4 A-400M's and immediately in pursuit the 3rd group with 2 French C-130's and another 2 Hercules aircraft from the French-German co-operation unit, which is based at Evreux. The last group of the 8th formation had 4 Evreux based CN-235M's for light cargo and para-dropping duties amongst others, flying together.



The 9th and finishing formation of all the naval and air force aircraft, was all about Special Forces. Here you could see an A-400M, a C-130H and a DHC-6 "Twin Otter" flying in formation with 2 EC-725R2 "Caracal" helicopters.

This 9th formation finishes the first part of the air defile, while the parade continues on street level at the Champs-Élysées with numerous units of ground forces and their vehicles. Later on in the morning the air defile continues with helicopter formations of which the majority



is of the French army aviation, added with several navy assets. Additionally some helicopters of the customs and gendarmerie (police) made a fly-by as well as a civil protection Airbus H-145.

There is no doubt that Evreux air base plays the major role as a starting point for the aircraft formations of Bastille Day. This year the base hosted about 30 French Rafales, 22 Mirage 2000s, 8 transporters, 11 PdF Alpha Jets and 6 foreign fighter jets, all participants for the air defile and a few acting as reserve aircraft for back-up.

Armament

Along with the various themes of all the different air force formations, you could see several of the Rafale and Mirage 2000 fighter aircraft at Evreux, armed with training variants of the air-ground AASM (Armement Air-Sol Modulaire) 250 and 1000 kg Guided Bomb Units (GBU).

AASM weapons make use of a rocket engine and wing concepts for precision strikes of ground targets up to 70km range. Other aircraft were armed with various types of MICA, Meteor and Scalp missiles or showed an underneath attached CC422 gun pod.

Additionally several aircraft were equipped with Thales TALIOS laser targeting pods with FSO-IRST (Front Sector Optronics with Infra-Red Search and Track function). These systems enable passive long-range threat detection with tracking capabilities of stealth aircraft and drones.

Next to armour, some of the Bastille Day aircraft showed their intelligence and surveillance supporting systems, like the earlier mentioned AREOS Reco NG Reconnaissance Pod system. Furthermore you could also see aircraft applied with the Thales ASTAC (Analyseur de Signaux TACTiques) reconnaissance system which is used to intercept and analyse tactical and technical data from Radio Frequency emissions of land based radars and weapons systems. ➡

Text and photos: Peter ten Berg



22 Shturmova Aviacionna Basa (22. ShtAB) – Bezmer Air Base



Bezmer Air Base is situated in the eastern part of the Upper Thracian Lowland, in Yambol Oblast region (Bulgaria), 10 kilometers west of the city Yambol and 30 kilometers southeast of the city Sliven, between the villages of Bezmer and Bolyarsko. The base takes its name from the nearby village, which is named after Khan Bezmer of Bulgaria (seventh century).

Bulgaria had always been a theatre of interest due to its strategic position, looking out to the Black Sea and consequently to Turkey and Russia and particularly favorable weather conditions of the area. The Imperial German Air Service built a base for Zeppelins in Yambol during World War I. The base was used for reconnaissance and bombing missions to Romania, Russia, Sudan and Malta. In 1955, the 22 Fighter Air Regiment was based at Bezmer, later this unit transformed into 22 Fighter-Bomber Air Regiment and eventually into 22 Attack Air Base. Now the units name is 22 Shturmova Aviacionna Basa which means 22nd Assault Aviation Base.

The Balgarski Voenno Vazdusni Sili (Bulgarian Air Force) was at its maximum power during the period of alliance with the Soviet Union under the Warszawa Pact when it operated around 400 aircraft like MiG-17, MiG-



19, MiG-21, MiG-23, MiG-29, Su-22 and Su-25 and around 100 helicopters like Mi-17 and Mi-24. After the cold war the Soviet support in terms of machines and spare parts ended which resulted in an important resizing. The MiG-17, MiG-19 and later the MiG-23, Su-22 and many MiG-21s were withdrawn from use. In the late 1980s a total of 40 Su-25 aircraft, 36 Su-25K single seat and 4 Su-

Su-25UBK twin seat, entered service and were based at Bezmer. The Su-25s took over the ground attack role, supported by the L-39s, from the MiG-21s which were retired from service. The Su-25 represents an effective and survivable attack workhorse purposely designed to fly short-range battlefield Close Air Support (CAS) missions. The Su-25 proved itself as a powerful weapon in many local conflicts. The high precision in turn allows the Su-25 to undertake non-visual bombing runs in poor weather and at night at low and medium level against fixed targets with known positions using unguided bombs from level flight.

During the late 1990s there were some problems with the Su-25 aircraft, mainly because they ran out of spare parts, and for different reasons it was decided to place over half of the fleet into storage at Bezmer Air Base. Later, most of the aircraft that were placed in storage were sold to the Georgian Aircraft company TAM. Fortunately, the Bulgarian Airforce was able to keep 14 Su-25s in active service within the Bulgarian Air Force. This number consists of 10 single seat Su-25K and 4 twin seat Su-25UBK aircraft. These 14 aircraft had received an overhaul and minor avionics upgrade. According to the 2006 Defence Cooperation Agreement between the United States and Bulgaria, Bezmer is among the joint US-Bulgarian military bases and is an important base for the United States. Also, the base was modernised, including modern communication, information, navigation systems and infrastructure development, including a runway extension and new (larger) platforms, which would expand the range of aircraft the base can support.

Overhaul and upgrades

In November 2018, the Bulgarian Ministry of Defence signed a US Dollar 85.5 million agreement with the 558th Aviation Repair Plant (558th ARP) Baranovichi, Belarus,



for major overhaul and life extension with avionics and weapons upgrade for the Su-25 fleet of the Bulgarian Air Force. The initial idea was to overhaul all 14 Su-25 aircraft, but the contract was downgraded to 8 Su-25 aircraft, 6 single seat and 2 double seat aircraft. The recalculated costs for the major overhaul of 8 aircraft were US Dollar 24.3 million. It took longer before the Su-25s could leave Bulgaria due to strong restrictions against Belarus with regards on the supply of weapons. The Bulgarian authorities and banks could not decide whether the Su-25 aircraft could be temporarily sent to the Republic of Belarus against which the EU constantly extends the embargo on the supply of weapons and equipment that can be used for “internal repression”. Since no payments were made under the contract until the end of 2018, the amount was postponed to 2019.

The overhaul and upgrade programme began on 28 August 2019 when the first Su-25 aircraft was transported by air to Baranovichi, Belarus. The major overhaul and upgrade included the installation of new radio's, new navigation systems with a satellite receiver, enhancing the information's that pilots need to accomplish their missions, an upgraded flight data recorder, a digital audio and video recorder, a new Head Up Display (HUD) providing a field of view double that of the old electro-optical sight and multi-functional cockpit displays used to display a digital map and flight, navigation and tactical information. The combination of all these updates increased significantly the accuracy when employing unguided ordnance with visual aiming.

Also, 16 R-95Sh engines were overhauled, which gives them a





life extension of 500 flight hours. The weapon systems had been enhanced with the introduction of the integration of the R-73 (AA-11) Archer highly agile short-range air to air missile. Between September 2020 and February 2021, all 8 modernised Su-25 were re-delivered to the Bulgarian Air Force at Bezmer. All Su-25 aircraft received a splendid pixel paint scheme with light green, dark green and dark brown colours. It's expected that the Su-25 aircraft stay in active service until at least 2028, but the expectation is they will be in service for longer than 2028. The Bulgarian Air Force was considering sending the other 6 Su-25 aircraft, 4 single seat and 2 double seat aircraft, to the 558th Aviation Repair Plant (558thARP) Baranovichi, Belarus for the same major overhaul and life extension programme but due to the political situation now it's impossible to overhaul the aircraft in Belarus. Unfortunately, a single seat Su-25K crashed on 28 September 2022. The pilot lost control during the landing at Bezmer Air Base, necessitating ejecting the aircraft. Luckily the pilot survived. This was only the second loss of a Su-25 in the 40 years the Bulgarian Air Force is operating this type. On



17 April 1989, there was an incident during a bomb attack on the Pitovo training ground causing the Su-25 to crash and sadly killing the pilot.

Training Area

Between 25 and 30 miles from Bezmer Airbase the Novo Selo training range is situated. The range has a surface area of almost 56 square miles. Presently the range is not only used by the Bulgarian Air Force, but since Bulgaria entered NATO (North Atlantic Treaty Organisation) on 29 March 2004 the range is also used by other NATO members as well. The range has special areas for tank shooting and reconnaissance training. All of this makes it an ideal training facility for the Bulgarian Air Force Su-25 crews to practice their skills. There are also shooting exercises organised by the Bulgarian Air Force in which other countries, like the United States Air Force, participated in the past. The Bulgarian Air Force is also hosting international exercises which mainly are operated from Graf Ignatievo but Bezmer had an important role in these exercises. In the past allied fighters participated as United States Air Force F-15 and F-16s, Italian Air Force EF-2000 and Tornado and Serbian Air Force MiG-29s. These exercises are fundamental for the Bulgarian Air Force pilots and crews to familiarise with operational procedures and standard decisions to be taken during missions, tactics and techniques, used by their colleagues of NATO, with the final aim to enhance the interoperability between the Bulgarian Air Force and other Allied forces to bolster readiness to conduct combined air operations.

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

**Article and photos: Lowpass Aviation
Rene Slegers and Bram Marijnissen**

Italian Air Force: The 32nd Wing

“The tip of the spear”



The 32nd Wing of the Italian Air Force was the first unit in Europe to operate the F-35 and managed the transition to fifth generation aircraft with the arrival of the first F-35A and the first F-35B, received on 12 December 2016 and 22 February 2020 respectively. This transformation naturally required major infrastructure upgrades at the base, including the creation of the “F-



35 Citadel”, a large, restricted and tightly controlled area where the F-35s and their associated control and rapid refuelling systems are housed. Today, the 32nd Wing undoubtedly represents one of the most advanced operational expressions of the Italian Air Force, with the 13th Squadron operating the F-35A, the 101st Squadron – re-established on 1 July 2025 – equipped with the F-35B, and the 28th and 61st Squadrons equipped with MQ-9 Predator B (Reaper) remotely piloted aircraft. The latter were upgraded last year to the Block 5 standard, giving them markedly improved capabilities and performance compared with the previous version. The Wing also has simulators and training capabilities sufficient to support the Italian Navy’s Grupaer.

The mission

Like all Italian Air Force Wings, the fundamental mission of the 32nd Wing is to train and prepare the personnel, assets and weapon systems assigned to the unit. It is a constant mandate, but one that in recent years has undergone a profound evolution, driven above all by the introduction of new, latest generation weapon systems: the F-35A since 2016, operated by the 13th Flying Squadron, and the F-35B, assigned to the 101st. Alongside these aircraft is the unmanned component, with Predator aircraft operated since 2002, when the first MQ-1s were introduced. These were later replaced from 2010 by the MQ-9 Block 1 and now by the Block 5, the most advanced and technologically sophisticated configuration in service with the 28th Squadron and the 61st Squadron, the latter based at Sigonella but an integral part of the Wing. In addition, from Amendola the 32nd Wing regularly performs operational tasks with both the F-35 and the Predator.

The most significant element is undoubtedly the provision of Quick Reaction Alert, the alert system for



the surveillance of national airspace. Since 2018, the 32nd Wing has provided this service with the F-35A, becoming the first unit in the world to employ a fifth-generation aircraft for this type of mission. The service is performed in rotation with the other Italian Air Force Eurofighter units and has progressively expanded: from an exclusively national role, it is now integrated into NATO's air-surveillance architecture, at times also in Air Policing missions beyond national borders, ensuring the air security of Allied countries that do not possess autonomous capabilities in this field.

The operational tasks assigned daily to the Predator component are instead Intelligence, Surveillance and Reconnaissance (ISR) missions, supporting both national and international operations: from surveillance in Kosovo in support of NATO's KFOR operation to operations in the Mediterranean, including the European Union's EUNAVFOR MED Irini.

A dual strategic posture

The unit stands out for a dual operational identity that is unique worldwide: on one side, the latest generation F-35A and F-35B fighters; on the other, Predator remotely piloted aircraft, key assets for strategic surveillance. These are profoundly different tools, yet they share the ability to ensure information superiority on the battlefield. However, the strength of the 32nd Wing does not lie solely in the weapon systems it operates: Amendola Air Base itself has

a particular strategic value. Its geographical position is almost central in relation to Central Europe, the Balkans and the Mediterranean — a natural crossroads that still enables the projection of operational capabilities in every direction in support of national defence.

Joint operations

When discussing joint operations, it is clear that the joint dimension is not an exceptional circumstance for the 32nd Wing, but the normal framework within which the unit plans and executes its missions every day.

13th Flying Squadron



With the transition to fifth generation aircraft, training within the 13th Flying Squadron has undergone a radical transformation, although the technical component has remained fundamental.

Today, maintainer training is centred on managing a complex predictive system. Through the analysis of codes and prognostic data,

technical personnel no longer simply repair a fault: they learn to anticipate it, thereby maximising flight-line efficiency. In this sense, maintainers have evolved into true system managers, capable of governing the aircraft's

digital health even before its mechanical integrity. The paradigm shift is, if anything, even more pronounced for pilots. The F-35 is a platform that pushes the concept of “multirole” to its extreme, defining itself as “omnirole”: a system capable of performing different types of mission simultaneously.

Today, the real operational limitation is no longer the performance of the machine, but the pilot’s ability to manage the flow of information it provides. Aircrew training therefore requires an unprecedented cognitive focus: pilots must be able to operate in scenarios saturated with advanced threats, coordinating on their own capabilities that in the past required the employment of three or four different flight lines.

In this context, advanced simulation has become a fundamental pillar of the fifth generation. The complexity of modern scenarios would require a number of real assets and an extent of airspace that would be difficult to sustain in reality. The use of high fidelity simulators therefore makes it possible to replicate and train personnel for critical tactical situations that would be virtually impossible to simulate in flight, guaranteeing the 13th Squadron absolute operational readiness.

101st Flying Squadron

This historic Flying Squadron, which in 2016 was equipped with AMX aircraft, was placed in “cadre” status – effectively suspended – and was reactivated on 1 July 2025 on the F-35B, an aircraft with STOVL capability, i.e. Short Take-Off and Vertical Landing, designed to operate from light aircraft carriers, amphibious assault ships and short or damaged runways. From an operational standpoint, the F-35B clearly gives the Armed Force a new capability that could be described as expeditionary: the ability to redeploy to bases unsuitable for all aircraft, perhaps because they have short runways or runways shortened by wartime damage and therefore usable only by STOVL aircraft.



It is therefore easy to understand that the reactivation of this Squadron operating the F-35B has opened up new capabilities and, consequently, new scenarios and challenges that the Italian Air Force has been able to seize.

The main missions assigned to the 101st Squadron are essentially twofold: operational and training. The first is natural, since the 101st was created as a genuine operational squadron, on a par with the other Italian Air Force F-35A squadrons. At the same time, however, the Squadron also carries on the training tradition of the “old” 101st – disbanded in 2016 as part of the completion of the reorganisation of the 51st Wing at Istrana – which was an OCU, or Operational Conversion Unit, responsible for training new pilots on the aircraft, at that time the AMX and today the F-35B.

Pilot training, as we shall see later, can take place through conversion from the F-35A to the F-35B, as is the case for all 101st Squadron pilots coming from the 13th, or from fourth-generation aircraft, as in the case of the Italian Navy, which sends its student pilots to Amendola for the Operational Conversion Unit phase on the aircraft.

In particular, training includes all ground based activity – theoretical lessons and simulator sessions – followed by the first flights at Amendola and continued activity at Grottaglie with Gruppaer. In summary, there are two capabilities: operational and training.

The Commander of the 101st Squadron, Magg. Davide “Burghez” B., says: “As already mentioned, the Squadron stems from the 13th, a solid and historic unit that has operated the F-35A since 2016 – although the first aircraft were delivered to the Wing and not directly to the Flying Squadron – developing training and operational experience on this aircraft. We can therefore say that the framework we have given the Squadron is not entirely new: we simply had to take personnel, pilots and aircraft from the 13th and bring a new Flying Squadron to life.

Clearly, there were some specific implementations and training activities related to the B variant that we had to put into practice during this year in order to achieve the aircraft’s new capabilities. Nevertheless, we carried with us a substantial legacy already available within the 13th Squadron, so the organisational, logistical and training solutions were already partly in place.





A logistical strength is the “F-35 Citadel” at Amendola, already established and operational and conceived from the outset to host two operational squadrons. It was clear, in fact, that the Air Force expected us to open a second Flying Squadron.”

The new challenges

To understand how central personnel training is, we must consider the new challenges tackled by the 101st Squadron. Many scenarios have opened up in which the 101st has already participated.

With its F-35Bs, the Squadron has taken part in almost all embarkations with the Italian Navy in recent years, developing close cooperation with Grupaer in an operational scenario in which it had previously not been involved.

Examples include deployment aboard the aircraft carrier Cavour, training activity aboard the British aircraft carrier Prince of Wales, and, together with colleagues from the Italian Navy's Grupaer, participation by Italian Air Force F-35Bs in several exercises, including Pitch Black in Australia in 2024. They embarked on Cavour for the entire return voyage from Australia, opening new scenarios that previously could neither exist nor coexist.

These scenarios and related activities have played a central role, because the F-35B is the ideal aircraft for flight operations from an aircraft carrier. Turning to other activities carried out in recent weeks by the Italian Air Force's 101st Flying Squadron, we highlight the recent



deployment to the island of Pantelleria, where the runway is only 1,700 metres long and the F-35B is essentially the only aircraft fully suitable to operate there. The Squadron conducted flying activity there and, together with the Eurofighters of the 37th Wing from Trapani, carried out training missions for the first time in the history of the Italian Air Force.

Another significant activity involving the 101st Squadron and the F-35B was the recent Imminent Field 26 exercise, organised in Finland by the Satakunta Air Wing from 18 to 22 May. During the exercise, pilots from the 101st Squadron took off from and landed on a highway, on a stretch approximately 1,500 metres long — characteristics well suited to the F-35B. Other participating aircraft, such as Finnish F/A-18s, did not land on the highway but carried out approach activity followed by a go-around on final, because the “runway” was too short for them to stop. The B variant, by contrast, performed actual landing, repositioning and take-off operations. This type of mission, conducted for the first time by Italian aircraft, is highly significant: one only has to think of an operational context in which airport runways have been damaged, a condition in which the F-35B variant can make the difference.

Lt. Col. Davide “Burghez” B: “These new challenges have obviously required an implementation of training, because the pilots coming from the 13th Squadron had never carried out activity aboard aircraft carriers. We therefore found ourselves, for the first time, performing an entirely unfamiliar activity, and we had to adapt to the type of training typical of the Italian Navy, while still achieving the same training objectives they had already set for their own pilots. So, to answer the question, personnel training is absolutely central: it allows us, as in this case, to operate in complex scenarios and to develop interoperability characteristics together with the other Italian Armed Forces and NATO member forces.”

The author thanks the 5th Department of the Italian Air Force General Staff, Gen. Urbano Floreani, the Italian Air Force Public Information Office, Col. Francesco De Vincenti, Col. Roberto Losengo, Lt. Col. Stefano Testa, Lt. Col. Fabiano “Victor” S., Lt. Col. Davide “Burghez” B., Lt. Ida Battista and all the Wing's personnel. ➡

Text: Gian Carlo Vecchi

Images: Gian Carlo Vecchi/Pier Paolo Lazzarin

Thracian Blade 26 takes Cheshnegirovo



The war in Iran showed again the importance of having a good and well trained rescue force in the area of operations. The efforts of various aerial Combat Search and Rescue (CSAR) units to find and recover an, over enemy territory, downed USAF F-15E crew, was world news early April 2026. The regular training and exercises of these crews to operate under difficult circumstances, was without doubt key to make the mission in Iran successful.

Training is therefore also a major important element in the objectives of the Multinational Helicopter Training Centre (MHTC), in which currently 14 European nations participate and having its headquarters in Portugal. For the purpose to train new crews or bring senior crews to a higher level, the MHTC plans annual “Blade” exercises

to achieve these objectives. Therefore this June saw the MHTC present in Bulgaria to conduct the 2 weeks exercise under the name “Thracian Blade 26” (TB26). The exercise brought together around 27 aerial assets out of 8 European nations to train out of Krumovo air base from 1–19 June.

MHTC

Organiser of the Thracian Blade exercise is the MHTC, which was founded by the European Defence Agency (EDA) in 2024. The EDA, which was filling gaps in tactical training and interoperability since 2009 by promoting a common approach for helicopter activities in new and challenging environments, saw the need to bring all its helicopter activities together in the new dedicated MHTC command for efficiency reasons. This meant that all Helicopter Training Programmes, being the Helicopter Exercise Programme (HEP), the Helicopter Tactics Course (HTC) and the Helicopters Instructors Course (HTIC), were placed within a modular approach of the MHTC.

Blade

The modular programme of the MHTC has an annual occurrence of Blade exercises and are planned with a multi-year horizon. Earlier editions of the exercise took place in Portugal with “Hot Blade” at Beja air base in 2024 and in Hungary with “Fire Blade” from Papa air base in 2025. With the 2026 Blade edition in Bulgaria it was easy to make the Thracian connection, referring to the ancient inhabitants of the area. The centre of operations for Thracian Blade was Krumovo air base,





just south of the city of Plovdiv. Krumovo, 24th Air Base, is the main helicopter operating base of the Bulgarian air force and housing 3 squadrons, operating types like the Mi-24V, AS-532UL, Mi-17 and the Bell 206B.

TB26

Krumovo had for “Thracian Blade 26” (TB26) a wide variety of nations, and helicopter types present at its base for 2 weeks. Austria was participating with 2 AW-169 and 2 OH-58, Serbia with a Mi-35 and an H-145M, Slovakia had an UH-60 and Switzerland had 2 AS-532 Cougars detached at the Bulgarian base. The Hungarian Air Force joined the exercise shortly for supporting TB26 missions

with some Gripen fighter aircraft and a KC-390 tactical transporter. Bulgaria, as host country, delivered the main force of aerial assets which included fix wing Mig-29 Fulcrums, Su-25 Frogfoots, L-39 Albatros, C-27 Spartans and their rotor force consisted out of 2 AS-532 Cougars, a Mi-17 and a Bell 206. Also their latest fighter aircraft, the F-16 took part in the exercise. Several of these, with aerial assets, participating nations together with Belgium and Slovenia, brought in a number of Ground Elements (GE) for the exercise, focusing at, amongst others, mission planning and Electronic Warfare (EW).

A Blade exercise provides the opportunity to helicopter operators from multiple European Nations to train





together using common helicopter Tactics Technics and Procedures (TTP). In this set up they can plan and execute complex missions in a multinational environment, in accordance with the MHTC HEP Standard Operating Procedures (SOP). The exercise knows a building block approach which is initiated by an academic session, a familiarisation phase and cross training activities on small Composite Air Operations (COMAO) missions to create mutual understanding and to ensure a safe operational environment. While the TB exercise was in progress, the complexity of each COMAO mission and the number of flight assets increased accordingly.

Main elements of the TB26 COMAO's included transport of troops and equipment into the landing zone, Medical Evacuation (MedEvac), Combat Search and Rescue (CSAR) and Personnel Recovery (PR) of isolated persons in hostile area, Search and Rescue (SAR) in remote areas, Special Operations Forces, escort and protection of the multinational tactical air assets to the Area of Operation (AO) and provide Close Air Support (CAS) to neutralize actions of hostile opposite forces in AO and finally detecting, classifying, identifying, tracking and defeating low, slow and small air threats.



Cheshnegirovo

After 2 weeks of intensive training the Thracian Blade exercise finished with a large COMAO where all training



elements were combined into one large mission. Area of Operation was the air base Cheshnegirovo, at about 20 kilometres east of Plovdiv. In presence of high military officials a realistic scenario was rolled out to demonstrate the multinational cooperation of the 2 weeks training. A pair of "hostile" MiG-29's, on patrol over the air base, where intercepted and engaged by F-16's to clear the air space. The new Bulgarian F-16's maintained their new positions over Cheshnegirovo air base to defend against new threats. While on station over the air base, the F-16's came under fire by Man-Portable Air Defence Systems (MANPADS) of enemy ground forces, which were successfully encountered by evasive manoeuvres.

Meanwhile several helicopters were approaching flying tactical at tree top level. A Bell 206 observed the area from a distance while a Mi-35 executed several attack runs to neutralise the enemy forces with their MANPADS. Together with the F-16's several L-39's came into theatre as a Forward Air Controller (FAC) to observe the Area of Operations and coordinate any action against enemy ground forces and pushing them away from the air base. This made it possible for a C-27 Spartan doing a run at medium level to drop equipment etc by Container Delivery Systems (DCS) and immediately followed by helicopters inserting ground troops by fast roping to secure the area. Once the last resistance was neutralised, other helicopters came on scene to deliver a substantial number of troops into the Landing Zone (LZ). Next was a Medical Evacuation (MedEvac) by helicopter, to take away injured troops to a hospital. With the successful taking of Cheshnegirovo, the TB26 scenario came to an end.

Observers

After the TB26 final trainings mission, all aerial assets, except for the fighter aircraft, gathered at Cheshnegirovo air base, making it able for observers and other guests to speak to the crews and hear about their training and exchanging experiences. Thracian Blade 26 had observers from Cyprus, Greece, Czech Republic, Lithuania and New Zealand to monitor the exercise.

For 2027 a new Blade exercise will be held in Portugal.

Text and images: Peter ten Berg

Thracian Blade 2026

Cheshnegirovo Air Base, Bulgaria; 17 June 2026



Exercise Thracian Blade 2026 (TB26) represents a significant milestone for the Bulgarian Air Force as it hosts this multinational training event at Krumovo Air Base. Although Bulgaria is not yet a member of the Multinational Helicopter Training Centre (MHTC), the country has worked in close partnership with the organisation to facilitate this exercise. The primary motivation for hosting was to evaluate the country's capacity for conducting complex rotary wing crew training and to gain the necessary experience to inform future decisions regarding full membership in the MHTC framework. Colonel Peyo Donchev, Chief of Staff in Operations of the Bulgarian Air Force and Exercise Director for TB26, notes that the process began after observing the Fire Blade exercise in Hungary last year. Following a detailed report to the Bulgarian Air Force leadership, the team received a mandate to organize Thracian Blade. "After 18 months of hard work and close cooperation with MHTC and member states that expressed their willingness to join this exercise, we have this as a real exercise," stated Colonel Donchev.

Thracian Blade core objectives

The core objective of Thracian Blade is to build not only a blue (air) but also green (land) tailored exercise dedicated to supporting ground elements. Throughout the event, which runs from 1–19 June 2026, aircrews have utilised common Tactics, Techniques and Procedures

(TTP's) within a Composite Air Operations (COMAO) concept. The exercise followed a building block approach, starting with academic sessions and simple missions before progressing to more complex scenarios involving electronic warfare threat simulators and live assets. Despite the inherent challenges of flight operations, Colonel Donchev emphasizes the value of the planning phase. "I could confirm that participating crews demonstrated day by day how their proficiency, their knowledge in planning process is improving," Donchev explains. While adverse weather grounded flying operations for two days, the exercise maintained its momentum by focusing on the rigorous planning process. Donchev highlights the importance of this methodology, stating, "This is the knowledge, the



knowledge we build trust through the process and this is the reality". The exercise involves over 450 aviation personnel and 27 air assets from nations including Austria, Bulgaria, Hungary, Serbia, Slovakia and Switzerland. By conducting these operations in accordance with MHTC's Helicopter Exercise Program (HEP) and Standard Operating Procedures (SOP), the Bulgarian Air Force has provided a platform for participants to refine interoperability at the tactical level. Reflecting on the execution, Colonel Donchev concludes, "What I saw during the planning process, during the briefing phase, during the execution phase and even during the debrief I'm really satisfied".

Swiss standardisation in global exercises

For the Swiss Air Force, participation in the Thracian Blade 2026 exercise at Krumovo Air Base represents a crucial milestone in its long term operational development. While Switzerland conducts foundational and tactical training for its helicopter crews domestically, the environment at home is constrained by high population density, strictly regulated flight corridors, and limitations on altitude and speed. These geographic and regulatory factors create significant gaps in the ability to practice complex, international-standard missions. As a relatively new affiliate of the MHTC, having joined the organization in March 2026, this exercise provided the Swiss detachment with an essential platform to bridge these capability gaps and validate their operational standards against NATO-aligned benchmarks. Lieutenant-Colonel Lukas Rechsteiner, the Senior National Representative of the Swiss Helicopter Detachment at the exercise,



emphasises that the true value of TB26 lies in the multinational framework. "We have the basic training in Switzerland, the tactical basic training on helicopters," Rechsteiner explains. "But otherwise we have very little opportunity in a multinational framework". By deploying to Bulgaria, the Swiss team was able to move beyond domestic limitations, working alongside diverse European partners to refine their tactical approach in a permissive yet challenging operational environment. The Swiss detachment at Krumovo consisted of approximately 35 personnel operating three AS532UL Cougar helicopters. This force structure allowed the detachment to maintain two helicopters in daily flight operations while keeping the third as a vital reserve asset for operational continuity. The personnel were organised into two crews per helicopter, ensuring a robust, rotating cycle of mission planning and execution.

Throughout the three week exercise, the detachment focused on the MHTC's core principles; Team, Train and Trust. According to Rechsteiner, the 'Team' component





involved sharing experiences and tactics with other nations, allowing crews to learn from different operational perspectives and procedural nuances. The ‘train’ phase offered a rare two week window where the unit could remain tactically focused without the disturbances of domestic initiatives. “We can really practice something for two weeks, where we are not disturbed by other initiatives, but are tactically focused and the training from day to day, you just feel it is going better and better every day while training,” says Rechsteiner.

The final component ‘trust’ is the absolute cornerstone of any successful multinational operation. As crews from different nations began to operate in complex, contested environments involving simulated enemy air defenses and joint land–air scenarios, the necessity for a common language of tactics and procedures became clear. Rechsteiner observed that while early cooperation might feel reserved due to language barriers or differing national expectations, the rigorous planning cycles of the COMAO environment forced a rapid convergence of standards. By



engaging in these complex scenarios, the helicopter crews transitioned from independent operators to components of a cohesive, multinational strike force.

By the end of the exercise, the Swiss crews had demonstrated their ability to perform high–stakes tasks, including casualty evacuation from hostile environments and tactical troop transport. This are capabilities that were really tested during the exercise’s final phase. The successful deployment to Krumovo has provided the Swiss Air Force with invaluable insights into its own interoperability, confirming that international cooperation is the only way to validate the effectiveness of modern helicopter units in a realistic, multinational theater.

AW169B ‘Lion’, a new platform on scene

For the Austrian Air Force, Exercise Thracian Blade 2026 served as a critical venue for integrating new technology into a multinational operational framework. Lieutenant–Colonel Chris Kappl, a squadron commander within the Austrian Air Force, arrived in Bulgaria with a





unique perspective; he is currently transitioning between the legacy OH-58 Kiowa and the modern Leonardo AW169B, which is in Austria affectionately nicknamed the 'Lion' by the Austrian Ministry of Defence and the public. This transition is central to Austria's aviation strategy, with the goal of replacing the aging Kiowa fleet entirely by 2029 or 2030. The introduction of the AW169B represents a generational leap for Austrian rotary-wing operations. "I would say we jumped with the AW169 from the 19th century into the 21st century," explains Lt Col Kappl. Unlike the OH-58, which is constrained by a top speed of approximately 100 knots, the AW169 operates comfortably within the speed regimes of both small-to-medium and heavy transport helicopters. This performance parity allows the Austrian detachment to operate effectively within Composite Air Operations (COMAO) formations without the limitations previously imposed by the slower Kiowa airframes.

Beyond speed, the AW169 offers enhanced utilities as a flexible weapon platform and light transport helicopter. It allows the Austrian crews to infiltrate small teams into landing zones that are inaccessible to larger, heavier transport helicopters. The platform's advanced automation, integrated flight management systems, and superior radio communication suites have fundamentally altered how the detachment approaches mission planning and execution. Austria plans to procure a fleet of 36 helicopters, with 24 configured for military operations and 12 in a basic configuration intended for pilot training and utility tasks.

TB26 provided the first mission focused deployment for the 'Lion' outside of Italy, where Austrian instructor pilots received their advanced training. For the Austrian detachment, the exercise was not merely a demonstration of hardware, but a rigorous testing ground



for mixed formation tactics. The detachment operated in a combination of close air support, fire support, sniper support, and escort roles, often flying in mixed formations that included both the legacy Kiowas and the new AW169s. This mixed fleet approach allowed the detachment to validate national procedures while simultaneously improving their interoperability with international partners. "For us it's very important, we see that and we can show our young pilots that the training we perform back home does make sense," stated Lt Col Kappl. Watching his crews integrate with colleagues from Bulgaria, Serbia, Slovakia and Switzerland proved the effectiveness of the common planning mindsets and procedures fostered by the MHTC. Over the course of the two week exercise, the steep learning curve demonstrated by the crews validated the Austrian Air Force's investment in these new capabilities of the 'Lion' and the effectiveness of their domestic training programmes. ➡

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

Thank You, 17th Punjab

By Dinesh K Kapila CGM (Retd) NABARD

It was the afternoon of a warm and humid August in 2016. I recall it even now. I entered the General ICU at a local reputed hospital in Chandigarh to meet my mother. She had collapsed at home due to a diabetic complication and for us it was touch and go till the ambulance got her to the Emergency Wing and subsequently moved her to the General ICU. Thankfully she recovered quite well and was discharged within a few days with the advice to recuperate at home.

But to go back to the General ICU, I saw my mom lying quietly on her bed and walked towards her. This was the second day of her stay. As I bent down to greet her, she smiled, asked about me (a mother is a mother) and then gestured to the elderly tall lanky Sikh gentleman in the next bed. She said with a sense of familiarity, he is Major Jagtar Singh from 17 Punjab. I moved towards him, so did Major Jagtar Singh, he insisted upon getting up and embracing me. My mother said, my eldest son, Dinesh and as we embraced, I wished him and said a sincere heartfelt “thank you”. We had never met, my mother had never met him, but it was as though we knew each other. My father, as I came to know, had already met him and had a long chat, the Major was from near Bhatinda and was undergoing treatment at the hospital. The 17th Punjab Battalion was located near Bhatinda only.

Our family owes a real debt to this battalion, years pass on, memories fade, but they never ever did for my parents and not for me, being the eldest. I and over the years, my wife Anita and my children, Priyanka and Prashant, understood their emotions and feelings. In late 1968, Dad (Major General Rajendra Nath, PVSM (Retd), 2nd Course IMA, as Lt Col was commanding 6/11 GR (Gorkha Rifles) at Ambala and on promotion he was promoted to Brigadier and tasked to command a Mountain Brigade on the active Chinese Border at Sikkim. The 17th Punjab was one of the battalions comprising the Brigade. He moved to Sikkim while my mother stayed on at our bungalow at Allenby Road Ambala Cantt so as to avoid interrupting our education. The Brigade we do not clearly remember but it could be the 165th Mountain Brigade.

My father loves the mountains and was passionate about them. Since he moved to the Indian Military Academy at Dehradun in 1946 from Hoshiarpur in Punjab (my grandfather practised as a lawyer at Lahore and Hoshiarpur), he loved the mountains, this was a lifelong passion. Well, gung ho, always on the go and self-confident in handling mountains and complications, he was visiting his units in 1969 and getting familiar with the terrain regularly. Maybe he ought to have been taking it easy but then even when he was ninety four years old I had to

plead with him to stop driving. He strongly objected to my request but gave in grudgingly.

In April 1969, he was to visit some pickets of 17 Punjab and before he set out, his long time Batman, Amber Bahadur Gurung, from 6/11 GR, requested him politely not to go. In chaste Gorkhali, he submitted my father was tired. It would be a long tough hike. As my father decided to go, he insisted on placing a copy of the “Hanuman Chalisa” in my father’s folder. Dad remembered to have quietly accepted it with reverence.

Well, it was a snowy day, it was snowing heavily at 16,000 feet, when my father collapsed after inspecting a picket. There was commotion as to the officers and men realised it was the dreaded high altitude sickness, Pulmonary Oedema. Water or rather fluids leak into the lungs and it is not possible for the lungs to handle it, leading to collapse of the lungs and major complications, sometimes fatal. The only solution is to bring the patient to lower altitude, on priority and as early as possible. Then also it can be a gamble. Here in Sikkim at that time the infrastructure was poor, roads located far away and the path was just a mountain track. The helicopter could not fly in because of very adverse weather conditions.

The 17th Punjab scrambled fast. Three groups were constituted at varied locations. One advance party set out to ascertain the easier and faster path in heavy falling snow and ice on the tracks. It was foggy and visibility was poor. The resolve of the men was we are not losing our Commander. They tied my father to a cot, strapped him in and physically four to six men at a time started carrying the cot down. We can only imagine how tough and arduous it would have been. But the typical army spirit of not losing a man and not giving in carried them on. After every few hundred feet another team took over, shouting encouragement to him in Punjabi and moving on relentlessly. I can only imagine today the planning put in, the tasks allocated and then executed on a real time basis. Years later, we were always thankful, Dad always said, I am alive because of the 17 Punjab.

The rescue parties, with sheer grit and determination, brought him down to around 10,000 feet in around four and a half to five hours maximum. This is really swift going while carrying a man strapped on a cot and on a mountain track in snowy conditions. There a jeep was waiting with the unit doctor. His laconic statement was, “one lung collapsed, one about to, move him down very very fast”. Lying strapped in, Dad remembered the matter of fact tone clearly all across the years. The men cleared the way, the jeep raced to 8000 feet, that’s when my father

felt the urge to relieve himself and the doctor said, “you will live Sir, the 17th Punjab saved you. It’s just in time”.

Next day he was airlifted to the Military Hospital at Calcutta from the Base Hospital, where he would spend nearly 75 days recovering. My mother would get to talk to him once a day, that was her lifeline. I forgot to add, my maternal grandfather turned up early morning after the episode, his address was listed in the contact numbers at Army HQ’s. Then the telegrams followed and the ladies of the 6/11 GR rallied around my mother. It would have been very tough on her. Dad had a long tough recovery, posted later as the BGS, Central Army Command at Lucknow, he insisted on walking to office from the house at Dilkusha Road, resting at every crossing saying a polite thanks but no to all offers of a lift, he had to build up his strength and be loyal to his profession.

So thank you 17 Punjab. Thank you always. It’s because of them my father would celebrate 98 years, when he passed away in 2024. Thank you Amber Bahadur too. Later, when he was commanding a division at Akhnoor, 17 Punjab was a part of it and he conveyed his thanks and gratitude along with my mother. And danced with the troops with gay abandon.

Tailpiece – I also want to thank the Regiment of Artillery of the Pakistan Army. In 1971 in East Pakistan they traced his vehicle, he was commanding 62 Mountain Brigade, and fired off a series of bursts. His jeep was thrown in the air by the shells. The driver, guard, my father and his GSO3 (A Captain) were thrown all over and were in shock but unharmed. A few more shells fell but all survived. In fact

the GSO3 said amidst all the confusion and chaos I feel we lost the Commander but then my father shouted I am on the other side of the road. So for inaccurate firing by the Pakistan Artillery my thanks. In another inaccurate fire, they severely injured his guard standing just next to him, so thank you again.

A different and sincere thanks too. In 1974, there were floods in the Munawar Tawi, a river in Chamb, J&K. Two jawans were marooned. Returning from another location by helicopter, my father (then a Major General, commanding 10 Infantry Division) directed the pilots to rescue them as he was monitoring it on the radio. They had to stray two three times into Pakistani territory. Later on his Pakistani counterpart told him on the radio, my troops had noticed the violation. We knew you were on it, they just wanted my orders to fire, I withheld it. But it will not happen next time. So a thanks here to his wisdom.

PS: Well, after all these years, I thought of penning this. 17th Punjab, all the glory and success to you, I was 8 years old in 1969, my youngest brother 3 years, as my mother would say. The Unit gave the rescue its all, with full commitment, Major Jagtar Singh then carried a letter from my father to the current Commanding Officer conveying his gratitude. I had then asked Major Jagtar Singh, do you remember him, he said it is as if it was yesterday. He was the Intelligence Officer at the unit in 1969 and said your dad’s swagger and self-confidence rubbed off on us, plus he remembers the handlebar moustaches! Across the years we met, parted and moved on. But the gratitude is always there from all of us. ➡

Raising Day of 17 Battalion of Punjab Regiment celebrated

The 63rd Rising Day of 17th Battalion of Punjab Regiment was celebrated in November 2025 at Pansai village in Hamirpur district by former officers and soldiers. They paid tributes to the martyred soldiers and observed a two minute silence. Major Prem Singh Kharwal, who was chief guest of the function, said that Punjab Regiment was the first regiment to be raised after Independence in 1962 as part of the expansion plans of the Indian Army. He added that many soldiers of the regiment had won gallantry awards for their actions during the 1965 and 1971 wars.

The retired officers, including Honorary Captain Ranjit, Tarsem, Kashiram, Ratan Singh, Milap Singh, Captain



Hemraj, Subedar Major Gyanchand, Captain Shyam Singh, Subedar Major Bhup Singh, Sanjay Kumar and ex-servicemen from Jammu and Kashmir and Himachal Pradesh of the 17th Battalion of Punjab Regiment were present. (Information and photo courtesy: The Tribune)

Battle of Chushul: Reminiscences of 20 Lancers

By Maj Gen (Retd) AK Dewan, AVSM, VrC



It is almost 50 years ago when a detachment of 20th Lancers comprising two tank troops opened new vistas of armoured warfare in the Battle of Chushul (Ladakh) in the Indo–China war 1962.

I had the proud privilege to command this Detachment in this battle. My reminiscences of this battle bring back memories of the historic landing of the first AMX–13 tank in Chushul on 25 October 1962 by An–12 aircraft, at a height of 14,230 ft, subsequently built up to two tank troops, and the heroic performance of the men under my command in the most adverse conditions of sub–zero temperatures and rarefied atmosphere at such high altitudes. This proved to the world that armour has no limitations.

Early memories of Chushul

Our success in this battle was largely due to the untiring efforts and indefatigable spirit of all concerned to overcome the numerous problems and difficulties that faced us during induction, and the subsequent problems and difficulties that confronted us after the landing of tanks in Chushul. The driving and motivating force behind the success of this Detachment was indeed one man—my Commanding Officer, Lt Col Gurbachan Singh— popularly known as “Butch”, who later in service rose to the rank of Army Commander. He saw to it that we got what we needed to live and fight in such inhospitable terrain and truly cared for our welfare.

The loading of the first tank in An–12 in Chandigarh on 22 October failed as the front half of the tank after negotiating the steep ramp of the aircraft came down with a thud like a dead weight when its centre of gravity passed the edge of the aircraft floor. This resulted in damage to the aircraft as the iron rod jack supporting the rear of the aircraft went through its aluminum floor, and the tank tracks started to slip on it resulting in the tank gun ramming the side of the aircraft and damaging it. Our

VCOAS and senior AF officers were present during this loading trial.

The AF authorities put their hands up and declared the loading trial as a failure as they were not prepared to take any more risk of causing damage to their recently inducted An–12. This news was received with disquiet and disappointment, but “Butch” was not the one to give up and let this opportunity slip out. He overcame this problem by getting hold of the fabricators/carpenters in Chandigarh and got a platform made of the same height as the aircraft floor and flush with it, along with a suitable ramp.

To avoid the tank slipping on the aluminium floor of the aircraft, wooden decking was also done on it. It was now easy for the tank to go up the ramp to the platform, which would absorb the thud of its dead weight, and drive slowly into the aircraft. Having made this platform by working 24 hours round the clock, we successfully demonstrated loading of the tank in the aircraft to the satisfaction of the AF by noon 24 October.

Troubleshooting

The next problem was that of bringing down the tank load within the aircraft restrictions of an all–up weight of 10 tons. To start with, the AF insisted that the tank gun if not the whole of turret be taken off and assembled at the other end. They were assured that if this were the only answer even this would be done, but emphasised that the need for the tank to arrive in one piece was imperative so as to be operational within the minimum possible time.

This need was dictated by the proximity of the enemy to the airfield, their constant observation of our flights, and therefore possible reaction in the form of precipitate action to prevent further buildup of tanks. Further a recce of Chushul airfield the same morning and assessment of the resources and working conditions aggravated by the high altitude and sub–zero temperature effects, as also the lack of facilities for re–assembling heavy parts of tanks, had left no doubt that speedy preparedness for action would be highly problematical if the tanks were inducted in part knocked–down condition.

The AF appreciated our viewpoint and decided to reduce the all up weight by cutting down on fuel in the aircraft— just sufficient for flying to Chushul and back and minimum stay at the airfield without switching off engines. It is this risk taken by their pilots, which was largely responsible in making possible this memorable and historical armoured adventure. We played our part in reducing the tank weight by unloading its ammunition, keeping fuel to the minimum, and removing all detachable access plates/equipment and stowage items.

The first pilot who volunteered to fly the tank to Chushul was Sqn Ldr Chandan Singh, a very brave officer

indeed, and other aircraft were to follow one at a time on his successful return to base. He earned many decorations during his service—MVC, AVSM, VrC—and rose to the rank of AVM.

The stage was now set to load the tanks on nights 24/25 October and 25/26 October. By noon 26 October 1962 two troops of AMX tanks had landed in Chushul—first time in our history that a tank had been flown into combat under the very nose of the enemy, and also first time in the world that the tanks had operated at such heights and in such extreme sub-zero temperature conditions.

Not just a tank

It is difficult to express my feelings when I landed with the first tank at Chushul on the morning of 25 October. It was perhaps one of exhilaration at the prospect of fighting my first action, mixed with awe of the bleak and barren landscape, and anxiety about the performance of tanks in this terrain and the well-being of my men in such conditions, having been inducted without any acclimatisation. It was only a few days back that I had returned to the Regiment after my ERE at ACC&S Ahmednagar; so the totally changed conditions one had to adjust to can well be imagined.

Within a few days of arrival of our complete Detachment at Chushul, the inhospitable conditions took their toll and three officers including the Sqn Cdr were evacuated due to high altitude sickness/effects. I therefore assumed command of the Detachment and had the good fortune of commanding it in the Battle of Chushul.

We faced many problems regarding performance of tanks but managed to solve them as they came along by innovation and sustained support from the Regiment. The major ones were:

1. Loss of engine power due to lack of sufficient air resulting in rich fuel mixture leading to incomplete combustion and stalling of tanks. Our LAD officer, Bunt Ayenger innovated a temporary solution by inserting a thin copper wire in the main jet to reduce the flow of fuel. Although this did not result in an ideal fuel mixture, yet it helped a lot in preventing stalling, though with appreciable loss of power.



2. The difficulty of starting a tank exposed to such sub-zero cold conditions. Temporary solution was found by keeping one tank started for some time every 2 to 3 hours and starting remainder tanks by connecting their female socket with jumper lead from the started tank.
3. The difficulty in building up engine operating temperature due to low boiling point in rarefied high altitude. An engineer of TDEV, Ahmednagar attended to this problem and fitted a higher rating vapour pressure relief valve (VPRV) in the water header tank. He did this job on 17 November but did not want to wait to see the result. The Chinese attacked early morning on 18 November and the header tank of this tank busted as the VPRV did not open thus grounding one tank!! So much for our engineers!
4. Longer main gun ranges were achieved with shorter application on the telescope. We managed to test the tank guns by actual firing a few days before the battle. This proved to be very useful when the battle was joined, as gunners knew what to expect.
5. Bulky snow clothing issued to the crews was not conducive to working inside the tanks. It is to the credit of "Butch" that he got us light and warm clothing—fur-lined cap, jacket, trousers, boots and double gloves—in record time.

We did not allow these problems to get the better of us but solved them fairly effectively, thanks to the motivation and indefatigable spirit of all ranks, superbly supported by "Butch" and his team. We were also lucky to get sufficient number of days to become a well-knit, highly motivated outfit before joining action. Our spirits were high as one can gauge from Lt Avinash Chad's example of refusing to get evacuated despite succumbing to serious high altitude sickness a week before the battle.

So on 18 November when the Chinese attack was preceded by intense artillery and artillery fire on Rezang La, Maggar Hill, Gurung Hill and Spanggur Gap at about 0615h, we lost no time in getting ready for action.

Pushing on

The initial dispositions of own infantry were a company each at Tsaka La and Rezang La, two companies each



at Gurung Hill and Maggar Hill and one company in Spanggur Gap. Our two troops were located close to the airfield and Gurung Hill.

Our task was to deny Spanggur gap approach to the enemy, particularly to Armour that may try to venture out towards Chushul. (It was however learnt later that enemy had no tanks contrary to earlier intelligence reports), to act as mobile reserve with an infantry company to safeguard flanks and any sizeable infiltration that may take place during battle along road Tsaka La–Chushul and finally to provide close fire support.

The Chinese started closing in for an assault on Gurung Hill and Rezang La around 0700h on 18 November. As they neared the objective, their guns and mortars lifted their fire and brought a hail of shells on the Chushul airfield. I got in touch with CO 1/8 GR and learnt that two places were under attack. I immediately moved one troop closer to Gurung Hill led by me in an open jeep under heavy shelling to have better observation to bring down fire on the enemy. The target was top of Gurung Hill at an altitude of 18,000 ft and 4000 yards away from the firing position.

As the enemy descended down the forward slopes, the three tanks kept pumping in accurate fire and managed to stall the attack by 1015h causing heavy casualties. Since the range of the target was more than the graticules marked on the telescope, the firing was conducted by improvised method making corrections on the hand wheel, which incidentally is also not graduated to any scale. By this time the Kumaonese Company at Rezang La had fallen in the face of overwhelming Chinese superiority. It is here that Maj Shaitan Singh and his valiant men carried out fighting to the last man and last round. Their action will forever remain a shining example of unparalleled bravery and sacrifice.

Chinese get aggressive

After the fall of Rezang La, there was a possibility that the Chinese might establish a roadblock on road Chushul–Tsaka La thus blocking the only exit route to Leh. To counter this I sent one troop (consisting of only 2 tanks as one tank had become off–road before the battle due to bursting of the water header tank) under Avinash as ordered by the Brigade HQ. Avinash, who had been itching ‘to have a go’, moved like lightning and established himself in a suitable position to thwart enemy design. He had to remain there in a firing position precariously perched in a

narrow re–entrant for many days hoping in vain to have a shot.

With a portion of Gurung Hill and the whole of Rezang La with the Chinese on the one hand, and the neutralisation of their guns/mortars, and heavy casualties suffered by them on the other, there followed a comparative lull in the remaining hours of 18 November except for sporadic shelling of the airfield during night 18/19 November.

The Chinese infantry resumed movement for an attack on the remaining defences on Gurung Hill around 1000h on 19 November and were engaged by own artillery. I moved a troop of tanks under Ris Dalsukh to pre–selected firing positions and started pounding them with relentless fury causing heavy loss of lives. Eventually, it was at 1400h that under cover of mist and snow fall, the Chinese launched their attack in such overwhelming strength that Gurung Hill finally fell at 1630h.

The Chinese aim appeared to be to roll down in strength from Gurung Hill on night 19/20 November with a view to cutting off the rear of our troops at Spanggur gap and at Maggar Hill. Our tanks also helped in covering the withdrawal of troops from the forward positions to their second line of defence, which was occupied by the Brigade by first light 20 November.

Getting an edge

It may be mentioned here that after the fall of Gurung Hill, the Chinese advance towards the airfield from Gurung Hill was prevented entirely by the effectiveness of our tanks and artillery fire.

On 21 November the Chinese declared ceasefire. Thus ended the heroic and magnificent performance of this Detachment under the most difficult conditions. This was generously applauded by all the higher commanders in the theatre right up the echelons of command. Our Brigade Commander, Tappy Raina (who later became COAS) remarked, “the tanks gave a magnificent account of themselves” GOC 3 Himalayan Division addressed all ranks of our Detachment and said, “words fail me when I want to express my gratitude for the excellent work done by you all.” The Corps Commander was equally appreciative and flew into Chushul a couple of days later to congratulate us. Our action was also recognised by the award of Vir Chakra and Sena Medal.

25 October 1962 — for 20 Lancers and for the whole of Armoured Corps— is indeed a unique day as it was on this day that AMX tanks were flown direct into combat for the first time. This battle also established that we could handle our equipment anywhere and under any circumstances with the barest of frills.

This battle has also perhaps established an unbeatable record of operating with tanks at heights from 14,230 ft to 16000 ft. This should make us all very proud indeed. 🚀

This article first appeared in the Salute magazine on 3 December 2020.

All representational images (Wikipedia)

25 Years Back

**From Vayu Aerospace Review
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First HAL-upgraded MiG-21bis

Following the completion of test flights by the first two MiG-21bis sent to Russia in 1996, and “certification” by SOKOL at Nizni Novgorod, start has been made for upgradation of the balance 123 MiG-21bis at HAL’s Nasik Division. The first such aircraft (C-2794) made its maiden flight on 31 August 2001.

Russia blames India for MiG accidents

Reacting sharply — and uncharacteristically strongly — to the spate of reports from Indian governmental organisations which have put the blame on “poor quality MiG aircraft for the high accident rates of the Indian Air Force”, Russia has sought to blame India for the frequent crashes of MiG aircraft of the IAF.

Russian “warning” on Israeli involvement

Again, in a very strong statement, virtually a warning, Barkovsky expressed concern over reports that India is in negotiations with Israel for upgrading its MiG-27 and MiG-29 aircraft. He said that to keep Russia out of the exercise gave it a “dangerous dimension” and would have “serious consequences” for the IAF.

Russian Air Chief “rejects” MiG-AT

The Russian Air Force chief General Anatoly Komukov has created dramatic sensation by ruling out the induction of the MiG advanced trainer, which the company RAC-MiG has long been pushing for the Indian Air Force. General Komukov stated that he was “opposed to the induction of this advanced jet trainer”.

CCS clears joint defence staff

The Cabinet Committee on Security (CCS) has cleared the institution of the first ever integrated defence staff and cleared establishment of a Tri-Service Command in the Andaman and Nicobar Islands. This was announced by Defence Minister Jaswant Singh after a meeting of the CCS.

Agni induction by the Army

According to well-informed sources in New Delhi, even as India goes ahead with the project to develop the long-range “Agni III” missile, the first version of the ballistic missile is set to be inducted by the Indian Army before end-December 2001.

The Chief of Defence Staff (CDS)

In a recent article Defence Analyst K. Subrahmanyam writes: One of the recommendations of the group of ministers to reform the national security system relates to the creation of the post of CDS. The GoM is of the view that the creation of a CDS is essential to promote “jointness” in the armed forces.

IAF’s opposition to the CDS

It is in view of the strong opposition from the Indian Air Force (IAF) that the Centre has postponed a decision on the appointment of the CDS. The Cabinet Committee on Security (CCS) has decided on revamping the intelligence set up but deferred a decision on the CDS.

Indian Navy’s stress on Information Warfare

“Military powers with a superior ability to gather, understand, control and use information have always had a definite advantage in the battlefields,” stated Vice Admiral Harinder Singh, Flag Officer Commanding-in-Chief, Southern Naval Command. He was delivering the opening address at a seminar on ‘Information Warfare and Technology’.

Canada 3000 airlines debut in India

Canada 3000 Airlines have announced the beginning of its operation in India with Ms Nutan Gupta, Director India, heading the company’s new office in India. Canada 3000’s inaugural flight from Delhi to Vancouver will commence from 2 October 2001 while Canada 3000’s inaugural flight to Toronto will depart from Delhi on 12 October.

Now fly Lufthansa to Bangalore

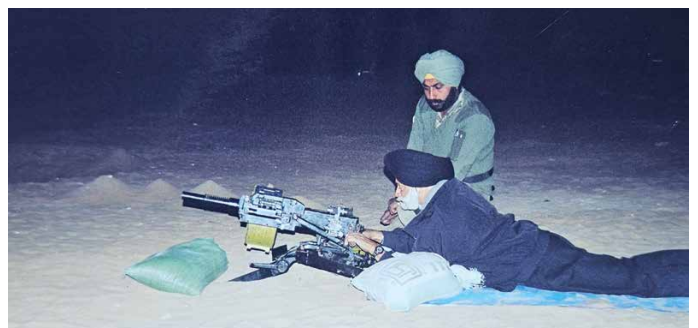
Lufthansa German Airlines officially commenced its three weekly non-stop Airbus A.340-300 services between Bangalore and Frankfurt from 1 September 2001. Bangalore, capital of the state of Karnataka, is Lufthansa’s fourth destination in India.

3 percent growth in domestic air travel

Statistics released by the Director General of Civil Aviation indicate that close to 37,700 people a day, adding up to an impressive 6.9 million flew the domestic skies between January and June this year, but this accounted for an average growth of just 3 per cent over the corresponding period last year. ➡

Tale Spin

Remembering Pushpinder Singh, Founder and Editor of the Vayu Aerospace & Defence Review journal on his 5th anniversary of passing away. Besides being a history buff, his knowledge on all aviation matters in India and rest of the world was untouchable. He loved to travel and especially within India where he visited and covered for the magazine various defence establishments (not to mention the 35 books he authored on the Indian Armed Forces). His passion had no bounds. Some photos here of his visits to all sorts of places! ➡



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