

Aero India<sup>9</sup>25 review Highlights at Al<sup>9</sup>25 SOF at Yelahanka The Pravalg Veer India's Security Challenges Exercises and visits ELECTRONICS & DEFENSE

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# **II/2025**





Cover : At Aero India 2025, the two 5th generation Russian Su-57 and American F-35 crossing paths. Photo by Shrey Chopra (Instagram and Twitter/X: @captchops)

# Editorial Panel

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**BUSINESS DEVELOPMENT MANAGER** Premiit Singh

# 10 Union Budget 2025–26 for MoD

The Union Budget of India has made a provision of Rs 6,81,210 crore for Financial Year (FY) 2025-26 for the Ministry of Defence (MoD). This allocation is 9.53% more than the Budgetary Estimate of FY 2024-25.

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### **CSG Charles de Gaulle and Indian Navy**

After stopovers in Goa and Kochi on India's western coast, the entire French carrier strike group (CSG) centered around aircraft carrier FNS Charles de Gaulle cast off on 9 January 2025 for the next phase of Mission Clemenceau 25 in the Indian Ocean.







#### **TROPEX-25**

The 2025 edition of Indian Navy's capstone Theatre Level Operational Exercise (TROPEX), took place in the Indian Ocean Region. This operational level exercise is conducted biennially with participation by all operational Indian naval units along with substantial participation of Indian Army, Indian Air Force and Coast Guard assets.





In this series that we have been monitoring over the past 5 years or so, it is great to see Indian participation along with international navies, air forces and armies. From a few exercises a year. now there are dozens spread out over all branches of the forces.



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#### **DFFSS** seminar

The Delhi Forum For Strategic Studies (DFFSS) conducted its annual seminar on 18 January 2025 at the India International Centre, New Delhi. It was attended by many senior veterans, former diplomats, members of the academia, media and defence analysts. The theme selected for this year's discussions was '2025: India's Security Challenges'.

# **Checking out the Pravaig Veer**

Vavu's Rishav Gupta had the chance to sit with Siddhartha Bagri, the CEO of Pravaig, a Bharat based deep tech mobility company, to discuss the VEER-the world's first electric tactical all-terrain vehicle for the military.

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# Aero India 2025: a report

Aero India's 15th edition (10-14 February 2025) was bigger than ever. From the usual 5 halls, it grew to 7 in 2023 and this time there were 9. The "first" Aero India show was held at Yelahanka Air Force Station, Bengaluru, in 1996, organised by the DEO, Department of Defence Production, MoD. A 70+ page report on the event.



Sankalan Chattopadhyay writes on Asia's biggest air show which unveiled numerous cutting edge platforms. Here are some top indigenous systems and concepts that will steer the Indian Armed Forces towards supremacy in any potential conflict.









# 40 SOF at Aero India 2025

Abhinav Negi says that while most of the people were there only to see the two rivals aka the Su-57 Felon and F-35 JSF, he was taken aback by something very different or off the chart!



# 119 **UK Chagos plans reviewed**

Richard Gardner talks about the agreement to relinquish sovereignty of the UK's extensive Indian Ocean Territories linked to a new defence treaty covering a 99 year lease of the important Diego Garcia anchorage and air base.



#### **Regular features:**

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# Lt Gen Kamal Davar says... .....Despite spending hike on defence, many challenges yet to be tackled



ver the past four years, not only is the post-Covid-19 world at war with itself, but warfare has emerged in newer forms, with myriad challenges across varying domains putting to rest military truisms which have stood the test of time. India lies in one of the most politically stressed and stricken regions in the world. Confronting an overly assertive and ambitious China, and a perpetually anti-India Pakistan, both independently and in collusion with each other, is a glaring fact of our regional geopolitical conundrum. With the erstwhile pro-India neighbour on our east, Bangladesh, has in the past few months unexpectedly become hostile, means India is now facing a third front.

To achieve the requisite operational capabilities and strategic deterrence, are India's armed forces adequately equipped for modern warfare across land, sea, air, space, cyber, AI and other emerging technological dimensions. To attain the desired military capabilities, adequate allocations in the country's defence budget is simply unavoidable.

Finance minister Nirmala Sitharaman, presenting her eighth Union Budget, for 2025–26, has earmarked Rs 6.81 lakh crores for defence spending, including Rs 1.8 lakh crores for military modernisation. This year's allocation is 9.5 per cent higher than what was allocated for defence in last year's Budget and six per cent more than last year's revised estimates. It accounts for 1.9 per cent of the nation's projected GDP and 13.45 per cent of the government's Budget. As in some earlier years, the finance minister did not touch upon defence allocations in her speech.

The revised Budget estimates show that the armed forces were unable to spend Rs 12,500 crores of last year's capital outlay of Rs 1.72 lakh crores an avoidable malaise. Defence Minister Rajnath Singh has said that 75 per cent modernisation outlay will be spent on buying weapons and equipment from domestic sources to give a fillip to achieving self-reliance in the defence manufacturing sector.

An overview of India's defence budgets since Independence has most analysts surmising that, by and large, they have been short of expectations in overall allocations, yearly spending as also bereft of long-term planning. Without delving too much into the past, it has been observed that our defence budgets have been largely slightly above two

per cent of our GDP, which is quite inadequate.

The only exception was after the 1962 debacle against China. In the last financial year, however, it had fallen to a mere 1.9 per cent of GDP. Various parliamentary committees have suggested that the allocations for defence should be at least three per cent of GDP.

While India has the world's fourth largest defence budget, it is still in dire need of additional fighter aircraft, an extra aircraft carrier, as well as warships, nuclear submarines, advanced multi-role helicopters, drones of various types, light tanks, additional artillery, air defence missiles and aero engines, apart from replenishing its ammunition stocks.



As widely reported in the media, there are many critical gaps in our arsenal. The Indian Air Force is down to a precarious level of 31 fighter squadrons, as against the minimum desired strength of 42 squadrons, and this grave operational void needs to be filled with the alacrity it deserves. The IAF too must send a firm recommendation to the government for the aircraft it urgently requires, along with details of the induction of AMCA (Advanced Medium–Range Aircraft), plans for induction of the indigenously built Tejas Mk.1 and has done well by emphasising on self-reliance for all defence needs of the nation and its "Atma Nirbharata" programme should be given full support for successful implementation. The decision to spend 75 per cent of its budgetary allocations for purchases from domestic manufacturers is indeed a bold one. The Centre must also ensure genuine assistance to India's vibrant and technologically advanced private sector.

Also, foreign equipment manufacturers must be encouraged to set up production units in India itself for mutual benefit. It is a common Overall, factoring the emerging security challenges to India in the foreseeable future, the nation has to ensure its military capabilities to be adequate for its needs. The government and the service headquarters thus must ensure the capital outlays earmarked for modernisation are wisely and fully spent in the current financial year. Additional budgetary support, if and where required, should also be catered for.

Successfully confronting India's all-encompassing security challenges is, therefore, the need of the hour.



aero-engines for it, acquisition of ultra-modern drones, etc. China already deploys many fifth generation aircraft and recently unveiled two types of sixth generation aircraft. Even financially stressed Pakistan is reportedly trying to acquire 40 fifth generation aircraft from China. The defence ministry, DRDO and HAL must move much faster to fulfil the IAF's requirements. For all this, substantial budgetary allocations are required, and wherever shortfalls are there in capital outlays for modernisation could be made up later.

For decades, India has been among the top arms importing nations. Most of our defence public sector units, set up since the early 1950s, have underperformed. The government lament that some of our policies like "single window clearances" are mere utterances, and not observed with sincerity by our bureaucracy.

One area where India's indigenous defence industry can take credit is in the encouraging spurt in the export of defence equipment. India is supplying Brahmos cruise missiles, Pinaka rockets, artillery guns, radars, Dhruv helicopters, electronic warfare systems, among other equipment, to some friendly foreign nations. India's defence exports have reached Rs 21,083 crores in 2023–2024, a 32.5 per cent increase from the previous financial year. The government aims to have defence exports touching Rs 50,000 crores by 2029.



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

# **DRDO conducts trials of VSHORADS**

Defence Research & Development Organisation (DRDO) successfully conducted three successive flight trials of Very Short Range Air Defence System (VSHORADS) from Chandipur off the coast of Odisha. These tests were carried out against high speed targets flying at very low altitude. During all the three flight tests, the missiles intercepted and completely destroyed the targets having reduced thermal signature mimicking low flying drones at different flying conditions.



# DRDO & Indian Navy in trials of NASM–SR

Defence Research & Development Organisation (DRDO) and Indian Navy carried out successful flight trials of firstof-its-kind Naval Anti-Ship missile (NASM-SR) from Integrated Test Range (ITR), Chandipur on 25 February 2025. The trials demonstrated the missile's capability against ship targets while launched from an Indian naval Seaking helicopter. The missile uses an indigenous Fiber Optic Gyroscope based INS and radio altimeter for its mid-course guidance, an integrated avionics module, electro-mechanical actuators for aerodynamic and jet vane control, thermal batteries and PCB warhead.



# **Contract for anti-ship cruise missiles**

On 4 February 2025, Ministry of Defence signed a contract with Russia for the procurement of anti-ship cruise missiles, in the presence of Defence Secretary Rajesh Kumar Singh at New Delhi. These missiles will "significantly augment the combat capabilities" of the Indian Navy's submarine fleet.



# MoD contracts with EEL, MIL and BEL

Ministry of Defence has signed contracts with Economic Explosive Limited (EEL) and Munitions India Limited (MIL) for the procurement of Area Denial Munition (ADM) Type-1 (DPICM) and High Explosive Pre Fragmented (HEPF) Mk-1 (Enhanced) rockets respectively for Pinaka Multiple Launch Rocket System (MLRS) at a total cost of Rs 10,147 crore. In addition, a contract for upgrades in Shakti software has also been signed with Bharat Electronics Limited (BEL). The procurement of ADM Type-1 (DPICM) and HEPF Mk-1 (E) rockets will mark a significant milestone in the modernisation of the artillery rocket regiments.

# **BEL receives orders worth Rs. 1,292 Cr**

Bharat Electronics Limited (BEL) has signed contract valued ล 1,034at Rs.  $\mathbf{Cr}$ (excluding taxes) with the Ministry of Defence for supply of Software Defined Radios (SDRs) and Data Communication Terminals (DCTs) for the Indian Coast Guard. The state-of-the-art radios, indigenously



developed jointly by DEAL (DRDO) and BEL, support multi-band, multi-channel, multi-role/mission operations to meet the needs of network centric warfare. The DCT system enables communication between shore and ships with the accuracy, speed, security and reliability required for critical missions.

# Indian Army procures CBRN equipment

Indian Army signed a contract on 25 February 2025 for procurement of 223 Automatic Chemical Agent Detection and Alarm (ACADA) systems with L&T Ltd at a cost of Rs 80.43 Cr, under the Buy Indian (IDDM) category. This will give a significant boost to the GoI's Atamnirbharta drive since more than 80% of the components and subsystems of the equipment will be sourced locally. Induction of ACADA in the field units will substantially enhance Indian Army's defensive CBRN capability for operations, as also for peacetime, especially for responding to disaster relief situations related to industrial accidents.



# **BEL executes IA order for WLR**

Bharat Electronics Limited (BEL), on 4 March 2025, handed over the 49th Weapon Locating Radar (WLR– Plains)–Swathi to the Indian Army, developed indigenously by BEL and DRDO lab LRDE, well ahead of the delivery schedule. WLR Swathi, a joint development project of radar house LRDE (DRDO) and BEL, has proven its might by providing rapid intelligence for retaliatory strikes. BEL has also exported the Weapon Locating Radar to friendly countries, a "testimony to India's growing capability to design and manufacture advanced systems indigenously, meeting the international standards".



# MoD contracts with ACE Ltd & JCB India Ltd

The Ministry of Defence signed contracts with ACE Limited and JCB India Limited in the presence of Defence Secretary R K Singh for procurement of quantity 1868 Rough Terrain Fork Lift Truck (RTFLT) at a total cost of Rs. 697.35 crore for Indian Army, Indian Air Force and Indian Navy. Rough Terrain Fork Lift Truck (RTFLT) is a critical equipment which will assist in various combat and logistics support tasks by avoiding manual handling of enormous number of stores.

# 'Sanjay' flagged off

Raksha Mantri Rajnath Singh flagged-off 'Sanjay – The Battlefield Surveillance System (BSS)' from South Block, New Delhi on 24 January 2025. Sanjay is an automated system which integrates the inputs from all ground and aerial battlefield sensors, processing them to confirm their veracity, preventing duplication and fusing them to produce a Common Surveillance Picture of the battlefield over secured Army Data Network & Satellite Communication Network. It will enhance battlefield transparency and transform the future battlefield through a Centralised Web Application which will provide inputs to Command and Army Headquarters, and the Indian Army Decision Support System.



# IA orders drones from IG Drones

Amid rising security concerns and evolving drone warfare tactics, IG Drones has "solidified its position as a trusted technology partner for India's defence forces" by securing a significant contract with the Indian Army. The order includes the supply of IG Drones' indigenously developed VTOL (Vertical Take–Off and Landing) and FPV (First–Person View) drones, designed to enhance the Army's operational capabilities while addressing national security concerns surrounding the use of foreign components in critical defence systems.



# Mahindra Group and Anduril in partnership

Mahindra Group and Anduril Industries, an American technology company that specialises in autonomous systems, announced a strategic partnership aimed at co-developing and co-producing state-of-the-art Autonomous Maritime Systems, advanced AI enabled Counter Unmanned Aerial System (CUAS) technologies and innovative Command and Control (C2) software. The partnership focuses on developing modular Autonomous Underwater Vehicles (AUVs) that can be rapidly deployed for security, surveillance, survey, and reconnaissance missions, significantly enhancing underwater operational capabilities.

# **GRSE & AMS sign MoU**

Garden Reach Shipbuilders & Engineers Limited (GRSE) and Apollo Micro Systems Limited (AMS) have entered into a Memorandum of Understanding (MoU) for a period of five years to establish a business partnership for the joint research and development (R&D), co-production, export of underwater weapons and vehicles, underwater mines, underwater communication systems and air defence systems and supply of advanced weapons and electronic systems for both defence and non-defence industries.

# Zen Technologies 3rd patent for T–90 simulator

Zen Technologies Limited has announced the grant of its third patent for the T–90 Tank Simulator – the Containerised Driving Simulator System (T–90 DS). This marks the third patent granted for T–90 tank simulators, following the earlier patents for the Basic Gunnery Simulator (BGS) and Crew Gunnery Simulator (CGS). Additionally, Zen has three patents covering T–72 and BMP–II tank simulator variants, further demonstrating its commitment to developing advanced military training systems for armoured vehicle operations.



# **RTX's Collins Aerospace's new centre in Bengaluru**

Collins Aerospace, an RTX business, has opened its new Engineering Development and Test Centre (EDTC) at the company's North Gate campus in Bengaluru, India. The new facility streamlines product development, testing and certification of components locally, bringing aerospace technologies to market faster. The state-ofthe-art facility includes comprehensive testing equipment to ensure the aerospace systems meet the highest global safety and performance standards. These tests simulate harsh aircraft operating conditions and address potential issues including extreme temperatures, high altitudes, vibration, and electromagnetic interference.



# John Cockerill Defense and Electro Pneumatics & Hydraulics in JV

John Cockerill Defense and Electro Pneumatics & Hydraulics Pvt Ltd, have entered into a Joint Venture (JV) agreement for combining "their technological, manufacturing and innovation capabilities to strengthen India's defence ecosystem". The JV will focus on manufacturing, assembling, and commissioning turrets for the Indian Army's Indian Light Tank (ILT) programme, a critical initiative aimed at "enhancing India's defence capabilities in extreme and challenging terrains".

# **Keel laying of 7th ASW SWC**

Keel laying the seventh of ship (BY 529, Machilipatnam) of the Anti-Submarine Warfare Shallow Water Craft (ASW SWC) project was undertaken on 29 January 2025.



Contract for building eight ASW SWC ships was awarded to Cochin Shipyard Limited by the Ministry of Defence on 30 April 2019.

# **Steel cutting of 3rd FFS for IN**

Steel Cutting ceremony of third of the five Fleet Support Ships (FSS) was held at L&T Shipyard, Kattupalli on 20 February 2025, in the presence of R Adm Satish Shenai, Flag Officer Commanding Tamil Nadu and Puducherry Naval Area and senior officials from Indian Navy, Hindustan Ship Yard Limited (HSL) and L&T. The Indian Navy had signed a contract with HSL for acquisition of Five Fleet Support Ships (FSS) in August 2023, with delivery commencing mid–2027. Showcasing the strength of Public–Private partnership, HSL has contracted part construction of two FSS to L&T Shipyard, Kattupalli to "effectively utilise country's shipbuilding capacity and meet stringent timelines for delivery".



# **ISRO's 100th launch**

On 29 January 2025, ISRO's GSLV-F15/NVS-02 mission was successfully accomplished and with this, India has reached new heights in space navigation! GSLV-F15 is the 17th flight of India's Geosynchronous Satellite Launch Vehicle (GSLV) and 11th flight with indigenous cryo stage. It is the 8th operational flight of GSLV with



an indigenous cryogenic stage and 100th launch from the India's Spaceport Sriharikota. GSLV–F15 payload fairing was a metallic version with a diameter of 3.4 meters.

Navigation with Indian Constellation (NavIC) is India's independent regional navigation satellite system designed to provide accurate position, velocity and timing (PVT) service to users in India as well as to region extending about 1500 km beyond Indian land mass.

# Air India and Lufthansa Group in expansion

Air India and Lufthansa Group have agreed to build on their longstanding codeshare partnership, which sees Air India enter into a new codeshare agreement with Austrian Airlines, as well as expand the existing codeshare agreements between Air India, Lufthansa and Swiss International Air Lines (SWISS). The expanded partnership significantly boosts flight options and connectivity for travellers between the Indian Subcontinent and Europe with the addition of close to 60 codeshare routes operated by the four airlines across 12 Indian and 26 European cities.



# IndiGo damp lease for three Boeing 787–9

IndiGo has announced another firm agreement with Norse Atlantic Airways for damp lease of three Boeing 787–9 aircraft. These aircraft will be arriving in India in the second half of 2025 and will serve long haul routes out of India. These additional three damp leases will bring the total to four and IndiGo and Norse continue to explore opportunities to broaden the cooperation and possibility for contracting more aircraft.

# ACG delivers 2 Boeing 737–8 MAX to Air India Express

Aviation Capital Group LLC (ACG) announced the delivery of two Boeing 737–8 MAX aircraft to Air India Express. Featuring CFM International LEAP–1B engines, these are the third and fourth aircraft scheduled to deliver to the airline as part of a multiple–aircraft sale–leaseback transaction between ACG and Air India Express.

# **Just in!**

# 1st rear fuselage for LCA Mk.1A handed over to HAL by Indian private industry

The first rear fuselage for Light Combat Aircraft Mk.1A, produced by Indian private industry, Alpha Tocol Engineering Services Private Ltd, was handed over to Hindustan Aeronautics Limited (HAL) in the presence of Raksha Mantri Rajnath Singh at Aircraft Division in Bengaluru, Karnataka on 9 March 2025. A fuselage is the main body section of the aircraft which holds the pilot, passengers and cargo, while the rear fuselage supports the tail section and its associated components. Raksha Mantri described HAL as the fuselage of the country's defence and aerospace sector, with private companies such as L&T, Alpha Tocol, Tata Advanced Systems and VEM Technologies playing the role of rear fuselage, supporting HAL. "Together with these Indian components, the aircraft which is being manufactured in our defence and aerospace sector will reach greater heights in the times to come," he stated.

HAL had placed orders on various Indian private companies such as L&T, Alpha Tocol Engineering

Services, Tata Advanced Systems Ltd (TASL), VEM Technologies and Lakshmi Mission Works (LMW) for supplying major modules for the 83 LCA Mk.1A contract.

HAL has already manufactured 12 LCA Mk.1A rear fuselages, which are on the aircraft in the manufacturing line. With this supply, a major structure module produced by an Indian private partner will be integrated into the LCA Mk.1A aircraft, enabling HAL to meet additional delivery commitments for IAF from 2025–26 onwards.



# **APPOINTMENTS**

# Vice Admiral Rajaram Swaminathan assumes charge as The Controller Warship Production and Acquisition

ice Admiral Rajaram Swaminathan assumed charge as the Controller of Warship Production & Acquisition on 30 January 2025 from Vice Admiral B Sivakumar. VAdm Swaminathan was commissioned in Indian Navy in 1987. In a career spanning more than 37 years, he has worked onboard the aircraft carrier, INS Viraat, for more than nine years in various capacities. The Flag Officer has held many important assignments including Fleet Engineer Officer (Western Fleet), General Manager (Refit) at Naval Dockyard (Mumbai), Director of Personnel and Principal Director Ship Production at New Delhi. He was also involved in the acquisition of aircraft carrier, Vikramaditya, as Warship Production Superintendent in Russia and as Principal Director Aircraft Carrier Projects in Delhi.



# Rs 6.81 lakh crore allocated in Union Budget 2025-26 for MoD



he Union Budget of India has made a provision of Rs 6,81,210.27 crore for Financial Year (FY) 2025–26 for the Ministry of Defence (MoD). This allocation is 9.53% more than the Budgetary Estimate of FY 2024–25 and stands at 13.45% of Union Budget, which is highest among the Ministries.

Out of this, Rs 1,80,000 crore i.e. 26.43% of total allocation will be spent on Capital Outlay on Defence Services. On Revenue Head, allocation for the Armed Forces stands at Rs 3,11,732.30 crore which is 45.76% of total allocation. Defence Pension receives a share of Rs 1,60,795 crore i.e. 23.60% and balance Rs 28,682.97 crore i.e. 4.21% is for civil organisations under MoD. The Ministry has taken a decision to observe 2025–26 as 'Year of Reforms'.

### **Capital Outlay**

In the current geopolitical scenario where the world is witnessing a changing paradigm of modern warfare, Indian Armed Forces need to be equipped with state-of-the-art weapons and have to be transformed into a technologically advanced combat ready force. Keeping this in view, Rs 1,80,000 crore has been allocated on Capital Outlay of the Defence Forces. This allocation is 4.65% higher than the

Budgetary Estimate (BE) of FY 2024–25.

Out of this, Rs 1,48,722.80 crore is planned to be spent on Capital Acquisition, termed as modernisation budget of the Armed Forces and remaining Rs 31,277.20 crore is for capital expenditure on Research & Development and creation of infrastructural assets across the country.

In order to encourage the private sector for manufacturing and technological development in the defence sector, a notable percentage of domestic share is further earmarked for acquisition from domestic private industries. Accordingly, for FY 2025–26, Rs 1,11,544.83 crore i.e. 75% of modernisation budget has been earmarked for procurement through domestic sources and 25% of domestic share i.e. Rs 27,886.21 crore has been provisioned for procurement through domestic private industries.

This allocation will take care of major acquisitions planned in the ensuing FY and bolster jointness and integration initiatives. This allocation of funds will further facilitate MoD's plan to venture in new domains such as Cyber & Space and emerging technologies such as Artificial Intelligence (AI), Machine Learning and Robotics etc. Some major acquisitions planned in the next year such as Long Endurance Remotely Piloted Aircraft of High and Medium altitude, stage payment of Deck-based Aircraft, next generation submarines/ships/platforms will be funded out of this allocation.

The budgetary allocation to Defence Research and Development Organisation (DRDO) has been increased to Rs 26,816.82 crore in FY 2025–26 from Rs 23,855.61 crore in FY 2024–25 which is 12.41% higher than the BE of 2024–25. Out of this, a major share of Rs 14,923.82 crore has been allocated for capital expenditure and to fund the R&D projects.

Indian Coast Guard (ICG) has been allotted Rs 9,676.70 crore under Capital and Revenue Head which is 26.50% more than the allocation for FY 2024–25 at BE stage.

In order to further improve the border infrastructure and facilitate the movement of Armed Forces personnel through tough terrains, Rs 7,146.50 crore has been allocated to Border Roads Organisation (BRO) under capital head which is 9.74% higher than the BE of 2024-25.



# Kalyani Group unveils MArG 155mm/45 Cal MGS at IDEX 2025



Kalyani Strategic Systems Ltd. (wholly owned subsidiary of Bharat Forge Ltd.) unveiled the MArG 45 India's first 155mm/45Cal Mounted Gun System on a 4x4 HMV at IDEX, Abu Dhabi on 17 February 2025. The launch was officiated by H.E. Mr. Sunjay Sudhir, Ambassador of India to the UAE.

Alyani Strategic Systems Limited, a wholly-owned defence subsidiary of Bharat Forge, unveiled the MArG 45, mobile gun system mounted on a 4x4 all- terrain platform, at IDEX Abu Dhabi in February 2025. "MArG 45 exemplifies Kalyani Group's ingenuity in challenging conventions, integrating firepower, range, and mobility into a single, ground breaking platform. Designed for rapid deployment and superior manoeuvrability, it is a go-anywhere gun with unparalleled shoot-and-scoot capabilities" stated company officials.

Mr. Baba Kalyani, Chairman & MD, Bharat Forge Ltd, commented on this milestone, "This Mounted Gun Platform represents a significant leap in defence technology, showcasing our commitment to innovation and excellence. It is a testament to our capability to develop 'Designed and Made in India' most advanced artillery defence platforms. The unveiling of MArG 45 marks a significant milestone in mobile artillery, reinforcing Kalyani Group's commitment to self-reliance and cutting-edge defence innovation. This breakthrough system is set to redefine modern battlefield capabilities with its exceptional agility, firepower and rapid deployment efficiency".

MArG 45 is capable of firing beyond 36 km using conventional ammunition. Built for superior mobility, its tailor-made chassis, developed in-house, ensures maximum agility in diverse combat environments. The system is compatible with NATO standard and in-service ammunition, enhancing its versatility. Weighing 23.5 tons, it carries 18 rounds with Zone 6 onboard, enabling sustained operations. Designed for rapid deployment, it boasts a coming into action time of just 1.5 minutes during the day and 2 minutes at night. With an elevation range of  $-2^{\circ}$  to  $+72^{\circ}$  and a traverse of 25° left and right, it delivers exceptional battlefield adaptability. The gun features an intense rate of fire of 10 rounds in 3 minutes and a sustained rate of 42 rounds in 60 minutes, ensuring continuous firepower during combat.

Kalyani Strategic Systems Limited KSSL (a wholly owned subsidiary of Bharat Forge Limited), а pioneer in the Indian defence



industry with a strong research and development focus, has developed a number of indigenous weapon platforms, off-road protected mobility solutions and high technology military products. It is already exporting its in-house designed and developed artillery systems, munitions and mobility solutions globally.

Bharat Forge Bharat Forge Limited (BFL), a Pune based Indian multinational, is a technology driven global leader in providing high performance, innovative safety critical components and solutions for several sectors including automotive, power, oil and gas, construction and mining, rail, marine, defence and aerospace. BFL has global manufacturing footprint with presence across five countries, with the largest repository of metallurgical knowledge and offers full service supply capability to its geographically dispersed marquee customers from concept to product design, engineering, manufacturing, testing and validation.

#### KSSL and AM General in Lol for supply of cannons to the US

Kalyani Strategic Systems Ltd (KSSL) and AM General, USA, signed a Letter of Intent (LOI) at IDEX 2025 for the supply of made in India advanced artillery cannons to the United States. This marks the first ever supply of cannons from an Indian defence manufacturer to the United States, a testament to the strengthening bilateral defence cooperation between our two nations. Building upon its extensive expertise in artillery systems and its prior collaboration with AM General, KSSL continues to establish itself as a key player in the global defence industry. The company had recently entered an agreement with AM General to



co-develop a wide range of next-generation artillery solutions, i n c l u d i n g mounted, towed and ultra-light gun systems in both 105mm and 155mm calibers.

# TASL unveils the LAMV at IDEX

ata Advanced Systems Ltd. (TASL) unveiled a new indigenously developed Land Vehicle for - the Armed Forces for the first time at IDEX 2025, Abu Dhabi; this is the global variant of its Light Armoured Multi-role Vehicle (LAMV) in a 4x4 configuration. The LAMV 4x4 is a NATO standard compliant, air-transportable platform designed to enhance battlefield mobility and protection for military forces worldwide. The LAMV is designed to provide armed forces with high-mobility and armoured protection in combat and reconnaissance missions. It enables troops to navigate dangerous terrains while staying safeguarded against ballistic threats, making it ideal for operations in conflict zones and high-risk environments. Designed for versatility, it operates smoothly in both deserts and high-altitude regions, reaching speeds of up to 100 kmph.

"The international launch of the LAMV marks a significant milestone in showcasing TASL's advanced, mission-ready solutions to global defence forces, reinforcing its position as a competitive player in the international market. Highly customisable to meet diverse operational and qualitative needs, it can be tailored to country-specific defence requirements. Designed for reliability, maintainability and safety, it ensures efficient





lifecycle support and long-term operational readiness," stated company officials.

"The LAMV is a TASL designed and built platform. TASL holds complete in-house intellectual property rights (IPR), ensuring full ownership and control over its design and technology. The LAMV platform designed to enhance battlefield mobility and protection for military forces worldwide. Marking a significant milestone in India's defence manufacturing capabilities, the TASL LAMV brings cutting-edge mobility, protection and adaptability to armed forces worldwide, supporting modern battlefield operations, rapid deployment missions and urban warfare scenarios. As TASL expands its footprint in international defence markets, the launch of the LAMV at IDEX 2025 reinforces our commitment to delivering world class, battle proven solutions tailored to the dynamic demands of modern warfare," further stated officials.

#### **Features**

Designed for modern combat and tactical operations, the TASL LAMV sets a new benchmark in mobility combining ballistic and blast protection for the crew; equipped with a high power engine and automatic transmission, the vehicle delivers exceptional agility and endurance across challenging terrains. Built to NATO standards, it features cutting edge ballistic protection up to Stanag level 3, offering maximum survivability of crew in high-threat environments. The integration of a Health and Usage Monitoring System (HUMS) enables predictive maintenance, allowing operators to anticipate and address potential issues before they impact mission readiness. To ensure sustained performance in the field, TASL has established a robust three tier service network, comprising field, regional and base level workshops, supported by specialised channel partners trained to provide rapid maintenance and support.

# Sakthi Aircraft Industry and Aero Club of India to manufacture DA40 NG



From left to right Vaibhav D (CEO, SAIPL), Dr. M Manickam (Chairman, Sakthi Group), Kinjarapu Rammohan Naidu (Minister of Civil Aviation), Rajiv Ranjan Rudy (President, ACI) and Capt. Arvind Badoni (Secretary General, ACI)

Secretary General, ACI, in the presence of Mr. Kinjarapu Rammohan Naidu, Minister of Civil Aviation, Government of India and Mr. Kirti Vardhan Singh, Minister of State for External Affairs, Government of India and Sr. Vice President, Aero Club of India along with senior officials from the Directorate General of Civil Aviation (DGCA) and Airport Authority of India (AAI).

Established in 1927 and affiliated with the Fédération Aéronautique Internationale (FAI) since 1950, ACI has been instrumental in developing flight training organisations in India. As the largest owner of training aircraft in India, ACI supports

n 11 March 2025, Sakthi Aircraft Industry Private Limited (SAIPL) and the Aero Club of India (ACI) announced a Memorandum of Understanding to manufacture and supply 200 Diamond DA40 NG trainer aircraft in India. This strategic partnership, aligned with the Government of India's "Make in India" initiative, aims to revolutionise the commercial pilot training landscape by ensuring a consistent and costeffective supply of advanced training aircraft to FTOs across the nation. Under the agreement, ACI will act as

the central aggregator, consolidating demand, managing aircraft allocation, and facilitating seamless handovers to FTOs. SAIPL, in a joint venture with Diamond Aircraft Industry, Austria, will establish a state-of-the-art manufacturing facility in India to produce, sustain and provide comprehensive lifecycle support for the DA40 NG.

The MoU was formalised by Mr. Vaibhav D, Chief Executive Officer, SAIPL, and Capt. Arvind Badoni,





numerous governments, semi-government, and publicprivate partnership FTOs.

SAIPL is a subsidiary of the renowned Sakthi Group of Coimbatore, dedicated to advancing India's aviation manufacturing and training capabilities through strategic partnerships and innovative solutions.

The Diamond DA40 NG (Next Generation) is a modern, single engine, four seat aircraft renowned for its efficiency, safety, and advanced technology. It is constructed from durable composite materials, contributing to its aerodynamic performance and long life. A key feature is its Austro Engine AE300 turbocharged diesel engine, which offers significant fuel efficiency and reduced operating costs compared to traditional avgas engines. The DA40 NG is also equipped with a state-of-the-art glass cockpit, typically featuring the Garmin G1000 NXi avionics suite, providing pilots with enhanced situational awareness and advanced flight management capabilities.

# CSG Charles de Gaulle conducts air-sea manoeuvres with the Indian Navy



A fter stopovers in Goa and Kochi on India's western coast, the entire French carrier strike group (CSG) centred around aircraft carrier FNS Charles de Gaulle cast off on 9 January 2025 for the next phase of Mission Clemenceau 25 in the Indian Ocean. It set course for the Indonesian arc, where it conducted exercise La Perouse.

A few hours after setting sail, the CSG carried out cooperation activities with the Indian Navy at sea and in the air. The French CSG destroyer conducted a joint navigation exercise with the Indian frigate INS Mormugao, during which the two ships practised tactical evolution manoeuvres. The two ships also deployed their respective onboard helicopters to carry out a cross-decks manoeuvre.







After the first drill, the fleet replenishment tanker FNS Jacques Chevallier refuelled the INS Mormugao frigate at sea. At the same time, Indian Sukhoi and Jaguar fighter jets carried out sorties with Rafale Marines from the embarked French Navy air fleet for a joint anti–aircraft drill.

On 10 January, an Atlantique 2 maritime patrol aircraft made a logistical stopover in India before heading for Indonesia, where it joined the deployed French force. Thanks to the privileged relations between France and India, the halt of the in-transit Atlantique 2 on Indian territory enabled the CSG to deploy far away from its base and maintain its operations at sea. These activities once again demonstrated the high level of interoperability between the two navies. This joint manoeuvre came ahead of the 42nd edition of the bilateral naval exercise, Varuna, which France and India have been holding since 1983. For 27 years, France and India have been united by a strategic partnership aimed at developing bilateral cooperation between our two countries.

In concrete terms, this includes numerous exercises, be they on land (Shakti), in the air (Garuda), or at sea (Varuna). India regularly supports French Navy ships by allowing numerous stopovers for ships and crew rest (16 stopovers since 2022).











# Theatre level operational readiness exercise (TROPEX–25)





The 2025 edition of Indian Navy's capstone Theatre Level Operational Exercise (TROPEX), took place in the Indian Ocean Region. This operational level exercise is conducted biennially with participation by all



operational Indian Naval units along with substantial participation of Indian Army, Indian Air Force and Coast Guard assets. TROPEX 25 was aimed at validating Indian Navy's core warfighting skills, and ensuring a



synchronised, integrated response to preserve and protect national maritime security interests in a contested maritime environment against conventional, asymmetric as well as hybrid threats.

TROPEX 25 was conducted over a duration of three months from Jan-Mar 2025. The exercise was being conducted in various phases; both in Harbour and at Sea,



integrating various facets of combat operations, cyber and electronic warfare operations, live weapon firings during Joint Work Up Phase and Amphibious Exercise (AMPHEX).

During the exercise, the combined fleets comprising approximately 65 Indian naval ships, 9 submarines and over 80 aircraft of different types, were put through complex maritime operational scenarios to validate and refine the Navy's Concept of Operations including forward deployed sustenance and interoperability with other Services.

TROPEX 25 witnessed participation of platforms like indigenous aircraft carrier Vikrant, state-of-the-art Visakhapatnam and Kolkata Class destroyers, Kalvari Class submarines and aircraft fleet comprising MiG-29K, P8I, HALE Sea Guardian and MH-60R helicopters.

Towards enhancing synergy and jointness amongst the Services, IA, IAF and Indian Coast Guard were also integrated into the exercise, with participation of Sukhoi– 30MKI, Jaguar, C–130, flight refueller, AWACS aircraft, an infantry brigade with over 600 troops, and more than 10 ICG ships and aircraft.





# **INS Tushil arrives at Dakar, Senegal**

INS Tushil, Indian Navy's latest stealth frigate, as part of the ongoing operational deployment visited Port of Dakar, Senegal on 3 January 2025. This visit "will further bolster the existing ties with Senegal and enhance interaction between the navies of the two countries. The visit is another strong sign of the importance India attaches to its relations with Senegal and its quest to further strengthen the growing defence cooperation and friendly ties between the two nations. It will also provide an opportunity for both navies to learn from each other and explore new avenues of cooperation", stated the Indian Navy.



## **INS Tushil at Lagos**

INS Tushil, Indian Navy's latest guided missile stealth frigate, arrived at Lagos, Nigeria, on 12 January 2025, for an operational turnaround, as part of her ongoing deployment to the Gulf of Guinea. The ship was escorted into Lagos harbour by a Nigerian naval ship and was accorded a warm welcome by Nigerian Navy officers, Indian High Commission officials, and the Indian diaspora at Lagos.

### **INS Mumbai at exercise La Perouse**

The indigenously designed and built guided missile destroyer INS Mumbai participated in the fourth edition of the Multinational Exercise La Perouse mid–January 2025. This edition witnessed participation of personnel/ surface and sub–surface assets from various maritime partners including Royal Australian Navy, French Navy, Royal Navy, United States Navy, Indonesian Navy, Royal Malaysian Navy, Republic of Singapore Navy and Royal Canadian Navy.



#### **TROPEX-25**

Lieutenant General Johnson P Mathew, Chief of Integrated Defence Staff to the Chairman Chiefs of Staff Committee (CISC), Lieutenant General NS Raja Subramani, Vice Chief of the Army Staff (VCOAS), Vice Admiral K Swaminathan, Vice Chief of the Naval Staff (VCNS), Air Marshal SP Dharkar, Vice Chief of Air Staff (VCAS) and Lieutenant General Ajay Kumar, Director General Infantry embarked on Indian Navy ships off the West coast from 30 to 31 January 2025 to witness the Joint Phase of Theatre Level Operational Readiness Exercise–2025 (TROPEX–25), which included the Amphibious Landing by Indian Army troops.

The senior officers embarked onboard the aircraft carrier INS Vikrant, guided missile destroyer INS Visakhapatnam,









stealth frigate INS Satpura, and landing platform dock INS Jalashwa and witnessed dynamic operations of Indian naval ships, submarines and aircraft, demonstrating the Navy's combat capability and preparedness. This included missile, gun, and rocket firings and anti-submarine drills. Onboard INS Vikrant, the senior officers witnessed extensive flying operations by MiG-29K and various helicopters both by day and night. The air power demo by Indian Navy aircraft included bomb bursts, rocket firing and low-level aerobatics. Onboard INS Jalashwa, the senior officers interacted with the Army component embarked onboard and witnessed an amphibious landing that included Bunker-Busting drills, Combat Free Fall by the Marine Commandos of the Indian Navy, and landing of troops and BMPs by Landing Craft Mechanised (LCM) and Landing Craft Assault (LCA) culminating in the establishment of a beachhead.



# Indian Navy's First Training Squadron at Singapore

Indian Navy's First Training Squadron (1TS) comprising INS Sujata, INS Shardul and ICGS Veera visited Changi Naval Base, Singapore from 6–9 February 2025. During the port call, Capt Anshul Kishore, Senior Officer, 1TS called on Col Rinson Chua Hon Liat, Commander, Maritime Training and Doctrine Command. The interactions focused on training aspects and avenues for future collaboration in Training and Operations. Dr Shilpak Ambule, High Commissioner of India to the Republic of Singapore visited the ships of 1TS and emphasised the role of the Indian Navy towards 'Building Bridges of Friendship'. A solemn Wreath Laying Ceremony was held at the Kranji War Memorial to pay homage and honour the fallen soldiers.

# India-Egypt exercise Cyclone III

The 3rd edition of Joint Special Forces Exercise Cyclone took place at Mahajan Field Firing Ranges in Rajasthan. The exercise was conducted from 10–23 February 2025. Exercise Cyclone is an annual event conducted alternatively in India and Egypt. Last edition of the same exercise was conducted in Egypt in January 2024. The Indian contingent comprising 25 personnel were represented by troops from two Special Forces Battalions. Egypt contingent also comprised 25 personnel and were represented by Special Forces Group and Task Force of Egyptian Special Forces.

Exercise Cyclone enabled the two sides to share their best practices in tactics, techniques and procedures of conducting tactical operations. The exercise also facilitated developing bonhomie and camaraderie between soldiers of both the sides.



## **INS Tushil arrives home**

INS Tushil, the first of the two additional P1135.6 follow-on ships, proudly sailed into her home port, Karwar, on 14 February 2025. This marked the culmination of a historic journey that panned over 12,500 nautical miles. The ship sailed from Kaliningrad, Russia, on 18 December 2024 and visited eight countries across three continents. The ship was commissioned into the Indian Navy on 9 December 2024, in a ceremony held at Kaliningrad, Russia, in the presence of Raksha Mantri of India, Mr. Rajnath Singh.

# Exercises AND VISITS



# **Indian Navy platforms in Indonesia**

Indian Navy platforms INS Shardul and long range maritime surveillance P8I aircraft were in Bali, Indonesia, to participate at the International Fleet Review (IFR) 2025, from 15–22 February 2025. The IFR, a prestigious multinational naval event, was reviewed by the President of Indonesia and witnessed participation of naval forces from various countries. During this period, the Indian Navy also took part in various high level engagements including International Maritime Security Symposium, and tactical



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floor games. Following IFR 25, both INS Shardul and the P8I participated in Exercise Komodo, a multilateral naval exercise aimed at enhancing maritime interoperability and regional security cooperation. This follows the participation of INS Mumbai and the P8I aircraft in the La Perouse exercises in Indonesia in January 2025 and visit of Adm Muhammad Ali, Chief of Staff of the Indonesian Navy, to India, as part of the high level delegation accompanying His Excellency President Prabowo Subianto, the Chief Guest for the Republic Day Parade 2025.

# India–Japan exercise Dharma Guardian

The Indian Army contingent departed for 6th edition of India–Japan Joint Military Exercise Dharma Guardian. The exercise was conducted in East Fuji Manoeuvre Training area of Japan from 24 February to 9 March 2025. Exercise Dharma Guardian is an annual event conducted alternatively in India and Japan. Last edition of the same exercise was conducted in Rajasthan in February–March 2024. The Indian contingent comprising 120 personnel was represented mainly by troops from a battalion of the Madras Regiment along with troops from others arms and services. The Japan Ground Self Defence Force (JGSDF) contingent, also comprising similar strength, was represented by 34th Infantry Regiment.

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# **Exercise Desert Hunt 2025**

An integrated Tri–Service Special Forces exercise named Exercise Desert Hunt 2025 was conducted by the Indian Air Force at Air Force Station Jodhpur from 24–28 February 2025. The exercise involved elite Para (Special Forces) from

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the Indian Army, the Marine Commandos from the Indian Navy along with the Garud (Special Forces) from the Indian Air Force, participating together in a simulated combat environment.

This high-intensity drill was aimed at enhancing interoperability, coordination and synergy among the three Special Forces units to ensure swift and effective response towards emerging security challenges. The exercise included airborne insertion, precision strikes, hostage rescue, counter-terrorism operations, combat free falls and urban warfare scenarios wherein the combat readiness of the forces was tested under realistic conditions.

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## **INS Kuthar in Colombo**

Towards strengthening maritime ties, INS Kuthar, Eastern Fleet Ship under the aegis of Eastern Naval Command is on mission deployment in Indian Ocean Region and arrived at Colombo, Sri Lanka on 5 March 2025. Commander Nitin Sharma, the Commanding Officer of the ship called on RAdm MHCJ Silva, Commander Western Naval Area, Sri Lanka Navy. As part of the visit, personnel from both navies engaged in professional interactions, knowledge sharing sessions and joint activities to enhance operational synergy between the two navies.

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# INS 1TS concludes visit to Phuket Deep Sea Port

The visit of First Training Squadron (1TS) INS Sujata, INS Shardul and ICGS Veera to Phuket Deep Sea Port,

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![](_page_22_Picture_11.jpeg)

Thailand concluded on a high note with coordinated tactical manoeuvres and exchange of sea riders during PASSEX with HTMS Huahin on 4 March 2025. During the stay at harbour, bilateral activities between the Indian Navy and Royal Thai Navy (RTN) included multiple professional exchanges, training visits and social interactions Navv-to-Navv bolstering connections. The sea trainees of 1TS visited 3rd Naval Area Command. Phangna Naval Port and HTMS Krabi providing opportunity for training interaction and sharing of best practices. 🔫

# **2025: India's Security Challenges**

Impressions from Delhi Forum for Strategic Studies Seminar: 18 Jan 2025

By Col Jasbir Dahiya

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The Delhi Forum For Strategic Studies (DFFSS) conducted its annual seminar on 18 January 2025 at the India International Centre, New Delhi. It was attended by many senior Veterans, former diplomats, members of the academia, media and defence analysts. The theme selected for this year's discussions was 2025: India's Security Challenges.

Readers of VAYU may recall that the DFFSS was promoted by the renowned Air Power historian, the late Pushpindar Singh Chopra and the founder DG Defence Intelligence Agency, Lt Gen Kamal Davar around 12 years back. Each year it conducts very well attended and high powered discussions on strategic matters impacting India.

Opening the Seminar, Lt Gen Kamal Davar, President of the DFFSS recounted that post the COVID 19 era, many serious kinetic conflicts, global and regional disruptions had shaken the world and the region. He stated that these unjustified wars that were creating geopolitical disturbances in the world specially in the Middle East, Africa and Europe making life difficult for the vast impoverished populations as well as consuming huge resources which could otherwise be utilised for social upliftment of the people. Security challenges created by these wars also had unexpectedly adverse outcomes in areas far from the war zones due to interlinked economies, trade, and security arrangements. The short and long term impact of these instability producing conflicts on India needed to be thoroughly analysed to derive useful lessons for India, as an emerging global power and one of the leading powers in the Asian region. India had a vital role to play both in ensuring political stability and economic well-being in the region. Gen Davar stated that India's role and leadership will be keenly observed by the comity of nations in the foreseeable future.

The discussion on Geo-strategic shifts in the Pakistan-Afghanistan was initiated by Lt Gen Bhopinder Singh (retd), former Lt Governor of the Andamans and Nicobar Islands and Puducherry: Gen Bhopinder Singh opined that Afghanistan was trying to adjust to new realities after the sudden US exit in 2021 and trying to find its feet in the comity of nations. He stated that the anti–Pak terror outfit, the Tehrik–e–Taliban Pakistan (TTP) presence in Afghanistan and the border skirmishes on the Durand line

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Delhi Forum For Strategic Studies

#### 2025: INDIA'S SECURITY CHALLENGES

#### 18th January, 2025

DETAILED PROGRAMME

TIME	EVENT	PANEL/SPEAKER
9.30 am – 09.55 am	Registration and Tea	Pergola Terrace
10.00 am - 10.15 am	Introductory Remarks	Lt. General Kamal Davar - President, DFFSS
10.15 am - 10.55 am	Geo-strategic Shifts in Af- Pak Region	Lt Gen Bhopinder Singh (Retd) - Former Lt Gov Andamans and Nicobar Islands and Puducherry; Amb Ajay Biseria, Former Indian High Commissioner to Pakistan & Amb Dr TCA Raghavan, Former Indian High Commissioner to Pakistan
10.55 am - 11.35 am	Transformational Trends in Aerospace Force Applications	Air Vice Marshal Kapil Kak (Retd), Defence Analyst; Air Vice Marshal Anil Golani (Retd), DG CAPS; and Cmde Anil Jai Singh (Retd), Vice President, Indian Maritime Foundation
11.35 am - 11.55 am	Tea	Pergola Terrace
11.55 am - 12.45 pm	Act East Through North East and Harmonizing Relations with Bangladesh and Myanmar	Lt Gen AK Singh (Retd), Former Lt Gov Andamans and Nicobar Islands and Puducherry; Lt Gen KJ Singh (Retd), Former Army Commander; and Ms Rami Desai, India Foundation
12.45 pm - 13.00 pm	Closing Session and Vote of Thanks	Lt Gen Kamal Davar – President DFFSS
13.00 pm	Lunch	Pergola Terrace

have altered the Af–Pak relationship as never before. For a change, he stated, that Afghanistan is not much in the news with other countries as it used to be in earlier years. He also brought out there is a degree of rapprochement between the Taliban govt with India also which had never happened before. He stated that differences between Pakistan and Afghanistan on acceptance of the Durand Line political status had led to frequent border clashes between the two nations. He summarised that relations between these erstwhile friendly nations would likely further deteriorate in the foreseeable future.

Amb Ajay Bisaria, former Indian High Commissioner to Pakistan referred to continuing Pak sponsored terrorism in India and India's bold decision to go for Balakote airstrikes after the Pulwama terror incident. He stated that Pakistan had not learnt any lesson from its wrong policies towards India since long and the avoidable repercussions it had created between the two neighbours. He also brought out that Pakistan, owing to its adherence to terror activities, had pushed itself backwards in economic and social development indices and caused a negative streak in relationships between South Asian countries reducing the focus on cooperation and development. He also mentioned how the likely policies of newly elected US President Donald Trump towards the region and the professed use of Bagram Air Base by the US to counter Chinese inroads into Afghanistan could make the situation there more volatile in future. He hoped that as India grows stronger, there will be reduction in conflicts in the region.

Amb Dr TCA Raghavan, also former Indian High Commissioner to Pakistan, narrated, how since years earlier, Pakistan had enjoyed the most influential role in Afghan affairs which too impacted India's security and economic ties with Afghanistan as also with the Central Asian Republics. Amb Raghavan highlighted how the situation has changed since 2019 wherein now Afghanistan has become a greater worry for Pakistan

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itself. He also highlighted how India's genuine people– friendly approach was creating positive shifts in India– Afghanistan relations even as Pakistan was trying to open a new front against India by cozying up to Bangladesh. He opined that Pakistan was increasingly getting into a precariously tighter security and economic situation and this trend was likely to continue in the near future too.

The next major theme addressed during the Seminar was the Transformational Trends in Aerospace Force Applications. Initiating the discussions, Air Vice Marshal Kapil Kak (retd), reiterated India's aerospace challenges from both China and Pakistan and how India had fared in confronting these in the last many years. Speaking about the changing paradigms in Air Warfare, Air Vice Marshal Kapil Kak mentioned how India could learn from the ongoing conflicts wherein the aerospace force was shaping wars with new vectors from seas to the skies.

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He also touched upon how India's limited defence budget could be utilised to build critical capabilities. He stressed on the need for matching manned and unmanned systems and enhancing ISR capabilities, air to air refuellers and AI based threat analysis and decision support systems. Furthering the discussions in this vital area, Air Vice Marshal Anil Golani (retd), DG Centre for Air Power Studies lamented the depleting air capabilities and suggested that the security planners must take serious note of the situation and have a healthy mix of immediate operational requirements and futuristic capabilities needed to handle India's vast security challenges. He mentioned that only a strong fist can assure national security and that too much dependence on diplomacy may not serve our broader security goals. Speaking about tech cycles he highlighted the need for constant upgrades of our aerospace capabilities. He also stated that combat aircraft with matching unmanned capabilities like Loyal Wingman were still the ultimate tools for air warfare.

Cmde Anil Jai Singh (Retd), Vice President, Indian Maritime Foundation touched upon the crucial debate regarding the utility of aircraft carriers to dominate the Indian Ocean and beyond and whether submarines had greater utility in countering the security challenges from a growing Chinese expansion in and around the Indian Ocean. With the costs involved in maintaining various platforms and their sustainability during the wars, he advised a more calibrated approach in achieving India's security requirements. Referring to the newly established China–Pak AI centre in Islamabad, he highlighted the need to cater for India to have capabilities to counter both traditional and non–traditional threats. He also emphasised on deploying adequate aerospace elements at sea for power projection.

"Act East Through North East and Harmonizing Relations with Bangladesh and Myanmar" was the final theme for the discussions during the Seminar. Lt Gen AK Singh (Retd), Former Lt Gov Andamans and Nicobar Islands and Puducherry: Gen AK Singh highlighted the issue of accountability, especially in the forces, and mentioned the need for sound investment in the R&D and study of new concepts as in USA to prepare for future wars. He added that keeping in mind our plethora of security needs, especially against China we need to have more modern platforms in larger numbers and the capability to sustain longer wars for which we need to spend higher GDP percentage on defence. The forces also need to clearly articulate their needs to the Government. He stated how the look East Policy or Act East policy has not helped spur India's security and economic interests primarily because of the focus of most Eastern countries on China. He stated that while India's neighborhood-first policy is sound in principle impact of India's internal policies in shaping relationships with neighboring countries is profound. He also brought out how India's relationship with Bangladesh and Myanmar has shaped and reshaped over time due to internal and external dynamics. He mentioned that India has also not been able to utilise the Andaman and Nicobar Island as strategic fulcrum.

Former Western Army Commander Lt Gen KJ Singh mentioned the challenges in sustaining our "Look East and Act East" policy to create a geo-economic pivot as we have failed to stabilise the NE fully. He mentioned how the role played by Bangladesh based insurgent groups and

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the situation in Myanmar due to internal divisions has prevented the opening up of desired communication links with East Asian countries. He also mentioned how the full potential of the Andamans has not been utilised so far. Indicating the ever increasing Chinese influence in and around India he stressed the need to use India's strength in soft skills like cyberspace and knowledge of the English language.

Ms Rami Desai of the India Foundation, speaking with intimate experience of Myanmar affairs, highlighted the external influences which were adding to internal conflicts in Myanmar and warned of significant hardship for the people when 2.23 million people were already living as refugees. She stated that the country could even face a famine in the near future which could accentuate the suffering. She also stated that in current circumstances, China was only trying to guard its investment and interests and is not in control of the situation there. She mentioned how superpower rivalry, the flow of drugs and high instances of HIV was creating a complex situation in that country. India's dream of stable democracy in Myanmar stands disrupted. Combined with the situation in Bangladesh, Myanmar poses significant challenges for India in the North East.

S. Montek Singh Ahluwalia, renowned economist and former Deputy Chairperson of the Planning Commission, in his Closing Address appreciated the high quality of the discussions at the Seminar both in content and candidness. He mentioned that while planning the budgets, the allocation for defence was decided by the Defence Planning Committee—despite the concerned top stakeholders presence at this forum, adequate allocations for defence have been found wanting. He also highlighted how the share of defence budget allocation in the GDP has witnessed a steady decline since 1991. He cited the growth of China militarily owing to its very large allocations for defence which enabled it now to pose a credible threat not only to India but even a super power like the US. Mr Ahluwalia stressed the need for Indian budget planners to take the threat from China seriously and defence budgets planning should keep pace with the security requirements of the nation.

Appreciating the quality of the interaction during the seminar he wished the quality of interactions in various open forums could be as candid as the nation's interests were at stake. He mentioned that while planning the budgets the allocation for defence was decided by the Defence Planning Committee where all concerned with defence of the country are always present, somehow the outcomes have never been as per expectations. He brought out how China has transformed economically and technologically and depended on higher military spending to create a severe security challenge not only for India but USA also. He talked about India's policy towards China not fully meeting our geo-political aspirations. He mentioned that China is going all out to enhance its military capabilities in the Indo-Pacific region and it is going to impact the outcomes in relation to Taiwan and other countries in the region including Japan. It must force India to think about its participation in AUKUS and QUAD etc. He also mentioned about the complexities of the Indian Ocean as Zone of Peace. He cautioned against the ever mounting non-productive government expenditure on public "freebies" which could be very counter-productive for India's growth. He stated that all political parties were guilty on this aspect.

In his Concluding Remarks, Lt Gen Kamal Davar expressed his gratitude to all the speakers and discussants for their incisive and deeply knowledgeable participation. He mentioned that in 2025, hopefully, India will go all out to strengthen all the constituents of Comprehensive National Power to successfully confront the myriad challenges to its national security and well-being. He also reminded all present that much can be learnt by us from the ongoing Israel-Hamas-Lebanon conflicts and the Russia-Ukraine War and thus all stakeholders in the nation must diligently analyse these conflicts in all their dimensions, of course in the Indian context.

# VAYU on-the-spot report VEER: Pravaig's Bold "Leap of Faith" in Defece

![](_page_27_Picture_1.jpeg)

Trials in Ladakh (Photos by Pravaig Dynamics)

In the evolving landscape of defence technology, innovation plays a crucial role in shaping the future of military mobility. We had the chance to sit with Siddhartha Bagri, the CEO of Pravaig, a Bharat based deep tech mobility company, to discuss the VEER—the world's first electric tactical all-terrain vehicle for the military that has won the IDEX award. By challenging the long-standing dominance of traditional Internal Combustion Engine (ICE) platforms,

![](_page_27_Picture_4.jpeg)

Siddhartha Bagri, the Co-founder and CEO of Pravaig Dynamics.

can VEER bring a paradigm shift with its advantages? We take a look at a first-of-its-kind innovation globally, emerging from India.

### **Pravaig's Military Bet**

While electric vehicles are slowly becoming a favourite in the civilian market due to their long-term cost efficiency, an EV for defence purposes was previously unheard of. However, Pravaig has not only introduced but also operationalised one! In 2023, General Motors Defense also unveiled the Electric Military Concept Vehicle (eMCV), a military adaptation of the GMC Hummer EV. However, while its American counterpart awaits deployment, VEER is already deployed by the Indian Armed Forces, offering unique advantages. So what are those?

Firstly, in military operations, stealth is crucial—and what's better than a platform that produces zero noise? Only an EV can naturally achieve this. The vehicle can navigate tough obstacles, such as steep inclines and deep ditches, all while remaining silent.

Secondly, unlike ICE-equipped vehicles, an EV's body reflects a negligible heat signature. This makes it difficult for electro-optical/FLIR pods to detect it. During trials in Ladakh, three ATVs—Pravaig VEER, SHERP/JSW ATOR N100 and Polaris RZR 1000—were lined up and tracked

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by a FLIR pod equipped helicopter from 4 distances. The VEER remained invisible in footage recorded at 2 of the longer ones, while the "hot" blips of the ATOR and Polaris were very easily detectable. It was only in extremely close range that the VEER could be spotted as another vehicle on the camera.

Thirdly, in terms of efficiency, ICE vehicles struggle at high altitudes due to a lack of oxygen. In contrast, EVs perform better because they do not rely on oxygen for power, unlike ICE vehicles, which lose efficiency due to lower air density. Electric motors provide consistent power and torque regardless of elevation. Additionally, regenerative braking helps recover energy when descending, further improving efficiency. While cold temperatures can slightly affect battery performance, modern thermal management systems may help mitigate this issue.

Fourth, the VEER does not always require costly and large-scale charging stations. It can be charged using standard sockets via an adapter, making it easily deployable. With a maximum range of 650 km (which may vary slightly based on payload and other factors) and a reliable 400-450 km range in most conditions, the VEER is well suited for long duration operations.

If this range is found to be insufficient during operations, the vehicle is also equipped with a flex fuel based range extender, which can be pre-filled before deployment or refuelled mid-operation using jerry cans. The system is configured to activate automatically when the battery drops below a certain level, minimising manual intervention and ensuring continuous operation. However, while its adaptability reduces dependence on large charging infrastructure, sustained deployment in forward bases still requires careful planning. Ensuring consistent power availability—whether through portable charging solutions, renewable sources, or the optional petrol-based range extender—remains a key factor in its operational effectiveness.

Looking broadly, special operations are best executed silently and covertly. The VEER can be a suitable mobility solution, enabling the tactical insertion of Special Forces behind enemy lines. It can operate for extended durations as well with an add-on flex fuel based range extender and consistently delivers efficient performance in all conditions. Due to the vehicle's gross weight reaching around 3 tons, it can also be paradropped from tactical transport aircraft like the Boeing C-17 "Globemaster" III. However, the trials are yet to begin for that scenario.

### **Adaptive Architecture**

The VEER features multiple hardpoints that can be used to mount both utility and combat solutions. For example, the side mirrors can be replaced with weapon mounts capable of carrying an LMG or sensor. Alternatively, the

![](_page_28_Picture_6.jpeg)

windshield can also be easily removed to accommodate a weapon or sensor. In both cases, the front seat passenger can operate the mounted system.

In the closed cab version of the VEER, the company has designed a single type of composite shield (armoured) doors for all four sides, making replacements much easier. Unlike vehicles with different door designs, which require the exact match for repairs, the VEER's standardised doors ensure quick and hassle-free replacements.

Speaking of ease of maintenance, the VEER can be fully disassembled and reassembled within six hours or less. During trials, the Indian Army Electronics and Mechanical Engineers (EME) managed to complete this process in just four hours!

# **Adaptability Check: Army's Verdict**

After undergoing rigorous evaluations and trials across weather conditions, including high altitude tests and extreme desert trials in the western sector, the vehicle

![](_page_28_Picture_12.jpeg)

![](_page_29_Picture_0.jpeg)

Trials in Ladakh (Photos above by Pravaig Dynamics)

has been approved with minimal recommendations for the final closed body variant out middle of 2025Furthermore, the final contract for procuring the VEER in is in its final stages, as the Army looks forward to replacing its ageing fleets with the indigenous VEER.

Once the contract is signed, mass production will begin. The company is negotiating with two states to set up a manufacturing facility capable of rolling out a high volume of units per month. The VEER is also undergoing minor refinements based on feedback from trials, with its final design having already been frozen, and simulations have been done to evaluate the practicality. The first final-spec unit is expected to roll out by mid-2025.

## The Technology with Mobility

The VEER may not just be an innovation in mobility but also advanced technology. One of its most innovative features is an integrated night vision camera, fitted into the headlights panel. The visuals from this camera can be directly accessed on the dashboard screen, eliminating the need for external thermal/FLIR cameras for reconnaissance and night operations.

Additionally, the VEER is equipped with a Health and Usage Monitoring System (HUMS), which plays a crucial role in real time vehicle health diagnostics. This system, in conjunction with Intelligent Tyre Pressure Monitoring System (ITPMS), monitors the battery's health, voltage, motor elements, temperature and tyre pressure while offering software supported insights and alerts, in case of anomalies.

In case of major mechanical issues, such as overheating, the system can automatically cut off power to prevent further damage to the vehicle's electronic and mechanical components. However, in combat situations, where survival takes priority, the crew has the option to skip the safety cut-off (via a switch) and keep the vehicle operational until they reach a safe location.

Pravaig runs its defence systems' range under ATIMA. And speaking of that, we would like to begin with VEER itself, which is not just one vehicle but a platform that comes in various variants as per the customer's requirements. Pravaig offers both an armour protected closed cab variant as well as an open variant. Armouring and ballistic protection solutions will be integrated in collaboration with Indian vendors, ensuring a bulletproof frame that will provide STANAG-level protection for the crew and electronics. In terms of offensive capabilities, the vehicle can be equipped with Light, Medium and Heavy Machine Guns in both variants.

# Electrification of the future Frontlines: What Comes Next?

Militaries worldwide are shifting towards electrified vehicle fleets for sustainability, efficiency, and stealth. Countries like Australia and the US are adapting hybrid electric versions of vehicles like the Bushmaster and Humvee respectively to

enhance endurance and reduce thermal and noise signatures. This global transition aims to improve high altitude performance, reduce fuel dependency and enhance battlefield mobility.

### Conclusion

In conclusion, Pravaig exemplifies a self-reliant India, developing its ecosystem domestically while collaborating with Indian partners for production. At the same time, it is expanding globally, offering advanced solutions to international markets. By venturing into an unconventional segment, Pravaig took a bold "leap of faith", demonstrating innovation and resilience. Its journey reflects the balance between strategic planning and impactful execution—steadily advancing "behind the scenes" to bring meaningful impact in defence mobility.

![](_page_29_Picture_15.jpeg)

Visit, report and all photos (except where mentioned): Rishav Gupta of Team Vayu. Twitter/X: @ connect\_rishav

# Aero India 2025 takes flight!

![](_page_30_Picture_1.jpeg)

ero India's 15th edition (10–14 February 2025) was bigger than ever. From the usual 5 halls, it grew to 7 in 2023 and this time there were 9 halls. While this is great news for the organisers and the event itself, for us the 'Official Associate Media Partners', there was exponentially more work to do that included from walking the tiresome long distances meeting companies in scattered/spread out halls to the static and flying displays to the distribution of our Special Issue and Show dailies. But that's what it is all about for trade magazines like us and we would not have it any other way!

The "first" Aero India show was held at Yelahanka Air Force Station, Bengaluru, in 1996, organised by the Defence Exhibition Organisation, Department of Defence Production, Ministry of Defence. This continues to be so.

However, the "actual first" one was in 1993 and called 'Avia India', so as far as we are concerned, this is the 16th edition of the Show.

And just to let everyone know, we have never missed any edition of the event and infact have been "Official" media partners for the DEO ever since its inception. Plus we have been bringing out Special Issues/Show Dailies

![](_page_30_Picture_6.jpeg)

every time! All this thanks to our big and dedicated team who are more than passionate about all things aviation!

Our team reached Yelahanka three days before the show to set up and put the logistics in order. Day 1 and Day 2 at Aero India was fun and exhausting for us as we had barely slept because of our Show Daily preparations and schedules. The first 5 days at Bangalore setting up and preparing for the week started to take its toll on the Vayu Team but spirits remained high (thankfully!). The event had been a high energy one with flying, meetings,

![](_page_31_Picture_0.jpeg)

![](_page_32_Picture_0.jpeg)

interviews, catching up with old aviation friends, the endless walking to the chalets and halls etc. Pity Day 3, our last day, too passed fast!

And so, Aero India 2025 opened with much fanfare. "Aero India 2025, a confluence of critical and frontier technologies, will provide a platform to further strengthen relations among like minded countries based on mutual respect, mutual interest and mutual benefit to deal with today's uncertainties," stated Raksha Mantri Mr. Rajnath Singh while inaugurating the 15th edition of Aero India at the Yelahanka Air Force Station in Bengaluru, Karnataka on 10 February 2025. He exuded confidence that Aero India 2025 would showcase the country's industrial capability and technological advancements to the world, while further strengthening symbiotic relations with friendly countries. Lasting peace could only be achieved if nations became stronger together and worked for a Better World Order, he said.

Raksha Mantri stated that the five day event would witness the participation of Government Representatives, Industry Leaders, Air Force Officers, Scientists, Defence Sector Experts, Start–ups, Academia and other stakeholders from all across the globe, and this confluence would bring India's partners closer to the benefit of all.

"We often interact as buyers and sellers, where our relations are at a transactional level. However, at another level, we forge our partnership beyond the buyer-seller

![](_page_32_Picture_6.jpeg)

![](_page_33_Picture_0.jpeg)

relationship to the level of Industrial Collaboration. We have many successful examples of co-production and co-development with like-minded countries. For us, there is no Indian security or Indian peace in isolation. Security, stability and peace are shared constructs that transcend national borders. The presence of our foreign friends is a testimony to the fact that our partners share our vision of One earth, One family, One future," added Mr. Rajnath Singh.

Organised in a total area of over 42,000 sq m and with the confirmed participation of over 900 exhibitors, including 150 foreign companies, the event was the biggest ever Aero India till date. The Minister termed the participation of more than 90 countries as a testament to the growing global confidence in India's aerospace and defence capabilities. "Defence ministers or representatives from about 30 countries have come to participate in this event. The presence of Air Chiefs and Secretaries from 43 countries further highlights the significance of this event – not just for India, but for the entire international defence community," he said.

Raksha Mantri pointed out that in the present environment of global uncertainty, India was one such big country which was witnessing peace and prosperity. "India has never attacked any country nor has it been involved in any great power rivalry. We have always been an advocate of peace and stability. It is part of our fundamental ideals," he said. Mr. Rajnath Singh told the Defence Ministers, senior officials and representatives of foreign Original Equipment Manufacturers present on the occasion that their cooperation with India was crucial for global peace, prosperity and stability.

The Minister asserted that India was going through a transformational phase, rapidly moving from a developing to a developed nation. He added that a vibrant and thriving defence industry ecosystem had been created in the country due to a concerted, sustained and well thought out roadmap by the Government under the leadership of Prime Minister Mr. Narendra Modi. He

![](_page_33_Picture_5.jpeg)

stressed that the defence industrial sector, which was earlier not viewed as a component of national economy, has today been fully integrated with the overall economy. The sector is now a motor, powering the growth engine of the Indian economy, he said.

Raksha Mantri stated that the record allocation of Rs 6.81 lakh crore to Ministry of Defence in Union Budget 2025–26, including Rs 1.80 lakh crore for capital acquisition, was proof that the Government considered

![](_page_33_Picture_8.jpeg)

![](_page_34_Picture_0.jpeg)

defence as a top priority sector. He added that like the previous budget, 75% of modernisation budget had been reserved for procurement through domestic sources with an aim to widen and deepen the capabilities of India's Defence Industrial Complex.

Mr. Rajnath Singh reiterated the Government's commitment towards enhancing the participation of private players in this overall growth story. "The private sector is going to play a big role in the economic mainstreaming. Due to its drive, resilience and entrepreneurship, the sector is capable of bringing a new wave of prosperity in the country. In many advanced countries, private industry has led defence production. The time has come that, here as well, the sector becomes an equal partner in the defence industry," he said.

Raksha Mantri added that the defence manufacturers were working with a collaborative approach to strengthen the defence sector, terming the joint venture between Tata Advanced Systems Limited and Airbus for the production of C–295 transport aircraft in Gujarat as a shining example of this cooperation. He added that today India had become a Globally Preferred Destination for Aerospace Components & Complex System Assembly and the public sector and private industries were playing an important role in this transformation.

Highlighting the transformation of the defence and aerospace sector in the recent years, Raksha Mantri asserted that India was not only capable of designing and developing major platforms and equipment within India, but it had also successfully established a vast supply chain within the country. "Advanced platforms like Light Combat Aircraft Tejas, Light Combat Helicopter Prachand and C-295 Transport Aircraft are now being produced in India. We have also taken a firm resolve to manufacture fifth generation fighter aircraft within the country. From the advanced variants of the Agni missile, the Astra missile system, and the Pinaka missile system to the cutting edge hypersonic missile

![](_page_34_Picture_6.jpeg)

system and the Akash air defence system, we have built numerous success stories. These achievements have played a crucial role in strengthening our defence sector, making India more self-reliant and secure," he said.

Shedding light on the accomplishments achieved from the last Aero India, Mr. Rajnath Singh stated that a number of high-tech products such as Astra Missile, New Generation Akash Missile, Autonomous Underwater Vehicle, Unmanned Surface Vessel, Pinaka Guided Rocket were being manufactured within the country. He voiced the Government's unwavering resolve to surpass the Rs 1.27 lakh crore defence production and Rs 21,000 crore defence exports figures in the coming times, and ensure that the defence sector moved ahead at an unprecedented pace. It may be recalled that during the curtain raiser press conference of Aero India 2025, Raksha Mantri had expressed confidence that defence production would exceed Rs 1.60 lakh crore by the end of 2025–26 and defence exports would surpass Rs 30,000 crore.

On 2025 being declared as the 'Year of Reforms' in the Ministry of Defence, Raksha Mantri termed it as not just a government slogan, but the Government's commitment towards reforms. He said the decisions for reforms were not being taken only at the Ministry level, but Armed Forces and DPSUs were also participating in this endeavour. "To take this drive of reforms forward more rapidly, there should be participation of all stakeholders in the defence sector. Suggestions from all stakeholders associated with the Ministry are welcome," he said.

February 10th to 12th had been reserved as business days, with 13th and 14th set as public days for people to witness the show. The event comprised Defence Ministers' Conclave; CEOs Roundtable; inauguration of India & iDEX Pavilions; Manthan iDEX event; Samarthya Indigenisation event; Valedictory function; seminars; breath-taking airshows and an exhibition of aerospace companies.

## **Defence Ministers' Conclave**

With the aim to strengthen defence cooperation with friendly nations amidst a rapidly evolving global security landscape, Raksha Mantri hosted the Defence Ministers' Conclave on 11 February in hybrid mode. The theme this year 'Building Resilience through International Defence and Global Engagement (BRIDGE)' underscored the importance of supply chain resilience and strategic collaboration in defence.

The last edition witnessed the participation of 27 Defence Ministers and Deputy Defence Ministers alongside 15 Defence and Service Chiefs and 12 Permanent Secretaries. This year, the participation had expanded as representatives from more than 80 countries participated in the conclave. Approximately 30 Defence Ministers in addition to Defence/Service Chiefs and Permanent Secretaries from friendly nations attended the event. The conclave provided a

![](_page_35_Picture_8.jpeg)

crucial platform to address key aspects such as defence capacity building through investment, joint ventures and co-production, collaboration in R&D, training and technological advancements in AI and space, Maritime security cooperation and strategic partnerships.

### **CEOs Roundtable**

CEOs Roundtable 2025 was chaired by Raksha Mantri on 10 February on the theme 'Enabling Defence Cooperation through Global Engagement (EDGE)'. Over 100 Original Equipment Manufacturers (OEMs) participated. These included 55 from 19 countries (USA, France, Russia, South Korea, UK, Japan, Israel and Brazil etc), 35 Indian (Larsen & Toubro, Bharat Forge Ltd, Adani Defence & Aerospace, Mahindra Defence Systems Ltd, BrahMos Aerospace & Ashok Leyland Defence) and 16 Defence Public Sector Undertakings (DPSUs). Mr. Rajnath Singh had addressed over 73 CEOs of 28 Foreign OEMs and 45 Indian OEMs in the 2023 edition of the event.

Major foreign OEMs including Airbus (France), Ultra Maritime (USA), GNT (South Korea), John Cockerill Defence (UK), Mitsubishi (Japan), Rafael Advance Defence System (Israel), Safran (France) and Liebherr Aerospace (France) highlighted their future plans, joint ventures, collaborations, partnerships with Indian companies for production of spares parts, development of aero–engines, setting up of Maintenance, Repair and Operations (MRO) facilities and establishment of R&D facilities etc.
# **NERO** INDIA REVIEW

## **India Pavilion**

The India Pavilion provided an opportunity to Indian Defence Industries to showcase their design, development, innovation and manufacturing capabilities. It was inaugurated by Raksha Mantri on 10 February. The grandeur show at India Pavilion signified the 'Flight of Self–Reliance' which encapsulated India's journey towards becoming a global aerospace and defence powerhouse.

India Pavilion was divided into five distinct zones displaying indigenous capabilities in aero aviation, land aviation and naval aviation, def-space and niche technologies domains. More than 275 exhibits were on display through various mediums, represented by complete defence ecosystem of the country which included DPSUs, design houses, private corporates including MSMEs and start-ups. The Central Area exhibits included a striking display of marquee platforms including Advanced Medium Combat Aircraft, Combat Air Teaming System and Twin-Engine Deck-Based Fighter.

#### **iDEX** Pavilion

The iDEX Pavilion was inaugurated by Raksha Mantri on 10 February. It showcased cutting edge indigenously developed products and technologies, marking a significant milestone in India's defence innovation journey. Leading innovators displayed their indigenously developed products spanning a wide-range of advanced domains including Aerospace, DefSpace, Aero Structures, Anti-drone systems, Autonomous Systems, Robotics, Communication, Cybersecurity,





Surveillance and Tracking, Unmanned Ground Vehicles etc. The Pavilion also featured a dedicated section highlighting the winners of Acing Development of Innovative Technologies with iDEX (ADITI) scheme, showcasing their ground-breaking work in critical and niche technologies.

iDEX has successfully onboarded over 600 startups and MSMEs, marking a significant milestone in fostering innovation. Furthermore, 40 prototypes developed under iDEX have received official clearance for procurement, with 31 procurement contracts worth Rs 1,560 crore already signed.

#### **Seminars**

A number of seminars on a variety of topics were organised as part of Aero India 2025. On 11 February, Raksha Mantri addressed a seminar organised by the Indian Air Force on the theme 'Manned Unmanned teams for Aerial Warfare – concept to targeting' and another organised by DRDO on the theme 'DRDO Industry Synergy towards Viksit Bharat'. Other seminars on the themes – Mission DefSpace: From Vision to Reality – A Progress Report; Indigenous Development of Aerospace Materials: Strengthening India's Self–Reliance; Transition to Aatmanirbhar Indian Naval Aviation 2047 and its associated ecosystem; Transformation of Maritime Aviation by Adopting Technological trends and Indigenisation; Aligning Technologies to Future Conflicts; and Investment Opportunities for Aerospace & Defence Manufacturers in Karnataka – were also held as part of the event.



An idea of what the daily flying display looked like.

## Historic first: Su–57 and F–35 at Aero India



For the first time in history, Aero India 2025 witnessed the participation of two of the world's most advanced fifthgeneration fighter aircraft-the Russian Su-57 and the American F-35 Lightning II. It marked a milestone in global defence collaboration and technological advancement, offering aviation enthusiasts and defence experts an unparalleled prospect to witness these state-of-the-art warplanes.

The inclusion of both the Su-57 and F-35 highlighted India's position as a key hub for international defence and aerospace

collaboration. Aero India 2025 provided a rare side-by-side comparison of Eastern and Western fifth generation fighter technology, offering defence analysts, military personnel and aviation enthusiasts valuable insights into their respective capabilities.



All photos: Abhishek Singh Chauhan (Twitter/X: ilyushin\_76md and Instagram: chandigarh\_spotter) Article/text: The Vayu Team

# Some Top Concepts and Potential Inductions at Aero India 2025

The 15th edition of the Asia's biggest air show unveiled numerous cutting edge platforms. Here are some indigenous systems and concepts that will steer the Indian Armed Forces towards supremacy in any potential conflict.

#### Yashas

22 years after the first flight, India's indigenous jet trainer "HJT-36 Sitara" is reborn as "Yashas," going through two decades of rigorous improvements to meet the requirements. It has been developed for the Stage-II pilot training. It's equipped with a single AL-55I engine (with Full Authority Digital Engine Control or FADEC system) generating a dry thrust of 17.3 kN, allowing a maximum take-off weight (MTOW) of 5.4T and a payload capacity of 1T. The cockpit has been redesigned for improved pilot visibility and situational awareness. The glass cockpit system includes multifunctional displays (MFD), advanced navigation and training system, and a head-up display (HUD). The improved aerodynamics have addressed the stall and spin recovery issue.



#### **Radars: VHF**

A Very High Frequency Radar operates in the 30–300 MHz band. The longer wavelengths allow the system to track aerial platforms with low radar cross-section (RCS), denying elevation. Thus, VHF radars play a crucial role in the detection of stealth platforms. DRDO showcased the VHF surveillance radar (VHF–SR) at Aero India, based on a TATA 6×6 high mobility platform. The range has been reported to be around 400 km (for the low RCS platforms). Once an enemy platform is detected, this radar will feed information to the tracking radar. Interestingly, private entity ADTL has also showcased its own VHF radar concept, "Surya," which is currently under development.



## **For Fighter Jets**

The active electronically scanned array (AESA) radar has become an instrumental part of modern fighter jets. Quite astonishingly, not just the public sector but also the private sectors of India have started witnessing success in development. DRDO's LRDE has already developed the "Uttam" series GaAs AESA (manufactured by AMP Ltd.) for the Tejas Mk.1 and Tejas Mk1A. Recently it unveiled even more advanced GaN AESA "Virupaksha" for the upgraded Su–30MKI. In the future, variants will be used for the upcoming LCA Mk.2, TEDBF and AMCA. Meanwhile, private company Data Patterns unveiled the "Hawk I" GaN AESA family offering not just for the Su–30MKI, but also for the Tejas and MiG–29 as well! According to their claim, the radar offered to the Su– 30MKI has a range of 350 km for a target with a radar cross section (RCS) of 5 sqm and 200 km with an RCS of just 1 sqm. Most interestingly, this system is based on a swashplate, allowing a higher degree of azimuth and elevation, which will be crucial during air challenges.

There are some more important concepts that were also showcased: DRDO S-band space object tracking radar, AMPL S-band surface ship radar, X-band radars for APS by CoreEl Technologies, and AMPL etc.



## C–UAS

Many private sector entities have come up with advanced counter unmanned air systems (C–UAS).

## **Tonbo Imaging Wave Strike Gen3**

It is a high power microwave (HPM)-based system. Based on an articulated mobile platform, it is equipped with an electro-optical (EO) system, four radars and the HPM package. The EO system, equipped with both a day camera and a thermal image (TI) system, can identify the incoming threats. The radars (similar to the US Multi-Mission Hemispheric Radar) provide 360° aerial surveillance to accurately detect, identify and track a potential threat. The HPM then neutralises the threat by frying the electronics inside. Being a compact system, it's quite easy to deploy. The HPM can neutralise an entire swarm within a moment, denying any escape. This system will enable the user to defeat enemy electronic warfare (EW) systems as well.

#### **Big Bang Boom Solutions Vajra Strike**

They brought a laser based mobile counter system. Equipped with an EO and IR sensor and a high– energy laser (HEL), the entire system can be mounted to even an unmanned platform, allowing a high level of deployment. It has a detection range of 1.5 km and an engagement range of 1.2 km. The laser can shoot continuously for 120 seconds.

#### Adani Defence–DRDO VMCDS

The Vehicle Mounted Counter Drone System is based on a 4×4 mobile platform. The X and S Band 3D radar has a target acquisition range of 10 km. It's also equipped with EO and signal intelligence (SIGNIT) equipment. For soft-kill, it has radio frequency (RF) and global navigation satellite system (GNSS) jammers, while it uses HPL and a 7.62mm remote weapon system (RWS) as a hard-kill option.

#### Zen Technologies Vyomkavach

It's an integrated multi-layer defence system incorporating both the soft-kill and hard-kill options. Equipped with EO, radars and RF detectors, it has an excellent capability to identify the incoming threat. To defeat an incoming swarm, it has an RF jammer, kamikaze UAS, mini surface-to-air (SAM) missiles and a four-barrel RWS, which will work as a close-in weapon system (CIWS).

#### AMPL Comprehensive C–UAS System

It has an EO system, an RF detector, and radar (Drishti) to track drones and identify drone signals accurately. The command & control (C2) system seamlessly integrates data from multiple sensors. The omnidirectional and directional jammers disrupt enemy drone communication. For enhanced deterrence, it can be equipped with lasers and reconfigured rockets.

#### **DATRAN 1500**

Jointly developed by the CVRDE and BEML, it aims to provide a 1500 Hp solution for the Arjun series MBT and the future FRCV as well. It's a 12-cylinder, 4-stroke, twin-turbocharged, V-90 configured platform with a swept volume of 25 liters. It has a coolant charge air cooler, which deters the concentration of water droplets inside and prevents corrosion. It can achieve an output of 1500 hp at 2600 rpm and has a peak torque of 4780 Nm at 1560 rpm. It has been developed to work in -40°C to +55°C ambient temperature. While developed primarily to work with the best output within an altitude of 1,000 m, it will work decently even at a height of 5,000 m.

#### **AVNL LBPV**

JONGA stands for the "Jabalpur Ordinance And Gun Carriage Assembly". In 1969, the VFJ started manufacturing the Nissan P60 as JONGA. In 2025, AVNL has resurrected it in a new form to meet the LBPV requirement of the Indian Army. By the way, this LBPV possibly uses a 1T carrier chassis or a new one, rather an old P60. Unfortunately, it couldn't be asserted. It has a gross vehicle weight (GVW) of 4.2T with a payload capacity of 600kg.

It can support a crew of six. Powered by a 163 hp engine, it can go from 0 to 60 km/h in just 18 seconds! Once developed, it will have a top speed of 80 km/h and 40 km/h off-road with a full load!

#### EHWT

The electronic heavyweight torpedo has been developed by the NSTL to be integrated with the Kalvari class submarines and future other inductions. The wire acts as a medium for communicating data for the guidance of the torpedo towards the target during its underwater run. It is 1.6T platform with a diameter of 533mm and can be operated at as deep as 600 m! The range is reported to be 50 km, which is comparable to other cutting-edge equivalents in the international market.



#### **BDL ATGM**

BDL unveiled two new anti-tank guided missiles: Amogha II and Prabha. Prabha has been developed primarily to be used from infantry combat vehicles as a replacement for the older Konkurs–M series. While it also does have a semi-automatic command to line of sight (SACLOS) command guidance, unlike the Konkurs, it does not have a wire for guidance. It is a laser beam rider guided missile (LBRGM). Meanwhile, not much could be known of Amogha II. But possibly, it's the man-portable variant of the Prabha. Or, better to say, Prabha is the ICV-mounted variant of the Amogha II.

#### NASM-MR

The Naval Anti-Ship Missile—Medium Range is an air-launched, sea-skimming missile. It maintains a lowlow-low trajectory to avoid detection and demonstrates high-G quicker skid-to-turn terminal maneuvers. It



maintains a high subsonic speed only to accelerate to higher at target impact.

#### **Guided Artillery Rounds**

The DRDO 155mm ramjet-propelled artillery shell aims to increase the range of conventional shells by more than 100%. The incorporated precision guidance system will allow an accurate engagement. On the other hand, Vem Technologies is developing guided rocket artillery. The prospective range is 250 km with a CEP better than 10 meters. At the same time, DRDO is also working on future Pinaka guided rocket artillery, aiming to double the existing range.



#### Kusha

This is a family of India's future long-range surfaceto-air missiles. Three interceptors will be developed with ranges between 120 km and 350 km. With a top speed of Mach 5.5, it's aimed to achieve a maximum altitude



of 30 km. Interestingly, it will carry a kill vehicle as well. It will not be an exaggeration to state that "Kusha" will be effective against enemy ballistic missiles as well!

Article by Sankalan Chattopadhyay (X: @vinoddx9)

# **SOF at Aero India 2025**





#### **GARUDs**

#### PARA SF with LSV

The most awaited air show i.e. Aero India 25 finally commenced and culminated at Yehalanka AFS, Karnataka in February. As Asia's premier airshows, it truly presented the might of Indian Armed Forces and defence manufacturing capabilities. The vast line– up of aircraft and other equipment were a treat to the millions of eyes present at the airbase during the 5 days long airshow. While most of the people were there only to see the two rivals aka the Su–57 Felon and the F–35 JSF, I was taken aback by something very different or off the chart I would say!

For a young SF (Special Forces) geek who aspires to be one of them one day, what else can be better than witnessing SF troops from up and close? The airshow did just exactly that, giving me the opportunity to meet and interact with multiple Special Forces officers and men, getting insights and motivation on how to join the Special Forces and as to how I should follow the path with passion rather than seeing this as a tough challenge.







ADC to COAS with Su-57



Garud on a Tata Xenon



Abhinav Negi with SF men

The new vehicle and equipment displayed by the various SF men were truly astonishing and a very minor glimpse of our SF capabilities, and from my personal observation the elite PARA SF men on the Force Light Strike Vehicle stole the show for me. The modernisation and professionalism could be seen by just having a glimpse of them.

The SF element present at the airshow whether as ADCs to the chiefs, QRT to the senior officials or just randomly strolling around enjoy the airshow by themselves, made this a very jolly and memorable experience for me. At last, I would say that the Indian SF are truly a breed apart and wishing all the ranks of our various SFs and SOFs a very happy hunting!

Here are some images taken by me and other members of Team Vayu at the venue.



Text by Abhinav Negi of Team VAYU Instagram: @ that.article.guy & Twitter: @ThatArticleGuy





their mandate. These organizations aren't versatile like The Indian SOFs are: 1.SFF 2.NSG Also, there are even more Cdo and SOF units under the un

Column and 2SG. Below are the badges worn by these unit a tenure in S



Courtesy: SFF & SG Logo by Mrityunjay Raghuvanshi (@MrityunjayRagh2 on X). Balidan Badge by @officialTatya\_1 on X. SFF, Siachen, Parawings, Archer Cdo, Victor Cdo, CFF, Jump Indicator, Arm Patch and SGs badge by Abhinav N



IA, IN, IAF, NSG & CRPF Logo and Badges from Open Source. Ashoka Lions and Indian Flag from Open Source. egi of Team VAYU. Infographics and Artwork by Abhinav Negi of Team VAYU. @ThatArticleGuy on X. @thatarticle.guy on Instagram.

# **Stealth rivals steal the show!**

So everyone was busy running around Yelahanka and its exhibition halls, the aero display area was buzzed by two showstoppers delivering the most dramatic spectacle ever in aviation history! As soon as the Su-57 ended its first marvellous display, the F-35 surprised the crowd with an unexpected taxing towards the runway and eventually taking off for an enthralling flight display.

While global observers and enthusiasts were still recovering from the fact that two rival nations had brought their stealth fighters to the same venue, they were once again jolted after hearing that these aircraft had decided to perform consecutively on the same day. As soon as the F-35 returned after a five minute display, the Su-57 (T-50-4), piloted by Sukhoi's Chief Test Pilot Sergey Bogdan, took off once again for another display, a second time within half an hour! The event became unforgettable as the flagships of US and Russian aerospace engineering put on a thrilling show. Only in Bharat? We think yes!

#### Reporting by Rishav Gupta Photo by Abhishek Singh Chauhan



# "Looking for a deeper collaboration with India than before": UAC

In an interaction with media personnel on Day 2 of Aero India, the CEO of United Aircraft Corporation (UAC), Vadim Badekha, discussed the capabilities of the Sukhoi Su-57 fifth-generation multirole fighter aircraft, as the platform was being showcased by the company at the airshow for the very first time. Badekha spoke about the feasibility of the aircraft for its potential clients including India. The company offers a modernised version of the Su-57, which can be tailor-made as per requirements. This is possible due to the platform's open architecture, which allows the integration of sensors and other sub-systems on the aircraft as per the operational needs of the IAF in future upgrades, similar to the Su-30MKI. It is also ready to produce the aircraft in India. The company emphasised its long standing partnership with India, as Russian origin fighters have been the backbone of the IAF fighter fleet even today, with the availability of MiG and Sukhoi fighters. Additionally, it is ready

to assist New Delhi with its indigenous Advanced Medium Combat Aircraft (AMCA). While the Su-57 is being pitched, Badekha also confirmed that no discussions are currently in place with India for the aircraft.

#### **Report and photo by Rishav Gupta**



# **Indian Navy with full force at Aero India'25**



ero India 2025 was used as an opportunity for the Indian Navy to showcase and acquaint the general populace with various types of naval aircraft being presently operated by Indian Navy as part of the static display. This included MiG-29K 4th generation carrier borne fighter aircraft, Kamov-31 Airborne Early Warning helicopter, Seaking 42B and MH-60R anti-submarine and anti-ship helicopters.

In addition, the Indian Navy displayed the Light Combat Aircraft (Navy) in the exhibition Area. Among the aircraft formations for the fly-past was the all Navy Varuna formation in a 'V' denoting 'Victory', with P8I in the lead flanked by MiG-29K and Hawk 132 aircraft. In pursuance to the nation's goal of 'Aatmanirbhar Bharat', India Pavilion featured indigenous projects developed/being developed by the Indian Navy in partnership with industry and DRDO, such as state of the art missiles, air droppable Search And Rescue (SAR) Kit, Air Droppable Container (ADC) for logistic stores, carrier borne systems for MiG-29K and Advance Light weight torpedo (ALWT). Also on display in the India Pavilion was the scaled model of Indian Navy's future deck borne fighter – the Twin Engine Deck Based Fighter (4++ generation, designed by ADA) mounted on a ski jump. Naval aviation being technology intensive, the Indian Navy is also infusing startups to develop futuristic naval aviation platforms and systems. Some of these were on display in the India Pavilion.



# **Interview with Air Marshal Nagesh Kapoor** Air Officer Commanding-in-Chief (AOC-in-C) Training Command (TC)



**VAYU**: What kind of exhibits are you anticipating in this Aero India? Are AI-driven defence systems participating?

Aero India continues to evolve with the latest trends in defence and aerospace. With global interest in automation and smart warfare capabilities, this Aero India is likely to feature a mix of emerging technologies and industry collaborations. While unmanned systems have played a significant role in past editions, this year's focus may extend to AI-powered solutions, automation and enhanced operational capabilities. As technology advances, events like these provide a great opportunity to explore innovations shaping the future of defence and security. As always, technological evolution remains a key theme, and we also look forward to seeing what's on display.

## **VAYU:** How does Aero India contribute to the AtmaNirbharta/Make in India initiative?

Aero India plays a crucial role in supporting the 'Make in India' initiative by providing a global platform for Indian aerospace and defence manufacturers to showcase their capabilities and in that, it fosters collaborations between domestic and international



companies, encourages indigenous production, and highlights advancements in aerospace technology developed within India reinforcing Atmanirbharta in aerospace and defence.

The India Pavilion at the Aero India will showcase India's commitment to its Make-in-India initiative by showcasing indigenous defence manufacturing capabilities and cutting-edge technologies ready for the global stage, including the future prospects. Promotion of Indian start-ups is a focus area at Aero India 2025 and a wide spectrum of state-of-the-art technologies/ products developed by them will

be showcased at an exclusive iDEX pavilion.

**VAYU**: What are the major defence agreements expected to be signed during this event & how do global defence collaborations at Aero India benefit India's air power?

Aero India has already carved a niche for itself globally as a premier aerospace exhibition with 14 successful editions organised since 1996 in Bengaluru. The last edition achieved remarkable milestones as it attracted over seven lakh visitors, dignitaries from 98 countries and 809 exhibitors including businesses, investors, start-ups & MSMEs. Over 250 partnerships, including 201 MoUs, major announcements, product launches and technology transfers worth more than Rs 75,000 crore, were witnessed. The 2025 edition aims to surpass these achievements, and promises to be even bigger in scope and grandeur.

The event will provide a platform for forging partnerships between foreign & Indian firms and the discovery of newer avenues in the global value chain to accelerate the indigenisation process. A number of bilateral meetings are planned at the levels of Raksha Mantri, Raksha Rajya Mantri, Chief of Defence Staff and Secretary among others on the sidelines of the event. The focus will be on bolstering the defence and aerospace ties with friendly countries by exploring newer avenues to take the partnership to the next level.

The CEOs' Round-Table is expected to provide a favourable platform to foreign Original Equipment Manufacturers (OEMs) for manufacturing in India. Global CEOs, CMDs of domestic PSUs and premier private defence & aerospace manufacturing companies from India will be participating in the event.

## **VAYU**: How do you see the evolution of IAF's air combat capabilities in the future?

India's air combat capabilities are poised for significant advancements in the next decade, driven by indigenous production, technological modernisation, and global collaborations. The IAF is Saksham, Sashakt, Atmanirbhar – Potent, Powerful, and Self–Reliant highlighting the IAF's commitment to protecting India's airspace, modernising and becoming self–reliant. So we are looking at modernisation of our inventory with new aircraft and upgrades to existing platforms, greater use of AI and automation in combat operations, including unmanned aerial systems, enhanced air defence networks with improved missile systems and surveillance capabilities and stronger global partnerships to facilitate technology transfer and innovation.

## **VAYU**: What are the attractions at Aero India this time?

Aero India is much more than just an event—it's a celebration of dreams taking flight. Aero India is not just an industry event but also a chance to experience the thrilling world of aviation and aerospace up close. The air shows, live demonstrations, and static displays of cutting–edge aircraft, defence technologies, and aerospace innovations create an exciting and immersive experience for attendees.

The general public, especially aviation enthusiasts, get an incredible opportunity to witness first hand some of the most advanced military and civilian aircraft in action. The flying displays are a major highlight and draw large crowds. For many, it's a once-in-a-lifetime experience to see such advanced technologies in motion.

In addition to the excitement, the event also provides a platform for civilians to learn more about aerospace and defence technologies. With various exhibitions and interactive sessions, visitors can gain insights into the technical aspects of aviation, the future of defence systems, and the role of innovation in the industry.

We are also focused on creating an inspiring experience for the young students attending Aero India. We believe that moments like these have the power

to ignite the spark of curiosity and ambition in young minds, and we're committed to making sure they leave with a sense of wonder, possibility, and motivation.

We'll also be hosting career guidance sessions that are all about showing students the limitless opportunities in this field. Whether they're drawn to flying, designing, building, or innovating, we want them to know that they have a place in this industry. The world of aerospace is vast and full of opportunities, and we want these students to understand that the sky is not the limit it's just the beginning. Aero India is more than just an exhibition; it's a platform for young people to envision the future and to realise that they can be the ones to shape it. We hope to inspire them to dream fearlessly, work hard, and never stop believing in their potential.

## **VAYU**: What do you envision the future of Aero India in the coming years?

Aero India is not just an airshow—it's a launch pad for the future of aerospace and defence. In the coming years, we envision it evolving into a global powerhouse, where cutting–edge technologies, game–changing collaborations, and next–gen innovations take centre stage. We also expect to witness AI–driven combat systems, autonomous drones, and futuristic aviation concepts redefining air superiority. With India's rapid strides in defence manufacturing and space exploration, Aero India will showcase not just aircraft but the future of aerial warfare, sustainability in aviation, and space– defence integration.

Attendees can look forward to a bolder, more immersive experience-start-up showcases, and deepdive sessions with global defence leaders. Aero India will continue to be the ultimate convergence of visionaries, strategists, and innovators shaping the future of aerospace.

# **VAYU:** How does the IAF plan to leverage the technology and partnerships showcased at Aero India for the future?

Aero India has already carved a niche for itself globally as a premier aerospace exhibition with 14 successful editions organised since 1996 in Bengaluru. The 2025 edition aims to surpass these achievements, and promises to be even bigger in scope and grandeur. The event will provide a platform for forging partnerships between foreign & Indian firms and the discovery of newer avenues in the global value chain to accelerate the indigenisation process. The IAF will take a look at the consolidated take aways at the end of the event.



# Yelahanka through the













# lens of Shrey Chopra













Shrey Chopra Instagram and Twitter/X: @ captchops

# Saab at Aero India 2025

aab presented a wide portfolio of products and systems for the air, land and sea domains at Aero India. Taking centre stage was the Full Scale Replica (FSR) of Gripen E and the Gripen E Cockpit Simulator. On display also was the Carl-Gustaf M4, which will be made in India at the manufacturing facility Saab are establishing in Jhajhar, Haryana.

"We look forward to wide ranging discussions with the Indian Air Force on our Gripen E offer. We will also be engaging with Indian industry for Make in India as well as for discussions on expanding our sourcing from Indian companies which have emerged as suppliers to the world's foremost aerospace companies," stated Mats Palmberg, Chairman and Managing Director, Saab India.

"Aero India 2025 comes at a crucial juncture of global developments, leading to a greater focus on defence capabilities as well as on developing self-reliance along with the need for robust and modern technology. We are fully committed to supporting the Indian government's Atmanirbhar approach to national defence capability. To that end, Saab is setting up a manufacturing facility for Carl-Gustaf M4 in India, further strengthening production in the country. The facility will support the production of Carl-Gustaf M4 for the Indian Armed Forces as well as components for users of the system around the world. Saab will also be partnering with Indian sub-suppliers and the products manufactured in the facility will fully meet the requirements of Make in India," Palmberg added.

At Aero India Saab exhibited among others:

Gripen E - The world's most modern fighter, Gripen E, combines exceptional operational performance, a highly advanced networked warfare capability at a whole new level, superior sensor fusion, unique BVR features and an adaptability for new threats that is a decade ahead of any other fighter, making it a true game changer. The Saab offer for the Indian Air Force combines cost efficiency with true and extensive transfer of technology through a comprehensive industrial E Mission Simulator.

**Carl-Gustaf M4** is a man-portable multi-role weapon system that provides high tactical flexibility through its wide range of ammunition types. It is extremely lightweight (less than 7 kgs), and has improved ergonomics for the gunner which reduces action time and aids accuracy. The Carl-Gustaf system has been in service with the Indian Army since 1976.

**AT4CS AST** is a lightweight, man-portable, unguided and fully disposable weapon system. AT4 weapon has been selected by the Indian Armed Forces and will be used by the Indian Army and the Indian Air Force.

**The Next-Generation Light Anti-tank Weapon** (NLAW) system is the shoulder launched, Overfly Top Attack, anti-tank missile system that makes it the true tank killer for infantry which operate dismounted in all environments including built up areas.

**Ground Combat Indoor Gunnery Trainer** for ground combat weapon systems. To shape the best troops, training needs to be as realistic as possible.

The AUV62 System is the latest generation of Saab



#### VAYU

modular AUV systems. The AUV62-MR for mine reconnaissance has a high resolution side-looking sonar. It can autonomously search for and identify sea mines with a large area search capability.

**Integrated Defence Aids Suite (IDAS)** is a fully integrated end-to-end solution that provides protection for airborne platforms. IDAS includes radar warning, missile approach warning and laser warning sensors. In India IDAS is so far integrated on the ALH Dhruv helicopter.

Land Electronic Defence System (LEDS) is an integrated, modular, active protection system combining a laser warning system and effector control, providing armoured combat vehicles with vital situational awareness of laser threats with manual or fully automatic responses against threats.



**r-TWR Deployable:** a deployable, digital tower that provides high availability, mission-to-mission modularity and flexibility. It is mission ready within an hour and can be operated remotely from a secure location at a base or connected to a centralised facility hundreds of miles away, keeping military personnel safe.



# Thales and Bharat Dynamics Ltd agree on initial supply of Man Portable Air Defence systems to India

hales and Bharat Dynamics Limited (BDL) announced the signing of an initial supply of Laser Beam Riding Man Portable Air Defence systems (LBRM) in response to a requirement set out by the Indian Government to support India's air defence capabilities.

This initial supply of High Velocity Missiles (STARStreak) and launchers will be delivered this year and represents the first time that India has received this latest VSHORAD capability. This step confirms the foundation of a long-term collaboration and manufacturing partnership between Thales and BDL. In the spirit of the 'Make in India' initiative, this partnership will serve the current and future requirements of the Indian Ministry of Defence.

Thales, together with BDL, is "committed to the transfer of technology (ToT) of battle proven capabilities to India to equip the Indian Armed Forces".







# Saab over the years at Yelahanka





# Saab's Gripen E will "be the fastest delivery to IAF"



s the IAF looks closely at the full package of choices available for its MRFA acquisition programme, Saab's Gripen offer is a complete package of capabilities to defeat the most advanced threats in a modern battlespace while ensuring future operational relevance. According to Kent-Åke Molin, Head of the Gripen India campaign, "Gripen's exceptional capabilities align seamlessly with India's defence needs, offering advanced weapons, cuttingedge sensors, countermeasures systems and pilotfriendly Human-Machine Collaboration (HMC)."

What is critically important from an IAF point of view is the speed of delivery and the transfer of capabilities to Indian industry to enable them to not build the aircraft but also take them to the next level.

"The Gripen E aircraft will be the fastest delivery to IAF on signing of the contract," Kent-Åke says.

Leveraging decades of experience in fighter jet production, Saab combines state-of-the-art manufacturing technologies with highly efficient processes to ensure swift delivery of Gripen. Factors such as AI, Model-based development, additive manufacturing (AM), and 5-axis high-speed machining significantly reduce lead time.

"We offer an industrial programme that builds selfreliance and offers sustainable high-tech jobs while creating extensive business opportunities across India. Our proposal includes the transfer of Maintenance, Repair, and Overhaul (MRO) capabilities, the local production of aircraft components and engine assembly, and the establishment of a state-of-the-art Gripen Design Centre in Bangalore. The centre will harness local engineering talent for advanced avionics and software development. It will not only allow India to develop systems tailored to its specifications, but also ensure full control over its fighter systems, including the ability to execute upgrades and modifications," Kent-Åke says. Saab's technology transfer offer goes far beyond Gripen; it includes potentially supporting indigenous programmes like the Light Combat Aircraft (LCA) and Advanced Medium Combat Aircraft (AMCA).

Gripen's technology transfer offer also presents India with opportunities to build a global export centre. "We would like to position India as a potential export hub for Gripen E aircraft and related systems. Our proposal promises a self-reliant defence industry that supports itself and serves international markets as well," Kent-Åke concludes.



# **Great displays at ADTL**

VHF Radar 'SURYA' has been developed by Alpha Design Technologies for Indian Air Force. It is a Solid State 3D radar operating on VHF frequency band. It has detection ranges up to 360 km and detection height up to 15km. The system is integrated with ADTL made IFF MK-XII(S) interrogator with autonomous operation capability.



# Saab signs MoU with HAL for Laser Warning System

A ab signed a Memorandum of Understanding (MoU) with Hindustan Aeronautics Limited (HAL) to collaborate on the Electronic Warfare land Laser Warning System–310 (LWS–310). This agreement builds on a strong partnership between Saab in South Africa and HAL that began in 2005 during the development of the



Advanced Light Helicopter Programme. The MoU provides for a Maintenance Transfer of Technology, which aligns with the Indian Defence Procurement Procedure, so that HAL can gain the capability to manufacture LWS-310 within India. This includes setting up necessary infrastructure, training programmes and transferring technical expertise from Saab to HAL to ensure long-term support for the system.

"This MoU reflects Saab's commitment to localisation and indigenisation in India by identifying and utilising an Indian company. This ensures the longevity of the Security of Supply in supporting the Indian Armed Forces," stated Mats Palmberg, Chairman & Managing Director, Saab India.

With rapid threat warning and threat classification, LWS-310 enables a combat management system to employ effective countermeasures against laser threats, which further increases situational awareness and selfprotection capabilities for combat vehicles.

# **KSSL/ Bharat Forge at Yelahanka**

#### KSSL and L3Harris sign MoU

AGILITY ON ALL FRONTS



Alyani Strategic Systems Limited (KSSL), a subsidiary of Bharat Forge Limited and L3Harris Technologies signed a Memorandum of Understanding (MoU) for wider collaboration in supporting advanced defence and security equipment in India. Under the two year agreement, both companies will work in close collaboration to provide solutions for mutually agreed opportunities in Command, Control, Communications, Intelligence, Surveillance and Reconnaissance (C4ISR) technologies. The MoU provides L3Harris with a strong, local partner to support tactical communications network development in India, extending an existing global install footprint of more than 1 million fielded radios across US Department of Defence and allied inventories.

"This MoU sets the stage for future partnerships and opportunities in India, where the combined strengths of L3Harris and KSSL can contribute to bolster national security for the country," stated Dave Johnson, Vice President, International, L3Harris. "We are excited to move forward and increase our delivery speed in advanced tactical radios and equipment to the Indian Armed Forces."

The US–India Defence Industrial Cooperation encourages both parties' support of advanced defence technologies, capabilities and equipment. The MoU is designed to foster collaboration in defence technologies, with a framework for innovation that benefits both L3Harris and KSSL.

"This collaboration unlocks new strategic capabilities and will lead to harnessing new opportunities for quick





delivery of sophisticated defence products to the Indian Armed Forces," stated Neelesh Tungar, President & CEO, KSSL. "Aligned with the evolving doctrines and emerging warfare paradigms, this collaboration between KSSL and L3Harris is aimed at serving future strategic requirements, including joint and integrated ISR capabilities."

While focusing on the Indian market, the collaboration also seeks to establish robust and resilient supply chains outside India for global obligations. L3Harris has operated in India for more than 21 years, with facilities in New Delhi and Bengaluru. In addition to providing the Indian Armed Forces with sophisticated tactical radios and manned airborne electro-optic/infrared systems, the company provides Futuristic Telecommunications Infrastructure for all Indian airports in partnership with the Airport Authority of India.

## Bharat Forge and VEDA Aeronautics (P) Ltd collaborate

Bharat Forge Ltd (BFL and VEDA Aeronautics (P) Ltd (VEDA) signed a Memorandum of Understanding (MoU) to develop state-of-the-art Unmanned Aerial Vehicles (UAV) and other high speed aerial weapon systems used in the battlefield. While VEDA has been engaged in shaping the unmanned system technology for defence services, BFL will supply the micro jet engines used in these unmanned systems. The MoU is expected to play a vital role in leveraging each other's capabilities to strengthen India's defense capabilities and contributing to national self-reliance.

Mr. Guru Biswal, CEO, Aerospace Division, Bharat Forge stated, "This MoU with VEDA is a testimony of our commitment to work for an Atmanirbhar Bharat, and to create niche technologies that shall support Indian and global requirements in the evolving technological landscape of warfare. BFL will focus on indigenous development of jet engines upto 400 Kgf thrust to power the unmanned systems developed for Indian defence forces. The 40 and 45 Kgf engines developed by BFL are under serial production and will be used by VEDA for all defence projects".

# Aero India through









# Abhishek Singh's eyes!











Abhishek Singh Chauhan Twitter/X: ilyushin\_76md and Instagram: chandigarh\_spotter ERO INDIA REVIEW

# Interview with Mr Manoj Jain, CMD, BEL



# **VAYU:** Can you tell us how BEL is helping the Government realise the dream of an Atmanirbhar Bharat?

BEL, since inception, has been working towards achieving self-reliance. Responding to the clarion call by the Hon'ble Prime Minister of India, BEL has recalibrated its efforts and is strongly promoting the Government's Make in India initiative by laying strong thrust on in-house R&D and indigenisation, Public–Private Partnerships, Joint Ventures, capacity expansion and modernisation.

The Akash Air Defence Weapon System of BEL is a great success story and shining example of BEL's indigenous design, development and manufacturing drive. The Coastal Surveillance System developed by BEL for the Indian Coast Guard is now being offered to other friendly countries as well as for generating export business. The Weapon Locating Radar, developed



indigenously by BEL and DRDO lab LRDE, and its lighter version designed for surveillance in mountainous and high-altitude terrains are proving to be gamechangers for India's military.

To ensure that we stay at the forefront of innovation, we invested 6.24% of our turnover in R&D last year and, as a result, achieved 77% of our turnover in FY 2023–24 from indigenous products. Increasing the level of indigenisation of its products and systems has not only given BEL long-term competitive advantage but also helped in aligning itself with the country's dream of achieving Atmanirbharta (self-reliance) in Defence.

#### **VAYU:** How do you see BEL making an impact in the domestic defence and non-defence markets in coming years and what are your strategies to retain leadership position in these sectors?

BEL has maintained a decent mix of Defence and Non-Defence business in its overall business portfolio. In the Indian Defence Electronics segment, we continue to hold a significant market share based on our deep understanding of customer's needs and our ability to fulfil it. As the technology landscape continues to evolve in Defence sector, our concerted efforts in building state-of-the-art, innovative products and solutions have helped us in being the preferred partner of our Armed Forces.

BEL is actively participating in the MoD's Make–I, Make–II and Make–III projects involving indigenous solution development with emphasis on Sub–Systems, Systems and Services for which capabilities and competencies already exist. Further, BEL is also actively investing to develop new capabilities as needed. Opportunities are being explored to build long–term relationships with defence industry participants. Diversification across products, segments, customers, industries and geographies remains an important focus area to unlock new opportunities and scale growth. This includes growing the Non–Defence business where we see significant prospects, especially in metro, civil aviation and cyber security areas. We will continue to build on our existing competencies and diversify to newer areas. Additionally, we are pursuing opportunities to expand our customer base in the existing and new geographies.

Though competition continues to intensify in our major business segments, our laser sharp focus in delivering our brand promise of Quality, Technology & Innovation to our customers gives us a distinct competitive advantage. This will continue to remain our guiding business mantra for retaining leadership in our core business segments.

# **VAYU**: Please tell us about your company's financial performance, turnover, order book position, etc.

BEL has always been a profit-making PSU despite various challenges including stiff competition. FY 2023–24 saw the company achieve a record turnover of Rs. 19,819.93 Crore as against Rs. 17,333.37 Crore in FY 2022–23, thereby registering a growth of 14.35%. The growth was driven by strong performances across all segments. Defence contributed to 81% of revenue in FY 2023–24 with the balance 19% coming from the Non–Defence segment. Profit after Tax grew by 33.7% to Rs. 4,020 Crore in FY 2023–24 as against Rs. 3,007 Crore in FY 2022–23.

BEL also continued the momentum in order acquisition by booking highest ever annual order inflow of Rs. 35,046 Crore during FY 2023–24. Headed into FY 2024–25, we expect order acquisition in the range of Rs. 25,000 Crores. The company's order book position as on January 1, 2025, stands at around Rs. 71,000 Crore, giving it stable revenue visibility. While we participate in

new orders, we will be sharply focussed on the timely execution of the existing order book. Our near-term aim is to get an entry into the Maharatna club of PSUs. Towards this, we are targeting a healthy revenue growth of double digits driven by the expansion of both Defence and Non-Defence businesses.

BEL. many noteworthy won awards and recognitions for its multidimensional excellence, including the prestigious 'CII EXIM Bank Award for Business Excellence (2023)' for Hyderabad Unit, 'Karnataka State Export Excellence Award', Economic Times 'Iconic Brand of the Year Award - 2023', 'Employee Excellence Award' from Times Group, Institution of Engineers (India) 'Industry Excellence (Gold) Award for Business Excellence', 'Project of the Year - Large Category (Runner Up) Award' from Project

Management Institute, Indian Chamber of Commerce 'PSE Excellence Awards', Governance Now PSU Awards, National Export Excellence Award, etc.

# **VAYU**: What is your vision for taking BEL on a fast track growth path in coming years?

It's well acknowledged that fast track growth is basically the outcome of super synchronised functioning of various key business functions including R&D, Marketing, Operations, HR, Finance, etc. Our concerted focus has been towards streamlining each of these business functions to set a strong foundation for BEL to deliver fast track growth. Alongside our existing business segments, various high growth areas (like Arms & Ammunitions, AI, Cyber Security, Unmanned Systems, Rail & Metro) have been identified and a resilient business model is being worked upon to deliver sustained growth in these emerging segments.

Innovation has been the cornerstone of our success and our customers can rest assured that BEL will continue to develop innovative and quality products for them through collaborations with DRDO labs, research & premier academic institutions, and niche technology players. We will continue to build on our existing competencies and diversify into newer areas. Opportunities abound, we also remain watchful of the challenges brought by geopolitical situations, emerging technologies, regulatory changes and evolving customer expectations. We will remain agile to effectively navigate them and ensure steady growth path.

Roadmaps have been created for the development of future products and technologies, creation of IPRs and acquisition of key technologies. This will enable us to stay at the cutting-edge of technology and meet our customer's evolving requirements with cost-effective and innovative solutions.



# BEL showcases its capabilities at Aero India 2025



t Aero India 2025, Bharat Electronics Limited (BEL) showcased state-of-the-art products and systems employing cutting edge technologies and spanning every domain of its business.

BEL displayed its latest offerings for the armed forces in 14 clusters, namely 'Defence Communication', 'Electro Optics', 'Avionics & Airborne Electronic Warfare', 'Shipborne Systems', 'Weapon Systems', 'Land-based Electronic Warfare', 'Futuristic Technologies', 'Cutting Edge Solutions', 'Artificial Intelligence', 'Arms & Ammunitions', 'Radar Systems', 'Global Collaborations' and 'Domestic Partnership'.



Software Defined Radio manpack.

Notable among the products and systems on display were communication equipment such as variants of Software Defined Radio, Radio on the Move and High Capacity Radio Relay; electro-optic devices like Uncooled Thermal Imager Sight for Assault Rifle, Passive Night Vision Goggles and Border Observation Surveillance System; airborne EW and Avionics products including Stall Protection System for helicopters, Digital Fight Control Computer and Tactical Datalink for Naval platforms (airborne); Shipborne systems like Passive Hydrophone Element - Low Frequency and Medium Frequency, HUMSA-NG Transducer Element and Shipbased SIGINT EW System; weapon systems such as Pralay Missile, Long Range Land Attack Cruise Missile and QRSAM; Land-based Electronic Warfare systems including Portable Anti Drone System and Ground Based ELINT System; Arms and Ammunition including Corner Shot Weapon System, Electronic Artillery Fuzes and Long Range Glide Bomb; Radar systems such as Air Defence Fire Control Radar, Arudhra Radar, Ashwini Radar and Multi-Function Radar.



BEL also showcased futuristic technologies such as 5G Solution for Defence, Quantum Cryptography, Unmanned Warfare Technology, Space Situational

Awareness and Theatre Command; Upgraded Ku Band Exciter, Direct RF Signal Processing and Digital Light Engine.



Apart from these, on show were the latest Artificial Intelligence based products like Generative AI-based Virtual Assistant, AI-based Language Translation Solution and AI-enabled Speech Analysis and Voice Translation System. The last two clusters, 'Global Collaborations' and 'Domestic Partnership' featured advanced products and systems developed by BEL in collaboration with local MSMEs and global OEMs.

#### BEL signs MoU with CoreEL Technologies Pvt Ltd

Bharat Electronics Ltd (BEL) and CoreEL Technologies Pvt Ltd, Bengaluru, signed an MoU for the joint development and indigenisation of subsystems in the areas of electronic warfare, sonars, radars and missile electronics. The objective of the agreement, announced at Aero India 2025, was to co-operate and support indigenous development of subsystems required for the realisation of equipment/systems in the field of EW, radar, sonar, etc, for defence applications.

## **BEL signs MoU with EndureAir Systems Pvt Ltd**

Bharat Electronics Ltd and EndureAir Systems Pvt Ltd signed an MoU to co-operate and work together for the joint development, manufacture, marketing and sales of vertical take-off and landing unmanned aerial systems. The MoU aims at leveraging the complementary strengths and capabilities of BEL and EndureAir Systems Pvt Ltd for the joint development of medium and high altitude logistic (cargo), micro, nano and tethered drones for surveillance and military applications.

# BEL, Mitsubishi Electric & MEMCO in tripartite MoU

Bharat Electronics Limited, Mitsubishi Electric Corporation (Mitsubishi Electric), Tokyo, Japan, and MEMCO Associates India Private Limited (MEMCO), Bengaluru, signed a tripartite MoU to collaborate and explore business in select domains of Defence and Space.

The MoU, announced at Aero India 2025, is envisaged to exploit business opportunities with Mitsubishi Electric in contract manufacturing and supply of customised components for defence and space domains such as radars, electronic warfare systems and space situational awareness.

#### **BEL MoU with Godrej & Boyce**

Bharat Electronics Ltd signed an MoU with Godrej & Boyce Manufacturing Company Ltd, Mumbai, for co-operation in various platforms of defence. BEL with its extensive design and manufacturing facilities in mechanical, electronics and software domain, and Godrej & Boyce Manufacturing Company Ltd with its strong expertise in the manufacturing of critical assemblies for defence, aircraft and space applications will co-operate and work together in areas/programmes related to weapon systems, missile systems, space/ ground applications, engines for missiles and spacecraft, UAVs, decoy launchers, etc.

#### BEL & Reshef Technologies, Israel in MoA

Bharat Electronics Ltd and Reshef Technologies, Israel. signed a Memorandum of Agreement (MoA) to execute a Long Term Make in India (LTMII) contract, aimed at the indigenous manufacture of Electronic Fuzes. The objective of the agreement. announced at Aero India 2025, is to execute a 10-year contract LTMII for production of Electronic Fuzes in the country, thereby addressing the mandated indigenisation requirements of the Indian Army. 🔫



Electronic proximity fuze.

# BEL IAI Aerosystems begins operations to support India's Defence Forces

Heralding a new chapter in Indo-Israeli Defence and security cooperation, BEL IAI Aerosystems, a landmark joint venture between Navratna Defence PSU Bharat Electronics Limited (BEL) and Israel Aerospace Industries (IAI) announced the commencement of its operations at Aero India 2025.

Both companies have established a JV, which is a significant step towards strengthening international collaboration, paving the way for a robust strategic partnership envisaged to provide a single point of contact for extending long-term product support services for India's Defence Forces.

The JV is uniquely positioned as the exclusive support entity for post-warranty maintenance of India's defence systems. This initiative leverages manufacturing capabilities and technological innovations, fostering India's self-reliance in sync with the 'Make in India' vision even while delivering world-class solutions.

Beyond post-warranty maintenance, this collaboration will also lead to the transfer of advanced

technological capabilities to India, enabling the development of local expertise in critical defence systems. By establishing a dedicated support infrastructure, the JV will empower India to operate, maintain, and enhance its defence systems independently.

The venture's long-term impact extends to creating job opportunities, upskilling the local workforce, and contributing to the growth of India's defence manufacturing ecosystem, reinforcing the nation's position as a global defence player.

Mr Boaz Levy, President & CEO of Israel Aerospace Industries, stated, "This collaboration is a historic milestone as it marks the first ever joint company established by leading defence firms of Israel and India.

It reflects the robust and flourishing relationship between the two nations, and we are excited about the significant contributions this venture will bring to India's defence capabilities. We extend our gratitude to the Tri-Services for their unwavering partnership."

# Aero A2Z for manifesting Make in India' radar systems

ero A2Z Services Private Limited, an Indian aerospace and defence company, introduced a range of tactical and medium range radar systems at Aero India 2025. These software based radars are battle proven flexible, developed in collaboration with DRS RADA Technologies.

The radar applications introduced include very short to medium range detect and track systems, Counter-Unmanned Aerial Systems (C-UAS), Fire Control (FC) systems, Counter Rocket, Artillery & Mortar (C-RAM), including Automatic Sense & Warn (AS&W), Active Protection Systems (APS) and Force Protection.

Vikas Batra, Director, Aero A2Z, while sharing his vision stated, "Bringing in the best of global expertise from giants like DRS Rada who have established their efficacy in Israel and US markets, Aero A2Z is committed to local manufacturing of advanced solution that address modern warfare and new age security threats. Over the past four years, we have a robust supply chain and are now setting up a state-of-the-art facility near Gurugram that will be operational within the next few months and will cater to the burgeoning demand for our valiant services."



Vikas Batra, Director (on the right) chats with Vayu's Rishav Gupta

# Brahmos down the ages at Yelahanka! (Great displays as always)

















# **BEML and STX Engine forge** strategic partnership



BCML Ltd, a leading Defence Public Sector Undertaking (DPSU) under the Ministry of Defence, signed a strategic partnership with STX Engine, a South Korean company, to co-develop, manufacture, and market battle tank engines, marine

engines, spares and engine aggregates. The agreement also included servicing and maintenance of engine components to cater to Indian defence needs while exploring export opportunities to friendly nations.

The Memorandum of Understanding (MoU) was exchanged between Mr. Shantanu Roy, CMD, BEML Ltd, and Mr. Sangsu Lee, President & CEO, STX Engine, in the presence of senior officials from both organisations.

Mr. Shantanu Roy, CMD, "This BEML Ltd, stated: collaboration is a testament to BEML's commitment to strengthening India's indigenous defence and maritime capabilities, in line with the vision of 'Aatmanirbhar Bharat.' By integrating our engineering excellence with STX Engine's advanced technology, we aim to drive innovation, reduce import dependency, and build a robust domestic manufacturing ecosystem. This strategic partnership marks a

significant leap towards self-reliance in critical defence technologies, paving the way for a resilient and futureready infrastructure."

"BEML Ltd has a rich legacy of innovation and technological leadership across defence mobility solutions, missile systems, metro and rail components, mining equipment and modernisation programmes. With this partnership, BEML aims to expand its footprint into defence and marine engine technologies, leveraging STX Engine's deep expertise to develop advanced propulsion solutions for India's evolving defence programmes", stated company officials.

This collaboration underscores BEML's commitment to strengthening indigenous capabilities in defence and maritime engineering, reinforcing India's vision of 'Aatmanirbhar Bharat' (Self-Reliant India). By combining BEML's engineering excellence with STX Engine's expertise in engine technology, the partnership is poised to drive innovation, reduce import dependency, and build a robust domestic manufacturing ecosystem.



Unrelated to the news above are these two UAVs at the BEML stand at Aero India 2025.

# DRDO showcases indigenously developed technologies and systems

efence Research and Development Organisation (DRDO) with an endeavour to integrate various stakeholders of defence R&D ecosystem in the country, participated in a big way at Yelahanka. They featured indigenously developed state-of-theart technologies and systems, working models and innovations in all formats, i.e., Indoor Pavilion, Outdoor Displays, India Pavilion and Flying display.

DRDO for the first time showcased a full-scale model of India's first 5th Gen stealth aircraft Advanced Medium Combat Aircraft (AMCA) equipped with features at the India Pavilion. This Pavilion at Aero India 2025 showcased India's commitment to its Makein-India initiative by displaying indigenous defence manufacturing capabilities and technologies ready for the global stage.



Apart from this, visitors to this Pavilion could gain insight from 16 other DRDO developed products and technologies being displayed such as Twin Engine Deck Based Fighter (TEDBF); LCA Mk-2 Model; Air Droppable Container (ADC) -150; Advanced Light Weight Torpedo; Kaveri Derivate Aero Engine without afterburner, Naval Anti-ship missile – Medium Range and various other missiles.



DRDO indoor pavilion at Hall–D at Aero India was meticulously divided into 9 themes, encompassing core areas of defence innovation. The themes were: 'Airborne Surveillance Solutions', 'Naval Warfare', 'Next–Generation Missile Systems', 'Supremacy in

the Skies - ADA's 5th Gen Leap', 'Unmanned Aerial 'RadarScape: Mapping the Invisible', Systems', 'Maritime Sentinel: A New Era of Surveillance & Safety', 'Sensors Suite for Fighter Aircraft' and 'Rakshak'. The Pavilion displayed over 330 products which were categorised into 14 technology zones. It provided an in-depth exploration of key defence areas, namely Advanced Materials & Composites; Surveillance & Reconnaissance Technology; Antenna & Microwave Technology: Soldier Support Systems: Combat Aircraft Technology; Corporate Directorates; Micro Electronic Devices, Computational Systems and Cyber Security; Land Systems & Munitions; Missile Technology; Next-Gen Combat Vehicles & Tactical Mobility; Photonics, Laser and Quantum Technology; Electronic Warfare & Communication; Simulation & Training Technology; and Aero Propulsion Technology. The indoor pavilion

> also displayed the products developed under Technology Development Fund (TDF) Scheme being executed by DRDO.

The outdoor segment of DRDO pavilion was designed to demonstrate the realworld application of cutting-edge defence technologies featuring full-scale model of QRSAM Mobile Launcher Vehicle, Akash NG Launcher; Archer UAV 1:1 (Rustom-1); Air Droppable Survival and Rescue Kit (SARK); Emergency Escape Parachute System for Air Crew (EEPSA); Military Combat Parachute System (MCPS); Vehicle Mounted Jammer; Anti UAV

(JAU) Entity of Project Dharashakti, and VHF radar. The demonstration of Dornier aircraft's midlife upgrade was one of the main highlights of DRDO's participation at the Aero Show. The upgraded Dornier showcased enhanced avionics, better fuel efficiency, advanced radar systems, enhanced manoeuvrability, integrated surveillance systems, and improved electronic warfare capabilities, reinforcing its role as a dependable asset of the Indian Air Force.



# HAL's LUH takes centre stage; CATS Warrior star of India Pavilion

AL showcased its indigenous products and technologies centred on the theme 'Innovate. Collaborate. Lead' at Aero India 2025. "HAL's indigenously designed and developed Light Utility Helicopter (LUH) is at the centre stage. Various innovative products conceived and developed by HAL demonstrator of Combat Air Teaming System (CATS) Warrior was the highlight of the India Pavilion along with Advanced Light Helicopter Next Generation (ALH NG) and RUAV. ALH NG was placed in front of the India Pavilion to signify HAL's entry into civil aviation. For the first time, a 1:1 model of Advanced Medium Combat



R&D Divisions in the area of avionics, mechanical systems, engines and aerospace for manned and unmanned aircraft are the highlights at HAL stall", stated Dr D K Sunil, CMD, HAL.

HAL's major attraction at its indoor pavilion (Hall E) was the LUH, Hindustan Turbo Trainer (HTT)–40 simulator, scaled models of LCA Mk.1A fighter, LCA Mk.1 Trainer, Hindustan Jet Trainer (HJT)–36, HTT–40, LCH and ALH Mk IV. The scaled models of Hindustan 228 and its amphibian variant were also displayed in this area.

The outdoor display adjacent to HAL stall featured the LCA Mk.1A and HJT-36. HTT-40, LCA Mk.1 Trainer, Hindustan 228, Do-228 and LUH on static display.



The flying display witnessed a unique LCA Mk.1A formation, HJT-36, HTT-40 and LUH.

The central theme of the India Pavilion was 'Flight of Self Reliance'. A functional full scale engineering Aircraft (AMCA) was also placed at the Pavilion.

HAL's indoor pavilion showcased state-of-theart avionics systems like Management Mission System. Digital Map Generator, Data Lite-Communication System, IFF & CIT, Indigenous Communication Complex with Audio Management System, Audio Warning System, SCDLU, Radio Control Panels etc. Also, the advanced Flight Control Actuators and



electro mechanical systems like Active Side Stick Control were displayed.



Static models of actual HTSE-1200 and GTEG-60 engines were showcased displaying their technological challenges and innovation. An exclusive aerospace corner with scaled models of Cryogenic Engine CE-20, GSLV Mk.III and Chandrayaan-3 showcased HAL's capabilities and role in the aerospace industry.

# HAL's Mk.1A enthrals spectators at Aero India

The LCA Mk.1A flew at the inaugural programme of Aero India 2025. Four Mk.1A aircraft flew in 'finger four' formation called Yodha formation. The Mk.1A second prototype did an amazing aerial display in front of the Raksha Mantri, enthralling the spectators. The Mk.1A, also called the 'Alpha,' is a more capable and significantly upgraded aircraft slated to be a part of IAF in the coming months.

The upgrade includes a new sensor suite, new more capable Mission and Digital Flight Control System, new weapons, net centric capability and Astra BVRs







apart from precision guided weapons. IAF has placed 83 aircraft order on HAL. The lead aircraft are poised to get Military Type Certificate and enter service.

# HAL's upgraded Hindustan Jet Trainer (HJT) 36 renamed as 'Yashas'

The flagship jet training aircraft of HAL, Hindustan Jet Trainer, HJT–36, is now renamed as 'Yashas' after extensive modifications to resolve departure characteristics and spin resistance throughout the aircraft envelope. Mr. Sanjeev Kumar, Secretary (DP) unveiled the new name in the presence of Dr D K Sunil, CMD, HAL and senior officers at Aero India 2025 on 10 February 2025.

For induction into service, the aircraft was recently upgraded with state-ofthe-art avionics and an ultra-modern cockpit. These will enhance training effectiveness and operational efficiency, whilst providing weight reduction and overcoming obsolescence of imported equipment with Indian LRUs.

Yashas is capable of Stage II pilot training, counter insurgency and counter surface force operations, armament training, aerobatics etc. It is powered by a FADEC controlled AL55I jet engine, providing best in class thrust to weight ratio, optimised thrust management and reliability. Stepped up rear cockpit with drooped nose provides excellent all– around vision and enhanced situational awareness with state–of–the–art glass cockpit with MFDs and HUD. The capabilities of HJT–36 are stall and spin, aerobatics, armament carriage up to 1000kg, single point ground refuelling and defuelling.



# Some photos taken by ace photographer









# our good friend and Amartya Mitra











# **Interview with Salil Gupte President, Boeing India and South Asia**



**VAYU:** How is Boeing addressing India's growing aviation market across commercial, defence and services businesses?

SG: Boeing's vision has always been to bring the best of Boeing to India and take the best of India to the world. With over 80 years in India, Boeing has been integral to the growth of the country's commercial aviation sector and the modernisation of its defence forces, building trust and reliability among local stakeholders. Our long-standing presence and continuous engagement have positioned us as the mainstay of India's growing commercial aviation sector. We have strong partnerships with Indian carriers such as Akasa Air, Air India and SpiceJet. Air India's historic order for up to 290 Boeing jets and the Akasa Air order of 226 737 MAX airplanes speak to Boeing's increasing presence and participation in India's aviation growth. Boeing also offers comprehensive lifecycle support services, such as pilot and technician training and digital solutions, to optimise airline operations.

Today, India operates 11 C–17s, 22 AH–64 Apaches (with six more on order), 15 CH–47 Chinooks, 12 P–8Is, 3 VVIP aircraft and two Head of State aircraft, all Boeing platforms. We are also seeing growth in our services business and, with it, growth in the value Boeing creates through product lifecycle support and training. Our team is working with the Indian Air Force and the Indian Navy to provide operational capability and readiness for the P–8Is, C–17s, Apaches, Chinooks and Head of State aircraft through sustenance contracts. Boeing Defence India (BDI), our local establishment in India, is leading our investments in services infrastructure, building of local capabilities, workforce training and partnerships right here in India that are aimed at ensuring the Indian armed forces are always mission ready, and operate their assets at peak condition.

We are collaborating closely with Indian stakeholders across the public and private sectors to deliver advanced capabilities in aviation and defence. In 2024, Boeing executed pivotal programmes such as the Air Cargo Symposium, Pilot Roundtable, and Executive Development Programs. These initiatives involved collaboration with airline customers, regulatory bodies like the Directorate General of Civil Aviation (DGCA) and Ministry of Civil Aviation (MoCA), the Airports Authority of India (AAI), and aviation startups, aiming to enhance various facets of India's aviation sector.

In 2021, we launched the Boeing India Repair Development and Sustainment (BIRDS) Hub. It is an initiative to bring together ecosystem partners to shape India as a strategic destination for aerospace engineering, maintenance, repair and sustainment services. This is a one-of-its-kind initiative that seeks to provide customers with best-in-class solutions, efficient turnaround times, and optimal economic value, all available in-country. Partnership is Boeing's key to success and we believe it makes more sense to partner with local Maintenance, Repair, and Overhaul (MROs) that are already established and have great capabilities. Through such partnerships, Boeing is working with customers and local industry to develop MRO facilities in the region, to support India's aspiration to become an MRO hub for the region.

Our focus on transparency, innovation, and localised solutions has built enduring relationships with customers, suppliers, and policymakers. Boeing's infrastructure, skill development and research investments have further reinforced our reputation as a reliable partner contributing to India's aviation growth and defence modernisation.

# **VAYU:** How are Boeing's collaborations and investments in India fostering the development of a robust and self-reliant aerospace and defence ecosystem within the country?

SG: Boeing's steadfast commitment to "Make in India" and "Aatmanirbhar Bharat" is evident in our strategic investments, partnerships, and innovations that help grow India's aerospace and defence ecosystem. Our approach goes beyond transactions—we collaborate to co-develop advanced solutions, drive innovation, and foster indigenous manufacturing and skill development.
An example that stands out is Tata Boeing Aerospace Limited (TBAL) in Hyderabad, a state-of-the-art facility that integrates cutting edge technology with indigenous manufacturing. TBAL produces aero-structures for Boeing's AH-64 Apache helicopter, including fuselages, secondary structures, and vertical spar boxes. With now over 300 fuselages delivered globally, including to the US Army, more than 90% of the fuselage parts are manufactured in India, sourced from network of over 100 MSME suppliers. TBAL also has a more recent production line that manufactures vertical fin structures for 737.

Our supplier ecosystem in India has consistently achieved global recognition, with partners such as Cyient, Tata, Rossell, and Dynamatic Technologies Limited receiving Boeing's prestigious "Supplier of the Year" award among a competitive network of over 11,000 suppliers worldwide. This highlights the exceptional quality and capabilities of Indian suppliers, reinforcing their growing role in global aerospace manufacturing. Through initiatives like these, Boeing continues to drive India's indigenous aerospace ambitions, strengthening local manufacturing capabilities and advancing the country's vision of self-reliance in the sector.



**VAYU**: In what ways do Boeing's partnerships in India stand out from those of other foreign OEMs in terms of their scope, depth and impact?

SG: Boeing's partnerships in India are deeply collaborative and designed to drive long-term growth for both our global operations and India's aerospace ecosystem. With over \$1.25 billion in annual sourcing, 70% of this sourced from manufacturing, and collaborations with 300+ supplier partners, including over 25% being Micro, Small & Medium Enterprises (MSMEs), Boeing stands out for its commitment to integrating local expertise into our global supply chain. We also have a dedicated and fast growing supply chain team based in India that focuses on developing new suppliers, including MSMEs. This effort has been pivotal in the growth of our network, which is propelled by significant advancements in quality and capability along the value curve. Our suppliers are transitioning from simple assemblies to more complex ones, including advanced materials like composites and thermoplastics, and employing technologies such as fullsize determinant assembly (FSDA) and robotics.

### **VAYU**: What factors have contributed to this growth story in supply chain in India?

SG: Today, India's aerospace and defence sector is experiencing a burgeoning growth that is attracting diverse talent. The country's traditional strengths in engineering, extending beyond software to encompass broader engineering disciplines, have converged with a substantial improvement in manufacturing quality over the past decade. This combination of engineering excellence and enhanced manufacturing capabilities presents a remarkable opportunity for industrial companies to invest in India. Additionally, initiatives like "Make in India," financial incentives, and infrastructure development, have created a conducive environment for growth. With over eight decades of presence in India, Boeing's investments over time, reflect our confidence in the country's potential. Boeing will continue to invest in local manufacturing, co-production, co-development, skill enhancement, and innovation initiatives to support the growth of the overall aerospace, defence and commercial aviation ecosystem.

#### **VAYU:** What is the impact of BIETC's research and development efforts on the future trajectory of both Indian and global aerospace and defence industries?

**SG:** As Boeing's largest engineering centre outside the US, BIETC goes beyond providing engineering support it drives aerospace innovation and talent development, shaping the future of aerospace and defence in India, for India, and the world.

Forefront of cutting edge research and development: BIETC teams are at the forefront of pioneering work, driving advancements in next-generation airplane management, secure communication networks, and the development of innovative technologies, including the integration of AI/ML, IoT, and Cloud Computing solutions. The centre's R&D efforts focus on addressing critical industry needs, such as eco-friendly coatings for sustainability and advanced aircraft health management systems for enhanced operational efficiency. These innovations reflect Boeing's unwavering commitment to tackling the industry's greatest challenges and paving the way for a transformative future in aerospace.

Driving innovation in India, for India, and the world: The 43–acre BIETC campus in Bengaluru is a cornerstone for partnering with India on next generation products and services for the global aerospace and defence industry.

Fostering talent growth through industry-academia partnerships and incubator programmes: Boeing is committed to shaping the future of aerospace in India through partnerships and pioneering incubator programmes that propel talent development and innovation. With enduring collaborations with IISc to form Aerospace Network Research Consortium (ANRC) producing 75+ research papers, STEM education initiatives with RVCA college in Bengaluru, and IIT incubation centres fostering research driven breakthroughs, Boeing is empowering the next generation of engineering and aviation talent from India.

Through transformative initiatives such as the Boeing University Innovation Leadership Development (BUILD) programme, which fosters the growth of India's startup ecosystem, and the Boeing National Aeromodelling Competition, Boeing is cultivating a world class ecosystem to advance global aerospace excellence with strong roots in India.

## Tata Boeing Aerospace delivers 300 AH–64 Apache fuselage, manufactured in India



Tata Boeing Aerospace Limited (TBAL) announced the delivery of the 300th fuselage for the AH-64 Apache attack helicopter from its state-of-the-art facility in Hyderabad. These fuselages are manufactured for customers around the world, including the US Army, including the six on order with the Indian Army. The Indian Air Force operates a fleet of 22 AH-64E Apache attack helicopters. The joint venture between Boeing and Tata Advanced Systems Limited (TASL) employs over 900 engineers and technicians, leveraging cutting edge robotics, automation, and advanced aerospace concepts in its manufacturing processes.

TBAL's 14,000 sqm facility serves as a global sole source supplier for Apache fuselages, with over 90 percent of the parts used in the Apache aerostructure assemblies manufactured in India through more than 100 Micro, Small, and Medium Enterprises (MSME) suppliers.



## Boeing and HPCL partner to advance SAF in India

Boeing and Hindustan Petroleum Corporation Ltd announced a partnership to help advance India's sustainable aviation fuel (SAF) ecosystem and support the Indian Government's environmental goals.

As part of this partnership, Boeing and HPCL will explore opportunities to scale SAF production in India, support the certification of domestically produced SAF, and advocate for policies to develop a robust SAF ecosystem in the country. They will also collaborate to implement sustainability standards and practices across the entire SAF supply chain, explore opportunities for training programmes, and share leading practices with SAF.

"At Boeing, we are dedicated to developing products and solutions to help our customers achieve their sustainability goals. We recognise that SAF is a critical lever for decarbonising the aviation sector and that strategic partnerships within India's aerospace ecosystem are vital to advancing SAF production. We are proud to collaborate with HPCL to drive sustainable aviation efforts in India, for India," stated Salil Gupte, President, Boeing India and South Asia.

In India, HPCL is actively working to commercialise SAF with a strong emphasis on its development and production. At the forefront of this initiative is the HP Green R&D Centre, which has pioneered and patented its proprietary Trijet technology for converting used cooking oil into SAF. Through cutting edge research and innovation, HPCL continues to drive advancements in sustainable energy solutions, playing a pivotal role in the global transition toward a more sustainable aviation industry.

SAF lowers carbon emissions over the fuel's life cycle by up to 84%, depending on the feedstock, and it has the potential to reduce even more in the future. SAF can be made from a wide variety of sources: cover crops and other non-edible plants, agricultural and forestry waste, non-recyclable municipal waste, industrial plant off-gassing and other feedstocks.



## GE Aerospace's role in strengthening India's naval modernisation

India's maritime landscape is undergoing a significant transformation, driven by a strategic focus on enhancing naval capabilities and self-reliance under the "Make in India" initiative. As the nation expands its naval fleet with advanced warships and modern propulsion systems, GE Aerospace is a key partner offering advanced technologies and steadfast support to the Indian Navy.

GE Aerospace is aligned and prepared to support the Indian Navy by providing reliable technology to ensure the success of each ship's mission. Hindustan Aeronautics Limited provides local assembly and testing capabilities. We are working closely with HAL on growing our partnership to serve the Indian Navy with proven technology enhance the indigenous content in line with the Government's policy of 'Make in India'. GE Aerospace has a proven track record of successful achievement of indigenous content programmes.

### Ensure the success of the ship's mission

A warship is a high capital asset with a highly trained crew that performs critical military and operations tasks. The choice of a propulsion gas turbine determines speed, helps to keep the ship at sea with reliable and easy to maintain equipment. GE Aerospace offers a range of marine gas turbines—4.6 to 52.7 MW—enabling naval architects to choose the right engine to meet mission requirements with best–in–class reliability.

GE Aerospace also has decades of experience with aeroderivative marine gas turbines that share architectural commonality with aviation engines, both in mechanical and generator drive applications.

Navies are becoming more attuned to the lifecycle cost of supporting their fleets. The LM2500 family of engines are designed to minimise

maintenance, and when they do need it, they are easy to service. Our turbines allow for in-module repair and module replacement so there is no need for expensive full turbine removals or full gas turbine spare engines. Our engine models (LM500, LM2500, LM2500+G4, LM6000) can power the smallest (corvette) to the largest (aircraft carrier), negating the need for multiple gas turbine models for a fleet, which provides a substantial benefit in commonality in spare parts, logistics, and training.

With eight global service depots for gas turbines, navies have worldwide support whether onshore or at sea, and interoperability benefits with other allied ships. GE Aerospace has delivered gas turbines to more than 630 naval ships serving 39 navies worldwide and currently provides the propulsion for 95% of the United States Navy surface combatant fleet.

#### **GE** Aerospace localisation expertise

GE Aerospace's philosophy is to provide in-country support from initial gas turbine manufacture to commissioning to lifetime maintenance. That's why GE Aerospace Marine Engines & Systems and Hindustan Aeronautics Limited (HAL) have a deep collaboration in India for decades and continue to work together to provide the Indian shipbuilding industry with innovative propulsion solutions.

GE Aerospace Marine Engines & Systems has long been a trusted supplier to the Indian Naval Forces; presently powering the Indigenous Aircraft Carrier with four LM2500 gas turbines and the three Shivalik–class frigates with two LM2500's each. We have delivered LM2500 gas turbines and gas turbine auxiliary equipment that will power the Indian Navy's new Nilgiri–class P17A frigates (seven ships and 14 gas turbines). The first frigate, INS Nilgiri, was commissioned on 15 January 2025.



#### New programmes and technology

We are presently engaged in a number of new propulsion system opportunities with our technology development— to include the next generations of Indian Navy vessels. In 2023, GE Aerospace implemented a first of its kind LM2500 Digital Twin on the INS Vikrant. We worked very closely with Cochin Shipyard and Indian Navy during the implementation phase of the digital twin to ensure its usability.

In August 2024, GE Aerospace received a contract to supply LM2500 gas turbines, composite base and enclosure along with auxiliary equipment for the Indian Navy's Next Generation Missile Vessels (NGMV) built by Cochin Shipyard Limited located in Kochi, India.



Now in wide distribution with US and other international navies, the LM2500 composite enclosure provides significant benefits to ship designers and sailors compared to its steel walled counterpart. While maintaining its full US MIL–S–901D shock rating, it provides 5,500 pound weight savings, and is 60% quieter while having lower wall temperatures (25 to 50 F) and improved heat rejection.

GE Aerospace's LM2500 gas turbine engines are poised to propel the Indian Navy into the future. These contracts further solidify GE Aerospace's strategic cooperation with India focused on cutting edge technology and local expertise. Leveraging a legacy of innovation, the LM2500 family of gas turbine engines' track record of combat readiness and ease of maintenance, as well as its global service network, make it the clear choice for navies around the world.

By Mark Musheno, Executive, VP of Sales and Marketing Marine Engines & Systems, GE Aerospace.

## **GE Aerospace contract with IAF for T700 Engine Sustainment Solution**

Aerospace announced the signing of a five-year Performance **Based Logistics (PBL)** contract with the Indian Air Force provide (IAF) to ล comprehensive sustainment solution for the T700-GE-701D engines powering the IAF's fleet of AH–64E–I Apache helicopters.

Under this contract, GE Aerospace will



be responsible for the Maintenance, Repair, and Overhaul (MRO) of the T700 engines as well as flight line parts to ensure engine availability to the IAF. The PBL solution is designed to streamline engine sustainment operations, improve turnaround times, and enhance the availability and operational readiness of the Apache fleet.

"We are honoured to continue our partnership with the Indian Air Force through this PBL contract, which underscores our commitment to deliver reliable and innovative sustainment solutions for critical defence platforms," stated Youngje Kim, vice president and general manager, Asia Pacific, Defence & Systems for GE Aerospace. "This agreement demonstrates GE Aerospace's focus on supporting the Indian Air Force's operational needs and mission readiness by ensuring the T700 engines are maintained at the highest level of performance."

The T700/CT7 family of turboshaft and turboprop engines powers 15 types of military and civilian helicopters and fixed-wing aircraft with more than 130 customers in over 50 countries. More than 25,000 T700/CT7 engines have been delivered and approximately 130 million total flight hours accumulated. The T700/CT7 design has proven itself in the harshest environments, logging millions of flight hours in hot-harsh combat zones like Iraq and Afghanistan.

## A busy Loekheed Martin stand at Yelahanka



# Javelin JV explores production opportunities in India

The Javelin Joint Venture (JJV) is exploring future co-assembly and co-production opportunities of the Javelin anti-tank weapon system in India through a competitive source selection process with potential Indian partners. In addition, the JJV signed a Memorandum of Understanding (MoU) agreement with Bharat Dynamics Limited (BDL), a Government of India Enterprise with vast experience in weapon production and system integration.

"We look forward to exploring partnership opportunities to co-produce Javelin in India and better support its defence and security needs," stated Dave Pantano, Javelin Joint Venture vice president and Lockheed Martin Javelin programme director. "In recent months, we have met with potential Indian partners to discuss a competitive source selection process with the goal of developing strategic long-term partnerships that will help the Indian Ministry of Defence deter and defend against potential threats."

The renewal of the MoU with BDL will allow the JJV to evaluate the possibility of manufacturing Javelin in India, fulfilling potential future requirements of the Indian Ministry of Defence and strengthening its antitank capabilities. "Together with industry partners in India, we are exploring opportunities to leverage in-country expertise for Javelin," stated Andy Amaro, president of the Javelin Joint Venture and Raytheon's Javelin programme director. "As demand continues to grow for Javelin, these agreements will help support local industry, while providing India the most effective, combat-proven anti-armour weapon system in the world."

Javelin is developed and produced by the JJV between Raytheon 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. Javelin has been procured by 25 countries around the globe.



## RTX (Collins Aerospace, Pratt & Whitney and Raytheon) at Aero India 2025



R<sup>TX's</sup> three business units – Collins Aerospace, Pratt & Whitney and Raytheon – have partnered with India for over seven decades across commercial, defence, regional, and general aviation sectors. With nearly 7,000 employees and one of the largest sourcing of services and components from India, RTX is one of the largest multinational aerospace and defence OEMs in India.

RTX has produced a wide range of propulsion systems and products for global warfighters and aircraft programmes for decades, including systems for the latest 6th Gen aircraft in development. RTX products and solutions are found on the Indian Air Force, Indian Navy and Indian Army's most modern platforms.

As India embarks on its next phase of modernisation and indigenisation, RTX's advanced products and solutions will provide the technological edge and mission-readiness required for the Indian Armed Forces' various nextgeneration programmes, such as the Advanced Medium Combat Aircraft (AMCA), the Indian Multi Role Helicopter (IMRH) and the Medium Transport Aircraft (MTA). These include propulsion (with the F100 and V2500), power systems, avionics, aerostructures, systems, and more – across Collins Aerospace, Pratt & Whitney and Raytheon.



## Safran Aircraft Engines and HAL contract for LEAP engine

AL signed a long term contract with Safran Aircraft Engines (SAE) for supply of turbine forged parts for their LEAP engines during Aero India 2025. An MoU was signed between the two companies in October 2023, to develop industrial cooperation with commercial engine parts manufacturing, as part of the Indian Government's "Make in India" policy. This is the first contract as part of this industrial co-operation. Under the terms of this contract, HAL will produce forged parts for LEAP engine at its state-of-the-art Ring Rolling facility at Foundry & Forge Division in Bengaluru, supporting LEAP programme's ramp-up for global airline requirements.

"We are very enthusiastic about continuing this partnership with HAL," stated Dominique Dupuy, Safran Aircraft Engines' Purchasing VP. "We are perfectly in line with the objectives set out in our 2023 agreement for the production of forged parts".

India is CFM's third largest market in terms of the number of engines in service, with 75% of the Indian commercial fleet equipped with CFM engines. Today, of the 500 aircraft operated by 7 Indian airlines with CFM engines, over 370 are LEAP powered, and over 2,000 engines on order are for Indian airlines. Safran Aircraft Engines is strengthening its foot print in India with five production units and the sixth unit dedicated to LEAP engine maintenance is planned at Hyderabad.



## Safran selects TEAL for LEAP turbine parts

t the Aero India trade show in Bengaluru (India), Safran Aircraft Engines and Titan Engineering and Automation Limited (TEAL), a major player in the Indian aerospace industry based in Bengaluru, signed a contract for the production of parts for the LEAP engine's low-pressure turbine. This first partnership between the two companies leverages TEAL's technological expertise and will enhance production capabilities for the LEAP in India. Production of the first parts will start in 2026.



This contract is part of the "Make in India" policy promoted by the Indian government to support the country's aerospace growth. In this context, Safran Aircraft Engines is developing a complete industrial ecosystem in India, backed by major Indian partners to support the ramp-up of LEAP production, as well as the M88 engine powering the Rafale.

"We are delighted by this new partnership with TEAL, which marks an important step in our development in India and the setting up of local supply chains," stated Dominique Dupuy, Purchasing VP at Safran Aircraft Engines. "We look forward to working closely with TEAL, a major partner of our supply chain in India."

Safran Aircraft Engines is thus strengthening its footprint in India, a key market where the company already has five production sites in Hyderabad, Bangalore and Goa. A sixth site, dedicated to LEAP engine maintenance, repair and overhaul (MRO) activities, will open in Hyderabad in 2025.

# Safran and BEL forge partnership in defence sector

Bharat Electronics Limited (BEL) and Safran Electronics & Defense, France, announced the signing of a partnership to create a joint venture for the manufacturing, customisation, sale and maintenance of HAMMER (Highly Agile Modular Munition Extended Range) Smart Precision Guided Air-to-Ground Weapon in India.

As part of this partnership, BEL and Safran Electronics & Defense also plan to establish a Center of Excellence aimed at enhancing India's defence capabilities. HAMMER is a combat proven, precision guided weapon system known for its high accuracy and modular design, making it adaptable for multiple platforms, including the Rafale and LCA.





## DRDO conducts high-altitude trials of ILSS for Tejas

The Defence Bio-Engineering & Electro Medical Laboratory (DEBEL), a Bengaluru based lab under the Defence Research and Development Organisation (DRDO), successfully conducted high altitude trials of the Indigenous On-Board Oxygen Generating System (OBOGS) based Integrated Life Support System (ILSS) for the LCA Tejas aircraft.

The OBOGS-based ILSS is a cutting edge system designed to generate and regulate breathable oxygen for pilots during flight, eliminating dependence on traditional liquid oxygen cylinder based systems. The ILSS underwent rigorous testing on the LCA Prototype Vehicle-3 aircraft of Hindustan Aeronautics Limited (HAL)/Aeronautical Development Agency (ADA), meeting stringent aeromedical standards in varied flight conditions, including altitudes of up to 50,000 feet Above Mean Sea Level and high-G maneuvers.

Performance evaluations covered critical aspects such as oxygen concentration, demand breathing, availability of 100% oxygen, aerobatic maneuvers at required altitudes for full functional testing of Anti – G Valve, Breathing Oxygen System (BOS) ON during taxying, Take off, Cruise, G turns and rejoin approach & landing. Following flight clearance from Centre for Military Airworthiness & Certification (CEMILAC), the system successfully met all specified parameters. Beyond OBOGS, the ILSS integrates 10 Line Replaceable Units, including the Low-Pressure Breathing Regulator, BOS, Emergency Oxygen System, Oxygen Sensor, Anti-G valve, and other advanced components.

The system has been manufactured by L&T as a Development cum Production Partner, reflecting a significant collaboration between DRDO and Indian defence industries. Notably, the ILSS has 90% indigenous content, furthering India's selfreliance in aerospace technology. With appropriate modifications, the system can also be adapted for use in MiG-29K and other aircraft. This milestone has been achieved through the collaborative efforts of DEBEL, ADA, HAL, CEMILAC, National Flight Test Centre, Directorate General of Aeronautical Quality Assurance and Indian Air Force.

## Safran over the years at Aero India







SSAFRAN

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## **MBDA at Aero India 2025** "Missile Systems that Support Indian sovereignty"



BDA showcased at Aero India 2025 the advanced missiles that support the Indian Armed Forces in their mission to protect Indian sovereignty. At the centrepiece of the company's presence this year in Bangalore, were weapon systems that arm the Indian Air Force's latest Dassault Rafale combat aircraft. These

highly potent set of weapons from MBDA give the IAF an air combat capability that is unrivalled by any of India's neighbours. The most famous of these weapons is the Meteor beyond visual range air-to-air missile, which is widely recognised as a game changer for air combat. The Meteor is powered by a unique rocket-ramjet motor that gives Meteor far more engine power, for much longer than any other missile. This means it can fly faster, fly longer, and manoeuvre more than any other missile – giving Meteor the ability to chase down and destroy agile hostile fighters at even the furthers of ranges. As a result, Meteor has a no-escape zone many times greater than any

has a no-escape zone many times greater than any other air-to-air missile.

India's Rafales are also equipped with the Scalp deep strike cruise missile from MBDA to strike hardened and protected targets deep inside hostile territory. The IAF's Rafales are also equipped with MICA, a potent air combat missile the Indian Air Force knows very well as it is also part of the upgrade package for the IAF's Mirage 2000 aircraft. MBDA is also proposing all these potent weapons, as well as the famous Exocet AM39 air launched anti-ship missile for the Rafale M for the new Indian aircraft carrier.

MBDA has been delivering battle winning capabilities to the Indian Air Force and collaborating with Indian industry for over 50 years. Today L&T MBDA Missile Systems Ltd, MBDA's joint venture with Larsen & Toubro, was exhibiting at Aero India 2025 where it showcased the work it performs in Coimbatore delivering Make in India projects in support of Atmanirbhar Bharat for the Indian Air Force. LTMMSL is working to propose new Make in India projects to support the needs of both the Indian Navy, with short range surface to air missile systems, and the Indian Army with latest generation anti-tank missiles (ATGM5).

Throughout MBDA's history of partnership with India, there have been two

guiding principles: to provide the very best technologies to the Indian Armed Forces, and to work in true partnership in support of the Indian Defence Industry. The company then is fully committed to the 'Make in India' programme, which aligns with MBDA's long term strategy.



Other examples of technological edge equipping the Indian Air Force include the ASRAAM within visual range air combat missiles. ASRAAM is providing the IAF's Jaguar fleet with a step-change in air combat performance – a capability that will soon also enhance the IAF's new Tejas LCA Mk1A. Meanwhile the MBDA Mistral ATAM system has been successfully integrated on the Advanced Light Helicopter (ALH) and Light Combat Helicopter (LCH).

MBDA has an excellent track record providing both operational and industrial capabilities in partnership with the Indian Air Force and Indian Defence Industry. The strength of these two pillars make it a long term true partnership, and one that should only continue to get stronger.

#### Text courtesy: MBDA Photos: Vayu

## Thales presents advanced defence and aerospace innovations at Aero India 2025 Reinforcing its 'Make in India' commitment

Thales showcased its cutting-edge technologies across the defence and aerospace sectors at the 15th edition of Aero India 2025, India's flagship air show, highlighting the Group's commitment to 'Make in India for India and for the world', aligned with the Aatmanirbhar Bharat vision.

Thales offers a comprehensive array of capabilities and services designed to support the Indian armed forces in attaining operational excellence. At Aero India 2025, Thales showcased its latest capabilities– across air, land and naval defence as well as space, cyber and digital – that are tailored for modern and future needs of the forces.

Thales provides state-of-the-art equipment on board fighter aircraft, including the RBE2 AESA radar, the Spectra electronic warfare suite, optronics, the communication, navigation and identification suite (CNI), key cockpit display systems and a logistics support component. The Thales stand at Aero India 2025 had a dedicated section on these capabilities.

Thales also highlighted its combat-proven airborne optronics, including TALIOS (Targeting Long-range Identification Optronic System) pod, the 2-in-1 system that delivers unmatched image quality, and the InfraRed Search and Track (IRST) system. Also on display was Thales's air defence solutions such as the Lightweight Multi-role Missile (LMM), the STARStreak missile and ForceShield, alongside air surveillance capabilities such as the GM 200 MM/A radar and the SkyView air command and control system.

For the first time in India, Thales showcased its innovation in avionics through the FlytX suite



for helicopters, in advanced aeronautics navigation systems such as TopAxyz, TopShield and TopStar M. Connectivity solutions such as SYNAPS-A, the airborne member of the SYNAPS software defined radio family designed to support battlespace digitisation, Modem 21 Air Compact, and the NextW@ve TRA 6030 radio, was also at Aero India this year.

As a leader in the fast-growing market of Unmanned Aircraft Systems (UAS), Thales provided an overview of its portfolio of drone solutions, including its EagleShield



drone countermeasures (an integrated nano, micro, mini and small drone countermeasures solution to protect and secure civil and military sites): the PARADE that provides system 360° protection of people, properties and activities, optimised for micro and mini UAS, ranging from 100g to 25kg; and Gamekeeper (a holographic radar that allows detection, tracking and classification unlimited of targets



simultaneously including micro and mini drones), in addition to its safe and efficient UTM (Unmanned Traffic Management) system for cooperative and noncooperative drones, being unveiled for the first time in India.

Thales also presented its LGR 68 and LGR 70 Laser Guided Rockets that come with laser guidance precision, are jamming proof and are extremely precise for guiding ammunition to target.

As part of its underwater solutions for efficient Maritime Security Operations, Thales featured its Sonoflash sonobuoy, an anti–submarine warfare system that allows the detection, classification and localisation of submarines. It also showcased the AirMaster C radar, the latest addition to its Air Master range of airborne surveillance radars, that is highly adaptable and can be integrated into both manned and unmanned airborne platforms.

### "Thales presents AI systems we can trust at Aero India 2025"

Thales is a major AI player in these complex environments. The company is Europe's top patent applicant in the field and devotes a lot of effort to research on AI, both in-house and through academic and industry partnerships. The Group, a major player in trusted AI, provides armed forces with greater efficiency in data analysis and decision making, while taking into account the specific constraints, such as cybersecurity,

ALE

embeddability and frugality, associated with critical environments.

#### Expanding its team in India – hiring at Aero India 2025

Thales is expanding its team in India and seeking engineers in hardware, software and systems for its engineering in Bengaluru and Noida. Thales HR executives present during the public days of the show on 13 and 14 February 2025 to meet engineers and share various possible career opportunities available.

"As India progresses towards its Aatmanirbhar Bharat vision, Thales is proud to be a trusted partner in the nation's ambitious journey. We remain committed to 'Make in India' and are advancing our roadmap by strengthening our local teams, collaborations and bringing advanced defence and aerospace technologies to the country. We look forward to continue equipping the Indian armed forces with the next generation of innovative and effective solutions to support their strategic defence ambitions. Aero India 2025 will serve as a key platform for us to present our flagship capabilities and engage with the authorities, forces and our industry partners." stated Pascale Sourisse, President & CEO, Thales International.

Thales is a global leader in advanced technologies specialised in three business domains: Defence, Aerospace and Cyber & Digital. It develops products and solutions that help make the world safer, greener and more inclusive. The Group invests close to Euro 4 billion a year in Research & Development, particularly in key innovation areas such as AI, cybersecurity, quantum technologies, cloud technologies and 6G. Thales has close to 81,000 employees in 68 countries. In 2023, the Group generated sales of Euro 18.4bn.

Present in India since 1953, Thales is headquartered in Noida and has other operational offices and sites spread across Delhi, Bengaluru and Mumbai, among others. Over 2200 employees are working with Thales and its joint ventures in India. Since the beginning,

> Thales has been playing an essential role in India's growth story by sharing its technologies and expertise in Defence, Aerospace and Cybersecurity & Digital Identity markets. Thales has two engineering competence centres in India - one in Noida focused on Cybersecurity & Digital Identity business, while the one in Bengaluru focuses on hardware, software and systems engineering capabilities for both the civil and defence sectors, serving global needs. 🔫

**Courtesy: Thales** 



Building a future we can

## **Cyient DLM in manufacturing award from Thales**

yient DLM, an integrated partner for design-led manufacturing, has been awardedastrategicavionicsmanufacturing programme by Thales. Under this collaboration, Cyient DLM will manufacture high reliability Printed Circuit Board Assemblies (PCBAs) for Thales's next generation flight avionics systems, further strengthening its position as "a trusted manufacturing partner in the global Aerospace and Defence ecosystem". These mission critical PCBAs will be deployed in leading commercial aircraft platforms.

Deepak Talwar, Vice–President Group Procurement – Engineering, and India, Middle East and Africa, Thales, stated, "At Thales, we are committed to advancing the 'Make in India' vision, and in that spirit, we are proud to foster

deeper ties with our trusted local partners. Cyient DLM has demonstrated strong technical capabilities and competitive edge over the years for various Thales's solutions. We are pleased to have them onboard to also manufacture high reliability PCBAs for our next gen flight avionics systems."



Kaushal Jadia, CTO, Cyient DLM and Deepak Talwar, Vice–President Group Procurement – Engineering, and India, Middle East and Africa, Thales with their representatives during the signing of contract.

## BEL delivers 7,000th transmit/receive module to Thales for Rafale RBE2 radar

'n line with the Make in India policy, Bharat Electronics Ltd (BEL) has manufactured the 7,000th T/R (transmit/receive) module for the RBE2 radar on-board the Dassault Aviation Rafale, and delivered it to Thales. Thales is demonstrating its commitment to the Make in India policy through transfers of technology and production. This transfer has been growing since it was initiated in 2017 and has expanded both in scope and quantities. In November 2020, the first RBE2 AESA (active electronic scanning array) radar with a front end manufactured by BEL in India was delivered by Thales to Dassault Aviation. Four years later, BEL announced that the 7,000th transmit/receive module had been produced and delivered to Thales. This Thales-BEL cooperation has been expanded with the start-of-the production of advanced technological microwave modules dedicated to the Rafale SPECTRA EW (Electronic Warfare) suite.

Specifically developed for Rafale, the RBE2 is the first in-service European AESA radar and has been combat proven on Rafale aircraft operated by the French Air Force and the French Navy. It was developed in close partnership with Dassault Aviation and the French Defence Procurement Agency (DGA) to meet the requirements of air forces, and uses innovative technologies to combine advanced fire control radar functions and target tracking capabilities. The T/R (transmit/receive) modules are key to the RBE2 radar's active electronic scanning performance, enabling it to steer the radar beam with the speed of an electronic chip.



## **Dassault Aviation at Aero India**



fter rounding off a great 2024, Dassault Aviation were present at Yelahanka in a big way with a nice stand and displays.

Post event, Mr. Eric Trappier, the Board of Directors stated, "Driven by the commercial success of the Rafale, particularly the 30 Export Rafale ordered in 2024, Dassault Aviation's backlog continues to grow. It stood at a new record of EUR 43.2 billion as of 31 December 2024, consisting of 299 aircraft (164 Export Rafale, 56 Rafale France and 79 Falcon). A total of 507 Rafale have been ordered since the beginning of the programme- 273 Export Rafale and 234 Rafale France. Net sales in 2024 amounted to EUR 6.2 billion, versus guidance in the range of EUR 6 billion. 21 Rafale (14 France and 7 Export) and 31 Falcon aircraft were delivered. Adjusted operating income amounted to EUR 519 million, i.e. an operating margin of 8.3%. The record adjusted net income stood at EUR 1.1 billion, i.e. a net margin of 17.0%".







## UK–India defence agreements boost 'Atmanirbhar Bharat' ambition



The UK-India strategic partnership took another major step forward with the formal launch of Defence Partnership-India (DP-I) and the signing of several defence agreements at Aero India 2025. Announcing DP-I, UK Defence Minister Lord Vernon Coaker opened the UK-India Defence Partnership Pavilion, establishing a dedicated programme office within the UK's Ministry of Defence that will serve as a one-stop shop for strengthening bilateral defence collaboration between the two countries.

The UK and India have agreed to expand their collaboration on next-generation weapons with Thales and Bharat Dynamics Limited (BDL). Thales and BDL have signed a contract that will deliver Laser Beam Riding MANPADs (LBRM), with an initial supply of High Velocity Missiles (STARStreak) and launchers to be delivered this year. This contract represents an important next step for UK-Indian defence cooperation in the critical area of air defence. Following the signing of this initial LBRM contract, both Thales and BDL will further collaborate to produce Lightweight Multirole Missiles (LMM). This develops and expands the partnership between Indian and British industry, laying the foundation for BDL and Indian industry to form an integral part of Thales' global supply chain. It will address mutual security concerns, create jobs in both countries and enable interoperability by both armies.







In a separate development, MBDA UK and BDL have been working together on the installation of a first of its kind Advanced Short-Range Air to Air Missile (ASRAAM) assembly and test facility in Hyderabad, arming current fleet of India's fighter jets as well as exporting to the world. On the maritime front, the UK and India have signed a Statement of Intent to design and develop an Integrated Full Electric Propulsion (IFEP) system for India's next generation Landing Platform Dock (LPD) fleet. As next steps, GE Vernova and BHEL are working to develop India's first maritime Land Based Testing Facility to deliver LPD in the water by 2030.



ERO INDIA REVIEW

## Rolls–Royce bullish on India, accelerates progress and partnerships at Aero India 2025

A t Aero India 2025, Rolls–Royce highlighted its strategic partnerships and capabilities in India that align with the country's vision of defence indigenisation and modernisation.

Reiterating its commitment to serving the needs of the market with cutting edge solutions and co-development opportunities, Alex Zino, Executive Vice President Business Development and Future Programmes (Defence), Rolls-Royce, stated, "Rolls-Royce has proudly built a strong ecosystem of people, products and partnerships in India over several decades. We are committed to participate in opportunities that will help build national security, energy and economic resilience in line with the vision of a Viksit Bharat in the future. We look forward to collaboratively build technology and capability for critical combat technologies to accelerate self-reliance across defence domains. Our plans to double our supply chain in India will further strengthen capabilities in-country to support our collaborative programmes."

Rolls–Royce announced that it intends to double its supply chain souring from India by 2030, in line with the Raksha Mantri's call for greater global supply chain integration with India, during his recent visit to the UK to strengthen ties between the two nations.

GS Selwyn, Managing Director of MTU India, Rolls– Royce's Power Systems business, added: "Aero India is a great platform for us to meet with and familiarise defence customers with our portfolio of advanced technology offerings for safety–critical applications across domains of air, land and sea. Our Power Systems business has been supporting the mission–readiness of the Indian Navy, Coast Guard and the Indian Army with advanced power solutions, and we remain committed to building on this partnership. Together with our partners in India, we hope to accelerate localisation and production of higher power range governmental marine propulsion engines and land defence platforms, supporting the

vision of greater selfreliance in defence."

Abhishek Singh, Senior Vice President of Business Development and Future Programmes for India and Southeast Rolls-Royce Asia. (Defence) stated. "We are progressing significantly in our partnerships, supply chain integration, and engineering capabilities in India. Our proposal for combat engine codevelopment is not just about technology transfer; it's about

co-developing end-to-end capabilities that allows India to build and own IP for advanced combat engine technologies, enabling future upgrades, exports and indigenous development. This will boost India's future technology development and add thrust to its vision of being a self-reliant defence powerhouse."

Rolls–Royce has a longstanding association with the Indian Armed Forces with over 1400 engines powering Indian Military aircraft, the Indian Army's Arjun Main Battle Tank and numerous vessels of the Indian Navy and Coast Guard.



L-R) Abhishek Singh, Senior Vice President of Business Development and Future Programmes for India and Southeast Asia, Rolls-Royce (Defence), Alex Zino, Executive Vice President – Business Development and Future Programmes (Defence), Rolls-Royce and GS Selwyn, Managing Director of MTU India, Rolls-Royce's Power Systems business at Aero India 2025.





### Rolls-Royce and Triveni Engineering in MoU for 4MW marine gas turbine generators

Rolls-Royce Marine North America Inc and Triveni Engineering and Industries Limited have signed a Memorandum of Understanding (MoU) to explore opportunities to collaborate on programmes for 4MW marine gas turbine generators (GTG) for customers in India. This would include several key areas including design, development and manufacturing of the marine GTGs, as well as comprehensive sales and support activities.

Abhishek Singh, SVP of Business Development and Future Programmes for India and Southeast Asia, Rolls-Royce, stated, "This MoU with Triveni is part of our efforts to bring the combined strengths of our naval marine products and services to the customer here. This is significant, given the potential to establish end-to-end support for our marine gas turbine generator in India, from installation and testing to after-market support. Rolls-Royce has proudly supported India's defence forces for several decades, and over the years, we have continued to build strategic partnerships in-country to enable the localisation and production of our products."

With over 80 years of experience in naval markets, Rolls–Royce is a leading provider of power and propulsion solutions on major global programmes. In India, Rolls–Royce is well–positioned with a strong ecosystem for aerospace and defence, and its mtu engines power several vessels of the Indian Navy and Coast Guard.

## Rolls-Royce intends to double its sourcing in India by 2030

Rolls-Royce is reinforcing its commitment to India, signalling its intent to double its supply chain sourcing from the country over the next five years. As a strong proponent of the 'Make in India' programme, Rolls-Royce sources a wide range of high-precision parts and engine components for its Civil Aerospace, Defence and Power Systems businesses from numerous Indian partners, and has long-term plans to grow India's participation in its global supply chain.

With plans to grow its presence and participation in India's defence sector, Rolls–Royce will now seek to increase its sourcing of complex parts for advanced aerospace engines, naval propulsion systems, diesel engines and gas turbine engines. This strategic move also aligns with Indian Defence Minister Mr. Rajnath Singh's call for greater integration of Indian companies into global supply chains (during his recent visit to the United Kingdom).

Following a legacy of successful technology transfer for licensed production of various engines in the defence domain, Rolls-Royce has established an ecosystem of strategic partnerships, skilled talent, engineering and digital capabilities, service delivery, supply chain and manufacturing in India.

The company has strong joint ventures with Hindustan Aeronautics Limited and Force Motors, as well as long-standing relationships with Tata, Bharat



Forge, Godrej & Boyce and others, for manufacturing and sourcing complex parts for its businesses.

More than 2000 high-skilled engineers work in-house and through outsourced agreements, contributing to global development programmes. Today, Rolls-Royce is well-positioned to pursue growth opportunities across all the sectors in which it operates.

# NewSpace doing a stellar job as always!



Sameer Joshi, CEO & Director, NewSpace













## **Rafael's focus at Aero India 2025**

A sRafaelcommemorates nearly 30 years of collaboration in India, we reflect on a journey marked by shared success and deep rooted partnerships. Over the decades, we have delivered advanced, combat proven systems that continue to serve India's defence forces, a testament to the resilience and reliability of our solutions.

Our enduring commitment to India is more than just operational—it's strategic. Since 2014, Rafael has fully embraced the Make in India initiative. Through our subsidiaries, Kalyani Rafael Advanced Systems (KRAS)





modernisation and growth of India's defence industry inspire confidence, and we at Rafael are proud to stand alongside our partners on this remarkable journey.

We are deeply grateful for the trust and collaboration we have shared over the years. As we continue to innovate and grow together, Rafael remains committed to strengthening its partnerships with the Government of India, the Ministry of Defence, and our esteemed local partners.

Here's to many more years of shared success and innovation!

and Astra Rafael Comsys (ARC), we have heavily invested in local manufacturing, technology transfer and knowledge sharing. This collaboration not only is designed to enhance India's defence capabilities but also contributes significantly to its economic growth and self-reliance.

At Aero India 2025, Rafael showcased its latest advancements in air defence, precision guided solutions and electronic warfare. Our focus remains on innovation, driven by substantial R&D investments to provide cutting edge technologies that secure critical assets while fostering local Indian partnerships.

Looking ahead, we envision India becoming

a global hub for defence exports, a transformation supported by robust ecosystems we help create. The



Text courtesy: Rafael Images: Vayu

## **Israel Aerospace Industries at Aero India 2025**



AI showcased its latest advancements in defence technology, demonstrating its commitment to India as a strategic partner and a key market in the defence sector. The company's presence at the exhibition highlighted its nearly 40 years of collaboration with India and its dedication to strengthening defence cooperation between the two nations.

Over the past year, IAI has made several additional investments in the Indian market, including with its subsidiary AeroSpace Services India (ASI); its partnership with IIT Delhi, demonstrating its commitment to the next generation in India; the launch of its NeuSPHERE Innovation Acceleration Programme, enabling collaboration with Indian deep-tech startups and most recently; and the opening of its new HELA Systems facility in Hyderabad, enhancing localised Maintenance, Repair, and Overhaul (MRO) capabilities for advanced radar systems and reducing turnaround times for India's defence forces.

### At Aero India 2025, IAI exhibited a diverse portfolio of solutions:

- OptSAR 550–A dual–payload electro–optical and synthetic aperture radar (EO/SAR) tactical observation system designed for real–time intelligence and reconnaissance missions.
- MCS–A cost–effective digital communication satellite offering robust and secure connectivity for military and government operations.
- Heron TP-A multi-role, medium-altitude longendurance (MALE) remotely piloted aerial system (RPAS) providing superior intelligence, surveillance, and reconnaissance (ISR) capabilities.
  - B767 FRA-A strategic flight refueller aircraft

capable of extending the operational range of combat aircraft and enhancing air superiority.

- APUS–A long–endurance quadcopter designed for persistent surveillance, border security, and tactical reconnaissance missions.
- MRSAM-An integrated air and missile defense system providing advanced protection against aerial threats, including missiles, aircraft and UAVs.
- Oron Aircraft (ELI-3150)-A multi-mission airborne reconnaissance and surveillance system designed for persistent intelligence gathering and situational awareness.
- Eitam Aircraft (ELW–2085)–A conformal airborne early warning and control (AEW&C) system equipped with state–of–the–art radar and battle management capabilities.



## **HENSOLDT** at **Yelahanka**

"As India advances its Make in India and Atmanirbhar Bharat initiatives, HENSOLDT is committed to being a trusted technology partner in shaping the future of Indian aerospace and defence. The company's expertise in radar, electronic warfare, electro-optics and situational awareness solutions aligns with India's vision for selfreliance. It will bring cutting-edge airborne sensor technologies to support the Indian military. Aero India 2025 provides an excellent platform for HENSOLDT to reaffirm its dedication to India's defence modernisation, forging deeper partnerships with the Indian Armed Forces and the defence industry", stated company officials.

HENSOLDT showcased next-generation airborne sensor solutions tailored for India's defence forces, including: Advanced AESA Radar & ISR Systems Enabling superior airborne surveillance, early warning, and target tracking for fighter aircraft, UAVs and airborne early warning platforms; Electronic Warfare and Self-Protection Systems - Enhancing the survivability of combat aircraft with missile warning systems, radar warning receivers and electronic countermeasures; Electro-Optical & Infrared (EO/ IR) Solutions - Providing long-range target detection, tracking and intelligence gathering for aerial platforms and finally AI-Powered Data Fusion and Multi-Sensor Integration – Strengthening real-time threat analysis, mission planning and battlefield awareness for the Indian Armed Forces. 🚤

HENSOLDT is not just supplying technology to India; it is committed to developing localised solutions, transferring critical technologies and fostering strategic industrial partnerships to drive India's defence self-sufficiency. As a trusted partner of the German government, HENSOLDT is at the forefront of expanding Indo-German defence ties. Germany's growing engagement in the Indo-Pacific, coupled with India's increasing demand for advanced defence electronics, presents a unique opportunity to deepen technology collaboration and operational cooperation.



# Rafael and L&T sign MoU to offer TROPHY

Rafael Advanced Defense Systems Ltd (Rafael) and Larsen & Toubro (L&T) announced the signing of a Memorandum of Understanding (MoU), during Aero India 2025, aimed at offering of TROPHY Active Protection System (APS) indigenously. TROPHY is a critical battlefield technology featuring Counter Unmanned Aerial Systems capabilities and defences that enable protection of an entire platform and soldiers. Through this cooperation TROPHY APS shall be offered as a unique solution that can be integrated on India's defence platforms.

This collaboration is in line with the Government of India's initiative to forge international collaborations to fast track the indigenisation process for critical and emerging technologies and, aligns with 'Aatmanirbhar Bharat' and 'Make in India, Make for the World' vision.

Yoav Tourgeman, CEO of Rafael Advanced

Defence Systems, emphasised the significance of this collaboration: "The partnership between Rafael and L&T for TROPHY APS is a major milestone for both the companies. It will not only enhance the operational capabilities of the Indian Armed Forces but also our commitment to India's defence manufacturing ecosystem and the nation's operational readiness. Together, Rafael and L&T, will contribute to the strengthening of India's defence capabilities through world-class technologies."

Rafael Advanced Defense Systems Ltd designs, develops, manufactures and supplies a wide range of cutting edge defence solutions for air, land, sea, space and cyber domains. As Israel's national research and development centre for defence technologies, Rafael is a global leader in areas such as air and missile defence, active protection, AI-based battlefield systems, precision weaponry and advanced electronic warfare.

## WB Electronics India Pvt Ltd showcases cutting edge technology

B Electronics India Pvt Ltd, a joint venture with the WB Group of Poland, a leader in defence electronics and communications, was a participant as an exhibitor at Aero India 2025, Bangalore.

"WB Group reaffirms its commitment to Prime Minister Mr. Narendra Modi's vision of Atmanirbhar Bharat and the Make in India initiative. As part of this mission, WB India is making significant investments in the Uttar Pradesh Industrial Defence Corridor. The company is also exploring strategic acquisitions to bring battle proven technologies to India



while developing innovative solutions tailored to local conditions", stated WB India CEO Ashish Sharma.



At Yelahanka, WB Electronics India unveiled a range of innovative and battle proven technologies "that redefine modern defence capabilities" like the Warmate Loitering Munition, Warmate Tube Launched Version, FlyEye Mini ISR UAV and XFronter Personal Unmanned Aerial System.

The WB Group is Poland's largest privately held defence company and a global leader in advanced defence electronics and communication systems. Known for its commitment to innovation, the group continues to deliver cutting edge solutions to meet the evolving needs of modern armed forces.

### **WB Group and L&T forge strategic partnership**

B Electronics India and Larsen & Toubro (L&T) signed a Memorandum of Understanding (MoU) at Aero India 2025 marking a significant step in their collaboration to develop cutting edge autonomy solutions for unmanned aerial systems (UAS).

L&T, known for its expertise in providing indigenous defence and aerospace solutions, has made significant strides in the development of Unmanned Aerial Systems (UAS) and advanced technologies such as "Decentralised Collaborative Autonomy". The partnership aims to combine the strengths of both organisations to deliver customised, indigenous collaborative autonomous solutions that meet the evolving needs of the Indian Armed Forces. By integrating advanced technologies, the collaboration will focus on enhancing operational capabilities and reinforcing India's pursuit of self– reliance in defence technology.

Commenting on the partnership, Mr. Ashish Sharma, CEO of WB Electronics India, stated, "At WB Electronics India, we take immense pride in the innovative technologies we bring to India's defense sector. We are excited to partner with Larsen & Toubro, a recognised leader in defence engineering solutions, to deliver tailored, indigenous systems that will significantly augment the capabilities of the Indian Armed Forces."



# Samtel's indigenous defence avionics and military displays



Samtel Avionics (SA), a key player in India's defence technology sector and part of the 50 year old Samtel Group, showcased its indigenous manufacturing capabilities at Aero India 2025. With a strong legacy of supporting India's self-reliance goals, Samtel Avionics has been at the forefront of developing high tech rugged military systems, aligning with the Government of India's Atmanirbhar Bharat and Make in India initiatives.

For over 15 years, Samtel Avionics has played a critical role in the evolution of India's defence avionics landscape. The company has collaborated extensively with Hindustan Aeronautics Limited (HAL), Bharat Electronics Limited (BEL), Indian Air Force (IAF), and Defence Research and Development Organisation (DRDO) to develop indigenous displays electronics. and military Samtel's proprietary Ruggedisation technology, developed under the guidance of DRDO, has enabled the design, development and manufacturing of advanced multifunction displays for platforms such as the Su-30MKI, Light Combat Helicopter (LCH), Advanced Light Helicopter (ALH) and HTT-40 trainer aircraft.

Further strengthening India's defence manufacturing ecosystem, Samtel Avionics, through its joint venture with

HAL, has successfully contributed to the indigenisation journey of the Indian Armed Forces. Products manufactured by the JV are already operational and proving their capabilities in active service.

Simultaneously, the company has been forging strong partnerships with global aerospace and defence companies to establish India as a leader in high-tech design and manufacturing under the Make in India vision.

### SAMTEL and HENSOLDT in MOU

AMTEL Avionics and HENSOLDT Avionics signed an MoU to explore possibilities of establishing a coproduction facility in India through an industrial partnership for the HENSOLDT's products – LCR 100, Cavi Sight and Cavi Connect. Commenting on the collaboration, Mr. Puneet Kaura, MD and CEO, SAMTEL Avionics stated, "We are elated to announce this partnership with HENSOLDT Avionics. We look forward to a long-term relationship in the field of innovative avionics solutions which are specifically designed to improve the efficiency and safety of aerial operations."





## Embraer at Aero India with KC–390 Millennium

Beginning its showcased its KC-390 Millennium tactical air transport aircraft and solutions spanning its defence portfolio at the Aero India 2025 at Bengaluru. "Embraer is excited to be back at Aero India as we showcase the KC-390 Millennium and our broad portfolio of defence and security solutions to the industry," stated Bosco da Costa Junior, President & CEO, Embraer Defense & Security. "It is an aircraft that is growing its global operator base and impressing the industry with its modern capabilities and reflects the versatility and reliability that our aircraft are known for. The Embraer team and its partners are at Aero India in full force, in support of India's aviation and defence aims".

Embraer has more than 40 aircraft and 11 aircraft types operating in India across defence, commercial aviation and executive jets, reflecting the diversity of Embraer's portfolio in the country. This includes the Legacy 600

aircraft used for the transportation of government officials and VIPs by the Indian Air Force (IAF) and



Border Security Force (BSF) and the 'Netra' AEW&C aircraft based on the Embraer ERJ145 platform operated by the IAF. Star Air, one of the largest regional airlines in the country is an all-Embraer aircraft operator with a fleet of E175 and ERJ145 aircraft.

## **Dynamatic Technologies and Deutsche Aircraft Collaborate at Aero India 2025**

ynamatic Technologies Limited has partnered with Deutsche Aircraft, a regional aircraft OEM, at Aero India 2025. Dynamatic hosted the Deutsche Aircraft team at chalet number 40, marking a significant step in the aviation sector and supporting the "Make in India" initiative.

As India evolves into a major hub for regional aviation, Deutsche Aircraft is advancing its D328eco, a 40-seat turboprop aircraft designed to enhance connectivity, sustainability and economic efficiency. The D328eco features a fuel-efficient engine and state-of-the-art avionics, aligning perfectly with India's UDAN scheme, which promotes connectivity to Tier 2 and Tier 3 cities. In addition, the aircraft's versatile design allows it to serve various roles, including passenger transport, cargo, and specialised missions.



## **Airbus Helicopters at Aero India**

#### Himalayan Heli Services orders two Airbus H125s

Himalayan Heli Services Ltd, India's leading helicopter company in the pilgrimage and aerial work sectors, ordered two Airbus H125 helicopters to expand its fleet. This latest order will expand Himalayan Heli's fleet to eight H125 helicopters, making it the largest H125 multi mission operator in the country. The helicopters will be deployed for commercial air transport and aerial work missions in northern India. as airborne geophysical survey across varied terrains. A prompt technical support by Airbus gives us much required confidence while serving in remote regions," stated T. Wangchuk Shamshu, Managing Director, Himalayan Heli Services Limited.

"We are honoured that Himalayan Heli has once again chosen Airbus Helicopters' H125 for their expanding services. This order underscores the trust that Himalayan Heli places in Airbus and highlights the expansion of our partnership," stated Sunny Guglani, Head of Airbus Helicopters in India and



South Asia. "The H125 is known for its versatility and performance in high altitude terrains. We are certain that these helicopters will be valuable assets that will enable Himalayan Heli to expand their growing network of services in the country," he added.

The helicopter is a member of Airbus' Ecureuil family, which has accumulated more

"Himalayan Heli Services is proud of using Airbus H125 helicopters for more than 15 years. The H125 has proven to be a safe, very versatile and most suitable helicopter for high altitude passenger flying as well



Sunny Guglani, Head of Airbus Helicopters, India and South Asia presenting a model of the H125 to T. Wangchuk Shamshu, Managing Director, Himalayan Heli Services Limited and Harshvardhan Sharma, Executive Director, Himalayan Heli Services Limited along with Gaurav Adhikari, Head of Civil Sales, Airbus Helicopters, India and South Asia.

than 40 million flight hours worldwide. It can operate in high-and-hot and extreme environments and can be easily reconfigured for various missions, including aerial work, firefighting, law enforcement, rescue, air ambulance, passenger transport and many others. The H125 is the only helicopter to have landed at the top of Mount Everest, demonstrating its agility in operating in high altitude, extreme environments.

### Chipsan Aviation grows with the Airbus H160

Chipsan Aviation of India has outlined its plans to deploy Airbus H160 helicopters for multi-mission roles in India. The company is going to add two more H160 helicopters to its fleet within the year. Chipsan Aviation leased two H160 helicopters in 2024 from GD Helicopter Finance and took delivery of the first one in December 2024, making Chipsan Aviation the first Indian operator to have leased the aircraft type. Designed as a multi-role helicopter, capable of performing a wide range of missions, these H160s will be deployed by the company for commercial air transportation, supporting connectivity and economic activity across the country. The helicopters will be used for connecting Lakshadweep Islands with the mainland and for offshore energy missions in India.



To buy your copy, do email us at vayuaerospace@lycos.com and we will send you the payment details. Just to let everyone know, the cost inclusive of postage is Rs. 1500 but after our introductory discount, the total price will be Rs. 1000. Cheers!

## Eaton at Aero India 2025

t the event, Eaton showcased its advanced technology solutions and components designed for military and aerospace applications, reinforcing its commitment to supporting India's defence and aerospace industries through 'Make in India' initiative. Eaton's exhibit showcased an array of "innovative, high-performance solutions designed to meet the rigorous demands of military and aerospace operations". Key highlights included: hydraulic systems engineered to enhance performance and reliability in critical military applications; air-to-air refueling systems exemplifying Eaton's expertise in supporting mission-critical operations; conveyance solutions developed and manufactured at Eaton's facility at Bengaluru etc.

Desmond Goh, Managing Director, APAC, Eaton Aerospace stated, "Eaton is proud to showcase our extensive capabilities at Aero India 2025. Our commitment to the 'Make in India' initiative reflects our dedication to fostering innovation, building advanced technologies locally, and supporting the growth of India's aerospace and defence ecosystem."



Team Eaton at Aero India 2025– In the center is Desmond Goh, Managing Director, APAC, Eaton Aerospace

## Godrej Enterprises Group secures strategic MoUs at Aero India

Aerospace he business of Godrej & Boyce, part of Godrei ล Enterprises Group, strengthened its commitment to India's self-reliance vision through signing of multiple significant MoUs during Aero India 2025atBengaluru to support



national programmes backed by the Government of India. A Memorandum of Understanding signed with the Aeronautical Development Agency (ADA), Ministry of Defence, GoI marked a crucial step forward in indigenous manufacturing of flight control actuators for India's Advanced Medium Combat Aircraft (AMCA) programme.

This MoU builds upon Godrej's two decade long partnership with ADA in developing components for flight critical DDV based servo actuators and associated functional elements. Under the MoU, Godrej Enterprises Group will undertake comprehensive development of Flight Control Actuators for AMCA, including precision manufacturing, procurement of aerospace grade raw materials, assembly and testing, and development of test rigs for qualification tests.

At Aero India 2025, the company showcased its comprehensive range of aerospace manufacturing capabilities. The exhibition highlights included advanced aero engine components such as fans, compressors, turbines and shafts manufactured from exotic materials, demonstrating the company's sophisticated machining capabilities. The display featured precision engineered tubes, ducts, and brackets, titanium, aluminum and stainless steel, alongside indigenously manufactured Line Replaceable Units (LRUs) including actuators, nose wheel steering manifolds, lubrication pumps and uplocks.

## **The Vayu Team**



## at Aero India'25















## **PS Bedi powers Aero India 2025**



Jatin Bhardwaj, Associate Vice President-Exhibitions, Events and Media along with HS Bedi, Director PS Bedi.

s the vibrant skies of Bengaluru hosted yet another spectacular edition of Aero India, a crucial force of 300+ worked tirelessly behind the scenes to ensure every international and domestic exhibit was in place. This was P S Bedi & Co Pvt Ltd, the Sole Official Freight Forwarding, Customs Clearing and Onsite Handling Agent (also called PSBedi in short). With five decades of expertise in logistics, PSBedi has yet again proven why it remains the trusted partner for defence and aerospace exhibitions globally: the company managed an event of staggering scale, ensuring seamless execution and precise delivery of exhibits, aircraft and cutting edge defence technology from across the globe.

Founded as a family business three generations ago, PSBedi has grown into an industry leader in defence, aerospace and exhibition logistics. With deep understanding of international trade, regulatory framework and complexities of defence consignments, the company has built a reputation for reliability and efficiency. Winning the mammoth logistics contract from the Defence Exhibition Organisation (DEO), Ministry of Defence, Government of India, for Aero India 2025 marked a milestone in its journey of 50 years of excellence.

Managing logistics for an event that attracted 916 exhibitors, 53 aircraft, 27 participating countries and over 7 lakh visitors, is no small feat. The sheer magnitude of Aero India demanded meticulous coordination, seamless execution and round-the-clock dedication. Handling such an event requires integration of multiple stakeholders, including defence agencies, Customs and Immigration authorities, aviation regulators, international freight forwarders and international & domestic exhibitors — all of whom PSBedi seamlessly collaborated with to ensure timely and secure movement of exhibits.



Maj RS Bedi, a veteran of the 1971 War, and Chairman of PS Bedi Group Companies.



Su-57 Captain of Aircraft Sergey Bogdan, 62 yrs old, at the site office.

To achieve this, the company deployed 250 highly trained personnel overseeing logistics, customs, and onsite handling; over 20 Material Handling Equipment (MHEs) with professional crew to move heavy and sensitive exhibits; 30 specialised trailers to transport aircraft, aerospace and defence hardware plus high value and sensitive exhibits. Separate dedicated teams managed customs clearance of flying and static display



PS Bedi Team being felicitated by AOC Yelahanka for their professional execution at Aero India.

VERO NUI REVIEW

aircraft, ensuring compliance with customs regulations including at transit locations.

Managing the logistics for an event of this scale is akin to a military operation in itself. PSBedi's planning began as soon they were appointed Sole OFF: tracking incoming shipments, coordinating with airline/airport/ Customs/Immigration authorities, aligning with defence protocols and ensuring exhibitors had a zero error hassle free experience. Aerospace and Defence exhibition logistics present a unique challenge. Every exhibit must be cleared on time through customs, transported under strict security and other regulations and made available to the Exhibitor within a short window. With precision driven execution, PSBedi ensured zero delays, zero damages and 100% exhibitor satisfaction.

The challenges of handling aerospace logistics are immense, ie, from the transportation of delicate avionics to the clearance of high security defence equipment. Each movement was planned down to the last detail, and PSBedi's teams worked 24/7 to keep the time lines and have the operations running smoothly.

"As Aero India continues to grow, PSBedi remains committed to setting new benchmarks in aerospace logistics. With each edition, the challenges will grow, but so will the company's resolve to deliver an even



Hard work by the busy team members.

smoother, more efficient and world class experience. From the roar of fighter jets to the awe inspiring aerobatics, every moment of Aero India was backed by a robust logistics framework that made it all possible. And at the heart of this framework stood P S Bedi & Co Pvt Ltd—India's most trusted name in defence and aerospace logistics. As the company celebrates 50 years of excellence, PSBedi looks ahead with the same vision, dedication and commitment to making history, one successful event at a time", stated HS Bedi, Director at PS Bedi.



Pictures of exhibits at various booths of customers-supporting Make in India initiative with complete logistics support.

## HC Robotics: Pioneering the future of aerospace & defence intelligence



In aviation, precision and safety are paramount. Takeoffs and landings, the most critical yet accident prone phases of flight, pose significant risks, disruptions, and financial losses, on account of Foreign Object Debris (FOD), wildlife intrusions, and security breaches, creating multi-billion-dollar challenges. With exponential growth of air traffic grows, the need for real-time intelligence and automated safety solutions has never been felt more urgent.

HC Robotics is at the forefront of this transformation, engineering advanced imaging, detection for monitoring systems for airbases, defence forces and aviation leaders. Our solutions enable real-time surveillance, precision monitoring and AI-driven automation, ensuring safer and more efficient aerospace operations.

Visibility is the key in defence and aviation. HC Robotics' high-performance electro-optical and infrared (EO/IR) imaging systems deliver unparalleled situational awareness. Our Chakshu EO/IR gimbal cameras offer long range precision tracking for defence, border security and aerospace applications. Additionally, our thermal imaging and PTZ surveillance systems provide reliable monitoring in low visibility conditions, including night operations and extreme weather. To enhance security, our Automated Perimeter & Intrusion Monitoring systems offer real time detection and alerts for unauthorised movement and airfield breaches. By integrating AI-driven automation, HC Robotics enhances human oversight, ensuring no critical detail is overlooked.

## Advanced safety solutions for aviation and defence

Automated FOD Detection: Runway safety is a race against time. Conventional FOD inspections require extensive manpower and hours of scanning. HC Robotics' AI-powered FOD detection system streamlines this process, delivering rapid, precise results. Our system offers real time detection of objects as small as 5 mm, faster turnaround times with full runway scans in under 30 minutes using only 2–3 operators, and has been tested and validated at AFS Hakimpet. This efficiency boost enhances both commercial aviation operations and mission readiness for defence forces.

Wildlife Detection and Reporting

**System:** Wildlife intrusions remain a persistent challenge for airbases. Traditional visual spotting methods are limited, especially at night and in adverse weather. HC Robotics'

AI-powered Wildlife Detection System provides 24/7 monitoring, offering instant alerts for animal movement near runways, thermal based tracking for visibility in complete darkness, and predictive AI insights to deter intrusions and enhance safety measures.

Aircraft Landing and Takeoff Recording System: Regulatory bodies, such as the Directorate General of Civil Aviation (DGCA), mandate flight data monitoring. Yet many airbases rely on manual logging and low resolution CCTV footage. HC Robotics' Aircraft Landing and Takeoff Recording System transforms flight



documentation by capturing high-resolution video from up to 10 km away, providing automated insights for incident analysis and regulatory compliance, and enhancing aviation training programs with verifiable, high-quality visual data. This system ensures regulatory compliance while improving operational efficiency and safety audits.

**Unmanned Systems and AI-driven aviation intelligence:** HC Robotics develops advanced unmanned systems that provide long-endurance intelligence for continuous surveillance, real time reconnaissance for





mission critical tracking, and optimised airfield operations through Runway Occupancy Time Analysis, reducing congestion and enhancing turnaround efficiency.

Bird Detection and **Reporting System:** Following incidents such as the Jeju Air Flight 2216 crash caused by a bird strike. effective bird hazard management assumes critical priority. HC Robotics is developing an AI-enabled automated Bird Detection System to identify and track bird movement near runways, alert aviation authorities to prevent potential collisions, and mitigate risks proactively, thereby enhancing flight safety.



### Advancing India's aerospace and defence self-reliance

As India strengthens its indigenous defence capabilities, HC Robotics is leading the charge by designing and manufacturing mission critical UAV components domestically. Our 100% Made in India solutions include power distribution boards optimised for UAV electronics, flight controllers engineered for



precision aerial navigation, GNSS + NAVIC modules enabling advanced satellite based positioning, current sensors enhancing UAV endurance with real time power monitoring, and electronic speed controllers delivering seamless UAV motor control for superior performance.

HC Robotics is recipient of numerous accolades for its ground breaking technological advancements, including a Patent for the longest and lightest robotic arm for UAVs, a Patent for a robotic insulator cleaner for transmission towers, Specialty UAVs for law enforcement with a patent pending, Winner of the iDEX Challenge Disc 7 SPRINT developing an EOIR Pod for naval aircraft, and the Excellence Award for Product Innovation (FTCCI, 2022). Our relentless pursuit of innovation continues to drive transformative solutions in aerospace intelligence and defence surveillance.

From runway safety to national security, HC Robotics harnesses automation, AI and cutting-edge imaging technology to redefine aerospace intelligence. With an unwavering commitment to quality and indigenous technology, our solutions not only enhance aviation safety but also strengthen national defence capabilities.

#### **Text and images: HC Robotics**

## WORLD AVIATION & DEFENCE NEWS

### Successful tests for HUGIN to USN

Only one year after being awarded a 24 month frame contract for Large Diameter Unmanned Underwater Vehicles (LDUUV) by the Defence Innovation Unit (DIU), Kongsberg completed acceptance testing and delivery of the first HUGIN Superior Autonomous Underwater Vehicle (AUV) for this customer.



### Archer unveils Midnight "Launch Edition"

A rcher Aviation announced a "Launch Edition" commercialisation programme for its Midnight aircraft. The goal of this programme is to establish a pragmatic and repeatable commercialisation playbook to deploy Midnight in dozens of early adopter markets in advance of type certification of the aircraft by the FAA. Abu Dhabi Aviation (ADA) is Archer's first Launch Edition customer, with plans to deploy an initial fleet of Midnight aircraft later this year. Archer personnel will now work together with Abu Dhabi Aviation to fly Midnight in the country in the coming months, targeting a passenger flight in Abu Dhabi later this year.



### Bombardier Challenger 3500's 1,000th delivery

 $\mathbf{B}_{1,000th}$  super-midsize aircraft, marking a significant milestone in the history of business aviation". This landmark achievement was celebrated with the delivery

of a Challenger 3500 aircraft to JM Family Entreprises, a long standing Bombardier customer, during a special ceremony at Bombardier's Challenger delivery centre in Montreal.



### **P&W GTF Advantage in FAA certification**

**P**ratt & Whitney announced that the GTF Advantage engine had achieved the US Federal Aviation Administration (FAA) type certification for the Airbus A320neo family. The Advantage is the latest engine from the GTF family to be certified.



### Rohde & Schwarz and ELT Group join forces

In a major development for the defence industry, Rohde & Schwarz has selected ELT Group to provide components for EW for the German Navy's F124 class frigates and the Polish Navy's new Miecznick class multirole frigates. Rohde & Schwarz and ELT Group signed a contract to provide EW systems for the German Navy's F124 project and the Polish Navy's new Miecznick class multirole frigates.

## WORLD AVIATION & DEFENCE NEWS $\equiv$



### GA-ASI sub-hunting with new air-dropped sensors

Ceneral Atomics Aeronautical Systems continues

 $\mathbf{J}$  to expand the role of unmanned aerial systems, demonstrating the first-ever Anti-Submarine Warfare (ASW) capability on an MQ-9B SeaGuardian. In а groundbreaking test in January 2025, company-operated ล SeaGuardian MQ-9B successfully deployed and tested anti-submarine sensors using multiple pre-production Sonobuoy Dispensing System (SDS) pods.



### Safran agreement with Finland

Safran Electronics & Defense announced a significant agreement with the Finnish Defence Forces for the supply of advanced Geonyx Inertial Navigation Systems (INS) for their Artillery systems. The Geonyx INS, leveraging Safran's HRG Crystal technology, is designed for precise navigation, targeting, and artillery pointing even in GNSS1-denied environments. Its compact, shock resistant design makes it ideal for integration into various military platforms, including vehicles, artillery systems and mobile radars.



### 15 E190–E2's for Japan's ANA Group

ANA Holdings Inc has ordered 15 E190–E2 aircraft from Embraer with options for an additional five aircraft. The selection of the E190–E2 is part of ANA's fleet renewal plan. Deliveries of the E190–E2 aircraft to ANA are expected to commence in 2028.



### **ANA Holdings Selects GEnx**

GE Aerospace announced that ANA Holdings (ANA) Inc has committed to purchasing GEnx-1B engines to power its order for additional Boeing 787 Dreamliners.



### Diehl Defence's new protection System Sky Sphere

Diehl Defence exhibited its Sky Sphere drone defence system at this year's Enforce Tac trade fair in Nuremberg. The focus was on the new eMissile CICADA,


# WORLD AVIATION & DEFENCE NEWS $\equiv$

which is designed to defend against threats from class 1 and 2 drones and which was presented under this name for the first time in Europe. CICADA is an electrically driven missile that is supposed to be deployed in two versions with different payloads. In a non-lethal version, drones are to be neutralised by a catch net; in a lethal version, a fragmentation warhead is integrated as an effector.

### NASA's X–59 completes electromagnetic testing

NASA's quiet supersonic X-59 research aircraft has cleared electromagnetic testing, confirming its systems will work together safely, without interference across a range of scenarios. "Reaching this phase shows that the aircraft integration is advancing," stated Yohan Lin, NASA's X-59 avionics lead. "It's exciting to see the progress, knowing we've cleared a major hurdle that moves us closer to X-59's first flight."



#### LM unveils scalable Counter–UAS solution

As the threat of small Unmanned Aerial Systems (UAS) continues to evolve, Lockheed Martin demonstrated a new approach to counter these emerging threats. A recent field event marked the first in a planned series of innovative showcases featuring a scalable, layered defence system, designed to detect, track, identify and defeat UAS.



#### Saab Combat System for Colombian Navy's new frigate

Saab has signed a contract with the Dutch shipbuilder Damen Naval to deliver the combat system for the Colombian Navy's new Plataforma Estrategica de Superficie (PES). The order includes the 9LV Combat Management and 9LV Fire Control System, Ceros 200 radar and optronic tracking fire control director, EOS 500 electro-optical fire control director, Sea Giraffe 4A radars as well as other Saab systems.



#### **Raytheon demos 1st ever AI/ML**

Raytheon has successfully completed flight testing on the first-ever AI/ML-powered Radar Warning Receiver (RWR) system for a fourth-generation aircraft. The Cognitive Algorithm Deployment System, known as CADS, combines the latest Embedded Graphics Processing Unit with Deepwave Digital's computing stack, enabling AI models to be integrated into Raytheon's legacy RWR systems for AI/ML processing at the sensor.

This integration allows CADS to employ cognitive methods to sense, identify and prioritise threats. With the CADS capability, the enhanced RWR will increase aircrew survivability while facilitating the rapid and cost-effective mass deployment of modern AI/ML capabilities.



# WORLD AVIATION & DEFENCE NEWS $\equiv$

#### **B61–12 system production ends**

Sandia National Laboratories and the nuclear security enterprise have achieved a significant milestone for the US's nuclear deterrence programme with the completion of the last production unit of the B61–12 nuclear gravity bomb. While the last production unit is now complete, the B61–12 programme is still producing spare components and pursuing programme closeout activities into fiscal year 2026.



#### A321XLR with P&W engine in EASA certification

The European Union Aviation Safety Agency (EASA) has issued the Type Certificate for the Airbus A321XLR powered by Pratt & Whitney GTF engines. This follows the certification of the CFM LEAP-1A powered A321XLR in July 2024 and paves the way for the first customer aircraft with Pratt & Whitney engines to enter into service later this year.



#### USAF designation for new CCA: YFQ-42A

General Atomics Aeronautical Systems has welcomed The US Air Force's designation for its Collaborative Combat Aircraft: the new uncrewed jet fighter will be called the YFQ-42A. The announcement followed an earlier USAF decision in 2024 that GA–ASI was selected to develop and build the YFQ–42A.



#### Saab in order for TAURUS sub-components

Saab has received an order for maintenance and modernisation of the cruise missile TAURUS KEPD 350. The order value is SEK 1.7 billion and the contract period is 2025–2035.



#### P&W F135 surpasses 1 million FH

Pratt & Whitney announced that the F135 engine had surpassed one million engine flight hours powering the F-35 Lightning II.

In achieving this milestone, the F135 has established itself as "the safest, most capable and reliable fighter engine, delivering superior performance and advanced low observable technologies for the fifth generation fighter".



# 50 years of F–4E in Turkish Air Force service





he Turkish Air Force organised a two day event celebrating 50 years of operating its F-4E Phantom II in November 2024.

In total 5195 Phantoms in several versions were built by McDonnell Douglas, USA (5057) and Mitsubishi Heavy Industries (MHI), Japan (138). The Phantom was operated by 12 countries. The Turkish Air Force operated the F–4E and RF–4E reconnaissance. The first batches were direct purchases in the United States. These were followed by deliveries of F–4Es (80 divided in 40 ex USAF and 40 ex Air National Guard) as well as 32 RF–4E bought from the German Air Force.

Two squadrons still fly the 50 year old Phantom. Both are based



at Eskisehir Air Base. 111 Filo "Panterler" (Panthers) is the operational squadron. Their sisters of 401 Filo "Ruya (Dream)" are assigned the test role. The F-4Es received upgrades which were performed in Israel and Turkiye. The F-4E modernisation project kicked off in 1997. It saw 28 Peace Diamond I, 21 Peace Diamond II and 5 Peace Diamond VI Phantoms selected to undergo the modernisation. The contract covered preparations for air-to-ground missions as well as structural and avionics upgrades. 26 aircraft were sent to Israel, the other 28 Phantoms were upgrade in Turkiye. In 2006 project Simsek saw an avionics and structural upgrade of 16 Phantoms. The Isik project covered upgrades and extension of flying hours for 18 RF-4Es from 2009..

All current operational Phantoms are designated F-4E-2020 "Terminator".

During the weekend of 16–17 November 2024 the Turkish Air Force hosted the 50th anniversary of its F–4E Phantom II.

#### 16 November, low flying through the valley

The first event to celebrate 50 years of Phantom took place in a valley, about a 2 to 2.5 hours drive from Eskisehir. Close to the village of Calkaya (Eskisehir), a rock had to be climbed to get a view over the Sakarya river in the valley. In the timeframe between noon and 16.00hr two Phantoms would make passes of the present photographers and other spectators. It took until 2.30pm for the skies to clear. Around that time it became clear both Phantoms departed Eskisehir Air Base. The first F-4E to arrive had received an anniversary colour scheme. The first passes were made from the left, then changed to passes from the right. After passing the viewing area the Phantoms pulled up turning north overflying the mountains and set-up for their next pass. Different passes were made providing nice photo opportunities. After their last pass both Phantoms climbed out and returned to Eskisehir.

#### **17 November, the elephant walk**

As announced by the Turkish Air Force festivities would take place at Eskisehir Air Base. The highlight being an elephant walk by the Phantoms. Everyone



was transported by bus to the runway in the morning. Five F-4Es departed the base of which two, two-ships were made. These made several passes over the airbase for the dignitaries and own personnel. After all aircraft returned to the base we were transported to maintenance area where on a ramp four Phantoms were placed on static display. Two of them had air-to-air and air-to-ground weapons placed in front of them. The 50th anniversary jet joined its colleagues for the static display. It was then time for the final part of the celebration. Everyone was brought back to the runway. Another flight would be made. This time by four Phantoms. Again these flew passes over the air base. Meanwhile six of their colleagues taxied from the shelters towards the end of the runway. Here they waited for their colleagues. After landing these four F-4s turned on the runway and slowly taxied back joined by their colleagues forming a ten-ship elephant walk. When arrived at a taxi track back to the shelter and ramp areas and in front of the photographers the formation stopped. It gave everyone time to photograph the formation or single aircraft. This included another special marked jet and as well as both Phantoms assigned to 401 (test) Filo. When concluded the formation taxied back to their parking spots with some going straight into the HAS while some others used the taxi track parallel to the runway enabling some more photo opportunities.



#### The F–4E Phantom in service with the Turkish Air Force squadrons

The Turkish Air Force provided a 50 year F-4E booklet which contained several details. Taken from this booklet are the squadrons who operated Phantoms (first two columns). The last three columns provide their current status.

132 Filo: in 1996 the F–4E was added to the squadron who already operated the F–5A/B Freedom Fighter. The squadron was assigned the Weapons Tactics and Standardisation role. On 1 September 2006 after a change the squadron received the F–4E–2020 and the F–16C/D Fighting Falcon. On 4 May 2014 it said goodbye to the Phantom. Its aircraft transferred to both 111 and 171 Filo.

171 Filo: From 5 July, 1979 the squadron received

Phantom sqn	Phantom AB	Sqn status	Current aircraft	Current AB
111 Filo "Panther"	1 AJÜ Eskişehir	Current	F-4E-2020	1 AJÜ Eskişehir
112 Filo "Devil"	1 AJÜ Eskişehir	Disbanded		
113 Filo "Light"	1 AJÜ Eskişehir	Current	F-16C/D Block 30/50	1 AJÜ Eskişehir
401 Filo "Test"	1 AJÜ Eskişehir	Current	F-4E-2020	1 AJÜ Eskişehir
131 Filo "Dragon"	3 AJÜ Konya	Current	E-7T	3 AJÜ Konya
132 Filo "Dagger"	3 AJÜ Konya	Current	F-16C/D Block 30/50	3 AJÜ Konya
171 Filo "Pirate"	7 AJÜ Erhaç –Malatya	Disbanded		
172 Filo "Falcon"	7 AJÜ Erhaç – Malatya	Disbanded		
173 Filo "Dawn"	7 AJÜ Erhaç – Malatya	Disbanded		

Comments: AJÜ: Ana Jet Üssü (Main Jet Bases) and 113 Filo has been renamed "Ceylan" (Gazelle).

#### Squadron facts

111 Filo received the F-4E from 23 October, 1998. The first Phantom sent to Israel for modernisation was tail number 77–0289. It completed its upgrade programme on 29 January, 2001. The interceptor/bombardment role is only executed by 111 Filo within the Turkish Air Force.

112 Filo: received its F-4Es from 1974. These were Peace Diamond I programme Phantoms of which 20 out

of the 40 purchased were assigned to the squadron. 112 Filo made their last flight on 12 June 2015 and was deactivated on the same date.

113 Filo: received the first two Phantoms delivered to Turkiye. They received the other 20 Peace Diamond I F-4E (1974: 8, 1975: 12). The squadron transitioned to the RF-4E becoming a reconnaissance squadron in 1979 and nicknamed "Light". Its last flight with the Phantom was made on 21 April 2014.

401 Filo: the squadron executes testing of ammunitions and their systems which are developed by the Turkish defence industry.

131 Filo: Received its Phantom aircraft in 1987. It ceased its F-4E operations on 30 July, 2004. Its aircraft were transferred to 7 AJU and joined 173 Filo.

the F-4E. Its F-4E-2020 missions started from 21 December 2021. The curtain for this squadron fell in 2016. The Phantoms moved to 111 Filo.

172 Filo: Was modernised with the F–4E from 1978. The Turkish Air Force command decided to withdraw the F–4Es that were not to be upgraded from service. This meant the end for 172 Filo which was deactivated.

173 Filo: The squadron received 20 former German Air Force RF-4E Phantoms changing its role to tactical reconnaissance. This role ended on 30 June 2004. The aircraft were transferred to 113 Filo. The squadron received the F-4E from their sister at 31 Filo. It trained the Turkish F-4E pilots. 173 Filo reverted back to flying the RF-4E passing its F-4Es to 172 Filo. On 12 March 2015 the squadron flew its last RF-4E mission and was deactivated as well.



Article and photos: Manolito Jaarsma Instagram: Phantomaviation Twitter: @Phantomaviation

# The expanding contracts of the NHV at Esbjerg Airport



E sbjerg Airport, located on the western coast of Denmark, has long served as a vital hub for aviation and transportation. Among the notable operators at this airport, one stands out with their bright



yellow Helicopters, which is NHV (Noordzee Helikopters Vlaanderen), a company known for its significant contributions to the offshore helicopter industry, particularly in the North Sea region. Roelof–Jan Gort and Bjorn van der Flier went to Esbjerg Airport to find out more and talked with the Base Manager Gitte Eriksen, pilot Jahne Dethlefsen and the Head of Maintenance Steve McNeill about this.

#### Early years and development

Originally founded in 1997, NHV quickly established itself as a reliable operator in the offshore transportation sector, expanding its footprint across Europe, Africa and beyond, offering tailored helicopter transport services. The company initially focused on providing helicopter services for the oil and gas industry, which was burgeoning in the North Sea. Esbjerg Airport, with its strategic location and modern facilities, became a key operational base for NHV. The airport's history dates back to 1948, but it was the rise of the offshore energy sector in the late 20th and early 21st



centuries that transformed Esbjerg into a critical logistics hub. The presence of NHV further solidified this role, as the company expanded its fleet and service offerings to meet the growing demands for the offshore industry.

#### **Expansion and fleet development**

As NHV grew, so did its fleet. Initially operating smaller helicopters, the company invested in larger, more advanced aircraft to accommodate the increasing passenger and cargo demands of the offshore sector. Notable aircraft types included the EC155, EC225 Super Puma, H175, AW139, AW169, H145 and the AS365.

The United Kingdom was always at the forefront of the offshore flying sector, quickly adopting flight safety concepts that led to the development of twin-engine helicopters with a two crew concept. The main issue was that while UK had its own helicopter manufacturing industry, companies like Westland Helicopters and Denmark did not have any of this, and thus was completely dependent on foreign OEMs.

In the end, the EC155s and AS365s became the very first safety enhanced offshore helicopters in Denmark, and a newly formed operating company called DanCopter took over some contracts from Maersk in 2003.

Since the introduction of a new helicopter type, the offshore flying industry has experienced some difficulties. On 1 July 2012, a new helicopter type was introduced by NHV's predecessor DanCopter, the EC225, allowing for the transportation of up to 19 offshore workers to platforms and back to shore. However, just four months after its introduction, another Helicopter Operator's EC225 helicopter carrying fourteen offshore workers ditched at sea, resulting in a temporary industry wide grounding for safety reasons. Although the EC225 returned to service by the end of the year. Unfortunately, in 2016 another EC225 engaged in a tragic fatal incident at Bergen Norway, where the main rotor detached from the helicopter, causing the death of all onboard. This led to the end of the EC225 in the North Sea offshore business and the closure of several operators.

In 2015, NHV Group acquired DanCopter, beginning a new chapter for the Danish offshore helicopter business. Following the EC225 disaster, all oil and gas customers refused to accept new helicopter models. Despite discussions with Airbus Helicopters about a new helicopter model, which eventually became the H175, which is currently the best helicopter for their operations. In comparison to the EC225, the aircraft has a smaller passenger capacity with three seats less, which suits NHV's needs. With the smaller cabin size of the H175, they are now achieving close to 100% occupancy in this helicopter.

NHV's commitment to safety and quality led to numerous certifications and accolades, enhancing its the industry This dedication was

reputation within the industry. This dedication was reflected in the high standards of maintenance and training, ensuring that pilots and crew were well-prepared for the unique challenges of offshore operations.

#### **Operations at Esbjerg Airport**

Esbjerg Airport serves as a key operational base for NHV's Danish entity, NHV A/S, facilitating the transportation of personnel and equipment to offshore installations as well serving offshore wind in the North Sea. The airport's proximity to major oil and gas fields makes it an ideal location for NHV's operations, which include passenger transport, cargo services and training and safety programmes.

At Esbjerg Airport, NHV currently has a fleet of three H175 helicopters. NHV now has thirty six employees that are working for them at Esbjerg Airport, split into fourteen pilots, fourteen technicians and eight in supporting office.



### Strategic partnerships and collaborations

We asked Ms. Eriksen about the tenders and what was the reason for choosing NHV for the Danish oil and gas



operations. Ms. Eriksen explained: "It is the customer who chooses us. We bid on the tender with a lot of other companies in the world. But I think it is because of the product we deliver, our safety policy and the price. We do not compromise safety at all." She goes further: "When we bid on a tender we investigate, what will be the best type of helicopter according to our customers' requirements. How far shall we fly, how many passengers shall we move. Then we try to give the best price, payload and flight time for the customer."

#### **EASA Heli Sa Cat 1 operations**

In March 2024, NHV Group announced that their Danish entity is the first operator in the North Sea to be approved to provide "Operations with Operational Credits — Helicopter Special Authorisation Category I (Heli Sa Cat I) Operations" from EASA – European Union Aviation Safety Agency.

This new approval has been introduced to increase the number of available and accessible alternates within the available fuel range. This gives NHV a huge advantage over competitors, when they are forced to stay on the ground NHV can still perform their flights, providing better service to their customers.

Key Components of Heli Sa Cat 1 are the Safety Management Systems (SMS), pilot training and competence, maintenance standards, and operational procedures.

Compared to the standard regulation, this special approval gives them better operational benefits, including:

• Reduced minimum visibility to 300m from the usual requirement of 550 meters, so the special approval offers a significant reduction.

• With the use of the Instrument Landing System (ILS), they can now descend down to 150 feet. If the airport has the capability to use Low Visibility Procedures (LVP), then they are authorised to descend to 130 feet. This is a significant difference from the usual minimum descent altitude on an ILS, which is typically 200 feet.

• Lower weather requirements for alternate airfields when the weather is marginal at their destination. This offers us a substantial improvement in the number of operational days and a better payload for our clients. The



weather requirements for alternate airfields are reduced from a 1000 meter visibility to a 600 meter visibility, and the cloud ceiling is reduced from 400 feet to 300 feet.

To obtain this approval, NHV needed to use a helicopter with a 4-axis autopilot featuring automatic level-off capabilities, a feature present in all H175 helicopters. Additionally, the crew needed to undergo theoretical and practical simulator training to meet the approval requirements. All the pilots have completed this training during the most recent training sessions in the simulator in Marseilles.

#### **Pilot training programmes**

NHV invests heavily in pilot training, adhering to EASA's high standards. The company implements rigorous training programmes that include simulator training, emergency response drills, and regular assessments. This commitment ensures that pilots are not only proficient in operating helicopters but are also prepared for unexpected situations.

Ms. Eriksen explained: "We do all the training ourselves, here at the base and at Airbus Helicopters in Marseilles in the simulator. There is a minimum of hours they need to have in the simulator and there are also some requirements about flying hours from our customers before a pilot is allowed to fly for them. If you are a new pilot on this helicopter type, the first training start at the office with classroom training. Later they are sent to Marseilles in SIM. And if they pass, they will continue to do some line training in the helicopter for a period. And there is about three weeks classroom training, two weeks in SIM and seven to fourteen days flight training with a Line trainer. Then you might be ready to be a new co-pilot, but you are only allowed to fly with experienced Captains".

#### Maintenance and operational excellence

NHV's maintenance procedures are designed to meet and exceed EASA's regulatory requirements. The company utilises advanced technology and best practices to conduct thorough maintenance checks, ensuring that all aircraft are safe and dependable. Operational protocols are continuously reviewed and updated to reflect the latest safety standards and best practices.

Steve McNeil was the Chief Maintenance in Africa for ten years and is now the Chief of maintenance in Denmark for the last five years. At the NHV base in Esbjerg Airport, they run a progressive maintenance schedule, both calendar and flying hours wise, on all inspections up to eight hundred flight hours. Some of the engineers are qualified with a B1.3 license which means you can work on different helicopters having one or more than one turbine engine. A B1.3 licensed engineer overlooks all aspects of the maintenance of helicopters. Some are qualified with a B2 license which means that their work is related to instrumentation and electronic equipment. And some are qualified with a C license. This person manages the maintenance tasks of the aircraft to ensure conformity to maintenance manual as well as regulatory requirement and issues certificates of release to service following base maintenance on aircraft. Regarding the maintenance schedule he explained: "We do a first check every 10 flight hours, then there are 50 flight hours, 100 flight hours, 150 flight hours, 200 flight hours, 280 flight hours, 400 flight hours, 600 flight hours before BMX at 800 flight hours". The availability of the operational deployment of the helicopters is now above 85% despite flying five days a week, sometimes seven days a week considering the mixed defects, etc.

### Expanding contracts in the oil and gas industry

In May 2023, NHV A/S secured a new contact with TotalEnergies EP Denmark to support offshore operations in the Danish sector of the North Sea. The contract involved that NHV at Esbjerg Airport deploy a dedicated H175 helicopter to transport personnel and equipment to TotalEnergies installations in the Dan and Tyra field.

Ms. Eriksen explains that, "In July 2024, NHV successfully secured a 3 + 2-year contract renewal with INEOS plus further potential extensions. What we are doing is flying people offshore every day for crew change.

We must fly every day to the rigs and if they suddenly need an extra flight, we need to be able to support them with this". She continues: "For INEOS and TotalEnergies we have about 2 to 4 flights a day. Sometimes they ask for more if they must catch up due to the severe weather. Then we try to find a solution to help them and if possible, with more flights than we normally have. But each flight takes between 2.5 to 4 hours and then the pilots need to plan for their next flight. So, the engineers sometimes need to look at the helicopter to check everything between the flights. So, this is one big coordination every day for our team."

Regarding the amount of people, they are flying to the platforms she added: "On daily basis we fly between two and sixteen passengers (pax) during each flight. We have also flown with only one passenger, if it is important for our customers to take that person offshore, we will do this for them. But

normally we fly with twelve to sixteen people on each flight. The only reason we cannot fly to the platforms is due to the



weather. When there is bad weather like lightning or high waves (six meters or higher), we have to wait a day or two before the weather is better again. So, the weather has an enormous impact in the flights we perform on daily basis."

#### **Prospects**

As the global energy landscape evolves, NHV Group continues to adapt to new realities, including the increasing focus on renewable energy sources. The company is exploring opportunities in the offshore wind sector, which is gaining momentum in the North Sea. This shift aligns with global sustainability goals and promises to keep Esbjerg Airport at the forefront of aviation logistics in the region.

We at FlyHighAeromedia.com would like to express our gratitude to Jessicca Gordon and Delphine Demeyer of the NHV Group headquarters in Oostende and a special thanks goes to Base Manager Gitte Eriksen, co-pilot Janne Dethlefsen, and Chief Maintenance Officer Steve McNeil, and the people of Esbjerg Airport for making this article possible.



Article and photos: Roelof–Jan Gort and Björn van der Flier

# Rotary Wing Mission Commander Course 2024



The "Rotary Wing Mission Commander Course" (RW MC Course) is a pivotal exercise for the French Air and Space Force's helicopter units, designed to prepare pilots for high-intensity combat scenarios.

Scheduled from 4–15 November 2024, at Base Aérienne 120 "Commandant Marzac" Cazaux (ICAO: LFBC), the course was structured into three phases:

Academic Week: Candidates receive training on methods for preparing complex missions, in coordination with experts from the Weapons School of the Air Warfare Center.

**Virtual Week:** Future Mission Commanders (MCs) execute several missions in a virtual environment using networked massive simulation tools.

Live Exercise (LIVEX): This final phase involves real world scenarios with various helicopter types (Fennec, Puma, Panther and NH90), air commandos, intelligence specialists, and medical teams. This year's exercise includes participation from the French Navy's helicopters and crews, enhancing the joint forces component.



Throughout the LIVEX, MC candidates were tasked with preparing and leading missions encompassing complex scenarios such as commando infiltrations, combat search and rescue (RESCO), and evacuations of nationals, embodying the motto of the Brigade Aerienne d'Appui et de Projection (BAAP, Air Support and Transportation Brigade): "Combattre et Sauver" (Fight and Save). The RW MC Course also serves to develop, test, and standardise technical and tactical skills, as well as new equipment.



The 2024 edition will specifically test the new optical and thermal camera system of the Fennec helicopter, assessing its contribution to high–spectrum missions.

This comprehensive training ensures that future Mission Commanders are well equipped to lead diverse aerial operations, integrating multiple helicopter types and other assets such as fighter jets, transport aircraft, and drones across all competencies of the Air and Space Force's helicopter component.

#### **Major Thibaut interview**

Major Thibaut, now an instructor for the course, reflected on his journey. He began as a student in a European training programme in Italy in 2016, later becoming a qualified instructor pilot in 2020. With over 2,500 flight hours, he exemplifies the expertise and experience necessary to guide the next generation of Mission Commanders (MC – Chef de Mission).

This exercise underscores the commitment to building skilled leaders capable of operating in high-stakes environments, ensuring readiness for any mission. One of the unique challenges for the Mission Commanders is leadership under pressure.

They must delegate effectively, ensuring tasks are completed while leveraging the expertise of their teams. Success relies on collaboration, not individual effort, highlighting the importance of leadership both in the air and on the ground.





#### Participants Mission Commander 2024

Armee de l'Air with Aerospatiale SA 330 Puma, Eurocopter AS332 Super Puma, Eurocopter AS550 Fennec (2 helicopters) and EADS CASA CN–235.

Marine Nationale with Eurocopter AS565 Panther and NHIndustries NH90 Caiman.

#### **LIVEX Media Day**

On 20 November, a media day was organised whereby the media was flown in a German KC–130J (based at BA Evreux) from BA Villacoublay (near Paris) to BA Cazaux.







After a flightline visit followed by the take–off, the KC– 130J flew back to BA Villacoublay during sunset.

#### Additional information

**New Fennec cameras:** The new optical and thermal camera system on the Fennec helicopters is a cutting edge technology upgrade aimed at enhancing the helicopters' mission capabilities in both day and night operations.

It comprises enhanced surveillance and targeting, thermal imaging, multi-spectrum observation, combines visual spectrum cameras with thermal sensors, offers real time imaging that overlays data for detailed situational awareness plus, stabilisation and precision.

During the Rotary Wing Mission Commander (RW MC) Course 2024, the optical and thermal camera system on the Fennec helicopters were tested in high-spectrum missions (evaluating the system's performance in detecting and engaging threats in complex, multi-faceted scenarios) and integration with other assets (assessing its contribution to missions involving coordination with other helicopters like Puma, NH90, air commandos, and intelligence units).

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

### UK Chagos plans reviewed Richard Gardner reports from London

ithin a few days of taking up office as the UK's new Prime Minister, in July last year, Sir Kier Starmer announced that he had agreed to relinquish sovereignty of the UK's extensive Indian Ocean Territories linked to a new defence treaty covering a 99 year lease of the important Diego Garcia anchorage and air base. This was a shock announcement, as the subject was always going to be highly controversial, and the previous UK government had not regarded this as a priority issue. However, the inauguration of new Trump led US а Republican administration in Washington, which held strong views on not ceding Western strategic any



advantage which might favour China, has now put the brakes on the timescale, if not the entire implementation of the plan.

These geographically remote islands house a British base that has become a major strategic air and naval asset for US Forces who are the main users of its extensive facilities, and it has played a vital role in supporting US strategic air power in every significant conflict during the last four decades, including operations over the Middle East and Afghanistan. It is also an important support base offering a secure staging post for military air transport and long range air operations above and beyond the Indian Ocean region and for sustaining US and British nuclear submarines.

In an exclusive conversation with the author, James Cartlidge MP, the UK Shadow Defence Secretary, stated, "It is extraordinary that, in the face of the most significant military threats for a generation, the Labour Government is delaying a long term funding increase for our armed forces, while rushing through surrendering sovereignty over Chagos. This deal will reportedly cost us £9 billion to lease back the Diego Garcia military base we currently own freehold, when our own military are urgently in need of more cash. Whilst Labour appear to have listened to my repeated appeals to pause the deal until President Trump's inauguration, they now need to go the whole hog and scrap their Chagos plan altogether."

The issue of the status of these islands itself is not new. The previous Conservative Government in London had started a dialogue with the previous Mauritius Government following a ruling by the International Court of Justice (IOJ) that the territory should be handed over to Mauritius. It was understood that Mauritius has maintained close relations with China and the essential positioning of the islands, with a pro-Western ownership in place, had become even more important in recent times as China embarks on an ambitious naval and air base expansion policy, linked to its massive Belt and Road infrastructure investments in East Africa. The creation of the AUKUS defence partnership, between Australia, the UK and USA, has been built around a new fleet of nuclear submarines, and was designed to provide a response to the growing naval reach and capability posed by ever expanding Chinese power projection in the Asia Pacific region.

The IOJ judgment was non-binding and although the initial UK discussions in late 2023–24 were based on a possible 99 year base lease, the wider strategic issues were by no means settled, and there was strong opposition within the then Conservative Government, and across a broad community of retired UK Service Chiefs, not to mention alarmed elements within the US defence community. The Biden Administration, being anti-colonialist in nature, appeared to be somewhat ambivalent and did not insist on a veto, so when a political change arrived following the defeat of the Conservatives and replacement by a left leaning Labour Party in the UK, there was a massive shift in direction in London, with a new government enthusiasm



A Royal Navy image of the proposed next generation attack submarine to follow the Astute Class is the basis for the new AUKUS nuclear boats, which will be able to use the mid–Indian Ocean base to help monitor Chinese naval activity. (MoD RN image)

for being seen as sympathetic to de-colonising a colonial territory, even though that particular territory had never been part of Mauritius in the first place and when independence was granted to the island of Mauritius the distant Chagos Island territory was specifically excluded. Local islanders had been displaced when the base was built and many had been re-settled in the UK and given British Subject status. Some settled in Mauritius but their requests to remain under British sovereignty were ignored by the new UK Government as the future was discussed. Many had no desire to become part of a new administration in Mauritius which might ultimately come under Chinese control or, at the least, high pressure influence.

Many billions had been spent building the Diego Garcia base, regarded by the US military as essential, and the UK military establishment was somewhat flabbergasted to hear that the new UK government was rushing through at breakneck speed a draft agreement whereby the whole territory would be given to Mauritius along with up to £9 billion over a 99 year period for the privilege of being allowed to continue to use its own base! There was even last minute speculation that the lease was being reduced to just 50 years in length, with a multi-million upfront payment, though this was never confirmed.

President Donald Trump was well briefed on this situation as Republicans were as alarmed as defence leaders in the UK at the prospect of putting at risk such key overseas assets, so there was much relief on both sides of the Atlantic when the expectation of a completed UK/ Mauritius deal was shelved at the eleventh hour before Donald Trump became President Trump. Behind the scenes it was no doubt a complicating factor that the little realised reality that Mauritius was unlikely ever to be in a position to be both a signatory to the long-term transfer/ lease agreement with the UK and its status as having signed up to the Pan African pledge to disallow the hosting of nuclear–equipped overseas forces.

The more robust defence and foreign policy stance of the new Trump government in the US, and the desire of the new UK government to be seen as a credible defence partner seems likely to keep the status quo in the Chagos Islands. The UK Defence community certainly hopes so. China is clearly the biggest long term threat to Western interests, including essential global seaborne trade routes across the Asia Pacific and well into the Northern Pacific to Japan. China's massive increases in extending its global naval fleet, with advanced aircraft and long range missiles as well as new aircraft carriers and submarines, increases the future threat level, which cannot be ignored.

The US and UK have to balance their interests between providing adequate force level critical mass and superior capabilities to counter Chinese military strength with the reality of heavy

economic trading and two way investments with China itself, and it is in nobody's interests to increase regional tensions. The potential transfer of this Indian Ocean Territory to the nearest, but still distant, small African state, with no internationally legitimate legal claim, could never be regarded as of any strategic benefit to the West, but its loss would deliver a hugely tempting opportunity for China to build its own facilities within that oceanic territory, and at the same time negating the currently unchallenged value of Diego Garcia. China has ignored all international protests to date concerning its disputed occupation and military development on disputed reefs and islands in the South China Sea, so the likelihood of repeating this in the Indian Ocean if given the opportunity cannot be discounted. The Chinese Government always plays the long game when it comes to global influence and defence expansion and the potential "gift" of a potential new strategic base, or bases, close to the existing Diego Garcia would certainly add to the worries of all those nations that value freedom to trade and protect their own interests. India continues to play a major role in helping to counter Chinese naval expansion and should be given every encouragement in the West to continue to do so.



The B1 has been the major USAF heavy bomber for many years and can reach well into the Middle East and Asia from the Chagos Islands, as can the more secretive bombers and surveillance aircraft in US service. (RG photo)

## Air Marshal (R) Harish Masand says...

I learnt more than flying from them: Hasimara Happiness December 2024 (Part–2)



Druks. Harassed. On the phone trying alternate lunch.

The icing on the cake at the end of the morning schedule was a visit to 101 Squadron, "The Falcons of Chhamb", with a brief on the squadron's history and enviable accomplishments, particularly in the 1971 War on the Western front. For all of us, and particularly the ladies in the group, this was a wonderful visit and all of us were impressed not only by the latest technology on display but also the enthusiasm and zeal so evident in all the young pilots and technical personnel of the Squadron. I had personally served in 101 twice before: first in 1972–73 on the Su-7 and later in 1976-77 on the MiG-21M, both tenures in Adampur. One of them had even tagged the squadron diary of those days and showed me the long tall handwriting in which I used to write the Diary those days. Old photographs of that era were also truly nostalgic and all of us taken back to those days and felt like youngsters again. I also had the pleasure of meeting my namesake, young Squadron Leader Masand, currently serving with the Squadron, though no relation.

That evening, we were taken to the new auditorium next to the married quarters to be felicitated and introduced to the current generation including some Army Officers from the Brigade for a 2 hour session wherein we were asked to recount our stories and anecdotes from our time in Hasimara. While everyone talked of their time in Hasimara or their experiences in the War, Actor decided to divert to his days in Afghanistan, training Afghan airline pilots. The funny part that kept everyone in splits then, and even later, was about how he was asked to stay back for a million dollars and also choose any woman by just putting his hand on her. On the question as to who he finally put his hand on, he left us all in suspense, and in splits. Finally, in the end was my long talk to fill in the allotted time as the organiser and mop-up guy followed by the presentations to our hosts where we presented to the Wing a painting by Deb Gohain of the Meghna Crossing by IV Corps of Lt Gen Sagat Singh with just 11 Mi-4 helicopters commencing 9th December 1971, some of them from 111 HU ex-Hasimara, and another by Rakesh



Binaguri-Smiles brighter than the sun.





101 party.

Gorgeous team leader.

Chouhan of the attack on the Governors' House in Dhaka by 4 Hunters of 37 Squadron on the 14th of December 1971. We also presented a miniature reproduction of the painting by Deb Gohain of the F-86 Sabre shot down on the 4th of December 1971, symbolising the two shot down by then Wg Cdr N Chatrath and me that day, to CO 101 Squadron wishing them many such kills in any future engagement.

Immediately after the above ceremony, the Wing hosted a dinner for us in the front lawn of the Officers' Mess. The young MC thought that we oldies would be happy with the music from the Hindi movies of our time though this was hardly the music to dance to. To their surprise, Mrs Asha Cariappa, Mrs Chatrath and Padmini Menon took the floor and showed their Bollywood dance moves. Soon, the entire lot was enthused and joined in. A lot of videos were filmed showing the energy and enthusiasm of our "young at heart" ladies!

The effect of such enthusiastic participation and dancing was evident through our stay in Hasimara and did not wear off from many as would be evident from breakfast on the third day. As a matter of fact, some younger folks even asked me later as to where we were hiding the elixir of youth and from where we got the energy. Moral of the story was that age is just a number and one can still enjoy life and dance to its music, no matter what is played, depending on one's mindset and thinking.

The next day, on the 5th, we had planned to visit Binaguri and the Binaguri/Western Dooars Club and then drive back to Phuntosholing to have lunch at Druks, all of these being our favourite haunts in the those old days. The idea was to spend just half an hour driving around the military station in Binaguri to see the changes from our time and then visit the Club for a cup of tea, if possible, and drive back at 1130h to reach Phuntosholing by 1230h for lunch. As it happened, the 20 Division Commander, Major General Vanthanu Raghu, on hearing of the visit of veterans who had supported 33 Corps during the 1971 war decided to welcome us with all his subordinate commanders and staff and also laid out an elaborate tea for us.

The red carpet was literally laid out for us particularly after hearing that Field Marshal Cariappa's daughter in law was part of the entourage apart from the wife of CO of 17 Squadron who had shot down a Sabre on the very first day of the War, that is our leader Mrs Pam Chatrath. That it's a small world was once again proven by the fact that General Raghu was the nephew of Air Marshal BR Krishna whom most of us knew. The Div Cdr also insisted that we should have lunch with them instead of going to Phuntosholing. While we declined this offer, all their hospitality upset our schedule somewhat and we were about an hour late at Phuntosholing. Quite naturally, this led to some friendly leg-pulling of the organiser, me. Fortunately or unfortunately, depending on how one looks at it, the Dooars club was in a dilapidated and disappointing state and we saved some time there. From there, while everyone



Ladies at the bar.

else was sent off towards Phuntosholing, in the time saved, I decided to take a small detour to see the house in DBITA (Dooars Branch Indian Tea Association) where Malini and her parents, Brigadier SN and Mrs Amita Mitra, used to stay and where Malini and I got married in November 1974, just over 50 years before this visit. Deb, Actor and Indu accompanied me for this quick look—see at the house. Once again, the house was there but not being lived in so was in a state of disrepair, not in the pristine state when we used to buzz and beat up the place in the 1970s, as can be seen form the attached picture.

Druks in Phuntosholing, while a regular big hotel now instead of the small place we used to dine in, was again very disappointing because they had chosen to lay out a typical Punjabi menu with daal, aloo gobi, naan et cetera, due to a misunderstanding, instead of the Bhutanese meal that we were looking forward to. Obviously, I was now scrambling "and harassed" to find an alternate place at that late hour with everyone hungry and expectantly waiting for me to find a solution to this issue, as can again be seen from the picture on the terrace of Druks. Fortunately, we found the Asian Kitchen not too far from Druks which welcomed



Druks Hotel now-SK, Padmini & Sushma.

us with open arms and we literally occupied the entire small restaurant and had a late but wonderful time and meal. Once again, the session was full of light banter and laughter with the management wondering what made us all tick the way we did, as indicated to me when I was clearing the bill at the end. The pictures say it all.

That evening, we hosted the key officers from the Wing and the Brigade. While I had hinted that we expected the other single officers staying in the Mess to bounce the party, as per the old traditions of Hasimara, the squadron guys and others supporting staff could not join us because of night flying planned that evening and since it was a Thursday with the working week not yet over. Even though the younger crowd was missing, we still managed to liven up the party with some dancing music and our "young at heart" ladies taking to the floor. This included Brigadier Ajinkya and Mrs Rachna Jhadav who livened up the party further. Having started the party at 1930h, with sunset being around 1700h, we finally wound down around 2300h. I was just wrapping up the party with my last drink with the LO, Harsh, with me when some of the younger pilots from 101 returned after night flying. Seeing me there in the lawn, young "Sukhi", stopped by and sat with me while Harsh drove his car to the back to its parking slot. Sukhi was not flying the next morning though he had a 0700h, perhaps for some debrief or some such commitment.

Initially, he didn't have a drink at all but finally had a tiny one, even smaller than a small, since we were having an interesting conversation about Hasimara, the old anecdotes about squadron life then and comparing it with the current environment apart from exchanging bits about our personal lives. Before we realised, it was 0100h and Sukhi asked me if I had seen my old room yet. The "Bhangi" colony that we had initially stayed in for about a year had been demolished but the room I had moved into, and shared it initially with my course mate Derek J Daly and later with Deb Ghosh, was still there but locked since the current occupant was away. Sukhi then showed me his own room in a new block. I was very happy to see that the current lot of bachelors were staying in much better accommodation in a two room set with a small kitchenette and modern facilities. I walked back to my own room around 0130h though the Flight Commander the next evening told me that he kept a track of all younger officers and Sukhi was reported to have been "drinking" with me till 0230h. Before Sukhi got into any trouble over this, I clarified the true facts with both the Base Commander as also the Squadron Commander. The evening did give me a taste of the spirited youngsters that now man our Air Force which was reconfirmed later on Saturday, the 7th.

On the 6th, we had actually planned to visit Jaldapara sanctuary for a short while in the morning before getting back to the Brigade for a briefing and lunch. The forest officer in charge at Jaldapara was most uncooperative and raised a lot of issues including even the transportation to get to the forest lodge. We, therefore, switched to Buxa Tiger reserve which was a little rather but welcomed us with open arms and finally turned out to be a better drive and experience. Of course, due to the driving time, there was some delay in reaching the Brigade but the Commander was most understanding and accommodating in this respect and gave us not only a great briefing on



The old house in Binaguri where I got married.

his area of responsibility in Sikkim but also laid out a sumptuous lunch where we met all his officers and their ladies. On top of the driving time, my driver Sushil in the lead vehicle erroneously took the slightly longer village route back and just gave a sheepish smile when I asked him about it. However, even that turned out to be good because we saw Hamiltonganj and Kalchini, places that we wanted to see earlier but couldn't due to the tight schedule. Due to the delay, I got some more flak from some impatient members but it was all in jest and, actually, I got some more laughs because Deb Ghosh had opted out of this visit and wanted to see and have lunch in the Forest Resort where we had planned to stay in between. And this delay meant that his transportation was delayed too. As it happened, Amrita was with us for Buxa so we pulled Deb's and Amrita's leg a lot about why he went on his own and who he had got tucked away in the Resort.

The Brigade gave us a warm welcome with Brigadier Jadhav giving us an interesting briefing about his area of responsibility. In his welcome address, he also made a special mention of my brother, Bharat, and called me an OG pilot since I half belonged to their Battalion, 7 Para, and had attended all their functions since 2004. We presented a miniature reproduction of the painting by Deb Gohain of the Sabre being shot on 4th of December to the Brigade which was much appreciated. The Brigade also laid out a sumptuous lunch for us.

Having complimented the Brigade cooks on the meal they had prepared, I requested the Commander to loan us one of their cooks for the Barbecue dinner we had planned that

evening in the Air Force Mess. Unfortunately, the Mess staff sent him back and sort of messed up the barbecue which I had to personally do because the staff detailed for it didn't know how to. Apart from this minor hiccup, we had a great party that evening also, being the last evening for the team, apart for me. This was Friday evening, and true to tradition, 101 guys staying in the Mess all bounced the party and made it livelier. As it had happened, the evening turned out to be even more interesting than I had anticipated. Seeing the earlier parties, Actor got inspired to stay the extra day with me in Hasimara on the 7th, visit 101 and fly the simulator, and leave for Bagdogra only on 8th morning when I left for Cooch Behar to catch my train while Indu and he would cab it back to Bagdogra since his flight was only in the evening. Little did Actor realise what he was in for that evening.

Most folks left the party around 11-11.30 pm to get some sleep, pack and be ready to depart for Bagdogra early the next morning. Since it was weekend eve, and since I was managing the barbecue the whole evening, I was at the bar with four of 101 guys, including their Flight Commander "Vicky", having a drink and in an animated discussion with them. Actor came to the bar last, with Indu a few paces behind, to take their leave. The younger folks immediately caught him and asked Actor to have a drink with us like a fighter pilot. Actor looked back at Indu to see if she was okay with him having another drink while Indu just signalled that they should leave. I was now in splits seeing Actor's dilemma. He wanted to continue the evening with us and swap some fighter pilot tales but Indu obviously did not approve. Since I had my leg pulled through the visit for one reason or another, the moment Actor seemed to decide to leave, I purposely egged the youngsters on to hold him back, citing the old traditions. Finally, Actor gave in and had a drink with us. I was suppressing my laughter just thinking of how Actor was going to get nuked that night because Indu walked back some 30 paces and sat alone with her arms crossed.



Bagdogra lunch. Some Ladies paying attention. Rare. Ms Dey Extreme Left.

Actor left us around midnight but we carried on and I walked back to my room around 2 am. While walking, I saw there was a missed call from Actor at about 1 am. I decided that it was too late to call him back at that time and left it till the morning. By 5.30 am when I got up, I saw a message from Actor that he was reverting to his old schedule and going back with the rest to Bagdogra in the morning since, as he put it, "his flight had been preponed to 1045h on the 8th from 1740h". Over breakfast, you can only imagine the way we pulled his leg over the way he got nuked that night and decided not to spend another night with me. As it turned out, he not only missed a wonderful session with the younger folks in 101 Squadron that morning and flying the simulator later, he also missed out a great party of 101 on Saturday, the 7th.

Since I had stayed back alone for that extra day to clear the bills et cetera, after seeing off the team at 0800h heading for Bagdogra, I visited 101 Squadron after seeing the old dispersal of 37 Squadron from we had operated in the 1970s. That building and dispersal were currently being used by some other unit but the crew room across the taxy-track from the flight complex had disappeared with the ruins reclaimed by nature and the vegetation. An hour plus of chats with the young folks of 101 thereafter was invigorating, to say the least. While I narrated some war experiences that they wanted to hear about, they told me about some of their experiences while converting on the Rafale and preparations for international exercises. After that session, I went to the Rafale simulator where an old friend, Group Captain Biswas (Retd) who was in charge, along with a young pilot from 101, "Chang", briefed me on the layout and displays. I flew the first 30 minutes just handling the aircraft and getting used to the side stick with no movement or artificial feel. A tricky affair for my generation but, I suppose, something that comes naturally to the Gen Z folks who are used to computer games. In the second sortie, Biswas had made a graphic image of the Governors' House in Dhaka to let me relive a part of the attack on 14th of December 1971. Thereafter, Chang simulated the target on which I fired my guns in manual mode to simulate the way I had engaged the Sabre on the 4th of December. A quick bite with 101 wrapped up the morning session.

During that session, "Trips" the CO had hinted that they were bidding farewell to two of their members that evening. He didn't have to say more since I indicated immediately that I would bounce the party. I guess he was expecting that since the moment I joined the party at 1930h, the youngsters cautioned me that they wouldn't let me go till breakfast the next morning, as per the old traditions. I tried to lay a cut-off at 0600h since I was to be driven to Cooch Behar at 0830h to catch my train to Delhi but was overruled. It was a lively evening with the younger lot even grabbing my pipe and forcing me to down some vodka/tequila shots in between lot of dancing and fun. We played some games, danced and joked till the wee hours with the last man standing with me being young Flying Officer Cheema at 0300h in the morning. He then got a call from his fiance/girlfriend and had to leave with me reminding him of the old Punjabi anecdote about shooting the cat the very first night of the wedding. Finally, I walked back to my room at about 0330h laughing, dancing and singing with the music of the evening still buzzing in my head. That music stayed with me for days and still keeps me moving on my feet almost a month after the visit, as I write this piece.

With a heavy heart but lot of good memories, I bade farewell to Saurabh Pachauri, Harsh and others after breakfast on Sunday the 8th and drove off to Cooch Behar with Subedar Madeep Singh and Havaldar Sushil of 14

Punjab to catch my train from there. The lessons I took back from this visit cum Reunion are many but let me pen down a few essential ones. The first one that was obviously reinforced was that life must be lived to the fullest on the lines of the phrase I had coined while in 1 Squadron in 1983 and had it painted across the entrance, "Work hard, Play hard". Such reunions with old friends, particularly in locations where you spent the best years of your life, help renew old friendships and which give a new meaning to life itself. The second lesson was to laugh at oneself more than one laughs due to others. My leg was being pulled through the visit but I learned to laugh at myself finding that this made me happier than ever before. When I tried to control the proceedings to ensure that things went as per plan to the do things their own way and in their own time, my friends started calling me "Baas", in a funny way of saying "Boss" only to bring a bigger smile to my face. The third was to spend more time with younger folks. As I told them in my talk on the 4th, their youth rubs off on one and one tends to forget the aches and pains that come naturally with age. The examples of Mrs Pam Chatrath, Mrs Asha Cariappa, Padmini Menon and all the other ladies dancing and leading from the front are true examples of this youth potion having been injected in all of us during this visit. As I also told the current generation, this dose would probably last me for a year but we would need a booster dose soon while nudging 101 to have their overdue anniversary soon. The most important lesson and comfort I personally drew from this visit is that our younger generation is far more capable and tech-savvy than we were and, seeing their zeal, enthusiasm and high spirits, I am reassured that our Air Force is in good hands, Their concerns and views also had a faint ring of similarity to the manner in which we had voiced our concerns in earlier days, though the issues were completely different since the basic needs of accommodation and other facilities had been addressed and, now, the concerns were more on higher requirements in the hierarchy of needs.

To be honest, I haven't laughed as much or danced as much in over a decade of my retirement and this visit gave me a new lease of life as well as the strength for facing the usual problems with greater equanimity and with a spring in my steps. No wonder, as soon as we got home, there was a chorus of requests from many of the members of this group to organise another reunion as soon as possible. I am working on that too with music and laughter still buzzing in my head.



*Phuntsholing-Sneaking into the photo.* 

# FLY NAVY, FLY A HISTORY OF INDIAN NAVAL AVIATION

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SEALAND, FIREFLY, SE SUPER CONSTELLATION (IG-29K, P-8I, ALH, SE LCA NAVY, HAVE SEALAND, FIRE

LCA N SEALAN SUPEN IG-29N LCA SEALA SUPEN IG-29K

> PUSHPINDAR SINGH ANGAD SINGH

CHETAK, CHETAK, HER II, E, H-300 MI-4 HETAK, HER II, E, H-300 2, MI-4 CHETAK, ARCHER II, J, DOVE, H-300 HPT-32, MI-4 RAN, CHETAK, SEARCHER II, B, DOVE, H-300

RE, KIRAN, CHETAK, 8, DO 228, SEARCHER II, -31, MQ-9B, DOVE, H-300 Years Back From Way

#### From Vayu Aerospace Review Issue II/2000

#### HAL award for "Excellent Performance"

Dr CG Krishnadas Nair, Chairman, HAL receiving the award on behalf of HAL from the Prime Minister of India, for "sustained excellent performance among public sector undertakings". HAL was selected as one of the top 10 public sector companies and is the only high-tech engineering Company to get this award.

### Indian Navy to augment aircraft inventory

The Indian Navy plans to enhance its maritime surveillance and strike capabilities by upgrading its existing fleet of Tupolev Tu-142M (Bear Foxtrot) and Ilyushin Il-38 maritime patrol/ASW aircraft and acquiring "some numbers" of supersonic Tupolev Tu-22M3 bombers on lease from Russia.

#### Indian naval exercise: Spring Ex-2000

In what has been the start of the biggest ever exercises at sea by the Indian Navy, forty warships and nearly 50 aircraft of both the Naval Air Arm and Indian Air Force have been carrying out a series of manoeuvres in the Arabian Sea.

#### **IAF on new UN mission**

An Indian Air Force contingent, part of the United Nations peacekeeping force stationed in Sierra Leone, left New Delhi on 12 March 2000. The remaining batches left during the following six days. The IAF contingent services include cargo re—supply, troop movement, transportation, medical support and casualty evacuation.

#### MiG-21bis upgrade by late 2003

The Indo-Russian programme to upgrade the Indian Air Force's MiG-21bis fighters, already behind schedule by about 18 months, is now likely to be completed by late 2003. Test flights of the two MiG-21s which were upgraded in Russia as prototypes, have been progressing well.

#### India–Vietnam defence pact

On March 28, India and Vietnam signed a wide ranging defence agreement paving the way for greater military-tomilitary cooperation including sale of HAL built Advanced Light Helicopters, assistance in repair and overhaul, of the Air Force's MiG-21 fighters and raising the level of military contacts between the two countries.

#### Indian Army Chief moots Services integration

Responding to the crises faced by most armed forces of the world, the Chief of Army Staff, General VP Malik, has advocated the integration of the three defence services – the Army, Navy and Air Force – into a single organisation. The Chief is of the opinion that such integration would increase efficiency, cut down on redundancy and make the functioning of the armed forces more cost–effective.

#### "Kargil Report" highlights failure of intelligence

The K Subrahmanyam-led Kargil Committee Report has said that the Research and Analysis Wing (RAW) was unable to "accurately monitor and report" a Pakistani troop build-up along the Line of Control before the Kargil intrusion the Spring of 1999.

#### **Insat 3B launched successfully**

India's first third-generation satellite, Insat 3B was launched into space by Arianespace's Ariane-5 rocket the 22 March. The Rs.150 crore spacecraft with a mission life of ten years and built by the ISRO, was blasted into space by Arianespace's Ariane-505 vehicle.

#### **HAL exceeds targets**

The FY 1999–2000 has been successful for HAL in many ways: exceeding the physical and financial targets, bagging the 'EEPC' award for export performance and continuing to maintain an "Excellent" rating in the MOU assessment.

#### **HAL Rotary Wing Academy**

HAL, has inaugurated a Commercial Helicopter Pilot's Training Institute – the HAL Rotary Wing Academy (RWA) at Bangalore – now approved by the DGCA. Basic training is planned on a Schewizer 300C piston engine helicopter with an option to convert on the Schewizer 330SP gas turbine version.

#### **Pawan Hans in Antarctica**

Pawan Hans Helicopters Ltd (PHL), India's leading civil helicopter operator, has completed another successful operational mission in Antarctica. According to Major General A Natarajan, Chairman and Managing Director of Pawan Hans, the crew accomplished a monumental task in the forbidding, icy environment of the earth's southernmost continent bringing to bear on the operation all their flying skills.

# Tale Spin

#### Branding comes of age in India

Etihad Airways, in December 2024, celebrated its striking new Chennai Super Kings (CSK) livery as its Airbus A320neo made its inaugural flight from Abu Dhabi to Chennai, India. Also, in the same month, Delhi based Pradhaan Air became the Official Airline Partner, "Celebrating Bryan Adams India tour on the World's First Airbus A320F".





### The "I Love..." disease spreads

In the past few years, every city and town in India has seen a glut of the "I love" signs. Now it has spread to events and recreational activities as well.





#### **Unnecessary name change?**

Everything is being renamed in India. Nothing is being spared. Even the lovely name of HAL's IJT HJT-36 'Sitara' has been changed to 'Yashas'. Why? What was the need? Sitara is such a pretty name!.



#### New fancy buggies at Aero India'25

The Indian Army Chief was seen in this cute green camo retro style buggy wandering all over Aero India's vast venue. We're sure the CAS and CNS will demand theirs next time.







Pushpindar Singh Chopra Ravi Rikhye

PAKISTAN AIR FORCE

Forthcomint

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RAVI RIKHYE







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