

VAYU

II/2026

Aerospace & Defence Review

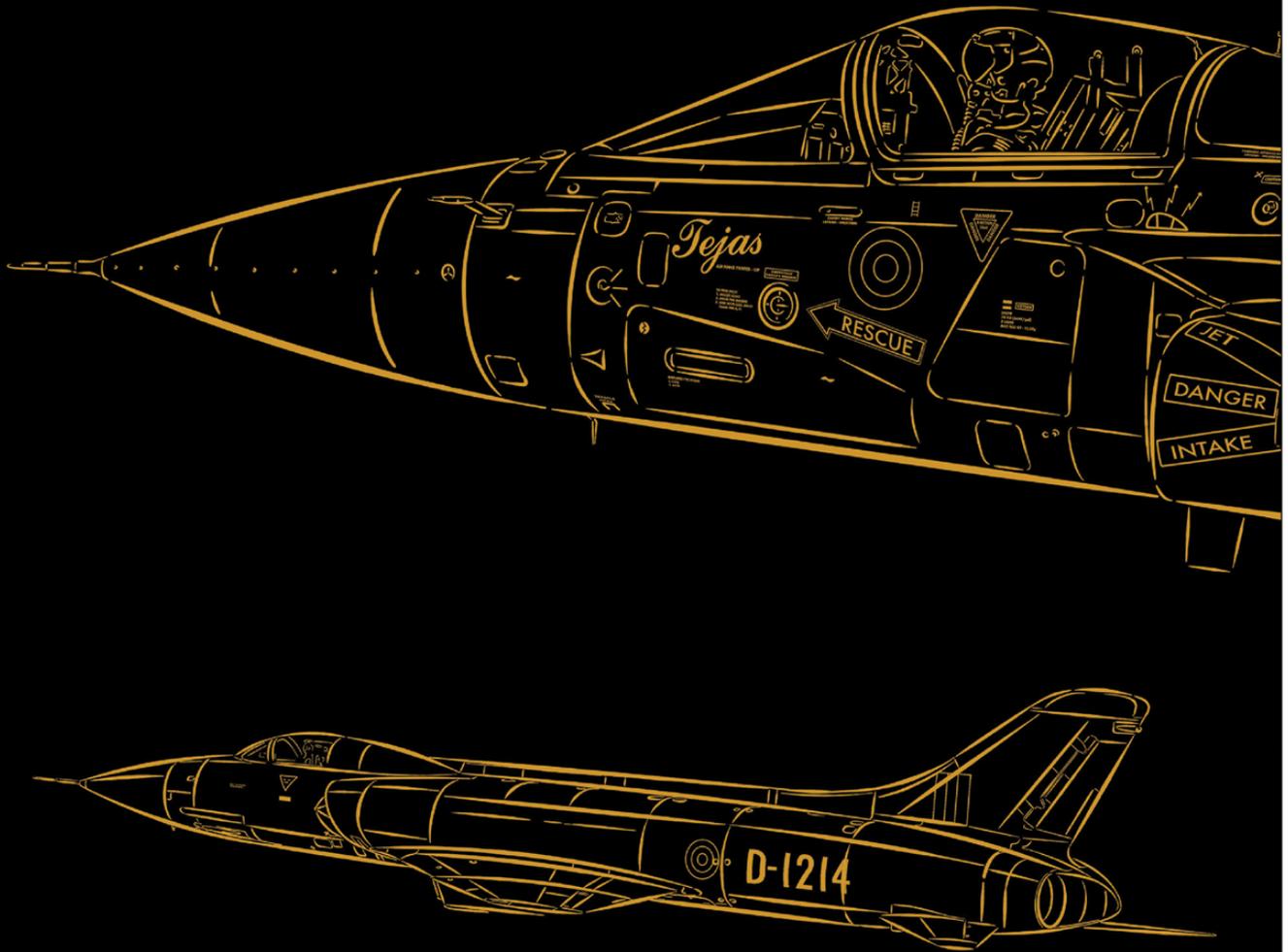


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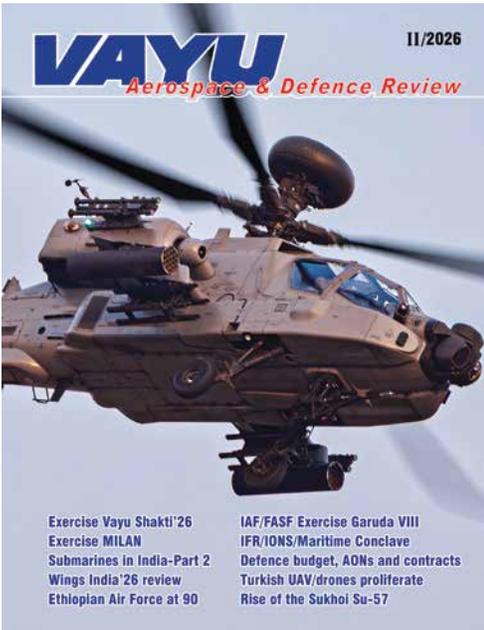
VAYU

Aerospace & Defence Review



THE GOLDEN ANNIVERSARY ISSUE
50 YEARS: OCT 1974–OCT 2024

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Cover : Photo of IAF's AH-64E Apache at Exercise Vayu Shakti'26 at Jaisalmer by Alex van Noye. Joris van Boven along with Alex were at Pokhran Field Firing Range to cover the event and report for us.

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Vayu Shakti 2026

The desert ranges of Pokhran once again reverberated with the thunder of jet engines and precision firepower as the Indian Air Force conducted Vayu Shakti 2026, its flagship firepower demonstration in February 2026.



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Embraer making strides in India

Embraer and the Mahindra Group have announced plans to work towards establishing Maintenance, Repair and Overhaul (MRO) capability in India for the C-390 Millennium upon selection in the Indian Air Force's Medium Transport Aircraft (MTA) programme. Plus more news and tie-ups.



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The DFFSS January 2026 conclave critically examined the erosion of India's strategic influence in its neighbourhood, concluded that goodwill based diplomacy must give way to a recalibrated mix of hard power, technology and youth centric engagement.



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Made in India Submarines

Sankalan Chattopadhyay says that while the acquisition of the Type 209-1500, Kilo Class and Kalvari Class addressed India's immediate requirement for the time being, it was still far from fully answering India's ambitions. This article is the second part; the first being in the previous edition.



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Wings India 2026

Wings India 2026 provided a stage to over 150 exhibitors ranging from global giants to emerging aviation startups, attracting more than 7,500 visitors and bringing together policymakers, global CEOs, investors, airlines, airports, OEMs, MROs, lessors, technology providers, training institutions and innovators. Rishav Gupta and Durgesh Singh covered the event for us.



56 Exercise Garuda VIII

Exercise Garuda VIII, the eighth iteration of the bilateral Indo-French air combat training exercise, was conducted at Base Aérienne 118 Mont-de-Marsan, France, from 16-27 November 2025. This biennial exercise represented the continuation of a 22 year partnership between the IAF and the FAS. Joris van Boven and Alex van Noye report for us.



63 Photo story of Vayu Shakti'26

Joris van Boven and Alex van Noye visited the IAF's Exercise Vayushakti-26 at Pokhran Field Firing Range, Jaisalmer on 27 February 2026. 130+ aircraft took part in a day and night exercise including Rafales, Su-30MKIs, Mirage 2000s, MiG-29s, Jaguars, Hawks, Mi-17s, C-130Js, C-295s, C-17s, the Dhruv and LCH.

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The rise of Sukhoi Su-57

Sayan Majumdar reports on the T-50 Fifth Generation Fighter Aircraft (FGFA) prototype's maiden flight piloted by Sergey Bogdan, took place on 29 January 2010, from KnaAPO's Dzemgi Airport and lasted 47 minutes to verify the manoeuvrability, the normal operation of engines and main systems.



92 Turkiye and their UAVs

Cem Dogut writes on ISR activities were becoming increasingly important for gaining control of the area. UAVs were needed to monitor critical geographical areas such as gorges, passes and valleys used by PKK militants as transit routes, sensitive transportation routes and PKK camps both domestically and abroad.

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Ethiopian Air Force marks 90 years

From 23-27 January 2026, Ethiopia celebrated a major milestone in its military history – the 90th anniversary of the Ethiopian Air Force with a full programme of national events, culminating in an impressive air show and aviation expo at Hara Meda Air Base near Bishoftu (Debre Zeit), Ethiopia.



Regular features:

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

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Lt Gen Kamal Davar says...

...Will 15% increase in Defence Budget give India more bang for the buck?

Is the budget for this financial year adequate to ensure India's overall security build-up to cater for the formidable two-front threat that India faces from its main adversaries—China and Pakistan—both individually and collectively? That deserves serious analysis.



Never before since the end of the Second World War has the world been so badly fractured as now, especially since Donald Trump's return to the White House in January 2025. That he, holding the most powerful office in the world, who should have been seriously working to uphold the global rules based order, is doing just the opposite, has left most nations, including most long term US allies, seriously worried. It is needless to say that some of his policies also impact India, in more ways than one, including in strategic matters.

Overall, as the strategic and security environment worsens the world over, including in South Asia, India needs to factor in its security calculus the manifold existing challenges and the newer ones emerging. Our own Operation Sindoor involvement highlighted the nuances of a fragile and hostile geopolitical environment in our neighbourhood and the critical imperative of being

operationally ready and better militarily prepared against our own adversaries at all times.

Unquestionably, adequate resources thus have to be allocated for ensuring security preparedness – but are we doing it? India's finance minister, Nirmala Sitharaman, in her record ninth consecutive Budget presentation, and the Narendra Modi government's 13th Budget in the Lok Sabha on 1 February 2026, has allocated Rs 7.85 lakh crores for the defence budget in FY 2026–2027 – a satisfying 15 per cent jump from last year's defence budget and which is two per cent of India's GDP. Last year's allocation was Rs 6.58 lakh crores for the defence ministry, which was around just 1.9 per cent of GDP. It may be noted that India's defence spending currently accounts to around 14.5 per cent of the total Union Budget in 2026–27.

Is the budget for this financial year adequate to ensure India's overall security build-up to cater for the formidable two-front threat that India faces from its main adversaries – China and Pakistan – both individually and collectively? That deserves serious analysis. India's parliamentary subcommittees have unanimously and consistently recommended that the nation's defence budget be raised to three per cent of GDP is quite well known but has never been implemented by any government of any political hue.

In analysing the adequacy or otherwise of the allocations for the forthcoming financial year, it will be worthwhile to take a sharp look at the immediate requirements of our armed forces. The Indian Air Force, according to reliable media reports, is now down to a mere 31 fighter squadrons, from its minimum operational requirement of at least 42 squadrons. As the IAF and the defence ministry grapples with the selection of which fighters to be procured from abroad and the establishment of the AMCA project,



or expediting the induction of the later versions of the indigenous Tejas aircraft, the fact remains that we have to import at least a hundred fifth generation aircraft with alacrity, for which adequate capital budgeting has to be

OPINION

earmarked. The same is true for the import or indigenous production of at least a dozen more advanced featured submarines for the Indian Navy, including some nuclear-powered heavy torpedo and perhaps a third aircraft carrier too, apart from suitable replacements for its aging MiG-29 naval warplanes. Additional advanced Brahmos missiles, S-400 and S-500 air defence systems, drones and UAVs of multiple types also need to be inducted, apart from latest maritime reconnaissance aircraft, 155mm artillery guns and longer range multi-barrel rocket launchers, attack helicopters and a plethora of other equipment and platforms, including upgrades of all types of weaponry across the three services.

The armed forces also need to sharpen their capabilities for AI, quantum computing and cyber warfare, and begin working in the realm of space warfare. All these critical operational requirements would require very high investments from the government.



Keeping India's defence modernisation in mind, the finance minister has allocated around Rs

2.19 lakh crores as capital outlay for modernisation, which is a welcome 22 per cent increase from the last financial year. In addition, under the revenue expenditure head, which is the major and remaining portion of the Budget and caters for salaries, operations, maintenance and pensions, a provision for increased allocation for pensions too has been catered for. Importantly, the budget for R&D has been also increased to Rs 17,500 crores.

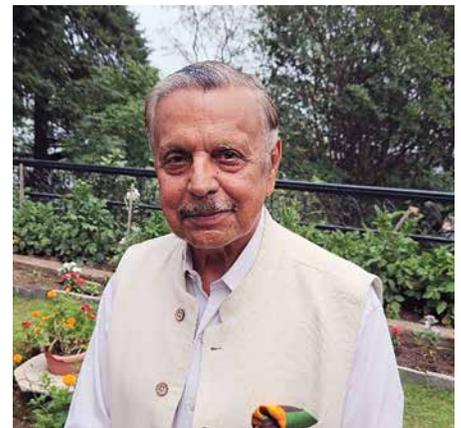
In addition to the allocation of sufficient resources by the finance ministry, the ministry and the three services must ensure the optimal utilisation of funds by determinedly implementing measures which are well known, but somewhere their fruition gets into problems. There is no alternative to "atma nirbharata" (self-reliance), which should be given top priority. For this, unwavering assistance to India's vibrant private sector and ensuring cooperation between them and the DRDO is essential. Leading foreign companies should be encouraged to set up joint production facilities in India for arms and equipment, not only for the Indian armed forces but even for export. The armed forces and other security forces should be directed to ascertain their requirements with clarity and not keep changing their qualitative requirements for the weapons, platform and equipment they want inducted.

Importantly, the funds allocated for air defence, AI, UAVs and drones



of various types must be fully utilised and not fall prey to bureaucratic malaise. The procedures for procurement of various requirements in the arsenal must be streamlined, for which the armed forces cannot blame any institution but themselves. An eye on future criticalities must also be ensured.

In all likelihood, 2026 will be a challenging year owing to the continuing volatility in our neighbourhood. It is thus imperative for all stakeholders in India to rise to the challenges ahead and ensure full utilisation of the resources allocated for India's defence. Overall, the deteriorating geopolitical environment may warrant additional funding for our defence needs, which should also be given some thought now. ➡



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

Admiral Arun Prakash says...

...Civil–military gap must be bridged

In April 2006, the Chairman, Chiefs of Staff Committee, wrote a letter to Raksha Mantri (RM) Pranab Mukherjee, seeking his “...personal intervention for the appointment of a Service officer as a constituted member of the 6th Central Pay Commission (CPC)” and reminding him that “...a lack of Service representation was perhaps one of the main reasons for the dissatisfaction expressed by the Services post 5th CPC award...” While expressing agreement in principle, the RM regretted his inability to comply with this request.

The recommendations of the 6th CPC initially evoked a positive response due to an overall salary hike, but this quickly soured as specific anomalies emerged that were seen as unjust to the military. In an unprecedented move, the three Service Chiefs delayed submission of revised salary bills, effectively deferring implementation to send a message to the government. The reaction to the 7th CPC was even more severe, with the Service Chiefs, in 2016, taking the extraordinary step of writing to the Prime Minister about holding the implementation in abeyance; they executed it only after “assurances at the highest level” that anomalies would be addressed.

Civil–military dissonance has been an issue of long standing concern in India, and it constitutes a major flaw in our national security matrix. The root of this problem lies in two convictions of the politician; firstly, that “civilian control” of the military can/should be exercised on its behalf by the bureaucracy, and secondly, that civil–military relations are a “zero–sum game” in which civilian control can be maintained/enhanced only by balancing and blunting the military’s influence/prestige. An indicator is the progressive blurring of lines between the military and the Home Ministry–helmed 1.1 million–strong Central Armed Police Forces (CAPFs).

Since relative seniority in the government hierarchy is based on a functionary’s “basic pay”, the easiest way of altering established relativities is by changing the pay structures. The best instrument to effect such changes is the decadal CPCs staffed by bureaucrats. This is how successive pay commissions, all of which have excluded military representation, have served to aggravate this civil–military asymmetry.

Typical of the anomalies that have caused serious concern to the military leadership is a policy termed “Non–Functional Upgrade” (NFU), which guarantees civilians automatic higher pay entitlements, even without a merit or vacancy–based promotion. By according this unjustifiable benefit to the civilians and then to the CAPFs, but denying it to the military, the CPC not only depressed the latter’s relative status but also dealt a blow to morale.

This sense of systemic discrimination was further fuelled by other measures, including a drastic cut in pensions for soldiers disabled on duty and a system of “hardship allowances” that favoured civilians in peace areas over the military in combat zones. A dive into history is necessary in order to get to the root of these problems.

At the time of Independence, a hurried reorganisation of the imperial defence structure took place to suit the new republic’s needs. During this turmoil, the military leadership remained blissfully ignorant of a significant development orchestrated by the civil services; the armed forces HQs, instead of being designated independent “departments” of the Ministry of Defence (MoD), were reduced to “attached offices” and made subaltern to the Department of Defence. This “act of commission” was to be followed by equally significant “acts of omission”.

The Constitution, vide Article 312, created two new “All–India Services” – the IAS and the IPS (to be joined later by the Indian Forest Service). Inherited from the empire was another category of bureaucracy, known as the Central Civil Services, consisting of 89 Group ‘A’ and ‘B’ services.

In 1961, the President promulgated the Allocation of Business (AoB) and Transaction of Business Rules, which provided the administrative framework and guidance for civil service functionaries of the Government of India (GoI).

For 58 years, in none of these documents was there any mention of the military till, in 2019, the 353rd amendment to the AoB Rules incorporated the new Department of Military Affairs (DMA). However, the constitution of the Chief of Defence Staff – a historic step – still did not find mention in these rules.

Since their status vis–à–vis the All–India as well as Group ‘A’ and ‘B’ civil services has remained undefined, successive CPCs, maintaining that the armed forces do not fall into any “recognised category”, have employed whimsical logic to depress their emoluments and, consequently, their status.

Apart from upsetting historic relativities with the IAS, IPS and the CAPFs, such alterations have created awkward situations for military commanders. Civilian personnel of organisations such as Border Roads, Military Engineering Services, Naval Armament Services and Armed Forces HQ Cadre, created to support the armed forces, having overtaken their military superiors in terms of pay grades, now demand an altered relationship.

The Service Chiefs, too, receive perfunctory attention from politicians and bureaucrats because they have no locus standi as per rules of the GoI. It is the civilian Secretary, Department of Defence, who is deemed responsible for the “...defence of India, and every part thereof” and speaks for the Services. This is an iniquitous situation which has stimulated civil–military friction for decades.

As the constitution of the 8th CPC has been promulgated, the issues highlighted above assume urgency. It is incongruous that the standing of the armed forces of the Union should remain unspecified and open to repeated misinterpretation vis–à–vis civilian and police organisations. It is similarly inappropriate that the Service Chiefs and the CDS – responsible for national defence – should be denied due recognition in GoI rules and remain “invisible” in the MoD.

A clear definition of the status of the armed forces as being on a par with the All–India Services and spelling out the role and functions of the military hierarchy will lead to smooth and harmonious civil–military functioning in the MoD and the inclusion of a Service officer as a constituted member of the 8th CPC will raise the military’s morale and bolster national security.

If NFU is considered a rational measure, it must not be denied to the military. 

Lt Gen Kamal Davar says...

...India's Security Imperative in 2026: Challenges, Choices and the Road



importance in today's grey zone warfare concept. The saving grace in our harmonising the neighbourhood has been the warming of relations with the Afghan Taliban regime in Kabul, our assistance to our neighbour Sri Lanka during its recent natural calamity, and increasing aid to Bhutan, the Maldives and Nepal. Such humanitarian efforts must continue in 2026. Trade and connectivity issues must be given greater emphasis with Afghanistan.



The dawn of each new year generally brings fresh hopes for brighter, peaceful, and more prosperous days ahead. Unfortunately, historically speaking, the opposite is often true. Nevertheless, as change is the only constant, nothing stops a nation or society from striving for improvements in all aspects of human endeavour. India, located in South Asia—one of the most volatile regions of the world—despite being the largest and most powerful country in this turbulent expanse, also faces many challenges to its security and well-being. Though India has no expansionist tendencies, securing India's rise in this war stricken global ecosystem is indeed a formidable challenge.

India, GDP wise, is the fourth largest economy in the world and is gradually climbing to become the third largest in the coming years. Yet, by GDP per capita, we are at a dismal position of 136 or so in the world, which is hardly a matter of satisfaction. Thus, the Indian government must assiduously work to ensure that our economy is not tainted by sheer monopolistic orientation and the fruits of growth do get disseminated to our masses, some of whom still live under the poverty line. This year, the government will also have to address the one sided and unfair tariff strategies by our "strategic partner", the US.

India's current handling of its trade ties with the US has been firm and fair, and to ensure our strategic autonomy policy, we should be prepared to weather the storm. On the other hand, India must continue to buy as much oil as it can, at competitive rates, from Russia. For its exports, India must seek new trading partners. Temporary economic losses inflicted by others will have to be absorbed. Anyway, the US too is getting economically isolated to some extent and may soon learn to mend its ways!

On the foreign policy front, India did not appear to have achieved significant successes last year. Though we adhered to our strategic autonomy policies, we should have done better in our neighbourhood. As the principal power of South Asia, India has to find ways and means, both overt and covert, to be of significance to all political parties in their respective nations. Even during Operation Sindoor, when India rightly punished terror exporter Pakistan, most of the nations, even friendly ones, did not come out to praise India or condemn Pakistan forcefully. India may not have received its due from friendly foreign nations, perhaps owing to our inadequacies in "shaping the narrative" to the deserved levels. Such lapses must be thoroughly analysed and rectified by the government's agencies, as psychological warfare is of immense

For decades, India has faced a two-and-a-half-front threat. With the internal security threat from the Naxalites in the Indian hinterland well under control, the credible threat from China and Pakistan, both independently and collectively, remains persistent and is expected to intensify in the coming months. Though the wily Chinese have recently made some friendly gestures, India must not fall into any trap, as at the macro level, the Chinese have not shown any inclination or accommodation regarding the long outstanding border problems between the two Asian giants. However, without letting our guard down in security preparedness, there will be no harm in discussing and settling contentious issues with them regarding the borders and the huge trade deficit they enjoy over India, amounting to over 100 billion dollars. The Indian government must be firm in its dealings with the Chinese, as some analysts have opined that we appear soft towards them. During the recent

four day kinetic conflict with Pakistan in May 2025, the Chinese brandished their new weaponry against us through their arming of Pakistan, which used Chinese J-10C and JF-17 Thunder jets, PL-15 air-to-air missiles and HQ-9 air defence systems. The Indian Armed Forces acquitted themselves creditably in these exchanges, causing tremendous harm to the Pakistanis.

Our western neighbour, Pakistan, continues with its myopic and self-destructive policies towards India and has intensified its terror exports to India. We thus must be extra careful as regards Pakistan, as it has now also introduced “white-collar terrorism” in India, and surprisingly, a few doctors in our border state of J&K have been affected. Pakistan’s export of radicalisation will have to be effectively neutralised preemptively by further sharpening our grassroots intelligence and ensuring effective coordination between our intelligence agencies and state police forces, as was evident in the November Red Fort blast case. Though Pakistan has been adequately warned against any mischievousness against us, India must be extra vigilant and ready to teach them a lesson if they create any trouble. India’s long-standing policy of strategic restraint must give way to a policy of punitive deterrence towards Pakistan. The de facto ruler of Pakistan, Field Marshal Asim Munir, currently the hot favourite of US President Donald Trump, has been vociferously speaking against India, and his misplaced ambitions will have to be carefully monitored by our security establishment.



A serious strategic challenge has crystallised on India’s eastern front, emerging from the political instability and radicalisation afflicting Bangladesh since August 2025 after the ouster of its pro-India PM Sheikh Hasina and her replacement by Mohd Yunus, currently the Interim Adviser to Bangladesh. Mohd Yunus, reportedly an American protégé, has been fanning anti-India sentiments in Bangladesh and turning a blind eye to the carnage inflicted on Bangladesh’s minority Hindu population, which causes immense political reverberations in India. Additionally, an anti-India China-Pakistan-Bangladesh axis appears to be forming, and Bangladesh’s intelligence agency, the Directorate General Forces Intelligence, and Pakistan’s sinister Inter-Services Intelligence have been plotting together against India in the past few months.

Both armies of the two nations have been in liaison with each other recently. It is indeed surprising that Bangladesh Islamists have forgotten the genocide committed by the Pak Army in 1970-71 on the Bangladesh people and the sacrifices made by the Indian Armed Forces in the war to secure Bangladesh’s freedom. With radicalisation on the rise in Bangladesh, it is only a matter of time before terrorism or a kinetic threat is posed towards India’s vulnerable Siliguri Corridor bordering Bangladesh. If better sense does not prevail with the Bangladesh administration, India may have to take strong preemptive steps to prevent Bangladesh’s likely follies. Hopefully, the elections in Bangladesh in February 2026 will usher in a mature government; otherwise, India will have to contend with a serious challenge from its eastern flank.

India must now prepare itself with full resolution and alacrity for multiple domain warfare and incorporate hi-tech weaponry like UAVs, various types of drones, employ AI and quantum computing, and become fully adept in the nuances of cyber warfare. India must invest in and develop long-range standoff munitions, as was made clear post-Op Sindoor and from the ongoing Russia-Ukraine War.

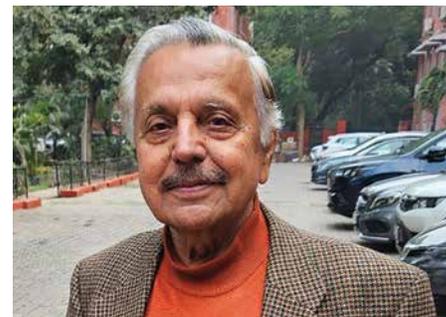
Importantly, India urgently needs to allocate sufficient capital budgeting for speedy indigenous development and/or acquisition of state-of-the-art weaponry, platforms, air and naval assets from friendly foreign nations to make up for critical deficiencies in our national arsenal. The Ministry of

Defence must take swift steps to induct another eight to ten fifth and sixth generation fighter aircraft squadrons and at least ten additional submarines, apart from other critical deficiencies within the Armed Forces. There can never be an alternative to self-reliance to meet overall national security requirements. The government must truly encourage our highly talented private sector with the vast resources of the government, such as DRDO, HAL, and defence public sector undertakings. Leading arms manufacturers from abroad should also be encouraged to set up their gigantic factories in India, both for induction of their arms into the Indian Armed Forces and for export.

With two nuclear-armed adversaries confronting India, the government needs to revisit our nuclear preparedness and have a fresh look at our policy of “no first use” of nuclear weapons, the safety and security of our nuclear arsenal, their deployment, and diversification of platforms to launch them if necessary. India’s Strategic Forces Command has its work cut out in the coming year for streamlining our nuclear doctrine and readiness.

Though India does not covet any nation’s territory or have imperialistic ambitions, it unquestionably faces many diverse and formidable challenges to its security. 2026 will likely present many challenges to India’s well-being. The government must conceive and strictly implement a “whole of nation approach” and take all sections of society to march in unison to ensure India’s rise in the comity of nations. There is no place for divisive and polarising elements in our beautiful, values-driven ancient land.

Let’s all strive unitedly in 2026 to make India take its rightful place on the global high table. ➡



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

Admiral Arun Prakash says....

....Sinking of Dena opens new front in the war, disrupts hard won regional peace

The torpedoing of the Iranian frigate IRIS Dena, 40 miles off the coast of Galle, Sri Lanka, in the early hours of 4 March 2026, offered India a blinding flash of harsh reality: The conflict we thought was 3,000 km away in the Persian Gulf had arrived at our doorstep.

By releasing periscope camera footage of a submarine launched torpedo detonating under the stem of the ill-fated Dena, the Pentagon provided a cold blooded demonstration of the US Navy's reach. The sinking of an Iranian warship homeward bound from the Indian Navy's Visakhapatnam base, where it had been a guest for the International Fleet Review (IFR), must have been a profound shock to its hosts.

The destruction of the Dena by a single Mark 48 torpedo — described by US Defence Secretary Pete Hegseth as a “quiet death” — signals that Washington is no longer content to contain the US–Israel–Iran conflict within the Persian Gulf. By striking near Sri Lanka, Washington has declared that there are no “safe” waters for its adversaries. The message is clear: The capability to strike is, in itself, the only logic that matters in the era of “Operation Epic Fury”.

The uncanny sequence of recent events witnessed across the world, from Eastern Europe and the Middle East to Venezuela, and now the Persian Gulf, should serve as a stark reminder that the hallowed principles of “state sovereignty” and “non-interference”, that lay at the heart of the 1648 Treaty of Westphalia, and were enshrined in the 1945 UN Charter, have become little more than relics.

Far more apposite to our fraught present situation is the ancient verdict of the Athenian strategist Thucydides: “The strong do what they can, and the weak suffer what they must.” In this grim 2026 replay, the “strong”; embodied by a Virginia class nuclear attack submarine—possibly the most powerful weapons platform afloat — has dispatched a “weak” Iranian frigate that

naively presumed that international waters would grant it impunity.

Much of the indignation in India is fixated on the personal affront rendered: The Iranian vessel and its 180 sailors were recently guests of the Indian Navy. Yet the harsh truth is that once the vessel departed India's territorial waters, we owed her no sovereign protection. With Iran and the US locked in open conflict, any warship flying a belligerent's flag becomes, by the inexorable logic of war, a legitimate target.

However, there are more cogent reasons why sinking the Dena in such proximity to the Indian peninsula was an ill-considered and needlessly escalatory action. While the conflict had largely remained confined to land or localised littoral zones, this kinetic action off Galle — a focal point of East–West shipping — has opened a new, global dimension to the war.

The shipping world, already spooked by the threatened blockage of the Strait of Hormuz, is reeling. War risk premiums have surged by up to 80 per cent, with some insurers cancelling coverage entirely in the Persian Gulf and Red Sea. Combined with the rerouting of ships via the Cape of Good Hope, freight rates are spiking. The ultimate cost will be borne by the poor common citizen in developing nations.

Decades after the concept of an Indian Ocean Zone of Peace was buried, these waters have become the focus of international maritime cooperation. Through initiatives like SAGAR, India has fostered a stable transit corridor for the world's energy and trade. This is the lens through which New Delhi views the sinking of the Dena: A gratuitous disruption of a hard won regional peace and tranquility, by a friend, a “strategic partner” as well as a “major defence partner”.

The US rationale for dramatically shifting the theatre of war to the South Asian maritime domain is, perhaps, rooted in its 2026 doctrine of Deterrence

by Denial. By targeting a ship returning from a high profile diplomatic and military mission in India, the US may be signalling three objectives: (a) neutralising Iran's naval reach in the eastern Indian Ocean; (b) demonstrating to Beijing that the US maintains total escalation dominance overcritical sea lines of communication; and (c) signalling to regional powers that the era of comfortable maritime neutrality is ending as the Indian Ocean becomes a primary zone of kinetic enforcement.

Secretary Hegseth's claim that this was the first torpedo sinking of an enemy ship since WWII is historically inaccurate. A notable post WWII precedent is the 1982 sinking of the General Belgrano by a Royal Navy nuclear submarine during the Falklands War. While that strike was a strategic gain, it became a long term diplomatic embarrassment for London. The Belgrano was sunk outside the “Exclusion Zone” established by the UK, leading to accusations of “state piracy” and “unnecessary escalation” that haunted Margaret Thatcher's government for years.

Finally, note needs to be taken of US Secretary Hegseth's public rhetoric, which marks a radical departure from traditional US military–diplomatic restraint. His open advocacy of unrestricted violence (“raining death and destruction all daylong” on Iran), his disdain for international institutions, and “rules of engagement” are disquieting to say the least.

Such shrill rhetoric can have unforeseen and unintended consequences, particularly when two of the three primary belligerents are nuclear armed. Fortunately, New Delhi maintains friendly, functional ties with all parties. It is now the urgent task of Indian diplomacy and statesmanship to persuade these actors to impose limits on this conflict before the “logic of war” consumes the global commons and inflicts irreparable harm on mankind.

Admiral Arun Prakash says....

....The long wait for indigenous engines

A major dampener on India's enthusiastic claims of Atmanirbharta (self-reliance) has been the persistent absence of domestically designed and manufactured "prime movers" — the engines that power major military platforms. Whether installed on Indian built fighters, destroyers, submarines or tanks, none of these critical power plants — gas turbines, diesel engines or electric motors — are fully indigenous.

A long awaited breakthrough has been the DRDO's recent development, in collaboration with Bharat Earthmovers Ltd, of a 1,500 horsepower diesel engine. While this may pave the way for India's future tanks and armoured vehicles to be powered by an indigenous engine, the failure to develop families of aviation and marine gas turbine engines will severely limit its military aviation and naval capabilities. The consequences are serious: heavy dependence on foreign suppliers and heightened operational vulnerability during times of conflict.

All aircraft in the IAF's current inventory — fighters, transports or helicopters — are powered by aero-engines that are either imported or built/assembled by Hindustan Aeronautics Ltd under foreign licences. Of greater concern is the fact that all versions of the indigenous Tejas fighter as well as future projects like the Advanced Medium Combat Aircraft (AMCA) are currently tethered to US built engines.

In the Indian Navy (IN), smaller warships and submarines are driven by diesel engines, but all frontline destroyers, frigates and (one) aircraft carrier are now powered by gas turbines. While marine diesel engines are built in India under French, German and US licences, all gas turbine engines are imported from just two sources; Ukraine and the US. Since Ukraine's reliability as a supplier has been seriously diminished by the ongoing conflict with Russia, the US may become the sole source of gas turbines for future IN warships.

This abject reliance on foreign sources represents a critical Achilles' heel for India's strategic autonomy. In the context of indigenous R&D, a brief review of the DRDO's Kaveri aero-engine project should serve as a sobering case study.

In 1986, the DRDO's Gas Turbine Research Establishment (GTRE) was

tasked to initiate the GTX-35VS Kaveri aero-engine project, meant to power the Tejas Light Combat Aircraft (LCA). Full scale development began in 1989 with 17 prototype engines budgeted at \$55 million. The first engine was tested in 1996, but a 2004 airborne trial on a Russian flying testbed yielded disappointing results — a thrust shortfall as well as overheating issues.

While the GTRE was still struggling with Kaveri's design and engineering challenges, the prototype Tejas urgently needed an engine, and the choice fell in 2004 on the US made General Electric F-404 turbofan. As this engine was duly installed and successfully flown on the Tejas in 2008, the project became inexorably committed to the US F-404 engine family.

Reports in 2014-15 indicated that the DRDO, having spent over Rs 2,100 crore without attaining performance targets, had decided to close the Kaveri project. All this while, reports had been circulating about the GTRE's opaque and unsuccessful quest for obtaining technical consultancy from French and British engine manufacturers. Talks reportedly collapsed over costs and quantum of technology transfer being sought/offered. The MoD and service HQs remained silent observers throughout.

At one point, the IN had proposed a marine derivative of the Kaveri to power its future warships. After a brief consideration, this proposal was rejected, and in 2016, the DRDO decided to revive the project in the form of a less powerful version for powering the indigenous Ghatak unmanned aerial vehicle. A glimmer of hope has emerged from recent reports that the IN has revived a project for the design and development of a marine gas turbine engine, to be taken up by a consortium of DRDO laboratories and private sector firms. While this vital initiative is unlikely to deliver results in less than a decade, it would be a case of "better late than never".

The failed Kaveri project bears an interesting comparison with China's achievements in the field of aero-engines. Recognising their pivotal role in military aviation, Chairman Deng Xiaoping initiated a jet engine project in 1986. China managed to transform its military-industrial complex (from a 1950s industrial baseline, akin to

India's) through a long term, visionary campaign, encompassing a reverse engineering programme, unhampered by regard for intellectual property rights.

After spending billions and encountering many failures, China's WS-10 aero-engine project, based on the licence-produced French-American CFM-56 engine, was crowned with success. The WS-10 and subsequent versions now power the bulk of the People's Liberation Army Air Force's current fighter fleet, and more powerful types are on the way.

So, what lessons should India learn from the dismal Kaveri saga, especially when placed alongside China's reported success? In my opinion, this unhappy situation can be attributed to a number of institutional shortcomings that need to be addressed on priority.

Firstly, there has been insufficient appreciation at the political level of the vital importance of R&D as well as the long gestational periods involved and heavy funding demanded by military-industrial projects. This is manifest in political indifference towards vital projects like Tejas, Kaveri and the Arjun battle tank, which were allowed to drift for decades. Secondly, there has been failure on the part of DRDO scientists to show long term vision and pursue, with resolve, engine related R&D for military platform projects like fighters, ships, submarines and tanks. Thirdly, the military's leadership has consistently failed to take "ownership" of such projects and impart necessary impetus to their urgent pursuit.

Fourthly, as a nation, we need to face the fact that arcane technologies are hard to come by, and it may be more cost-effective, in national interest, to acquire or purchase them from wherever available — regardless of cost — rather than to struggle ineffectively, wasting time. Finally, it is time to shed our embedded bias against the private sector, and force R&D out of the "silo" of DRDO labs and into a collaborative model with private industry in the larger national interest.

Without mastering the technology of military "prime movers", India's claims of self-reliance will remain hollow, rendering its strategic autonomy hostage to foreign powers. 

The Insurgency in J&K

Recollecting with Col Raman Kapila by Dinesh K Kapila, CGM NABARD (Retd)

What I describe here is what many young officers in infantry battalions and the Rashtriya Rifles would have undergone in the 1990s and 2000 to 2010 period and maybe 2015, the sheer depth of the insurgency and shrill propaganda. And the vicious cruelty often exhibited by the well trained radicalised terrorists. Most were trained in Pakistan. Raman is my first cousin, we are close. He joined the Army in the Infantry (Rajput Regiment) and when the terrorism cum insurgency arose in the early 1990s, he was in the thick of it with multiple stints in the Mountainous regions of the Jammu Region and in Kashmir. He had his fair share of successes and at times failures or rather what military men style as setbacks. This does happen, more so, in a fluid and ever changing scenario as it was then, it was chaos and confusion as the units adjusted themselves. Then it was Pakistani Army regulars often being inducted to train and motivate and to set up the camps and sub units of terrorists. They were committed and gave no quarter and firmly believed a change was just on the cards.

Raman, now retired, and greying, has often over a glass or two at times exchanged his views and his recollections with me. He has experienced what every Army officer of that time would have undergone, specially from the fighting arms. In a sense what he rarely shares is but what most men from the services would have witnessed and gone through on a daily basis. His view is that the mountainous regions of Jammu can be horrendous, extremely steep and with isolated hamlets. They test you physically and mentally. The gentler slopes of the Kashmir Valley are much better on the knees and physical stress. Except when it snows, then a long climb at night in treacherous terrain and thereafter setting up an ambush is harrowing, as the sweat freezes in the chilly weather.

Yet, one thing I notice in him and many other army officers, there is no hatred or ill will for the local population as such, they did it for their nation for the duty vested with them, and have moved on in life. So in a sense what I share from what we talk at times is what most Army Officers have seen and with public indifference being what it is in India, shrugged and moved on. There are many incidents as regards counter insurgency which Raman has at times shared with me.

My favourite is about the LMG wielding Jasbir Singh, his role comes in much later in a major skirmish, but he stands out. This was around 1993. Raman as Company Commander was tasked to move to Doda, yet unexplored as regards terror groups, it was an overnight march across steep terrain. He was with the 10 RR then, if I remember correctly. They were near village Pukarwas and they had credible intelligence that this area in general had been impacted by trained terrorists and with Pakistani Regulars in charge. One day, it was around 5:30 am and he was leading Alpha Company on a patrol. In those years, bulletproof jackets were rare and prized, they had two in all. So the two men leading would be given the jackets and



the rest would follow. Seeing a green house away from the village, Raman decided to skirt the house and the village by some distance. It was purely by intuition and some knowledge about local opinion makers. Suddenly they were under heavy fire and they fell back. It takes time for even trained professional soldiers, battle hardened at that, to gather information, regroup and then respond. While the sporadic response was immediately there, Raman and his Radio Man moved swiftly to assess the situation. To retaliate, they had to know exactly from where the firing had been initiated and to assess the level of response required. Plus the insurgent or rather terrorist will always have limited ammunition. Raman decided to wait and observe. Plus it was now clear the house and its nearby areas were the base and that women and children were also inside and being used as human shields. Raman meanwhile decided to run around the sheer cliffs and site the men. Risky, but then that is the job. Jasbir with his LMG was sited to the right of the house at a decline and instructed to be facing towards the village and partially only towards the house. Raman had run from the left to deploy the men and meanwhile, in the absence of a microphone he advised his JCO to shout to the women and children to come out. We ought to remember this is occurring in real time. And it's non-stop and at times simultaneously and punctuated with firing and abuses.

Raman soon learnt the group holed up inside was well led. The insurgents had also waited, sized up the matter and zeroed in on the leader. They decided to go for him. They missed Raman but got his radio man, Shiv Singh. He dropped dead due to a shot to his temple. Both sides were using sniper rifles too and Raman was attempting to plug the gaps and move in. Jasbir meanwhile was all by himself, cool and collected, and incredibly, in all the mayhem, Raman saw he was singing to himself and even using a one stringed instrument! In the meantime Mohammad, another jawan with Raman's company, walked up with a rocket launcher. He was emotional and told Raman that Shiv Singh was his buddy, he wanted revenge. Raman

told him to wait and that his turn would come. Meanwhile Raman lost another man. And then the RL was used. They fired a HE (High Explosive) round which can penetrate and detonate. Two terrorists died while a preacher staying with them ran the other way.

Then a six feet five inches guy was observed moving swiftly with a Dragunov sniper rifle and attempting to escape. He seemed to have another weapon with him too. Raman saw him and amidst the shouting and mayhem started shouting out to Jasbir to look up and towards the house and to be alert. There were terrace fields and the large sized guy was jumping on the bunds and moving towards a nullah. He was seeking shelter there. Jasbir was singing away laconically while Raman was shouting in Punjabi (we are Punjabis) to him (Jasbir was from 10 Sikh LI) and suddenly Jasbir swung around and came face to face with the guy. They had an exchange with the large sized guy shouting to him to make way or surrender. Jasbir first abused him roundly in Punjabi very colourfully and simultaneously simply shot him down. His papers would reveal he was a JCO (Junior Commissioned Officer) in the Pakistani Army. It took eight guys to bury him. Try thinking of all this on a real time basis.

The story does not end there. These guys camped there, then the next day when they left, they saw a collection of tube lights with coloured lights. And they saw it at another location on the way back, and a bit too late realised they were sympathisers passing on messages. They were ambushed but after a protracted engagement, calling upon all their training and skills, and with astute leadership, extricated themselves. They used Very Lights as they lacked mortar flares. The ambushers simply melted away in the darkness.

Just by the way, this was a time of intrigue and involved the organising of a chain of informers too. Raman lost a relation, Captain Rohit Kaushal in Doda the brave young cub, was enticed by a group of terrorists that they wanted to surrender. He was killed in an unbecoming manner. The young brave lad was raring to go always and was misled by an informer. Most officers train and will themselves to always be on guard with informers. But mistakes still happen or when the trust at times overcomes caution. The killing was vicious and cruel as they caught Rohit alive. My father, Major General Rajendra Nath, PVSM (Retd), had a tough time preventing the family from seeing the body. He was burning with anger himself.

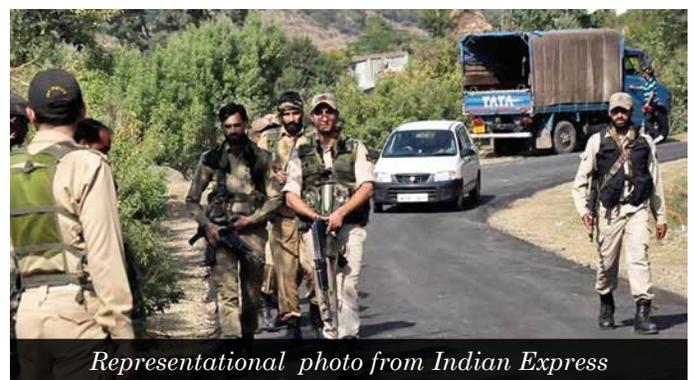
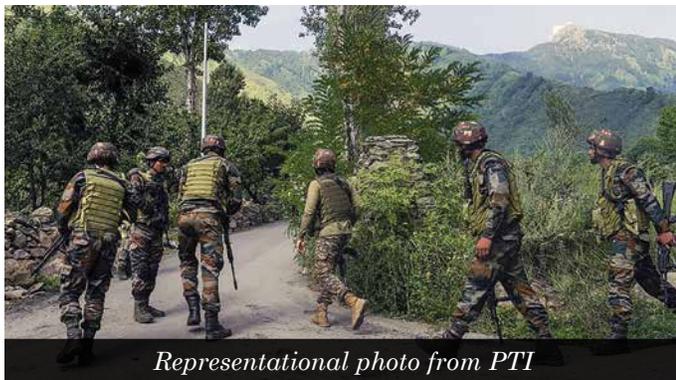
Raman has had stints in the valley too. At Khanabal, the FCI had a chain of warehouses and in 1991, he was

ambushed thrice. Once the insurgents even used boats on the River Jhelum to fire at the army units. Locating the firing positions, redeploying men, shouting orders and firing back is always a mentally strenuous task. Then in Ganderbal in 1992, he was deployed at the cattle breeding farm, surrounded by fenced in farms. Around 17–20 terrorists carried out a major raid on them. LMGs were also used during the falling dusk cum night. And finally rocket launchers, both sides lost two men each. As Raman says, they were led by professional Pakistanis and well trained. As he recollects, there were three to four such raids cum ambushes by the terrorists cum Pakistani regulars before they could tap into loyalists cum informers and then started quietening them down by effective ambushes and attacks. Some cultured loyalists, outstanding citizens of society, paid for even chatting with the soldiers with their lives. Strange experiences were there, finding caches of arms in graves and once buried under water tanks. Raman made one of the largest hauls of a cache of munitions at that time, reported by the Frontline magazine.

One incident is rather interesting. In Ganderbal, Raman was located in a valley. With his company. With all the precautions, a terrorist managed to sneak in close by and let off a rocket launcher for his tent. Raman had luck on his side that day. He was very much in the tent. The projectile passed through his tent and then immediately exploded. Meanwhile the squad on periphery duty took on the terrorists and managed to capture the guy who fired the rocket launcher. He turned out to be an Ex NCO from the Pakistani Army. Brought before Raman, he was unapologetic and said he was not regretting his capture but regretted that Raman was alive. Raman appreciated his boldness, so he gave him a chance. A hundred or so yards distance was given to him and his worst marksman, a soldier rather infamous for his bad shooting, was identified to have a go at shooting him down. The whistle sounded, the terrorist ran, the shooter fired, and to their surprise, downed him with his first burst of fire. He fell like a downed partridge as Raman says.

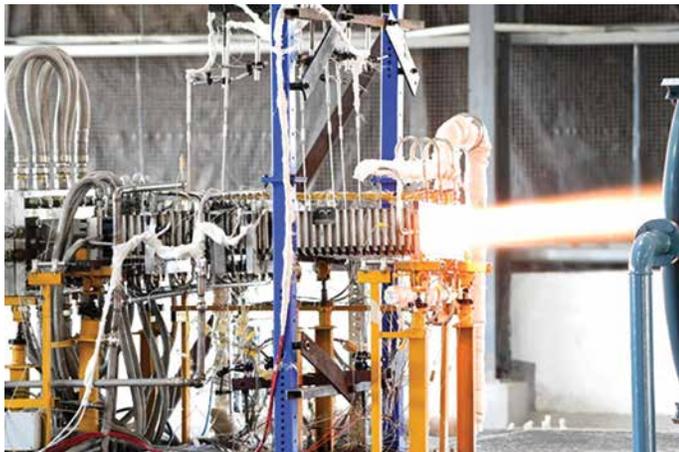
These incidents live on in the minds of soldiers, there is a quiet professional satisfaction at having contributed one's best and to have come out unscathed and with minimal losses to his troops.

PS: My father never did understand the reluctance to use helicopters and even major arms at times against entrenched terrorists. But that is for another day.



DRDO's ground test of scramjet engine

Defence Research & Development Laboratory (DRDL), the Hyderabad based laboratory of DRDO, has achieved a milestone in the development of hypersonic missiles. The DRDL successfully conducted an extensive long duration ground test of its Actively Cooled Scramjet Full Scale Combustor, achieving a run time of over 12 minutes at its state-of-the-art Scramjet Connect Pipe Test (SCPT) Facility on 9 January 2026.



DRDO tests SFDR

Defence Research & Development Organisation (DRDO) has carried out successful demonstration of Solid Fuel Ducted Ramjet (SFDR) technology from the Integrated Test Range (ITR), Chandipur off the coast of Odisha at around 1045 hrs on 3 February 2026. The successful demonstration places India into an elite league of nations possessing this technology that enables developing long range air-to-air missiles to give tactical edge over the adversaries. All the subsystems including nozzle-less booster, solid fuel ducted ramjet motor and fuel flow controller performed as per expectations after being initially propelled by a ground booster motor to the desired Mach number.



DRDO tests MPATGM

Third generation fire and forget Man Portable Anti-Tank Guided Missile (MPATGM) with top attack capability was flight tested successfully against a moving target in KK Ranges, Ahilya Nagar, Maharashtra by DRDO's DRDL, Hyderabad on 11 January 2026. The indigenously developed MPATGM consists of indigenous technologies like Imaging Infrared (IIR) homing seeker, all electric control actuation system, fire control system, tandem warhead, propulsion system and high performance sighting system, etc.



IRBM Agni-3 tested

Intermediate Range Ballistic Missile 'Agni-3' was successfully test fired from the Integrated Test Range, Chandipur, Odisha on 6 February 2026. The launch validated all operational and technical parameters. It was carried out under the aegis of the Strategic Forces Command.

DRDO flight trials of VSHORADS

Defence Research & Development Organisation, on 27 February 2026, successfully conducted three successive flight trials of Very Short Range Air Defence System (VSHORADS) from the Integrated Test Range (ITR), Chandipur off the coast of Odisha. These tests were carried out to revalidate the capability of VSHORADS missile system in neutralising high speed threats flying at varying speed, range and altitude. During all the flight tests, the missiles intercepted and destroyed the high speed aerial targets mimicking enemy aircraft in various threat scenarios meeting all extreme engagement points.



DRDO tests Gaganyaan drogue parachute

India's human spaceflight programme achieved a key milestone with the successful qualification level load test of drogue parachute for Gaganyaan programme at Rail Track Rocket Sled (RTRS) facility of Defence Research and Development Organisation (DRDO) at Terminal Ballistics Research Laboratory (TBRL), Chandigarh. RTRS is a specialised dynamic test facility being used extensively for high speed aerodynamic and ballistic evaluations.



Civil aviation infrastructure at Leh

A project aimed at developing civil aviation infrastructure at Air Force Station Leh was inaugurated on 28 January 2026 by Mr. Kavinder Gupta, Lieutenant Governor of The Union Territory of Ladakh in the presence of Air Marshal JS Mann, Senior Air Staff Officer, Western Air Command.

The inauguration marks a significant milestone in strengthening the Civil Aviation infrastructure in Ladakh and the "spirit of close cooperation between the Civil Administration and all agencies involved in the region's development".



Activation of ELF on national highway

The state of Assam witnessed a historic event, inauguration of an Emergency Landing Facility (ELF) on the Moran bypass in Dibrugarh district on 14 February 2026. This ELF is first of its kind in the North East region. The facility opens an identified stretch on the highway as an alternative runway during contingencies which would

be capable of handling emergency landing and take-off operations of fighters, transport aircraft and helicopters. This will also prove instrumental during Humanitarian Assistance and Disaster Relief (HADR) operations in far flung areas.



TASL to overhaul/upgrade Pinaka

Tata Advanced Systems Ltd has been awarded a supply order to support the Indian Army's 510 Advance Base Workshop (ABW) in the overhaul cum upgradation of in-service first-generation Pinaka Multiple Launch Rocket Systems (MLRS) and Battery Command Posts (BCPs). Under the collaboration, in the initial phase, Tata Advanced Systems and 510 ABW will jointly undertake a pilot overhaul of select Pinaka MLRS and BCPs. Following the completion of this phase, the remaining Pinaka MLRS and BCPs will be overhauled by 510 ABW of the Corps of EME with Tata Advanced Systems providing critical spares, quality assurance and technical support.



L&T and Indian Army for upgradation of Pinaka

L&T has been awarded a supply order by the Corps of Electronics and Mechanical Engineers (EME) of the Indian Army, for the overhaul, upgrade and obsolescence management of the indigenous Pinaka Multi-Rocket Launcher Systems. This partnership between a domestic

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private OEM (Original Equipment Manufacturer) and the Indian Army, for sustenance of frontline artillery systems, is a significant step for product lifecycle support of Made-in-India, in-service artillery systems.



TASL inaugurates Airbus H125 FAL

Tata Advanced Systems Limited (TASL) has inaugurated India's first private sector helicopter Final Assembly Line for the Airbus H125 at Vemagal in the southern Indian state of Karnataka. The H125 helicopter Final Assembly Line facility was inaugurated virtually by Mr. Narendra Modi, Prime Minister of India, and Mr Emmanuel Macron, President of France.



BEL and Safran JV for HAMMER production

Bharat Electronics Ltd (BEL) and Safran Electronics and Defense (SED), France, on 17 February 2026, signed a Joint Venture Agreement (JVA) to establish a Joint Venture Company (JVC) for the production of Highly Agile Modular Mmunition Extended Range (HAMMER) smart precision guided air-to-ground weapon in India. The JVC, with equal shareholding between BEL and SED, will focus on the manufacturing, supply and maintenance of HAMMER to meet the operational needs of Indian Air Force

and Indian Navy. The transfer of production will happen in a phased manner ensuring a stabilised production line in India. The indigenisation level will progressively increase with key sub-assemblies, electronics and mechanical parts being manufactured locally.



Elbit PULS in IA service

At India's Republic Day Parade on 26 January 2026, Elbit Systems' PULS long range rocket launcher made its first public appearance in service with the Indian Army, marking a significant step in India's evolving long range fires capability. More than a ceremonial display, the system – locally designated SuryaAstra, reflects "a scalable, modular approach to precision firepower, aligned with local production and operational requirements under India's Make in India framework".



IAF instructors to train RAF pilots

The United Kingdom and India have agreed to further enhance military training engagements following the conclusion of the 19th UK-India Air Staff Talks on 12 February at New Delhi. Under the latest agreement, the Indian Air Force will deploy three Qualified Flight Instructors (QFI) to Royal Air Force (RAF) Valley in the UK – the training base for British fast jet pilots. This marks the first time that Indian QFIs will impart fast jet training to British pilots at RAF Valley. The deployment will be initially for a period of two years. The development closely follows the first time deployment in January this year of an Indian Air Force officer as an instructor to the Royal Air Force College Cranwell – the air academy that trains the next generation of RAF officers. This marked all three British military academies now hosting Indian officers as instructors from respective services.

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BEL in orders worth Rs. 596 crore

Bharat Electronics Limited (BEL) has secured additional orders worth Rs. 596 crore since the last disclosure on 1st January 2026. Major orders received include drone detection and jamming system, mobile communication terminal, software solution, upgrades, spares, services etc.

BEL and Bellatrix Aerospace collaborate

Bharat Electronics Limited (BEL) and Bellatrix Aerospace, an Indian space tech company specialising in satellite propulsion systems and satellite subsystems, have signed a Memorandum of Understanding (MoU) to collaborate on the design, development and manufacturing of satellite systems and payloads. By combining their complementary strengths, the partnership aims to advance indigenous capabilities in satellite platforms designed for Very Low Earth Orbit (VLEO) operations.

olee.space demonstrates 10 Gbps WLCS



olee.space, a leading Indian photonics and defence technology company, announced the successful demonstration of a 20 km, 10 Gbps wireless laser communication system built predominantly with indigenous components. Designed, manufactured and tested in India with approximately 85% local content, the system validates olee.space's capability to deliver long range, high capacity optical wireless links for defence and

strategic applications under representative atmospheric conditions.

olee.space unveils AI-powered laser sniper on UGV platform

India has taken a decisive step forward in next generation battlefield technology with the development of a compact 2 kilowatt AI-enabled laser sniper system mounted on an unmanned ground vehicle (UGV) by indigenous defence technology firm olee.space. Designed



as a Directed Energy Weapon (DEW) for close combat and perimeter defence, the system can neutralise, dazzle or functionally damage hostile personnel, vehicles and equipment within seconds, offering a rapid, non-kinetic response to emerging threats.

Moog's Genesys Avionics Suite on ALH

Moog Inc, a worldwide designer, manufacturer and systems integrator of high performance precision motion and fluid controls, control systems and avionics announced a major milestone: the successful first flight of its innovative Genesys Avionics Suite aboard Hindustan Aeronautics Limited's (HAL) Advanced Light Helicopter (ALH) Dhruv NG.



Adani and Leonardo forge strategic partnership

Adani Defence & Aerospace announced the signing of a Memorandum of Understanding (MoU) with Leonardo, the global leader in defence, aerospace and security. This landmark partnership will establish a fully integrated helicopter manufacturing ecosystem in India, addressing surging military demands and propelling the nation toward self-reliance in helicopter production. Targeting the Indian Armed Forces' requirements, particularly for Leonardo's AW169M and AW109 TrekkerM helicopters, the collaboration will deliver phased indigenisation, robust maintenance, repair and overhaul (MRO) capabilities plus comprehensive pilot training.



Shield AI V-BAT UAS and Hivemind for IA

Shield AI announced that India had selected Shield AI to supply V-BATs to the Indian Army. Under the



programme, the Indian Army will receive V-BATs and licenses for Shield AI's Hivemind autonomy software, which will be integrated into the V-BAT platform. In addition to the procurement of V-BAT aircraft, the deal includes the licensing of Shield AI's Hivemind autonomy software development kit (SDK). Hivemind enables defence systems to sense, decide and act, allowing autonomous platforms to adapt to dynamic environments, avoid threats, and complete missions without human intervention.

Leonardo's interest for fighter pilot training

Leonardo is eyeing the possibility of bringing its "globally recognised fighter pilot training expertise and capabilities" to India, as the country scales up its defence requirements and modernises pilot training for new generation fighter aircraft to meet the growing demand for advanced training from partner and allied states. The company is committed to support the training of India's fighter pilots through a customised advanced/lead-in fighter training programme that meets India's growing pilot requirements.



Rolls-Royce to scale-up activities in India

Rolls-Royce has announced its intention to scale up its business in India to support future programmes and partnerships across defence, civil aviation and energy. Rolls-Royce is currently exploring opportunities in India that include the potential co-development of a next generation combat jet engine; as well as partnerships to localise and manufacture engines for the Indian Army, Navy and Coast Guard and potentially power solutions for critical infrastructure and industry. These initiatives

could more than double the size of the workforce that supports Rolls-Royce and its partners, to approximately 10,000 people in India.



IG Defence patent for fixed-wing tactical drone

IG Defence has been granted a patent for its fixed wing tactical unmanned aerial system (UAS), developed to meet the changing demands of modern battlefield operations. The platform's fixed wing architecture enables longer range, higher endurance and stable performance over extended missions. With the ability to carry a warhead payload of up to 5 kg, the system can be configured with mission specific munitions or equipment.



Indrajaal secures Rs. 100+ crore MoD contracts

Indrajaal has secured multiple contracts from the Ministry of Defence with a value of Rs. 100 crore for the deployment of its multi-layered autonomous anti-drone systems. At the core of Indrajaal's architecture is its proprietary SkyOS C5ISR platform, which integrates Command, Control, Communications, Computers, Cyber Defence, Intelligence, Surveillance, Reconnaissance, and Targeting into a single cohesive system. SkyOS enables AI-driven, real time decision making with minimal

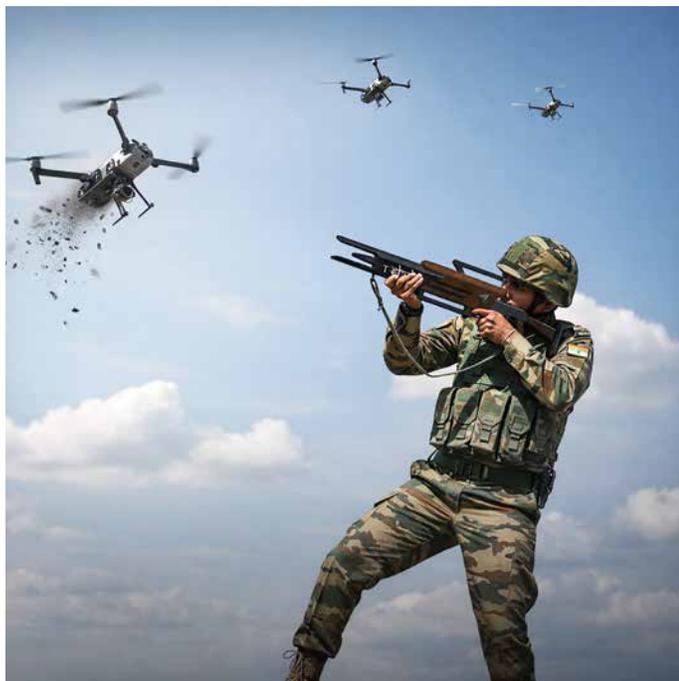
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human intervention, compressing response timelines from minutes to seconds while maintaining operational oversight.



IG Defence secures IA and IN orders

IG Defence an indigenous defence technology company, has secured orders from the Indian Army and the Indian Navy for its Made-in-India counter-drone system, the IG T-Shul Pulse anti-drone gun. The IG T-Shul Pulse is a handheld, electronic warfare based anti-drone jammer designed to disrupt and neutralise hostile drones in operational environments. Lightweight and quick to deploy, the system is intended for frontline troops, perimeter security, protection of military bases and critical strategic assets.



Bharat Forge Limited in contracts for unmanned systems

Bharat Forge Limited Aerospace Division has achieved a significant milestone in India's defence modernisation journey by securing contracts worth approximately Rs. 300 crores under the ongoing Emergency Procurement – VI (EP-VI) framework. These contracts are for the Indian

Army and also for end use at Indian Navy, cover a range of indigenous unmanned systems, including Intelligence, Surveillance and Reconnaissance (ISR) platforms and loitering munitions. The contracted platforms namely Omega One, Omega Nine, Bayonet and Cleaver, are developed for India to meet urgent operational requirements across diverse terrains and mission profiles.



NBC Bearings and Ahamani EV Technology in partnership

National Engineering Industries Ltd (NBC Bearings), the flagship engineering company of the CKA Birla Group and Ahamani EV Technology India Pvt Ltd, the Indian subsidiary of Ahamani Advanced Inc, Taiwan, announced a strategic partnership to accelerate the commercialisation and adoption of next generation drone technologies in India. As a part of this strategic partnership, NBC Bearings will invest in 30% equity stake in Ahamani India.

28-ft Heavy Drop System–20T from JCBL

The Indian Army has successfully validated the indigenous Advance 28-ft Heavy Drop System–20T (Type V), a 100% Make-in-India product developed by Airbornics Defence & Space Pvt. Ltd. (ADSL), the defence division of JCBL Group, in partnership with ADRDE (DRDO) as production partner. Compatible with heavy lift aircraft such as the C-130 and C-17, the system enables aerial deployment of heavy combat platforms and strategic cargo across operational terrains.



Sigma Advanced Systems wins MoD order

Sigma Advanced Systems has secured fresh orders worth about Rs. 100 crore from the Ministry of Defence and associated defence PSUs. The contracts relate to ongoing strategic programmes across missile systems, naval platforms and airborne applications, under which Sigma will supply built-to-spec systems, control electronics and actuation solutions. The scope of work covers surface-to-air missile (SAM) programmes that support next generation air defence platforms, as well as anti-tank missile programmes involving critical built-to-spec electronics and flight control systems. Sigma will also contribute to new generation anti-radiation missile programmes through precision guidance systems, and to naval weapon systems, where it will provide actuation solutions for underwater platforms.

BEA agreement with Krusik, Serbia

Brahmastra Explosives Ammunition (BEA) has announced the signing of an exclusive Business and Technical Cooperation Agreement with Holding Corporation Krusik, Serbia. The agreement not only establishes a robust framework for sales and technology transfer but also paves the way for joint sales initiatives, strategic market expansion, and collaborative product innovation. Brahmastra Explosives Ammunition will lead initiatives in sales, technology transfer, and product development whereas Holding Corporation Krusik, Serbia will provide comprehensive support to ensure seamless execution across sales operations, technology integration, and new product development.



The ePlane Company integrates HENSOLDT avionics

Ubify Technologies (The ePlane Company), India's leading developer of electric Vertical Takeoff and Landing (eVTOL) aircraft, has announced a strategic partnership with HENSOLDT Avionics, a global leader from Germany in sensor solutions and mission management electronics. This integration forms part of the e200X transition from subscale to full scale prototype development. By integrating HENSOLDT's advanced avionics suite, ePlane

is equipping its flagship aircraft with a "digital nervous system" designed for uncompromising safety, situational awareness, and operational efficiency in dense urban environments.



NewSpace in MAPSS order

NewSpace Research & Technologies Pvt. Ltd, an iDEX startup, has secured a procurement order from the Indian Army for the indigenous MAPSS (Medium Altitude Persistent Surveillance System) UAV, developed under iDEX.



Jyoti Global Plast and military drones

Jyoti Global Plast announced the launch of AeroDrop, a military grade unmanned aerial platform, marking the company's strategic expansion into defence focused unmanned aerial systems. AeroDrop has been developed as a tactical payload delivery UAV, capable of deploying "mission specific defence payloads with high accuracy and control". The platform supports a maximum take-off weight of 25 kg and a payload capacity of up to 7 kg, with dedicated hardpoints for 5-7 payloads and an automatic payload release mechanism to enable precise deployment during operational missions.



BEL and SASMOS to strengthen indigenisation

Bharat Electronics Limited (BEL) and SASMOS HET Technologies Ltd have signed a Memorandum of Understanding (MoU) to collaborate on advanced defence technologies. This strategic partnership is aligned with the Government of India's Atmanirbhar Bharat mission and focuses on co-development and co-indigenisation in key technology domains, including fibre optics and photonics, tank electronics, naval systems and airborne platforms.



SDHI in export order from Oman

Swan Defence and Heavy Industries Limited (SDHI), India's largest shipbuilding and heavy fabrication company, has secured a defence export order from the Government of Sultanate of Oman to supply a state-of-the-art training ship. The vessel that will support the Royal Navy of Oman's (RNO) advanced naval training and maritime operations, is expected to be delivered within 18 months.



IG Defence unveils Project KAL

"With long range one way attack drones emerging as a defining feature of modern warfare—seen recently in conflicts involving Iran, Israel and the United States—

Project KAL aims to develop a Made in India deep penetration unmanned strike platform designed to expand India's indigenous combat drone capabilities. The drone is being envisioned with a projected range of up to 1,000 kms and an endurance of three to five hours, enabling it to operate deep inside contested environments and engage strategic targets such as logistics hubs, radar installations and other high value military assets", stated the company.



Avantel in order from NewSpace India Limited

Avantel Limited has received a purchase order worth Rs. 122 crore from NewSpace India Limited (NSIL) for the supply of S/X-band with Ka-band ready full motion antennas. NSIL is the commercial arm of the Indian Space Research Organisation (ISRO) and is responsible for commercialising space products and services, including launch services, satellite services and transfer of space technologies to industry. The order covers the supply, installation and commissioning of the antennas and forms part of NSIL's satellite communication and ground segment requirements. The contract is scheduled for completion by August 2027.

SRL in fresh IN orders

Shree Refrigerations Limited (SRL) has secured multiple fresh orders worth more than Rs 40 crore from the Indian Navy. These orders, predominantly pertain to retrofitting/upgrading existing equipment with newer and higher performance equipment and replenishing spare parts for earlier installed equipment.

GRSE-KSSL collaboration

Garden Reach Shipbuilders & Engineers (GRSE) Ltd signed a Memorandum of Understanding with Kalyani Strategic Systems Limited (KSSL) on 5 March 2026, to jointly develop and promote indigenous solutions for advanced naval systems, unmanned platforms and other strategic maritime capabilities for domestic and global markets.



Indian Navy assumes first ever command of CTF 154

In a landmark development “underscoring India’s commitment to collaborative maritime security and capacity building” in the Indian Ocean Region and beyond, the Indian Navy has assumed command of Combined Task Force (CTF) 154, a key multinational training task force under the Combined Maritime Forces (CMF). CTF 154 is specifically oriented towards training and capacity building of member nations of CMF.



IN contract for 3 ‘bottom opening non-propelled barges’

A contract for construction and delivery of 3 x 200T Bottom Opening Non-Propelled Barges has been concluded with Suryadipta Projects Private Limited, Thane (MSME Shipyard) on 16 January 2026. These barges are the proud flag bearers of Make in India and Aatmanirbhar Bharat initiative of Govt of India and will be built under the Classification Rules of Indian Register of Shipping (IRS).

Contract for 4 self-propelled fuel barges

A contract for construction of 4 X 500T Self Propelled Fuel Barges was concluded with Shoft Shipyard Private Limited, Thane (MSME Shipyard) on 2 March 2026. The primary role of these barges will be replenishment of fuel to ships and submarines in harbour and at anchorage.

R11 is 1000 “traps strong”

INS Vikrant R11, on 3 March 2026, achieved 1000 successful and safe arrested landings, marking a “testament to relentless teamwork and combat readiness”. RAdm Vivek Dahiya, FOCWF commended Team Vikrant and her embarked squadrons for this proud operational milestone.



GRSE commences production of two CRV’s

Garden Reach Shipbuilders and Engineers (GRSE) Ltd commenced construction of two Coastal Research Vessels (CRVs) it is building for the Geological Survey of India (GSI), with a ceremonial steel cutting on 14 February 2026.



Indian Navy commissions Anjadip

The Indian Navy has enhanced its anti-submarine warfare (ASW) capabilities with the commissioning of Anjadip, the third vessel of the eight ship Anti-Submarine Warfare Shallow Water Craft (ASW-SWC) project.



GRSE lays keel for third MPV

In yet another major milestone in its export programme, Garden Reach Shipbuilders and Engineers (GRSE) Ltd laid the keel for the third vessel under the Multi-Purpose Vessel (MPV) project being built for Germany’s Carsten Rehder Schiffsmakler and Reederei GmbH & Co. KG on 23 February 2026.



AI's 3rd Diamond DA42 NG

The third Diamond DA42 NG for Air India arrived in India mid-January 2026. Part of the 34 trainer aircraft order from December 2024, it arrived just weeks after the first two twin engine Diamonds were welcomed from the manufacturer's facilities in Austria. They join the 13 Piper single engine trainers already shipped from Florida, strengthening Air India's pilot training ecosystem. Together, these aircraft will soon support cadet training at South Asia's largest Flying Training Organisation in Amravati, Maharashtra.



TrueNoord leases two ATR 72-600s to FLY91

TrueNoord, has further strengthened its presence in India with the delivery of two ATR 72-600 aircraft on long term operating leases to Just Udo Aviation Private Limited (FLY91). The first aircraft, MSN 1233, was delivered in late December 2025 and is already operational with the Indian regional airline. The second, MSN 1236, was delivered in mid-January 2026. The delivery of FLY91's third and fourth aircraft is another step in the carrier's planned growth to a fleet of 30 aircraft by 2029. ➔



APPOINTMENTS

Air Marshal Inderpal S. Walia is AOC-in-C EAC

Air Marshal Inderpal Singh Walia assumed the Appointment of Air Officer Commanding-in-Chief, Eastern Air Command, IAF on 1 February 2026. He is an alumnus of the National Defence Academy and was commissioned in the Fighter stream of the Indian Air Force on 11 June 1988. The Air Officer is qualified on all variants of the MiG-21, MiG-23, MiG-27, Jaguar and Su-30MKI. He has over 3200 hrs of accident/incident free flying. In a career spanning over three decades, the Air Officer has tenanted various Command and Staff appointments. He has commanded a MiG-27 Squadron, the Tactics and Air Combat Development Establishment (TACDE) and was Air Officer Commanding of a frontline base.



Mr. BP Singh is DG Naval Armament

Mr. BP Singh Assumed Charge as Director General of Naval Armament (DGONA) at Naval Headquarters, New Delhi, on 1 March 2026. A Mechanical Engineering graduate from Bihar College of Engineering (now National Institute of Technology), Patna, Mr. BP Singh brings with him over three decades of experience in the Naval Armament Organisation. Prior to his appointment as DGONA, he was serving as Chief General Manager, Naval Armament Depot (NAD), Mumbai, where he led critical operational, logistics and infrastructure initiatives.



Ministry of Defence Union Budget 2026-27

In the Union Budget post Operation Sindoor, Defence Services have received an unprecedented allocation amounting to Rs 7.85 lakh crore for the Financial Year (FY) 2026-27. This allocation stands at 2% of the estimated GDP for the next Financial Year and shows a significant increase of 15.19% over the Budgetary Estimates (BE) of FY 2025-26. Total Defence budget is 14.67% of the Central Government expenditure and is the highest among the Ministries.



In addition to the modernisation of the Armed Forces and financing their regular requirement, the significantly enhanced allocation will also cater for the financial requirements that have arisen due to the emergency procurement of arms and ammunition made subsequent to Operation Sindoor under both the categories viz. Capital and Revenue. A large share of the defence budget to the tune of Rs 2.19 lakh crore has been allotted for capital expenditure vis-à-vis Rs 1.80 lakh crore which was allotted as BE of FY 2025-26. Through this enhanced provision, the Government has reaffirmed its resolve to transform the Armed Forces and their capabilities to the world's highest standards with a strategic shift towards the goal of Aatmanirbhar Bharat.

Out of the total allocation made to the Ministry of Defence (MoD), a share of 27.95% is for capital expenditure, 20.17% for revenue expenditure on sustenance and operational preparedness, 26.40% for revenue expenditure on pay and allowances, 21.84% for Defence Pensions and 3.64% for civil organisations.

For FY 2026-27, budgetary allocation under capital head to the Defence Forces stands at Rs 2,19,306.47 lakh crore, which is 21.84% more than the Budget Estimates of FY 2025-26. Out of this, Rs 1.85 lakh crore is earmarked for Capital Acquisition, which is approximately 24% higher than the Capital Acquisition budget for FY 2025-26. In the current geo-political scenario, quantum jump in the modernisation budget is a strategic imperative. During FY 2025-26, up to 3rd quarter i.e., till December 2025, MoD has concluded contracts worth Rs 2.10 lakh crore and has, so far, given Acceptance of Necessity approval for more than Rs 3.50 lakh crore. The upcoming projects under capital acquisition will equip the Armed Forces with next generation fighter aircraft, smart and lethal weapons, ships/submarines, unmanned aerial vehicles, drones, specialist vehicles, etc.

Interruption in global supply chains and prioritisation of domestic requirements over foreign sellers has re-emphasised the need for import substitution and going for indigenisation not only for sustenance but for future



modernisation. In line with this, MoD's policy to earmark funds to boost domestic industries through budgetary policies has been further strengthened by earmarking Rs 1.39 lakh crore i.e., 75% of the Capital Acquisition budget for procurement through domestic industries during the FY 2026-27. Through such earmarking of funds, domestic players have been reassured about their investment and their increasingly greater role in capability development of the Armed Forces. Enhanced allocation for Capital Acquisition, especially for domestic industries, will have long term positive impact on the national economy and will lead to development of many ancillary industries, creating job opportunities in the country.

Defence budget has made a provision of Rs 3,65,478.98 crore for spending under revenue heads. This allocation is 17.24% higher than the allocation for BE 2025-26. Out of this, Rs 1,58,296.98 crore has been allocated for operation and sustenance related expenditure and the remaining for salary and allowances. The budgetary provision made in this regard for the upcoming FY will facilitate procurement of operationally important stores, spare parts etc. and will ensure maintenance of vital platforms in addition to catering for their day-to-day requirements.

The Government has reiterated its commitment to providing better infrastructure in border areas through



higher allocation to the Border Roads Organisation (BRO). Accordingly, budgetary allocation to BRO under Capital for BE 2026-27 has been enhanced to Rs 7,394 crore from Rs 7,146.50 crore for FY 2025-26. The said allocation will cater to many strategically significant projects such as tunnels, bridges, airfields, etc. and will promote regional development and tourism, along with providing last mile connectivity in the border areas.

The budgetary allocation to Defence Research and Development Organisation (DRDO) has been increased to Rs 29,100.25 crore in FY 2026-27 from Rs 26,816.82 crore in FY 2025-26. Out of this allocation, a major share of Rs. 17,250.25 crore is allocated for capital expenditure. ➡

Text and photos: MoD

Dhvani: The Lethal Glider

The Dhvani missile is an upcoming Indian Hypersonic Glide Vehicle (HGV) being developed by the Defence Research & Development Organisation's Aeronautical Research & Development Centre (ARDC) in collaboration with the Defence Metallurgical Research Laboratory (DMRL). Successful development will position India among a select group of countries with hypersonic weapons. It is designed to travel at speeds greater than Mach 6 (7,400 km/h), at the same time making sharp plasma sheath defying evasive manoeuvres mid-flight making it difficult to intercept, and has the capability to penetrate layered defences. With an estimated range of several thousand kilometres, the stealthy "blended wing body" missile will be launched to the edge of the atmosphere with a rocket booster at an altitude of 100 km and then execute controlled glides to its target at hypersonic speeds by a scramjet engine.

Incorporating advanced stealth and ceramic composites plus ablative coating based thermal protection technologies (will be able to withstand temperatures of 2,000 to 3,000°C during hypersonic flight) the missile will be capable of carrying both conventional and nuclear warheads. In this context, DRDO has successfully demonstrated the hypersonic air-breathing scramjet technology with the flight test of Hypersonic Technology Demonstration Vehicle (HSTDV), (also capable of propelling manoeuvring nuclear warheads) at 11.03 a.m. on 7 September 2020 from the Launch Complex 4 of the Integrated Test Range (ITR) at Abdul Kalam Island (former Wheeler). Lofted to an altitude of 30 km by a proven solid rocket motor, the HSTDV working at high dynamic pressure and high temperature sustained a speed of Mach 6, for 20 seconds.

By Sayan Majumdar

MoD contracts and AoN's

DAC clears Rs 3.60 lakh crore proposals

The Defence Acquisition Council, under the chairmanship of Raksha Mantri Rajnath Singh, accorded Acceptance of Necessity (AoN) for various proposals of the Services at an estimated value of about Rs 3.60 lakh crore, on 12 February 2026. For the Indian Air Force (IAF), AoN was approved for the procurement of Multi Role Fighter Aircraft (MRFA) Rafale, combat missiles and air-ship based high altitude pseudo satellite (AS-HAPS).



The majority of MRFA to be procured will be manufactured in India. The combat missiles will enhance the stand-off ground attack capability with deep strike power and very high accuracy. The AS-HAPS will be utilised towards carrying out persistent Intelligence, Surveillance and Reconnaissance, Electronic Intelligence, telecommunication and remote sensing for military purposes.

For the Indian Army, AoN was accorded for the procurement of anti-tank mines (Vibhav) and overhaul of vehicle platforms of armoured recovery vehicles (ARVs), T-72 tanks and infantry combat vehicles (BMP-II). Vibhav mines will be laid as anti-tank obstacle system to delay the advance of enemy mechanised forces. The overhaul of vehicle platforms of ARVs, T-72 tanks and BMP-II will enhance service life of equipment ensuring readiness and operational effectiveness of the Indian Army.

For the Indian Navy, AoN was cleared for 4 MW Marine Gas Turbine based Electric Power Generator and P-8I long range maritime reconnaissance aircraft. Induction



of 4 MW Marine Gas Turbine based Electric Power Generator under Make-I category of Defence Acquisition Procedure 2020 will minimise the dependency on foreign manufacturers, ensure self-reliance in power generation requirement of Indian Navy. The acquisition of P-8I aircraft will significantly boost the Navy's combat/war-fighting capability of long range anti-submarine warfare, maritime surveillance and maritime strike capability.

For the Indian Coast Guard (ICG), AoN was accorded for the procurement of electro-optical/infra-red system for Dornier aircraft. The procurement will assist in enhancing the efficacy of maritime surveillance capability of the ICG.

Contracts for ALH Mk-III (MR) and VL-Shtil missiles

Ministry of Defence, on 3 March 2026, signed for the acquisition of six HAL Advanced Light Helicopters (ALH) Mk-III (Maritime Role) for the Indian Coast Guard (worth Rs 2,901 crore) and surface-to-air vertical launch Shtil missiles for the Indian Navy. The contract for the procurement of Shtil missiles and associated missile holding frames, valued at Rs 2,182 crore, has been signed with JSC Rosoboronexport, Russian Federation.



Contract with HAL for 8 Dornier 228s

Ministry of Defence has signed a contract with Hindustan Aeronautics Limited (HAL), Transport Aircraft Division, Kanpur for the acquisition of eight Dornier 228 aircraft along with Operational Role Equipment for the Indian Coast Guard (ICG) at a cost of Rs 2,312 crore under Buy (Indian) category on 12 February 2026. ➡



Exercise MILAN



Raksha Mantri Mr. Rajnath Singh called upon the international community to effectively tackle the evolving complex and interconnected challenges at sea while acting in the spirit of mutual respect and give and take. He was addressing Navy Chiefs and Heads of Delegations from 74 countries during the inaugural ceremony of Exercise MILAN at Visakhapatnam, Andhra Pradesh on 19 February 2026.

“The role of Navies in international peacemaking has only increased over time. There has been an exponential economic growth during last few decades leading to massive increase in international trade and transport. There has also been a rise in contests for ownership of straits and channels, sometimes causing threats of flare up. Increasing international attention to underwater resources, particularly rare earth minerals are adding a new dimension to this tension. In addition, there is a need to guard our waters from the nefarious terrorist activities which are spreading tentacles across countries and regions,” stated Raksha Mantri.

Pointing out that the established international order was witnessing an upheaval, Mr. Rajnath Singh stated that platforms like MILAN brought together professional expertise, building mutual trust, enhance interoperability and enabling coordinated responses to common challenges.

Raksha Mantri described MILAN 2026, with the participation of 74 nations, as a reflection of the confidence the global maritime community places in India as a trusted and responsible maritime partner. “MILAN 2026 seeks to enhance interoperability among navies of partner countries, improve professional competence by sharing of professional experiences and practices, and deepen friendships by evolving bonds of mutual advantage. We aspire to establish an equitable maritime order based on international rules and freedom of navigation in accordance with international law,” he said.

In his opening remarks, Chief of the Naval Staff Admiral Dinesh K Tripathi likened MILAN to a Maritime Mahakumbh, wherein maritime professionals from across the world came together, united by a common commitment and purpose to keep the seas safe, secure and

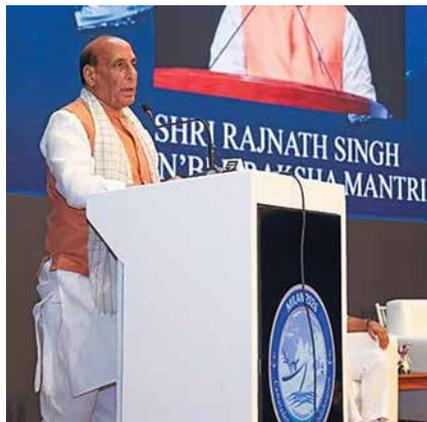
open. He emphasised that a maritime nation like India clearly recognised that today’s maritime challenges were complex, interconnected and transnational, that were best addressed through cooperation and partnership.

Admiral Dinesh K Tripathi asserted that during MILAN 2026, the navies would engage in complex maritime manoeuvres, drills and exercise, professional exchanges and insightful discussions. While enhancing mutual understanding, trust and interoperability, these interactions would also help in learning from each other’s experience and expertise, he said.

MILAN 2026 is among the largest and most complex editions of the Indian Navy exercise to date, bringing together naval ships, aircraft, and professional delegations from 74 countries. The exercise aimed to deepen professional relationships, enhance operational compatibility, and promote a shared understanding of contemporary maritime challenges in an increasingly interconnected security environment.

The Exercise was conducted in two phases - Harbour Phase and Sea Phase. The Harbour Phase focussed on strengthening professional interaction, fostering mutual understanding, enhancing cooperation and people-to-people linkages through a comprehensive programme of engagements. Key activities during this phase included the International Maritime Seminar, Subject Matter Expert Exchanges, bilateral engagements, MILAN of Young Officers, and cross-deck visits among participating navies. The Harbour Phase also included pre-sail planning conferences, operational and technology demonstrations, city and cultural tours, sports interactions, and a MILAN Cultural Evening, providing participating personnel and delegations opportunities for meaningful interaction beyond operational engagements.

The Sea Phase featured a series of advanced operational exercises at sea, designed to enhance maritime cooperation and interoperability among participating navies. These exercises included coordinated maritime security operations, tactical manoeuvres and communication drills, thereby “strengthening mutual trust, operational synergy and collective readiness”. ➡



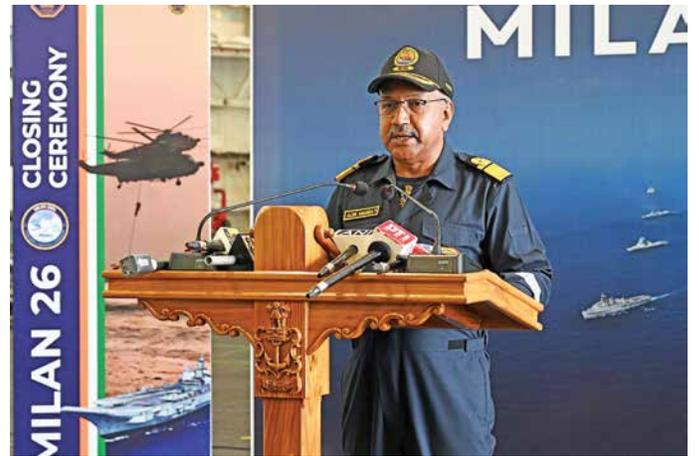
MILAN 2026 concludes successfully

Exercise MILAN 2026, the Indian Navy's premier multilateral maritime exercise, culminated on 25 February 2026 with a closing ceremony conducted onboard India's indigenous aircraft carrier, INS Vikrant, off the coast of Visakhapatnam. The ceremony was presided over by Rear Admiral Alok Ananda, Flag Officer Commanding Eastern Fleet (FOCEF). Commanding Officers and officers from all participating units attended the ceremony, marking the successful completion of the exercise and celebrating the enduring bonds forged across the vast expanse of the Bay of Bengal.

Held under the theme 'Camaraderie, Cooperation, Collaboration', MILAN 2026 witnessed participation on an unprecedented scale, comprising 42 ships and submarines and 29 aircraft. These also included 18 ships from the participating Friendly Foreign Countries. Further, apart from integral helicopters onboard the Friendly Foreign Country ships, maritime patrol aircraft from France, Germany and USA also participated.

Live firings as part of surface gun shoots and FPM drills as well as anti-air firings were also undertaken. Emphasis was placed on real-time coordination, joint mission planning and logistical support at sea. Friendly Foreign navies participated in high-tempo tactical manoeuvres alongside Indian naval ships, reflecting growing convergence of maritime interests towards ensuring safe and secure seas.

During the closing ceremony onboard the indigenous aircraft carrier INS Vikrant, Commanding Officers of all



participating ships expressed their deep appreciation for the professional conduct and meticulous planning that characterised MILAN 2026. They unanimously affirmed that the exercise had comprehensively achieved its training objectives and operational aims, significantly enhancing interoperability, mutual understanding and collective maritime readiness. ➡



International Fleet Review 2026



The Indian Navy successfully conducted the International Fleet Review (IFR) 2026 off the coast of Visakhapatnam on 18 February 2026, with participation from 74 countries, marking a grand maritime spectacle that showcased global naval cooperation, professional camaraderie and India's maritime capability. IFR 2026 marked the third International Fleet Review hosted by India, following earlier editions at Mumbai (2001) and Visakhapatnam (2016).

The President of India, Smt. Droupadi Murmu and Supreme Commander of the Armed Forces, reviewed the Fleet from INS Sumedha, an indigenously built Offshore Patrol Vessel, which served as the Presidential Yacht for the occasion. INS Sumedha was adorned with the Ashoka Emblem and flew the President's Standard at the mast.

Following a Ceremonial Guard of Honour by a 150 person contingent and a 21 Gun Salute, the President embarked onboard INS Sumedha and sailed past the assembled Fleet of 52 anchored ships off the Visakhapatnam coast. A total of 85 ships, including 19 foreign warships participated in the fleet review, reflecting the scale and diversity of maritime participation. The Indian fleet included 60 ships of the Indian Navy, four Indian Coast Guard vessels, and one ship each from the Shipping Corporation of India and the National Institute of Ocean Technology.

The review also featured three Indian Navy submarines, one French Atlantique maritime patrol aircraft, and participation by over 60 aircraft, underscoring the multi-domain operational capability and the coordinated maritime presence on display.

The President also reviewed the Indian Naval Air Arm, marked by a flypast of helicopters and fixed wing aircraft. This was followed by a mobile column of warships and submarines steaming past the Presidential Yacht. The event further featured maritime and waterfront demonstrations, including a Parade of sails, Search and Rescue operations and aerial manoeuvres by Hawk aircraft.

Addressing the occasion, President highlighted, "The spirit of friendship on display today through participation of so many friendly foreign countries highlights the truth that we are collected rather than divided by the seas. India's approach to international relations, including the maritime domain, is guided by our ethos of 'Vasudhaiv Kutumbakam' or 'the world is one family'. This approach

reflects the wisdom that global security, growth, sustainability and stability are built through friendship." She further remarked, "The review also takes forward India's vision of MAHASAGAR, which stands for 'Mutual and Holistic Advancement for Security and Growth Across Regions'. The spirit of togetherness is well confirmed in this message of this review- 'United through Oceans'. It is a positive message to the global community that it is the collective naval strength that can overcome maritime challenges".

The International Fleet Review 2026 reaffirmed India's commitment to maritime cooperation, interoperability and collective security, in keeping with the theme "United Through Oceans", while highlighting the Indian Navy's indigenous capability, operational professionalism and enduring partnerships with like minded navies. ➡



Goa Maritime Conclave 2026

The 5th Edition of the Goa Maritime Conclave (GMC-26) was successfully conducted at Naval War College, Goa on 21 February 2026, bringing together Chiefs of Navies and senior maritime leaders from 15 Indian Ocean Region nations. The Conclave reaffirmed the collective commitment of regional partners to strengthen cooperative mechanisms aimed at addressing common maritime security challenges in the Indian Ocean Region (IOR).

Organised by the Indian Navy under the overarching theme of “Common Maritime Security Challenges in the IOR – Progressing Lines of Efforts (LoOE) to Mitigate Dynamic Threats”, GMC-26 underscored India’s continued role as a convenor of structured maritime dialogue and an enabler of collaborative security architecture in the region. Conducted in consonance with the Prime Minister’s vision of ‘MAHASAGAR – Mutual and Holistic Advancement for Security and Growth Across Regions’, the conclave provided a structured platform for deliberations focused on actionable outcomes and collaborative implementation frameworks.

In his keynote address, Admiral Arun Prakash (Retd), former Chief of Naval Staff, highlighted that the evolving maritime security environment demands synchronised regional responses anchored in real time information exchanges, institutionalised coordination mechanisms and sustained capacity development. He emphasised that addressing challenges such as Illegal, Unreported and Unregulated (IUU) fishing, trafficking networks and other transnational maritime crimes required collective ownership and shared responsibility among IOR nations.

The first session moderated by Vice Admiral G Ashok Kumar, (Retd), former National Maritime Security Coordinator, focused on enhancing mechanisms for real time exchanges of maritime information and operational coordination to counter IUU fishing, drug trafficking and other illegal maritime activities. The speakers in this session were Rear Admiral TVN Prasanna, of the Indian Navy and Colonel Amanulla Ahmed Rasheed from Maldives. Issues of trans-national significance like strengthening maritime domain awareness networks, interoperability of information sharing systems and the need for structured institutional linkages to enable rapid and coordinated responses across jurisdictions were highlighted by the speakers.

The second session examined collaborative pathways for capacity building and capability enhancement among maritime agencies of the IOR. Rear Admiral Srinivas Maddula and Captain (IN) Ranendra S Sawan, Senior Fellow, National Maritime Foundation, shared their insights, with Admiral Karambir Singh, (Retd), former Chief of the Naval Staff and Chairman, National Maritime Foundation, moderating the session. The ensuing deliberations highlighted the importance of pooling regional training resources, expanding professional exchange programmes and strengthening institutional frameworks to ensure long term maritime

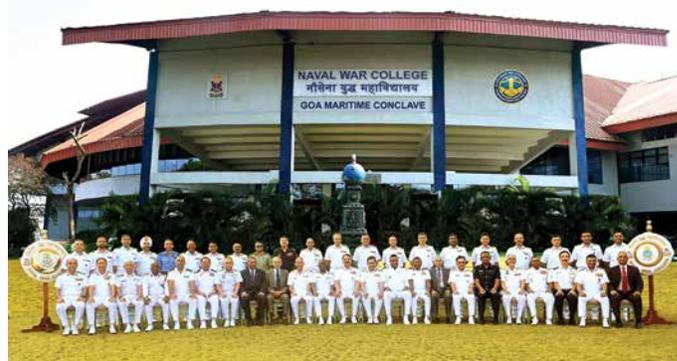
resilience. The session reinforced the understanding that sustainable maritime stability in the IOR is contingent upon coordinated capability development and structured cooperation.

The Conclave concluded with addresses by Chiefs of Navies and Heads of Delegations, who articulated national perspectives on advancing collaborative Lines of Efforts to mitigate dynamic maritime threats.

Adm Dinesh K Tripathi, CNS conveyed sincere appreciation to all partner nations for their participation and enduring commitment to shared maritime security in the Indian Ocean Region. He underscored that in an era of adaptive maritime threats, we must move from shared awareness to coordinated action by leveraging technology, seamless information sharing and focused operations under the vision of MAHASAGAR.

The deliberations reflected strong convergence on strengthening regional maritime partnerships, institutionalising cooperation mechanisms and enhancing collective capacity.

In its fifth iteration, the Goa Maritime Conclave reaffirmed India’s commitment to fostering inclusive, consultative and action oriented maritime cooperation in the Indian Ocean Region. GMC-26 once again resolved to uphold safe, secure and stable seas through structured collaboration, real time information exchange and coordinated capacity development initiatives.





India assumes Chairmanship of IONS

The 9th Conclave of Chiefs of the Indian Ocean Naval Symposium (IONS) convened at Visakhapatnam on 20 February 2026, bringing together Chiefs of Navies and Heads of Maritime Security Agencies from 33 countries, representing IONS Members, Observers, and other Indian Ocean littoral nations. Participation spanning from the Atlantic to the Pacific reflected the growing alignment of like minded navies committed to strengthening maritime cooperation and security in the Indian Ocean Region.

In a historic moment for the forum, the Indian Navy assumed the Chairmanship of IONS from the Royal Thai Navy, marking India's return to the helm after 16 years. Having earlier held the inaugural Chairmanship from 2008 to 2010, India now takes forward the forum that has evolved into a central platform for professional maritime collaboration. Adm Dinesh K Tripathi, Chief of the Naval Staff and Chair of IONS, articulated a clear and forward leaning vision to reinforce the functional relevance of IONS by strengthening its Working

Groups on Maritime Security, Humanitarian Assistance and Disaster Relief, and Information Sharing and Interoperability as the principal drivers of cooperation.

Key developments during the Conclave included the launch of the upgraded IONS website, undertaken by the Indian Navy to enhance usability, institutional continuity, and secure engagement among member navies. The Philippines was included as an Observer and Oman joined the IONS Working Group on HADR, further enhancing the scope of collaborative engagement under IONS and widening forum's cooperative reach.

India also outlined initiatives to be advanced during its tenure, including the conduct of the IONS Maritime Exercise (IMEX), continued deployment of IOS SAGAR to IONS member countries with participation of personnel from IONS navies and maritime security agencies onboard, and structured Maritime Information Sharing Workshops and dialogues aimed at enhancing operational interaction, professional exchange and capability enhancement.

The 9th Conclave marks a renewed phase in the evolution of IONS. As India assumes the Chair, it signals strengthened momentum, expanded engagement, and a deeper collective commitment to maritime stability in the Indian Ocean Region. ➡



International City Parade 2026



The International City Parade (ICP), conducted on 19 February 2026 at Visakhapatnam as part of the International Fleet Review (IFR) 2026, witnessed enthusiastic participation from the public and served as a major outreach initiative, reflecting India's maritime ethos through a seamless integration of operational capability, ceremonial display and cultural expression.

The Governor of Andhra Pradesh, Mr. S Abdul Nazeer, graced the occasion as the Chief Guest, and the event was hosted by Adm Dinesh K Tripathi, Chief of the Naval Staff. The event was also attended by State ministers, Senior Central and State Government officials, former IN Chiefs, Naval Chiefs and Heads of Delegations from participating Friendly Foreign Countries, senior officers of the Indian Navy and a large gathering of spectators.

Marching contingents comprising officers and personnel of the Indian Navy, Indian Army, Indian Air Force and Indian Coast Guard, along with contingents from participating foreign navies, the Sea Cadet Corps, National Cadet Corps and State Police formed the central feature of the parade. Dressed in ceremonial uniforms, the marching and cultural contingents reflected shared maritime traditions, discipline and professional camaraderie of navies from across the world, symbolising unity and cooperation.

Adding to the grandeur of the International City Parade, the Naval Air Arm was showcased as part of the



proceedings, reflecting the Indian Navy's integrated and multi-domain capabilities. Following the operational and ceremonial displays, Adm Dinesh K Tripathi, Chief of the Naval Staff, addressed the gathering and highlighted the significance of the International City Parade as a 'Unique interface between the Indian Navy, participating foreign navies and the citizens'.

The International City Parade concluded with the illumination of ships at anchorage, followed by a laser and drone show and fireworks, creating a visually striking finale. The waterfront and parade routes witnessed large public turnout, during the event. ➡



President takes sortie in the LCH



The President of India, Smt Droupadi Murmu undertook a sortie in the indigenous Light Combat Helicopter Prachand at Air Force Station Jaisalmer, Rajasthan on 27 February 2026. Earlier, she had undertaken sorties in Sukhoi 30MKI and Rafale in 2023 and 2025, respectively.

The mission was undertaken as a two aircraft LCH formation. President Droupadi Murmu flew in the lead aircraft with Gp Capt Nayan Shantilal Bahua, while Chief of Air Staff, Air Chief Marshal AP Singh and Gp Capt A Mahendra flew as Number 2 in the second aircraft. During the approximately 25 minute mission, they flew over Gadisar Lake and Jaisalmer Fort and attacked a Tank Target.



Later in the visitor's book, the President expressed her feelings by writing a brief note in which she said, "The sortie in India's indigenously developed Light Combat Helicopter 'Prachand' is an enriching experience for me. This sortie has filled me with a renewed sense of pride in the nation's defence capabilities. I congratulate the Indian Air Force and the entire team of Air Force Station Jaisalmer for successfully organising this sortie".

In the evening, the President witnessed the Indian Air Force's Exercise Vayu Shakti at Jaisalmer. ➡



Exercise 'Vayushakti-26' at Jaisalmer



The Indian Air Force (IAF) successfully conducted Exercise Vayushakti-26 at Pokhran Field Firing Range, Jaisalmer, demonstrating its “formidable combat readiness, operational synergy and technological prowess across full spectrum of air operations” on 27 February 2026.

The President of India, Smt. Droupadi Murmu graced the Fire Power Demonstration as the Chief Guest, accompanied by dignitaries including the Governor of Rajasthan, Haribhau Kisanrao Bagde, Raksha Mantri, Rajnath Singh, Minister of Civil Aviation, Kinjarapu Ram Mohan Naidu, Minister of Culture and Tourism, GS Shekhawat, Chief Information Commissioner, Raj Kumar Goyal, Cabinet Secretary, Dr TV Somanathan, Chief of Defence Staff, Gen Anil Chauhan, Commanders-in-Chief of Indian Air Force and Indian Navy, Senior Officers of the three Services, Officers of the Centre and State Governments, DPSU’s, former air chiefs, esteemed veterans, Defence Attaches from friendly foreign countries, Indian and international media and school children.

The exercise showcased IAF’s capability to execute complex, integrated air operations within a dynamic and realistic battlefield environment. Earlier in the day, the President undertook a sortie in the indigenously developed

LCH Prachand, reflecting “India’s growing self-reliance in defence manufacturing under the vision of Atmanirbhar Bharat”.

For the first time, Exercise Vayushakti was executed along a defined operational storyline, transforming into simulated live combat theatre. The exercise seamlessly integrated offensive air strikes, air defence operations, Special Forces missions and humanitarian assistance, highlighting IAF’s role as a multi-domain, integrated force and nation’s first responder.

The exercise commenced with National Song and National Anthem, accompanied by a ceremonial flypast of Chetak helicopters carrying National Flag, Air Force Ensign and Operation Sindoor Flag. This was followed by a precisely timed sonic boom by a Rafale fighter, setting the stage for high-intensity combat missions.

Over 130 aircraft participated in a day and night exercise including Rafale, Su-30MKI, Mirage 2000, MiG-29, Jaguar, Hawk, Mi-17, C-130J, C-295, C-17, the indigenous Advance Light Helicopter (ALH) Dhruv and Light Combat Helicopter (LCH) Prachand. Fighter aircraft executed precision strikes on simulated enemy targets using advanced air-to-ground weapons, including precision guided munitions and long range strike

capabilities, underscoring IAF's ability to deliver decisive firepower with accuracy.

Air defence capabilities were demonstrated through coordinated engagements involving airborne platforms and ground based systems such as Akash and Spyder missile systems, supported by Army air defence assets, like L-70 and M-777 reflecting seamless jointmanship between air and ground forces. Special operations and humanitarian assistance missions formed a key component of the exercise. As dusk fell, Garud Special Forces, along with Para SF elements, were inserted by Mi-17 helicopters to conduct simulated urban intervention and hostage rescue operations. This was followed by assault landings and evacuation by C-130 and C-295 aircraft from Advanced Landing



Ground, reaffirming IAF's critical role in rapid response and casualty evacuation.

The night phase of the exercise showcased integrated air defence and air-landed operations, followed by precision night strikes by multiple fighter platforms, demonstrating IAF's capability to dominate the battlespace round-the-clock. The exercise concluded with a symbolic ceasefire fly-past by a C-17 aircraft, followed by a drone display celebrating IAF's legacy and achievements.

Guided by its core values of "Achook, Abhedya aur Sateek", Exercise Vayushakti-26 validated IAF's operational doctrine, joint integration and technological capabilities reaffirming its role as a key enabler of India's comprehensive national power and strategic deterrence.

Text and images: MoD/IAF



Vayu Shakti through the lens of Himanshu Dhingra

The desert ranges of Pokhran once again reverberated with the thunder of jet engines and precision firepower as the Indian Air Force conducted Vayu Shakti 2026, its flagship firepower demonstration in February 2026. The exercise was witnessed by the President of India, Droupadi Murmu, along with the top leadership of India's defence establishment, senior military officials and invited dignitaries. Designed to showcase the Indian Air Force's operational readiness and technological edge, the event brought together an impressive array of aerial platforms, weapons systems and coordinated combat scenarios that closely mirrored real battlefield conditions.

The demonstration opened with a dramatic start as Rafale fighters streaked across the grandstand at supersonic speed, sending a wave of excitement through the audience. Moments later, Jaguar aircraft performed low level reconnaissance runs, simulating battlefield surveillance while capturing high fidelity imagery of the grandstand. The pace intensified as frontline fighters including the Su-30MKI, MiG-29 and Mirage 2000 joined the combat sequence.

Across the three hour demonstration, a total of 120 aerial platforms took part, comprising 77 fighter aircraft and 43 helicopters. The exercise involved the employment of 277 weapons with a cumulative explosive weight of nearly 11,835 kilogrammes, underlining the destructive capability and accuracy of the Indian Air Force. In one of the most striking moments of the day, a formation of Su-30MKI fighters released 44 OFAB-100-120 bombs on designated targets, creating a powerful visual display of coordinated strike capability.

Air dominance was further demonstrated when a Su-30MKI engaged an aerial target using an R-73 missile. The missile successfully intercepted and destroyed a MEAT (Manoeuvrable Expandable Aerial Target), a system designed to simulate realistic enemy aircraft behaviour, providing a dramatic representation of air to air combat capability.

The helicopter fleet added another dimension to the battlefield scenario. The indigenous Light Combat Helicopter Prachand demonstrated its combat prowess by firing air to ground missiles, while Mi-17 helicopters



launched rocket attacks on simulated enemy positions. The heavy lift CH-47 Chinook showcased its operational role by airlifting M-777 Ultra-Light Howitzers in underslung mode, highlighting the rapid deployment capability of artillery assets.

Transport and strategic support aircraft played an equally crucial role during the exercise. Platforms such as the C-17 Globemaster III, C-130J Super Hercules, Il-76, Il-78 and An-32 demonstrated strategic airlift and logistical support operations. In a high intensity sequence, a C-130J carried out assault landings while deploying the Indian Air Force's elite Garud Special Forces. As darkness fell over the range, the same aircraft performed a spectacular flare dispensing sequence that illuminated the night sky.

A major highlight of the event was a video presentation on Operation Sindoor, which showcased the operational effectiveness of India's air defence network. The presentation highlighted how the S-400 'Sudarshan' air defence system achieved what is believed to be the longest range kill in military history, successfully engaging a target nearly 300 kilometres inside enemy territory during the operation.



Complementing this were demonstrations of indigenous and imported air defence systems including the Akash missile system and the SPYDER air defence system.

In just three hours, approximately 120 tonnes of ammunition were delivered across a two square kilometre target area, reflecting the Indian Air Force's ability to deliver overwhelming firepower with remarkable precision. The evening concluded with a grand drone show that painted the night sky with formations depicting the map of India, Air Force symbols and historic operations including the 1965 Sargodha strike, the Tiger Hill bombing during Kargil, the Balakot air strike and Operation Sindoor.

Beyond the spectacle, Vayu Shakti 2026 served as a powerful reminder of the Indian Air Force's readiness, integration of modern technology and its unwavering commitment to safeguarding the nation's skies. 

Article and photos: Himanshu Dhingra
(Instagram: @hdhingraclicks)

Embraer making strides in India



Embraer and Mahindra plan C-390 Millennium MRO

Embraer and the Mahindra Group have announced plans to work towards establishing Maintenance, Repair and Overhaul (MRO) capability in India for the C-390 Millennium upon selection in the Indian Air Force's Medium Transport Aircraft (MTA) programme. The two companies entered a strategic partnership in October 2025 to produce the C-390 Millennium multi-mission military transport aircraft in India. This collaboration aims to support the Indian Air Force's Medium Transport Aircraft (MTA) programme, with plans to establish local manufacturing strengthening the 'Make in India' initiative.

The C-390 offers a payload capacity of up to 26 tons and higher speed and range compared to other medium sized military transport aircraft. It is capable of performing a wide range of missions, including cargo and troop transport, airdrop operations, medical evacuation, search and rescue, firefighting, and humanitarian missions. The aircraft can operate from temporary or unpaved runways and may be configured for air-to-air refuelling, both as a tanker and

as a receiver. The in-service fleet has demonstrated a mission completion rate above 99 percent, highlighting its productivity and reliability.

The proposed MRO facility will provide comprehensive in-country maintenance and sustainment for the C-390 fleet, supporting high levels of operational readiness and availability. The initiative reinforces the companies' joint commitment to positioning the C-390 Millennium as a strong solution for India's future medium transport aircraft requirements.

"Embraer is committed to delivering not only a world-class aircraft, but also a robust, long term support ecosystem tailored to India's operational and industrial requirements," stated Bosco da Costa Junior, President and CEO of Embraer Defense & Security.

"Embraer and Mahindra, intends to expand collaboration with Indian aerospace companies to drive higher localisation of C-390 Millennium and also to support MRO activities, reinforcing our commitment to the Government of India's 'Make in India' initiative and the vision of "Atmanirbhar Bharat", stated Carlos Naufel, President and CEO of Embraer Services & Support of



KC-390 in Indian Air Force colours.

Embraer. “In addition to fleet support, this new facility could create high-skill employment and further contribute to the integration of Indian companies into Embraer’s global supply chain.”

The C-390 Millennium has been selected by the air forces of Brazil, Portugal, Hungary, the Netherlands, Austria, South Korea, Uzbekistan, the Czech Republic, Sweden, Slovakia and Lithuania.

Embraer has a longstanding presence in India, with nearly 50 aircraft across 11 different types currently in operation in the country in commercial, defence and business aviation roles. In the defence segment, the ERJ145 platform serves as the basis for the Indian Air Force’s Netra AEW&C aircraft, while the Legacy 600 is operated by the Indian Air Force and the Border Security Force (BSF) for the transportation of government officials and VIPs.

Adani Defence & Aerospace and Embraer propose E175 FAL in India

Adani Defence & Aerospace, a leading player in India’s aerospace and defence, and the flagship company of Adani Enterprises Ltd and Embraer, have exchanged an enhanced Memorandum of Understanding regarding the establishment of a Final Assembly Line (FAL) for the E175 regional jet for India’s Regional Transport Aircraft (RTA) programme. The MoU was exchanged between Francisco Gomes Neto, President and CEO, Embraer and Mr Jeet Adani, Director, Adani Defence & Aerospace in the presence of the President of Brazil, Luiz Inácio Lula

da Silva and the Minister of Commerce & Industry, Government of India, Mr Piyush Goyal.

This advancement from the initial MoU signed in January 2026 represents a significant step forward and forms part of a broader roadmap to develop an integrated RTA ecosystem in India. The MoU also represents strengthening of strategic relations between India and Brazil. The industrial partnership will aim to establish an ecosystem for the E175. Both companies are already working together to progress all aspects of the MoU, including opportunities in aircraft manufacturing, supply chain, aftermarket services, and pilot training, and securing orders to support the proposed FAL.

As one of the world’s fastest growing aviation markets in terms of passenger traffic, India is expected to require at least 500 aircraft in the 80-to-146 seat segment over the next 20 years. This reflects a strong demand for efficient regional and short-haul connectivity driven by smaller, efficient jets.

The E175, a proven regional jet with seating for up to 88 passengers, is suited to unlock India’s ‘blue ocean’ opportunities in uncontested market spaces concentrated in Tier-2 and Tier-3 cities. These markets remain underserved by larger aircraft and the E175 can enable new routes, improved connectivity, reliable operations and accelerated expansion of regional air travel. As the government accelerates efforts to bring air travel to more people, the E175 offers a proven and efficient solution for the RTA, that aligns strongly with UDAN, which is transforming air connectivity across Tier 2 and Tier 3 cities of India. ➡



Embraer and Hindalco in MoU

Embraer and Hindalco Industries Limited have signed a Memorandum of Understanding (MoU) to conduct exploratory activities to assess potential business opportunities in India. The joint action aims to identify possibilities in aerospace grade aluminum raw material manufacturing to support Embraer’s industrial initiatives while strengthening the company’s commitment to the Make in India ambition.

“This joint action reinforces our focus to identifying local partners that can become our suppliers and, in doing so, accelerate the development of the Indian industrial base,” stated Roberto Chaves, Executive Vice President of

Global Procurement and Supply Chain at Embraer. “The initiative enhances Embraer’s engagement to advancing the aerospace ecosystem in India, creating long-term value across the entire supply chain”.

The signing of the MoU comes at a time when Embraer is steadily expanding its presence in India and maintaining active dialogue with local industry leaders and government stakeholders. Throughout this evaluation cycle, the company assessed a broad spectrum of industrial capabilities in the country, including aerostructure assembly, machining, metal forming, composites, wiring systems, and hardware and software development.

Black Shark for IN Scorpène SSK

In late December 2025 a contract was signed with Italy's Leonardo for supply of 48 Black Shark heavyweight torpedoes for Indian Navy's (IN) Scorpène Class hunter-killer submarines (SSK). Deliveries are to commence from April 2028 and completed by early 2030 ensuring seamless integration with Scorpène's SUBTICS combat management system. WASS demonstrated the Black Shark torpedo during the Euronaval exhibition in Paris in October 2010. The torpedo was also exhibited during Defexpo, a major international exhibition of naval and land defence and security, in New Delhi, India, in March 2012.



The Black Shark new generation Heavyweight Torpedo (HWT), in words of the manufacturer, is most advanced, technologically and operationally, multi-purpose weapon designed to be launched from submarines or surface vessels. It has been designed to counter the most challenging threat posed by any type of surface or underwater target for at least the next 30 years. The Black Shark is a 21" standard diameter, powerful, long range, fully stealth, wire guided and self-homing HWT with incomparable capabilities obtained at affordable cost.

The Black Shark has been developed by Leonardo (previously Whitehead Alenia Sistemi Subacquei/WASS) under contracts issued by the Italian Navy which is closely supporting the programme. WASS developed the Black Shark torpedo as an evolution of the A184, with more advanced Electronic Counter-countermeasures (ECCM) abilities and sonar. The advancements in electric motor design and battery allowed an increase in both range and speed.

Leonardo is also the Prime Contractor and Design Authority of the complete Torpedo System. More than 100 torpedoes are being manufactured

and delivered to a number of important navies in three continents. Following the successful completion of the easy and affordable integration activities, the Black Shark is now in service with U209, U212, U214 and Scorpène Class submarines.

Main characteristics include dual purpose anti-submarine/anti-ship torpedo roles, an optimisation for deep and very shallow (coastal) water deployment, swim-out and push-out launch capabilities, short length allowing easy integration with any submarine handling and launching system, Stanag 4405 interface compatibility to ease the electrical and functional integration with all modern combat systems, full stealth with practically undetectable radiated noise obtained by the state-of-the-art propulsion system, electrical propulsion system with high energy rechargeable battery, very high top speed (50+ knots) with stepless control in the whole speed range, reliable optical fibre wire guidance link with high speed data rate, increased bandwidth and enhanced signal processing ensures tactical situation being continuously upgraded by the wire guidance link, available to the operator for threat assessment and target selection. Optimised acoustic head shape ensures reduced flow noise, (target acquisition limited by sea state noise) and shallow water reverberation. Black Shark has a range of 50 km.

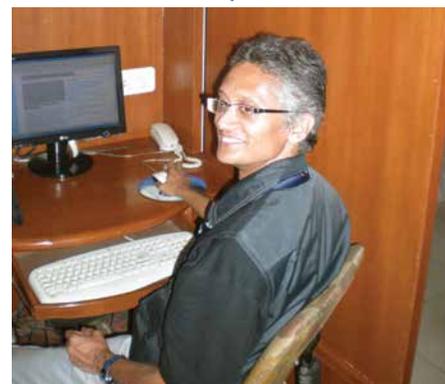
Acoustic section is armed with fully digital beam forming and advanced signal and data processing, long detection range even on small, zero doppler and silenced targets audio channel and demon analysis capabilities performed on board the torpedo. Very sophisticated Acoustic Counter-Countermeasures (ACCM) features include simultaneous multi-target capabilities.

The acoustic head of the Black Shark, named ASTRA (Advanced Sonar Transmitting and Receiving Architecture), is a state of the art active and passive acoustic head for modern torpedoes which represents the latest effort made by Leonardo. It is possible to use ASTRA as an additional remote sensor of the submarines combat suite. The advanced signal and data processing provides medium and high frequency operation in passive mode,

spatial filtering, multi-frequency and multi-code capabilities, frequency filtering, constant False Alarm Rate (CFAR) processing, DEMON analysis, Echo elongation, spatial coherence and angular extension analysis.

The electrical propulsion system consists of a new design advanced Lithium Polymer re-chargeable aluminium silver oxide (Al-AgO) battery, with a very high power and energy content, of a contra-rotating direct drive brushless motor and of skewed propellers which assure a minimum radiated noise and wakeless run and make impossible the torpedo detectability at useful ranges even by modern towed sonars. Developed by Saft, the AgO-Al batteries are provided with high energy density and high electrolyte conductivity offering maximum safety and storage life of up to 12 years.

Multiple wake sensors are available for detection and classification, immune to countermeasures and for optimised wake homing capability plus target simultaneous tracking and homing in acoustic and wake modes. The Insensitive Munition Explosive warhead (STANAG 4439) is lethal for surface vessels and submarines, activated by both acoustic influence and impact fuses, is safe and reliable in any operational phase and the warhead proven against real targets. Black Shark can be launched at any operational depth of the submarine in discreet mode (start up at low speed, cavitation free). Continuous monitoring is performed of Torpedo Board Interface (TBI) solutions for integration on existing platforms and different types of Combat Management Systems (CMS). 



By Sayan Majumdar

Delhi Forum for Strategic Studies 2026

India's 'Neighbourhood First Policy' under scrutiny



(L-R) Former External Affairs Minister Salman Khurshid, Lt Gen Kamal Davar, Montek Ahluwalia (an Indian economist and former Deputy Chairman of the Planning Commission of India) and Bharat Karnad (an emeritus professor in National Security Studies at the Centre for Policy Research, Delhi and a national security expert).

The DFSS January 2026 conclave critically examined the erosion of India's strategic influence in its neighbourhood, concluded that goodwill based diplomacy must give way to a recalibrated mix of hard power, technology and youth centric engagement. Experts warned that terrorism, emerging warfare technologies, foreign influence and doctrinal rigidity demanded urgent policy renewal if India was to reclaim strategic heft in South Asia.

The Delhi Forum for Strategic Studies (DFSS), under the leadership of Lt Gen Kamal Davar, held its annual January conclave on 17 January 2026, at New Delhi. The theme, "India's Neighbourhood and the Evolving Security Paradigm," was highly relevant given the current flux, friction and foreign intrusion shaping India's regional environment, making the discussions timely and impactful.

During a concise 2.5 hour session, the forum critically assessed whether India's 'Neighbourhood First' policy had adapted to changing geopolitical realities. The consensus was clear: goodwill alone no longer guaranteed influence

in India's immediate strategic periphery, underscoring the need for strategic recalibration.

The conclave assembled a diverse group of strategic thinkers, including former ministers, diplomats, senior military commanders and regional experts. The forum enabled candid discussions, with notable attendees

Delhi Forum for Strategic Studies			
2026: India's Neighbourhood and Evolving Security Paradigm			
17 Jan 2026			
Detailed Programme			
TIME	EVENT	SPEAKER	Remarks
9.30 am - 10.00 am	Registration and Tea	-	Pergola Terrace, IIC
10.00 am - 10.15 am	Introductory Remarks	Lt. Gen. Kamal Davar (Retd), President, DFFSS	
10.15 am - 10.45 am	Terrorism in South Asia - Emerging Dynamics	Dr Ajay Sahni, Executive Director, Institute for Conflict Management	
10.45 am to 11.15 am	Employment of UAVs, AI, and Quantum Computing in Future Wars	Lt. Gen. RS Pannu (Retd), Former GOC 14 Corps	
11.15 am - 11.30 pm	Tea	-	Pergola Terrace, IIC
11.30 am - 12.00 pm	Resetting India-Nepal Ties	Maj. Gen. Ashok Mehta (Retd), Defence and Strategic Analyst	
12.00 pm - 12.30 pm	Revisiting India's Nuclear Doctrine	Mr. Bharat Karnad, Strategic Analyst	
12.30 pm - 13.00 pm	Question Answer Session	To be moderated by Lt. Gen. Kamal Davar, President DFFSS	
13.00 pm - 13.30 pm	Closing Address	Mr. Manish Tewari, MP	
13.30 pm	Lunch	-	Pergola Terrace, IIC

including Mr Montek Singh Ahluwalia, Ambassador KC Singh, Air Vice Marshal Kapil Kak (Retd), retired Generals, Ambassadors and senior Bureaucrats with extensive regional experience, thereby enhancing the forum's credibility.

Gen Kamal Davar's opening frame— Intent vs Outcome: In his opening remarks, Lt. Gen. Davar offered a balanced assessment of India's Neighbourhood First policy. He acknowledged its original intent, ie, fostering regional goodwill through connectivity projects, humanitarian assistance, disaster relief and economic cooperation. For years, India's rapid response as a first responder in crises from earthquakes to floods had reinforced its leadership image. That advantage, he warned, was eroding. China's systematic use of debt trap diplomacy, Pakistan's sustained proxy warfare and the growing footprint of extra-regional powers, most notably the United States, in countries such as Bangladesh and Nepal, had narrowed India's strategic room for manoeuvre. Gen Davar observed that India's "heft had waned," partly because assistance was now viewed transactionally rather than emotionally.

He argued for recalibrating neighbourhood engagement, blending hard power with economic leverage, technological outreach and youth centric diplomacy. Influence, he stressed, must be earned continuously, not assumed.



Terrorism's persistent shadow— Ajay Sahni's assessment: Mr Ajay Sahni, one of India's foremost counter-terrorism analysts, set the tone for the substantive discussions. His presentation underscored a sobering reality: despite shifts in global attention, South Asia remained fertile grounds for terrorism and unrest. Sahni traced how neighbourhood instability directly fed terror ecosystems. Bangladesh, once viewed as having decisively rolled back extremist networks under Sheikh Hasina, was now showing signs of renewed radicalisation along its fringes. Porous borders, weak institutions and political churn were magnifying these vulnerabilities. More worrying, Sahni argued, was the rise of hybrid threats. Digital radicalisation, often amplified through encrypted platforms and foreign hosted infrastructure, demanded urgent technological innovation to empower counter-terrorism efforts and instill confidence in security agencies.



India's response, Sahni insisted, must move beyond reactive policing. He advocated for technology driven border hardening, including AI enabled fencing, predictive analytics and real-time intelligence fusion.

Lt Gen RS Pannu (Retd), former GOC of 14 Corps, shifted the conversation to the future of warfare. His presentation, "Employment of UAVs, AI and Quantum Computing in Future Wars," traced the transformation of conflict over the past seven decades—from manpower heavy engagements to data dominated battlefields. Modern warfare, Gen Pannu argued, was no longer about linear engagements but about "web kill chains," where adversaries were drawn into layered sensor and shooter networks. In such environments, unmanned aerial vehicles, artificial intelligence and quantum-enabled systems offered decisive advantages.

China's dominance in this domain was presented in stark terms. With roughly 26 per cent of global R&D output, Beijing enjoyed an overwhelming edge in drone swarms, electronic warfare and quantum decryption. India's contribution, Gen Pannu noted bluntly, remained negligible by comparison. This disparity forces India into import dependence, often leading it to acquire platforms already nearing obsolescence. "We inherit others' discards," he remarked.

Using the example of SpaceX's 8,000 satellites within an orbital environment of 12,000 to 15,000 objects, he illustrated how space had become a contested operational domain. Yet, Gen Pannu cautioned against technological determinism. Human judgment, he said, remained critical. AI can process volumes of data, but the human mind retains the agility to detect anomalies and intent. For India, the path forward lies in a dramatic expansion of indigenous R&D, driven by public-private partnerships, that fosters a sense of national pride and confidence in developing cutting edge defence technologies like Israel's Iron Dome, especially in high altitude regions like Ladakh.

Maj Gen Ashok Mehta (Retd), drawing on recent fieldwork and extended engagement with Nepal, examined the country's internal churn through the lens of youth politics and foreign influence. His presentation focussed on

how Nepal's Gen Z was increasingly alienated from traditional political elites and dynastic structures. Economic stagnation, unemployment and growing disillusionment with governance had created fertile grounds for protest. China's infrastructure led engagement, often underwritten by opaque BRI loans, had deepened Nepal's debt exposure while expanding Beijing's political leverage.



At the same time, Gen Mehta highlighted the expanding role of US soft power. Initiatives such as leadership programmes, educational exchanges and funding for civil society were shaping narratives and aspirations among Nepal's youth. He drew parallels with earlier generational engagements, noting how early exposure could have long term political impact.

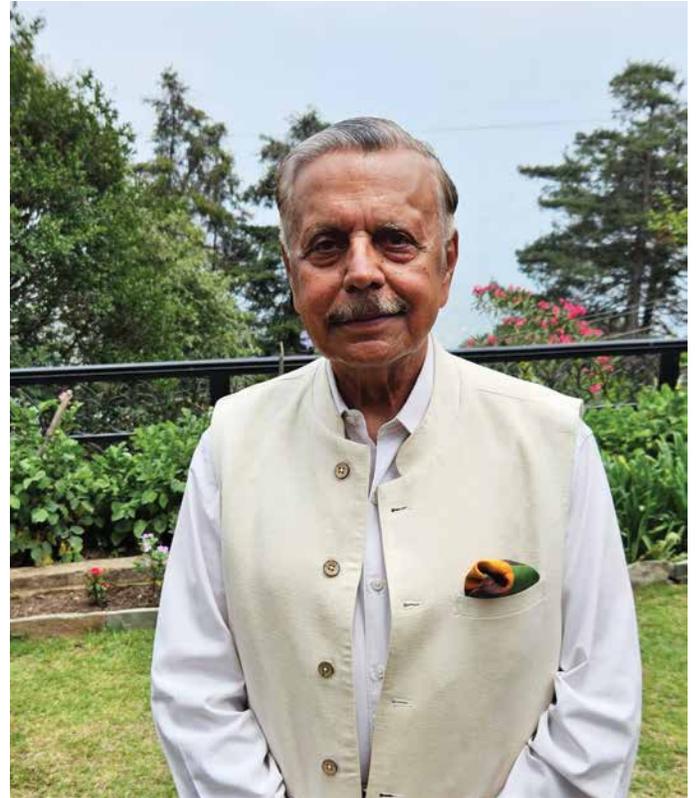
India, he warned, risked being perceived as complacent or transactional. Cultural affinity and historical ties were no longer enough. "New Delhi must invest in targeted development assistance, digital engagement and people-to-people programmes that speak directly to younger audiences. Failure to do so could see Nepal's Gen Z drift decisively toward external poles of influence".

One of the most contentious analyses was delivered by Mr Bharat Karnad, who called for a fundamental re-examination of India's nuclear doctrine. He argued that India's continued reliance on a singular 'No First Use' posture ignored the asymmetry between its two principal adversaries. Against China, with an arsenal exceeding 500 warheads, India's deterrence posture risked being perceived as weak or symbolic. Against Pakistan, whose tactical nuclear weapons are designed to offset conventional inferiority, NFU may offer little restraint.

Bharat Karnad proposed dual doctrines: one centred on massive retaliation against China, the other tailored to deter Pakistan's battlefield nuclear use. He also criticised constraints arising from the Indo-US nuclear deal, particularly the prohibition on further testing. India's six nuclear tests, he argued, were pale against China's 43 nuclear tests. Without renewed testing and modernisation, India's deterrent credibility could erode. Karnad urged accelerated development of the nuclear triad, including MIRV capable systems such as the Agni-VI, to restore strategic balance.

Former External Affairs Minister Salman Khurshid closed the conclave with a broader diplomatic lens. He framed the upheavals in Bangladesh and Nepal as symptoms of generational transitions rather than isolated crises. Elections, he noted, would serve as crucial tests of institutional resilience and leadership legitimacy. Khurshid cautioned against the corrosive

role of social media in bilateral relations. Misinformation and performative outrage often outpace diplomacy, constraining governments even when national interests align. Mature statecraft, he argued, required resisting public pressure when necessary and communicating intent clearly.



Lt Gen Kamal Davar

Pathways forward: Reclaiming strategic heft

The DFSS 2026 conclave converged on a clear conclusion: India's 'Neighbourhood First' policy requires renewal, not abandonment. Gen Davar's opening framework set the tone, calling for a blend of economic statecraft, security preparedness and youth engagement.

Sahni's emphasis on counter-terrorism highlighted the need for technological vigilance. Gen Pannu's focus on future warfare underscored the cost of R&D neglect. Gen Mehta's neighbourhood analysis revealed the stakes of youth diplomacy. Karnad's nuclear critique challenged long held assumptions. Khurshid's closing remarks reminded participants that diplomacy is as much about restraint as it is about resolve.

The forum's consolidated report, to be shared with policymakers, carries both warning and opportunity. As Gen Davar's stewardship of DFSS once again demonstrated, strategic clarity begins with honest diagnosis. Whether India acts on these insights will determine the future credibility of its neighbourhood leadership. ➡

**By Lt Col Manoj K Channan, Armoured Corps,
Indian Army**

Made in India Submarines A History of 50 years (Part 2)



In the previous issue, we discussed the journey of India's quest for Make in India submarines, from the early 1970s to the mid-2000s. While the acquisition of the Type 209-1500, Kilo Class, and Kalvari Class addressed India's immediate requirement for the time being, it was still far from fully answering India's ambition. As the older Kalvari Class and Vela Class (Soviet origin Foxtrot Class) started being phased out, India's situation returned to square one. But the situation started getting worse without a steady flow of new submarines.

Project 75 India

To combat the fast dwindling submarine fleet strength and to address ever-evolving threats, India focuses on the acquisition of six modern submarines under P-75I. While exact requirements are not public, a more modern platform than the Kalvari Class is sought. The boats must have a very low acoustic signature, concealment from detection by anti-submarine platforms, advanced countermeasures, integration with a fuel cell-based AIP system, new generation sensors, modern weapon systems and high indigenous content. While the base of the programme was

cemented back in 1999, it made little progress in the next twenty years.

Finally, the Defence Acquisition Council (DAC) approved indigenous construction under the Strategic Partnership (SP) model on 31 January 2019. The aim of such an approach is to ensure seamless transfer of niche technologies and higher indigenous content (than P-75), steering self-reliant investment in the future. The MoD issued a Request for Proposal (RFP) on 20 July 2021. Five Original Equipment Manufacturers (OEMs) and two Indian strategic partners (MDL and L&T-Larsen & Toubro) were shortlisted. But for various reasons, only Germany (TKMS) and Spain (Navantia) remained in the race. In 2023, TKMS picked up MDL, while L&T became a partner of Navantia. The Spanish side offered their latest S-80 class platform equipped with Spanish (Bio-Ethanol Stealth Technology) BEST AIP. While the official offer from Germany was never made public, a render released resembled a redesigned Type 212 hull with angular features and an X-shaped rudder, indicating enhanced stealth, a reduced acoustic signature, and improved maneuverability.



According to the reports, Germany asked for a government-to-government (G2G) deal for a quick conclusion of the programme. In 2024, India teams reached out to Germany and Spain for a thorough assessment of the offers, trials and evaluation of the concerned AIPs. While the demonstration by the German side concluded soon, things hit a hiatus for the Spanish side. The Spanish BEST system was not ready by that time, and only a shore based demonstration could be possible. Thus, Indian demand for the sea proven system could not be met. This flaw led to the non-compliance of the L&T bid in 2025. Meanwhile, TKMS was given the go-ahead by the technical oversight committee. Finally, by August 2025, MDL was given clearance for the commencement of negotiation. The negotiation is yet to be concluded (as of February 2026). According to the RFP, the first boat is to be delivered seven years after the signing of the contract with an indigenous content of 45%, only to be gradually increased with the progress of the programme. Citing a potential future scenario, in May 2025, MDL signed a Memorandum of Understanding (MoU) with the Hindustan Shipyard Limited (HSL), aiming for a second submarine production line when needed.

Project 76

India's pursuit of an indigenous platform began in the 1980s. Dr. Ulrich Gabler, the legendary figure behind Germany's submarine might since World War 2, was the key architect behind the design for India's Type 1500 requirement. To enhance the cooperation, India initiated 'Project X' and deputed a design team to IKL for the design of a new indigenous submarine under the supervision of Dr. Gabler. It would be a larger design than the Project 1500. Sadly, I could not find out more about the project. Anyways, India continued the Type 1500 till the project went into abeyance. In 1999, once again, the subject of indigenous submarine construction resurfaced with an aim of twelve such inductions post-2012. Unfortunately, no progress was made in this at all at that time. Almost twenty-five years later, the first ray of hope was observed when, on 14 May 2024, MDL, on the occasion of its 250th Foundation Day, announced the development of the design of a full-scale conventional submarine by 2028.

In 2025, reportedly, DRDO jumped into a proposal to design and develop an indigenous and highly advanced submarine. The proposal will be placed in front of the CCS.

According to the reports, upon approval, the design phase will last for a maximum of three years, followed by a five year timeline for the construction of the first submarine. While the exact features of the concept are not known, it is expected to have similar but up-to-date features of the P-75I class along with the Vertical Launching System (VLS) for the land attack cruise missile strike capabilities. The project reportedly aims to have as high as 95% of indigenisation. The programme is being developed with the Warship Design Bureau (WDB). The indigenous submarine programme, popularly known as Project 76 (P-76), is expected to be continued in parallel to the P-75I.

Wasted Opportunities

When India first braved a foreign OEM to design, develop and manufacture an advanced submarine (of contemporary time), there were only a handful of countries, even in the West, to match the requirements of India. Today in Asia there are five countries (Japan, China, South Korea, Taiwan and Turkey) that have the capabilities to develop and manufacture indigenous submarines. But India is still struggling to have what India dreamt back in the 1970s! In the quest to have "the best," India not only just did not explore the full potential of the indigenous "good," but also invested financially huge margins with only limited return. The original Type 209-1500 could have been taken forward in parallel to the Kalvari Class. This could become the stepping stone, which would become advanced gradually, allowing India to have a further advanced boat in a later period. This would not only negate India's dependency on a foreign supplier but also would save a good amount financially, which instead would allow further investment into indigenous development.

For a better comparison, take the example of the Republic of Korea (South Korea). Like India, the RoK also procured the Type 209 boats in the late 1980s under Project KSS-I. The only difference is they continued the project and even developed a Korean variant for the export. The continuous progress eventually allowed them to have a giant leap. It's true that they later procured Type 214 as well. But that did not abruptly stop the indigenous programme. Currently, Korea is constructing KSS-III series submarines, which can rival the best Germany can offer! On the other hand, even after almost six decades, India is still dependent on a foreign supply, has sanctioned a huge financial amount to buy a foreign platform but not for the investment into indigenous programmes, is still

not confident in the viability of the technologies acquired, is not fully satisfied with the cooperation, and worse, has failed to manage dwindling submarine fleet strength!

From Square One to Square Zero—this is the best way to describe India's current situation. 🗡️

By Sankalan
ChattoPadhyay
(Twitter/X @vinoddx9)



Wings India 2026



India's civil aviation carnival returns to Hyderabad

In the final four days of January 2026, the city of Pearls, Hyderabad, hosted India's biggest civil aviation trade show, Wings India 2026, at its traditional venue of Begumpet Airport. The event was formally launched with a grand inaugural ceremony led by Minister of Civil Aviation Mr. Rammohan Naidu, in the presence of high level dignitaries from India and abroad. Marking its 10th edition, and anchored around the theme "Indian Aviation: Paving the Future – From Design to Deployment, Manufacturing to Maintenance, Inclusivity to Innovation and Safety to Sustainability", Wings India 2026 highlighted India's rapidly expanding aviation landscape, its growing global footprint, and its vision to emerge as a key hub for manufacturing, services, innovation and sustainable aviation solutions.

Wings India 2026 provided a stage to over 150 exhibitors ranging from global giants such as Airbus, Boeing and Embraer to emerging aviation startups, attracting more than 7,500 visitors and bringing together policymakers, global CEOs, investors, airlines, airports, OEMs, MROs, lessors, technology providers, training institutions and innovators. The event provided dedicated platforms for exhibitions, chalets and B2B/B2G meetings, enabling business networking, partnerships and investment discussions. An Aviation Job

Fair connected industry leaders with young professionals and skilled talent across the aviation ecosystem.

Spectacular air shows, aircraft displays and aviation excellence

Wings India 2026 featured impressive static aircraft displays, flying displays and aerobatic air shows, showcasing a wide range of aircraft. Highlight attractions included aerial performances by the Surya Kiran Aerobatic Team of the Indian Air Force and Global Stars, an aerobatics team from UK led by Mark Jefferies. Furthermore, special flight demonstrations and media walkthroughs were organised by OEMs focused around their flagship aircraft present in the show.



A specially curated Civil Aviation Innovation Challenge for students was also organised to promote innovation, problem solving and industry oriented thinking among students and young professionals, providing them exposure to real world aviation challenges and opportunities.



The cultural programmes reflected India's rich heritage, adding a unique experiential dimension for delegates and visitors alongside the aviation showcases. Additionally, a prestigious Award Ceremony, continuing the tradition of recognising excellence and outstanding contributions in civil aviation was also held.

HAL growing civil aerospace ambition

Hindustan Aeronautics Limited (HAL) was at the forefront of the show, showcasing four products on static display: the Dhruv NG (Next Generation) helicopter, Hindustan 228 turboprop aircraft and the SJ-100 jet airliner along with its SJ-100-95LR business jet variant, jointly with United Aircraft Corporation. Dhruv NG is a 5.5 tonne twin engine helicopter tailored for versatile civil roles such as VIP transport, medevac, offshore operations and SAR, featuring modern avionics and enhanced safety systems.



Hindustan 228 is a lightweight twin turboprop regional aircraft developed for short haul connectivity and multi-role operations including passenger transport, ambulance, cargo and surveillance. The display was complemented by Customer Demonstration Flights of the Dhruv NG and H-228.



While Dhruv NG and H-228 are HAL's indigenously designed platforms, the SJ-100 family will be manufactured in India under license as part of HAL's recent collaboration with UAC. The agreement grants HAL the rights to produce, certify and sell the aircraft to domestic customers in both airliner and business jet configurations. This collaboration represents India's first serious attempt at serial manufacturing of a civil jet airliner within the country, even if under a licensed production model, marking a significant departure from India's traditional role as an aircraft importer and a step toward developing long term civil aerospace manufacturing capabilities.



The indoor pavilion display scaled models of the Dhruv NG, H-228, H-228 Amphibian, SJ-100, LUH Civil, Line Replaceable Units (LRUs) and accessories designed to meet the evolving needs of civil operators.

Pawan Hans for 10 HAL Dhruv NGs

HAL also secured an order from Pawan Hans Limited for the supply of 10 Dhruv NG helicopters, including spares





and accessories, with deliveries scheduled to be completed by 2027. These helicopters will serve crucial roles in the offshore industry and enhance last mile connectivity, particularly in hilly regions, northeastern states, as well as remote islands like Lakshadweep and the Andaman & Nicobar. The contract exchange took place between CMD PHL and CMD HAL in the presence of the Minister of Civil Aviation marking a significant step in improving aviation services in challenging terrains.

Avantel signs MoU with HAL

Strategic Electronics R&D Centre (SLRDC), the avionics R&D wing of HAL, and Hyderabad headquartered Avantel Limited entered into this MoU to collaborate in delivering solutions to the defence services and other strategic customers in the areas of HF systems, satellite communications and avionics equipment. Avantel Limited specialises in the development and production of satellite communications, radar systems, embedded and digital signal processing, and application software, supporting a wide range of defence and strategic programmes.

UAC showcases the Il-114-300 and the import-substituted SJ-100

United Aircraft Corporation, the state owned Russian aerospace conglomerate, presented the SJ-100 “Superjet” airliner, SJ-100-95LR “Aurus” business jet and Il-114-300 turboprop airliner designed for passenger and cargo operations on short to medium routes. SJ-100 is a modern twin engine, 100 seat short haul regional jet designed for commercial passenger service on domestic and regional routes. The aircraft presented, donning special livery with Indian flag and HAL logo, was the dedicated import-substituted variant, that was developed in the aftermath of western sanctions imposed on Moscow after the war started with Ukraine in 2022.



Nearly all the components on the aircraft are Russian made, including MFDs, seats, panels, switches and most importantly, the powerplant, that is Aviadvigatel PD-8 engine, that will replace the French-Russian SaM146 originally fitted on the aircraft. The certification for the engine is ongoing and likely to be completed by the end of 2026. SJ-100-95 is the extended range long range derivative of the Superjet 100 family offering greater flight range and enhanced comfort/luxury features for longer sectors than the baseline version.



Vayu's good friend Maxim Syssoev of UAC at the event.

The Il-114-300 is a twin turboprop regional airliner designed for passenger and cargo operations on short to medium routes, including harsh and remote environments. The engines, TV7-117ST-01 turboprop engine, are also Russian made, along with other crucial components onboard the aircraft. The aircraft is built using domestic components and is equipped with TV7-117ST-01 engines from the United Engine Corporation. A short flight demonstration was also conducted for the visitors to witness the aircraft's aerial performance.



The SJ-100 competes with Embraer E-Jet family, Airbus A220 while Il-114 competes with ATR-72 and De Havilland Canada Dash 8 (Q-Series). Together, the SJ-100, SJ-100-95LR “Aurus” and Il-114 underline Russia’s push to commercially revive and future proof Made-in-Russia aerial mobility solutions, aiming to restore self-reliance in civil aviation while offering competitive, homegrown alternatives across regional jet, business jet and turboprop segments

UAC and Flamingo Aerospace for 6 Il-114-300’s

United Aircraft Corporation (a part of Rostec) and Flamingo Aerospace Private Limited signed a framework purchase agreement for six Il-114-300 regional aircraft. The official signing ceremony took place during the Wings India 2026 International Aviation Exhibition at Begumpet Airport (Hyderabad). As part of the agreement, UAC has provided Flamingo Aerospace with a cooperation framework, including a detailed roadmap for developing aviation capabilities in India. This enables Flamingo Aerospace to undertake phased industrial activities such as aircraft assembly, customisation, maintenance, repair and overhaul (MRO) and preparation for manufacturing and infrastructure development.



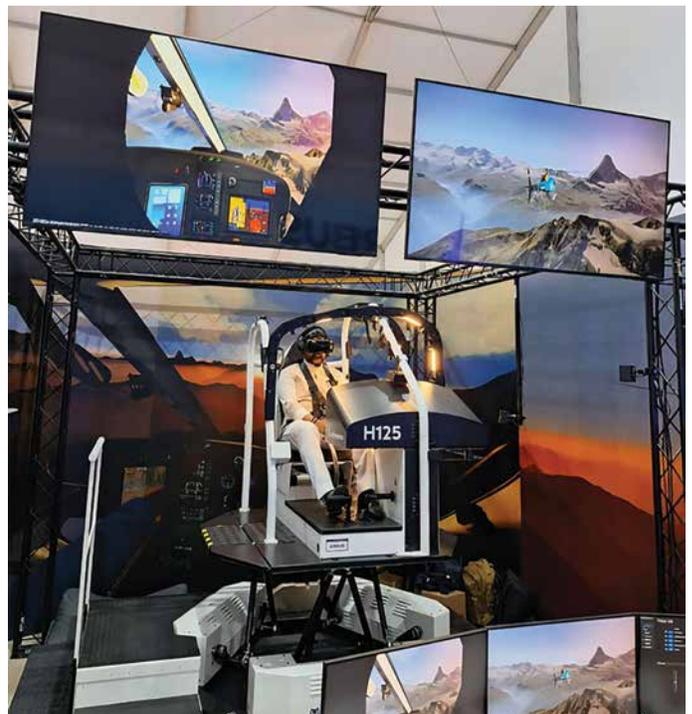
Airbus reiterates Make in India commitment

Airbus at Wings India 2026 reaffirmed its long term strategic commitment to India’s aviation growth not merely as an aircraft supplier but as an industrial partner.

The European aerospace giant lined up a comprehensive display of fixed wing and rotary platforms that they touted as “redefining the future of Indian aviation”. The static display included the A321neo and the A220. These were joined by the H160 helicopter and the H125, the multi-mission workhorse that will be produced in India by the Final Assembly Line (FAL) established in Vemagal, Karnataka in a joint venture with Tata Advanced Systems Limited (TASL).



At their stands, Airbus highlighted their latest fleet additions and future ready technology through scale models of the twin engine H145 and the single aisle long haul aircraft, the A321XLR. The A321XLR stands as the “route opener” capable of flying routes traditionally considered wide body routes, and made its debut in Indian market with IndiGo, that inducted its first airframe of the type in early January 2026. The centre-piece of the stand was the H125 Virtual Reality Simulator.



Mr. Kinjarapu Rammohan Naidu, Union Minister of Civil Aviation, Government of India, experiences the H125 helicopter simulator at the Airbus booth during Wings India 2026.

This immersive, new generation device provides advanced training solutions that combine the benefits of actual flight and the safety of simulation tools.

Airbus: Indian aircraft fleet to reach 2,250 by 2035

Beyond the static displays, Airbus also provided its annual commercial market outlook. The company highlighted that India's commercial aircraft fleet would triple in size to 2,250 aircraft over the next decade, as the country grows to become the third largest civil aviation market in the world by 2035. Therefore, this fleet expansion is driven both by the Indian aviation market boom and the Indian airlines' ambition to expand on international routes. This three-fold increase in aircraft over 100 seats from the 2025 fleet levels marks one of the most aggressive expansions in global aviation history.



The requirement for aircraft will be driven by a unique blend of the fastest economic growth among G20 nations, deeper government spending on infrastructure and a fundamental shift in Indian consumer behavior, with per capita air travel rising from 0.13 to 0.29 over the next decade. As a result, passenger traffic in India will grow at 8.9% per annum by 2035, the fastest among the major economies and well above the long term global average. To keep this scaled-up fleet airborne, the requirement of pilots is set to surge to 35,000 by 2035, up from the current 12,000, while the technical workforce must grow to 34,000, tripling the current strength of 11,000.

Heritage Aviation contract for Airbus H130

India based helicopter operator Heritage Aviation Pvt Ltd signed a contract for one Airbus H130 helicopter to



Rohit Mathur, Founder & CEO, Heritage Aviation Pvt Ltd, and Sunny Guglani, Head of Airbus Helicopters, India & South Asia, together with the officials from Heritage Aviation Pvt Ltd and Airbus.

further expand heli-pilgrimage and regional connectivity operations under the Government of India's UDAN scheme. The contract was signed at Wings India 2026 with the delivery scheduled for September 2026. The newly contracted H130 will be deployed for passenger transportation, heli-pilgrimage and regional connectivity missions, complementing Heritage Aviation's existing fleet of Airbus H125 and H130 helicopters currently operating under the UDAN scheme.

Airbus secures order for India's first H175 and two ACH160s

During the event, Airbus Corporate Helicopters also announced that it signed an order for two ACH160 helicopters and one H175 with a private Indian customer. The operator is an existing ACH160 customer and will become India's first H175 customer. Marking the introduction of the super-medium twin-engine helicopter into the Indian civil market, the H175 helicopter will come in a 16 seat configuration with delivery scheduled for 2026. The two ACH160 helicopters will be exclusively configured as per customer's requirements and will be delivered in 2027.



H175 (top) and ACH160 (bottom)



Air India converts its A321neo orders to A321XLR

Air India has converted 15 of its existing Airbus A321neo orders to the longer range A321XLR variant to boost international, medium haul, and long thin routes.

Scheduled for delivery between 2029 and 2030, these aircraft will provide up to 4,700 nautical miles (8,700 km) of range.



Campbell Wilson, CEO & MD Air India and Benoit de Saint-Exupéry, Airbus Executive Vice President of Commercial Aircraft Sales, on stage at Wings India 2026 with Minister of Civil Aviation, India, Kinjarapu Ram Mohan Naidu.

Boeing's commercial outlook

Boeing also briefed the media regarding its commercial market outlook, including current status, future prospects and its ambitions. India and South Asia's passenger air traffic will rise an average of 7% annually over the next 20 years, spurred by a growing middle class, economic growth and airport and connectivity investments. That demand for air travel means airlines will need nearly 3,300 new airplanes by 2044 as projected in the company's Commercial Market Outlook (CMO) for South Asia.



Single aisle jets will account for nearly 90% of these projected deliveries as airlines look to boost network flexibility on fast growing short and medium haul routes. Accounting for growth and replacement, the Indian and South Asian region's fleet will grow from 795 to 2,925 airplanes in two decades – a nearly four-fold increase over that time. Domestic travel that connects India will underpin this expansion, supported by a continuing shift from rail to air and investments in the country's airport infrastructure.

Indian and South Asian airlines are also projected to expand and diversify their long haul networks as India grows as a key hub for international passenger and cargo traffic. The South Asia region's widebody fleet will more than triple by 2044 as carriers enable millions of Indian

and South Asian passengers to travel to international markets including the Middle East, Europe and North America.

Thales, Air India and AVANT Up

Air India's new 787-9 aircraft, the newly inducted widebody aircraft and its first line-fit airframe of the type, was presented on the tarmac as well. The aircraft features a new 3 class, 296 seat cabin (30 Business, 28 Premium Economy, 238 Economy). VT-AWA, also with additional five aircraft on order, boasts 1-2-1 Business suites, 4K screens and Thales AVANT Up In-Flight Entertainment units, marking a major fleet overhaul. The system features over 3,000 hours of content and the largest library of Indian entertainment available in multiple languages.



Mr. Ankur Kanaglekar, Vice-President – India, Thales stated, "Thales is proud to be the official Avionics Partner for Wings India 2026, underscoring our long-term commitment to India's aviation journey. As a trusted partner to India's leading carriers, Air India and IndiGo, airport operators and aviation authorities, we are dedicated to shaping a safer, reliable, and digitally enabled aviation ecosystem. From enabling seamless DigiYatra experiences through 'Fly to Gate' biometrics and deploying Airport Operations Control Centres, to delivering advanced avionics and next generation inflight entertainment, our efforts are centred around elevating both passenger experience and operational performance. Localisation is a strategic priority for Thales in India. In partnership with the local industry, we further seek to bring high tech capabilities in drones and counter-drone solutions, Unmanned Traffic Management and Air Traffic Management. We also continue to innovate at our engineering competence centres in Bengaluru and Noida, expand our MRO facility in Gurugram, and strengthen domestic supply chain partnerships. Thales remains committed to building a strong and self-reliant aviation ecosystem in line with the Aatmanirbhar Bharat vision."



Ankur Kanaglekar, Vice President- India, Thales

Air India orders 30 Boeing 737 MAX

Boeing and Air India announced the airline had ordered 30 more 737 MAX jets, expanding its Boeing order book to nearly 200 airplanes across the company's single aisle and widebody airplane families. The airline finalised an incremental purchase of 20 737-8 jets and an order for 10 737-10 airplanes was previously unidentified on Boeing's Orders & Deliveries website. Both purchases exercised existing options as Air India expands its route network to meet rising travel demand. Air India Express will operate the new 737-8s, leveraging "their dispatch reliability, fuel efficiency and range flexibility on high-frequency, domestic and short-haul regional routes". The airline also plans to deploy the larger 737-10 to maintain operational commonality and carry more passengers at the lowest cost per seat among single aisle aircraft.



Air India Express B737-8 at Wings India 2026.

Embraer bets on India's regional expansion

Embraer showcased its pair of E-Jet aircraft family, E195-E2 (in Hunnu Air livery) and E175-E1 (in Star Air livery). E175-E1 is the first generation regional jet seating 76-88 passengers, widely used by regional airlines for short-to-medium routes. At present, Sanjay Ghodawat Group owned by Bengaluru based airline Star Air is the only operator of the type in India. Embraer E195-E2 is the second generation, larger, more fuel efficient single-aisle jet seating 120-146 passengers "with modern engines and aerodynamics for better economics on higher density routes, that is proven with its 80% share in US regional air travel market".



Embraer E-175 E1 (Left) and E-195 E2 (Right)

Embraer's significant participation in the event "underscores the company's commitment to advancing regional connectivity and sustainable aviation in the Indian market, presenting solutions tailored to address the country's unique and expanding aviation needs".

Embraer and Adani announce strategic partnership

Embraer and Adani Enterprises Ltd signed a Memorandum of Understanding (MoU) to develop an integrated regional transport aircraft ecosystem in India. The companies aim to collaborate on opportunities in aircraft manufacturing, supply chain, aftermarket services and pilot training. The collaborative industrial partnership will aim to establish an assembly line, followed by a phased increase in indigenisation to advance India's Regional Transport Aircraft (RTA) programme, in alignment with the Aatmanirbhar Bharat initiative and the UDAN regional connectivity vision.



Sakthi Aircraft powers India’s manufacturing leap

Sakthi Aircraft Industries Pvt Ltd (SAIPL) is pushing that shift by showcasing not just aircraft, but actual manufacturing muscle aimed at making India a serious hub for pilot training and regional aviation. With the launch of the Diamond Aircraft DA40 NG final assembly line in India under the DGCA’s CAR 21 license, SAIPL has become the first private player to manufacture training aircraft in the country. The locally assembled DA40 NG will supply Indian customers while aligning with the government’s Make in India push, strengthening the domestic pilot training ecosystem. Alongside the DA40 NG, static displays of Diamond Aircraft’s DA42 and DA62 “underline the focus on fuel efficient diesel engines, advanced avionics and reliable platforms that support both training and multi-mission operations, reinforcing India’s growing aviation manufacturing base”.

Expanding that ambition beyond training aircraft, Sakthi Aviation and Defence Systems Pvt Ltd (SADSPL) and OMNIPOL Group signed a Memorandum of Understanding at Wings India 2026 to bring the 19 seater L 410 NG to India. The next generation turboprop, manufactured by Aircraft Industries, a member of OMNIPOL Group, is expected to significantly boost regional connectivity with its short take-off and landing capability and rugged performance in diverse terrains. The partnership includes assessing the establishment of a final assembly line in India with Transfer of Technology, positioning the country not just as an operator but as a production and integration hub for regional aircraft.



Raghu Vamsi’s ARROBOT unveiled

At the event, Arrobot showcased a portfolio of indigenous unmanned and autonomous platforms that integrate propulsion, systems engineering, mission logic and platform integration. In addition to its defence focused autonomous systems, Arrobot unveiled autonomous ground tugs for aircraft and helicopters, designed to enhance airside efficiency, safety and turnaround times through intelligent, operator assisted and autonomous operations.



Conclusion

Wings India 2026 was more than a trade show; it reflected India’s shifting role in global aviation. From major aircraft orders to concrete manufacturing and assembly commitments, the event underscored New Delhi’s ambition to evolve from a fast growing aviation market into a serious aerospace production hub. Whether this transition gains sustained depth remains to be seen, but the direction is now unmistakable. ➡



Report by Rishav Gupta
Photos by Durgesh Singh and Rishav Gupta

First Training Squadron (1TS) to South East Asia

The ships of the First Training Squadron (1TS) of the Indian Navy – INS Tir, Shardul, Sujata and ICGS Sarathi – proceeded on a Long Range Training Deployment (LRTD) to South East Asia as part of a training curriculum of the 110th Integrated Officers' Training Course (IOTC). As part of the deployment, the squadron will undertake port calls at Singapore, Indonesia and Thailand.



ICGS Sankalp at Port Louis, Mauritius

Indian Coast Guard Ship (ICGS) Sankalp, an Offshore Patrol Vessel, arrived at Port Louis, Mauritius on 17



January 2026 as part of its ongoing Overseas Deployment to Friendly Foreign Countries in the Indian Ocean Region. The visit reflects “India’s continued commitment to strengthening maritime cooperation, enhancing interoperability and further deepening bilateral ties with Mauritius”.

INS Sagardhwani at Sagar Maitri V

INS Sagardhwani, India’s oceanographic research vessel under the Naval Physical and Oceanographic Laboratory (NPOL) of DRDO, was flagged off for the fifth edition of the Sagar Maitri (SM-5) initiative from Southern Naval Command, Kochi on 17 January 2026. The initiative aims to promote closer cooperation in socio-economic aspects and greater scientific interaction, especially in ocean research, among Indian Ocean Rim (IOR) countries.



ICG ships at Sri Lanka

Indian Coast Guard (ICG) Offshore Patrol Vessel ICGS Varaha and Fast Patrol Vessel ICGS Atulya made a port call at Colombo, Sri Lanka, on 24 January 2026, as part of their overseas deployment to the Indian Ocean Region (IOR). During their stay, ICG ships engaged in professional interactions with the Sri Lanka Coast Guard (SLCG), focusing on capacity building and the exchange of best practices.



1TS at Phuket Deep Sea Port, Thailand

As part of the ongoing training deployment to Southeast Asia, ships of the Indian Navy’s First Training Squadron (1TS) – INS Tir, INS Shardul, INS Sujata—along with ICGS

Sarathi, arrived at Phuket Deep Sea Port, Thailand, on 25 January 2026. The ships were accorded a warm welcome by the Royal Thai Navy (RTN) amidst the ceremonial fanfare of the RTN Band.



IAF at Singapore Air Show 2026

The Indian Air Force (IAF) participated at the Singapore Airshow 2026 from 3–8 February 2026 with the Sarang Helicopter Display Team, on the indigenously designed and manufactured Advanced Light Helicopter (ALH) Dhruv. The Sarang Aerobatic Team, established in 2005, comprises five ALH helicopters. This team has performed at various prominent events like MAKS international Air Show (Russia in 2021), Dubai Air Show (2021 and 2023), Bahrain International Air Show (2024) in addition to the Singapore Air Show in 2024 and 2026.



RoKAF transit via India

IAF provided full support towards landing and technical facilities, including customs and immigration to Republic of Korea Air Force contingent comprising of nine T-50B aircraft of the Black Eagles Aerobatic Team and one C-130. The contingent made a transit halt at Air Force Station Jamnagar from 31 January to 1 February 2026, enroute to Saudi Arabia for participation in World Defence Show 2026.



India–Kyrgyzstan Exercise Khanjar

The 13th edition of the India–Kyrgyzstan Joint Special Forces Exercise Khanjar took place from 4 to 17 February 2026 in Missamari, Assam. Exercise Khanjar is an annual training event conducted alternatively between India and Kyrgyzstan. The last edition of the exercise was conducted in Kyrgyzstan in March 2025. The Indian Army contingent comprising 20 personnel was represented by troops from the Parachute Regiment (Special Forces) and the Kyrgyzstan contingent also comprising equal strength was represented by ILBRIS Special Forces Brigade.



IAF/RTAF exercise

The IAF undertook a joint air exercise with Royal Thai Air Force (RTAF) on 10 February 2026. “The exercise will enhance operational coordination and interoperability between the two Air Forces”. IAF Su-30MKI, AWACS, AEW&C and Il-78 refuelling aircraft participated in the exercise, alongside RTAF Gripen aircraft, “strengthening Indo–Thai defence cooperation and regional synergy”.



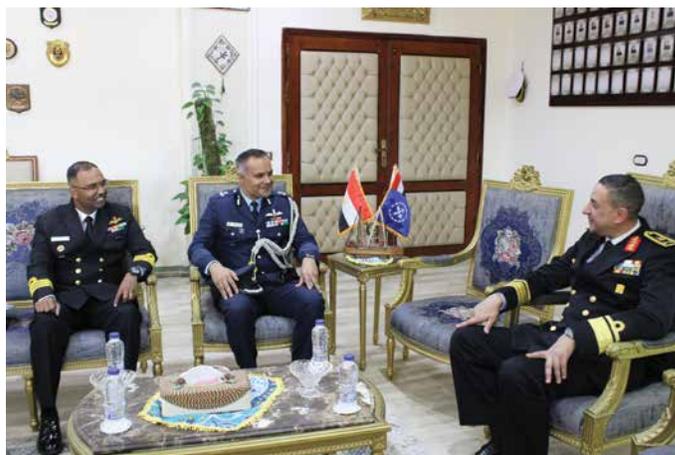
Tri-Service synergy in action

Andaman & Nicobar Command enabled seamless conduct of joint air exercise between IAF and Royal Thai Air Force (RTAF) by providing comprehensive operational and ground support at INS Utkrosh and AFS Carnic. “Efficient aircraft handling and precise marshalling ensured uninterrupted flying operations strengthening interoperability and mission readiness in island territories”.



INS Sudarshini at Safaga, Egypt

Indian Navy’s Sail Training Ship INS Sudarshini arrived at Safaga, Egypt on 21 February 2026 as part of her ongoing Lokayan-26 deployment. Covering a distance of 1,832 nautical miles in 16 days, the passage from Salalah to Safaga marked a significant milestone, highlighting the resilience, confidence and endurance of the ship’s crew. On arrival, the ship was warmly received by officials of the Egyptian Navy and representatives from the Indian Embassy.



India-US Exercise Vajra Prahar

A US Army contingent arrived in India to participate in the 16th edition of the India-US Joint Special Forces Exercise Vajra Prahar which was conducted at the Special Forces Training School, Bakloh, Himachal Pradesh, from 24 February to 16 March 2026. The previous edition of the exercise was held at the Orchard Combat Training Centre in Idaho, USA in November 2024. The Indian Army contingent, represented by Special Forces units, comprised 45 personnel, while the United States was represented by 12 personnel from the Green Berets of the US Special Forces.



India-Japan 'Dharma Guardian'

The 7th edition of the annual Joint Military Exercise 'Dharma Guardian' between the Indian Army and the Japan Ground Self-Defense Force (JGSDF) commenced at the Foreign Training Node, Chaubattia in Uttarakhand. The exercise was conducted from 24 February to 9 March 2026. This edition brought together a 120 member contingent from each side, with the JGSDF represented by troops from the 32nd Infantry Regiment and the Indian Army contingent drawn from the Ladakh Scouts. The exercise is held alternately in India and Japan and "remains a key pillar of defence cooperation between the two nations".



INS Tarangini at Trincomalee

Indian Navy's Sail Training Ship INS Tarangini arrived at Trincomalee Harbour, Sri Lanka on a training visit on 27 February 2026. The ship was accorded a warm welcome by representatives of the Eastern Naval Area of the Sri Lanka Navy. The visit follows the ship's recent participation in the International Fleet Review 2026 conducted at Visakhapatnam.



INSV Kaundinya flagged into Mumbai harbour

The Indian Naval Sailing Vessel (INSV) Kaundinya was ceremonially flagged into Mumbai Harbour on 2 March 2026 by Mr. Sanjay Seth, Raksha Rajya Mantri. The flag-in ceremony marked the successful completion of the vessel's maiden overseas voyage to the Sultanate of Oman and her historic return passage across the Arabian Sea, reaffirming India's enduring maritime heritage and India-Oman linkages across the Indian Ocean. ➡



Exercise Garuda VIII

Indo–French Air Combat Training



Exercise Garuda VIII, the eighth iteration of the bilateral Indo–French air combat training exercise, was conducted at Base Aérienne 118 Mont–de–Marsan, France, from 16–27 November 2025. This biennial exercise represented the continuation of a 22 year partnership between the Indian Air Force (IAF) and the French Air and Space Force (FASF). Approximately 500 airmen from both nations were brought together to conduct complex tactical air operations in a challenging operational environment. Mont–de–Marsan was selected due to its optimal location near the Atlantic coast and extensive infrastructure. For the exercise, India deployed six Su–30MKI fighters of 15 Squadron from Sirsa Air Force Station in northwestern India to southern France, where the FASF operates the Dassault Rafale.

Historical context and strategic framework

The exercise was opened by Air Division General Julien Sabéné, representing the FASF, who highlighted the historical context of Franco–Indian military aviation

cooperation. His address acknowledged the long–standing operational relationship between the two air forces, noting the shared aircraft inventories that have defined this partnership over decades—including Jaguars, Mirage 2000s, and the Rafale. The exercise design enabled two weeks of intensive interaction between the Indian Su–30MKI and French Rafale platforms, supplemented by additional French assets including tankers, transport aircraft, and helicopters deployed from eight different French airbases. As General Sabéné noted, “Having about 500 airmen from our two air forces training side by side” was intended to build operational bonds through shared tactical challenges that transcend theoretical cooperation and forge practical interoperability. The French commander concluded his opening remarks by acknowledging the extensive planning required and extending recognition to airbase commander Colonel Sergeti and his staff.

Ambassador Singla, Ambassador of India to France, provided the diplomatic framework contextualising Exercise Garuda VIII within the broader Indo–French bilateral relationship. His remarks at the exercise

culmination ceremony emphasised both the tactical value of the flying operations and the larger strategic significance of such military-to-military exchanges. He noted that Exercise Garuda had evolved significantly since its inception more than 22 years ago, becoming one of the most sophisticated professional exchanges between the two nations' armed forces. The progression reflected enhanced operational sophistication, with more complex mission profiles testing the limits of tactical coordination between the two air forces.

Exercise design and operational architecture

Lieutenant-Colonel Samuel, serving as Garuda Mission Commander and representing the 30th Fighter Wing at Mont-de-Marsan, provided comprehensive insight into the operational architecture and tactical design. As a Rafale pilot tasked with constructing the exercise framework, the fundamental challenge faced was representing the full spectrum of modern air warfare within a compressed two week timeline. The solution involved a progressive training architecture divided into two distinct phases, each addressing different aspects of air combat capability.

Phase One: Within visual-range combat operations

The first week was dedicated to within-visual-range combat, emphasising fundamental aircrew skills in close combat maneuvering and providing a foundation upon which more complex operations could be built. This phase focused on Basic Flight Maneuvers (BFM) and Air Combat Maneuvers (ACM) in one-versus-one and two-versus-one configurations. The week also incorporated extensive air-to-air refueling training, with both Rafale and Sukhoi aircraft conducting multiple aerial refueling sorties with the A330 Multi-Role Tanker Transport (MRTT). This capability validation represented a critical aspect of operational interoperability, demonstrating the compatibility of Indian and French aerial refueling systems.

Phase Two: Beyond visual-range operations

The second week transitioned to Beyond-Visual-Range (BVR) operations characterised by longer and more complex



mission profiles. These missions incorporated Radar-guided missile engagements with simulated weapons employment; High-value airborne asset protection missions requiring coordinated defensive packages; Offensive counter-air operations including route sweeps and strike escort profiles and finally defensive counter-air missions designed to maintain airspace integrity against varied threat packages

A particularly sophisticated defensive counter-air scenario involved a Combat Air Patrol (CAP) relay with twelve aircraft conducting continuous operations for two hours, performing seamless handover procedures in the same area against multiple threats. This mission profile represented a high-end training scenario requiring precise coordination and timing between multiple flights operating in compressed airspace while maintaining positive identification and deconfliction.

French force package and supporting assets

The exercise incorporated challenging mission sets against slow moving and low altitude threats, representing scenarios increasingly relevant in contemporary operational environments. The unique challenge presented by these targets stems from their small radar cross-sections, low

altitude operations, and slow speeds that complicate weapon employment parameters for high performance fighters. French helicopter units were integrated into the exercise scenario to provide realistic training against these tactically challenging targets. The exercise also planned to incorporate Unmanned Aerial Vehicle (UAV) platforms, though weather constraints prevented their employment.

The French Air Force package supporting the exercise was substantial and diverse: Six to eight Rafales from the 30th Fighter Wing; A330 MRTT and A400 tanker aircraft for air-to-air refueling and slow-mover protection; E-3C Airborne Warning and Control System (AWACS) aircraft; Ground-based systems simulating surface-to-air threats; Light propeller aircraft and helicopters representing low-speed threats and additional fighter aircraft including Mirage 2000D ground attack variants, Mirage 2000-5 air superiority fighters, and Rafales from other wings.



Mission tempo and operational statistics

The operational tempo throughout the exercise was intensive. A typical day commenced at 0700 hours, with the first wave launching at approximately 0730 hours local time. The operational day extended through morning and afternoon waves, with comprehensive debrief processes often extending into the evening hours. This 12 to 13 hour operational day, sustained across two weeks, represented significant physical and mental demands on participating aircrew and supporting personnel.

The first week featured multiple short duration missions, allowing for higher sortie generation rates and individual pilot engagements. In contrast, the second week featured extended mission profiles with more complex coordination requirements and extensive briefings.

The exercise statistics reflected the intensity and scope of operations: Six Proficiency and Maneuverability (PAM) flights; Sixteen one-versus-one BFM sorties; Ten ACM missions (two-versus-one fighting maneuvers); Two large-scale offensive counter-air missions with high-value airborne asset protection; One large-scale defensive counter-air mission (six versus six formation); One dedicated photo flight; Approximately 90 flying hours per aircraft type and 50 to 70 missions per aircraft.

Indian Air Force perspective and deployment

Group Captain Rohit Kataria, leader of the Indian contingent, provided detailed insight into the IAF perspective, operational approach, and comprehensive preparation undertaken to deploy 15 Squadron across continents. The scale and composition of the Indian deployment was substantial, representing a complete combat capable package of approximately 100 personnel with three different aircraft types. The core combat element consisted of a complete fighter squadron with six aircraft, its pilots and technicians. Support services were



represented from various headquarters and departments including air traffic control, safety services, meteorological services and logistics. This comprehensive deployment ensured the Indian contingent could operate independently with organic support capabilities, demonstrating the IAF's expeditionary capabilities.

The operational objectives extended beyond simple flying operations to enhance tactical interoperability, advance the strategic partnership, and share best practices in operations, maintenance and administration. However, the deeper purpose extended to cognitive understanding between the two air forces—the development of mutual comprehension of tactical thinking, decision making processes and operational approaches. As Group Captain Kataria emphasised, “Understanding how counterpart



aircrew react to opportunities and threats, their aggressiveness in particular situations and their risk tolerance constitutes the fundamental value proposition of the exercise. This cognitive dimension represents a more sophisticated form of interoperability than simple technical compatibility”.

The pilot selection philosophy was inclusive, with participation ranging from the commanding officer to the youngest pilot. Non-flying personnel observed the exercise from ground control positions, learning from the operational environment. Drawing on personal experience flying both Mirage 2000 and Rafale aircraft, the Indian commander offered comparative perspective on the platforms involved. The Rafale's strengths were identified as data fusion, electronic warfare, omni-role capability





and weapon carriage capability exceeding its own weight due to composite construction and advanced design. The Su-30MKI's strengths were emphasised as exceptional maneuverability, thrust vectoring and spacious cockpit configuration.

Logistical performance and cultural exchange

The logistical preparation for the deployment was comprehensive and demonstrated the IAF's capability to sustain complex operations at extended distances from home bases. Planning accounted for various spare parts, including modular components such as engines. This thorough preparation yielded excellent results throughout the exercise duration, with zero maintenance related cancellations across more than 50 sorties. This achievement represented significant validation of IAF maintenance procedures, spare parts planning and technical personnel proficiency operating in an unfamiliar environment approximately 7,000 kms from home base.

Beyond tactical aviation training, the comprehensive nature of the exercise objectives included cultural and diplomatic dimensions.

The 100 plus person contingent's interaction with the local community in Mont-de-Marsan formed an integral component of the broader strategic partnership objectives, with personnel serving as ambassadors of the IAF and India.

Training progression and familiarisation

The operational progression featured careful attention to familiarisation before progressing to complex operations. Immediately following arrival, familiarisation flights were conducted to acclimate Indian pilots to the area of operations, nearby airfields, weather patterns and Mont-de-Marsan airbase characteristics including runway



features, approach procedures and safety infrastructure. This foundation proved essential for safe conduct of subsequent tactical operations.

The first week concentrated on visual range combat emphasising individual pilot skills in well-defined, confined combat scenarios. The second week transitioned to large force engagements requiring sophisticated planning, coordination and execution. These missions incorporated multiple combat enablers representing realistic operational complexity, including air-to-air refuellers that extended mission duration and geographic range. The operational tempo maintained continuous pressure on aircrews while ensuring adequate crew rest through structured rotation, following a cycle of plan, brief, fly, sleep and repeat.

Professional knowledge exchange and weapons simulation

The exercise design incorporated contemporary combat developments, ensuring training relevance to current operational challenges. Advancements in air-to-air, air-to-surface and surface-to-air weapons from recent

conflicts were factored into the exercise. This evolutionary approach ensured operational relevance rather than scripted repetition of outdated tactics. Engagement between weapons school instructors from both nations enabled discussion of tactical developments, weapons employment techniques and operational concepts at sophisticated levels while respecting appropriate security boundaries.

The mission planning and execution methodology employed generic weapons parameters rather than revealing specific performance characteristics of classified systems. Air-to-air missiles were simulated in categories of very long range, medium range and short range without reference to specific systems. This methodology enabled pilots to employ realistic tactics based on weapon performance categories without compromising sensitive information.

India's ongoing efforts to expand indigenous weapons capability were highlighted, with particular reference to the Astra series of indigenous missiles. These weapons, being actively developed in variants for long, medium





and short ranges, represent a milestone in India's defence indigenisation programme, providing modern beyond-visual-range capability with domestically manufactured weapons.

Aerial refueling operations

The aerial refueling operations conducted during the exercise represented significant capability validation, demonstrating compatibility between Indian fighters and French tanker aircraft. Technical compatibility was confirmed, with the basket-and-drogue end system being compatible regardless of tanker platform. While some younger pilots experienced their first French tanker contacts during Garuda VIII, many experienced aviators had conducted similar operations during previous exercises and during the original Rafale ferry flights from France to India.

The Su-30MKI was characterised as well adapted for air-to-air refueling, with the aircraft demonstrating stability due to its size and weight. The probe position differences between the Su-30MKI and Rafale presented no significant operational challenges, as pilots received appropriate training for their respective aircraft configurations.

Strategic assessment and future implications

Exercise Garuda VIII concluded on 27 November 2025, having achieved its stated objectives of enhancing tactical interoperability, refining combat procedures, and strengthening the strategic partnership between the IAF and FASF. The successful execution under challenging weather conditions—November being one of the wettest months at Mont-de-Marsan with frequent precipitation, low cloud ceilings, and reduced visibility—demonstrated the adaptability and professionalism of both participating forces.

The progressive training architecture, beginning with fundamental within visual range combat and culminating in sophisticated beyond visual range scenarios, validated the exercise design philosophy. The structured approach enabled aircrew from both nations to develop shared tactical understanding while operating increasingly complex mission profiles in a compressed timeframe. The emphasis on cognitive interoperability—understanding how counterpart aircrew think, react, and make decisions



under pressure—represented perhaps the most significant outcome. This psychological dimension of joint training creates the foundation for effective combined operations in future contingencies.

Exercise Garuda VIII reinforced the position of the Franco-Indian air warfare partnership within the broader strategic relationship between the two nations. The exercise served as a practical demonstration of the multilateral approach to security challenges, contributing to the larger architecture of Indo-French defence cooperation encompassing equipment procurement, technology transfer and strategic consultation on regional security matters.

The 22 year evolution of the Garuda exercise series, from its inception in 2003 through the eighth edition at Mont-de-Marsan, reflects the deepening and maturing of Indo-French military cooperation. Each iteration has progressively expanded the scope and sophistication of training, incorporating new platforms, more complex scenarios and enhanced integration of combat enablers. The bilateral foundation established through the Garuda series creates conditions for more ambitious multilateral cooperation, as demonstrated by France's participation as an anchor nation in India's Tarang Shakti multilateral exercise in 2024.

Conclusion

Exercise Garuda VIII represents both culmination and foundation—the peak of over two decades of joint air combat training and the starting point for deeper collaboration. The exercise demonstrated that successful defence cooperation requires long-term commitment, investment in interoperability and mutual respect. Technical compatibility alone is insufficient; cultural understanding, transparency in identifying and addressing capability gaps and integration of operational cooperation into a broader strategic partnership are essential. As the IAF and FASF continue to modernise and adapt to new operational demands, the groundwork laid by Garuda VIII positions both nations to strengthen bilateral ties and contribute to wider multilateral security efforts. The operational skills, institutional relationships, and mutual trust built through this exercise series constitute strategic assets of lasting value to both nations. ➡

Article and photos by: Joris van Boven and Alex van Noye

Photo story by Joris van Boven and Alex van Noye...

...who visited the IAF's Exercise Vayushakti-26 at Pokhran Field Firing Range, Jaisalmer on 27 February 2026



130+ aircraft took part in a day and night exercise including Rafales, Su-30MKIs, Mirage 2000s, MiG-29s, Jaguars, Hawks, Mi-17s, C-130Js, C-295s, C-17s, the Advance Light Helicopter Dhruv and Light Combat Helicopter (LCH).



Air defence capabilities were demonstrated through engagements involving airborne platforms and ground based systems such as Akash and Spyder missile systems, supported by Army assets such as the L-70 and M-777.



Garud Special Forces and Para SF elements, were inserted by Mi-17 helicopters to conduct simulated urban intervention and hostage rescue operations. This was followed by assault landings and evacuation by the C-130J-30 and C-295 from the Advanced Landing Ground.



The night phase of exercise showcased integrated air defence, air landed operations and precision night strikes by multiple fighter platforms.



Saab order for Trackfire

Saab has received an order from the Swedish Defence Materiel Administration FMV for the Trackfire Remote Weapon Station (RWS). The order value is approximately SEK 1.5 billion and deliveries will take place 2026–2028.



Saab launches 2nd Polish SIGINT ship

On 14 January 2026, the launch of Poland's second SIGINT (Signals Intelligence) ship from Saab, ORP Henryk Zygalski, took place in Gdansk, Poland. ORP Henryk Zygalski is the second and final SIGINT ship built for Poland within the 'DELFIN' programme.



EASA approves Saab 2000(F) STC

Jetstream Aviation Capital announced the EASA approval of Täby Air Maintenance's (TAM)



Supplemental Type Certificate (STC) for the Saab 2000 Cargo conversion, representing a meaningful expansion of Jetstream's regional freighter investment platform.

Mexico for C-130J-30

The Fuerza Aerea Mexicana (FAM) recently announced the acquisition of their first Lockheed Martin C-130J-30 Super Hercules tactical airlifter, making Mexico the first country in Latin America to operate the C-130J. The FAM's acquisition of the Super Hercules was the first of two international C-130J contract awards to close out in 2025, with the second new international customer yet to be disclosed.



GA-ASI and USN test sonobuoy dispensing system

General Atomics and the US Navy continue to expand the Anti-Submarine Warfare (ASW) capability of the MQ-9B SeaGuardian Unmanned Aircraft System (UAS). The flight test featured Sonobuoy Dispensing System (SDS) pods, more than previously tested, doubling the number of sonobuoys available.



SNC procures 4th HADES

SNC has answered the Pentagon's call to lean forward through investment to drive innovation and speed in



future proof technology. At the close of 2025, the company purchased at its own expense, a Bombardier Global 6500 aircraft intended for the Army's High Accuracy Detection and Exploitation System (HADES) programme of record.

LM delivers 350th MH-60R to USN

Lockheed Martin delivered its 350th MH-60R to the United States Navy. The aircraft was delivered to HSM-41, the US Navy's Helicopter Maritime Strike Fleet Replacement Squadron, training the US Pacific Fleet's newest naval aviators and naval aircrewmembers to operate the MH-60R helicopter.



Delta Air Lines orders 60 Dreamliners

Boeing and Delta Air Lines announced the US carrier placed its first direct order for up to 60 787 Dreamliners to support long haul international growth and renew the airline's widebody fleet. Delta's purchase of 30 787-10 jets – with opportunity for up to 30 more of the largest 787 variant – will enable the airline's expansion and modernisation plans on high demand transatlantic and South American routes.



Aviation Capital Group orders 50 Boeing 737 MAX

Boeing and Aviation Capital Group LLC announced the airplane lessor has placed a new order for 50 737 MAX jets, including 25 737-8 and 25 737-10 airplanes.



Germany buys 8 MQ-9Bs

Germany's Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support and the NATO Support and Procurement Agency (NSPA) have announced the procurement of eight MQ-9B SeaGuardian Remotely Piloted Aircraft (RPA) from General Atomics.

NGC to manufacture US Navy's ALT

Northrop Grumman will manufacture and deliver to the US Navy a new advanced lightweight torpedo with a custom designed warhead to increase its lethality. Northrop Grumman will draw upon decades of production expertise to deliver a weapon that fires from multiple naval platforms.



MBDA Meteor for Germany

MBDA has received a contract to supply additional Meteor beyond visual range air-to-air missiles for the German Armed Forces (Bundeswehr). Following previous orders, this latest contract for Meteor was awarded

to MBDA by the Meteor Integrated Joint Programme Office (IJPO) on behalf of the German Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw).



TROPHY Selected by 4 NATO countries

Rafael Advanced Defense Systems has welcomed the signing of a multi-nation contract between EuroTrophy GmbH and KNDS Deutschland to supply TROPHY Active Protection Systems (APS) for the Leopard 2 A8 programmes of Lithuania, the Netherlands, Czech Republic and Croatia.



Singapore for P-8A and MK 54 lightweight torpedoes

Singapore has requested to buy up to four (4) P-8A patrol aircraft; seven (7) Guardian laser transmitter



assemblies for the AN/AAQ-24(V)N system; seven (7) system processors for the AN/AAQ-24(V)N system with selective availability anti-spoofing modules; and eight (8) MK 54 MOD 0 lightweight torpedoes all up rounds.

Ethiopian Airlines for 9 787 Dreamliners

Boeing and Ethiopian Airlines announced Africa's largest carrier ordered nine 787 Dreamliner airplanes as demand for long haul travel continues to rise. Ethiopian Airlines will leverage the 787-9 jets to grow its route network, which currently serves 145 international destinations.



France orders Airbus VSR700

The French Armament General Directorate (DGA) has awarded a contract to Airbus Helicopters and Naval Group for the production of six VSR700 uncrewed aerial systems. The VSR700s will be operated from 2028 by the French Navy.



Delta Air Lines grows Airbus fleet

Delta Air Lines has placed a firm order for 31 latest generation aircraft including 16 A330-900s and 15



A350-900s. Once delivered, Delta's widebody fleet will have grown to 55 A330neo and 79 A350s.

Embraer presents 1st ROKAF's C-390

Embraer announced at the Singapore Airshow that the first C-390 Millennium military transport aircraft for the Republic of Korea Air Force (ROKAF) had reached the final stage of its assembly process. The aircraft will now proceed to the production flights ahead of the integration of specific systems to meet ROKAF requirements.



Uzbekistan revealed as C-390 customer

Embraer announced at the Singapore Airshow that the Republic of Uzbekistan was the customer of an order for the C-390 Millennium transport aircraft previously announced as undisclosed. The Uzbek Air Force will primarily use the C-390 in transport and humanitarian missions, significantly improving its capabilities.



Elbit to integrate systems on CH-53K

As part of the preparations for receiving the CH-53K "Pereh" helicopters, the Defence Procurement Directorate (DPD) within the Israel Ministry of Defence (IMOD) has signed a deal with Elbit Systems to integrate advanced Israeli technologies, including command and control, avionics, and electronic warfare systems, and the advanced anti-missile DIRCM system, on the 12 new helicopters expected to replace the IDF's aging "Yas'ur" helicopters.



Germany and Sweden order Kongsberg for CAVS 6x6

Kongsberg Defence & Aerospace has signed a contract with Patria for the delivery of Protector Remote Weapon Stations (RWS) to support the German and Swedish Common Armored Vehicle System (CAVS) 6x6 programmes.



NGC accelerating B-21 Raider production

Northrop Grumman and the US Air Force are accelerating production capacity of the B-21 Raider. The B-21 programme showcases "Northrop Grumman's proven performance and relentless commitment to fielding advanced technologies and capabilities at the speed of need". Currently in production with final assembly at Northrop Grumman's Palmdale, California, facility and

other manufacturing operations across the United States, the first B-21 aircraft is on track to arrive at Ellsworth Air Force Base in 2027.



Thales selected for UK's Apache wingman drone programme

Thales has been down selected to propose an offer for the UK Ministry of Defence's Land Autonomous Collaborative Platform programme – Project NYX.



Manned-Unmanned teaming with F-22 and MQ-20

In collaboration with the US Air Force, General Atomics Aeronautical Systems, conducted its latest demonstration performing an autonomous mission out of Edwards Air Force Base in Southern California using its MQ-20 Avenger unmanned jet and an F-22 Raptor equipped with the latest government reference autonomy software. The test, which showcased Manned-Unmanned Teaming between the F-22 and MQ-20, leveraged autonomy and the tactical data link to enable coordination between the platforms.



The new X-76

SPRINT's experimental aircraft, officially revealed as the X-76, is now being built by Bell Textron following a successful Critical Design Review. The designation places it "within the historic lineage of X-planes that have long served to test the boundaries of aviation".



Joby to begin US Operations

Joby Aviation announced it had been selected as a partner in multiple winning applications under the White House-backed Electric Vertical Takeoff and Landing (eVTOL) Integration Pilot Programme (eIPP).



CDB leases 5 A321neo to LATAM

CDB Aviation announced on the sidelines of the ISTAT Americas conference the execution of lease agreements for a fleet of five Airbus A321-271NX aircraft with its existing customer, LATAM Airlines Group.



The rise of Sukhoi Su-57



2013 thanks to five Sukhoi test pilots Sergei Bogdan (who performed the maiden flights on the four prototypes being tested), Roman Kondratyev, Yuri Vashchuk, Sergei Kostin and Taras Artsebarsky. With an internal fuel of 25,000 lb plus supercruise attributes the aircraft should be able to attain a combat radius of over 2,000 km further boosted by air-to-air refuelling (AAR) operations. Serial production of the Sukhoi Su-57 began in July 2019.

Displaying standard attributes of Very Low Observable (VLO)/stealth airframe design especially in forward and upper

The T-50 Fifth Generation Fighter Aircraft (FGFA) prototype's maiden flight piloted by Sergey Bogdan, took place on 29 January 2010, from KnAAPO's Dzemgi Airport and lasted 47 minutes to verify the manoeuvrability, the normal operation of engines and main systems. The importance of the T-50 (renamed Sukhoi Su-57 in July 2017) project may be summed up in words of Mikhail Pogosyan, Sukhoi Company Director General commenting on the launch of the flight test programme. "Today we've embarked on an extensive flight test programme of the fifth generation fighter. This is a great success of both Russian science and design school. This achievement rests upon a cooperation team comprised of more than a hundred of our suppliers and strategic partners. PAK-FA (in Russian) programme advances Russian aeronautics together with allied industries to an entirely new technological level. These aircraft, together with upgraded 4th generation fighters will define Russian Air Force potential for the next decades. Sukhoi plans to further elaborate on the PAK-FA programme which will involve our Indian partners. I am strongly convinced that our joint project will excel its Western rivals in cost effectiveness and will not only allow strengthening the defence power of Russian and Indian Air Forces, but also gain a significant share of the world market".

The flight invoked considerable curiosity among military aviation community worldwide as it was the first fighter to have 'emerged' in Russia after dissolution of Soviet Union. In contrast to the common perception of being an uncompromising air superiority fighter to challenge the United States Lockheed Martin F-22 Raptor, this Vayu observer feels in T-50 prototype the Russian aviation industry have presented the "initial point" of a formidable strike fighter (conceptually similar to French Dassault Rafale and United States Boeing F-15E 'Strike Eagle') while retaining full capabilities of a formidable adversary in the air-to-air combat arena to be apparent once it completes development. Progress of the T-50 project had been strikingly smooth and swift (especially in contrast to United States Lockheed Martin F-35 Lightning II) and on 3 November 2011, the T-50 project achieved its 100th flight. The 200th flight was achieved in January

fuselage, inlet, wing and tail surface, Sukhoi Su-57 with a wingspan of about 14 metres and a length close to 20 metres has a flat appearance with a humped canopy area ideal for low-level stealthy ride over enemy landmass. The nose looks canted downward, with the tail being elevated. For the aforesaid ingress (like the Sukhoi Su-35S), the Sukhoi Su-57 will employ a dual mode GLONASS (Global Navigation Satellite System)/GPS receiver (military grade GLONASS signals will be made available to India and Russia) and Kalman filter based inertial navigation suite, with a Ring Laser Gyroscope (RLG). The combination of Active Electronic Scanned Array (AESA) radar and automation and high degree Artificial Intelligence (AI) systems (often referred by the Russians as the second pilot) will reduce pilot workload. The aircraft is superficially similar to Lockheed Martin F-22 Raptor with a quasi-trapezoidal wing with Leading Edge Root Extensions (LERX) (with vortex controllers) and traditional control surfaces. The vertical stabilisers angled out at about 25 degrees are trapezoidal and fully movable while the 'tail sting' houses the brake parachute and a rearward facing radar similar to Phazotron N012. The Infra-Red Search & Track (IRST) will be based on OLS-35 highly integrated with other electro-optical suite by 101KS Atoll system comprising 101KS-V IRST, 101KS-O Directional Infra-Red Counter Measures (DIRCM), ultraviolet 101KS-U Missile Approach Warning System (MAWS) and 101KS-N navigation and targeting pod. Composites (polymer carbon fibre reinforced plastic) comprise 25 % of its weight and 70 % of the outer surface with high degree of titanium content. The Radar Cross Section (RCS) of the forward hemisphere



is initially aimed to remain 40 times smaller than Sukhoi Su-30 to about 0.5 square metres ultimately to decrease to 0.01 to 0.03 square metres after clever application of Radar Absorbent Material (RAM) coating.

Two tandem main weapon bays (perhaps capable of opening and launching weapons even in supersonic speeds) in the centre fuselage between the engine nacelles measure between 4.5 to 5 metres long (doors of those have saw tooth-shaped edges) augmented by bulged, triangular-section bays at the wing root. The two tandem main weapon bays in the centre fuselage can accommodate a total of four R-77 (AA-12 Adder) sized Beyond Visual Range Air-to-Air Missile (BVRAAM) or appropriate air-to-surface ordnances developed by Tactical Missile Weapon Corporation while each triangular-section bays at the wing root can accommodate a Close Combat Missile (CCM). For air-to-air combat, the Sukhoi Su-57 carries four BVRAAM in its two main weapons bays and two short-range missiles in the side bays.

The primary medium-range missile is the active radar-homing R-77M (izdeliye 180), an upgraded R-77 variant with AESA seeker, dual-pulse motor, and conventional rear fins. The short range missile is the Imaging Infra-Red (IIR) homing R-74M2 (izdeliye 760), an upgraded R-74 variant with reduced cross-section for internal carriage. A clean sheet design short range missile designated K-MD (izdeliye 300) is being developed to eventually replace the R-74M2. At least four external hardpoints can accommodate the dual-mode solid-fuelled RVV-BD BVRAAM unveiled at MAKS-2011 for the first time capable of fulfilling the BVR role for "outer-air battles" by taking out enemy Airborne Early Warning & Control (AEW&C) and AAR platforms at the initial stages of conflict. RVV-BD weighs 510 kg, has a range up to 200 km and is capable of destroying targets with overload up to 8 g at an altitude from 15 m to 25 km.

For striking surface targets, the aircraft can carry the 250 kg (550 lb) KAB-250 or 500 kg (1,100 lb) KAB-500 Precision Guided Munitions (PGM) in its main bays. Internal weapons also include the Kh-38M air-to-ground missile, Kh-35U (AS-20 'Kayak') anti-ship missile, Kh-58UShK (AS-11 'Kilter') Anti-Radiation Missile (ARM), and Kh-69 (originally designated Kh-59MK2) cruise missile. For missions that do not require stealth, the Su-57 can carry stores on its six external hardpoints, that includes two under the air intakes, which can use most Russian tactical fighter weapons. The aircraft has a 9A1-4071K (GSh-30-1) 30 mm cannon with 150 cartridges mounted internally near the right LEVCON root. The weapon has an effective range of 800 m against aerial



targets and 1,800 m against surface targets.

The Sh-121 avionics system consists of the N036 Byelka radar system and L402 Himalayas Electronic Countermeasures (ECM) system. The fighter will be equipped with Tikhomirov NIIP N036-1-01 (further development of Irbis-E) X-band AESA radar in the nose with a 1-metre diameter antenna containing 1,526 solid state transmit/receive modules by NPP Pulsar, with an exceptional range of about 400 km against a 1 metre square RCS target. With such attributes N036-1-01 will remain fairly effective against ground and as well as stealthy airborne targets employing active countermeasures; and still further backed by two side-looking N036B-1-01 X-band AESA radars with 404 T/R

modules embedded in the cheeks of the forward fuselage for increased angular coverage. The nose antenna is tilted backwards for stealth. Moreover, the side-looking radar could enable the Su-57 to employ beaming tactics while still able to guide its own missile. The suite also has two N036L-1-01 L band transceivers on the wing's leading edge flaps that are not only used for specific detection of stealth targets and handling of the N036Sh Pokosnik (Reaper) Identification Friend-or-Foe (IFF) system but also for electronic warfare purposes. The third and fourth flying T-50 prototype flight tested the fighter's composite cutting-edge avionics suites that might well in addition include the Polyot S-111N Intra-Flight Data Link (IFDL).

Kinematics have traditionally the plus point of Sukhoi design bureau and variable cycle NPO Saturn AL-41F1 (izdeliye 117S) turbofan engines with 12 tonnes of dry thrust will enable the aircraft to supercruise at Mach 1.5 effectively enhancing the range of BVRAAMs by 30%. With afterburner 14.7 tonnes of thrust will be obtained. 15 tonnes of thrust is obtained in special emergency power. Still further developed more powerful variants are projected (izdeliye30/AL-51F1 with 11tonnes dry thrust and 17 tonnes in afterburner) to be the favourite power plants featuring three-dimensional thrust vectoring and complex automation systems, to facilitate super manoeuvrability for domination of close combat engagements plus defeat of hostile missile shots.

Interestingly the Sukhoi Su-57 is fitted with unusually robust high sink rate undercarriage, intended for operations from Short Take-Off & Landing (STOL) operations from short unprepared runways that will also be an added asset while operating from aircraft carriers in future, especially if the purpose built aircraft is fitted with strengthened undercarriage and an arrester hook. 

By Sayan Majumdar

Rafael's Ice Breaker and Sky Sting



During Aero India 2025, in order to facilitate the manufacturing of the Ice Breaker fifth generation precision guided, autonomous, long range anti-ship and land attack missile systems in India, Bharat Dynamics Limited (BDL) and Rafael Advanced Defense Systems signed a Memorandum of Understanding (MoU).

Rafael Advanced Defense Systems began work on the Sea Breaker in the late 2010s as a successor to its earlier Gabriel and Spike missile families. The project aimed to produce a fifth generation, precision guided weapon capable of striking maritime and land targets at stand-off ranges while operating in GNSS denied environments. The missile was formally unveiled on 30 June 2021. During development, Rafael incorporated an advanced Imaging Infra-Red (IIR) seeker, Automatic Target Recognition (ATR) and AI based guidance algorithms, as well as a two way data link to allow in-flight retargeting and Battle Damage Assessment (BDA). The system was designed for launch from surface vessels and land based launchers, with a stated range of up to 300 km with a 113 kg (250 lb) warhead at high subsonic speed.

Building on the Sea Breaker programme, Rafael developed an air launched variant under the name Ice Breaker. Weighing only 400 kg, this version was designed to provide similar capabilities to fixed wing and rotary wing aircraft, maintaining a high degree of commonality with the naval and land variants. Ice Breaker was first shown publicly at the Farnborough International Airshow in July 2022. The missile retained the Sea Breaker's IIR seeker, GNSS-independent navigation, Electronic Countermeasures (ECM) resistance and mid-course data link, while being optimised for carriage under aircraft pylons. In Indian Navy (IN) service, the missiles will arm the Lockheed Martin MH-60R Seahawk helicopters which in turn will enable the helicopters to engage destroyers or frigates sized targets from stand-off distances. Potential candidates also include HAL Tejas lightweight fighters.

At Paris Airshow 2023, Rafael Advanced Defense Systems unveiled what it calls a new 6th generation Beyond Visual Range Air-to-Air Missile (BVRAAM) then dubbed Sky Spear (now renamed Sky Sting), a weapon the company claims will have "the advanced capabilities that will provide users a qualitative edge over its most capable adversaries."

The missile is designed to give long range capabilities to aircraft and can be used on multiple fighter jets, new or old, according to a company spokesman. "With the advent of long-range air-to-air missiles, the challenges faced by aerial forces have increased exponentially over time. The engagement range has extended longer, and the time gap between launch and end game has created a significant zone of uncertainty," the company stated.

Rafael says Sky Sting employs a new breed of RF seeker

and additional technologies. "The Sky Sting missile is designed to engage targets at long ranges, ensuring that the opponents are overwhelmed before they have a chance to launch," the firm says. "Its new RF seeker technology allows for early lock on, a more accurate end game and substantial leap in Electronic Warfare (EW) immunity."

Rafael's retired Brig. Gen. (Res.) Pini Yungman, Vice-President and Head of the Air and Missile Defense Directorate, said in the company statement that the missile is the latest in the company's long legacy of air-to-air weapons. The first air-to-air missile created by Rafael was developed in 1959 and there are now five generations. The legacy goes back to the original Shafrir or Python series of missiles. The missile was designed by Rafael which is Israel's historically government-chartered research and development centre for defence products. Like the Sky Sting, Rafael has showcased previous generations of these types of missiles at the Paris Air Show.

Sky Sting uses a double fin design at the tail and four canards at the front. A similar design was used in the main segment of the ground-to-air Stunner interceptor. Coupled with a three-pulse rocket motor, supporting the boost, sustain, and endgame pulses, this design provides superior manoeuvrability and performance throughout the flight and engagement envelope. Sky Sting is designed as a BVRAAM. Rafael's sources did not specify the range; however, it is rumoured to be around 250 km and significantly exceeds the I-Derby ER/Derby Mk3, which is Rafael's longest range AAM. Another new element in the Sky Sting missile is its RF seeker. Unlike the Stunner's dual seeker, Sky Sting uses only an RF seeker, as Rafael performed trade-off studies that proved that the new seeker could deliver the required performance with a single seeker at the extended range and under contested electronic warfare.

Rafael presented the Sky Sting (which is close to final development) to several potential customers (including India) and will proceed with full scale development of this new missile upon the customer's commitment. Sky Sting addresses the need for long-range intercepts, as reflected by Raytheon's latest variants of AIM-120D AMRAAM, the European Meteor from MBDA, and the Vypel R-37M (RVV-BD) from Russia. Unlike the ramjet propulsion the Meteor uses to meet range performance, Sky Sting relies on proven rocket propulsion to achieve the required range and manoeuvrability. Sky Sting is slightly shorter than the I-DerbyER, and likely to fit in internal weapon bays for stealth. As mentioned before, the new RF seeker technology allows for early lock-on, a more accurate end game, and a substantial leap in EW immunity. ➡

By Sayan Majumdar

Italian Navy GRUPAER “Wolves in Transition”



The introduction of a new generation weapon system inevitably imposes radical change on those who adopt it—especially when that system effectively “skips” a generation, as in the case of the Italian Navy’s Carrier Air Group (GRUPAER).

For several years, the Air Group has successfully sustained two clearly distinct flight lines: the AV-8B Harrier II Plus—now approaching the end of its operational life, yet still fully capable of performing Close Air Support (CAS) and reconnaissance missions—and the F-35B, the short take-off and vertical landing (STOVL) multirole fifth generation fighter.

Recent media reports indicate that the US Marine Corps may retire its AV-8B+ fleet by the end of 2026, potentially accelerating the Italian Navy’s own phase-out of the Harrier.

Within the broader framework of Italian air power, the naval aviation component represents a relatively small niche compared to larger air forces. Yet it is a niche of excellence: the ability to deploy anywhere a complex sea based weapon system such as an aircraft carrier equipped with fifth generation fighters. With the F-35B now entering operational service, the Italian Navy joins the very limited group of nations capable of projecting such capability



from the sea—primarily the United Kingdom and the United States.

For GRUPAER, Exercise Pitch Black 2024 represented a defining moment. The Italian Carrier Strike Group, under the command of Rear Admiral Giancarlo Ciappina aboard aircraft carrier Cavour, was the only carrier force participating in the exercise and demonstrated the ability to operate two distinct flight lines simultaneously.

Italian F-35Bs—six aircraft deployed to the exercise, now increased to eight following 2025 deliveries—were tasked with leading composite air operations involving more than 30 aircraft. Missions included Composite Air Operations (COMAO), Defensive Counter Air (DCA) and Offensive Counter Air (OCA). Italian pilots trained daily alongside counterparts from 22 nations. Some countries, including India—an operator of two aircraft carriers—explicitly requested engagement with the Italian naval aviation component.

Achieving Initial Operational Capability (IOC)

As of October 2024, following the Indo-Pacific deployment of the 31st Naval Group, the embarked Air Wing aboard Cavour achieved Initial Operational Capability (IOC).

This milestone was not simply a matter of meeting numerical benchmarks established by Navy Headquarters and the Air Forces Command in terms of qualified pilots,

maintainers, aircraft numbers and weapons inventory. It represented the attainment of a genuine operational capability.

Since the delivery of the first aircraft assigned to the Group in 2021, a comprehensive Operational Test & Evaluation (OT&E) campaign has been conducted. Twelve macro-areas were defined, spanning operational effectiveness, interoperability with the carrier and other strategic assets, shipboard and shore-based logistics, operational and maintenance support, infrastructure, personnel, training, sustainability, flight safety and information security.

Each macro-area was broken down into Critical Operational Issues (COIs), assessed through qualitative and quantitative evaluation. The overall percentage of fulfillment constituted the criteria for IOC declaration and continues to be updated as the Group advances toward Full Operational Capability (FOC).

Although fleet numbers are still growing, GRUPAER already operates in major global training and operational theaters through a synergistic integration of F-35B and AV-8B. Participation in Large Force Exercises—including Pitch Black 2024, the Tactical Leadership Programme (TLP), Falcon Strike 25 and repeated activities on NATO's Eastern Flank—demonstrated how Link-based integration between F-35 and AV-8B acts as a true force multiplier and validates the operational doctrine of fourth-to-fifth generation fighter integration.



The dual qualification concept

Given limited force size, separating the two aircraft lines was not feasible. GRUPAER therefore adopted an innovative “Dual Qualification” concept. Experienced AV-8B pilots transitioning to the F-35B continued flying the Harrier to maintain combat readiness. This ambitious initiative required a disciplined methodology similar to that used in flight test environments, where pilots are trained to operate multiple platforms. The approach emphasised procedural rigor, reduced reliance on habit patterns and deliberately moderated reaction tempos to mitigate risks such as mode confusion and cognitive error between two radically different aircraft.

The result effectively expanded available pilot capacity while enabling cross-fertilisation of experience between platforms, capitalising on 35 years of Harrier operational heritage. The AV-8B also continues to provide complementary capability in certain roles, including Blue and Red Air support.

Fifth generation transformation

The F-35B represents a quantum leap in situational awareness. Its sensor fusion and data processing capabilities fundamentally redefine battle management. Even the most junior wingman now possesses a level of situational awareness comparable to, or exceeding that traditionally held by mission commanders. This evolution demands a generational shift in command structures and decision making processes to fully exploit the immediacy and depth of fifth generation capabilities while preserving established rules of engagement.

From a maintenance perspective, the F-35 introduces predictive diagnostics and globally connected information logistics systems. Modern maintainers must combine traditional aeromechanical expertise with digital proficiency, interfacing with networked databases and advanced diagnostic tools. The aircraft’s self-monitoring systems predict maintenance needs and integrate directly into the global JSF sustainment architecture.

Connectivity becomes fundamental, whether operating aboard ship or from remote deployed locations. Younger technicians adapt naturally to digital workflows, while experienced Harrier specialists contribute analytical depth derived from decades of operational practice.

STOVL evolution: From Harrier to fly-by-wire

The generational transition from a mechanically driven STOVL aircraft to a fly-by-wire fifth generation platform required doctrinal innovation. In 1999, the VAAC (Variable Advanced Aircraft Control) programme explored alternative control laws for the future JSF STOVL variant using a modified two-seat Harrier.



Two candidate control logics were evaluated: one reflecting traditional Harrier concepts, and another introducing a blended regime where throttle consistently controlled speed and stick input governed longitudinal and vertical control. Testing—including carrier landings aboard HMS Invincible—ultimately informed the control philosophy adopted for the F-35B.

Today, STOVL operations in the F-35B rely heavily on automation. During carrier recovery, a single command initiates automatic deceleration and stabilisation into hover aligned with the landing spot and ship speed. Training philosophy has evolved accordingly: simulator based preparation now replaces much of the field practice once essential for Harrier pilots.

Whereas the Harrier lives permanently within the V/STOL regime, the F-35B operates primarily as a conventional CTOL aircraft, converting to STOVL mode only for shipboard recovery.

Integration and multi-domain warfare

A defining feature of fifth generation aviation is federated data analysis and networked sensor fusion. F-35s share a unified operational picture across cockpits, multiplying the effectiveness of each aircraft. However, the full potential of fifth generation capability is realised only when integrated across coalition networks.

Through Link-16 and cooperative NATO integration, GRUPAER actively injects and receives data across multi-domain architectures, connecting air, land, sea, electronic warfare (EW) and ISTAR assets. This ensures that fifth generation capability contributes to—and benefits from—the broader coalition system.

Organisational transformation

Operating two such distinct aircraft types presents significant personnel, logistical, and structural challenges. Managing both lines requires careful human resource balancing within a force structure already under strain. At Naval Air Station Grottaglie, infrastructure modernisation has been extensive. Enhanced security



operational areas, replacing traditional range-based qualification models. Cultural transformation is ongoing and inevitably involves generational change.

The Future of the “Wolves”

“With IOC achieved, we now look toward FOC. We await the full allocation of the 20 planned F-35Bs, expected between 2031 and 2033. We must monitor new weapons development, ensure adequate stockpiles, and prepare for retrofit programs leading to full platform maturity. Given programme delays, the AV-8B will continue supporting operations at least until 2028—possibly 2030.

We cannot afford to lose the critical mass required to deploy 8–10 aircraft interoperating twice daily. Personnel strategy will be decisive—particularly increasing maintainer numbers to new levels of scale.

protocols, information protection requirements, and increased fuel logistics reflect the demands of fifth generation operations. The base has also become increasingly attractive to allied air forces seeking training integration.

Across the Italian Navy, training philosophy has shifted toward high intensity, multi-domain scenarios over large

Full transition means achieving Full Operational Capability of the sea based aerotactical component underpinning Italy’s strategic maritime power projection through the Carrier Strike Group. This requires not only development within GRUPAER or the carrier itself, but generational growth across the entire Navy.



Captain Gianbattista “Skipper” Molteni, GRUPAER Commander



Strategic discussions regarding a future conventional aircraft carrier reflect the need to move beyond STOVL limitations in range and payload. Parallel growth in personnel, logistics and organisational footprint will be indispensable.

Grottaglie must continue expanding to ensure seamless integration between shore based Air Wing elements and embarked operations, sustaining fifth generation sea based air power over time and distance.”

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**Text and images (air to air) by Gian Carlo Vecchi
Ground images by Gian Carlo Vecchi and Pier Paolo Lazzarin**

4th gen Finnish fighters prepare for 5th gen

F-35 will join Arctic force



The new NATO member Finland, who joined the alliance in April 2023, could not be called a rookie to the established military alliance. Although it is sovereign and neutral course within Europe for decades, the country had already been a member of the European Union since 1995. This was visible with the Ilmavoimat, the Finnish air force, aircraft assets when replacing its former Russian manufactured aircraft like MiG-21 fighters and Mi-8 helicopters, to British Hawks, American F/A-18's and European C-295's and NH-90 helicopters. Also, the frequent participation in NATO exercises was a clear sign and moreover, highly welcomed by the alliance. Meanwhile and more recently, however not yet as a NATO member, another step was taken. With the F/A-18 force coming at age the necessity of finding a successor was imminent. This meant the installation of a new project, the HX Fighter programme, in which manufacturers were invited to propose a new fighter aircraft for the Finnish air force. After a thorough evaluation process, the F-35 was finally selected as the best choice for the future. In December 2021, the Government of Finland authorised the Finnish Defence Forces to procure 64 F-35As and

initial deliveries have recently taken place. With all these new developments taking place, it was the right time to visit the new Scandinavian NATO member and learn more about their current front-line F/A-18 Hornet fighter operations while preparing in parallel for the future arrival of the F-35.

Air Combat Centre

We visited the Tampere-Pirkkala air base, about 200 km north of the capital Helsinki and home base of the "Ilmataistelukeskus", the Air Combat Centre (ACC). The ACC is the perfect unit to visit as they play a key role in projects for the Air Force Command in benefit of the operational units. The invitation to have a closer view and hear more about their F/A-18 operations and F-35 preparations planning, was given during the Frisian Flag (FF) 23 exercise in The Netherlands. Here we talked to former ACC commander Lt Col Juuso "AMEX" Ilkka who was the Finnish AF F/A-18 Detachment Commander, about their participation in FF. At that time the main focus for Finland was already at the F-35 and with British, American and Dutch forces joining the exercise with their

already operational 5th gen platforms, it was without doubt a highly beneficial decision.

At Tampere we were warmly welcomed by Lt Col Jaakko “AVERELL” Salomäki who was installed as the new ACC commander in June 2024. Lt Col Salomäki, a current F/A-18 pilot who has about 24 years of F/A-18 experience, including types like L-70 Vinka and Hawk aircraft, came from the Lapland Air Wing based at Rovaniemi air base in the North of Finland. Coming to the Satakunta Air Wing at Tampere was not new to commander Salomäki. He was earlier based here within the Fighter Squadron 21 as being its last commander. FS21 was an operational fighter unit which achieved the impressive milestone of collecting 44.500 flight hours on the Hornet before the squadron was disbanded in 2014.

The ACC is not the only flying unit based at Tampere, where you can also find several flights of the Supporting Air Operations Squadron “Tukilentolaivue”, flying with types like the C-295M, PC-12/47E and Learjet 35A. Although Tampere is the main base for the Tukilentolaivue, the unit maintains several detachments at other air bases in Finland. The Tampere air base has also a regional civilian aviation function with located companies providing services like training and maintenance. Civilian operator AirBaltic maintains several flights from and to Tampere and additionally you can find a station of FinnHEMS in response of helicopter medical flight request.

The responsibilities of the ACC reach a wide scope, from supporting air operations for the air force combat capability, up to undertaking research and development



projects on behalf of the nation’s high leadership. Another integral part of the Air Wings mission is the development of air warfare tactics and doctrine, which is done in close partnership with universities and technology industries. In general these projects include Operational Testing & Evaluation (OT&E) and Development Testing & Evaluation (DT&E). Additionally the ACC is in control of making Tactics, Techniques and Procedures (TTP’s) for the operational F/A-18 units. For a majority of these roles the elementary execution of test flights is essential for the ACC to make evaluations and present findings and conclusions or come with new advises for procedures. Sample of a major project for the ACC was the HX Fighter programme, which started in 2015, to select a successor for the F/A-18 and resulted in the procurement decision of the F-35 in 2021.

Lt Col Salomäki explains that the ACC can make use of all types of aircraft in service within the air force and can make use, on a temporary basis, of additional aircraft from the operational units for the ACC projects. The unit employs a number of test pilots who are responsible for the execution of the various projects. Furthermore a number of flight test engineers completes the dedicated unit which employs roughly 60 people in total. A normal route for a future test pilot is to apply for the function while operating in one of the front line units. A thorough and specific assessment procedure is in place and although flight experiences are essential, having high numbers of flight hours is no guarantee to become a test pilot. Other selection criteria, like the ability of a pilot to become quickly acquainted with new aircraft and fly them in a matter of weeks, are playing an important element in the selection procedure as well. Once selected, a pilot will follow a national





or international test pilot course. Test pilots visit every now and then other international test units, to fly a new plane in a couple of weeks. The ACC test pilot projects gives guidance to the moments and intensity of flights, as they are in charge to manage the projects with setting objectives, planning, registration and finally take care of documenting the findings in reports.

The F-35

With the finishing of the HX fighter programme in 2021 the free ACC capacity was immediately reserved for the various projects which would prepare for the entry of the new F-35 in the Finnish Air Force, as Lt Col Salomäki describes. The current overall project planning reveals meanwhile several specific timings, which kicked off in 2025 with the delivery of the first 5th gen aircraft which will be used for training purposes in the USA. Training is foreseen to take place at the 188th Wing at Fort Smith/ Ebbing Air National Guard Base, Arkansas USA, which is also hosting training programmes for countries like Poland and Germany. In 2026, the first F-35 will touch down in Finland and is planned for Fighter Squadron 11 of the Lapland Air Wing at Main Operating Base (MOB) Rovaniemi and is expected to achieve initial operational capability (IOC) in 2028. The other Finnish operational fighter unit, Fighter Squadron 31 of the Karelia Air Wing at MOB Rissala, will receive its first F-35s in 2028. The F-35 will achieve Full Operational Capability (FOC) by the end of 2030. Parallel with the F-35 deliveries, the F/A-

18 C/D Hornets will retire in phases and will be completely phased out by the end of 2030 leaving the F-35 as the main fighter for the Ilmavoimat.

By the end of 2024 the ACC main focus, of the built up of TTP's for F/A-18's, moved to the F-35 as Lt Col Salomäki explains. Meanwhile the base had received 2 FENIX F-35 flight simulators, as a partial preparation before Finnish pilots start flying their first F-35s in the US in late 2025. The first group of Finnish fighter pilots are running their initial F-35 training in the US. Upon their return, these pilots will take care of the start of a continuous F-35 training programme for the other pilots which will take place in Finland from that moment on at MOB Rovaniemi





and later at MOB Rissala. For fast jet pilot training, the Finnish air force uses the Hawk double seater. The aircraft has received several updates over the years, including new cockpit digital display systems making them also capable to fulfil the requirements for pilot training towards the F-35. Also, the latest development to install Hands On Stick And Throttle (HOTAS) in the Hawks is now running together with strategic partner Patria (previous Valmet) from Finland. Once the F-35's have entered service and experiences have been gained, there may come a moment to review the situation and evaluate the available options to replace the Hawks by a new trainer. Another valid and cost-effective option to consider may be joining a combined international or Nordic training. Within NATO, several international pilot training initiatives have been installed in the recent years and the programme is likely to expand its capacity throughout Europe.

NATO

In the meantime the ACC, in combination with the operational units, keeps on joining NATO exercises, like the Frisian Flag of 2024 and Ramstein Flag in last year. The exercises with F-35 participation of partner nations have the special interest as it will be good for building up general knowledge as well as how to operate best a 4th gen fighter for some years next to a 5th gen fighter. The ACC wants to learn how to integrate for example common tactics between both platforms. It is than interesting to know that the F/A-18 can carry more weapons than the F-35, which can currently carry only 4 AMRAAM's in its bay. However, the sensors of the F-35 provide much more and detailed info than the systems of the 4th generation Hornet does. It will be beneficial to have them fly together and that both can combine the stronger capabilities of the other. Lt Col Salomäki explains that they have been to Norway to support the Weapon Instructor Course (WIC) in 2024 of the local F-35's and during fall that same year, the Cobra Warrior exercise was joined in the UK where the F/A-18's could fly along with RAF and USAF F-35's. With the Finnish AF objectives, such exercises will have the priority to participate in for the coming years. Although there will be only several years that the Finnish F-35's and F/A-18's fly together, the integration of 4th and 5th gen aircraft remains an essential subject as when the Hornets have been phased out there will remain other

partners to integrate with and to make use of each other's strengths. A close by sample can be the integration with neighbouring country Sweden with its Gripen force, or other nations doing their regular Air Policing missions in the Baltics.

After becoming a NATO member in 2023, there was no immediate big difference noticed within the operational units. However, at the back ground the Finnish air force started working rapidly to do all preparational efforts which come along with the membership, like the operational planning according common NATO standards and procedures. Next to that, Lt Col Salomäki and his colleagues observed other NATO nations growing interest for training together with the Finnish aircraft in Finland. For example they want to learn how Finland conducts its wintertime flight operations in the Arctic regions when experiencing freezing conditions throughout the day. Another sample are the "Baana" highway exercises which are annually held. Here are flight operations trained from road strips throughout the country. In the Baana 2024 exercise which ran from 30 August to 6 September, the Finnish aircraft was joined by Eurofighters from Germany and F-35's from the US units flying to and from the Norvatie highway strip in Rovaniemi and the Hosio highway strip in Ranua. A year earlier RAF Typhoons and Norwegian F-35's already joined the exercise which includes day and night flying. A more recent Baana, which ran during May last year had a number of Dutch F-35's joining the highway exercise. During the exercises the roads are closed for normal traffic and provisional and temporary means are installed to make aircraft operations possible in out of airfield areas. For NATO the Baana 2024 exercise had been named "Imminent Field 24".

Another operational element that changed for Finland was the participation in NATO's Air Policing missions, providing adequate air power to member nations without sufficient defensive aerial means. The first deployment took place in the summer of 2024, when several F/A-18's were based in Romania for QRA duties at the east-flank during 2 months. During February 2025 Finland had its second NATO Air Policing mission, while deployed at Keflavik AB, Iceland. With 4 Hornets from the Lapland Wing together with 50 supporting airmen, the unit conducted Airborne Surveillance and Interception Capabilities (ASIC) to meet Iceland's Peacetime Preparedness Needs (IPPN) and to ensure the security of NATO Airspace in the Arctic region.

In the light of lining-up with other NATO members, Lt Col Salomäki was already able to reveal that the name of the Air Combat Centre will change to the Air Warfare Centre in the near future. The new name is seen as more common in use with other NATO partner units. Furthermore, 2026 will be important year according Lt Col Salomäki. Not only for all air force employees, who after all their preparational work will finally experience the introduction of the first F-35's in the Finnish air force, but also for the general public who will see the new fighter joining flights with the F/A-18 over Finnish air space. ➡

Text and photos by Peter ten Berg

ITALIAN NAVY

Comando Flottiglia Sommergibili

U212A

(COMFLOTSOM)



Our experience on board began by meeting the Commander of the Submarine Flotilla, Navy Captain Luigi Zefferino, who informed us that the Taranto base (where the Command is located) hosts 6 of the Navy's 8 submarines (4 diesel electric units of the Sauro class and 4 Air Independent Propulsion units of the Todaro class), while the other two are based in Augusta. As Zefferino explained, "The submarine flotilla is organised into a logistics department, a technical department, an administrative department and a training centre that we traditionally call the 'submarine school.' Even the word we use for our boats in Italian is linked to tradition, but in practice they are fully submarines: a 'sommergibile' is mainly designed to sail on the surface and submerge when needed, whereas a submarine is designed to operate underwater."

As for operations at sea, these "are directed by the Navy Submarine Command (MARICOSOM), which exercises operational control over assigned submarines under permanent delegation from the Commander in Chief of the Naval Fleet, to whom it is organically subordinate. To carry out this task, the Submarine Command operates a specialised Operations Centre within the Navy's Multi-Domain Operations Centre of CINNAV. In addition to ensuring communications with submarines at sea, the Submarine Command centre manages their operations by coordinating with allied operations centres, monitors all military and civilian underwater activity throughout the Mediterranean, and continuously monitors the International Submarine Escape and Rescue Liaison Office (ISMERLO) platform in order to promptly ensure rescue interventions in case of underwater emergencies."



Regarding the unit under Captain Zefferino's leadership, "the technical and logistical readiness of submarines is ensured by the Submarine Flotilla Command based in Taranto, supported by two logistics support units in Augusta and La Spezia. The Flotilla Command also performs the important task of training submariners through the Submarine School under its authority. All courses cover every specialist training level, some also conducted for foreign navies, such as the NATO course for coordinating rescue forces for distressed submarines. Training is essential because submariners operate highly technological platforms, carrying out prolonged missions in challenging and potentially hostile environments. The human factor is therefore indispensable for effectively managing a complex machine like a submarine, where each submariner contributes specialist expertise, balance and flexibility, a sense of responsibility, problem solving skills and the ability to work as a team."



Commander of the Submarine Flotilla, Navy Captain Luigi Zefferino

Submarines represent a unique and strategic asset in the defence landscape. Because of their specific characteristics, they help protect national interests in priority areas, especially in the underwater domain. This dimension has become a new arena of international competition, where the growing presence of submarines must be considered alongside the potential vulnerability of undersea infrastructure essential for energy supply, natural resource exploitation and communications flow.

"Italian submarines," Zefferino continued, "operated this year (2025) in the Mediterranean basin, conducting daily surveillance and control activities in maritime areas of national interest and ensuring, thanks to the average presence at sea of at least one submarine every day, an important deterrent effect against potential threats. More than 60% of sailing hours consisted of operational activities conducted both in strictly national operations (such as Operation Safe Mediterranean) and in NATO led activities (Operation Sea Guardian) or in support of EU led operations (Irinì). Submarines also took part in major national and international exercises. The remaining hours were devoted to training."

Before departure, we attended the briefing in which the commanding officer described the mission type and issued the main directives. Zefferino noted that 14 women are part of COMFLOTSOM (Submarine Flotilla Command), some





of whom serve aboard the Venuti (jokingly called the “pink submarine”). Its commander, Corvette Captain Francesco Giocondo, told us the exercise would be very demanding, involving various air and naval assets and that “as far as we are concerned, we will simulate a submarine transiting specific points of interest, following precision navigation. Opposing us will be a naval screen trying to detect us. Our task is to identify ships and plan a potential attack following very complex procedures designed to improve our training level. Although short, this exercise will be very intense, involving all onboard personnel divided into two teams, and will be an excellent opportunity to train younger crew members and consolidate existing knowledge, further increasing our professionalism. We will initially navigate at periscope depth, almost invisible, then dive to about 60 meters below sea level and complete the second part of the mission before returning to base.”

After about 20 minutes of navigation, the order came to go below deck for the start of the dive, and we were granted access to the heart of the submarine, the Combat Information Centre (CIC). Every aspect of the mission and the submarine is managed from here, and most of the crew works there. Their roles were explained by Captain Zefferino, starting with the combat system operator: “This operator transforms sonar information into three dimensional objects and inserts them into a graphical

representation. Mathematical algorithms called Target Motion Analysis analyse the movement of objects around the submarine. This is done passively, because we listen rather than use radar like surface ships: we simply listen to noise.

Another very important role is that of sonar operators: with their experience, supported by technology, they can tell us ‘who it is’ and ‘what it is doing.’ They hold different qualification levels, from junior operator on first embarkation up to team leader, who passes on experience and filters information.

Then there are platform system operators, starting with the helmsman, who uses two joysticks to control submarine movements. Following only instrument indications, this operator literally steers the submarine in three dimensions. Because space is limited, each crew member always has a second qualification; in this case, the helmsman is also the onboard medic.

We also have engine technicians, again with various qualification levels: from the first level, where the operator visually checks instruments and events, to the higher level platform control assistant, who manages systems through a console, up to senior propulsion controllers responsible for all onboard platform systems and navigation.

Finally, there is a team of electrical technicians responsible for onboard electrical systems and for the other heart of the submarine: the hydrogen plant and fuel cells that produce electricity. As for the kinetic side, the submarine carries what we call ‘heavy’ torpedoes, capable of sinking large ships at long distance.

For self-defence, attack torpedoes can also be used defensively, but not only that. While navigating, the submarine studies the water column—like creating a



cylinder in the sea with specific physical characteristics—so as to become invisible to ship sonars. Operators must constantly update the water column data; through maneuvers involving depth, speed, and course changes, we hide in the surrounding sea.”

Moving through the submarine, we observed that life onboard is rather spartan due to limited space but sufficiently comfortable. Crew quarters in the forward section include two bathrooms and two showers used by both men and women; bunks shared by two people (one on



duty and one resting, with alternating six hour shifts); and lockers—one per crew member—small but sufficient for a 24-day mission. Also forward, next to the crew quarters, is the torpedo loading hatch, with six launch tubes.

We asked about the psychological aspect of serving on a submarine. “It is experienced positively,” Zefferino replied. “Personnel are highly selected: to work on a submarine you need excellent self-control, great respect for others, and the ability to live well with your colleagues. This bond develops over time, but even during the first voyages crews find the right cohesion and adopt a lifestyle that allows them to live calmly together.”

Submarines are now more than ever an indispensable maritime defence asset, protecting national interests both underwater—where infrastructure is crucial for energy transport and data and communications flow—and on the surface, where over 80% of commercial traffic passes. In today’s unstable geopolitical scenario, the underwater dimension has become a field of intense international competition.

The Italian submarine component is engaged daily in maritime security operations at national, NATO, and EU level. Thanks to their stealth and versatility, Navy submarines provide credible, sustained deterrence and conduct essential intelligence gathering operations. Maintaining technological advantage—translating into operational advantage—is necessary to safeguard national interests. For this reason, technological evolution is underway with the acquisition of the new U212 NFS



submarines, already under construction and entering service between 2027 and 2031, gradually replacing the four Sauro class units.

Captain Zefferino explained that “Venuti and its sister unit Romei, the most recently delivered, feature highly innovative technological solutions. Built entirely of non-magnetic material and using the most modern silencing techniques to reduce acoustic signature, they are equipped with modern SHF satellite communications, a latest-generation optronic periscope, and a weapons system based on the new Italian made Black Shark Advanced heavy torpedo (Leonardo). Propulsion is AIP (Air Independent Propulsion), based on fuel cell technology where electricity is produced through the reaction of oxygen and hydrogen, ensuring underwater endurance three to four times greater than conventional battery submarines. The submarine component is at the centre of major innovation processes, including production of the new U212 NFS class. It has also contributed to important underwater domain projects, including the new National Underwater Hub, aimed at enhancing and integrating innovation capabilities across industry, research and universities. Noteworthy is the Neptune research project, a collaboration between the Navy, the European Space Agency, the Italian Space Agency, and several universities, comparing physiology and biology of International Space Station astronauts and Italian submarine crews, who share prolonged operations in confined spaces with minimal margins for error.”

The future has already begun with construction of three of the four U212 NFS submarines, intended to replace the Sauro class and renew the underwater fleet. NFS stands for Near Future Submarine and builds on U212A experience while introducing new technologies with strong national content, including lithium-ion batteries and next generation fuel cells. The NFS project aims to become a “system of systems” capable of interacting with networks of underwater sensors and drones. ➡

Note: The author thanks the Italian Navy, UPICOM, Adm. Jacopo Rollo, Commander Federico Mariani, Commander Luigi Zefferino, Lt. Cdr. Francesco Giocondo, 1st Lt. Fabiano Cardillo, and the crew of the submarine Venuti for their availability.

Text: Gian Carlo Vecchi
Images: Gian Carlo Vecchi and Pier Paolo Lazzarin

Peter ten Berg visits the... ...Dutch National Military Museum (at night)



The Dutch AF had 45 Gloster “Meteor” T.Mk.7 (I-19) in service for pilot training within 700 squadron at Twente air base and were used from 1949–1959. 10 of them were transferred to the marine aviation branch to prepare naval pilots for their transit to the Hawker Seahawk.



The Royal Dutch Naval Aviation Service (MLD) had the Augusta Bell 204B in service from 1962 to 1977. The helicopters were tasked for liaison duties as well as transport, SAR and in support of marine troops. Operations were conducted out of both Naval Air Stations, Valkenburg and de Kooij, detached on board of marine vessels but also at NAS Hato, Curacao at the Dutch Caribbean.



The current NMM museum is located at the former military air base Soesterberg. This Dutch air base was also host for one of the United States Air Forces in Europe's (USAFE) units, the 32nd TFS "Wolfhounds", from 1954 to 2005. One of the types in use within the 32nd TFSW during the early days, was the F-86F Sabre. The aircraft on display at the NMM, the "FU-385", is a former Portuguese AF asset and for the museum duty repainted in the original Wolfhounds sqn colours of the past.



Around 1956 the Dutch Air Force started to replace the Gloster Meteor by the Hawker Hunter as a fighter aircraft. A total of 96 have been in use in various squadrons until 1964. The "N-122" registered Hunter belonging to the NMM collection is an F.Mk.4 type and is kept in the museum's storage.



The backbone of the Royal Netherlands Air Force fighter aircraft during 1962–1984, was made out of 120 Starfighters, which included single seats (majority), reconnaissance as well as 18 dual seaters. The dual seaters, TF-104G, were for pilot training and part of the Operational Conversion Unit (OCU). The “D-5803” of the NMM is kept in storage, however in excellent condition.



The J-066 registered F-16B Fighting Falcon was the experimental testbed of the Dutch AF during the years that F-16 was in their operational service. The testbed is applied with specific test decorations as well as orange coloured elements to make a clear difference against the “normal” F-16 equipment in use. The J-066 received the appropriate “Orange Jumper” nickname and was added to the NMM collection only a few years ago.



Another type which was used by United States Air Forces in Europe's 32nd TFS during their presence in The Netherlands, was the McDonnell Douglas F-4E Phantom II. They were replaced by F-15 Eagles in 1978, however with a well kept Phantom sample, the NMM secured this part of Dutch based aviation heritage.



All images by Peter ten Berg

During the years that the Starfighter was in use, the Dutch air force also operated Northrop NF-5 Freedom Fighters. The "A" version was in use for light attack, while the "B" version had the pilot training role. The NMM Freedom Fighter, an NF-5B with K-4011, shows the 316 squadron badge of Gilze Rijen air base, which was one of the units, at its tail.

Türkiye and the unmanned revolution in the sky



Due to its geographical location, Türkiye is either a neighbour or very close to troubled regions of the world. Due to its proximity to conflict zones and its long history of combating terrorism both within and beyond its borders, Türkiye has had its own unique needs. The Kurdistan Workers' Party, recognised as a terrorist organisation by the US and the EU, is a separatist militant group that has been carrying out armed attacks against civilian and military targets in Türkiye since August 1984.

By the 1990s, air superiority had become increasingly important in the Internal Security Operations conducted against the PKK. The increasing number of general purpose and attack helicopters were used for both personnel transport and armed reconnaissance flights. Attack helicopters proved very useful in the region, but they also had their own drawbacks. The combination of the region's high mountains and high summer temperatures reduced the helicopters' performance. Their time spent in the mission area and the loads they carried were decreasing.

Intelligence, Surveillance and Reconnaissance (ISR) activities were becoming increasingly important for gaining control of the area. Unmanned Aerial Vehicles (UAVs) were needed to monitor critical geographical areas such as gorges, passes and valleys used by PKK militants as transit routes, sensitive transportation routes and PKK camps both domestically and abroad.





The General Atomics GNAT 750–45 MALE [Medium Altitude, Long Endurance] UAV System, consisting of six aircraft, a Ground Control Station, and a Portable Image Enhancement System, was ordered in December 1992 and deliveries began in August 1993 to meet this need. Thus, with the GNAT 750–45 UAV, which entered service in 1994, Türkiye became the second NATO country after the US to deploy advanced UAVs in the MALE category.

The use of this system, adopted early on, did not prove as beneficial as initially intended. The main reason for this was that the air force did not want to use the acquired system, so the GNAT 750–45s were given to the army. Since the army perceived this system as an extension of the artillery function rather than the Army Aviation Command, the system was initially deployed in the UAV unit established in Çorlu to support the artillery regiment there, performing artillery reconnaissance missions.

This mistake was eventually rectified, and the GNAT 750–45s deployed to Batman Air Base in May 1997 were actively used in Internal Security Operations. Following the positive results obtained, two more Enhanced GNAT (I–GNAT) UAVs and one additional Ground Control System were ordered in May 1998, and the systems were delivered within the same year.

Although the most advanced systems of their time were acquired very early on, these systems were not utilised to their full potential. The main reason for this, as mentioned above, is the failure to use it correctly. The lack of interest from aviation professionals and the lack of vision from army caused this important step taken during that period to become obsolete. Although the aircraft flew for very short periods, operational and usage errors quickly rendered them incapable of meeting needs.

While the armed forces using the system did not fully understand the value of unmanned aerial vehicles, the institution then known as the

Undersecretariat of Defence Industries, which guided the defence industry, recognised the importance of UAVs and initiated various projects for the production of these systems in Türkiye.

Original UAV development efforts, the seeds of which were sown in the early 1990s with the UAV–X1 Witness Project, gained a new dimension with the Turkish Unmanned Aerial Vehicle Programme, initiated by SSM in 2001. The first domestically produced target aircraft, Turna and Keklik Target Aircraft Systems, entered service with the Turkish Armed Forces in 2001, and as a reflection of the projects carried out under the coordination of SSM, an industrial infrastructure operating in the field of UAV Systems began to form in our country from 2004 onwards.

Under the TIHA Development Programme, a contract was signed between the main contractor TAI and SSM on 24 December 2004, for the development of a unique TIHA System consisting of three MALE Class UAVs, one Ground Control Unit, one Ground Control System, two Ground Data Terminals, three Day/Night Cameras, two Radars and one Automatic Landing/Takeoff System.

In parallel with the TIHA project, and to meet the ‘urgent’ needs of the Turkish Armed Forces, a tender was issued through Turkish Aerospace (TAI) for the direct procurement of three MALE UAV systems totaling 10 aircraft, and as a result of this tender, 10 Heron MALE UAVs were ordered in 2005. The Heron MALE UAV System entered the inventory of the Air Force Command on 23 March 2010. They are currently deployed at the 14th Base Command in Batman.

In the same year, the Mini Unmanned Aerial Vehicle Development Project was initiated to meet the Turkish Land Forces Command’s needs for short range reconnaissance, surveillance and target detection activities both day and night. Deliveries of 19 Bayraktar Mini UAV Systems, comprising 76 aircraft ordered under a contract signed between SSM and the KaleKalıp/Baykar Makina



Joint Venture on 4 October 2006, began in 2007. Baykar, a company whose name we now hear frequently, thus entered the UAV sector.

As part of the National Tactical UAV Development Project to meet the Turkish Land Forces' tactical UAV needs, a tender process was conducted with the participation of Kale Kalip/Baykar Makina Joint Venture and Vestel Defense Industry companies. As a result of this process, on 6 January 2010, it was decided to purchase two Tactical UAV Systems (12 aircraft) from Kale Kalip/Baykar Makina Joint Venture. Thus, the Bayraktar TB1 was born. When the project reached the mass production stage, the TB2, which was developed from the prototype TB1, went into production. The TB2's first flight took place on 3 May 2014. Six TB2s were delivered and entered service on 22 November 2014.

The ANKA Block-A MALE UAV, developed and produced with national capabilities under the TIHA Project, made its first test flight on 30 December 2010. To meet the Turkish Air Force Command's need for a MALE type UAV system, a contract was signed between SSM and TAI in October 2013, for the procurement of an ANKA MALE UAV system consisting of 10 aircraft with additional capabilities and features (satellite control capability, radio relay and CATS FLIR System integration). Deliveries of the ANKA Series Production (ANKA-S) project, which will be based on the ANKA Block-B airframe, began in 2017. ANKA-S is a system that adds strategic power to the Turkish Air Force Command. Six aircraft can be controlled simultaneously via satellite. Encrypted data transmission is provided in all communication systems, and hardware encryption is used in IFF and radio communication. Data recording is protected with a national encryption solution.



With the increase in the Turkish Armed Forces ISR (Intelligence, Surveillance and Reconnaissance) capabilities, coupled with its increased rotary wing capabilities, a new era began in the fight against terrorism. In 2016, the principle of confronting and preventing terrorism at its source, beyond the borders, was adopted. During this period, the number of cross-border operations and established bases increased, first in Iraq and then in Syria. To protect these elements and enable them to conduct operations, there was a greater need for UAVs. As their numbers rapidly increased, so did their capabilities. The most important of these capabilities is the ability to directly attack identified targets by integrating weapons, instead of using UAVs solely for ISR activities. The first SIHA Unmanned Combat Aerial Vehicles –UCAV began to enter the inventory in 2016.

The first test firing from SIHA was the Cirit guided missile launched by the Anka-B. This was followed by a MAM-L launch by the TB2. After these test firings, the first official UAV operation was announced by Anadolu Agency on October 23, 2016, stating that four terrorists



were neutralised in northern Iraq using a Bayraktar TB2-S. Thus, more proactive methods were adopted in counter-terrorism operations.

In 2016, SSM launched the Akinci TIHA Attack Unmanned Aerial Vehicle project. TAI and Baykar Makine submitted their own proposals. In January 2018, Baykar Makine was selected for the project. Akinci, which made its first flight on 6 December 2019, entered service on 29 August 2021. Thanks to its two turboprop engines, Akinci can fly much faster than conventional UAVs. This also increases its payload capacity. The High Altitude Long Endurance (HALE) class system has a maximum take-off weight of approximately 6 tons and a payload capacity of 1,500 kg. While the standard weapon of the TB2 and Anka is the MAM-L, weighing approximately 50 pounds, Akinci can carry ammunition up to 2000 pounds, such as the MK-84. Akinci is capable of carrying almost all guided weapon systems developed by the Turkish defence industry. It can also carry mission systems such as the Murad 100A AESA radar system developed by Aselsan, the ASELFLIR electro-optical camera family, and the ASOJ-234U electronic warfare pod. With its capabilities, Akinci has opened up new areas of use and operational concepts (CONOPS) for the Turkish Armed Forces.

With its current capabilities, Akinci significantly enhances the air strike power of relatively small countries' air forces. With lower initial purchase and operating costs than manned jet fighters, it has begun to carve out a place for itself in the market.

In parallel with the production of the TCG Anadolu LHD (Landing Helicopter Dock) ship, Baykar Makine started working on the TB3 model in 2020 to meet the need for a STOL (Short Takeoff and Landing) capable unmanned aerial vehicle to be used on this ship. With a length of 8.35 meters, a wingspan of 14 meters with folding wings, and a height of 2.6 meters, the TB3 is compact yet highly capable. With a payload capacity of 280 kilogrammes, the TB3 has a maximum takeoff weight of 1,450 kilogrammes. Powered by TUSAS Motor Sanayii (TEI)'s PD-170 engine, the TB3 has an operational radius of 2,200 kilometers, can fly for more than 24 hours at an operational altitude of 20,000 feet, and has a maximum altitude of 30,000 feet. A number of significant milestones were reached during the development of the TB3. The first prototype of the aircraft was publicly unveiled on 27 March 2023. On 13 October 2023, TB3 began its first runways on the runway. Following rapidly progressing ground tests, it made its first flight on 27 October 2023. A replica of the ramp on the deck of TCG Anadolu was built at Baykar's facilities in Çorlu. On 1 June 2024, TB3 performed its first ski-jump test from this ramp, demonstrating its compatibility with aircraft carrier based operations.

In November 2024, during tests conducted off the coast of Aksaz Naval Base, the TB3 completed its first flight from the amphibious assault ship TCG Anadolu, marking a transformative moment in naval aviation. The TB3 completed a 46 minute flight and landed back on the ship without requiring any landing support equipment.





This successful test followed over 700 hours of land based test flights. According to Baykar, the TB-3 is capable of autonomous take-off and landing without operator intervention. This capability is expected to simplify operations at sea in adverse weather conditions.

The deployment of the Bayraktar TB-3 on short runway ships like the TCG Anadolu offers transformative capabilities for modern military operations. In maritime reconnaissance and surveillance missions, the TB3's long operational range and advanced sensor systems will enable the Turkish Navy to monitor large maritime areas and provide early warning of threats. In amphibious assault operations, the TB3, deployed on amphibious assault ships, can provide close air support during landings and deliver real time intelligence to enhance the effectiveness of landing forces. Furthermore, the TB3 can precisely neutralise both high value targets and smaller, asymmetric threats (such as unmanned surface vehicles (USV) and armed boats).

With projects initiated in the early 2000s, the Turkish defence industry has become one of the world's leading countries in the field of Unmanned Aerial Vehicles (UAVs). As the evolution continues, transitioning from piston engined UAVs to larger, turboprop engined aircraft, two major players in the sector, TAI and Baykar Makine, have begun developing a Turbofan-engined MIUS Combat Unmanned Aircraft System.

The exact start date of the Anka-III programme,

which is being carried out using TAI's own resources, is not known, but the development process of the MIUS, now known as Anka-III, was announced to the public with two slides shared by TAI in a presentation at the "Turkey's UAV Roadmap with Emerging Technologies" panel held on 24 December 2015. This process was officially formalised by a decision of the TAI Board of Directors in January 2022. Anka-III successfully completed its first flight on 28 December 2023. With its extremely flat flying wing (delta wing geometry) fuselage design, lacking any vertical surface, Anka-III potentially has a low radar signature. With a low radar cross-section, the MIUS can also carry its ammunition in internal weapon bays. With a take-off weight of approximately 7 tons, Anka-III can operate at an altitude of 40,000 feet, reach a speed of 0.7 Mach, and remain airborne for 10 hours. Until the TF6000 turbofan engine developed by TEI enters service, the AI-322 engine acquired from Ukraine is being used. With the new generation stealth MIUS, Türkiye will have strategic first strike capability.

The Bayraktar Kizilelma Project, a turbofan-engined unmanned combat aircraft that Baykar Makine began developing with its own resources in 2020, was completed in May 2021. On July 20, 2021, the first concept design images and initial details about the aircraft's features were shared with the public. The first flight test of the unmanned combat aircraft was conducted on 14 December 2022. Kizilelma is a delta winged, winged unmanned

combat aircraft with dual vertical stabilisers. It features a fuselage designed with specific angles and shapes to reduce radar cross-section and provide stealth capabilities, and an internal weapons bay for carrying precision-guided air-to-air and air-to-ground munitions. Furthermore, the coatings on the fuselage are manufactured with a serrated structure to further reduce radar cross-section.

Kizilelma has a fuselage length of 14.7 m, a height of 3.3 m, and a wingspan of 10 m. With a maximum takeoff weight of 8.5 tons and a cruising speed of Mach 0.6 and a maximum speed of Mach 0.9, Kizilelma will have a flight time of 3+ hours, a mission/ combat radius of 500 nm, and a climb capacity of 35,000 ft. Capable of autonomous takeoff and landing, Kizilelma will be able to carry payloads such as an Electro-Optical Targeting System (EOTS/IR/LD/LRF) and a Multi-Purpose Aselsan Murad AESA Radar, and thanks to its SatCom communication capability, it can be controlled and commanded both within line of sight (LoS) and beyond line of sight (BLoS). Kizilelma has a payload capacity of 1,500 kg.

In a test conducted on 29 November 2025, a high speed jet powered target aircraft, launched as part of the scenario, was detected and tracked by the Murad AESA radar, developed by Aselsan and mounted on the Bayraktar Kizilelma drone. After the target was precisely marked by the radar, Kizilelma fired the Gökdoğan Beyond Visual Range Air-to-Air Missile, developed by Tübitak SAGE, which it carried under its wings. The domestically produced missile launched hit the jet powered target aircraft with pinpoint accuracy.

Baykar Makine, the world's largest unmanned aerial vehicle (UAV) company, has signed export agreements with 36 countries for the Bayraktar TB2 (armed UAV) and



with 16 countries for the Bayraktar Akinci (unmanned combat aerial vehicle). The company, which has produced more than 700 aircraft, aims to continue this success with Kizilelma. Similarly, TAI has sold UAV systems to more than 10 countries with its Anka and Aksungur UAVs, and with the stealth Anka-III, it aims to have a say in a market where very few manufacturers exist worldwide.

The Turkish Unmanned Aerial Vehicle (UAV) story began with a 6 kilogramme hand launched mini UAV and has transformed into a success story over approximately 20 years, flying an 8500 kilogramme jet propelled unmanned combat aircraft prototype equipped with internal EOTS and AESA radar, which is planned to be put into service soon. Initially used solely for ISR (Intelligence, Surveillance, and Reconnaissance) purposes, UAVs are now capable of performing complex missions such as SEAD/DEAD and ELINT/SGINT. Turkey is not only a UAV producer but also a country developing new tactics and creating CONOPS (Concept of operations) systems with its UAVs. Thanks to these capabilities, it has had a transformative impact on the course of conflicts in Syria, Libya, Karabakh and Ukraine.

When the development of the Kaan aircraft is considered alongside the Anka-III and Kizilelma projects, it is clear that “manned-unmanned teaming” (MUM-T) will come to the forefront in the force structure after 2030. Turkey sees the future in unmanned systems to reduce its dependence on foreign sources and strengthen its defence and deterrence capabilities. In line with this vision, it continues to invest in both platforms and their subsystems. As with manned platforms, the most challenging aspect for Turkey will likely be engine design and production. If it overcomes this challenge, unmanned aircraft could become the main striking force of the Turkish Air Force in the future. ➡

By Cem Doğut



Ethiopian Air Force marks 90 years with Air Show



From 23–27 January 2026, Ethiopia celebrated a major milestone in its military history – the 90th anniversary of the Ethiopian Air Force with a full programme of national events, culminating in an impressive air show and aviation expo at Hara Meda Air Base near Bishoftu (Debre Zeit), Ethiopia. The week long festivities were held under the overarching theme of “The Ethiopian Air Force: A Symbol of Freedom and Unity.” They attracted senior government officials, military representatives from Africa and beyond, industry experts and aviation enthusiasts.

On 23 January, the Aviation Expo 2026 opened with high-profile attendance from Prime Minister Abiy Ahmed and First Lady Zinash Tayachew, marking the event’s national significance. The expo showcased Ethiopia’s evolution in aviation and emphasised its strategic role in regional aviation cooperation, technological innovation and aerospace development.

A highlight of the anniversary celebrations was the Black Lion Air Show 2026, a public aerial display featuring both EAF aircraft and international participants. The show was held over multiple days and was kicked off by

an impressive fly-past on the second day, 24 January. The air show demonstrated the operational capabilities of the Ethiopian Air Force, with aerial performances that included advanced combat jets, trainers and other aircraft. Foreign air force contingents also took part, with notable participation from the United Arab Emirates Air Force.





During the aerial displays, observers noted the presence of newly received Yak-130 advanced jet trainers and light combat aircraft, which took part in the performances and underscoring very recent upgrades to the EAF's fleet.

On the second day of the show, 24 January 2026, a big flypast was performed including most assets of the EAF including Mi-17V-5, L-39C, Grob 120TP, AW139, AW119, Su-27, Su-30, Yak-130, C-130, Mi-24P and assets from the UAE Air Force (AH-64E, Mirage 2000 and F-16E).

In the days following the opening day, a daily show was held including the Su-27s, Su-30s, Yak-130s, Grob 120TPs and Mi-24s. Also, the UAE did a daily performance with the AH-64Es, Mirage 2000 and F-16E.

Besides the aerial performances, an interesting static display could be seen at the Air Base, incorporating the past and the present. On the opening day, some aircraft were present that later were

moved to the flightline (i.e. Su-30, C-130) but most of the aircraft remained presenting the current assets of the Ethiopian Air Force. One of the most notable aircraft were the recently overhauled DHC-5D Buffalo (former Ethiopian Airlines) and the MiG-23UB and SU-25UB.





The celebrations reflected Ethiopia's efforts to deepen regional and international military cooperation. Global military leaders and air force commanders attended the event, reinforcing Ethiopia's role as a hub for continental security discussions.

Notably, senior delegates from US Africa Command and the US Department of State joined Ethiopian officials at the Black Lion Air Show, illustrating broader diplomatic and defence ties. They arrived on the last day of the show with two MV-22B Ospreys.

In speeches delivered during the anniversary, both political and military leaders highlighted the historic and

contemporary importance of the air force. Prime Minister Abiy Ahmed emphasised the EAF's role in strengthening national defence and pledged ongoing modernisation, including plans to transition toward fifth generation combat capabilities by 2030 and to expand the combat aircraft fleet.

EAF Commander Lieutenant General Yilma Merdasa reaffirmed the institution's commitment to excellence, describing the air force as a "shield in the sky" that has protected Ethiopia's sovereignty and contributed to peace and security efforts.





The anniversary air show was more than a ceremonial display – it served as a platform to highlight the Ethiopian Air Force’s journey from its early beginnings to its current status as a key military institution in Africa. It also offered a forward looking vision of technological advancement and regional engagement in aerospace.

With the Black Lion Air Show and related events, Ethiopia underscored its intention to nurture domestic aviation capabilities, strengthen defence partnerships, and promote innovation – reinforcing the air force’s role not just in defence but also in national pride and strategic development. ➡

By Arnold ten Pas
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Some highlights from the show

AH-64E: Six AH-64E of the UAE Air Force were present on the airbase and participated in the daily show, sometimes carrying live ammunition.

Mirage 2000: On the second day, three Mirage 2000s of the UAE participated in the show. On the following days, a single Mirage 2000 performed its solo display.

F-16E: On the opening day, three F-16Es of the UAE participated in the show. On the following days, a single F-16E performed its solo display.

AW119: The VIP fleet of helicopters consists of three AW119n of which two were seen during the Black Lion Air Show 2026.

AW139: More VIP capacity is brought by two AW139s in the inventory. Both were seen during the opening flypast.

C-130: Ethiopia operates a single C-130E (Transport Squadron) that was seen on the static display, and later in the opening flypast.

DHC-5D: A recently overhauled DHC-5D Buffalo of the Transport Squadron was one of the many highlights in the static display.

Grob 120TP: No less than six Grob 120TP were seen during show days. The aircraft, assigned to the Primary Flight Training Squadron making up for half of the fleet of 12 aircraft.

Mi-8MTV-1 and Mi17V-5: Both a Mi-8MTV-1 and Mi-17V-5 were seen in the static display on different days. The Mi-17 was also used in the opening flypast.

Mi-171Sh: The Mi-171Sh at the static display was in VIP configuration and is assigned to the Transport Helicopter Squadron.

Mi-35P: Two Mi-35Ps from the Dire Dawa based Fighter Helicopter Squadron were participating in daily show.

Su-27: The EAF has taken delivery of quite a number SU-27P, SU-27UBK and Su-27SK aircraft from different sources (Russia, Ukraine). During the event, four different types could be seen flying. Besides that, several aircraft were seen in different stages of

maintenance. It is believed that the Flanker fleet will be enriched with the delivery of 6 Su-35s in the near future.

Su-30: Two Su-30K were seen participating in the flying displays. The aircraft, acquired in 2024 from Indian Air Force, performed multiple times during the event.

Yak-130: Surprise sightings in both the static show as flying display were the Yak-130s. Ethiopia has 6 aircraft on strength; all delivered in 2025; all six were seen during the Black Lion Airshow. Its integrated glass cockpit and reconfigurable flight control systems allow pilots to train for high-performance aircraft like the ETAF Su-27 and Su-30 without the prohibitive operational costs of flying frontline multirole fighters. The Yak-130 will fly alongside the modernised L-39s.

L-39: Ethiopia has been an L-39 user since the 1980s (both L-39C and L-39ZA) and still has around 10-15 aircraft operational. During the show, two aircraft were seen that had undergone recent modernisation, including a digital cockpit. These aircraft sported an 'L-39NG' color scheme although technically still L-39C aircraft.

MiG-23UB: 44 squadron reportedly still has 2-4 MiG-23s in operational service, but the aircraft seen in the static display was definitely not flyable at the time (if only for the lack of ejection seats)

Su-25UB: Debre Zeit based 4sq still operated a few legacy Su-25s in ground attack roles.

MV-22B: Two MV-22B Ospreys brought in the American guests on the 27th.



Silent Shield of the Capital EH 3/67 “Parisis” in Action



Roelof-Jan Gort and Björn van der Flier recently visited the unit EH03.067 ‘Parisis’ at BA107 Vélizy–Villacoublay, near Paris. The purpose of their visit was to gain a deeper understanding of this unique squadron.



Established on 1 October 1964, Parisis holds a significant place in history as a fighter squadron that transitioned to helicopters, with the mission not to engage in combat overseas, but to serve the city of Paris itself. In the initial stages, the robust Sikorsky H-34 helicopters operated in the humid skies, effectively transporting officers, essential documents, and sensitive materials throughout the bustling capital. Subsequently, the sleek French Alouette II and III models entered the fleet, landing seamlessly on expansive mansion lawns or hovering above the scenic Seine River. Initially, these helicopters functioned as reliable air couriers; however, by the late 1980s, significant political changes in France prompted a shift in focus. The question of paramount importance became: “How can we ensure effective protection?” This transition signified the commencement of a new chapter in the evolution of aviation requirements.

The early 1990s witnessed the introduction of the AS555 Fennec, an impressive, lightweight and agile helicopter equipped with advanced sensors and detection systems. This platform represents a substantial advancement,

servicing not merely as an aircraft but as a vigilant protector capable of responding rapidly to potential threats within Paris. The objective of the squadron is unequivocal: to execute MASA missions—Mesures Actives de Sûreté Aérienne—dedicated to securing the nation’s capital. These operations are both critical and continuous, occurring at any hour, whether at dawn, midnight, or during significant events such as Bastille Day. With the agility of the AS555 Fenec, there is a fortified sense of confidence in the defense of the French nation, a testament to the squadron’s commitment and the nation’s security.

The Squadron Commanders’ insights on the EH03.067 “Parisis”

From his office overlooking the flight line at Villacoublay Air Base, Commandant Gregoire has a commanding view of his squadron’s beating heart — a team of ground technicians meticulously preparing AS555 Fenec helicopters for the day’s operations. Beyond the hum of activity lies evidence of transition: moving boxes, temporary workspaces, and a tangible sense of anticipation. For EH 03.067 “Parisis”, change is on the horizon.

Over the next four years, the squadron will temporarily relocate to alternate facilities equipped with operational hangars. This move is not just a logistical necessity but a strategic decision to modernise the squadron’s infrastructure. The construction of new accommodations,

maintenance hangars and technical areas is designed to welcome the Fenec’s successor, the Airbus H160M Guépard, due to enter service in 2030. This marks the squadron’s commitment to staying at the forefront of aviation technology and its readiness to adapt to future challenges. It also signifies the dawn of a new chapter for one of the French Air and Space Force’s most versatile helicopter units.

Commandant Gregoire’s leadership philosophy is simple: lead from the cockpit. “I began my career in the Air and Space Force in 2008 and completed my academic studies in 2011,” he recalls. “After flight training on the TB30 Epsilon, I learned about a recruitment initiative for helicopter pilots — and seized the opportunity.”

Earning his wings in 2015, Gregoire was posted to EH 3/67 Parisis, flying the twin-engine AS555 Fenec, before later joining EH 1/67 Pyrénées, operating the H225M Caracal. Today, with approximately 2,750 flying hours — more than 2,000 of which are on the Fenec alone — he continues to fly operationally. “I believe it’s essential to stay close to the crews,” he explains. “Flying regularly helps maintain that bond of trust and camaraderie which is vital to our effectiveness. Leadership in a squadron like this means being part of the mission, not just overseeing it.”

As commander of EH 03.067 Parisis, Gregoire leads a contingent of approximately 120 personnel, supported





by a fleet of around 12 AS555 Fennec helicopters. The unit comprises some 30 pilots, 10 flight engineers and 10 gunners, alongside dedicated ground crew, intelligence officers, and administrative and communications specialists.

“Our operational commitments are wide-ranging,” he explains. “We contribute to national air defence and sovereignty missions, conduct search and rescue (SAR) operations and provide support flights, including liaison and training missions.”

This broad remit requires flexibility — a hallmark of the Parisi ethos. From air policing to VIP transport and training, the squadron’s workload demands both technical proficiency and rapid adaptability. Their ability to seamlessly transition between tasks instills confidence in their readiness to handle any situation, showcasing their adaptability and preparedness.

Defending the Skies Above Paris

Stationed at Base Aérienne 107 Villacoublay, just southwest of Paris, EH 03.067 Parisi serves as a critical component of France’s homeland air security network. Its helicopters stand watch over one of the most sensitive airspaces in Europe, providing a rapid response capability that complements the Air and Space Force’s fighter squadrons.

The Fennec fleet maintains a 24/7 Quick Reaction Alert

(QRA) posture, enabling an armed crew to be airborne within minutes to intercept, identify or assist any aircraft posing a potential threat to the capital’s airspace.

Preparing for the Guépard era

The upcoming introduction of the Airbus H160M Guépard marks a significant modernisation milestone for Parisi and the Air and Space Force as a whole. Designed as a common platform for the French Army, Navy, and Air Force, the Guépard will offer enhanced range, speed, payload, and situational awareness — a leap forward in capability.

For EH 03.067, this transition will involve not only new airframes but also a transformation in maintenance infrastructure, training and mission systems.

“Preparing for the Guépard means more than just replacing helicopters,” says Gregoire. “It’s about modernising our entire ecosystem — our hangars, our tools, our simulators, and even our operational mindset. The next few years will be a period of adaptation and learning, but also of opportunity.”

During the interim, Parisi’s personnel are heavily involved in planning and coordination to ensure a smooth handover. Flight and ground crews alike are contributing to design feedback, logistics planning, and integration discussions with Airbus and the Air and Space Force’s acquisition authorities.

Inside Fenec maintenance: An Interview with Captain Laurie

At Base Aérienne 107 Villacoublay, maintenance on the French Air and Space Force's AS555AN Fenec helicopters is an intricate and demanding task. Captain Laurie, a 35 year old Chief Maintenance Officer serving with Escadron d'Hélicoptères (EH) 03.067 Parisis, shared an in-depth look at the challenges of keeping the ageing light helicopter fleet airworthy and mission ready.

Captain Laurie oversees both line and base maintenance operations at Villacoublay. "Our activity is very intense," he explains, "but we participate in a gratifying mission." His team consists of 65 mechanics and nine support staff dedicated to maintenance and continuing airworthiness management. The workforce is diverse and highly specialised. "We have several categories of technicians," he continues. "There are vector mechanics, avionics specialists, weapon system experts, and structural mechanics – each bringing their own focus and expertise. Together, they ensure that the Fenec remains a reliable and versatile platform for our operational needs."

The Fenec maintenance schedule is meticulously structured. According to Captain Laurie, "We perform calendar maintenance operations that can last only a few hours." The first major inspection occurs after 100 flight hours and is handled 'on line'. Then, at 150 hours, maintenance shifts to 'on base'. Finally, after 600 hours or 24 months, the helicopter goes to the industry for heavy maintenance.

External contractors carry out this final phase under agreements with Airbus Helicopters and Safran Helicopter Engines, the respective type certificate holders for the airframe and engine. "For any technical issue,"



Laurie notes, "we may send a request to Airbus or Safran. Typically, we contact them by email, and they provide a corrective solution through a formal work card, either directly or via a subcontractor."

Keeping the Fenec operational is increasingly challenging. Introduced in the early 1990s, the fleet is showing its age, and spare parts are becoming increasingly scarce. "Our biggest challenge is to guarantee aircraft availability," Laurie admits. "With an ageing fleet, sourcing certain components is not always easy."

Despite these obstacles, the maintenance unit at Villacoublay continues to achieve high readiness levels thanks to the experience and adaptability of its personnel. "The mechanics are highly committed," he adds. "They show great professionalism and dedication, which allows us to sustain operations even when logistical or technical difficulties arise."

Captain Laurie remains optimistic about the future of Fenec maintenance at Villacoublay. "If I look ahead, I see new maintenance buildings with better quality equipment to facilitate our work," he says. "I also hope to have more mechanics in the squadron and a more effective support contract with the industry." He also highlights the importance of internal improvements within EH 03.067 Parisis. "Beyond infrastructure and staffing," Laurie concludes, "My goal is to continue the initiatives launched by my predecessors – improving the organisation and enhancing the fluidity of our squadron's maintenance activities."

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Article by Roelof-Jan Gort

Photos by Roelof-Jan Gort and Björn van der Flier



Heavy Haulers reach new heights in Spain



The 9th of April 2025 marked an important date with the delivery of the final CH-47F (locally known as HT.17A) to BHELTRA V Batallón de Helicópteros de Transporte V/ Transport Helicopter Battalion V).

The unit now has seventeen CH-47Fs on strength at Colmenar Viejo/ “Coronel Maté” Air Base with the FAMET (Fuerzas Aeromóviles del Ejército de Tierra/ Army Airmobile Forces). “Another CH-47F is planned to be delivered by 2029; this will be a completely new helicopter compared to the upgrade programme where CH-47Ds parts were reused to build the CH-47Fs and save costs” as BHELTRA V Commander Lt Col. Vázquez adds. “We will finally have eighteen Chinooks again in our fleet by 2029. I took over command in September 2024, at the time we only had thirteen CH-47Fs on strength. My aim is to bring back the battalion to full operational level, as we went through a transition period of five years implementing the Foxtrot with our battalion” elaborates Lt Colonel Vázquez.

BHELTRA V has and will remain focusing on a wide range of heavy-lift transport tasks: moving troops and equipment, logistics in terrain, air assault, disaster relief and international missions as ISPUHEL XX (Iraq Spain Unit Helicopter). Three CH-47Fs have been deployed as Task Force Toro to Al Asad Air Base in Iraq relieving the AS332s in 2024. The unit supports the Combined Joint Task Force Operation Inherent Resolve (CJTF-OIR). In January 2015 the first Spanish military units (special operations) deployed to Iraq as part of the newly created International Coalition to Fight Daesh. Since then, Spain has maintained its ongoing commitment to Operation

Inherent Resolve, deploying various capabilities over the past ten years, such as transport helicopters, focusing its efforts on training and capacity building for Iraqi security forces. Task Force Toro operated with three CH-47Fs from April to December 2024 marking the first deployment of the new CH-47F model abroad as part of ISPUHEL XX.

Plans for the transition to the CH-47F variant began in 2014, with funds allocated for the programme in 2018. In January 2019, Boeing and Spain agreed an intergovernmental programme to rebuild and upgrade the CH-47D fleet to CH-47F Block 1 standard under an €820 million contract.

The first helicopter arrived at Boeing’s Ridley Park, PA, in 2020, after some delays due to the COVID-19 pandemic.





The first of the upgraded Chinooks (ET-420) arrived in Spain in November 2021. This first remanufactured CH-47F Chinook helicopter was delivered on 2 February 2022 and completed with the delivery of the seventeenth CH-47F on 9 April 2025 (ET-436).

In 2023, a contract was signed with Indra for the delivery of Talium (Tactical and Logistics Information for Unlimited Missions) with the contract valued €15 million. It is an advanced multi-domain mission planning and management system. It is designed to plan, brief, conduct and debrief complex air (and joint) operations, combining tactical and logistical data to assess mission feasibility in real time and reduce crew workload and risk. It offers the Spanish Army's Airmobile Force advanced strategic preparation capabilities.



Talium can also be integrated into the BMS (battlefield management system), national and NATO command and control systems, air defence systems and IFF and simulators. The FAMET Tigre and NH90 helicopters already use this advanced Indra system. Talium has become a unified system for the joint operations within the FAMET.

Transformation and Maintenance

“It was decided to reuse the dynamic components of the CH-47Ds, as most had only limited hours and were in good shape”. David Iturbide is the BG Helicopters manager who has been involved since 2019 with the CH-47F programme, he continues “The motor, transmission boxes, rotor blades and rotor heads all were reused, a total over 100 components per helicopter. This was a rather difficult process as each CH-47F has to be tested thoroughly after delivery”. BG Helicopters was contracted by Boeing in 2019 as the prime company to be involved in the decommissioning of the CH-47D fleet and later on supporting the reinstallation and recommissioning of the CH-47Fs at Colmenar Viejo which was finalised in April 2025.

Currently there are 25 personnel of BG Helicopters supporting with C1 inspections (320hrs) and C2 (640hrs). “We only focus on daily visual inspections and 40hrs maintenance to FAMET technicians” adds Captain Barragan who is a pilot and now in command of the technical team. “Our main issue is that we don't have enough personnel, therefore we have BG Helicopters to take on deep maintenance for us”.



BG Helicopters is a local Spanish company who has been contracted via Boeing for continued maintenance support with BHELTRA V and consists of a mixture of both civilian and ex-military personnel. “BHELTRA V is focusing on operations, not on deep maintenance, that is where we come in as BG Helicopters” explains David Iturbide, the current manager and contact person. “We are able to perform a C1 level inspection in 2 months, where the FAMET team could take up a year to do this work”.

To further support BHELTRA V, Boeing has a Field Service Representative (FSR) for technical support to both the FAMET technicians as BG Helicopters explains Santiago Aquilera, the current FSR. Santiago has been employed at Cuatro Vientos for over 17 years and before joining Boeing in 2021. He had a transition course on the CH-47F. “With both BG Helicopters and the CSR BHELTRA V is able to perform all work at Colmenar Viejo. When helicopters are released from deep maintenance there are twelve test pilots available to perform the necessary testing before a helicopter is accepted to operational status” as Santiago Aquilera details.

Indra Company will equip the CH-47F fleet with the latest generation electronic warfare systems as part of a 35 million contract with the Spanish Department of Defence for next generation electronic defence systems signed back in 2023. The system will incorporate Indra’s ALR-400FD radar alerter, which is fully digitalised with fiber optic interconnections and is ready to detect and identify at long range the presence of enemy platforms and other radar threats by monitoring the entire radar spectrum, instead of covering different bands through partial band scanning strategies as was normal in previous generations. Further an InWarner sensor, equipped with a missile alerter and a laser alerter will be added to the fleet. The InWarner system detects whether any designator has acquired the helicopter as a target. The integration of both elements makes it possible to achieve full situational awareness and increases the effectiveness in activating countermeasures.

Especially during low-altitude flights and takeoffs and landings, Indra’s InShield infrared countermeasures (DIRCM) system will protect the aircraft against MANPAD type short range surface-to-air missile and infrared guided missile attacks.

Simulator training

In parallel to the CH-47F introduction a new state of the



art simulator, developed by the Indra Company, has been acquired and delivered in April 2025. Indra is a Spanish defence company that had a significant role in supplying and modernising the Boeing CH-47F Chinook helicopter fleet in Spain, including developing the first full-mission simulator for the Foxtrot version in Europe. It is located at the Helicopter Simulation Center CESIHEL (Centro de Simulación de Helicóptero) of the Army Aviation Academy ACAVIET (Academia de Aviación del Ejército de Tierra).

The new simulator is highly realistic, can be used for networked training exercises with other units. The simulation architecture is permitting joint tactical training for a mission via several simulators, in such a way that pilots which are located at different bases flying with other platforms such as the Tigre, Cougar, EC135 and NH90 can share scenarios in which the joint training is to be conducted. The CH-47F simulator uses the same avionics as the actual instrument components, ensuring consistency and compatibility with future upgrades.

Real Life training

At the time of writing four pilots (2 officers and 2 NCOs) have started their training with BHELTRA 5. As on average we have pilots stay in our unit approximately 10 years, we need to have new pilots each year. The Non-Commissioned Officers (NCO) training is 3 years with the Officers training is 5 years. Lt Col Vázquez says, “The actual number of new pilots we absorb can differ per annum based on vacancies we have in the battalion”. Captain Daniel Carballo, one of the senior pilots adds “After graduating from the Army Aviation Academy (ACAVIET) selected cadets will join BHELTRA 5. They will complete combat pilot training 2; we call it Combat Ready 2 within the squadron. We have six instructors to support the Combat Ready 2 phase. During this training the main focus is on mission planning, flying IFR and theoretical classes. In total new pilots will train 60 hrs and have 10 hrs on the simulator. After successful completion they will be Combat Ready 1 pilots. To continue to Combat Ready 1 you will need to have a minimum of at least 300 flying hours to start this course. All pilots eventually will be Combat Ready 1” concludes Captain Carballo. “Currently there are 42 pilots of which twelve are test pilots and six are instructors in the battalion” concludes Lt Col Vázquez.

**By Carlo Kuit and Paul Kievit
Bronco Aviation**

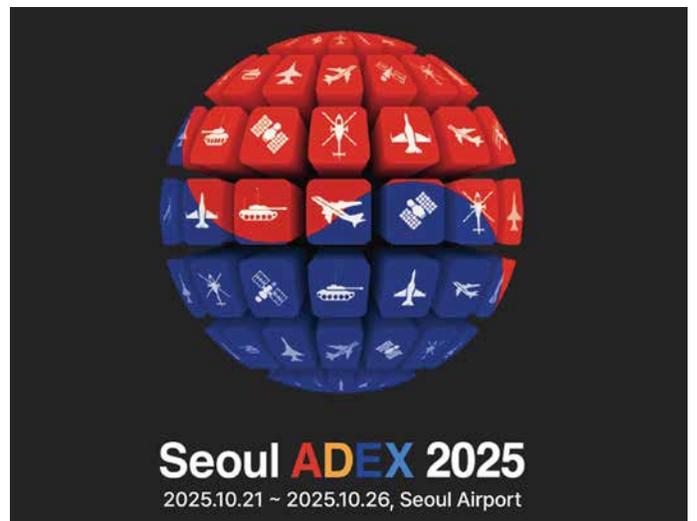
Ambitious South Korea shows itself during ADEX 2025



Part of the ADEX opening flypast, with 3 KF-16s and 2 KF-5s.

On 1 October 2025, during South Korea's Armed Forces Day, President Lee Jae Myung announced an increase of next year's defence budget with no less than 8,2% compared to 2025, the largest increase since 2019. "We are entering an era of increased conflict, where it's every man for himself. To ensure peace and prosperity for the Republic of Korea, we must not depend on anyone else but strengthen our own power." As is often seen these days, a large part of the extra investment will be going to AI-based manned and unmanned combat systems. However, priority is given to further strengthening of the response system against the unpredictable and nuclear armed North Korea, including start of the mass production of the KF-21 Boramae.

The goal set by President Lee was visible during the Seoul International Aerospace & Defence Exhibition (ADEX) 2025 that was also held in October. This biennial exhibition keeps on growing: with 49,000 sq mt floor space it's now almost as big as the Farnborough show,



ADEX logo

the second largest of its kind worldwide. It also acts as an illustration of the growing importance of South Korea as defence exporter. In total 600 companies from 35 countries participated with static and flying displays.

Star of the flying display was the local Black Eagles demonstration team with their T-50B aircraft. The 80 on the tail of the T-50s refers to the liberation of the Korean peninsula in 1945 after 35 years of Japanese occupation, exactly 80 years ago this year. The T-50 advanced trainer is one of a very successful family, with the TA-50 lead-in fighter trainer and light attack version and finally the FA-50 light fighter/attack version. The Republic of Korea Air Force (RoKAF) received no less than 142 aircraft in all different versions, but also internationally the T-50 family is very popular with the air forces of Indonesia, Iraq, Malaysia, Philippines, Poland and Thailand operating or getting different versions. Developed by KAI to replace the A-37 and T-38 in service with the RoKAF, the supersonic jet was a big step up after building the turboprop KT-1 trainer and KA-1 light attack aircraft earlier.

The next big step up for KAI is building a full scale indigenous multirole jet fighter aircraft called KF-21 Boramae ('Hunting Hawk'). Development is going smooth, with the maiden flight of the first prototype in 2021 and serial production having already started with first deliveries expected in 2026. Intention is to replace the F-5 Tiger II and (already withdrawn) F-4 Phantom, and in the future also the F-16 Fighting Falcon and F-15K Slam Eagle. At ADEX a dual seat prototype was on static display while a single seat prototype performed a spirited flying display. The fighters will be equipped with European built Meteor air-to-air missiles and soon as well with Spear air-to-ground missiles. And looking further ahead, Korean companies LIG Nex1 and Hanwha are developing short range air-to-air missiles that should be introduced in 2032, reducing reliance on foreign technology. Apart from these investments, for the KF-21 also new runways and extra ammunition depots will be built.

It is not just fighters that are focussed on. Recently South Korea's Defense Acquisition Programme Administration



KAI's first indigenously developed training aircraft, the KT-1 Woongbi.



A KAI T-50 during its display.



Newest helicopter by KAI: the LAH.



Two T-50Bs of the Black Eagles demonstration team doing a flypast.



Line up of a T-50, TA-50 and FA-50.

(DAPA) has given the green light to start the development of the first fully indigenous electronic warfare (EW) aircraft. The Block I contract has a value of some USD 1.3 billion and aims to deliver 4 operational aircraft by 2034. Main roles for the type will be long range jamming and suppression of enemy air defences (SEAD).

Korean Aerospace Industries (KAI) teamed up with Hanwha Systems and unveiled their design shortly before the start of ADEX, which is based on the Global 6500. KAI has not only been building aircraft for decades, from the KT-1 trainer to the KF-21 fighter jet, but they also handled the special missions conversion for both the B.737 AEW&C aircraft of the RoKAF and the P-3K maritime patrol fleet of the Korean Navy. Hanwha Systems specialises in electronic equipment, including jamming and signals processing technologies. Competitor is Korean Air together with LIG Nex1, who base their design on the Gulfstream 550. Korean Air has long experience in heavy aircraft maintenance and upgrades of military planes, while LIG Nex1 has already developed advanced electronic warfare systems for amongst others the KF-21. Early 2026 it will be decided which of these two consortiums will be selected to start the development.

In the meantime, during ADEX it was made public that Korean Air, together with partners L3Harris, ELTA systems and Bombardier, got awarded a contract to deliver 4 Airborne Early Warning and Control (AEW&C) aircraft to the RoKAF. The Bombardier Global 6500 will be the platform for the USD 2.26 billion order. According to a press release “following the delivery of the prototype aircraft, the AEW&C programme will transition to

Korean industry. Aircraft modification and mission system manufacturing will occur in Korea, to include key radar components to ensure the system can be sustained affordably throughout its service life without the need to source parts from overseas.” Korean Air will be in the lead for operations and maintenance, including future updates. South Korea already operates 4 Boeing E-7 Wedgetail AEW&C platforms.

Regarding transport capacities, the aging C-130H fleet will be replaced by the Embraer C-390 Millennium in the near future. Three aircraft are scheduled to be delivered in 2026, with probably more to follow. Although the RoKAF also already operate 4 C-130J Super Hercules, Embraer was the big winner over Lockheed Martin in 2023 in the



KF-21 Boramae doing a high speed pass.



The KAI MUH-1, called Marineon by the Marines.

Large Transport Aircraft II competition, making the C-390 the first Brazilian aircraft to be delivered to the Korean forces ever and South Korea the first Asian customer for the type. The aircraft will be specially configured for RoKAF use and multiple significant components are being produced by local Korean companies.

And it wasn't only aircraft at ADEX. On display both in the air and on the ground was the newest helicopter produced by KAI: the Light Attack Helicopter or LAH. This helicopter will be the RoK Army's next-generation armed helicopter, and will replace the ageing MD.500 and AH-1



An HH-60P simulating a rescue mission.

Cobras. The LAH is based on the Light Civil Helicopter (LCH) platform that was developed in cooperation with Airbus Helicopters. The LAH is equipped with a 3-barreled 20 mm gun and can also carry 70 mm rockets. For self-defence it will get radar, laser and missile warning receivers plus chaff and flare dispensers. The LAH can also be combined with an unmanned aerial vehicle called Air Launched Effects (ALE), also developed by KAI. This autonomous UAV, that was also on display at ADEX, can be launched from a helicopter in flight and can perform missions like reconnaissance, deception and also suicide.



The oldest participant at ADEX: this BAe.748 in VIP colours. One has been retired, but this one is still operational.



Derived from the KT-1, this KA-1 is an attack version.



This stretched C-130H-30 is earmarked for replacement.



One of 48 licence built KF-5E Tiger II on static display at ADEX.



Specifically designed for the RoKAF by KAI, the KT-100 trainer is never seen outside of South Korea.

While the LAH is still in the test phase, already a big success in Korean service is the KAI KUH-1 Surion helicopter. Some 250 examples are in use by both the army and marines (where it is called Marineon). Also the Korean police, forest service, coast guard and fire department operate specialised versions. So far the only export customer is Iraq, who ordered 2 KUH-1s which will be delivered in 2028. This deal signifies the growing defence partnership between South Korea and Iraq, who earlier already ordered 24 T-50IQ advanced jet trainers. KAI also signed an MoU with a Vietnamese company for the production of helicopter rotor blades, and are hoping this will open up the market in Southeast Asia.

Although not a Korean design, many of the H-60 Black Hawk helicopters in use by the army and air force were licence built by Korean Air. That same company has, together with two other parties, won the contract for upgrading the Black Hawks. A kickoff meeting was held in September and the upgrade programme should start very soon. The helicopters will amongst others receive a fully digital cockpit, automatic hovering capabilities and an obstacle warning system, all to reduce the workload for the pilots. Furthermore a Radar Warning Receiver and an integrated survival management computer will improve the survival capabilities during special operations. And to make it even more local, over 50 components needed for

the upgrade will be designed and produced in South Korea.

As is clear, South Korea's defence industry is growing fast, not only for the internal market but with more and more export orders as well. South Korea has made it into the top 10 of arms exporters worldwide, with orders ranging from howitzers to frigates and armoured vehicles to aircraft. This is the result of a long term process that was started a few decades ago, in an effort to secure domestic defence capabilities instead of solely relying on the West. Focussing on the aviation scene, this year another large success was achieved by KAI when the Philippines government ordered a second batch of 12 FA-50 Fighting Eagle light attack jet aircraft. Next customer for the FA-50 could be Egypt, who are currently negotiating the acquisition of up to 100 aircraft, which would make the FA-50 one of the most successful defence export products to date. And more good news for KAI was the signing of a letter of intent by the UAE and South Korea for cooperation on the KF-21 programme.

Who knows where all this will lead? Certain is that President Lee's vision to become the world's fourth largest military power is already becoming reality almost before he could state it during the opening speech at ADEX. ➡

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

Aviation Development in Hong Kong

Hong Kong's airport plays an indispensable role in the successful development of Hong Kong into an international aviation hub. The first recorded flight at Kai Tak took place 100 years ago. Kai Tak later evolved into an airport and the passenger terminal of Kai Tak Airport was completed and commenced service in the 1960s. Though operating only with one single runway, Kai Tak Airport had become one of the busiest airports in the world by the 1990s. For long term development, Hong Kong International Airport (HKIA) was relocated to Chek Lap Kok in 1998 and has since gradually expanded to have a dual-runway and now a three-runway system. Moreover, the Government of the Hong Kong Special Administrative Region and Airport Authority Hong Kong are pressing ahead with the "Airport City" development strategy, under which HKIA will be transformed into a node of various economic activities. Hong Kong Post issued a set of special stamps on the theme of "Aviation Development in Hong Kong" to feature the thriving aviation development in the city.



Kai Tak is the birthplace of Hong Kong's aviation industry. Once a desolate reclaimed land, Kai Tak was gradually developed into Kai Tak Airport over the years

and its passenger terminal was completed and commenced service in 1962. The public observation deck, located on the rooftop of the terminal, became a must visit spot to see people off. The stamp portrays people bidding farewell to friends and relatives from the observation deck, a place not only holding collective memories but also witnessing the history of Hong Kong's aviation development.

During the 1980s, as Hong Kong's economy was taking off, Kai Tak Airport saw significant growth in flight movements. At the same time, residential buildings continued to spring up around the airport. The close proximity of the airport runway to numerous high rise buildings nearby became a defining feature of Kai Tak Airport. The stamp illustrates the bustling Kai Tak Airport and the dense cluster of high-rises in its vicinity, reflecting the development of Hong Kong's aviation industry.



In view of the ever-growing demand for air traffic, Kai Tak Airport in Kowloon completed its historical mission in 1998 as HKIA was relocated from Kai Tak to Chek Lap Kok, marking a new milestone in Hong Kong's aviation development. The new airport has since consolidated Hong Kong's position as an international trade and financial centre and spurred the development of the aviation, tourism and cargo industries, as well as many other trades



and sectors. The stamp features the relocated HKIA at Chek Lap Kok, highlighting the perfect blend of modernity and simplicity in this spectacular architecture.

To cater for long term development and to reinforce Hong Kong's leading status in the global aviation arena, the Three-Runway System (3RS) at HKIA was commissioned in 2024. The 3RS not only significantly enhances the passenger and cargo capacity of HKIA, but also facilitates the development of a world class airport cluster amongst airports in the Guangdong-Hong Kong-Macao Greater Bay Area (GBA), turning a new chapter for Hong Kong's aviation industry and overall development. The stamp showcases HKIA with the 3RS, revealing its transportation potential and efficiency.

HKIA is now transforming from a city airport into an Airport City. This development project will combine core airport functions and turn HKIA into a new landmark in the region that integrates commerce, popular culture as well as entertainment and leisure experiences, so as to actively promote the sustainable development of Hong Kong and the GBA. The stamp sheetlet illustrates the Airport City blueprint, which signifies the beginning of a new era for Hong Kong's aviation industry.

30th Anniversary of Macau International Airport

Macau International Airport, as a key symbol of Macao's transformation from a maritime city to an international aviation hub, has come a long way since its opening in December 1995. Initially serving as a crucial link for indirect cross-Strait flights, it has now grown over the past three decades into a core driver of Macao's economic prosperity and internationalisation. In 2015, the airport was awarded the "Medal of Merit - Tourism" by the Macao SAR Government in recognition of its significant contributions to the tourism industry and economic development of Macao.



Starting from a reclaimed island, Macau International Airport has developed into an important transportation hub in the Greater Bay Area, supported by an internationally standardised runway and an intelligent terminal. The

airport continues to push forward with technological innovation and management optimisation, balancing safety, efficiency, and service quality, setting an exemplar of a smart airport based on the principles of safety, efficiency, and effectiveness. Notably, in regional route expansion and freight logistics, the airport has maintained close connections with partners, strengthening its multi-level links with the global network.

The growth of Macau International Airport is closely tied to the policies of the Macao SAR Government. With the goal of building Macao into a World Centre of Tourism and Leisure, the Government included the airport's expansion and upgrading as a strategic project in the "Second Five Year Development Plan", providing policy support to enhance international competitiveness and operational capacity. On 27 October 2022, the Central Government officially approved the reclamation and expansion plan of Macau International Airport, which will serve as a key driving force for its long term development.

Looking ahead, Macau International Airport is advancing its reclamation and expansion project, covering an area of approximately 129 hectares, which is expected to be completed in phases by 2030. The expansion will significantly increase flight parking capacity and passenger throughput, while also creating favourable conditions and land reserves for the airport's long term growth. After the first phase of reclamation and expansion, the airport's annual capacity will increase to 13 million passengers. The development will also include the construction of an upstream cargo terminal and a new terminal at Hengqin, and the implementation of a multi-modal transportation model to enhance connectivity with the region.

These efforts will strengthen Macao's integration into the multi-modal transportation network of the Guangdong-Hong Kong-Macao Greater Bay Area, further driving the city's sustained and vibrant development. In the face of rapidly changing international aviation dynamics, Macau International Airport continues to promote smart technologies and digital transformation to enhance operational flexibility and passenger experience. Upholding the core values of "safety, efficiency, and effectiveness", the airport is actively contributing to the collaborative development of the Guangdong-Hong Kong-Macao Greater Bay Area, injecting new momentum into Macao's journey toward becoming a World Centre of Tourism and Leisure. The 30th anniversary marks both a moment of reflection and a new beginning. Having undergone remarkable transformation and growth, each step has been supported by the collective efforts of society and the Central Government. Gazing into the future, the airport will continue to build on its solid foundation and visionary planning, working hand-in-hand with all sectors of society to embrace even greater horizons. ➤

By Vijay Seth
Aerospace Heritage Trust
Acknowledgement: Macau International Airport
Company Limited (CAM)

Book review

“Indian Aircraft Industry”

Authored by Dr. CG Krishnadas Nair



Hindustan Aeronautics Limited (HAL) released the book “Indian Aircraft Industry – A Brief History & The Way Forward” authored by Dr. C. G. Krishnadas Nair, President, SIATI & Former Chairman, HAL, at an event held at HAL Corporate Office, Bangalore on 27 February 2026.

A brief review

Dr. CG Krishnadas Nair is a jewel among the technology and industry leaders in Aerospace and Defence. He was the Managing Director of HAL from 1988 to 1997 and later on Chairman of HAL; he led a quiet but revolutionary transformation of HAL to become a high technology, cost and quality competitive and profit global player through R&D, diversification, partnership with private industries and SMEs developing reliable and innovative supply chain partners. He spearheaded indigenous development of advanced aerospace materials and processes and manufacturing technology for components, structures and enhanced the capability and capacity of the Indian aerospace industry through partnership and sharing technology with private sector industries. His leadership as founder President of Society of Indian Aerospace Technologies and Industries (SIATI) and of “Society of Defence Entrepreneurs and Technologists” was instrumental in pioneering new relationships between Public Sector and Private Sector including SMEs as Innovation & Technology partners in the Aerospace & Defence Sector.

The Society of Aerospace Studies, New Delhi founded by my father Mr. Pushpindar Singh Chopra, had the privilege of publishing his book ‘HAL–Story of Transformation of HAL’ (2003) and ‘Make in India – Strategy for Partnership’ (2014).

In keeping with his illustrious career, Dr. Nair is a recipient of several prestigious awards. These include the ‘Padma Shri Award’, ‘National Aeronautical Prize’, ‘Birla

Gold Medal’, ‘Tata Gold Medal’, ‘National Metallurgist Award’, ‘Vasvik Research Award’, ‘Shri Om Prakash Bhasin Award for Space & Aerospace’, ‘Prime Minister’s Scope Award and Gold Trophy for Excellence in Public Sector Management and for ‘Best Chief Executive’, ‘Swadeshi Sasthra Puraskaram’ and ‘Ambedkar Bharat Shree’ Award for Social Service.

I was privileged to edit his new book ‘Indian Aircraft Industry’ which is a very brief but comprehensive and up to date book. As he has acknowledged, there are two books published on Indian aircraft industry, but these are more than two decades old. The first covered a period 1910–1997 and the second although published in 2011 covered only HAL as the industry and covered the period up to 2001. Dr. Krishnadas Nair, in this current book has brought out the transformation and growth of the Indian aerospace industry with the participation of private industries including SMEs, networking with R&D and academic organisations for developing technology and for innovation. Formation for an association for these industries by the initiative of HAL, ISRO, DRDO, NAL with the support of the Ministry of Defence and Ministry of Civil Aviation and various other organisations have been highlighted; plus building partnerships and the entry of many SMEs and Indian private sector corporates into aerospace and defence sector enhancing India’s capability and capacity, energised by proactive policies of the Ministry of Defence is highlighted.

Many unanswered questions, such as why Indian industry has not developed commercial aircraft and high-tech jet engines have also been answered in the book and

the opportunities and way forward with international collaboration/partnership is presented.

The book is divided into 11 Chapters.

Chapter-1: Presents the early history of civil and military aviation in India and the founding of Hindustan Aircraft Ltd established in 1940 and also the founding of Tata Aircraft Ltd in 1942 plus the growth and contributions of both these early ventures during and after the Second World War.

Chapter-2 and 3: Covers the building up of the Indian industries capability for manufacture, repair and overhaul and growth through indigenous design and development of aircraft as well as through license production and the continuous augmentation of facilities and technologies for manufacture of engines, equipment and systems plus also materials and building up self-reliance.

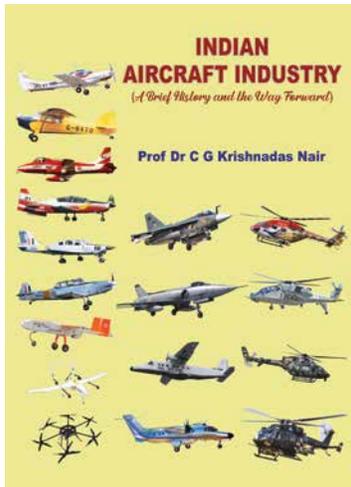
Chapter-4: Covers the transformation and growth of the aircraft industry through supply chain development, breaking away from the cost-plus profit contract to commercially negotiated price based contracts, enhancing productivity, quality and efficiency, introduction of advanced manufacturing technologies including application of Information Technology, partnership with academia and R&D organisations, diversification and export promotion, strengthening of the R&D and aligning with concerned manufacturing disciplines to develop expertise in each specific area.

Chapter-5: Gives a brief story of forming an association for the Indian Aerospace industries by primary stakeholder such as HAL, ISRO, DRDO, DGCA, CEMILAC, DGAQA and others to stimulate participation and growth of private industry corporates and SMEs in the Indian aerospace projects, and its activities and achievements.

Chapter-6: Briefly gives the origin of the Offset Clause in aerospace and defence procurement by the initiative of Aeronautical Society of India, HAL and the Society of Indian Aerospace Technologies and Industries (SIATI) and its impact on growth of Indian aerospace industries capability and capacity.

Chapter-7: Gives a summary of growth of private aerospace industries in India, consisting of large SMEs, medium and large private sector corporates. Building capability in the manufacture of precision components, structures, standard parts, equipment and systems, support equipment such as ground handling, ground support and a brief mention of MRO and UAV companies and capabilities in the private sector is all mentioned in detail.

Chapter-8: Deals with R&D in aeronautics and specifically in design and development of aircraft. It takes



note of the early achievements in design development of aircraft and establishment of National R&D labs in aerospace by the Government, the decline in the design and development activities due to increased preference for import and license production of aircraft. The chapter then narrates in detail the revival of design and development in the last two to three decades with the project on Advanced Technology Light Helicopter (ALH) and the Advanced Technology Light Combat Aircraft (LCA) and synergising the national capabilities by networking public sector industries, private sector industries including SMEs, R&D institutions and academic institutions. With the success of India establishing and developing world class design capability in advanced helicopters and for trainer and fighter aircraft, the Indian industry takes up design and development projects in partnership with National R&D organisations.

Chapter-9: Commercial Aircraft Development and Production (Lost opportunities & Way Forward) gives a comprehensive insight into efforts by both private sector and public sector industries and national labs and the way forward in making in India civil transport aircraft.



Dr. CG Krishnadas Nair at the Vayu magazine office at New Delhi in 2025.

Chapter-10: Highlights the role of technology public and private sector partnership and the networking with academic and R&D institutions and proactive policies of the government energising the Indian aircraft industry to grow forward. Some of the successful new projects in the development of new versions of Dhruv advanced light helicopters for Army, Navy and Air Force are presented and also increased private sector participation for enhancing the rate of production to make some of these world quality products not only for India but also for export.

Chapter-11: The concluding chapter emphasises the need for cooperation between PSUs and private industries and international OEMs for synergetic growth for 'Make in India' for India and for export and provide various plans for working together for benefit of all partners. The chapter also looks at the increasing opportunities in civil aircraft development and jet aircraft development and MROs and in dealing with end of life aircraft, recycling and disposal.

A great read for sure! ➡

Vikramjit Singh Chopra
Editor, Vayu Aerospace & Defence Review

25 Years Back

From Vayu Aerospace Review Issue II/2001

GSLV launch aborted due to fire

India's quest to bridge a technological gulf in its space programme suffered a setback when the launch of its biggest rocket, a Geosynchronous Satellite Launch Vehicle (GSLV) was aborted one second before the 3.47 p.m. take-off at SHAR on the 28th March. "The mission stands cancelled for the time being," ISRO Chairman, Dr K Kasturirangan, announced.

Agni-II test fired again

India took another decisive step towards its stated goal of deploying a credible nuclear deterrent by conducting the second flight test of its 2,500 km range Agni-II Intermediate Range Ballistic Missile (IRBM) from a mobile launcher at the Interim Test Range in Chandipur-on-sea in Orissa.

"India will buy over 200 airliners worth \$17.5 billion"

India's major carriers will need to buy 200 airliners worth \$17.5 billion in the 20 years upto 2019, according to Airbus's latest market forecast. The airliners are needed both to replace ageing aircraft and to provide for growth. The 222 aircraft comprise 124 to meet growth in passenger traffic.

Boeing bullish on IA/AI privatisation

Boeing is bullish that a successful partial privatisation of Air India and Indian Airways will increase sales prospects despite long delays in the fleet renewal plans of both carriers. One industry source predicts that Air India could require up to new widebodies over the next three to five years if privatisation is successful.

Snecma signs MoU with Air India

Snecma has signed a memorandum of understanding with Air India to set up an aero-engine maintenance joint venture in the country. The French company says the project could be launched within the next two years if the number of CMF56s operating with Indian carriers increases substantially.

Tata's pick up Pilatus PC-12

Tisco have bought a single PC-12 and is the first in India for the Swiss based Pilatus. Arun Sharma, Managing Director, Aviators (India) Pvt Ltd marketing and sales representatives for Pilatus, said that the single engine 9-seater commuter version can also be converted into a 6-seater executive version.

The Bhuj earthquake: Relief operations

The town of Bhuj, in the Kutch area of Gujarat state and scores of smaller places literally collapsed at 0852 hours on 26 January 2001, being the epicentre of a 7.9 Richter-scale earthquake. In the tragic aftermath, tens of thousands of people were killed.

Snecma may offer help on LCA engine

Snecma is offering to deepen its involvement in India's Kaveri indigenous aero-engine programme and may allow DRDO to tap technology developed for its flagship M88 fighter powerplant used in the Dassault Rafale. Originally the F404s were intended for use in the test programme with the LCA.

IAI to upgrade Indian Mi-8/17s

Israel Aircraft Industries (IAI) is offering its tactical upgrade package to the Indian Air Force for its Russian-built Mil Mi-8/17 utility helicopters. IAI's Lahav division had displayed a demonstrator at the recent Aero India airshow at Bangalore.

Vikhr-M missiles for Mi-17-1V's

The Kazan Helicopter Plant (or KVZ) has embarked on a contract for supplying India with forty Mi-17-IV military transport helicopters. The \$170 million contract (for 40 helicopters) is due to be fulfilled before the end of 2001. The first batch of four helicopters was delivered to the customer onboard An-124 Russian transport aircraft in October.

Barak evaluated by the Indian Navy

The Rafael Barak naval vertical launch air defence missile had been initially developed for the Israeli Navy and is now also in service with at least two other navies. Most recently, the Indian Navy has been discussing the purchase of these missiles of installation on board their sole aircraft carrier.

IAF to acquire six executive jets

Embraer, Dassault Aviation and Fairchild Dornier are amongst another half dozen companies bidding for an expected Indian Air Force (IAF) requirement for up to six business jets to supplement four Boeing 737-200s used for government and VIP transport. ➔

Tale Spin

Long time no see. Twenty years later!

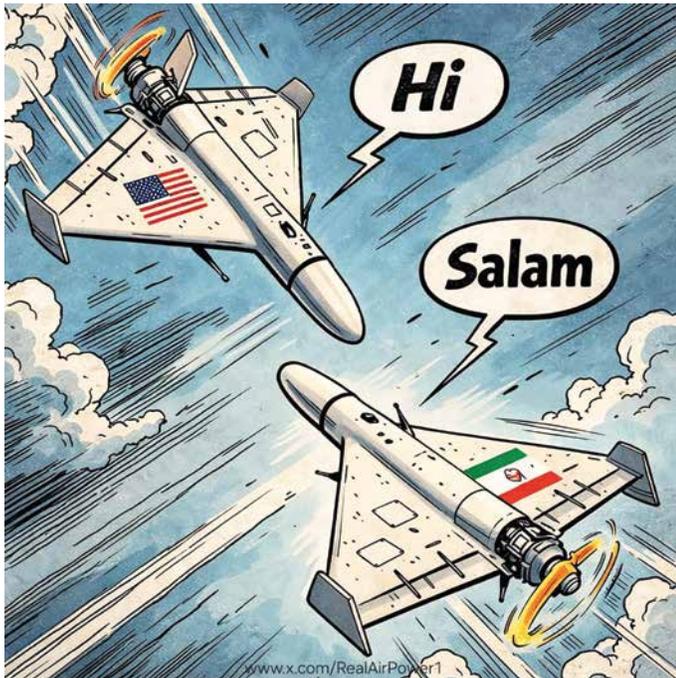
Nayantara Handa worked with the Vayu Team two decades ago and always kept in touch. But the real surprise was her dropping in all these years later in February 2026 and charming the whole office as always! Do come more often!

Also, 20 years of contributing to the Vayu magazine (in fact every issue!), finally we had the pleasure of meeting Joris van Boven and Alex van Noye from The Netherlands who were part of a media tour of 30 journalists to India organised by the Indian Ministry of Defence in February 2026. After an extremely busy and hectic 17 days here, we managed to catch up with them only on their last day! Guys—please come back soon so we can have some drinks and dinner together!



Lost siblings?

On X, user @RealAirPower1 commented on the ongoing Israel/US vs Iran war in March 2026: “CENTCOM has confirmed the use of one way attack drones (loitering munitions/LM) in Operation Epic Fury – the first time US has used kamikaze drones (LUCAS) in combat. But here’s the kicker: the drones used against Iran were modeled on Iran’s own Shahed–136 series! Just imagine you’re a drone over the Persian Gulf on your final mission, and you spot your twin zipping past you in the opposite direction – except for the flag on your wing, everything else is nearly identical. Now imagine the greeting you’d exchange! Strange times we live in”.



Not to be left behind...

India’s IG Defence has unveiled the first glimpse of Project KAL, an “indigenous long range strike drone platform

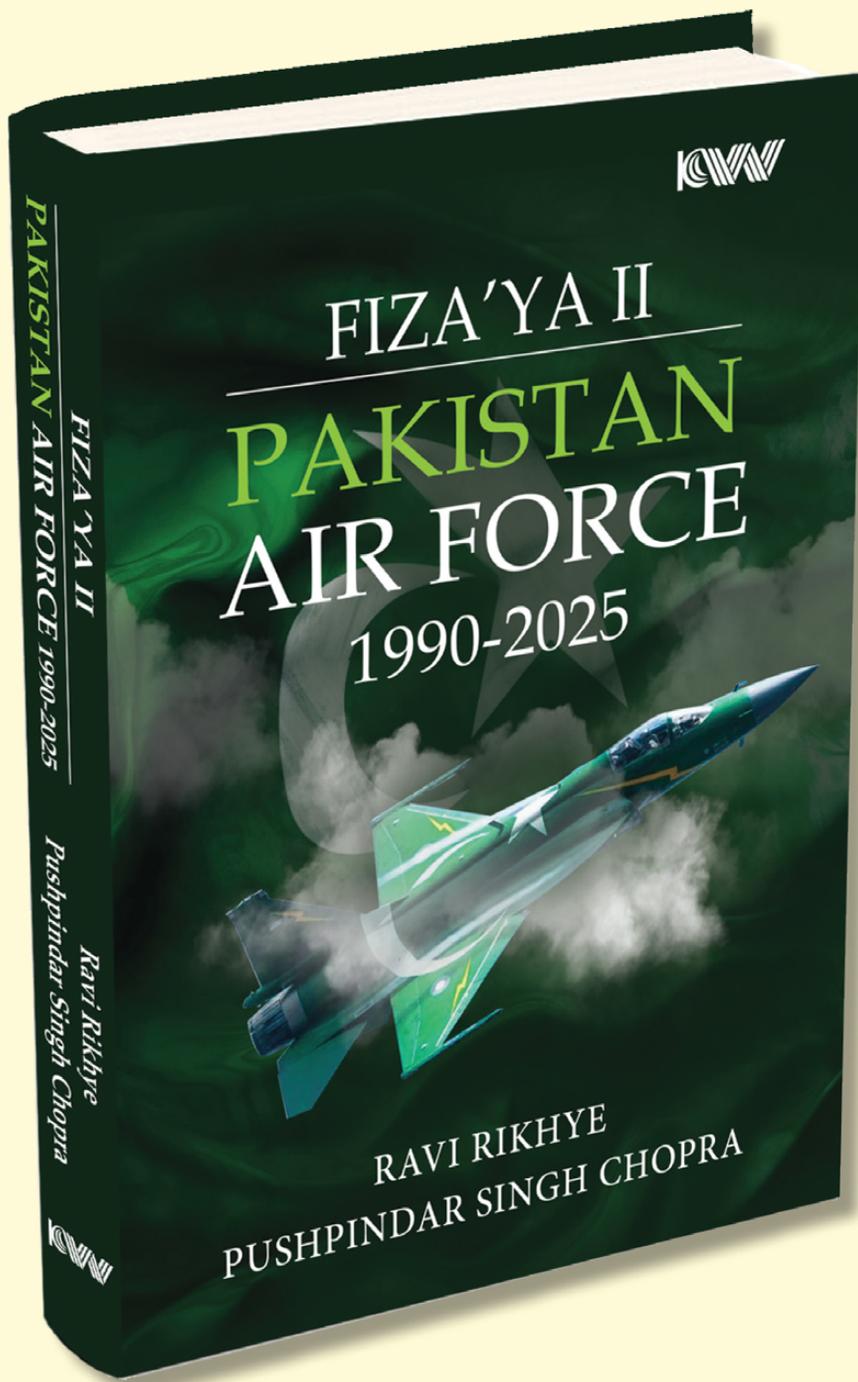
currently under development in India”. While the project is currently in the early stages, the initial glimpse shared by the company signals its intention to enter a new category of unmanned combat platforms.



...and also, from India’s NewSpace Research & Technologies, is the Sheshnag SN–150 UAV and loitering munition which shares the same design lineage. It has already been tested and the company says, “Multiple heads. One intelligence. Deadly Effects. Inspired by the Sheshnag divine snake from Indian scriptures, the NS Sheshnag SN–150 UAV combines swarm autonomy and precision strike capability”.



Afterburner



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

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

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

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