जून
June
2025

खंड/Vol. : 50 अंक/Issue :103

06 /06/2025

समाचार पत्रों से चयनित अंश

Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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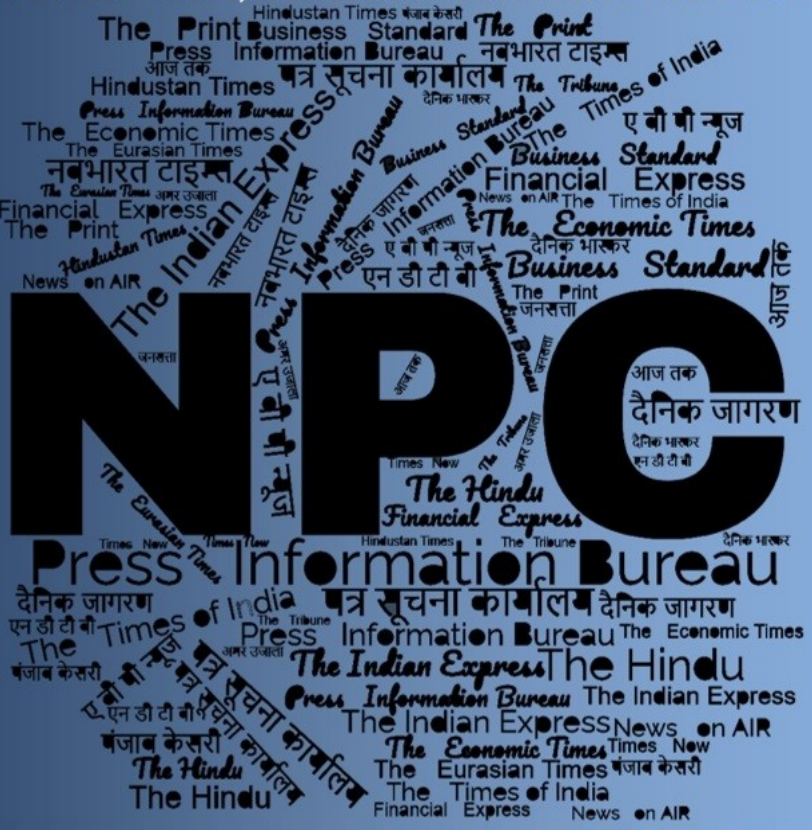

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भारत में बनेगी राफेल की रीढ़, डसॉल्ट और टाटा के बीच बड़ा समझौता; जानें सब कुछ

Source: Dainik Jagran, Dt. 05 Jun 2025

भारत की एअयरोस्पेस की ताकत के लिए 05 जून 2025 का दिन बेहद खास रहा है। ऐसा इसलिए क्योंकि आज फ्रांस की डिफेंस और एविएशन कंपनी डसॉल्ट एविशन तथा भारत की एअरोस्पेस कंपनी टाटा एडवांस सिस्टम लिमिटेड (TASL) ने राफेल फाइटर जेट के फ्यूजलेस (मुख्य ढांचे) को भारत में बनाने के करार पर समझौता किया है।

इस समझौता के तहत आने वाले समय में राफेल का फाइटर जेट का फ्यूजलेज भारत में बनाया जाएगा। आपकी जानकारी के लिए बता दें कि फ्यूजलेज लाड़ाकू विमान का मुख्य हिस्सा है, जिससे विमान के अन्य कई महत्वपूर्ण हिस्से जुड़े रहते हैं।

समझौते को लेकर किया गया करार

इस समझौते को लेकर एक प्रेस विज्ञप्ति भी सामने आई है। इस विज्ञप्ति के अनुसार, डसॉल्ट एविएशन और टाटा एडवांस्ड सिस्टम्स लिमिटेड ने भारत में राफेल लड़ाकू विमान के धड़ के निर्माण के लिए चार उत्पादन हस्तांतरण समझौतों पर हस्ताक्षर किए हैं, जो देश की एयरोस्पेस विनिर्माण क्षमताओं को मजबूत करने और वैश्विक आपूर्ति श्रृंखलाओं का समर्थन करने की दिशा में एक महत्वपूर्ण कदम है।

जानकारी दें कि ये पहली बार होगा जब राफेल फाइटर विमान का ढांचा फ्रांस से बाहर भारत में बनाया जाएगा। इस फैसले को भारत के मेक इन इंडिया के मिशन की दिशा में एक शानदार और सफल कदम बताया जा रहा है।

भारत में कहां बनाया जाएगा राफेल का फ्यूजलेज

बताया जा रहा है कि जो समझौता दोनों कंपनियों के बीच में हुआ है, उसके अनुसार टीएएसएल हैदराबाद में एक अत्यधिक आधुनिक विनिर्माण यूनिट बनाएगी। इस यूनिट में राफेल के कई अहम सेक्शन बनाए जाएंगे। इनमें रियर फ्यूजलेज के लेटरल शेर, पूरा पिछला हिस्सा, सेंट्रल और फ्रंट सेक्शन भी शामिल है।

माना जा रहा है कि यह मैन्यूफैक्चरिंग यूनिट वित्त वर्ष2028 से पहले अपने पहले फ्यूजलेज सेक्शन का निर्माण शुरू कर देगी। अनुमान के मुताबिक प्रत्येक महीने में 2 फुल फ्यूजेलेज तैयार करने की योजना है।

जानिए क्या होता है फ्यूजलेज?

बता दें कि फ्यूजलेज किसी भी विमान का मुख्य ढांचा होता है। सामान्य भाषा में इसको किसी फाइटर विमान का शरीर कहा जा सकता है। यह विमान का वह महत्वपूर्ण हिस्सा है, जो विमान के सभी मुख्य हिस्सों (पंखों, पूंछ और इंजन) को छोड़कर बाकी सब कुछ जोड़ता है। राफेल एक बड़ा फाइटर विमान है, इस प्रकार के विमान में फ्यूजलेज का डिजाइन स्टील्थ (रडार से बचने की क्षमता) और मजबूती के लिए काफी खास होता है।

इस समझौते की बड़ी बातें

- ये पहला मौका है जब राफेल फाइटर जेट का फ्यूजलेज फ्रांस से बाहर बनाया जाएगा।
- समझौते के अनुसार, हैदराबाद में हाई–टेक प्रोडक्शन फैसिलिटी को स्थापित किया जाएगा।
- वित्तवर्ष 2028 से इसके उत्पाद के शुरू होने की उम्मीद है।

- हर महीने 2 फ्यूज़लेज तैयार करने की क्षमता इस यूनिट की होगी।
- इस समझौते से मेक इन इंडिया और आत्मनिर्भर भारत को बल मिलेगा।

https://www.jagran.com/news/national-rafale-fighter-jet-fuselage-to-be-made-in-india-dassault-tasl-agreement-23956798.html

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Rafale fuselage to be made in India for the first time

Source: Hindustan Times, Dt. 06 Jun 2025

The main body of future Rafale fighter jets will be produced in India, outside France for the first time, with French aircraft maker Dassault Aviation and Tata Advanced Systems Limited (TASL) on Thursday announcing their partnership to build Rafale fuselage at a facility being set up in Hyderabad, in a move that is seen as a big leap for the government's wide-ranging Make-in-India initiative.

The Hyderabad facility will supply the fuselages for India and other international markets 2028 onwards, the two firms said. Some of the 26 Rafale Marine fighters ordered by India for its navy will come with locally produced fuselages, people aware of the matter said.

Dassault Aviation and TASL have signed four production transfer agreements to manufacture the Rafale fuselage in India and called it a significant step forward in strengthening the country's aerospace manufacturing capabilities and supporting global supply chains.

"Under the scope of the partnership, TASL will set up a cutting-edge production facility in Hyderabad for the manufacture of key structural sections of the Rafale, including the lateral shells of the rear fuselage, the complete rear section, the central fuselage, and the front section," the two firms said in a joint statement issued in Saint-Cloud and Mumbai.

The announcement comes weeks after India signed a ₹63,000-crore deal with France to buy 26 Rafale M aircraft for the navy which will operate them from its two aircraft carriers, with the deliveries expected to begin in three years and be completed by 2030.

The April 28 government-to-government deal for 22 single-seat Rafale M fighters and four twin-seat trainers included the setting up of a local production facility for the jet's fuselage as well as maintenance, repair and overhaul (MRO) facilities for engines, sensors and weapons in India.

The Hyderabad facility represents a significant investment in India's aerospace infrastructure and will serve as a critical hub for high-precision manufacturing, the statement said.

The first fuselage sections are expected to roll off the assembly line in 2028, with the facility expected to deliver up to two complete fuselages every month.

"For the first time, Rafale fuselages will be produced outside France," Dassault Aviation chairman Eric Trappier said. "This is a decisive step in strengthening our supply chain in India. Thanks to the expansion of our local partners, including TASL, this supply chain will contribute to the successful ramp-up of the Rafale and, with our support, will meet our quality and competitiveness requirements."

The development comes at a critical moment as the Indian Air Force (IAF) is scouting for 114 multi-role fighter aircraft to boost its capabilities, and the programme will involve a global plane

maker setting up a production agency in the country along with an Indian partner. Dassault Aviation is among the foreign firms interested in that programme.

In February, the chief of the air staff Air Chief Marshal AP Singh said such a model will give the air force an alternative option for any future design, including a stealth fighter, rather than depending only on the capabilities of state-run plane maker Hindustan Aeronautics Limited (HAL).

The IAF operates 36 Rafale jets bought from France at a cost of ₹59,000 crore, and the aircraft's naval variant will bring commonality with the air force's fighters, creating advantages in training, maintenance and logistics support. Some of the air force's Rafales were among the fighter jets used during Operation Sindoor --- India's strikes on terror and military installations in Pakistan and Pakistan-occupied Kashmir following the Pahalgam terror attack. This partnership marks a significant step in India's aerospace journey, TASL CEO Sukaran Singh said.

"The production of the complete Rafale fuselage in India underscores the deepening trust in TASL's capabilities and the strength of our collaboration with Dassault Aviation. It also reflects the remarkable progress India has made in establishing a modern, robust aerospace manufacturing ecosystem that can support global platforms."

This is the way forward for the local aerospace manufacturing sector, said Air Vice Marshal Anil Golani (retd), the director general of Centre for Air Power Studies, an influential think tank. "We couldn't have asked for a better opportunity to manufacture not just fuselages but entire fighter airframes in the future."

TASL is swiftly expanding its footprint in the aerospace manufacturing sector. TASL and European firm Airbus Defence and Space are jointly executing a ₹21,935-crore project to equip the IAF with 56 C-295 aircraft to modernise its transport fleet, including 16 in fly-away condition. The first made-in-India C-295 will roll out of a facility in Vadodara in September 2026 and the remaining 39 by August 2031.

US aerospace firm Lockheed Martin is partnering with TASL to bid for the IAF's medium transport aircraft (MTA) competition for up to 80 planes. The joint venture Tata Boeing Aerospace Limited (TBAL) is producing Apache attack helicopter fuselages in Hyderabad. And Airbus Helicopters is setting up a production line in India for H125 helicopters in partnership with TASL --- the fourth such facility in the world.

https://www.hindustantimes.com/india-news/rafale-fuselage-to-be-made-in-india-for-the-first-time-101749149568552.html

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On a wing and a prayer

Source: The Hindu, Dt. 06 Jun 2025

On April 4, the Council of Scientific and Industrial Research – National Aerospace Laboratories (CSIR-NAL) announced that it had entered into a "historic agreement" with a private company, Pioneer Clean AMPS Pvt Ltd, to manufacture the upgraded version of the Hansa-3, called the Hansa-3 NG (Next Generation). This two-seater trainer aircraft gives trainee pilots the opportunity to practise within India while undergoing their basic flying training.

Hansa, India's first light aircraft to be used for pilot training, designed and developed by CSIR-NAL, Bengaluru, on a sortie at Aero India 2025 in February.

Touted as "India's only government R&D organisation in civil aircraft development", CSIR-NAL is in Bengaluru and was established in 1959. "While we have had a successful track record, we have now managed to seal a partnership with a private company, which will manufacture these planes," N. Kalaiselvi, Director-General, CSIR, had said at the launch event held in Delhi. It was also presided over by Union Minister for Science and Technology Jitendra Singh and Minister for Civil Aviation Ram Mohan Naidu.

Pioneer Clean AMPS Pvt Ltd is three years old and expected to set up manufacturing facilities as well as handle marketing, servicing, and after-sales. NAL will be closely involved in the initial years to help the company with various aspects of manufacturing and operations, says Abhay Pashilkar, Director, CSIR-NAL.

Kishore Patel, founder and managing director of the Mumbai-based company, says his experience in business lay in the chemicals and automotive sector, but he decided to venture into aircraft manufacturing because of the opportunities and untapped potential. In the past year, he has organised a team of experts from the aviation sector, including engineers and scientists from organisations such as Hindustan Aeronautics Ltd — India's workhorse producer of defence aircraft — to be able to manufacture the Hansa-3 (NG).

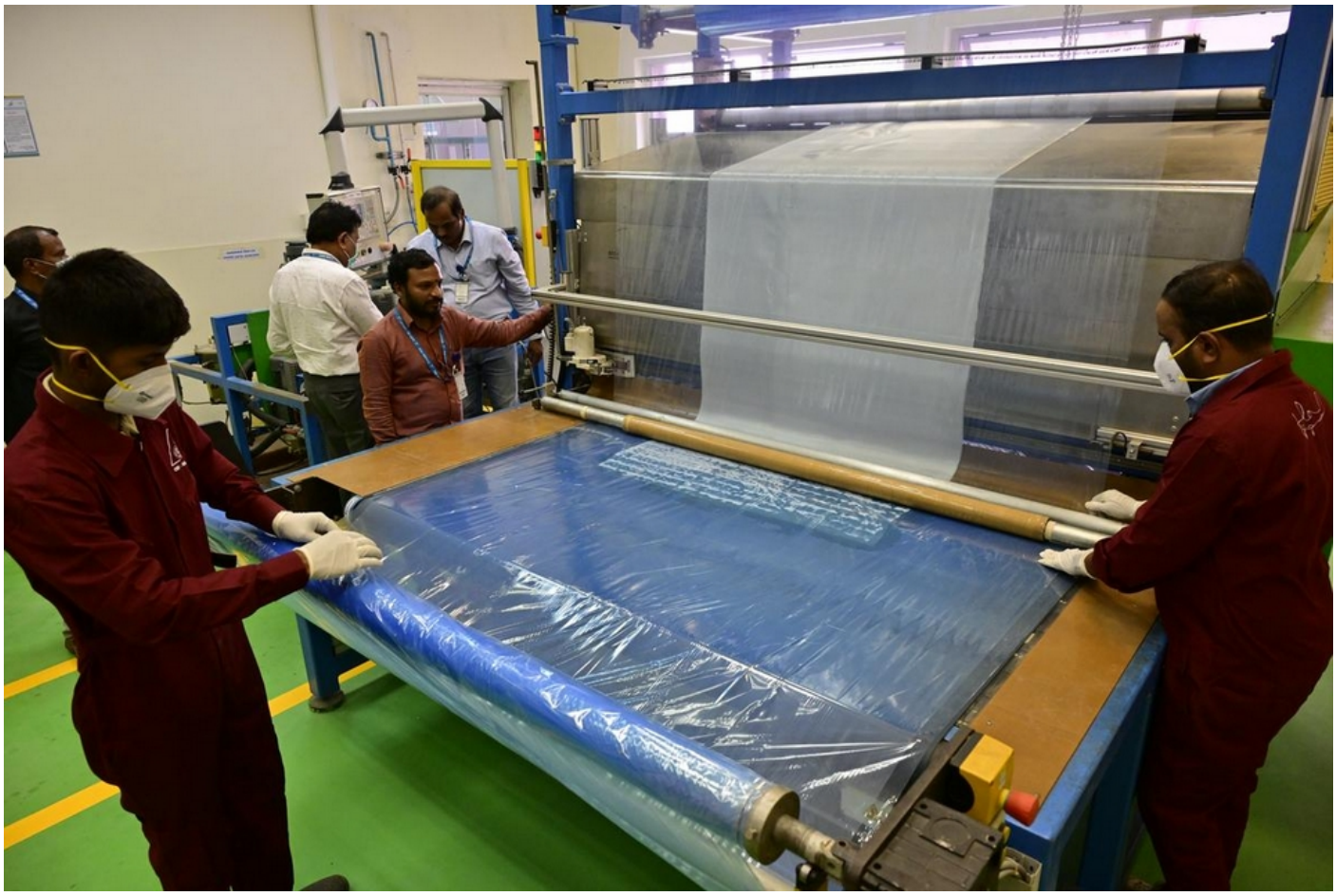
"The aviation sector is rapidly growing and with that, the demand for trained pilots. We expect locally manufactured aircraft trainers to be cheaper and offer quick turnaround time for maintenance than foreign planes," he said on the sidelines of a press event to announce the technology transfer.

The making of a plane

The NAL, a cluster of buildings spread out on a verdant campus of centenarian banyan and peepal trees, was intended to be away from the city. Few public labs in India can boast of having their own runways. Among these, the CSIR-NAL runway — a bluish grey rectangle of tarred road improbably laid out in a vast grassy field — is unique. It isn't your everyday airstrip intended for the private planes of the privileged. It is meant for planes imagined, designed, crafted, welded, and

assembled on the campus. Even a small plane going awry mid-flight can be an aerial coffin for the pilot, and at worst, a crashing inferno of a public hazard.

Therefore, every plane, when it flies for the first time, is a nerve-wracking experience for the engineers, designers, and technicians behind it because of the many things that could go wrong. It's inevitable that a runway and a surrounding vista, far from a bustling city, be built into a facility made to make planes.



The fabrication hangar of the Hansa aircraft at CSIR-NAL.

In one of these buildings is a cavernous workshop. There is a smattering of plane-parts: fuselage, wings, cockpit, propeller in various degrees of assembly, with none having reached their denouement. Like the baking moulds used to create cookies or cakes in assorted shapes, the fuselage — or the main spindle-shaped body of the plane where passengers and pilot are seated — is made by layering multiple layers of "composites" like glass fibre, carbon fibre, and aluminium over spindle-shaped moulds. Depending on whether the plane will be a two-seater or a five-seater, the placing of the plane's engines, the positions where the wings will be, different fuselage is employed. There are large 'layup' machines housed in various locations of the workshop.

Like the handlooms that spin out fabric, these machines can spin out the 'composites' used to make wings or any other parts. "You can have up to 70 layers of composite depending on which part of the plane is involved and how they must be attached to the fuselage," explains Abbani Rinku, Chief Scientist and the person in charge of CSIR-NAL's flagship Hansa (Swan) category of planes.

First flight

On May 11, 1998, three nuclear tests were conducted deep in Rajasthan's Pokhran desert, the first time such bombs had gone off since 1974, in a move by India to 'announce' its status as a nuclear power. It's the reason that India annually commemorates this day as Technology Day.

Nearly 2,000 km away in Bengaluru, another tech event took place: the inaugural test flight of the Light Trainer Aircraft Hansa-3 Prototype II.

Speaking in Parliament on June 8, 1998, then Education and Science Minister Murli Manohar Joshi said, "This aircraft is a prototype designed, developed, and manufactured by National Aerospace Laboratories, Bangalore."

The production of the aircraft was to be taken up towards the end of 1998 by a private sector company in Bengaluru. The expected cost of production was ₹30 lakh per aircraft.

NAL had entered into an agreement with Taneja Aerospace and Aviation (TAA), which had a manufacturing base in Hosur, Karnataka, to make the plane. Out of the 14 Hansa planes that were manufactured, one was made by TAA, says Rinku. However, he doesn't explain why more planes weren't manufactured by the company.

The Hansa aircraft landing after a sortie at the recently concluded Aero India 2025 - at Yelahanka Airforce Station.

They have all been given to flying clubs used by the Directorate General of Civil Aviation (DGCA) and were being used as trainer-aircraft for pilots in training.

The upgraded version of the Hansa-3 that will be made by Pioneer is a far more evolved variant of the one from Joshi's time. The aircraft offers a digital display (glass cockpit) system and is powered by an advanced fuel-efficient Rotax 912 iSc3 Sports engine and bubble canopy with a cabin width of 43 inches. It is equipped with electrically operated flaps to meet the user's

requirements. It can fly up to 620 nautical miles and has 7-hour endurance and maximum cruise speed of 98 knots calibrated airspeed (KCAS).

All of this also translates to the Hansa costing around ₹3 crore, a 10-fold spike. Pashilkar says it is still half the cost of an equivalent imported plane, and with the manufacturing and repairs expected to be handled locally, have a lower “down-time” than comparable ones.

Moreover, he added, the real draw of the plane is that many more pilots can be trained within India (today, several must go abroad for their licences). It will meet what Naidu projected as an “explosive” demand for planes and pilots in India. The country will need 30,000 pilots in the next 15-20 years, with 1,700 planes to be added to the fleet, he had said.

Manufacturing blues

The CSIR-NAL is a research agency. Its mandate is in designing new planes. This means experimenting with every component of the aircraft — wings, fuselage, tail, propeller — and figuring out new ways of making planes lighter and more durable. They are also expected to design planes for a range of purposes, for instance as air-ambulances, or transporting cargo, or chartered planes, or fuselage of varying lengths to run smaller planes that can be used in towns and cities, sans full-sized airports. These new designs can then be taken up by private manufacturing companies that can make these planes in bulk, service them, find new markets, export, and most importantly establish the complex chain of intermediary manufacturers and suppliers of the complex hardware that must all be integrated into the manufacture of an aircraft. Despite successfully designing two-seater planes such as the Hansa and a 14-seater plane, Saras, the NAL hasn’t yet been able to successfully rope in an Indian company that will manufacture its planes.

In 2018, the CSIR-NAL made significant upgrades to the Hansa-3, including integrating a glass-cockpit as well as significantly improved avionics and instrumentation. It announced a partnership with Mesco Aerospace Pvt Ltd to design and manufacture the Hansa-3 NG. The “targeted” cost of manufacturing the plane would be ₹80 lakh-₹100 lakh, an accompanying press release had said then.

Rinku says while Mesco showed interest in producing the NG plane, the firm couldn’t continue beyond one year. “There were reportedly some internal issues (with the company) but nothing to do with the aircraft or its design. While we had signed an agreement to be involved right from the stage of designing the aircraft, we didn’t progress to the stage of production,” he adds. This forced NAL to look for a new partner to design the Hansa-3 NG, and after four years of search found a partner in Pioneer.

It isn’t because the manufacturing of plane parts, assembling them, or establishing workshops is technically daunting that only research institutions like the CSIR-NAL or the Hindustan Aeronautics Limited (which makes defence aeronautical systems) are capable of. In America, Pashilkar says, the Hansa category of planes would come under the “home-built” category.

The Hansa has its origins in a category of planes called the Light Canard Research Aircraft (LCRA), a Long-EZ aircraft developed by pioneering American aerospace engineer and designer Burt Rutan and put together in 1985 at NAL by a team led by Rustom Damania. Over the 300 hours that the plane was flown in its lifetime, engineers and scientists discovered practical challenges, including the use of composites.

The Director of CSIR-NAL, Abhay Pashilkar

“We simply imported it as a knock-down kit, assembled it ourselves, then flew it. Even today, these are categorised as home-built planes and so in theory can be built by anyone. Despite all the know-how and potential, it is challenging to get a private manufacturer,” says Pashilkar.

Among the concerns that potential manufacturers raised were the availability of trained and skilled manpower. “There’s huge attrition in this industry. Yes, setting up the facilities to manufacture plane parts aren’t that challenging, but it requires extremely skilful people.”

For a plane like Hansa, it is essential that every component be made to the exact weight specifications. “We can now make it to within a kg of the required weight. Few organisations in India can do that. Take welding. While it sounds simple, only a few organisations — like HAL — have been approved by aviation regulators to be able to weld components. Aviation is a highly regulated sector, and you can’t go to a corner shop,” explains Pashilkar. “A car, if it malfunctions on the road, can be taken to the roadside for fixing. You can’t do that for an aircraft. Hence, the making and manufacture — given the risks — of even the smallest part is tightly regulated. This deters private sector participation.”

Then there’s the challenge of importing the raw material to make the composites. “With so few manufacturers, nobody produces these materials in India. And because nobody makes enough of this, there are few manufacturers, necessitating imports. You add up all the demand for civilian planes — an existing fleet of about 800 with 1,200 in the next five years — and it still doesn’t make

commercial sense for a private manufacturer to set up a foundry (to make raw materials) in India," Pashilkar reckons.

Another challenge is finding pilots. The NAL does not have pilots of its own, and given that these are test planes, it depends on pilots from the Indian Air Force. "Whether it is Hindustan Aeronautics Ltd, or us, there is always a shortage of pilots. Because there are different certification requirements for civil and military aircraft, we face delays in flying our test aircraft," rues Pashilkar.

By the rules under which NAL works, any private manufacturer has to first replicate NAL's manufacturing facilities. "Following this, they can come to our facilities and get help with making the first prototype; then we can go to theirs for the next one," explains Pashilkar. "This time, we've reduced technology transfer fees and given them two-year access to our facilities. Aircraft manufacturing is full of challenges in India, but we persevere."

https://www.thehindu.com/news/cities/Delhi/on-a-wing-and-a-prayer/article69651960.ece

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Project delays are a drag on IAF power

-by Air Marshal Diptendu Choudhury Retd

Source: The Tribune, Dt. 06 Jun 2025

AS the fog of Operation Sindoor begins to lift, the actual magnitude of success is beginning to emerge after the initial days of the media blitzkrieg. The offensive air power and air defence that the Indian Air Force (IAF) demonstrated was heartening, despite decades-old inventory shortcomings. Equally encouraging was the test of combat-worthiness of indigenous weapons and systems that played a defining role in the short, swift and high-intensity operation.

Whether it is the homemade Integrated Air Command and Control System, the backbone of the Indian air defence, the Akash surface-to-air missile or the BrahMos cruise missile — the star of the show — credit must go to the Indian industry. But, amidst the heady feel-good factor of success, the refreshingly frank and justified concerns of Chief of Air Staff Air Marshal AP Singh on the industry's failed promises and missed deadlines are a sobering reality check.

The irony is that despite being the primary customer of the Hindustan Aeronautics Limited, one of the oldest and largest aviation industries in the world, the IAF has long been struggling with the downstream effects of decades of sloth in our aircraft production capability.

The Air Chief's angst reflects years of over-promise, under-delivery, slippage of timelines, less-than-acceptable product quality and inadequate product performance follow-up, which the IAF has been a victim of despite decades of hand-holding and support. There is a serious need for the industry to introspect on the slippages in every indigenous platform — the Light Combat Aircraft, Advanced Light Helicopter, Light Combat Helicopter, the Netra Airborne Early Warning & Control System etc and weapon systems.

In the absence of accountability, the harsh fact is that the IAF's declining numbers of combat and support platforms have created an ever-increasing inventory gap due to the inadequate future 'fill rate' and is already in an irrecoverable downward spiral.

Future inductions will no longer be able to close the gap unless the industry achieves a substantial production capacity. Slippages snowball further into delays in induction, operationalisation, training

and development of employment tactics. The capacity shortcoming is an equally serious challenge in the industry's maintenance, repair and overhaul, as this means that a significant number of platforms are always waiting in long queues, and therefore there are lesser platforms available on the flight line.

The reduced numbers are weakening India's conventional deterrence, especially in view of the unique twin-adversary multi-front threat. Post-Op Sindoor, with the widened space for conventional employment of kinetic force, the possibility of a future conflict has gone up.

The recent conflict has shown that the China-Pakistan relationship, especially between the two air forces, is no longer a collusive affair. Instead, it is a bold display of open support between two ironclad strategic friends. Since there is no doubt about the role air power will play in any future conflict, the technology differential, the increasing disparity in numbers and the strategic synergy between the China-Pak aviation industry and the air forces are red flags for India's future security paradigm.

This is because the joint air power advantage will alter the continental security dynamics and impact India's force application options. India's already delayed Advanced Medium Combat Aircraft (AMCA) project, which has been recently opened to the private sector, is expected to take over a decade before the platforms can be inducted into service. By that time, China would have altered the air power balance and infrastructure in Tibet in its favour with sixth-generation platforms, and Pakistan would have operationally inducted the fifth-generation J35 as well. Of equal concern is that in this period, the IAF's mainstay fourth-generation fleet would have also become a decade older, despite their upgraded capabilities.

Like the AMCA, specialist weapons, advanced support platforms, future manned and unmanned teaming projects and space-based support for multi-domain operations are future imperatives that need accelerated research & development, supported by advance manufacturing processes and large production capacities.

The pace of technological advancements can only increase if the IAF and the industry short-circuit the synapses between the development of future operational concepts, identifying operational requirements, industrial research, development and production and finally operational testing and evaluation. These need to be addressed on the highest priority, given the long distance and lead times between the drawing board and the field.

A much-needed and most critical transformational change is for the industry to assume responsibility as a vital stakeholder of national security, and to be held accountable for it. The erstwhile silo-based design-development-testing-production process needs to be made inclusive, with much greater symbiotic institutional embrace between the industry and the customer.

The aviation industry should expand its engagement with the IAF more proactively to widen the aviation expertise base of its human resource in order to bridge the customer-producer divide — from the conception stage of a project, its production, operational integration and future upgrade. Creation of project management groups for progress and performance monitoring follow-up till the full maturity of a developed product must become a norm based on the life-cycle needs. They must be able to shut down a programme early, if necessary, to prevent cost overruns.

Supply chain robustness and resilience must be ensured to avoid delays and slippages. Similarly, projects cannot be executed on single prototypes; they need adequate pieces for running development and testing in parallel. Field trials are extremely complex affairs involving many

players and stakeholders, where delays and failures have pushed back projects for months, if not years. Shortage of test beds, testing equipment, non-availability of certain specialist test facilities in India, pre-mature testing etc. add to the challenges.

Greater independence, transparency and oversight on certification and quality assurance are necessary to ensure stringent adherence to desired operational and safety standards.

Considering the expanding defence industry space, with its vast count of players and the growing number of projects, there is clearly a need for a visionary strategy for India's aviation future. Given the immense growth trajectory of civil aviation, assets and infrastructure, adopting a model of an 'integrated military-civil aerospace industry' will be a strategic investment for the future.

In view of the combat-proven credibility of Indian defence products, speed and scale are of the essence. This will fill our critical inventory gaps, and generating extensive low-cost competitive exports will also serve to expand our regional influence by creating technology dependencies. It's a carpe diem opportunity for the government to drive the change. No more failed promises and missed deadlines.

https://www.tribuneindia.com/news/comment/project-delays-are-a-drag-on-iaf-power/

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Science & Technology News

Heaviest proton emitter astatine-188 detected

Source: The Hindu, Dt. 05 Jun 2025

Thirty years after bismuth emitting a proton was detected and measured in 1996, an international collaboration led by researchers at the University of Jyväskylä, Finland, detected and measured the half-life of the heaviest proton emitter 188At (astatine) isotope, which decayed by emitting a proton. While isotopes often undergo radioactive decay by emitting alpha, beta, and gamma particles, rarely do they emit a proton.

"The measured half-life for the 188At is 190 microseconds, which defines the time scale for the proton emission," Henna Kokkonen, the first and one of the corresponding authors from the University of Jyväskylä said in an email to The Hindu.

"For a nucleus with given proton and neutron numbers, if we keep on adding more protons, we will reach a limit where the last-added proton would simply drip away. Such proton-rich nuclei often decay by emitting a proton, which is a rare process and is measured with highly specialised experimental facilities and corroborated with state-of-the-art theoretical descriptions," explained Paramasivan Arumugam, Professor in the Department of Physics at IIT Roorkee, a coauthor of the paper. "This might be occurring naturally but this was the first time that an Astatine isotope decaying by proton emission was detected and measured in a lab."

To a question why the emission of a proton by Astatine was not detected and measured earlier, Dr. Kokkonen said: "Studies of the nuclei at this area of the nuclear chart are extremely challenging and require highly selective equipment to perform the experiments. The nuclei are challenging to

produce, since the production rate is very low. The measurement techniques and the analysis have advanced significantly during the past years allowing us to study more and more exotic nuclei."

The study is part of Henna Kokkonen's doctoral thesis.

The heaviest Astatine (At) nucleus, with an atomic number 85, was produced in a fusion-evaporation reaction by irradiating a silver target with a strontium ion beam. Of the several nuclei that were formed when the strontium beam hit the silver target, the 188At isotope was identified using a Recoil-Ion Transport Unit (RITU) recoil separator. After the emission of the proton, the 188At isotope has 84 protons and 103 neutrons.

"When the 188-astatine emits the proton, it becomes 187-polonium isotope, which has a half-life of only 1.4 milliseconds. The 187-polonium isotope then decays via alpha decay into 183-lead and so on, until it reaches a stable nucleus," Dr. Kalle Auranen, the other corresponding author from the University of Jyväskylä, said in an email.

The role of the IIT Roorkee team led by Prof. Arumugam was in ascertaining the proton emission through theoretical calculations. Sophisticated measurements carried out at the University of Jyväskylä have to be corroborated with theoretical calculations to ascertain the detection of proton emission. "We have been developing the theory for proton emission since 2008 in collaboration with the Universidade de Lisboa in Lisbon, Portugal," said Prof. Arumugam.

"The theoretical calculations allowed us to determine the shape of the Astatine nucleus to be strongly prolate (watermelon-shaped)," Prof. Arumugam said. "The structure of the nucleus is represented by the shape parameter, and the half-life strongly depends on the shape parameter."

https://www.thehindu.com/sci-tech/science/heaviest-proton-emitter-astatine-188-detected/article69661352.ece

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