



**CENTRE FOR AIR POWER STUDIES (CAPS)**

Forum for National Security Studies (FNSS)

# AEROSPACE NEWSLETTER



**76th Republic Day Parade at Kartavya Path in New Delhi**

Image Courtesy: [Indiatvnews.com](http://Indiatvnews.com)

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*“If India’s vision was to be a developed nation by 2047, to find a place in the world, the aerospace sector would be a major contributor towards that goal”<sup>1</sup>*

*- Air Chief Marshal AP Singh PVSM AVSM  
Chief of the Air Staff, Indian Air Force*

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<sup>1</sup> <https://theprint.in/defence/iaf-chief-expresses-frustration-with-sluggish-pace-of-tejas-production-tech-delayed-is-tech-denied/2435334/>

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## Opinions and Analysis

### Bring the Defence Ministry into the Space Commission

Chaitanya Giri | 31 December 2024

Source: ORF | <https://www.orfonline.org/expert-speak/bring-the-defence-ministry-into-the-space-commission>



Why does India pursue a ‘space program’ at all? Is it only to satisfy the scientific curiosity of its intelligentsia? Is it only to fulfil the harmless aspirations of its entrepreneurs to bring an economic windfall to the nation? If these are the only motives for the Indian government to pursue the space program, the high table known as India’s Space Commission—the tallest decision-making body on all matters space—with its current organogram, is perfectly fine. However, if you ask two more simple questions—Who takes care of defending India’s space assets? Who secures our sovereign realms from the strategic and tactical dangers emanating from orbital and outer space threats?—the current structure of India’s Space Commission warrants a re-assessment.

In 2019, India established the Defence Space Agency (DSA) under the aegis of the

Integrated Defence Staff (IDS), with two other agencies, the Armed Forces Special Operations Division and the Defence Cyber Agency. It is, indeed, a fact that these are the initial formative years for the DSA, but does that mean it does not have a place in the Space Commission? This question is beginning to impact security thinkers and planners in the country tasked to monitor India’s comprehensive security needs. From their perspective, these are dangerous gaps that must be filled fast.

The Indian government took some bold and long-pending decisions when it initiated the space reforms in 2020. The Space Commission, during these reforms, expanded its members and got new representatives: it invited the Chairman of the newly-created Indian National Space Promotion and Authorisation Centre (IN-SPACe), the Foreign Secretary, the Secretary of the Department for Promotion of Industry and Internal Trade (DPIIT), Chairman-Standing Committee of the Indian Institutes of Technology (IIT) Council, and the National Security Advisor to the Prime Minister. Since its formation, the Space Commission has been overly civilian, with a majority of its representation being from the civilian space agency Indian Space Research Organization (ISRO). Even after bringing in new members, the inordinately civilian influence on the Commission remains to this day, as its chairman is also the Secretary of the Department of Space and Chairman of the ISRO. What’s more of a concern is that ISRO is genuinely not in a position to execute ‘space defence’ measures, as such activities may fall under the purview of militarisation, an attribute it does not want to be associated with as an institution.

The DSA is not structurally part of the Department of Space, which is understood. Still, it is difficult to comprehend why there are no attempts to make it a part of the Space Commission. The conspicuous absence of representation from the IDS or the DSA in the Space Commission begs the question of whether the Commission is a civilian-economic body by design. If yes, we must live with the fact that there is no other equally empowered Commission where these many secretaries, academics, and the National Security Advisor (NSA) would come together to assist the DSA and IDS in building assets necessary for the 'space defence' of India.

If the current 'civilian' Space Commission has no room for the DSA or IDS, then a separate defence 'Space Commission' be created. If two 'space commissions' are not viable, there is only one eventuality: the reform of the Space Commission with equal representation that takes into account the civilian, commercial and military aspects of India's space activities. Such a reform would first warrant the participation of the Chief of the Defence Staff to plug in the tactical feed of the DSA, the next-to-come Indian Space Command and the Indian Space Force into the Space Commission. There are three reasons why this topic has come about now.

First, in October 2024, the Cabinet Committee on Security approved the third phase of the Space-Based Surveillance Project. The earlier two phases involved the launches of sets of four and six 'spy' satellites, respectively. The third phase features the launch of 52 'spy' satellites, all managed by the IDS (read DSA) via the National Security

Council Secretariat (NSCS). The civilian space agency will never build intelligence-gathering satellites. Even in the recent past, the electronic intelligence satellite, under Project Kautilya, was built by the Defence Research Development Organization. The 52 satellites, too, are likely coming from the domestic commercial space market.

Second, the Ministry of Defence is fast emerging as a leading end-user, customer, and operator of space assets in India. It has begun to cultivate an ecosystem of commercial players and leading national R&D laboratories, which demands a separate infrastructure outside the civilian confines of ISRO. In the past couple of years, the Ministry of Defence's Innovation in Defence Excellence, better known as the IDEX scheme, has financed several early-stage space companies under its 'Mission DefSpace Challenge' since 2022. This is only the beginning, and a large section of India's commercial space enterprises will soon get business orders from the DSA and the forces.

Third, the civilian and military space domains are not competitors but complement each other. The best example, which will be seen in the coming days, is the comprehensive operational role of the Indian Navy and the Indian Air Force in the Indian Human Spaceflight Programme. This relationship will only strengthen in the future as Gaganyaan and Bharatiya Antariksha Station begin to take shape.

Just like space technology is always dual-use, the country's commission overseeing the development, deployment, and domestic and external trade of space technology and its

sciences must include one of its fast-growing end users. The Space Commission was established when ISRO and its parent body, the Department of Space, were solo space technology designers, builders, operators, and commercialisers. Now that this solo authority is a thing of the past, a 'defence' representation in the Space Commission is warranted.

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## How China is Driving up Demand for India-made BrahMos

Sushim Mukul | 16 January 2025

*Source: India Today* | [https://www.indiatoday.in/india/story/brahmos-missile-export-demand-sale-philippines-indonesia-deal-malaysia-vietnam-south-china-sea-military-2665574-2025-01-16?utm\\_source=washare&utm\\_medium=socialicons&utm\\_campaign=shareurltracking](https://www.indiatoday.in/india/story/brahmos-missile-export-demand-sale-philippines-indonesia-deal-malaysia-vietnam-south-china-sea-military-2665574-2025-01-16?utm_source=washare&utm_medium=socialicons&utm_campaign=shareurltracking)



*The BrahMos missiles delivered to the Philippines are anti-ship cruise missiles, and part of a USD 375-million deal with India signed in 2022.*

*(Image: Indian Navy)*

Indonesia is set to ink a deal for the India-made BrahMos missile. The Philippines has already inducted the naval variant of BrahMos, and Vietnam and Malaysia are showing interest in the medium-range missile. This is how the posturing and actions of an assertive China is boosting demand for BrahMos missiles.

Months after the Philippines received the first batch of India-made BrahMos supersonic cruise missiles in April, Indonesia is soon set to sign a USD 450-million deal to acquire the medium-range missiles. The deal with Indonesia would be India's biggest defence export agreement, and comes amid a surge in interest in the BrahMos. Other southeast Asian nations like Vietnam and Malaysia have also shown interest in the BrahMos, and the demand might have a China link.

The spike in demand for the versatile BrahMos, a missile co-produced by an India-Russia joint venture, comes as these nations choose to arm their defence forces amid China's expanding influence and assertive military posturing in the South China Sea and the western Pacific Ocean. China's expansionist behaviour is what could be driving the demand for the India-made BrahMos.

China's increasing aggressive territorial claims in the South China Sea based on its maritime Nine-Dash line, its militarisation of artificial islands, and its increasing naval presence and random attacks have created a sense of unease among the neighbouring states. Because of this, the BrahMos missile is a highly-sought-after asset for military forces of the littoral states of the South China Sea, and is emerging as the cornerstone of India's defence exports.

And by building up the muscles of these countries, India is, in a way, building its own muscles in the region, experts believe.

With its ability to be launched from land, sea, and air platforms, the BrahMos boasts a

range of approximately 290 kilometres and a speed of Mach 2.8, making it a missile of choice for defence forces. Add to that India's growing naval power and its stand for peace and security in the Indian Ocean Region and its extended neighbourhood.

For countries like the Philippines, Indonesia, Vietnam and Malaysia, which have had historical disputes with China over maritime territories, the BrahMos missile offers a credible deterrent. The missile's precision and speed make it an effective tool for defending against Chinese naval and land-based threats.

### **Brahmos is Helping Philippines Deal with China Threat**

The Philippines, which bought the coastal battery variants of the BrahMos, now "keeps the Chinese threat at least 300 km away" from its coastline, according to Captain DK Sharma (retired), a former spokesperson of the Indian Navy.

China's assertive behaviour on the high-seas is much like China's territorial claims on parts of Indian territories in Ladakh, Uttarakhand, Sikkim and Arunachal Pradesh. It has also claimed parts of Nepal and Bhutan. China's Nine-Dash line, an imaginary maritime line in the South China Sea, forms the basis of such claims. Through this, China claims multiple islands that are in contention with the territorial interests of these countries.

Between February 2023 and July 2024, the Philippines reported at least 12 instances of unsafe unprovoked military behaviour by

China, often within the waters of its exclusive economic zone (EEZ), according to a 2024 report by think-tank International Institute for Strategic Studies (IISS).

The Philippines, which has already received a consignment of BrahMos, is strengthening its military in the face of Chinese encroachment. The country's experience with Chinese aggression in the Scarborough Shoal and other disputed territories has shown the need for advanced weaponry to protect its sovereignty.

### **Indonesia Bolstering Arsenal with Brahmos**

Countries with BrahMos missiles would end up creating a security arc against China.

"Look at the terrain. The extent of the sea in which the BrahMos missiles exported by India would be deployed is vast. There's the Philippines in the centre. You have got Indonesia below, and above on the arc, you have got Vietnam," Captain DK Sharma (retired), former spokesperson of the Indian Navy told India Today TV.

Indonesia, in particular, has also been bolstering its military arsenal in response to China's growing presence in the South China Sea under the leadership of President Prabowo Subianto, who is likely to be India's chief guest for the Republic Day ceremony. It may be during this visit that both nations ink the deal. The potential deal for BrahMos missiles is seen as a strategic move to enhance Indonesia's defence capabilities, especially in light of the country's geographic vulnerability with its extensive archipelago.

"Under President Prabowo Subianto, there is perhaps an attempt to pick up the pace. Indonesia needs to have a very powerful maritime capability to assert itself as a powerful maritime nation," Commodore (retired) Anil Jai Singh told India Today TV.

"From Indonesia's perspective, as a strategically located nation, it provides a gateway between the Indian Ocean and the Pacific Ocean. All three chokepoints, Malacca, Sunda, and Lombok, are in Indonesian waters. China, in an attempt to push its footprint westwards, has been troubling Indonesia by encroaching on its special economic zone. As an archipelagic state, Indonesia has a huge SEZ, and it is very difficult for it to patrol its region the entire time," added Commodore Anil Jai Singh (retired).

### **In Brahmos Deals, India has Strategic Interest in Mind**

India's success in exporting the BrahMos missile is not only a testament to the technological and commercial prowess of its defence industry, but also reflects the country's growing role as a reliable partner in regional security. India sees the Indian Ocean region as its strategic backyard, and peace and stability in the extended region is its priority, under its SAGAR doctrine.

So, for India, BrahMos missile deals are much more than defence exports.

"By building up Indonesia's muscle, India is, in a way of speaking, also building up its own muscle in the region," senior fellow at think tank ORF Sushant Sareen told India Today TV.

"India is now looking to play the game as it needs to be played," he added.

The surge in demand for the BrahMos coincides with India's defence exports reaching an all-time high. From exporting defence equipment worth Rs 686 crore in FY 2013-14, India has made significant strides, achieving exports worth Rs 21,083 crore in FY 2023-24, according to Ministry of Defence data.

"India's 'Look East' policy evolved into 'Act East', and assertiveness is at play in this approach," said Commodore Anil Jai Singh (retired).

As India continues to expand its defence exports, including the sale of the BrahMos to friendly neighbours, it is likely to attract more countries seeking to counterbalance the influence of an assertive China. And in doing so, China and its posture is contributing to driving demand for the BrahMos.

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### **The Arrival of Heterogeneous Airpower**

*Peter Layton | 20 January 2025*

*Source: Real Clear Defense | <https://www.realcleardefense.com/articles/2025/01/20/the-arrival-of-heterogeneous-airpower-1085747.html>*

The U.S. Air Force just released a report on what it might look like in 25 years' time. It's big takeaway is that the uncertainties are too large for long term planning. That sounds a wise course as air power is transforming. Surprisingly, a major driver of this is what others have been doing in small and large

conflicts in the Ukraine and the Middle East.

A notable feature of air operations in the last couple of years has been the extraordinary variety of rocket, missile and drone systems used by Ukraine, Russia, Iran, Hezbollah, the Houthis, and Hamas. The large-scale combat employment of such systems has long-lasting implications.

First, air operations have now permanently shifted from being homogeneous in nature to being heterogeneous. Traditionally, air forces principally comprised crewed aircraft and their training and support structures. This model has now expanded, from when initially boost-glide, cruise and ballistic missiles were developed to more recently with the introduction of many different types of uncrewed air vehicles. Such air vehicles are increasingly undertaking a diverse array of functions including surveillance, strike, electronic support, and logistics.

The Ukraine War is an exemplar of this change and what options it now offers traditional air forces. When both the Russian and Ukrainian air forces suffered unsustainable attrition of their crewed aircraft and helicopters in the first few months of the conflict, they quickly transformed to field and operate heterogeneous force structures. If they had stuck to their traditional crewed aircraft force structure, they would have soon become irrelevant to the war.

Second, heterogeneous air power can be employed by states and non-states, big and small. Given the complexities inherent in such a diversity of users, it is improbable to stay well-informed about all those that may use such air power in the future. The difficulties in

doing this become apparent considering Israel missed Hamas's preparations for its air assault on the Gaza border barrier. Gaza had been under extensive air, ground, and sea surveillance for decades with much seen and yet seemingly not fully appreciated.

The alternative approach might be for air forces to become more agile in terms of organisation, doctrine, workforce mind-sets and skills, and technology. The intent would then be to accept the possibility of surprise but be able to nimbly adapt to new circumstances quickly and efficiently. This could be a hard ask. Air forces have often not been agile organisations, not the least because the long-term nature of their equipment with service lives of 30 years or more has not required it.

Third, the rise of heterogeneous air power opens many opportunities for innovation. Importantly, innovations in uncrewed systems are inherently simpler to achieve and generally much more affordable than for crewed air vehicles. However, rapid innovation cuts both ways. In Russia's Ukraine war newly developed drones have been made obsolete within a few weeks as kinetic and electronic counters are equally rapidly devised. The elements comprising heterogeneous air power may experience considerable churn. It is unlikely to be the "set and forget" form of air power that homogeneous air power with its long-life equipment is.

Fourth, heterogeneous air power is difficult to comprehensively defend against. Just counter-drone systems alone can include warning sensors, backpack and vehicle mounted electronic jammers, gun systems, hard-kill interceptors and laser blinding devices.

Heterogeneous air power can be matched by heterogeneous counters, but this is inherently a complicated and costly approach that involves many skilled personnel and diverts them from other tasks.

Ideally, defensive systems would be capable against multiple dissimilar air power elements. Generic counters to heterogeneous air power are required. This becomes ever more important given that such counters may need to be deployed tactically on the frontlines and deep in the homeland.

Fifth, Iran exports simplified missiles and drones to those with a limited capacity to manufacture, maintain and operate complicated equipment. This extends to designing equipment others can manufacture under relatively rudimentary conditions such as is done by Hezbollah in Lebanon. Being able to rapidly scale up air power to meet urgent strategic and tactical demands arguably requires adopting a similar simplifying philosophy and, if needs be, accepting a reduced operational performance. The alternative appears a strong likelihood of quickly exhausting the available complicated means of air power when war starts. Any air power is better than none. Iran's air power export strategy shows what can be done.

Sixth, Ukraine, Russia, Iran, Hezbollah, the Houthis, and Hamas have all conducted heterogeneous air operations but across wildly differing timelines, prompted by both choice and necessity. In building a nation's air power, the possibility of needing to engage in air operations across extended periods, possibly in a non-linear manner, needs to be included in force structure deliberations. On the other

hand, consideration could be given to ways to better shape the pace of the air operations to be of a length and intensity that is preferred.

Seventh, with all using heterogeneous air power to gain reach, perspective and responsiveness, all need to embrace the hider part of the hider/finder dictum. Ways to disperse military entities and some civilian capabilities into smaller and smaller elements where each presents a less attractive to target, together with measures to deceive, confuse and obfuscate hostile heterogeneous air power are needed, and in the near term.

Lastly, air forces as organisations will need to change as crewed aircraft start to share centre stage with glide bombs, cruise and ballistic missiles, surface-to-air missiles and countless type of drones. The air domain has always been a crowded place where all wish to be involved but the situation has expanded dramatically.

Air forces need to fit into a new era in which most can use air power albeit to varying degrees. Air forces may need to be comprehensively reimagined. Ukraine's new Unmanned Systems Forces branch and Russia's Unmanned Systems Forces appears harbingers of fundamental change not one-offs. The U.S. Air Force is arguably right to leave its options open for 2050.

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## Air Power

### Republic Day Parade: IAF fly-past Puts up a Stunning show at Kartavya Path

26 January 2025

Source: *Hindustan Times* | <https://www.hindustantimes.com/india-news/republic-day-parade-iaf-fly-past-puts-up-stunning-show-at-kartavya-path-watch-101737876961176.html>



*Republic Day 2025: Indian Air Force (IAF) fly past during Republic Day parade 2025 at Kartavya Path in Delhi. (ANI)*

The Indian Air Force (IAF) displayed a stunning fly-past on Sunday as part of India's official celebration of its 76th Republic Day at the grand parade on New Delhi's Kartavya Path. President Droupadi Murmu led the celebrations, accompanied by her Indonesian counterpart Prabowo Subianto and Prime Minister Narendra Modi.

During the Republic Day Parade, the IAF contingent comprising four officers and 144 personnel was led by Sqn Ldr Mahender Singh Garati, with Flt Lt Nepo Moirangthem, Flt Lt Damini Deshmukh & Fg Offr Abhinav Gorski being supernumerary officers. It was followed by a fly-past by three MiG-29 aircraft in 'Baaz Formation'.

The 'fly-past' was one of the most eagerly awaited parade events. The guests witnessed

a breathtaking air show by 40 aircraft/helicopters, including – 22 fighter jets, 11 transport aircraft and seven helicopters – IAF. These included Rafale, Su-30, Jaguar, C-130, C-295, C-17, AWACS, Dornier-228 & An-32 aircraft and Apache & Mi-17 helicopters.

They displayed a variety of formations, including Dhvaj, Ajay, Satluj, Rakshak, Arjan, Netra, Bheem, Amrit, Vajrang, Trishul, and Vijay. The concluding Vertical Charlie manoeuvre was performed by a Rafale fighter aircraft.

### Armed Forces Parade

All three branches of the Indian Armed Forces -Army, Navy, and Air Force—marched with their respective contingents during the parade to put on a colourful, synchronous show.

Lt Ahaan Kumar led the first Army contingent leading the Mounted Column of 61 Cavalry. The 61 Cavalry is the only serving active Horsed Cavalry Regiment in the world. Other army contingents in the parade were the Brigade of the Guards, The Jat Regiment, The Garhwal Rifles, The Mahar Regiment, The Jammu & Kashmir Rifles Regiment, and the Corps of Signals, among others.

The Indian Navy contingent, consisting of 144 personnel, was led by Lt Cdr Sahil Ahluwalia as Contingent Commander and Lt Cdr Indresh Choudhary, Lt Cdr Kajal Anil Bharani & Lt Devender as Platoon Commanders.

The armed forces also displayed a tri-services tableau for the first time. It displayed a battlefield scenario demonstrating synchronised operations in land, water, and air, reflecting the synergy in multi-domain operations.

The parade culminated with the national anthem and the release of tri-colour balloons carrying banners with the official logo depicting 75 years of enactment of the Constitution in English and Hindi, the official language of the union.

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## **IAF C-17 Executes Airdrop 2,600 km away to free Hijacked Ship**

*Vijay Mohan | 26 January 2025*

*Source: [Tribune India](https://www.tribuneindia.com/news/chandigarh/iaf-c-17-executes-airdrop-2600-km-away-to-free-hijacked-ship/) | <https://www.tribuneindia.com/news/chandigarh/iaf-c-17-executes-airdrop-2600-km-away-to-free-hijacked-ship/>*

In the spring of 2024, in a secret mission involving flying undeclared in foreign airspace 2,600 km away, the Indian Air Force C-17 heavy lift aircraft flew non-stop for 10 hours to carry out a precision drop of Navy commandos and their equipment to help free a merchant vessel seized by pirates in the Arabian Sea off the coast of Somalia in Africa.

The bulk carrier, MV Ruen, had been hijacked by Somali pirates near the Yemeni island of Socotra and was intercepted by the guided missile destroyer INS Kolkata, on anti-piracy patrol under the Navy's ongoing Operation Sankalp that was launched in 2019 to safeguard sea lanes.

The task to assist the Navy fell on No 81 Squadron, the 'Skylords', based at Hindon airbase near the Capital and the IAF's sole squadron operating the Boeing C-17 Globemaster III heavy lift aircraft that can airlift up to 77,000 kgs of cargo and has a ferry range of 11,000 kms. The mission was time

critical and secret, requiring careful planning and execution.

The aircraft was piloted by Wing Commander Akshay Saxena, commissioned into the Flying Branch in June 2006 and on the posted strength of the C-17 Squadron since February 2021. He has been conferred the Vayu Sena Medal for gallantry on the eve of the Republic Day.

On March 16, 2024, aircraft airdropped two Combat Rubberised Raiding Craft (CRRC) boats and a team of 18 Marine Commandos (MARCOs) with combat load to capture a pirate-controlled ship.

Pirates onboard the ship were not only launching attacks on merchant vessels in the Arabian Sea but had also fired at INS Kolkata and had shot down a naval spotter drone on March 15.

The objective area was near the Somalian coast, 2685 kms from Mumbai and about 1,000 kms outside the Indian Flight Information Region, that is the area in which Indian air traffic controllers exercise jurisdiction.

"The mission involved real threat of small arms with the pirates over and above the extended mission timelines which involved flying into airspace of another country undeclared and undetected for close to four hours," the citation for the award states.

The officer, as Captain of the C-17 aircraft, decided to switch off all emitters, fly low level over the high seas in foreign territory and make his drop at dusk to avoid detection. Even after

receiving the changed drop location only 90 kms prior to the original drop point, he guided the crew to safely execute a precision airdrop thus resulting in the capture of the pirates and rescue of MV Ruen with its 17-member crew.

The operation to rescue MV Ruen lasted 40 hours and was also supported by the Indian warship, INS Subhadra, Sea Guardian high-altitude long-endurance drones and the P-8I maritime patrol aircraft. The IAF had termed the mission as a remarkable display of jointness and integration, resulting in all 35 pirates being captured.

“Wing Commander Saxena displayed effective inter-service coordination with the Indian Navy while maintaining heightened situational awareness both on ground and in air. All possible measures were taken to maintain secrecy of the almost 10 hours long mission. During the flawless execution of the extremely gruelling mission the officer displayed exceptional courage, dynamic leadership, outstanding professionalism and steadfast determination,” the citation adds.

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## CATS Warrior: HAL Completes Key Test of Loyal Wingman for Deep-Strike Ops

*Bhaswar Kumar | 13 January 2025*

*Source: Business Standard | [https://www.business-standard.com/external-affairs-defence-security/news/cats-warrior-hal-completes-key-test-of-loyal-wingman-for-deep-strike-ops-125011300631\\_1.html](https://www.business-standard.com/external-affairs-defence-security/news/cats-warrior-hal-completes-key-test-of-loyal-wingman-for-deep-strike-ops-125011300631_1.html)*



*HAL's Combat Air Teaming System (CATS) programme reached a key milestone with the successful engine ground run of its full-scale demonstrator, the CATS-Warrior, on Saturday. (Photo: @HALHQBLR)*

Hindustan Aeronautics Limited (HAL) achieved a significant milestone in its flagship Combat Air Teaming System (CATS) programme with the successful completion of the engine ground run of a full-scale demonstrator, CATS-Warrior loyal wingman, on Saturday. HAL announced the achievement on its official X (formerly Twitter) handle, ahead of Aero India 2025, where the prototype is set to be unveiled.

India's biennial aerospace exhibition, Aero India, will take place at Yelahanka, Bengaluru, from February 10 to 14.

In a post, HAL highlighted the synergy between its research and development centres, noting that the Aircraft Research and Design

Centre (ARDC) handled the aircraft design and integration, the Strategic Electronics Research and Development Centre (SLRDC) provided the indigenous mission computer, and the Engine Division (AERDC) supplied the indigenous power plant. HAL's Chairman and Managing Director D K Sunil congratulated the team and urged them to ensure the aircraft's maiden flight at the earliest.

The CATS programme represents a leap in unmanned and manned combat aircraft systems and has been under development by the Bengaluru-headquartered defence public sector undertaking (DPSU) for several years. The system envisages the Tejas Light Combat Aircraft (LCA) as the "mothership" controlling a network of autonomous platforms, including the CATS-Warrior, which is a low-observable unmanned combat aerial vehicle (UCAV).

The development comes as the Indian Air Force's active squadrons have fallen to 31 against the authorised 42, amid an ageing fleet and delayed inductions. The CATS programme could help stabilise the IAF's combat capabilities and mitigate losses until more advanced jets, such as the Advanced Medium Combat Aircraft (AMCA) and Tejas Mk-II, become operational in the next decade.

## CATS Overview and Components

The primary goal is to create advanced aerial platforms that can serve as atmospheric satellites for high-altitude surveillance and conduct autonomous deep-penetration precision strikes from standoff distances, all while minimising risk to life. To achieve

these capabilities, HAL's CATS programme comprises multiple platforms, each tailored for specific roles in combat operations:

**CATS-Warrior:** A stealth UCAV designed to accompany manned fighter jets on missions as a loyal wingman platform. It can carry Smart Anti-Airfield Weapons (SAAWs) and Next-Generation Close Combat Missiles (NG CCMs) in internal weapon bays to enhance its strike and self-defence capabilities. These drones reportedly possess stealth features, making them difficult for enemy radars and air defence systems to detect. The Warrior drone can execute strikes after penetrating nearly 700 km into enemy territory.

**CATS-Hunter:** Likely to be an air-launched low-observable cruise missile capable of precision strikes deep inside enemy territory. HAL has reportedly indicated that this system will play a role similar to the SCALP missile integrated with the IAF's Rafale jets.

**ALFA-S Swarm Drones:** Released from a carrier pod mounted on the mothership, these swarm drones can perform air-to-ground and air-to-air missions, including neutralising enemy air defence systems. A Tejas aircraft can potentially carry three pods (12 drones), while a Su-30MKI can carry up to four pods (16 drones).

**CATS-Infinity Pseudo Satellite:** The Infinity is an ultra-high-altitude, solar-powered pseudo satellite designed to operate at an altitude of approximately 70,000 feet. With an endurance of 90 days, it bridges the surveillance gap between satellites and UAVs. Equipped

with advanced sensors and synthetic aperture radar, its primary role within the HAL CATS programme is to track targets in enemy territory and coordinate missions involving the CATS Warrior. The pseudo satellite can also support 4G and 5G services, strengthening military communication systems.

### Strategic Significance

HAL's CATS aims to advance India's self-reliance (Aatmanirbharta) in defence technology and bolster its indigenous defence manufacturing capabilities. The Warrior, Hunter, and ALFA-S drones will reduce the need for pilots to enter enemy airspace by executing high-risk missions autonomously.

The unveiling of the CATS-Warrior at Aero India 2025 will showcase India's progress in developing advanced combat aviation systems. HAL is collaborating with key research bodies, including the Defence Research and Development Organisation (DRDO) and private firms, to meet ambitious targets for CATS development by 2025.

The programme's long-term goals include deep-strike precision, improved battlefield awareness, and secure communications for enhanced operational efficiency.

In 2021, the DPSU offered a preview of its air-teaming intelligence and autonomous mission concept through the CATS simulator. During Aero India 2021, HAL presented the simulator, which utilised the TEJAS-MAX cockpit as the mothership platform. The display illustrated air-teaming capabilities, showcasing both fully integrated and autonomous wingman

platforms, along with drone swarming for mission operations. The setup also featured immersive mission visuals projected on a wide screen, complementing the command and display system at the TEJAS-MAX cockpit.

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## Indian Armed Forces Conclude Exercise 'Devil Strike' Successfully

20 January 2025

Source: *Business Standard* | [https://www.business-standard.com/external-affairs-defence-security/news/indian-armed-forces-conclude-exercise-devil-strike-successfully-125012000355\\_1.html](https://www.business-standard.com/external-affairs-defence-security/news/indian-armed-forces-conclude-exercise-devil-strike-successfully-125012000355_1.html)



*Key highlights of the exercise included the deployment of advanced technologies and state-of-the-art equipment. | Representative Image*

The Indian Armed Forces have successfully concluded Exercise Devil Strike, a high-intensity joint exercise held from 16 to 19 January.

This collaborative endeavour between the Indian Army's elite airborne troops and the Indian Air Force showcased seamless integration, operational excellence, and readiness to operate in the most challenging environments, according to an official press release.

Conducted across Training Areas and Firing

Ranges, the exercise focused on validating complex airborne operations, including precision insertion of troops and equipment into hostile terrains. It also tested and refined logistic sustenance strategies, ensuring troops remained operationally effective under extreme conditions.

Key highlights of the exercise included the deployment of advanced technologies and state-of-the-art equipment for precise and efficient delivery of forces to remote locations; execution of synchronized airborne drills that demonstrated unparalleled coordination between the Army and Air Force; and successful completion of mission scenarios simulating real-world operational challenges.

Lieutenant General Zubin A Minwala, AVSM, YSM, GOC 33 Corps who observed the exercise commended the participating units' professionalism and adaptability.

Speaking about the exercise, he remarked, "Exercise Devil Strike has once again demonstrated our Armed Forces' ability to adapt, innovate, and operate as a cohesive unit in diverse operational scenarios. It reflects our commitment to maintaining readiness for future challenges."

The exercise has significantly enhanced joint operational capabilities, reaffirming the Indian Armed Forces' preparedness to safeguard national interests and respond effectively to any emerging threat. Exercise Devil Strike is yet another milestone in the ongoing efforts to maintain operational excellence and ensure the nation's security, according to the press release.

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## Moscow's Air Defence Repels Ukrainian Drone Attacks

24 January 2025

*Source: Investing | <https://in.investing.com/news/world-news/moscows-air-defence-repels-ukrainian-drone-attacks-4628475>*

Moscow, Jan 24 (IANS) Moscow's air defence systems were actively engaged in repelling a wave of Ukrainian drone attacks in the early hours of Friday, Moscow Mayor Sergei Sobyenin wrote on his Telegram channel.

Drone attacks occurred in multiple locations surrounding Moscow, including the Kolomna and Ramensky urban districts, southeast of the capital, where air defence forces successfully intercepted the drones, Sobyenin wrote.

Preliminary reports indicate no significant damage or casualties from falling debris. Emergency response teams were immediately dispatched to the affected sites, he wrote.

In the Podolsk urban district, two additional drones were shot down by air defence systems as they approached Moscow. Russian forces also neutralized a drone in the Troitsky Administrative District and another in the Shchyolkovo urban district of Moscow, according to the mayor.

As a precautionary measure, temporary restrictions on aircraft arrivals and departures were imposed at Moscow's Vnukovo, Domodedovo and Zhukovsky airports.

Earlier this week, Andriy Kovalenko, head of the Centre for Countering Disinformation

at Ukraine's National Security and Defence Council claimed that Ukraine's military had attacked a Russian aviation plant in Smolensk region in western Russia.

Kovalenko said on Tuesday that the plant participates in the production of military aircraft, particularly Su-25 attack aircraft, and is also involved in the overhaul and maintenance of aviation equipment.

"This plant is closely connected to other enterprises of the Russian defence industry, supplying components or participating in cooperation to create modern aviation systems," he said.

Kovalenko did not disclose the means used in the attack.

Separately, drones have also attacked an oil depot in Russia's western Voronezh region, the Ukrayinska Pravda media outlet reported.

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## Space

### ISRO Successfully Docks SpaDeX Satellites in Space, Creates History

16 January 2025

Source: [Hindustan Times](https://www.hindustantimes.com/india-news/isro-successfully-docks-spadex-two-satellites-in-space-101737003035346.html) | <https://www.hindustantimes.com/india-news/isro-successfully-docks-spadex-two-satellites-in-space-101737003035346.html>



*SpaDeX satellites holding position at 15m. (X/@isro)*

The Indian Space Research Organisation (ISRO) on Thursday successfully completed the docking process of the SpaDeX satellites.

"India docked its name in space history! Good Morning India ISRO's SpaDeX mission accomplishes historic docking success. Proud to witness this moment!", ISRO said in a post on 'X'.

The historic moment came just days after the space agency, on January 12, brought the two spacecraft to three metres and then placed them back at a safe distance in its trial attempt to dock the satellites.

The Space Docking Experiment (SpaDeX) mission was successfully launched on December 30, 2024.

ISRO shared the docking process of the SpaDeX satellites in a post on X and said that

it begins with the completion of a manoeuvre from 15m to 3m hold point.

Then docking is initiated with precision, leading to a successful spacecraft capture. "Retraction completed smoothly, followed by rigidisation for stability. Docking successfully completed," it said.

Notably, India became the fourth country to achieve this successful space docking after the United States, Russia, and China.

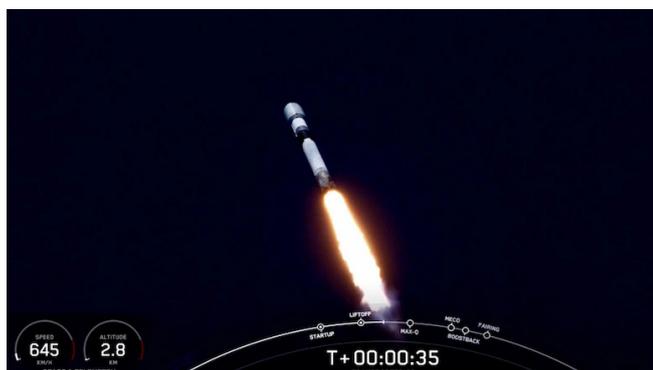
Post docking, the space agency said, the control of two satellites as a single object was also successful. "Undocking and power transfer checks to follow in coming days," it said in an update on the mission.

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## 'Fireflies' Light Up Sky as India Gets 1st Private Satellite Constellation

Pallava Bagla | 15 January 2025

Source: [NDTV | https://www.ndtv.com/india-news/fireflies-light-up-sky-as-india-gets-1st-private-satellite-constellation-7480109](https://www.ndtv.com/india-news/fireflies-light-up-sky-as-india-gets-1st-private-satellite-constellation-7480109)



Three satellites were placed in a sun-synchronous orbit at 550 km.

A Bengaluru-based space startup has made history by giving India the first private earth imaging satellite constellation. The constellation - 'Firefly' - has been developed by

Pixxel.

Pixxel - which has offices in India and the United States - was started in 2019 by Awais Ahmed and Kshitij Khandelwal while they were still studying at Birla Institute of Technology & Science, Pilani. They have already raised \$95 million, becoming one of India's satellite success stories.

Overnight, three 'Firefly' satellites were launched into 550-kilometre low Earth orbit, using a SpaceX Falcon-9 rocket from Vandenberg Space Force Base, California. Three more satellites will be launched later this year.

Congratulating Pixxel on this milestone, Dr Somanath, former Chairman of the Indian Space Research Organisation (ISRO) - under whose leadership new age space startups blossomed - told NDTV, "I hope that the impact of this hyperspectral imaging capability turns out to be a great boon to the sector".

Till now, all precision earth imaging satellites from India have been owned and operated by the Indian Space Research Organization (ISRO) which has about 52 different satellites in space. Lately, India's burgeoning private space sector has been increasingly giving competition to the government behemoth.

The space data company said these satellites are designed to deliver critical climate and Earth insights with unmatched precision, each satellite sets a new benchmark in hyperspectral imaging. With advanced spectral capabilities, near real-time data collection, and wide-ranging applications, the 'Firefly' constellation is poised

to revolutionise how we understand, interact with, and safeguard our planet's resources.

Praising the singular achievement Lieutenant General Anil Bhat (retired), Director General of the Indian Space Association (IspA), New Delhi, said, "Pixxel has found a unique niche by giving the world high-end imaging satellites which are a game changer for both monitoring Earth and defence applications". He also pointed out that today Pixxel is India's most well-funded space startup which took quick advantage of the opening up of the space sector by the Indian government in 2020.

In a statement, Pixxel said the 'Fireflies', currently the world's highest-resolution commercial-grade hyperspectral satellites, bring unprecedented precision to monitoring the planet and setting a new benchmark for hyperspectral imaging capabilities. With a five-meter resolution attained for the first time in a hyperspectral spacecraft, 'Fireflies' are six times sharper than the 30-meter standard of most existing hyperspectral satellites, capturing fine details previously invisible to conventional systems.

"The future of our planet depends on how deeply we understand it today. The successful deployment of our first commercial satellites is a defining moment for Pixxel and a giant leap toward redefining how we use space technology to address the planet's challenges," said Awais Ahmed, founder and CEO of Pixxel.

Pixxel's journey began in April 2022 with the historic launch of 'Shakuntala', India's first private Earth-imaging hyperspectral satellite,

aboard a SpaceX mission via Exolaunch, followed by 'Anand' on ISRO's PSLV.

These milestones catalysed India's private space ecosystem, proving that Indian companies could deliver cutting-edge technology on par with global leaders.

The 'Fireflies' built on this legacy, embodying years of indigenous research and development and engineering excellence and a vision to bring globally relevant and meaningful Earth insights from India.

The 'Firefly' constellation also marks a watershed moment in India's space journey as the nation's first commercial satellite constellation. These satellites surpass international standards in hyperspectral imaging, showcasing India's growing innovation and leadership in advanced space technology. They embody the spirit of "Make in India" and "Atmanirbharta" while highlighting the truly progressive impact of India's space reforms.

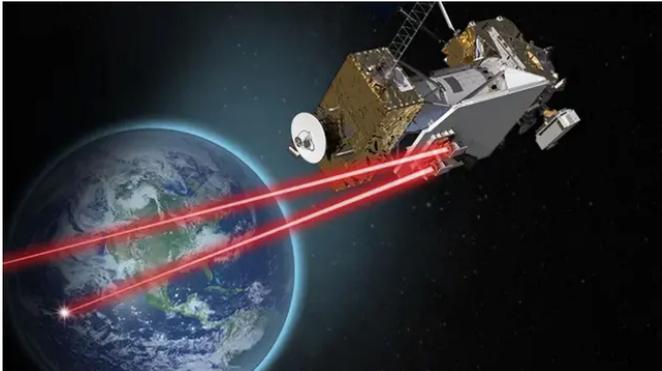
Kshitij Khandelwal, co-founder and chief technology officer (CTO) of Pixxel, said, "The ability of 'Firefly' to detect subtle changes in Earth's ecosystems will provide industries and governments with the precise information needed to address critical global challenges confidently."

Mr Ahmed told Reuters that it plans to add 18 more spacecraft to the six it has already developed, eyeing a share of the satellite imaging market projected to reach \$19 billion (roughly Rs 1,64,451 crore) by 2029.

## China Beats Starlink with 10X Faster 100 Gbps Space-Ground Laser Transmission

Mrigakshi Dixit | 02 January 2025

Source: [Interesting Engineering](https://interestingengineering.com/innovation/china-beats-starlink-with-laser-transmission?utm_source=facebook&utm_medium=article_post) | [https://interestingengineering.com/innovation/china-beats-starlink-with-laser-transmission?utm\\_source=facebook&utm\\_medium=article\\_post](https://interestingengineering.com/innovation/china-beats-starlink-with-laser-transmission?utm_source=facebook&utm_medium=article_post)



*Representational image: NASA's Laser Communications Relay Demonstration.*

The race to establish satellite-to-ground laser communications is heating up. Recently, China achieved a major milestone, which puts it ahead of Elon Musk's Starlink.

The nation successfully attained a 100 gigabit per second data transmission rate in satellite-to-ground laser communication. This unprecedented speed — ten times faster than their previous record — opens doors to a new era of space-based technologies.

Chang Guang Satellite Technology, the company behind the Jilin-1 constellation, accomplished this feat. Jilin-1 is reported to be the “world's largest sub-meter commercial remote sensing satellite network.”

As per South China Morning Post (SCMP), the data was transmitted between a mobile truck-based ground station and one of the 117

constellation satellites in Earth's orbit.

Interestingly, this advancement gives Chang Guang Satellite a lead over Starlink.

“Musk's Starlink has revealed its laser inter-satellite communication system but hasn't deployed laser satellite-to-ground communication yet. We think they might have the technology, but we've already started large-scale deployment,” Wang Hanghang, the company's head of laser communication ground station technology, told SCMP.

Hanghang added: “We plan to deploy these laser communication units across all satellites in the Jilin-1 constellation to improve their efficiency, with a goal of networking 300 satellites by 2027.”

### Truck-Based Mobile Ground Station

With technological advancement, satellites are getting smarter and better at capturing detailed information. However, sending all that data back to Earth using traditional methods is becoming a bottleneck.

Satellite communication, especially with lasers, is a more efficient and affordable solution.

For this reason, Chang Guang Company decided to focus on laser communication technology in 2020.

Chang Guang developed a compact laser communication terminal — roughly the size of a backpack — capable of transmitting data both between satellites and from space back to

Earth.

This advanced terminal was incorporated into the payload of a satellite (designated Jilin-1 02A02) launched in June 2023.

Since the ground station is mounted on a vehicle, it can be moved to avoid bad weather and turbulence, making the data transmission more reliable.

Multiple receiving stations will be established across China to improve remote sensing image data acquisition efficiency.

However, the achievement was not straightforward. For this achievement, the team overcame various technical hurdles, including atmospheric disturbances, the rapid movement of the satellite, and maintaining precise laser beam alignment.

### Rapid Progress in Laser Communication

In the last few years, the company made rapid progress in developing high-speed laser communication technologies — both for space-to-ground and inter-satellite data transmission.

For instance, the system had previously achieved a 10Gbps data transfer rate from space to Earth in October 2023.

SCMP stated this latest achievement of 100Gbps transmission rate is said to be equivalent to transmitting ten full-length movies within a “single second.”

This development in satellite-to-ground laser communication will significantly enhance China’s space capabilities. It will pave the way

for improved satellite infrastructure, including navigation, 6G internet, and remote sensing.

Other countries, like the US and France, are also actively working on this technology. For instance, NASA’s TBIRD system achieved a record-breaking 200Gbps transmission rate in 2023.

China’s progress in space lasers is a big deal in the global space race, and it will have a huge impact on the future of technology and how we communicate.

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### India Eyes Record Year for Space with 10 Planned Launches

*Andrew Jones | 03 January 2025*

*Source: [Space News | https://spacenews.com/india-eyes-record-year-for-space-with-10-planned-launches/](https://spacenews.com/india-eyes-record-year-for-space-with-10-planned-launches/)*



*An LVM-3 rocket carrying the Chandrayaan-3 spacecraft lifts off from Satish Dhawan Space Centre on July 14, 2023. Credit: ISRO*

HELSINKI — India’s space agency is planning 10 orbital launches in 2025 along with a debut commercial launch, potentially taking the country’s launch activity to double figures for the first time.

Indian Space Research Organisation (ISRO)

chairman S. Somanath told Indian media that 10 orbital launches are planned across the year, including four Geosynchronous Satellite Launch Vehicle (GSLV) launches, an LVM-3 and a human-rated LVM-3 launch for the Gaganyaan human spaceflight program, as well as three Polar Satellite Launch Vehicle (PSLV) missions and a launch of the SSLV solid rocket.

Among the highlights are the G1 mission for the Gaganyaan program, which is expected to launch no earlier than March. ISRO plans two further test missions, G2 and G3, before a first crewed flight, H1, no earlier than 2026.

India is aiming to become only the fourth country to develop independent human spaceflight capabilities. Beyond this, the country aims to construct the Bharatiya Antariksha Station (Indian Space Station) by 2035, and conduct a crewed moon landing by 2040. Notably, however, the G2 and G3 flights do not appear scheduled for this year. Meanwhile, the LVM-3 flight will carry BlueBird 6 for AST SpaceMobile.

A joint Earth science mission between NASA and ISRO, named NASA-ISRO Synthetic Aperture Radar (NISAR), is expected to launch around March on a GSLV rocket. The mission, which will map land and ice globally with L- and S-band radars, is delayed from 2024 due to a radar antenna issue.

The three other planned launches of the GSLV will respectively carry the NVS-02 navigation satellite, GISAT-02 remote sensing satellite and the IDRSS-01 communications satellite. The NVS-02 mission will be India's

first launch of the year, expected from the Satish Dhawan Space Centre around mid-January.

The activity represents an uptick in launch rate for the GSLV which will put a strain on capabilities. "Our ability to build a GSLV and launch is going to be challenging," S. Somanath told WION news Jan. 1.

A pair of PSLV launches will send the Anvesha satellite for the defense sector and ISRO's OceanSat-3 remote sensing satellite.

In addition, NewSpace India Limited (NSIL), the commercial arm of ISRO, will for the first time conduct its first PSLV launch. That mission is expected to carry the TDS-01 technology demonstration satellite.

Somanath noted that the targets require improvements in India. "As far as I am concerned, we need to ramp up further, primarily because of the industrial capability in India," S. Somanath said, adding that there are limitations in terms of manufacturing, testing of engines and making these in numbers.

"So we are looking at how we can ramp up by a little more investment, and also look at how the commercial models can be generated," S. Somanath said, including public-private partnerships.

In addition to ambitious government missions, the private sector is also stepping up, with Skyroot Aerospace planning its first Vikram-1 rocket launch. The rocket is a three-stage, solid-fueled rocket designed to lift 290 kg to a 500-km sun-synchronous orbit. India launched five times in 2024.

The most recent, Dec. 30, sent the SpaDeX docking demonstration spacecraft into orbit as part of its lunar sampling, space station and human spaceflight efforts. The pair are planned to execute docking early next week.

## China Launches Fourth Batch of Thousand Sails Mega Constellation Satellites

Andrew Jones | 23 January 2025

Source: *Space News* | <https://spacenews.com/china-launches-fourth-batch-of-thousand-sails-megaconstellation-satellites/>

Rocket	Mission Name	Payload	Purpose	Expected Launch
GSLV	NVS-02	Navigation satellite	Navigation	Mid-January 2025
GSLV	GISAT-02	Remote sensing satellite	Earth observation	2025
GSLV	IDRSS-01	Communication satellite	Inter-satellite communications	2025
GSLV	NISAR	NASA-ISRO Synthetic Aperture Radar	Earth science (collaboration with NASA)	Around March 2025
LVM-3	BlueBird 6	Satellite for AST SpaceMobile	Telecommunications	2025
Human-rated LVM-3	GI	Uncrewed test for Gaganyaan program	Human spaceflight preparation	No earlier than March 2025
PSLV	Anvesha	Satellite for defense sector	Defense	2025
PSLV	OceanSat-3	Remote sensing satellite	Earth observation	2025
PSLV	TDS-01	Technology demonstration satellite	Commercial launch by NSIL	2025
SSLV	Unnamed	Payload not specified	Various	2025
Vikram-I	Unnamed	Payload up to 290 kg to SSO	First orbital launch by Skyroot Aerospace	2025

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*A Long March 6A rocket lifts off from Taiyuan, Jan. 23, 2025, carrying 18 Qianfan satellites into polar orbit.*

*Credit: CASC*

HELSINKI — China launched the fourth batch of 18 satellites for the Thousand Sails megaconstellation early Thursday using a Long March 6A rocket.

The Long March 6A lifted off at 12:11 a.m. Eastern (0511 UTC) Jan. 23 from Taiyuan Satellite Launch Center in north China, carrying 18 Qianfan (Thousand Sails) Polar orbit group 6 satellites into orbit. The China Aerospace Science and Technology Corporation (CASC), which produced the launcher, confirmed launch success in a post-launch statement.

The 18 flat panel satellites are part of the Thousand Sails megaconstellation to provide low Earth orbit internet services. The project is led by Shanghai Spacecom Satellite Technology (SSST). The project is sometimes also referred to as Qianfan and G60 Starlink.

The launch followed earlier Thousand Sails/ Qianfan constellation satellite launches in August, October and December 2024.

There are now 72 Qianfan satellites in orbit. SSST, or Spacesail, plans to construct a constellation of 14,000 satellites, including having around 600 in orbit by the end of 2025. Spacesail has garnered substantial support, securing approximately \$943 million in funding in early 2024. Genesat, a satellite manufacturing subsidiary of Spacesai, secured \$137 million in funding in late December. The satellites launched today are thought to have been manufactured by the Shanghai Engineering Center for Microsatellites.

Of the three batches already in orbit, the first batch of 18 satellites have mostly raised their orbits from around 800 kilometers to around 1,060 kilometers in altitude, according to U.S. space tracking data. The second batch have so far performed little orbit raising, suggesting issues with the satellites. All satellites are in orbits inclined by 89 degrees.

CASC said it plans to launch more than 10 Long March 6A rockets this year. Last year it launched five; three of which were for Spacesail. Ten Long March 6A rockets have now been launched in total since its debut in 2022.

The Long March 6A, developed by SAST, is the first and so far only Chinese launcher to bundle a liquid propellant core stage with solid propellant side boosters. It is capable of launching 4,500 kilograms of payload to a 700-kilometer sun-synchronous orbit

The rocket has, despite successful launches, suffered apparent issues with its upper stage fragmenting. The upper stage for the launch which carried the first 18 Qianfan satellites broke up into a cloud suspected to number more than 700 pieces of orbital debris.

The first launch of satellites for another, state-owned Chinese megaconstellation, Guowang, took place mid-December.

The mission was China's fifth orbital launch attempt of 2025. It follows the launch of the Shijian-25 spacecraft servicing satellite Jan. 6, the sea launch of 10 navigation augmentation satellites Jan. 13, a remote sensing satellite for Pakistan and two smaller domestic satellites, and a Ceres-1 launch of five commercial satellites earlier this week.

CASC has yet to publish an overview of China's overall plans for the year, but it may once again attempt to reach around 100 launches, as targeted for 2024.

Major missions for 2025 include crewed Shenzhou-20 and -21 missions and Tianzhou cargo spacecraft to the Tiangong space station and the Tianwen-2 near-Earth asteroid sample return mission. The latter is expected to launch around May. China also aims to debut a number of new Long March and potentially reusable commercial rockets during 2025.

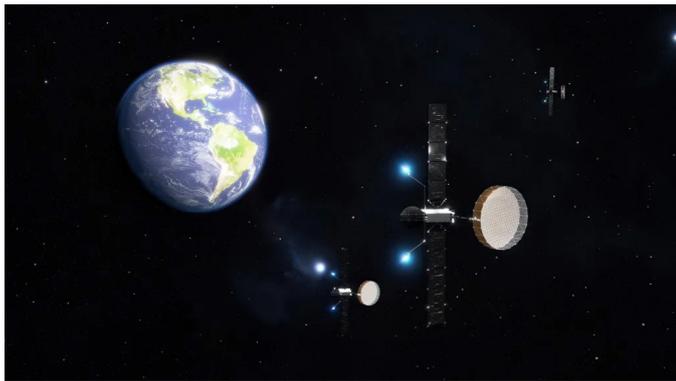
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## Global Aerospace Industry

### U.S. Space Force Forecasts \$2.3 Billion in Commercial Satellite Services Contracts

Sandra Erwin | 22 January 2025

Source: *Space News* | <https://spacenews.com/u-s-space-force-forecasts-2-3-billion-in-commercial-satellite-services-contracts/>



*Illustration of Astranis' next-generation small satellites for geostationary telecommunications services. Credit: Astranis*

WASHINGTON – The U.S. Space Force's Commercial Satellite Communications Office (CSCO) has announced contracting opportunities worth approximately \$2.3 billion for commercial satellite services over the coming year.

The procurement forecast, released in December, outlines major initiatives for fiscal years 2025 and 2026, with the centerpiece being a nearly \$900 million program focused on maneuverable satellites in geostationary orbit (GEO).

Clare Hopper, CSCO's director, said the forecast is intended to help prepare industry participants for upcoming Requests for Proposals (RFPs) and is subject to revision.

The largest opportunity, valued between \$895 million and \$905 million, is the so-called maneuverable geostationary Earth orbit (GEO) program. This initiative seeks to procure both satellite services and custom-built small GEO satellites designed for operations in geostationary orbit, approximately 36,000 kilometers above Earth.

Hopper emphasized the Space Force's intention to capture innovations from the burgeoning small GEO satellite sector. Weighing only a few hundred kilograms — compared to conventional GEO satellites that can weigh several tons — these satellites promise greater agility and lower cost.

The program represents a pivot toward agility in traditionally static GEO operations, Hopper noted. By utilizing maneuverable satellites, the Space Force can deploy a mix of communication services and potentially lease constellations.

In October, the CSCO issued a request for information to assess the small GEO sector's capabilities. Based on industry feedback, a draft solicitation for bids is anticipated in February, with contracts to be awarded later this year. It is expected to be a Indefinite Delivery/Indefinite Quantity (IDIQ) contract, allowing the Space Force to issue task orders for services and hardware on demand.

#### Army Satcom-as-a-Service

Another notable opportunity is the Army's Satcom as a Managed Service program, valued at \$195 million to \$205 million. This contract builds on a pilot program where commercial

providers Intelsat and SES demonstrated the feasibility of outsourcing satellite communications.

Under this model, private companies manage all aspects of satellite communication services, from hardware installation to network support, under subscription-based contracts.

The pilot informed the Army's procurement strategy, with a contract award expected this summer.

Speaking at a recent Via Satellite webinar, Hopper highlighted CSCO's growing role in integrating commercial satcom technologies into military operations. The office, she said, has received substantial investment to enhance its capabilities, including automation to improve collaboration with industry and government stakeholders.

"This Space Force is making significant investments in our office," Hopper said. The maneuverable GEO program, she added, exemplifies how "we're connecting the joint force to the commercial marketplace."

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## India, US push for Swift Closure of GE-414 Fighter Jet Engine Pact, Eyes March Deadline

22 January 2025

Source: [Economic Times | https://economictimes.indiatimes.com/news/defence/india-us-push-for-swift-closure-of-ge-414-fighter-jet-engine-pact-eyes-march-deadline/articleshow/117457512.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](https://economictimes.indiatimes.com/news/defence/india-us-push-for-swift-closure-of-ge-414-fighter-jet-engine-pact-eyes-march-deadline/articleshow/117457512.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)



A team from HAL is scheduled to visit the United States in the coming weeks to hold discussions with General Electric (GE) on the GE-414 engine deal. Defence officials have confirmed that the team will engage in detailed negotiations covering all aspects of the programme and work towards signing the deal by March.

The current negotiations involve the procurement of 99 engines, with potential expansion if the engine is selected for India's fifth-generation aircraft programme. "The level of transfer of technology promised by GE Aerospace is very high, and it will certainly help in boosting the capabilities of the country in this field," defence officials told ANI.

According to IDRW, GE has reportedly sought an additional \$50 million for the agreement, which increases the scope of Transfer of Technology (ToT) by 22% compared to the 2012 deal. The overall cost of the deal is estimated at around \$1 billion at 2023 price levels. HAL has established a Contract Negotiation Committee (CNC) to oversee the discussions and has requested specific technical documents from GE to assess the proposed ToT.

### **Challenges in Jet Engine Supply**

India has faced challenges due to delays in jet engine supply for its Light Combat Aircraft (LCA) Mark 1A and Mark 2 programmes. The delivery of GE-404 engines for the LCA Mark 1A fleet has been affected by global supply chain disruptions. Officials stated that delays in signing the GE-414 project could impact the induction of the LCA Mark 2, which is designed as a 4.5-generation aircraft to replace Mirage-2000, Jaguar, and MiG-29 fighter jets in the Indian Air Force.

### **Technological Advancement and Self-Reliance Efforts**

India is working towards achieving self-reliance in jet engine manufacturing by collaborating with global manufacturers. "India has now started working to develop an engine of its own and may be aligning with a global manufacturer soon in this regard," sources told India Today TV. The proposed ToT from GE is expected to significantly enhance India's indigenous capabilities in jet engine production.

### **Global Jet Engine Market and India's Position**

Currently, only a few countries, such as the US, France, the UK, and Russia, possess the capability to manufacture jet engines. Most fighter aircraft worldwide rely on engines from American, Russian, or European manufacturers. India aims to reduce dependency on foreign suppliers through strategic partnerships and technology acquisition.

### **Financial and Market Impact**

Despite ongoing negotiations, HAL shares traded 0.85% lower at ₹4,151.80 on Tuesday. The stock has remained flat on a year-to-date basis. Market analysts are closely watching the progress of the deal, given its potential impact on HAL's financial performance and India's defence sector.

The finalisation of the GE-414 engine deal is critical for India's defence modernisation plans. Successful completion by March will be key to ensuring timely production of indigenous fighter aircraft and enhancing national security capabilities.

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## Israel Set to Receive 25 F-15 I Fighters by 2031

Maya Carlin | 24 January 2025

Source: [National Interest](https://nationalinterest.org/blog/buzz/israel-set-to-receive-25-f-15i-fighters-by-2031/) | <https://nationalinterest.org/blog/buzz/israel-set-to-receive-25-f-15i-fighters-by-2031/>



Israel's initial procurement of the F-15I fighter occurred in the late 1990s, following lessons learned from the Gulf War.

With the Israeli-Hamas ceasefire in place, Iran's regional proxy groups are allegedly following suit with the aim to deescalate. The Yemen-based Houthi rebels signaled this week that they will direct future attacks to only Israeli-affiliated vessels in the Red Sea. For over two years, the Iranian-backed militant group has increased its barrages in this critical waterway, nearly halving all commercial traffic through this region. The Houthis' ability to disrupt the global economy on such a large scale is perhaps the group's greatest asset. However, if the Yemen-based group continues to target Israeli ships, retaliatory strikes will undoubtedly follow. Considering the strength and formidability of the Israeli Air Force (IAF), Houthi military sites and other assets in Yemen will make relatively easy targets. In fact, Israel's aerial might will only improve as the Jewish state recently penned a whopping \$5 billion deal to acquire an additional twenty-five F-15 fighters beginning in 2031.

The deal, signed by Israel's Defense

Ministry, includes twenty-five Boeing F-15IA fighter jets with options for an additional twenty-five. As Israel's specialized variant of the advanced F-15EX, these "Ra'am" fighters are often overshadowed by the fifth-generation F-35I Adir. Although the F-15I does not possess the F-35's stealth, the platform offers greater range which makes it essential for long-range strikes and air superiority missions. "Boeing takes pride in its longstanding partnership with Israel, a relationship that dates back to our nation's establishment," president of Boeing Israel Maj Gen (Retd) Ido Nehushtan noted. "The company will continue working with the U.S. and Israeli governments to deliver the advanced F-15IA aircraft through standard military procurement channels."

Israel's initial procurement of the F-15I fighter occurred in the late 1990s, following lessons learned from the Gulf War. Israel's ability to carry out long-range strike operations became apparent at this time, as many of the SCUD ballistic missiles that were launched by Iraq toward Israel were not intercepted. The Ra'am, equipped with specially modified features, was designed to suit the unique security needs of Israel. Specifically, the IAF version possesses more advanced weapons, avionics, communication capabilities, and electronic warfare systems than the original Eagle which was crafted to function as a pure air-to-air fighter.

### What makes the F-15I special?

Since the F-15I is directly linked to the Strike Eagle, the Ra'am platform fighters appear nearly identical to their American counterparts. Similarly, the two crew

members sit in tandem, and the twin-engine arrangement is side-by-side. Additionally, the wing mainplanes have swept-lines along their leading edges and vertical planes are used for ground running. The F-15I's two Pratt & Whitney F100-PW series afterburning turbofan engines enable the jet to fly at speeds greater than Mach 2.

Based on these specs and capabilities and the Ra'am's stellar service history within the IAF, Israel's desire to procure additional fighters makes sense. In October, the IAF launched airstrikes in Iran targeting military assets in retaliation for the barrage of ballistic missiles fired upon Israel previously. Two months later, the IAF struck Houthi sites in Yemen in Sanaa and Hodeida. As the Houthis continue to launch frequent barrages targeting Israel, the IAF's F-15 fleet will certainly be put to good use.

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## India Joins €7.1 bn Eurodrone as Observer. Here's what 4-Nation Programme is all about

Prateek Shukla | 04 November 2024

[Source: The Print | https://theprint.in/defence/india-joins-e7-1-bn-eurodrone-as-observer-heres-what-4-nation-programme-is-all-about/2457345/](https://theprint.in/defence/india-joins-e7-1-bn-eurodrone-as-observer-heres-what-4-nation-programme-is-all-about/2457345/)



*Eurodrone | Wikimedia Commons*

New Delhi: India has, as an observer state, officially joined the Medium Altitude Long

Endurance Remotely Piloted Aircraft System (MALE RPAS) or Eurodrone programme, managed by the Bonn-based Organisation for Joint Armament Cooperation (OCCAR) and led by Taufkirchen-based aerospace company Airbus Defence and Space.

A formal request to join the programme was made in August 2024, with acceptance coming just days before Aero India 2025 in Bangalore, Asia's largest military aviation exhibition.

Eurodrone is a four-nation initiative involving Germany, France, Italy, and Spain. The programme, led by Airbus Defence and Space (Germany), includes Leonardo (Italy), Dassault Aviation (France), and Airbus (Spain) as major subcontractors.

“This move demonstrates India's willingness to explore collaborative opportunities on shared interests with Europe,” OCCAR said in a statement.

OCCAR-executive administration director Joachim Sucker has handed over the letter of approval (LoA) to Ajit Gupte, India's ambassador to Germany.

India follows Japan, which became the first official OCCAR observer state in the MALE RPAS (Eurodrone) programme in November 2023.

### All about Eurodrone

The Eurodrone is a remotely piloted aircraft system (RPAS) designed for long-endurance missions such as intelligence, surveillance,

target acquisition, and reconnaissance (ISTAR), maritime surveillance, anti-submarine warfare, and airborne early warning.

Conceived as a “European Programme for European Sovereignty,” the initiative was founded in 2022 and passed its preliminary design review (PDR) in 2024. The drones are expected to enter service by 2030. Eurodrone is the first RPAS designed for “safe and reliable flight in non-segregated airspace,” according to Airbus.

With a maximum mission payload of 2.3 tonnes and an endurance period—maximum time an aircraft can stay in the air using a single load of fuel—of up to 40 hours, the drone offers superior capabilities compared to other existing remotely piloted aircraft systems.

Equipped with a twin-engine configuration, the drone is designed for operations in diverse environments, including severe weather conditions. Airbus says it prioritises the platform’s sovereignty over operations and data management, ensuring exclusive and confidential data handling through secure connectivity between the aircraft and the user’s network.

India’s participation in Eurodrone builds on past collaborative efforts. Previously, India joined Russia’s Su-57 fighter programme but withdrew in 2018. In October last year, India signed a contract with the US for 31 Predator drones and continues to pursue indigenous Unmanned Aerial Vehicle (UAV) projects like Tapas and Rustom, though progress has been slow.

Becoming a full-time Eurodrone observer will require India to bear costs for technical expertise. This partnership is expected to enhance defence cooperation with Europe, complementing projects such as the C-295 aircraft manufactured by Tata and Airbus in India, the Rafale M purchase for naval operations, and the expected contract for additional Scorpené-class submarines.

The Eurodrone programme is part of Europe’s collective defence strategy, reducing reliance on US and Israeli platforms such as the Reaper and Heron drones, respectively. Valued at €7.1 billion, the programme aims to develop, produce, and support 20 systems, each comprising three UAVs and two ground stations.

Other European collaborative defence projects include the Eurofighter jet, the European Patrol Corvette (EPC) for navies, and the Future Combat Air System (FCAS), which seeks to create next-generation fighter jets.

The first Eurodrone flight is scheduled for 2026, with initial deliveries expected by 2028. As European nations continue to pool resources for defence innovation, India’s involvement signals a strategic step in strengthening ties and advancing its own defence capabilities.

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## India's Aerospace Industry

### DRDO Successfully Conducts Scramjet Engine Ground Test for Hypersonic Missiles

Sushant Kulkarni | 23 January 2025

Source: [New India Express](https://indianexpress.com/article/cities/pune/drdo-successfully-conducts-scramjet-engine-ground-test-for-hypersonic-missiles-9793963/) | <https://indianexpress.com/article/cities/pune/drdo-successfully-conducts-scramjet-engine-ground-test-for-hypersonic-missiles-9793963/>



*The MoD said the ground test of the scramjet combustor showcased several notable achievements, demonstrating its potential for operational use in hypersonic vehicles, like successful ignition and stable combustion. Officials said the ignition in a scramjet engine is like 'keeping a candle lit in a hurricane'.*

Amid a global race to develop hypersonic munitions, the Defence Research and Development Organisation (DRDO) recently demonstrated a cutting-edge “active cooled scramjet combustor ground test” for 120 seconds for the first time in India. The successful ground test marks a crucial milestone in developing next-generation hypersonic missiles, the Ministry of Defence (MoD) said.

The Defence Research and Development Laboratory (DRDL), a Hyderabad-based facility of DRDO, has been working on

development of a long-duration supersonic combustion ramjet or scramjet-powered hypersonic technology.

Hypersonic missiles are a class of advanced weaponry that travel at speeds greater than ‘Mach 5’, or more than five times the speed of sound. These advanced weapons have the potential to beat existing Air Defence Systems of major military powers across the world and deliver rapid and high-impact strikes. Several nations including the US, Russia, India and China are actively pursuing hypersonic technology and have demonstrated various levels of development.

The key to hypersonic vehicles is scramjets, which are variants of a category of jet engines called the air breathing engines. The ability of the engines to handle airflows at speeds in multiples of speed of sound without using any moving parts gives them the capability of operating at those speeds.

The MoD said the ground test of the scramjet combustor showcased several notable achievements, demonstrating its potential for operational use in hypersonic vehicles, like successful ignition and stable combustion. Officials said the ignition in a scramjet engine is like ‘keeping a candle lit in a hurricane’.

Scramjet combustor incorporates an innovative flame stabilisation technique that holds continuous flame inside the combustor with air speeds more than 1.5 km per second. Many novel and promising ignition and flame-holding techniques were studied by the DRDO

scientists over multiple ground tests before arriving at the scramjet engine configuration. Advanced Computational Fluid Dynamics (CFD) simulation tools were used for their evaluation and performance prediction.

“The indigenous development of endothermic scramjet fuel, the first time in India, jointly by DRDL and industry partners is central to this breakthrough. The fuel offers dual benefits of significant cooling improvement and ease of ignition. The team developed a special manufacturing process to achieve stringent fuel requirements of DRDL at industrial scale,” the MoD said.

Another key achievement is the development of Thermal Barrier Coating (TBC), which is designed to withstand extreme temperatures encountered during hypersonic flight. A new advanced ceramic TBC having high thermal resistance and capable of operating beyond melting point of steel has been jointly developed by DRDL and Department of Science and Technology (DST) facilities. The coating is applied inside the scramjet engine using special deposition methods that enhance their performance and longevity.

“With demonstrated capabilities in stable combustion, enhanced performance and advanced thermal management, this breakthrough sets the stage for next generation hypersonic missiles. Raksha Mantri Rajnath Singh has complimented DRDO and the industry for the successful scramjet engine ground test,” the MoD said.

Earlier in September 2020, in another major milestone in India’s hypersonic technology development, the DRDO had successfully flight-tested the Hypersonic Technology Demonstrator Vehicle (HSTDV). In this test, the hypersonic cruise vehicle was launched using a solid rocket motor, which took it to an altitude of 30 km, where the aerodynamic heat shields were separated at hypersonic Mach number. The hypersonic combustion sustained and the cruise vehicle continued on its desired flight path at hypersonic speed for more than 20 seconds.

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## HAL Plans a Fourth Assembly Line for Tejas Jets at Nashik to make up for the Delivery Delay

Kalyan Ray | 10 January 2025

Source: *Deccan Herald* | <https://www.deccanherald.com/india/hal-plans-fourth-assembly-line-for-tejas-jets-to-make-up-for-delivery-delay-3349987>



LCA Tejas at HAL Airport, Bengaluru Credit: DH File Photo/Pushkar V

Aiming to accelerate the production of Tejas LCA, Hindustan Aeronautics Limited plans a fourth assembly line for manufacturing the home-grown fighter jet to make up for the lost time once General Electric starts supplying the engines, top sources told DH.

The failure of United States to deliver the F-404 engines for Tejas Mk-1 is the reason for HAL not being able to start the production of the combat aircraft for the Indian Air Force, which is struggling with depleting squadron numbers.

“GE currently has a backlog of 26 engines, but the company said it would deliver the first one by March and subsequently ramp up the production,” sources said here.

HAL has two LCA assembly lines in Bengaluru with a capacity of producing eight aircraft each. It also has a third facility at Nashik that also has the capacity of making eight aircrafts annually. The first LCA Tejas from the Nashik plant is likely to roll out by March.

The aviation major is now planning a second assembly line at Nashik, but it will come up only after the supply of engines from GE becomes regular. The company will need 1.5 years to establish the new facility.

The Defence Ministry in 2021 signed an agreement with the HAL to supply 83 LCATEjas Mk-1 – 73 fighters and 10 trainers – to the IAF at a cost of Rs 45,696 crores. For these aircraft, GE was to supply 99 engines.

While the US company claims "supply-side constraints" for its failure to deliver the engines in time, Defence Minister Rajnath Singh took up the issue with his US counterpart in his last visit. Indian officials also held a number of meetings with their US counterparts to resolve the crisis.

The stalemate in LCA production comes at a time when the number of IAF fighter squadrons is going down.

As against the sanctioned 42 squadrons of fighter jets, the IAF currently has 31 squadrons, but the strength will dip further this year with the phasing out of the last two squadrons of MiG-21s. Also the two squadrons of first generation Tejas LCA are used primarily for training.

Earlier this week, Air Chief Marshal AP Singh said the IAF didn't receive even the first batch of all the 40 Tejas LCA though the first one was inducted way back in 2016. HAL has supplied 38 aircraft so far and the last two trainers will be delivered shortly.

From the existing stock of reserve engines, HAL has produced the first LCA Mk-1A while the second one is on the assembly line. The first LCA Mk-1A is now flying for various trials and is likely to fly in the upcoming Aero India 2025.

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## Safran Leads Race to Partner with India on 6th Gen Engine for AMCA Project, Rolls-Royce and GE also Contend, 100% ToT Key

Jaydeep Gupta | 11 January 2025

[Source: Defence.in | https://defence.in/threads/safran-leads-race-to-partner-with-india-on-6th-gen-engine-for-amca-project-rolls-royce-and-ge-also-contend-100-tot-key.8198/](https://defence.in/threads/safran-leads-race-to-partner-with-india-on-6th-gen-engine-for-amca-project-rolls-royce-and-ge-also-contend-100-tot-key.8198/)



India's ambitious Advanced Medium Combat Aircraft (AMCA) program is gaining momentum with the anticipated finalization of a contract for the joint development of a 6th generation jet engine.

While French aerospace giant Safran appears to be the frontrunner in this high-stakes collaboration, Rolls-Royce from the UK and General Electric (GE) from the US remain strong contenders.

This collaborative project is estimated to cost around \$5 billion, a significant investment that will not only fund the engine's development but also establish a local production line in India. The funds will be used to create prototypes and support extensive ground and in-flight testing, ensuring the engine meets the demanding requirements of modern combat aircraft.

The ambitious timeline aims to have the engine ready for production by 2032-33.

Before that, three engines will be specifically developed for rigorous ground testing to identify and resolve any technical issues before proceeding to in-flight testing.

A crucial aspect of this partnership is the commitment to 100% Transfer of Technology (ToT) and the establishment of production facilities within India. This ensures that every component of the engine can be manufactured locally, aligning with India's "Make in India" initiative and its pursuit of self-reliance in defence technology.

While specific details remain confidential, the engine is expected to incorporate cutting-edge technologies, potentially including variable cycle capabilities. This would allow for optimal performance across different flight regimes, from subsonic to supersonic speeds, and enhance fuel efficiency.

Safran's potential selection as the partner for this project highlights the growing defence cooperation between India and France. However, with Rolls-Royce and GE also in contention, the final decision will likely depend on various factors, including technological capabilities, cost-effectiveness, and the level of commitment to technology transfer and local production.

The development of a 6th generation engine for the AMCA is a crucial step towards India's goal of fielding a truly indigenous fifth-generation fighter aircraft. This project not only strengthens India's defence capabilities but also positions it as a key player in the global aerospace industry.

## **DG Propulsion Successfully Tests Indigenous DG J40 Micro Jet Engine with 40 kgf Thrust, Designed for UAVs and Future Jetpacks**

*Manav Rastogi | 10 January 2025*

*Source: Defence.in | <https://defence.in/threads/dg-propulsion-successfully-tests-indigenous-dg-j40-micro-jet-engine-with-40-kgf-thrust-designed-for-uavs-and-future-jetpacks.12234/>*



Delhi-based DG Propulsion Private Limited (DPPL) has achieved a significant milestone in India's aerospace sector with the successful vertical test run of its indigenously developed DG J40 micro jet engine.

This achievement highlights India's growing prowess in aerospace technology and sets the stage for exciting future applications, including manned jetpack systems.

Designed for unmanned aerial vehicles (UAVs) and defence applications, the DG J40 boasts a thrust capacity of up to 40 kgf, making it the most powerful engine in DPPL's current lineup.

The rigorous vertical test run pushed the engine through various operational challenges, including fluctuating throttle settings and rapid RPM changes, confirming its reliability and potential for diverse applications.

DG Propulsion's vision extends beyond UAVs. The company has boldly announced plans to utilize this technology for developing a manned jetpack system. This ambitious goal could revolutionize personal mobility and military operations, offering a new dimension of aerial maneuverability.

Their approach involves integrating four DG J40 engines into a jetpack design to generate sufficient thrust for human flight. This could open up exciting possibilities for emergency services, military tactics, and even civilian adventure sports, though significant challenges remain in terms of safety, control, and regulatory approvals.

This successful test demonstrates DG Propulsion's technical expertise and ambition to push the boundaries of aerospace technology. Prateek Dhawan, the company's director, expressed optimism about the future, emphasizing that this is just the beginning of a new era for Indian aerospace innovation.

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## IAF Chief Expresses Frustration with the Sluggish Pace of Tejas Production. ‘Tech Delayed is Tech Denied’

Smruti Deshpande | 07 January 2025

[Source: The Print | https://theprint.in/defence/iaf-chief-expresses-frustration-with-sluggish-pace-of-tejas-production-tech-delayed-is-tech-denied/2435334/](https://theprint.in/defence/iaf-chief-expresses-frustration-with-sluggish-pace-of-tejas-production-tech-delayed-is-tech-denied/2435334/)



File photo of Chief of the Air Staff (CAS) Air Chief Marshal A.P. Singh | ANI

New Delhi: In a scathing remark on the snail-paced delivery of Tejas fighters by state-run Hindustan Aeronautics Limited (HAL), Indian Air Force (IAF) chief Air Chief Marshal A.P. Singh said Tuesday that “technology delayed is technology denied”. He lamented that the HAL has yet to deliver the first 40 Tejas fighters, deliveries of which started in 2016.

He called for advanced manufacturing processes and the need to rope in private players, saying fear of losing orders should be the norm.

“Production agencies have to invest in their advanced manufacturing processes so that the speed can increase. Upskilling their manpower and whatever they do, the scale of the production has to go up. Tejas, we started inducting in 2016,” he said, adding that the history of Tejas

should be seen from 1984 onwards when the aircraft was conceived.

“First aircraft flew in 2001—17 years. Then, the induction started another 15 years later—2016. Today, we are in 2024, I do not have the first 40 aircraft also. This is the production capability. We need to do something. I am very convinced that we need to get some private players in. We need to have competition. We need to have multiple sources available so that people are wary of losing their orders. Otherwise, things will not change,” he said.

The Chief of the Air Staff also said increased militarisation by China and Pakistan on the borders was a security concern for India, as he highlighted India’s level of preparedness.

Singh said the world was in a precarious position today, dominated by conflicts and contests. India, he added, had its own concerns on the western and northern borders due to heightened militarisation by the neighbours. “China is investing heavily in its air force, the recent unveiling of its new stealth aircraft is a case in point,” he said, referring to the sixth-generation fighter presented by China on 26 December.

India is still focused on its fifth-generation fighter program, the Advanced Medium Combat Aircraft (AMCA), a programme which is still under the design and development stage.

China has nicknamed its fighter aircraft the “White Elephant”, also known as J-36.

Speaking at the 21st Subroto Mukerjee Seminar, Singh added if India’s vision was to

be a developed nation by 2047, “to find a place in the world,” the aerospace sector would be a major contributor towards that goal.

The IAF chief talked about atmanirbharta (self-reliance) and how the force had given it a push, but warned that “R&D (research and development) loses its relevance in case it is not able to meet time-lines. Technology delayed is technology denied”.

The force, for some time now, has faced delays in delivery of Light Combat Aircraft (LCA) Mk1A. This is due to delays in the supply of General Electric-manufactured F-404 engines.

The hold-up in manufacturing of the aircraft comes at a time when the IAF is suffering from depletion of fighter squadrons. It requires 42 squadrons, but only has 30.

Singh added there had to be an increased aptitude for acceptance of risks involved and the failures of R&D. “There is an amount of risk inherent to R&D, and we should absorb it to a certain degree. A greater leeway should be available to researchers, there may be failures, what is important is that we learn from them and move on.”

He said atmanirbharta would come at a cost and that everyone should accept it. “We may have to spend more and buy at a higher rate if required, amortising the R&D part and limited numbers will push the cost up, but will give the much-needed self-reliance.”

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## NAL, HAL want Govt to Expedite Full Scale Development of Indigenous Passenger Aircraft

*Dev Kachari | 28 January 2025*

*Source: Infra | <http://infra.economictimes.indiatimes.com/news/aviation/nal-hal-want-govt-to-expedite-full-scale-development-of-indigenous-passenger-aircraft/117541917>*



*Representational Image*

NEW DELHI: Country's foremost stakeholders engaged in the designing and manufacturing of civilian aircraft want the government to give them the green signal for full scale engineering, development and manufacturing of indigenous regional transport aircraft as early as possible.

According to a senior official engaged in the programmes related to domestic manufacturing of civilian passenger aircraft, both the National Aerospace Laboratories (NAL) and Hindustan Aeronautics Ltd (HAL), want the government to approve the development of a 70-90 seater Regional Transport Aircraft or RTA, with the requisite financial support.

"The Ministry of Civil Aviation has now conceptualised two Special Purpose Vehicles (SPV), SPV1 and SPV2. SPV1 will comprise stakeholders from the aviation ecosystem who will bring in their expertise and knowledge with regard to manufacturing of civilian aircraft. SPV 2, which will include entities such as NAL and HAL will be entrusted with the full scale

engineering and development of the Regional Transport Aircraft," said the official to ET Infra.

"The current thought process within the ministry is to first form SPV1 and then after a few years form SPV 2, to be followed by full scale engineering work on the RTA. NAL and HAL want the full scale engineering work envisaged under SPV 2 to begin alongside SPV1 as the programme has already been delayed and there is no point of deferring it any further with neighbouring countries such as China already way ahead in their civil aircraft programmes," the official said.

Currently, the Ministry of Civil Aviation is yet to form SPV1 and invite the relevant stakeholders. When eventually formed, SPV1 is expected to have participation of players such as Larsen & Toubro, Dynamatic Technologies, Tata Group, among others.

Civil Aviation Minister Kinjarapu Ram Mohan Naidu at an industry event in September had revealed that the government is in the process of creating a SPV comprising senior officials from the aviation ministry, members of the industry and aviation experts, which will work on the creation of an ecosystem to facilitate manufacturing of an indigenous passenger aircraft.

### **Funding RTA Programme**

It is estimated that for NAL to undertake clean sheet design and development of a 70-90 seater civilian passenger aircraft, a funding of about \$2 billion will be required. NAL, established under the Council of Scientific and Industrial Research, is the principal organisation

tasked with the responsibility for designing and developing civilian aircraft in the country.

"There is still no clarity on the funding for the programme. Without the funding much of the research and engineering development associated with the programme cannot be started," the official said.

NAL was earlier pursuing adopting a derivative design, by co-partnering with a foreign entity and undertaking joint development but that endeavour has not met with any success so far.

"NAL tried to engage with other entities wherein the organisation was looking for partnership and adopt a derivative aircraft design but that has not happened so far," said the official. If developed from a proven design, the cost of research and development could substantially come down.

The official insisted that for India to make a mark in the development of civilian passenger aircraft, design and associated research and development must be undertaken in-house.

Civil Aviation Minister Naidu while disclosing the formation of the SPV in September had outlined that global aerospace majors such as Boeing and Airbus also have a strong inclination to partner with India for the development of an indigenous civilian passenger aircraft. However, the official stated that it is not in the interest of foreign origin aircraft manufacturers to help India in the development of a civilian passenger aircraft as it would threaten their own commercial interest in India's civil aviation market.

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*“The term ‘Aerospace’ was introduced in 1958 by the USAF Chief of Staff, General Thomas D White, as a new construct that depicted air and space as a seamless continuum stretching from the Earth’s surface to infinity.”*



The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Vice Marshal Anil Golani (Retd).

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