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**ISRO Unveils Vital Facilities for Solid Motor Advancement**



**Argentinian Defence Minister Visits HAL. LoI Signed on Co-operation for Light and Medium Utility Helicopters for the Armed Forces of Argentina**



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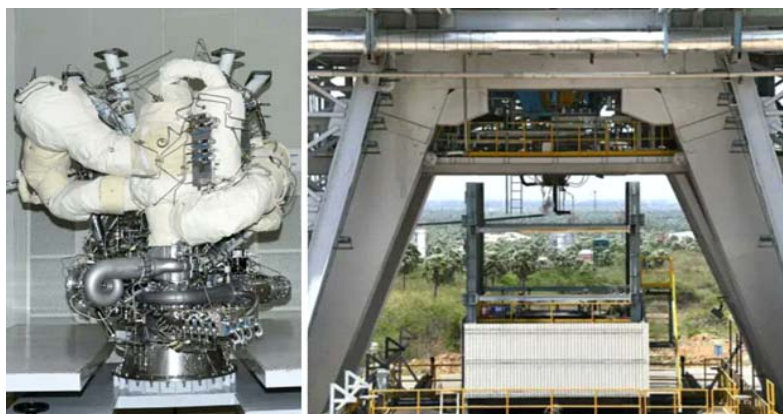
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## First hot test of the Semi-cryogenic engine conducted at IPRC, Mahendragiri



On July 1, 2023, ISRO conducted the first hot test on an intermediate configuration of the Semi-cryogenic Engine, known as Power Head Test Article (PHTA) at ISRO Propulsion Complex (IPRC), Mahendragiri, Tamil Nadu. The test was conducted towards developing a 2000 kN thrust semi-cryogenic engine to power the booster stages of future launch vehicles. The objective of the test was to validate the integrated performance of the critical subsystems such as the gas generator, turbo pumps, pre-burner and control components by carrying out a hot-firing for a short-duration of 4.5 s. The ignition and generation of hot-gas within the pre-burner chamber that drives the main turbine to drive the fuel and oxidiser pumps, was focussed. The test proceeded as predicted till 1.9 s validating the ignition and subsequent performance of PHTA. At 2.0 s, an unanticipated spike in the turbine pressure and subsequent loss of turbine-speed was observed. As a precautionary step, the test was terminated. Analysis under progress would offer further understanding before proceeding with further hot-tests for longer duration. The semi-cryogenic engine utilizes a propellant combination of Liquid Oxygen (LOX) and Kerosene, and the power head test article forms the first hardware test of the engine development program. The test was carried out the dedicated test facility recently established at IPRC for testing semi-cryogenic engines and stages. ISRO had commenced the testing of the PHTA in May 2023 at this facility.

Source: <https://www.isro.gov.in/>

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## CURRENT AFFAIRS

### ISRO Unveils Vital Facilities for Solid Motor Advancement

Satish Dhawan Space Centre (SDSC-SHAR), a group of vital facilities essential for the enhancement of solid motor realization were inaugurated by Shri Somanath S., Chairman, ISRO/ Secretary, Department of Space. Shri A. Rajarajan, Director of SDSC-SHAR, and Directors from other ISRO Centres/ Units were present. SDSC-SHAR is responsible for the development of solid motors/ segments for ISRO's acclaimed launch vehicles including PSLV, GSLV, LVM3, and SSLV. It aims establishing 29 primary and 16 auxiliary facilities to bolster solid propellant processing capabilities striving to achieve 2X improvement in its capacity. Commencing the first phase of this initiative, today's inauguration unveiled five key facilities dedicated to solid propellant mixing, casting, machining, as well as the non-destructive testing of cast segments.



Source: <https://www.isro.gov.in/>

### NISAR Utilization Programme (NISAR UP) for Indian Researchers

ISRO offers the NISAR Utilization Programme (NISAR UP), an opportunity for Indian researchers and scientists to access, analyse and interpret the data from the NASA-ISRO Synthetic Aperture Radar (NISAR) satellite mission. NISAR offers vital data to observe and study Earth's intricate processes. This cutting-edge mission involves high-resolution imaging, wide swath, precise orbit control, and short revisit periods. It aims to study ecosystems, cryosphere, solid earth science, and coastal ocean processes to address global environmental changes and natural hazards. It supports disaster response by providing rapid access to relevant data. NISAR UP seeks project proposals from researchers, academicians, and scientists affiliated with Indian Government organizations and Government-recognized institutions, universities, and departments. The programme, offered by the Space Applications Centre (SAC)/ISRO, looks to support 3-year projects, through an open data policy, in diverse application themes, such as agriculture, forestry, hydrology, snow/glaciers, disaster management, and more, using the L & S-band SAR data from NISAR. The focus areas include developing operational algorithms for applications in different fields, retrieval of biogeophysical parameters using NISAR and ancillary data, calibration/validation of NISAR data/science, tool development for NISAR data analysis, and value-added products/services to cater to user requirements. Selected projects will receive funding support, while non-funded projects will have access to technical support and ground validation data provided by ISRO. Mission details, guidelines, and proposal submission formats are at [here](#). Project proposals may be submitted by October 31, 2023. Evaluation results will be communicated by March 01, 2024. The researchers are invited to join the Programme, leveraging NISAR data to make discoveries and create a sustainable future for our planet.

Source: <https://www.isro.gov.in/>

### Commencement of Harbor Trials for the Gaganyaan Recovery operations

Recovery trial operations of the Gaganyaan mission entered into the second phase with the commencement of harbor trials on July 20, 2023, at the Naval Dockyard, Visakhapatnam. ISRO and Indian Navy jointly carried out the trials with the ship identified for the recovery operations during the first Development Mission of the Test Vehicle. The trials were conducted at the Eastern Naval Command in Visakhapatnam, using a mass and shape simulated Crew Module Mockup (CMRM). This mockup was a crucial component in the testing process, ensuring that the recovery procedures accurately simulated conditions. The various stages of recovery were simulated during the trials, including the attachment of the recovery buoy, towing, handling, and lifting of the crew module onto the ship deck. These procedures were executed according to the recovery sequence, demonstrating the preparedness of the teams involved. To ensure a

seamless and safe recovery process, the Standard Operating Procedures (SOPs) were fine-tuned based on the experiences from the phase-1 trials at the Water Survival Training Facility (WSTF) in Kochi. This iterative approach allowed for refinements to be made, enhancing the efficiency and reliability of the recovery operations.



Source: <https://www.isro.gov.in/>

## ISRO Supports a space start-up's Rocket Engine Test

On July 21, 2023, ISRO demonstrated its commitment to fostering the space ecosystem in India by enabling a successful rocket-engine test conducted by Skyroot, a Hyderabad-based space start-up, at ISRO Propulsion Complex (IPRC) Mahendragiri. The test took place in the Liquid Thruster Test Facility (LTF) in IPRC. The testing was enabled by IN-SPACE. The test involved the Raman-II engine, which was designed by Skyroot to generate 820 N (Sea Level) and 1460 N (Vacuum) thrust, with a nominal chamber pressure of 8.5 bar absolute. The regeneratively cooled engine, manufactured through additive manufacturing techniques, utilizes Mono Methyl Hydrazine and Nitrogen Tetroxide as propellants. The 10-second duration test achieved the expected performance in terms of start transient, steady state, and shut-off. Skyroot intends to integrate the Raman-II engine into the fourth stage of its launch vehicle, Vikram-I. The test facility systems demonstrated normal performance during the test, meeting the engine inlet conditions at T0. The instrumentation systems also performed as expected, further ensuring the accuracy and reliability of the test results. This facilitation underscores ISRO's commitment to nurture private players, start-ups, and Non-Government Entities (NGEs) in developing the country's space ecosystem. Going forward, a series of additional tests are planned to further validate and refine the Raman-II engine's capabilities.

Source: <https://www.isro.gov.in/>

## AB Pradhan Takes Over as Director (HR), HAL



Mr. A.B. Pradhan has taken over as Director (Human Resources) of HAL here today. Prior to this, he was holding the post as Officer on Special Duty at HAL Corporate Office and General Manager (HR) at Bangalore Complex. Mr. Pradhan joined HAL in 2005 and overall has 35 years of varied experience in human resource function in both public and private sectors with exposure to various industries dealing with engineering, metallurgy, paper, and aerospace & defence. Mr. Pradhan holds a Post Graduate Degree in Personnel Management & Labour Welfare from Utkal University, Bhubaneswar. He also holds a Law degree. During his service career, he was instrumental in the introduction of IT-enabled HR Systems. His major accomplishments include substantial number of wage agreements achieved through collective bargaining, improving efficiency of workmen through various methods like piece rate wages, reduction in standard man hours & overtime and introduction of TPM concepts including Kaizen and Fugai. He has streamlined the contract labour system and played a key role in outsourcing of non-core HR activities. He has wide exposure to whole gamut of HR functions like industrial relations, Corporate Social Responsibility (CSR), wage negotiation & settlements, statutory compliance, and HR policy formulation, manpower planning, recruitment & career development, skill development & training, performance management, facilities management and legal affairs.

Source: <https://www.hal-india.co.in/>

## **ISRO Successfully Tests Gaganyaan Service Module Propulsion System**

Indian Space Research Organisation (ISRO) successfully tested the Gaganyaan Service Module Propulsion System (SMPS) at ISRO Propulsion Complex in Mahendragiri, Tamil Nadu, on July 19. This test involved five liquid apogee motor (LAM) engines with a thrust of 440 N, and 16 reaction control system (RCS) thrusters with a thrust of 100 N. The service module of Gaganyaan is a regulated bi-propellant based propulsion system that caters to the requirements of the Orbital Module, performing orbit injection, circularisation, on-orbit control, de-boost manoeuvring, and SM-based abort (if any) during the ascent phase. The 440 N thrust LAM engines provide the main propulsive force during the ascending phase, while the RCS thrusters ensure precise altitude correction. The hot test of the System Demonstration Model (SDM) emulated the fluid circuit of the Service Module Propulsion System, encompassing the propellant tank feed system, helium pressurisation system, flight-qualified thrusters, and control components. The first hot test of the Phase-2 test series demonstrated the integrated performance of the Gaganyaan Service Module Propulsion System. The test, conducted for a duration of 250 seconds, involved LAM engines firing in continuous mode, along with RCS thrusters, adhering to the test profile. As part of the Phase-1 test series of service module SDM, ISRO had carried out five hot tests, totalling a duration of 2,750 seconds. Phase-1 involved five 440 N LAM engines, and eight 100 N RCS thrusters. Phase-2 test series involved the full configuration of five 440 N LAM engines, and 16 100 N RCS thrusters. 10 Science & Technology News With the successful completion of the hot test, the SMPS demonstrated its performance in the full configuration. Moving forward, ISRO has scheduled five additional tests to demonstrate both nominal and off-nominal mission scenarios, reinforcing the rigour of testing. The Gaganyaan project envisages demonstration of human spaceflight capability by launching a crew of three members to an orbit of 400 km for a three-day mission, and bringing them back safely to Earth, by landing in Indian sea waters. ISRO plans to carry out Gaganyaan's first abort test in August.

**Source:** <https://www.thehindu.com/sci-tech/science/isro-successfully-tests-gaganyaan-service-modulepropulsion-system/article67101045.ece>

## **Chandrayaan-3 Finishes Fourth Orbit-Raising Manoeuvre**

The Indian Space Research Organisation (ISRO) successfully completed the fourth orbit-raising manoeuvre (earth-bound perigee firing) of the Chandrayaan-3 mission. The space agency said, "India celebrates International Moon Day 2023 by propelling Chandrayaan3 step closer to the Moon. The fourth orbit-raising manoeuvre (earth-bound perigee firing) is performed successfully from ISTRAC/ISRO, Bengaluru." ISRO said Chandrayaan-3 had attained an orbit of 71351 km x 233 km orbit, as intended. This means that Chandrayaan-3 is now in an orbit, which when closest to earth is at 233 km and farthest at 71,351 km. Chandrayaan-3 was successfully launched by the Launch Vehicle Mark-3 (LVM-3) when it took off from the second launch pad of the Satish Dhawan Space Centre in Sriharikota at 2.35 p.m. on July 14 and placed at an elliptic parking orbit of 36,500 km x 170 km. Four orbit-raising manoeuvres have now been completed and the next firing is planned for July 25 between 2 and 3 p.m. IST. Chandrayaan-3 Mission update: The spacecraft's health is normal. The first orbit-raising maneuver (Earthbound firing-1) is successfully performed at ISTRAC/ISRO, Bengaluru. Spacecraft is now in 41762 km x 173 km orbit. [pic.twitter.com/4gCcRfmYb4](https://pic.twitter.com/4gCcRfmYb4) — ISRO (@isro) July 15, 2023 After the launch on July 14, ISRO Chairman S. Somnath said all earth-bound manoeuvres would be conducted till July 31. Thereafter, the trans lunar insertion would take place on August 1. The lander of the mission is planned to soft-land on the surface of the moon on August 23 at 5.47 p.m.

**Source:** <https://www.thehindu.com/sci-tech/science/isro-completes-4th-orbit-raising-manoevre-ofchandrayaan-3/article67101240.ece>

## **Final Orbit-Raising Manoeuvre of Chandrayaan-3 Completed**

The Indian Space Research Organisation (ISRO) on Tuesday (July 25) successfully completed the fifth and final orbit-raising manoeuvre (Earth-bound perigee firing) of the Chandrayaan-3 mission. It was performed successfully from ISRO Telemetry, Tracking and Command Network (ISTRAC) in Bengaluru. The spacecraft is expected to attain an orbit of 1,27,609 km x 236 km. This means that Chandrayaan-3 is now in an orbit, which, when closest to Earth is at 236 km and when farthest is at 1,27,609 km. "The achieved orbit will be confirmed after the observations," ISRO said after the successful orbit-raising manoeuvre. The four earlier orbit raising manoeuvres were performed by ISTRAC between July 15 and July 20. Following the final orbit-raising manoeuvre, ISRO will perform the TransLunar Injection (TLI) on

August 1 to slingshot Chandrayaan-3 towards the Moon. “The next firing, the TransLunar Injection (TLI), is planned for August 1, 2023, between midnight and 1 a.m. IST,” ISRO said. The Chandrayaan-3 consists of a lander module (LM), propulsion module (PM) and a rover which was launched by the LVM3-M4 on July 14. After the TLI takes place, the PM and the LM separation will happen on August 17. A series of deboost manoeuvres is also scheduled to take place before the power descent phase for the soft landing on the Moon. The lander is expected to touch down on the Moon surface on August 23 at 5.47 p.m. The Indian Space Research Organisation (ISRO) successfully completed the fifth and final orbitraising manoeuvre (Earth-bound perigee firing) of the Chandrayaan-3 mission. It was performed successfully from ISRO Telemetry, Tracking and Command Network (ISTRAC) in Bengaluru. The spacecraft is expected to attain an orbit of 1,27,609 km x 236 km. This means that Chandrayaan-3 is now in an orbit, which, when closest to Earth is at 236 km and when farthest is at 1,27,609 km. The four earlier orbit raising manoeuvres were performed by ISTRAC between July 15 and July 20.

**Source:** <https://www.thehindu.com/sci-tech/science/chandrayaan-3-mission-isro-successfully-performsfifth-orbit-raising-manoevre/article67119210.ece>

### **Chandrayaan-3 leaves earth’s orbit, heads towards moon: ISRO**

After remaining in the earth orbit for two weeks, India’s Chandrayaan-3 spacecraft moved into the translunar orbit in the early hours of Tuesday, beginning its journey towards the moon. “Next stop: the moon”, Indian Space Research Organisation (ISRO) said in a tweet. The spacecraft will cover the distance to the moon in about four days. On August 5, it will enter lunar orbit and start going around the moon, much like it has been going around the earth until now. It will slowly get into lower and lower orbit around the moon before obtaining a circular orbit of 100 km. It is from this circular orbit that the final descent of the lander and rover module will happen around August 23. Launched on July 14, Chandrayaan-3 is set to become India’s first spacecraft to make a soft landing on the moon. India’s previous attempt, with Chandrayaan-2 in 2019, had failed to make a successful landing. The spacecraft will spend the next 18 days or so going around the moon and reducing the velocity and orbit in preparation for the landing. The final orbit of the integrated spacecraft would be 100\*100km around the moon. The lander rover will then separate from the propulsion module and descend to the surface. Instead of shooting directly for the moon, the current and previous Indian missions have taken the help of the earth’s gravity to increase the velocity by going around it and increasing the orbit slowly. The landing site selected for the mission is just slightly off the one chosen for Chandrayaan-2. The spacecraft will land at 69.36oS and 32.34oE, near the moon’s southern pole. This region was selected as several craters remain permanently in shade, and can be the storehouse of water ice and precious minerals. Chandrayaan-2, which was also designed to achieve these objectives, crash-landed just 2.1 km from the surface. To ensure the success of the current mission, several changes were made, such as sturdier legs for the lander, one less engine on it to ensure appropriate thrust, more solar panels on its surface, and the option for it to land anywhere on a larger 4km\*2.4km area. Explaining the reason for the failure of Chandrayaan-2 in its last leg, ISRO chairman S Somanath had said the five engines on the lander developed a slightly higher thrust than expected. Although still within parameters, these errors accumulated during the period the lander had to remain stable. The lander clicked pictures during the descent to determine the landing site. When the course corrections began, the spacecraft needed to turn very fast but its ability to turn was limited by its software. The spacecraft faced contradictory requirements of slowing down the velocity at which it was coming down but accelerating forward in order to reach the correct landing site. So, when it did land, it hit the ground with a higher velocity. If soft landing is achieved, India will become the fourth country after the US, Russia, and China to do so. It will also be the first soft landing near the moon’s southern pole. With Chandrayaan-1, India had dropped a moon impact probe closer still to the south pole at 89.7oS near Shackleton crater.

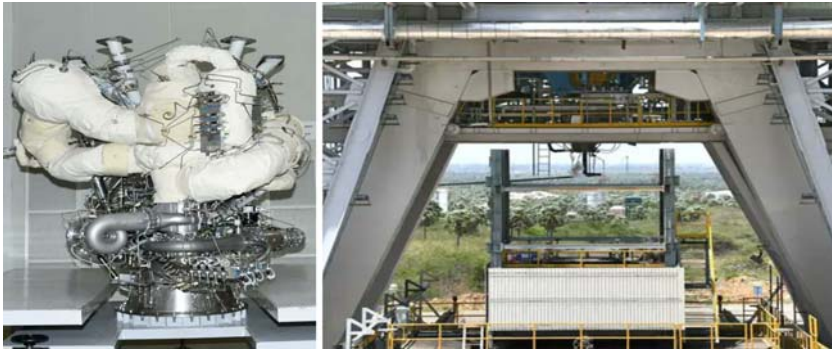
**Source:** <https://indianexpress.com/>

## TECHNOLOGY

### **First hot test of the Semi-cryogenic engine conducted at IPRC, Mahendragiri**

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and oxidiser pumps, was focussed. The test proceeded as predicted till 1.9 s validating the ignition and subsequent performance of PHTA. At 2.0 s, an unanticipated spike in the turbine pressure and subsequent loss of turbine-speed was observed. As a precautionary step, the test was terminated. Analysis under progress would offer further understanding before proceeding with further hot-tests for longer duration. The semi-cryogenic engine utilizes a propellant combination of Liquid Oxygen (LOX) and Kerosene, and the power head test article forms the first hardware test of the engine development program. The test was carried out the dedicated test facility recently established at IPRC for testing semi-cryogenic engines and stages. ISRO had commenced the testing of the PHTA in May 2023 at this facility.



Source: <https://www.isro.gov.in/>

## **Gaganyaan Mission: Successful Hot Test of Service Module Propulsion System**

ISRO successfully tested the Gaganyaan Service Module Propulsion System (SMPS) on July 19, 2023 at ISRO Propulsion Complex (IPRC), Mahendragiri. This test involved five liquid apogee motor (LAM) engines with a thrust of 440 N and sixteen reaction control system (RCS) Thrusters with a thrust of 100 N. The Service Module of Gaganyaan is a regulated bi-propellant based propulsion system that caters to the requirements of the Orbital Module, performing orbit injection, circularization, on-orbit control, de-boost manoeuvring and SM based abort (if any) during the ascent phase. The 440 N Thrust LAM engines provide the main propulsive force during the mission ascending phase, while the RCS thrusters ensure precise attitude correction. The hot test of the System Demonstration Model (SDM) emulated the fluid circuit of the Service Module Propulsion System, encompassing the propellant tank feed system, helium pressurization system, flight-qualified thrusters, and control components. The first hot test of the Phase-2 test series demonstrated the integrated performance of the Gaganyaan Service Module Propulsion System. The test, conducted for a duration of 250 seconds, involved LAM engines firing in continuous mode, along with RCS thrusters, adhering to the test profile. As part of the Phase-1 test series of SM SDM, ISRO had previously conducted five hot tests, totalling a duration of 2750 seconds. The earlier phase involved five 440 N LAM engines and eight 100 N RCS thrusters. For the Phase-2 test series, the current configuration includes the full configuration of five 440 N LAM engines and sixteen 100 N RCS thrusters. The Gaganyaan Service Module Propulsion System is designed, developed, and realized by Liquid Propulsion Systems Centre (LPSC). With the successful completion of this hot test, the SMPS has advanced in demonstrating its integrated performance in the full configuration. Moving forward, ISRO has scheduled five additional tests to demonstrate both nominal and off-nominal mission scenarios, reinforcing the rigor of testing and the commitment to mission success.

Source: <https://www.isro.gov.in/>

## **BUSINESS**

### **Argentinian Defence Minister Visits HAL. LoI Signed on Co-operation for Light and Medium Utility Helicopters for the Armed Forces of Argentina**

HAL and the Ministry of Defence of The Republic of Argentina have signed a Letter of Intent (LoI) on productive cooperation and acquisition of Light and Medium Utility Helicopters for the armed forces of the Argentine Republic. The LoI was signed here today by Mr Jorge Taiana, Argentinian Defence Minister and Mr C B Ananthakrishnan, CMD, HAL in the presence of Mr Francisco Cafiero, Secretary of International Affairs, Ambassador Hugo Javier Gobbi, Ambassador

Dinesh Bhatia and other senior officers from Argentinian side and HAL. The Argentinian Defence Minister remarked that the day was interesting and a step on the road to an ever growing and strong collaboration with HAL. CMD HAL and other senior officers of HAL briefed the visiting dignitaries on various activities of HAL and a presentation was made on the occasion. During the day-long program, the Argentinian Defence Minister and his team viewed the flying display of various HAL products at HAL Airport. The team also paid a visit to LCA, Helicopter Divisions and evinced keen interest in HAL products.



Source: <https://www.hal-india.co.in/>

## Two New Directors for DRDO Labs

The Centre had announced the appointment of directors for two key defence establishments on Saturday. The new director of Research Centre Imarat (RCI), Dr APJ Abdul Kalam Missile Complex, DRDO, here will be Anindya Biswas, an outstanding scientist. RCI is a premiere avionics lab of DRDO. 1 DRDO News DRDO Technology News The Advanced Systems Laboratory (ASL), also located in the Dr. APJ Abdul Kalam Missile Complex, will also have a new director in B V Papa Rao, a distinguished scientist. Mr. Biswas graduated in Electronics and Telecommunication from Bengal Engineering College (Calcutta University), Shibpur, West Bengal, and M.Tech (ECE) from IIT Kharagpur. He played a vital role in the indigenous development of terminal guidance systems for anti-tank guided missiles, and precision-guided systems strengthening indigenous defence capabilities. As a team leader for the terminal guidance systems, he led the conceptualisation, design, and development of several low-cost miniature terminal guidance systems that find applications in numerous tactical missiles. He also led the design and development of several precision guided weapons. The new RCI director was DRDO Young Scientist Award in 2002 and the Scientist of the Year Award in 2016. Mr. Papa Rao graduated in mechanical engineering from Andhra University, Visakhapatnam, Andhra Pradesh, and M.Tech in production engineering from JNTU, Hyderabad. He has more than three decades of experience in the design and development of state-of-the-art advanced propulsion systems, gas generators, auxiliary motors and thrust vector control systems for solid motors. His sustained R&D contributions in advanced propulsion systems and other mission-critical subsystems have been crucial for the development of submarine-launched ballistic missiles and longrange Agni missiles. He has been conferred with performance excellence award, special award for strategic contributions, a technology group award and National Science Day award. He is a member of the Astronautical Society of India, International Ballistic Society and others, informed an official spokesperson on Saturday.

Source: <https://www.thehindu.com/news/national/telangana/two-new-directors-for-drdo-labs/article67030758.ece>

## India, France to Develop New Generation Military Equipment: French Envoy

India and France agreed to develop new generation military equipment as part of a long-term roadmap during Prime Minister Narendra Modi's visit to Paris, French Ambassador Emmanuel Lenain said on Tuesday. The envoy also said that there is "real" political consensus in France on enhancing ties with India as he cited Modi's meetings with President of the French Senate Gérard Larcher, President of French National Assembly Yaël Braun-Pivet and Prime Minister Élisabeth Borne. "It shows that when it comes to India in France, there is real consensus. There is no difference. Everybody is so supportive and that is one of the trademarks of this partnership," Lenain said at a media briefing. Prime Minister Modi visited Paris on July 13 and 14 during which both sides reaffirmed their commitment to expand overall strategic cooperation including in defence. "Defence cooperation has always been very important for the two countries as we feel that in order to be independent, we have to be secure. And in order to be secure, we need good equipment and technologies," Lenain said. The Defence Acquisition Council, headed by Defence Minister Rajnath Singh, on July 13 accorded the approval for the purchase of 26 Rafale-M (naval variant) and the three-Scorpene

submarine from France. The envoy said the two countries are working on a roadmap to produce next-generation military equipment and technologies. "We have decided to work and co-develop the next generation of equipment. And we are working on a roadmap in the defence field," he said without elaborating. At the same time, Lenain said the defence cooperation between the two sides was much beyond one or two platforms as both sides are looking at expanding it significantly. Ambassador Lenain described Modi's visit to Paris as a reflection of "trust and strong partnership" between the two countries. "It was a very good and significant visit to send a strong message of trust and friendship," he added. On the 1650 MW nuclear power project in Jaitapur in Maharashtra, the envoy said there has been some progress on it. Both sides are engaged in talks to resolve all issues including those relating to civil nuclear liability, cost and techno-commercial matters. During Modi's visit, both sides agreed to adopt a 25-year roadmap to set the course for the bilateral relationship up to 2047 to celebrate the centenary of India's independence and the centenary of the diplomatic relations between the two countries. "The roadmap for the next 25 years will mean one century of bilateral relations. The roadmap is very very ambitious," Lenain said. He said the two sides are committed to expanding cooperation in the Indo-Pacific as well. Following talks between Modi and French President Emmanuel Macron, the two sides unveiled an India-France Indo-Pacific roadmap for boosting cooperation in the region. "Our two countries believe in a free, open, inclusive, secure and peaceful Indo-Pacific region," the roadmap noted. "We believe that the India-France partnership will be a crucial pillar of the inter-connected and intersecting arrangements in the Indo-Pacific region and indispensable for a peaceful and prosperous future for the Indo-Pacific region," it said.

**Source:**<https://www.deccanherald.com/national/india-france-to-develop-new-generation-militaryequipment-french-envoy-1238306.html>

## **Airbus C-295 Aircraft Manufacturing Ecosystem Taking Shape in India**

In about 45 days from now, in September, the Indian Air Force (IAF) will receive the first C-295 transport aircraft and ahead of it, six pilots have been trained in Seville by Airbus and training of a 20-member maintenance crew is currently under way. Ground breaking ceremony for a training centre at Air Force station, Agra, was done in March with a full motion simulator to be delivered by the end of 2024. Work is under way for setting up the Final Assembly Line (FAL) at Vadodara in partnership with Tata Advanced Systems Limited (TASL), according to Jorge Tamarit, head of C295 India programme, Airbus." Mr. Tamarit said speaking to a small group of visiting journalists from India. "Next week the Main Constituent Assembly [MCA] in Hyderabad is set to start production where several major sub4 assemblies for the 40 aircraft to be assembled in India would be made, beginning with the rear-end fuselage." The second C-295 will be delivered in May 2024 followed by seven aircraft in 2024 at the rate of one per month, said Jorge Madrid, head of C-295 India-version development programme. In September 2021, the Defence Ministry signed a 22,000-crore deal with Airbus<sup>1</sup> and Space S.A., Spain, for procurement of 56 C-295MW transport aircraft to replace the Avro aircraft in service with the IAF. As per contract, 16 aircraft would come in fly away condition, manufactured at the Airbus facility in Seville, and 40 would be manufactured in India by Airbus jointly with TASL. The C-295 has a capacity of 9 tonnes and can carry up to 71 troops or 50 paratroopers. Eventually, IAF will become the largest operator of the C-295. Talking of the uniqueness of the deal, Mr. Tamarit said the contract involving 'Make-in-India' and offset obligations is unprecedented. Airbus has not done a full production system ever, he said stating the deal involves 30% offset obligations on top of 'Make-in-India' obligations. The contract includes service support programme: spares, ground support and test equipment, tech publications, training, training devices, performance-based logistics contract. In March, the contract for Performance Based Logistics (PBL) for five years was signed as per which a fleet availability rate of 85% rate would be ensured. Also the contract for supply of spares is for 10 years covering 10 operating bases. The FAL spread over 36 acres will be ready by mid-2024 and operations will start by November 2024. All parts produced in Hyderabad will be shipped to Vadodara for the final assembly. The MCA in Hyderabad is set to start production by next week beginning with the rear-end fuselage, followed by rear fuselage, centre fuselage and so on. We are doing fortnightly deliveries of tail parts to India, Mr. Tamarit said. These are for the 17th C-295 which will be the first aircraft to be manufactured in India. The first 'Make-in-India' aircraft is scheduled to be delivered in September 2026 and the contract would be completed by 2031. Indigenous radar warning receiver and missile approach warning systems made by Bharat Electronics Limited (BEL) and counter-measure dispensing system made by Bharat Dynamics Limited (BDL) have been certified and installed on the first aircraft, Mr. Madrid stated. In all, 14,000 detailed parts would be made in India and roughly around 3,500 parts will be industrialised every year, said Mr. Tamarit. Tata-produced parts would be sequentially incorporated from aircraft 17 to 32 and from the 30th aircraft onwards 100% of the tail parts and labour would be in India. The last eight aircraft from 32 to 40 would have the maximum indigenous content, he said, adding the scheduled delivery of the 32nd aircraft is in the first quarter of 2029. "We measure indigenisation by labour hours and by the 32nd aircraft it will reach 98%." Engines, avionics and some systems like



landing gear are not done by Airbus and would be sourced directly. So Tata will not be doing them as well as a small number of detailed parts, Mr. Tamarit noted adding some technologies like Chemical Milling will be transferred by Airbus to Tata. "It is an Intellectual Property licence agreement." The project will create 15,000 direct jobs and 10,000 indirect jobs over the coming 10 years. Airbus currently employs over 2,750 full-time employees in India and its exports from supply chain is \$750 million per year in terms of components and services. Under the offset obligations, to begin with it will be direct sourcing and Airbus is looking to diversify, officials added. A deal for 15 more C-295s to be converted into a maritime role for the Navy and Coast Guard by the Defence Research and Development Organisation is in the pipeline and discussions are on for 5 it, company officials said. Approval from the Defence Acquisition Council (DAC) is awaited for this.

**Source:**<https://www.thehindu.com/news/national/c-295-manufacturing-ecosystem-takes-shape-in-india-asfirst-aircraft-set-to-be-delivered-in-september/article67097785.ece>

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