E-NEWS

EVERY MONTH FROM THE AERONAUTICAL SOCIETY OF INDIA

VOLUME - 19 | February 2024 | RELEASE - 02

Covering the Period from
(01 January 2024 to 31 January 2024)

INSAT-3DS Satellite Flagged off to SDSC-SHAR

DRDO conducts successful flight-test of New Generation AKASH missile off Odisha coast

Eminent Indian Aeronautical and Aerospace Personalities in India

Series:12

Dr. S Srinivasan

A renowned Aeronautical Engineer was the Director of the Vikram Sarabhai Space Centre, Thiruvananthapuram, between 1994 and 1999. Dr Srinivasan was associated with the Indian space programme right from its inception. Born on April 14, 1941 in Thanjavur District of Tamil Nadu, Dr Suryanarayana Srinivasan obtained BE(Honours) degree in Electrical Engineering from Annamalai University and ME degree in Aeronautical Engineering from the Indian Institute of Science, Bangalore. After a brief stint at the Hindustan Aeronautical Limited, he received his PhD in Engineering Mechanics from Ohio State University in 1970. He started his career at Vikram Sarabhai Space Centre (then SSTC), Thiruvananthapuram in 1970. His initial stint was in the development of hardware for the Rohini sounding rockets. He was Deputy Project Director in the SLV3 Project, working with Dr APJ Abdul Kalam, when India made its entry into the exclusive 'Space Club' with the successful SLV3 mission on July, 18, 1980. Later he was entrusted with the challenging task of building the PSLV, which made India self-reliant in orbiting

Publisher

Journal of Aerospace Sciences And Technologies
The Aeronautical Society of India
Bangalore Branch Building
New Thippasandra Post
Bangalore 560 075
Karnataka, INDIA
Phone No : +91 80 25273851
Email: editoraesi@yahoo.com
Website: www.aerojournalindia.com

Publication Team

Dr R Balasubramaniam
Dr S Kishore Kumar
Dr P Raghothama Rao
Mrs Chandrika R Krishnan
Mr Hemanth Kumar R
Mr Kumaran A K M

Advertisement – Tariff

A4 – 1 Full Page : Rs. 2000
Draft Drawn in Favour of "Journal Office, The Aeronautical Society of India" Payable at Bangalore

Head Quarters

The Aeronautical Society of India
13-B, Indraprastha Estate
New Delhi 110 002, India
Tel: +91 11 23370516
Fax: +91 11 23370768

her remote sensing satellites. Realising the need for development of a family of launch vehicles to fulfil the country's application needs, he was made the Director of the Integrated Launch Vehicle Programme, leading to the optimum deployment of resources and reuse of designs thereby achieving higher levels of quality and productivity. In that capacity, he significantly contributed to the development of GSLV and the indigenous cryogenic stage. He became Director, SHAR in June 1994 and was instrumental in gearing up the facility for production of large solid rocket boosters, and launching vehicles with clockwork precision. After a short spell at SHAR, he became Director, VSSC in October 1994 and shouldered the responsibility of working in the direction of advanced technology. Dr Srinivasan was a fellow of the Aeronautical Society of India and Indian National Academy of Engineering, and a member of the Astronautical Society of India and the Society of R&D Managers of India. He had many awards to his credit, which includes the National Aeronautics Prize and the FIE Foundation National award. Dr Srinivasan passed away on September 01, 1999. The nation honoured him awarding Padma Bhushan posthumously.

Source: https://www.vssc.gov.in/Srinivasan.html

CURRENT AFFAIRS

Halo-Orbit Insertion of Aditya-L1 Successfully Accomplished

Halo-Orbit Insertion (HOI) of its solar observatory spacecraft, Aditya-L1 was accomplished at 16.00 Hrs (approx) on January 6, 2024 (IST). The final phase of the maneuver involved firing of control engines for a short duration. The orbit of Aditya-L1 spacecraft is a periodic Halo orbit which is located roughly 1.5 million km from earth on the continuously moving Sun – Earth line with an orbital period of about 177.86 earth days. This Halo orbit is a periodic, three-dimensional orbit at L1 involving Sun, Earth and a spacecraft. This specific halo orbit is selected to ensure a mission lifetime of 5 years, minimising station-keeping manoeuvres and thus fuel consumption and ensuring a continuous, unobstructed view of sun.

The Aditya-L1 mission is an Indian solar observatory at Lagrangian point L1 for "Observing and understanding the chromospheric and coronal dynamics of the Sun" in a continuous manner. Placing the Aditya-L1 in a halo orbit around L1 point has advantages as compared to placing in a Low Earth Orbit (LEO):

- It provides a smooth Sun-spacecraft velocity change throughout the orbit, appropriate for helioseismology.
- It is outside of the magnetosphere of Earth, thus suitable for the "in situ" sampling of the solar wind and particles.
- It allows unobstructed, continuous observation of the Sun, and view of earth for enabling continuous communication to ground stations.
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Halo orbit insertion

The halo orbit insertion process commenced as the spacecraft crossed the XZ plane in the Sun-Earth- L1 rotating system, with the required orbital state. The insertion maneuver is essential to nullify the X and Z velocity components and attain the required Y-velocity in the L1 rotating frame for the required Halo orbit. The targeted Halo-orbit for Aditya-L1 is Ax: 209200 km, Ay : 663200 km and Az : 120000 km (The semi-axes of the 3-dimensional Halo orbit- refer figure). The insertion of Aditya-L1 into this Halo orbit presents a critical mission phase, which demanded precise navigation and control. A successful insertion further involved constant monitoring along with the adjustment of the spacecraft's speed and position by using onboard thrusters. The success of this insertion not only signifies ISRO's capabilities in such complex orbital manoeuvres, but it but gives confidence to handle future interplanetary missions. Aditya-L1 was designed and realised at UR Rao Satellite Centre (URSC) with participation from various

ISRO centres. The payloads onboard Aditya-L1 were developed by Indian scientific laboratories, IIA, IUCAA and ISRO. The Aditya-L1 spacecraft was launched by PLSV-C57 on September 2, 2023 from SDSC SHAR, into an elliptical parking orbit (EPO) of 235.6 km by 19502.7 km. From here, Aditya-L1 embarked on an extraordinary journey towards the Sun-Earth-L1 Lagrange point, with the help of the onboard propulsion system, increased its orbital size progressively and moved toward L1 point. Five liquid engine burns (LEB) were executed during Earth orbit phase; gradually raised the apogee of the EPO in order to attain the desired trajectory with the fifth burn, known as the trans-L1 injection (TL1I) maneuver. The maneuver strategy is carefully devised to minimize incremental velocity addition (ÄV) for reaching the target L1 halo orbit while restricting the number of perigee passes to minimize the spacecraft's exposure to the high radiation Van Allen radiation belts. To address errors during, TL1I phase, a short burn of the engines, called TCM-1 was conducted. The Aditya-L1 spacecraft was moving from Earth towards the L1 point in the direction of Sun. The TCM1 &2 firing oriented the spacecraft toward the Halo Orbit, making it reach the HOI condition (which is a minimum fuel consumption condition) as on 6th January 2024 (Marked by the red dot). The final firing was done at this point, making the spacecraft align with the Halo Orbit. If the HOI manoeuvre was not conducted as done today, the spacecraft would have moved in the direction marked (Without HOI)

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Source: https://www.isro.gov.in/halo-orbit-insertion-adtya-l1.html

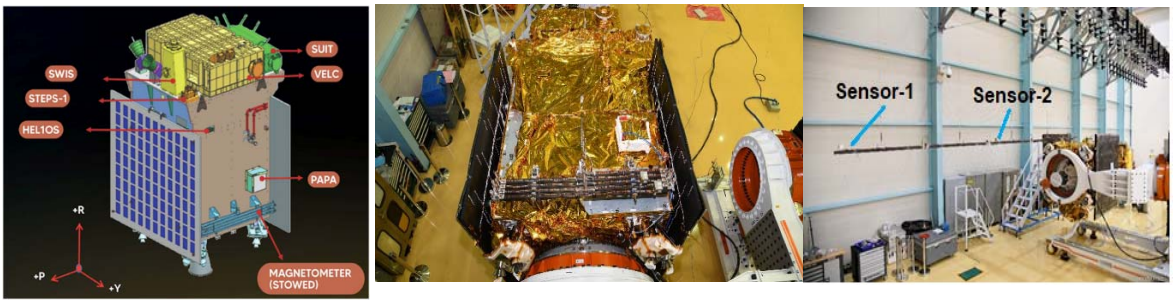
Instrument on Chandrayaan-3 lander started serving as a location marker near lunar south pole

The Laser Retroreflector Array (LRA) on the Chandrayaan-3 lander has begun serving as a fiducial point points (precisely located markers for reference) on the moon. NASA's Lunar Reconnaissance Orbiter (LRO) achieved a laser range measurement using the LRA by successfully detecting signals reflected. The ranging utilized the Lunar Orbiter Laser Altimeter (LOLA) on the LRO. The observation occurred during lunar night time, with the LRO ascending to the east of Chandrayaan-3. NASA's LRA was accommodated on the Vikram lander under international collaboration. It comprises eight corner-cube retroreflectors on a hemispherical support structure. This array facilitates laser ranging from various directions by any orbiting spacecraft with suitable instrument. The passive optical instrument, weighing about 20 grams, is designed to last for decades on the lunar surface. Landed near the lunar south pole on August 23, 2023, Chandrayaan-3's Vikram lander has been accessible for LOLA measurements since then. While several LRAs have been deployed on the Moon since the beginning of lunar exploration, the LRA on Chandrayaan-3 is a miniature version and is the only one available near south pole currently. NASA's LRA on Chandrayaan-3's Vikram lander will continue to serve as a long-term geodetic station and a location marker on the lunar surface, benefitting current and future lunar missions. These measurements, apart from helping in precise determination of spacecraft's orbital position, will help refine the lunar geodetic frame, revealing insights into the Moon's dynamics, internal structure, and gravitational anomalies.

Source: https://www.isro.gov.in/Chandrayaan-3_lander_Instrument.html

Successful Deployment of Magnetometer Boom on Aditya-L1 in Halo Orbit

The 6-meter long magnetometer boom on the Aditya-L1 satellite has been successfully deployed. It is deployed in the Halo orbit at the Lagrange point L-1, on January 11, 2024. The boom had been in stowed condition for 132 days since the Aditya-L1 launch. The boom carries two state-of-the-art, high-accuracy fluxgate magnetometer sensors that measure the low intensity interplanetary magnetic field in space. The sensors are deployed at distances of 3 and 6 meters from the spacecraft body. Mounting them at these distances minimizes the impact of the spacecraft generated magnetic field on measurements. , and using two of them assists precise estimation of this influence.The dual sensor system facilitates cancelling out the spacecraft's magnetic influence. The boom segments are constructed from carbon fibre reinforced polymer and serve as interfaces for the sensor mounting and mechanism elements. The articulated boom mechanism comprises 5 segments interconnected through spring-driven hinge mechanisms, allowing for folding and deploying actions. The deployment occurs in an accordion fashion, controlled by a novel patented Kevlar closed control loop mechanism, with hinges locking the segments into the deployed configuration. During the stowed condition, the boom is securely held in position by two hold-downs, transferring launch loads to the spacecraft body. A thermal cutter-based release system is employed to execute the boom deployment on command. Date received through the telemetry switches confirm the hold-down release, first motion, and locking of all hinges. The observed in-orbit deployment time was approximately 9 s, well within the predicted range of 8 to 12 s. All telemetry indications for hinge locking and hold-down release were within nominal parameters.



Source: https://www.isro.gov.in/Aditya_L1_MAG_Boom_Deployment.html

POEM-3 Mission achieves all its Payload objectives

POEM-3, the PSLV Orbital Experimental Module-3, India's unique inexpensive space platform using the spent PS4 stage of the PSLV-C58 vehicle that launched XPoSat on January 1, 2024, has successfully achieved all its objectives. After deploying the satellite into its intended orbit at 650 km, the vehicle was lowered to 350 km circular orbit to minimize the time of orbit decay after completion of the experiment. It is a three-axis-attitude controlled platform with power generation and telecommand & telemetry capabilities, for supporting Payloads. By 25th day in orbit, POEM-3 completed 400 orbits. Its current orbit measures around 322 km by 352 km. It is predicted that POEM-3 will continue orbiting for approximately 73 more days before re-entering the Earth's atmosphere. POEM-3 flew with nine Payloads from VSSC, PRL, Academia, and Space start-ups inducted through IN-SPACe. Over this period, each payload was put into operation, as planned and performance was demonstrated. The experiments of ARKA200 (Xenon Based Electric Propulsion) and RUDRA (HAN based Green Propellant Thruster) from Bellatrix, and LEAP-TD (Satellite Bus with VHF/ UHF Downlink & UHF Uplink – Tested using IIST ground station) from Dhruva Space were completed. Payload Data is collected regularly for WeSAT (Solar irradiance and UV Index study) from LBS Institute of Technology for Women, BeliefSat0(Amateur Radio satellite) from KJ Somayia Institute of Technology, RSEM (Radiation Shielding experiment) from TakeMe2Space, and DEX (interplanetary Dust particle experiment) from PRL for every orbit. 100 W Fuel Cell

Power System(FCPS) and Si-C based High Power Li-Ion (10AH/32V) Battery from VSSC were also demonstrated. Thus all payload objectives were fully met. In missions of POEM-1 to POEM-3, ISRO has flown a total of 21 payloads from various institutes and industries. After achieving all objectives, more experiments with POEM-3 are planned for generating data for future missions including upcoming POEM configurations. With the orbital decay and reentry of POEM-3 in three months, PSLV-C58 XPoSat mission will be leaving zero debris in space.

Source: https://www.isro.gov.in/POEM-3_Mission_achieves_Payload_objectives.html

INSAT-3DS Satellite Flagged off to SDSC-SHAR

INSAT-3DS, is an exclusive meteorological satellite realized by ISRO with the primary objective to provide continuity of services to the existing in-orbit INSAT-3D and 3DR satellites and significantly enhancing the capabilities of INSAT system is flagged off to SDSC-SHAR launch port on January 25, 2024 for the launch onboard GSLV F14. The Satellite had successfully completed Satellite Assembly, Integration & Testing activities at U R Rao Satellite Centre, Bengaluru. Pre-Shipment Review (PSR) was held with the participation of members from user community on January 25, 2024. The satellite is a user funded project with Ministry of Earth Science (MoES), configured around ISRO's well proven I-2k bus platform with a Lift-Off Mass of 2275 kg. Indian Industries have significantly contributed in the making of the Satellite. The satellite is designed for enhanced meteorological observations and monitoring of land and ocean surfaces for weather forecasting and disaster warning, with state-of-the-art payloads viz., 6 channel Imager & 19 channel Sounder meteorology payloads, communication payloads viz., The Data Relay Transponder (DRT) and Satellite aided Search and Rescue (SAS&R) transponder. The Data relay transponder (DRT) instrument, receives meteorological, hydrological and oceanographic data from automatic Data Collection Platforms / Automatic Weather Stations (AWS) and augments the weather forecasting capabilities. Satellite aided Search and Rescue (SAS&R) transponder is incorporated in the satellite to relay a distress signal / alert detection from the beacon transmitters for search and rescue services with global receive coverage.

Source: https://www.isro.gov.in/INSAT_3DS_Satellite_Flagged_off_to_SDSC_SHAR.html

Wings India 2024: HAL to Showcase its Indigenous Civil Platforms, Focus on Boosting Regional Connectivity

HAL will showcase its indigenous civil platforms, Hindustan-228 aircraft and ALH Dhruv upgraded civil helicopter during Wings India 2024 to be held from January 18-21, 2024 at Begumpet Airport, Hyderabad.Mr. C. B. Ananthakrishnan, CMD (Additional Charge), HAL says, "HAL is propelling the initiative of 'Made in India' fixed wing civil aircraft to boost regional connectivity in India. The Company is leveraging its strengths in manufacturing aircraft like Do-228 and HS-748 and extending its capabilities to civil aircraft programmes like the Regional Transport Aircraft. HAL is also actively pursuing collaborations for undertaking civil MRO activities." HAL will be present at Hall A, Stall No 25 during the show. HAL stall will display scale models of LUH (civil variant), Hindustan-228, ALH (civil variant), Line Replaceable Units

(LRUs) and accessories pertaining to civil aircraft. HAL will hold business meetings with OEMs and customers besides signing agreements with its business partners for various projects.

Upgraded civil Dhruv helicopter: The upgraded civil Dhruv helicopter, a variant of Advanced Light Helicopter, is a 5.5 ton, twin engine helicopter, designed and developed by HAL. The helicopter can perform various roles like disaster management, Search and Rescue (SAR), underslung roles, Heli-tourism, VIP ferry etc. The helicopter has Advanced Glass Cockpit and avionics. This helicopter would meet the Regional Connectivity program (RCS) of Govt. of India.

Hindustan-228: The Hindustan 228 aircraft is a multipurpose, light weight twin turboprop aircraft indigenously developed by HAL to cater to the remote regional connectivity on short haul air routes under the Regional Connectivity Scheme, UDAN (Ude Desh Ka Aam Nagrik). Hindustan-228 can be configured for variety of roles – Regional Airliner/Air Taxi, VIP/Executive Transport, Search and Rescue, Casualty evacuation/Ambulance, Cargo and Logistics Support, Calibration of Airport Nav-aids, Geographical surveys, Aerial photography, etc. The aircraft cockpit is upgraded with fully digital Glass Cockpit, upgraded avionics and systems. The aircraft is Type Certified by DGCA.

Civil LUH: HAL has also taken the initiative to develop a civil variant of the Light Utility Helicopter. The Company is pursuing the build of the LUH civil prototype with DGCA certification, expected to be achieved by December 2025.

Source:https://hal-india.co.in/media-details/wings-india-2024-hal-to-showcase-its-indigenous-civil-platforms-focus-on-boosting-regional-connectivity%2F

DRDO conducts successful flight-test of New Generation AKASH missile off Odisha coast

Defence Research and Development Organisation (DRDO) conducted a successful flight-test of the New Generation AKASH (AKASH-NG) missile from the Integrated Test Range (ITR), Chandipur off the coast of Odisha at 1030 hrs on January 12, 2024. The flight-test was conducted against a high-speed unmanned aerial target at very low altitude. During the flight-test, the target was successfully intercepted by the weapon system and destroyed. It has validated the functioning of the complete weapon system consisting of the missile with indigenously developed Radio Frequency Seeker, Launcher, Multi-Function Radar and Command, Control & Communication system.

The system performance was also validated through the data captured by a number of Radars, Telemetry and Electro Optical Tracking System deployed by ITR, Chandipur. The flight-test was witnessed by senior officials from DRDO, Indian Air Force (IAF), Bharat Dynamics Limited (BDL) and Bharat Electronics Limited (BEL). The AKASH-NG system is a state-of-the-art missile system capable of intercepting high speed, agile aerial threats. The successful flight test has paved the way for User trials. Raksha Mantri Shri Rajnath Singh has complimented the DRDO, IAF, PSUs and the Industry for the flight-test. The successful development of the system will further enhance the air defence capabilities of the country, he said. Secretary Department of Defence R&D and Chairman DRDO Dr Samir V Kamat also congratulated the teams associated with the successful flight test of AKASH-NG.

Source: https://pib.gov.in/PressReleasePage.aspx?PRID=1995445

New York to London in just 3.5 hours soon! NASA unveils X-59 supersonic jet 'son of Concorde'

New York to London in just three and a half hours soon! The aeronautic officials debuted a new **X-59 supersonic aircraft** which is capable of flying faster than the speed of sound. The 100-foot-long and 30-foot-wide plane was rolled out by NASA and Lockheed Martin in Palmdale, California. After launching in 1976 and experiencing expensive maintenance as well as a deadly crash in 2000, the Concorde, which had a top speed of 1,350 miles per hour, was retired almost twenty years ago. Officials stated that its new offspring can reach speeds of 925 miles per hour and cause less of a sonic boom in the communities below due to the advancements in design, shaping, and technologies. When planes break the sound barrier — called Mach 1 — a loud and continuous sonic boom is created that can shatter windows on the ground. The US banned civilian aircraft from reaching this speed over land in 1973, *Bloomberg* reported. Pam Melroy, NASA Deputy Administrator said, "The X-59 transcends its role as a mere aircraft; it stands as a symbol of our collective ambition to redefine the future of supersonic travel." "This breakthrough really redefines the feasibility of commercial supersonic travel over land. It brings us closer to a future that we can all understand: cutting flight time from New York to Los Angeles in half," the former commander of the space shuttle added. NASA had earlier said that the United Nations and other countries have banned supersonic flights due to its startling booms when such planes exceed the speed of sound, that is, 767 miles per hour. Lockheed Martin won a contract in 2018 valued at about $250 million to build a demonstrator plane, which has room for one pilot and is powered by General Electric Co.'s F414 engine, to help overcome this hurdle. The aircraft is designed to reach 1.5 times the speed of sound while reducing a sonic boom to a weak thump with its v-shaped wing and elongated nose. The company originally had expected to fly the X-59 in 2021. The overall project, including testing, will cost about $632 million over eight years, NASA said.

Source: https://www.livemint.com/news/world/new-york-to-london-in-just-3-5-hours-soon-nasa-unveils-x-59-supersonic-jet-son-of-concorde-11705719445234.html

TECHNOLOGY

ISRO's Fuel Cell flight tested in PSLV C58

ISRO has successfully tested a 100 W class Polymer Electrolyte Membrane Fuel Cell based Power System (FCPS) in its orbital platform, POEM3, launched onboard PSLV-C58 on January 1, 2024. The objective of the experiment was to assess Polymer Electrolyte Membrane Fuel cell operation in space and to collect data to facilitate the design of systems for future missions. During the short duration test onboard POEM, 180 W power was generated from Hydrogen and Oxygen gases stored on onboard in high pressure vessels. It provided a wealth of data on performance of various static and dynamic systems that formed part of the power system and the physics at play.

Fuel cell payload

Hydrogen Fuel Cells produce electricity directly from Hydrogen and Oxygen gases, along with pure water and heat. It is an electric generator which works on electrochemical principles, as in batteries, as against the combustion reactions employed in conventional generators. The ability to produce electricity directly from fuels without any intermediate step renders them very efficient. With water as the only byproduct, they are totally emission free. These features make them ideal candidates for space missions involving humans where electric power, water and heat are essential since a single systems can meet multiple requirements in the mission. Fuel Cells also possess significant societal application potential. They are also considered to be the most appropriate solution to replace the engines of various types vehicles in use today and to power standby power systems. Fuel Cells can provide range and fuel recharge time equaling that of today's conventional engine, which gives them a distinct advantage over batteries, and are expected to facilitate emission free transportation. Fuel cell is ideal power source for Space Station as it provides both power and pure water.

Source: https://www.isro.gov.in/FuelCellFlightTestedPSLVC58.html

SSPACE/IIST lends tracking support to space startup

The Indian Institute of Space Science and Technology (IIST), (an autonomous institution under the Department of Space), is an institute of excellence for education and research in Space Technology, Space Science and Space Application. IIST offers specialized courses in Avionics & Aerospace Engineering and Applied Sciences starting from undergraduate to doctoral and postdoctoral programmes. IIST enjoys close links with ISRO Centres and Units for the use of facilities and research materials. In the recent PSLV C-58 XPoSat mission launched on the new year day, IIST played a pivotal role in extending telemetry and telecommand support to the space start-up Dhruva Space. The POEM orbiting platform of PSLV C58 has 9 payloads including LEAP-TD from Hyderbased based space start-up Dhruva Space. Dhruva Space, Hyderabad, a pioneer among space startups in India working in the area of small satellite

systems development, has developed a payload called LEAP-TD for technology demonstration of key systems including telemetry telecommand modules in addition to many other subsystems. Small-satellite and payloads need tracking for telemetry and telecommand by a reliable Ground Station typically in VHF, UHF and S-band. For this purpose IIST has established a ground station which is fully developed and supported by student/staff of IIST and guided by talented professors and experts from ISRO centers. In this regard, four LEO missions, InspireSat1 satellite and POEM payloads PILOT, ARIS-1, ARIS-2 have been developed and launched from IIST. Multiple futuristic satellites and payloads for science exploration and technology demonstration are being developed by students. In this way IIST is creating industry ready students with knowledge of cutting-edge technologies in the space sector. Success of any satellite mission lies with the communication from ground for telemetry and telecommand. In this IIST played a pivotal role through Small-spacecraft Systems and PAyload CEntre (SSPACE), Ground Station tracking systems including antenna and RF systems for Telemetry and Telecommand operations round the clock. IIST has provided ground support to satellites including InspireSat1, InspireSat2, InspireSat4 and POEM payload on PSLV C53, and PSLV C58 mission. The LEAP-TD payload in the POEM platform is in a ~350 km low earth orbit with an orbital period of around 94 mins. Out of five high elevation orbits per day of elevation greater than 30 degrees the orbital platform is visible over IIST for around 10 mins. During this time the ground station has to reliably track the satellite for receiving the telemetry and transmitting the telecommand. A team of 8 members from Dhruva Space are in IIST to augment/adapt and operate the IIST Ground station for supporting the LEAP-TD payload launched in PSLV C58 on January 1, 2024. In today's world of rapidly advancing space technologies and aligning with the country's goal IIST has started collaborating with Universities and Industries in building small satellites and payloads using innovative technologies for miniaturizing systems, improving performance, reducing cost and rapid deployment of space assets in space.

S-band Antenna

Antennas for InspireSat1 and Antenna for LEAP-TD

Source: https://www.isro.gov.in/IIST_lends_tracking_support_to_space_startup.html

BUSINESS

Vibrant Gujarat Global Trade Show 2024: HAL to Showcase its Products with Thrust on Indigenisation

HAL is all set to participate in the 10th edition of 'Vibrant Gujarat Global Trade Show 2024' from January 9 to 13 at Gandhinagar, Gujarat. "With thrust on 'Aatmanirbhar Bharat', HAL seeks to explore the capability of Indian industries through this event", says Mr C B Ananthakrishnan, CMD (Addl. Charge), HAL. One of the major attractions at HAL stall will be Su-30 MKI aircraft which has been modified indigenously for integration of air-to-ground BrahMos missile manufactured in India. The missile weighs 2500 kg and has a range of nearly 300 kms. HAL has to date manufactured 220 Su-30 MKI aircraft and has overhauled over 100 Su-30 MKI. HAL's Prachand Light Combat Helicopter (LCH) will be

on static display. A Make-in-India product built with private participation, LCH is the only attack helicopter in the world which can land and take-off at an altitude of 5000 m (16,400 ft) with considerable load of weapons and fuel meeting the specific requirements of Indian Armed Forces. HAL has identified over 100 critical items for indigenisation and will display some of them in the show. Besides, the scale models of Su-30, LCA, ALH WSI, HTT40 and Do-228, HAL stall will showcase core competencies and capabilities of Indian industries, opportunities in indigenisation of critical aerospace parts, aggregates, LRUs, materials, and consumables. During the show, HAL will also focus on strategies for strengthening aerospace ecosystem by interacting with Indian industry to open the gateway for the future. Six manufacturing Divisions of HAL- Aircraft Division Nashik, Engine Division Koraput, Accessories Division Hyderabad and Lucknow, Transport Aircraft Division, Kanpur and Engine Division Bengaluru are participating in the event.

Source: https://hal-india.co.in/media-details/vibrant-gujarat-global-trade-show-2024-hal-to-showcase-its-products-with-thrust-on-indigenisation%2F

EVENTS

DRDO celebrates 66th Foundation Day

DRDO is today celebrating the 66th Foundation Day of its establishment. Secretary, Department of Defence R&D and Chairman DRDO Dr Samir V Kamat DRDO paid floral tributes to the Missile Man of India and former President Dr APJ Abdul Kalam. Floral tributes were also paid to Dr VS Arunachalam, Former DRDO Chief, who passed away in August 2023. Addressing DRDO fraternity, Chairman DRDO extended warm wishes to DRDO employees and their families. He stated that an eventful year has passed and a new one is about to begin and asked scientists to innovate and create for the Nation. Chairman DRDO highlighted the achievements of DRDO and said that during the year, several systems developed by DRDO have been delivered, inducted or handed over to the users. He expressed happiness that the Acceptance of Necessity (AoN) has also been accorded this year for induction of several DRDO developed systems worth more than 1 lakh 42 thousand crores. This is the highest ever accorded to DRDO developed systems in any year. This constitutes a significant component of Aatmanirbharta in Defence Production. He stated that several systems have also either completed or are in the final stages of User evaluation and many other systems are undergoing Developmental trials. He set the target for DRDO to ensure that the systems which are under User trials and under final stages of developmental trials, get accepted by the User in 2024, so that they are ready for induction. He said that DRDO laboratories should focus on development of complex, first of its kind systems and development of advanced and critical technologies, which will enable the country to become AtmaNirbhar and a leader in Defence Technology. Chairman DRDO highlighted some other success stories in his speech. He stated that it was a matter of great pride for all of us when Hon'ble Prime Minister flew in LCA Trainer on Nov 25, 2023. He mentioned that on the National Technology Day on 11 May 2023, Hon'ble Prime Minister dedicated the Rare Earth Permanent Magnet (REPM) plant

at IREL Vizag to the Nation. This plant was set-up using DRDO Technology. He said that indigenously Designed and Developed Heavy Weight Torpedo (HWT) 'Varunastra' was successfully test fired with a live warhead against an undersea target on 05th Jun 2023 by the Indian Navy. This was the first of its kind demonstration in the country or may be even in the world. He also mentioned about firing of Astra Mk1 air to air missile from Tejas for the first time, Landing of LCA Navy on Indigenous Aircraft Carrier INS Vikrant II, Deployment of DRDO's D4 system at Rashtrapati Bhawan, G-20 Summit, Republic Day Parade and Beating Retreat Ceremony. He further stated that DRDO's oceanographic research vessel 'INS Sagardhwani' embarked on Sagar Maitri Mission-4 to Oman to establish long-term scientific partnerships with Indian Ocean Rim countries in 'Ocean Research & Development. He mentioned that 15 DRDO Industry Academia Centres of Excellence (DIA-CoEs) have already been sanctioned several projects and will enable DRDO laboratories to seamlessly transition some futuristic technologies from low TRLs to high TRLs. Secretary DDR&D and Chairman DRDO in his address brought out that towards enabling industry, DRDO has been partnering with them for the realization of its systems. DRDO test facilities have been opened to the industries for utilisation. He pointed out that so far 1650 ToT's on DRDO developed systems have been handed over to the Indian Industries out of which 109 Licensing Agreements for Transfer of Technology (LAToTs) were signed with Indian Industries during 2023 for DRDO products. In order to make the Technology Development Fund (TDF) and allied schemes more effective, Hon'ble Raksha Mantri had constituted a committee headed by Dr Kakodkar, former Secretary DAE and Dr Saraswat, Member NITI Aayog to suggets ways to fund cutting edge research like what DARPA does in USA. The committee has submitted its report and once Hon'ble RM gives his approval we will implement this scheme in 2024. He concluded his adddress by expecting that everyone has to focus on achieving higher user satisfaction and incorporating artificial intelligence/machine learning in all our systems and technologies. He further said that each laboratory should appoint an AI/ML champion to proactively pursue the inclusion of AI/ML in all our systems and technologies. He also launched the Quantity-Distance Software developed by HEMRL Pune to automate the siting of explosives and related buildings. The software is an essential tool for all MoD establishments engaged in creating explosive related infrastructure in optimum time and with greater precision.

Source: https://pib.gov.in/PressReleasePage.aspx?PRID=1992193

DRDO to showcase Nari Shakti & indigenous critical systems & technologies during Republic Day Parade 2024

Many critical systems/technologies developed by Defence Research & Development Organisation (DRDO) will be showcased during the 75th Republic Day Parade at Kartavya Path on January 26, 2024. As an enabler of 'Aatmanirbharta', the valuable contribution of women scientists of DRDO in core areas of Defence Research has been significant. The DRDO tableau is based on the theme 'Women power in protecting the nation by providing the defence shield in all 5 dimensions namely Land, Air, Sea, Cyber, and Space'. Women's involvement in Defence R&D will be prominently highlighted in the tableau. Outstanding Scientist Smt Sunita Devi Jena will be the Contingent Commander. The tableau displays Man Portable Anti-tank Guided Missile (MPATGM), Anti-Satellite (ASAT) Missile, and Agni-5, Surface-to-Surface Ballistic Missile, Very Short Range Air Defence System (VSHORADS), Naval Anti-Ship Missile–Short Range (NASM-SR), Anti-Tank Guided Missile 'HELINA', Quick Reaction Surface-to-Air Missile (QRSAM), Astra, Light Combat Aircraft 'Tejas', 'Uttam' Active Electronically Scanned Array Radar (AESAR), Advanced Electronic Warfare System 'Shakti', Cyber Security systems, Command Control Systems and the Semi Conductor Fabrication Facility. Anti-Satellite (ASAT) Missile used in Mission Shakti was a major breakthrough in demonstrating the nation's anti-satellite technology and precision strike capability. India is the fourth country to acquire such a specialised and modern capability. Agni-5 is the surface-to-surface ballistic missile capable of striking targets with high degree of accuracy. Indigenously developed MPATGM is a third generation ATGM with 'Fire & Forget' 'Top Attack' and night operational capability. It is launched from a man portable launcher, integrated with thermal sight. NASM-SR is the first indigenous air launched anti-ship missile system. VSHORADS is a Man Portable Air Defence System meant for neutralising low altitude aerial threats at short ranges. Helicopter-launched Nag is the third generation, fire and forget Anti-Tank Guided

Missile that can engage targets in direct hit mode as well as top attack mode. The system has all-weather day and night capability and can defeat battle tanks having conventional as well as explosive reactive armour. The QRSAM is all-weather, Air-Defence system that provides mobile air defence cover to mechanised assets of the Indian Army in the Tactical Battle Area. ASTRA, is a state-of-the-art beyond visual range air-to-air missile to engage and destroy highly maneuvering supersonic aerial targets. LCA Tejas is indigenously developed light-weight and multirole 4+ generation tactical fighter aircraft which can carry laser guided bombs and modern missiles to cause extreme damage to the target. Uttam Active Electronically Scanned Array Radar (AESAR) is a multimode, solid-state active phased array fire control radar with scalable architecture that can be adapted for various types of fighter class of aircraft. Advanced Electronic Warfare (EW) System 'Shakti' has been designed and developed for Indian Navy for the interception, detection, classification, identification and jamming of conventional and modern Radars. Many other systems/technologies developed by DRDO will also be displayed at Kartavya Path in various contingents of the Armed Forces. This includes Pinaka, Nag Missile System, mobile bridging system 'Sarvatra', Medium Range Surface to Air Missile (MRSAM), Weapon Locating Radar 'Swathi' etc. The fly past of the Indian Air Force will include LCA Tejas and AEW&C developed by DRDO. The DRDO is a design and development agency for the Armed Forces and to reinforce the spirit of 'Aatmanirbhar Bharat', it is partnering with all stakeholders of defence ecosystem including academia, industry, MSMEs, start-ups and Services in developing state-of-the-art defence systems.

Source: https://pib.gov.in/PressReleasePage.aspx?PRID=1999044