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(01 March 2024 to 31 March 2024)

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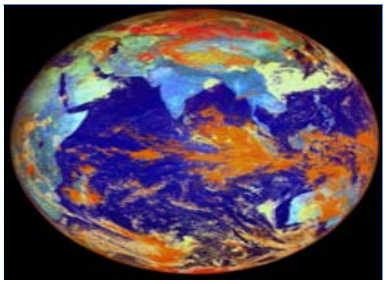

Eminent Indian Aeronautical and Aerospace Personalities in India

Series:14

Lt. Gen. (Dr) V J Sundaram PVSM, AVSM, VSM

Lt. Gen. (Dr) V J Sundaram PVSM, AVSM, VSM (Retd.)

President of The Aeronautical Society of Indian (1997)

Lt. Gen. (Dr.) V.J.Sundaram, obtained his B.Sc and BE (Mechanical) degrees from Mysore University followed by ME (Aero) and Ph.D from the Indian Institute of Science.

He joined the Indian Army in 1957 and worked on border roads at high altitudes in Jammu & Kashmir (Poonch Sector) as well as the Northeast (Sela-Tawang Sector), followed by tenures in infantry divisions and training centers.

After completing courses in telecommunication engineering and guided missiles he was at DRDL from 1968 to 1997. Concerning technology, he worked in the areas of propulsion, structures, environmental testing and missile assembly. He was Head of Structures and later Director of Propulsion.

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The editorial team invites your views, suggestions, to the News about Members Column and contributions to the e-news.

He led the Flight Vehicles design team for PRITHVI in 1982-83 and was its first Project Director (1983-89), guiding its induction into the Army with 95% indigenous content. From 1992 to 1997, He was Director of both DRDL and RCI with overall responsibility for all Indian Missile Projects. During this period, he was also a Director on the board of Bharat Dynamics Limited. He has strongly promoted the development of miniaturized flight instrumentation systems for missiles.

He was awarded the VSM in 1980 for his work on the Devil Surface to Air missile, the AVSM in 1989 for the PRITHVI, and PVSM in 1994 for overall contribution to the Indian Missile Program. He was an advisor to Aeronautical Development Agency on critical technologies denied to Light Combat Aircraft from 1997 to 2001

The esteemed honours include being the President of Aeronautical Society of India (1997) and since 2001 he has been the President of Association for Machines and Mechanisms (India). As Chairman of the Board of Governors of the National Design and Research Forum from 2000 to 2004, he promoted MEMS, Nano, Bio Sensor and Micro Air Vehicle Technologies across India in various institutions.

His current activities are Micro Air Vehicles, Micro-Nano-Bio Systems as well as the interfacing of biology and engineering.

He is the recipient of National Aeronautics Prize, Aeronautical Society of India – 1988, Aryabhata Award, Astronautical Society of India – 1998 & Instrument Society of India Award – 2002. Further he is recipient of the Lifetime Achievement Award of DRDO in 2005 from Dr. Manmohan Singh, then, Prime Minister of India.

CURRENT AFFAIRS

ISRO achieves yet another success in the RLV Landing Experiment

ISRO has achieved a major milestone in the area of Reusable launch vehicle (RLV) technology, through the RLV LEX-02 landing experiment, the second of the series, conducted at Aeronautical Test Range (ATR), Chitradurga in Karnataka today morning at 7:10 hrs IST. After the RLV-LEX-01 mission was accomplished last year, RLV-LEX-02 demonstrated the autonomous landing capability of RLV from off-nominal initial conditions at release from Helicopter. The RLV was made to undertake more difficult manoeuvres with dispersions, correct both cross-range and downrange and land on the runway in a fully autonomous mode. The winged vehicle, called Pushpak, was lifted by an Indian Airforce Chinook helicopter and was released from 4.5 km altitude. After release at a distance of 4 km from the runway, Pushpak autonomously approached the runway along with cross-range corrections. It landed precisely on the runway and came to a halt using its brake parachute, landing gear brakes and nose wheel steering system. This mission successfully simulated the approach and high-speed landing conditions of RLV returning from space. With this second mission, ISRO has re-validated the indigenously developed technologies in the areas of navigation, control systems, landing gear and deceleration systems essential for performing a high-speed autonomous landing of a space-returning vehicle. The winged body and all flight systems used in RLV-LEX-01 were reused in the RLV-LEX-02 mission after due certification/ clearances. Hence reuse capability of flight hardware and flight systems is also demonstrated in this mission. Based on the observations from RLV-LEX-01, the airframe structure and landing gear were strengthened to tolerate higher landing loads.






The mission was accomplished by Vikram Sarabhai Space Centre (VSSC) along with the Liquid Propulsion System Centre (LPSC) and the ISRO Inertial Systems Unit (IISU). Collaboration from various agencies including IAF, ADE, ADRDE and CEMILAC contributed to the success of this mission. Shri S Somanath, Chairman, ISRO / Secretary, DOS, congratulated the team for the flawless execution of this complex mission. On the success of the landing experiment, Director VSSC Dr S Unnikrishnan Nair mentioned that through this repeated success, ISRO could master the terminal phase manoeuvrings, landing and energy management in a fully autonomous mode, which is a critical step towards the future Orbital Re-entry missions. The team was guided by Shri Sunil P, Programme Director, Advanced Technology and Systems Programme, VSSC. Shri J Muthupandian, Project Director, RLV was the Mission Director and Shri B Karthik, Deputy Project Director, RLV was the Vehicle Director for this mission. For the success of this experiment, ISTRAC provided tracking support, SAC provided a Pseudolite system and a Ka-band Radar Altimeter, LPSC offered all pressure sensors on the wing body, IISU provided navigation hardware/ software and an integrated solution. Metrological and wind measurement support was provided by SDSC-SHAR, and URSC offered ground power support.

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

DRDO successfully conducts Mission Divyastra Indigenously developed Agni-5 missile makes maiden flight with MIRV

Defence Research and Development Organisation (DRDO) conducted first successful flight test of indigenously developed Agni-5 missile with Multiple Independently Targetable Re-Entry Vehicle (MIRV) technology. The flight test named Mission Divyastra was carried out from Dr APJ Abdul Kalam Island in Odisha. Various Telemetry and radar stations tracked and monitored multiple reentry vehicles. The Mission accomplished the designed parameters. Prime Minister Shri Narendra Modi lauded the efforts of the DRDO scientists who participated in the conduct of the complex Mission. In a post on social media platform X He said, “Proud of our DRDO scientists for Mission Divyastra, the first flight test of indigenously developed Agni-5 missile with Multiple Independently Targetable Re-entry Vehicle (MIRV) technology.” Raksha Mantri Shri Rajnath Singh has also congratulated the scientists and the entire team, terming it as an exceptional success. ‘

Source: https://pib.gov.in/PressReleasePage.aspx?PRID=2013549

Indian Air Force bets big on phantom fighters

India’s defence aerospace engineers deserve full credit for getting the AMCA’s design on the drawing board and hopefully off it in 22 years. Even the US and Russia took over 23 years to flight-test their first 5th-generation stealth fighters. Fair winds beckon the Indian Air Force (IAF) with the Cabinet Committee on Security clearing the much-awaited indigenous Advanced Medium Combat Aircraft (AMCA) fighter jet project on March 7. This clears the deck for a fifth-generation stealth fighter before this decade is out. The Aeronautical Development Agency (ADA), which is under the Defence Research and Development Organisation (DRDO), and the Hindustan Aeronautics Limited (HAL) will jointly make the aircraft with several private sector defence companies expected to participate in the Rs 15,000 crore project. The avionics for the AMCA will be developed at the new Flight Control System facility in Bengaluru while the United States aerospace major General Electric’s F-414 engine will power the prototype of the aircraft. An aircraft’s stealth capabilities depend on several cutting-edge technologies. The shape of the aircraft deflects radar waves, and its fuselage is coated with a unique material that absorbs nearly 90 per cent of radar waves. The aircraft’s engines operate so quietly that their heat signature — a tell-tale trail for infrared search and track (IRST) systems — is almost imperceptible to ground and airborne defences. The communication and navigation aids on board the aircraft use electromagnetic wavelengths which are difficult for enemy air defence systems (ADS) to detect. All these bequeath a game-changing nature on stealth warplanes enabling them to play multiple roles such as ground attack, bombing, reconnaissance, and intelligence gathering. In other words, these shadowy flying machines can dominate enemy airspace with impunity, confounding hapless ADS that are clueless about these phantom attackers. No wonder stealth technology remains so zealously guarded. While there are at least 10 known stealth warplane development programmes in the world, only three countries have successfully produced these highly-prized force multipliers: the US, Russia, and China. So that leaves the American F-22 Raptor and the F-35A Lightning II, along with Russia’s Su-57 and Su-75 Checkmate as the only truly 5th generation stealth-capable fighter jets around. India’s defence aerospace engineers deserve full credit for getting the AMCA’s design on the drawing board — and hopefully off it — in a span of 22 years. Even the US and Russia took over 23 years to flight-test their first 5th-generation stealth fighters, which compares favourably with what India could achieve if the AMCA makes its maiden flight in the next five years.. Regardless, DRDO sources seem confident that the AMCA programme will meet all its deadlines as the ADA has already developed many, if not most, of the 5th-generation technologies required for building the aircraft. This will be music to the ears of a beleaguered IAF as it tries to shore up the depleting strength of its fighter fleet which currently stands at 32 squadrons. The Air Force needs to add at least 10 more squadrons to maintain its sanctioned number of 42 squadrons — easier said than done since most legacy fighters such as the MiG-21s and Mirage-2000s are scheduled to be phased out in less than 10 years. The IAF is, therefore, pinning its hopes on inducting the newly-ordered Tejas LCA, along with upgraded Su-30 MKIs, in numbers to bolster its fleet strength. The addition of 40 AMCA

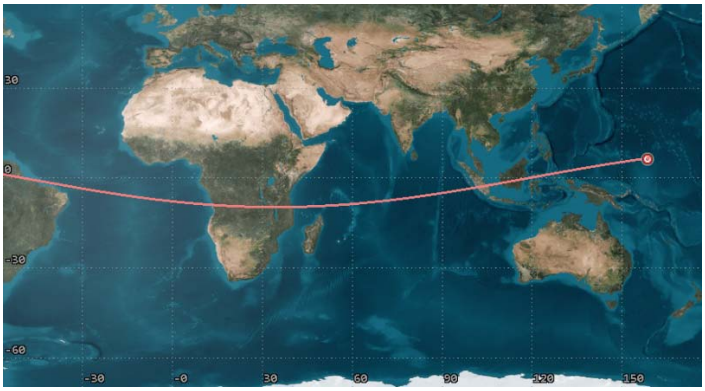
Mark-1s when they enter production, and subsequently 80 more AMCA Mark-2s — with 6th generation capabilities (such as Directed Energy Weapons) and accompanied by unarmed AI drones that attack targets independently — will ensure adequate fleet strength after the Su-30 MKIs are gone. The Air Force would then be able to breathe easy, as phantom fighters like the AMCA Mark-2s rule the skies of the mid-century battlefields.

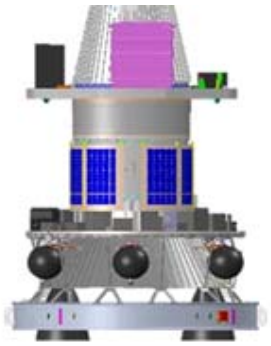
Source: https://www.deccanherald.com/opinion/indian-air-force-bets-big-on-phantom-fighters-2932595

TECHNOLOGY

PSLV accomplishes zero orbital debris mission

Another milestone was achieved by ISRO, when the PSLV Orbital Experimental Module-3 (POEM-3) met its fiery end through a re-entry into the Earth's atmosphere. The PSLV-C58/XPoSat mission has practically left zero debris in orbit. The Polar Satellite Launch Vehicle (PSLV-C58) Mission was accomplished in January, 2024. After completing the primary mission of injecting all satellites into their desired orbits, the terminal stage of PSLV was transformed into a 3-axis stabilized platform, the POEM-3. The stage was de-orbited from 650 km to 350 km, which facilitated its early re-entry, and was passivated to remove residual propellants to minimize any accidental break-up risks. POEM-3 was configured with a total of 9 different experimental payloads to carry out technology demonstrations and scientific experiments on the newly developed indigenous systems. Out of these, 6 payloads were delivered by Non-Government Entities through IN-SPACe. The mission objectives of these payloads were met in a month.





The orbital altitude of the upper stage continued to decay under the influence of natural forces, primarily atmospheric drag with the module (NORAD ID 58695) expected to have impacted the North Pacific Ocean (Lat 6.4 N & Long 158.7 W) on March 21, 2024, at 14:04 UTC (19:34 Hrs. IST). Through the POEM, which serves as a very cost-effective platform for carrying out short-duration space-borne experiments, ISRO has opened up new vistas for academia, startups, and NGEs to experiment with their new payloads. This novel opportunity has been effectively utilized by numerous startups, universities, and NGEs for carrying out experiments in space, which included electric thrusters,

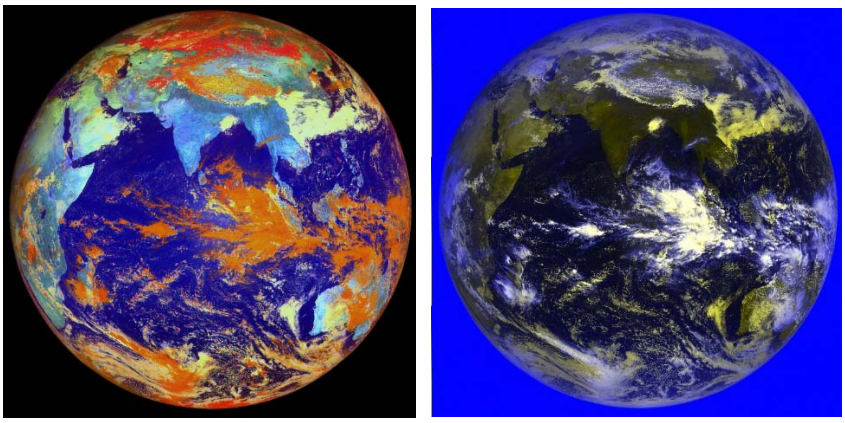
satellite dispensers, and star-tracking. POEM also incorporates new features such as total avionics in single-chain configuration, industrial-grade components in avionics packages including Mission Management Computer, standard interfaces for electric power, telemetry & telecommand, and new in-orbit navigation algorithms making use of rate-gyro, sun sensor, and magnetometer. For the effective conduct of experiments onboard in POEM-3, the body rates were stabilized to less than 0.5 deg/s throughout, and innovative schemes like controlled dumping of residual propellant after the main mission were introduced for minimizing disturbances due to passivation. The Vikram Sarabhai Space Centre (VSSC) has taken the lead in conceptualizing and realizing the POEM by augmenting the 4th stage of PSLV. PSLV-C58/XPoSat is the third such mission in the series, with POEMs being successfully scripted each time. The payload operations were carried out effectively by the spacecraft operations team from the mission operations complex (MOX) at ISTRAC and ISRO's System for Safe and Sustainable Spacecraft Operations Management (IS4OM) has been monitoring and analyzing the orbital decay all through. Till near re-entry, POEM-3 was tracked by ISTRAC ground stations. The Multi-Object Tracking Radar (MOTR) at Shriharikota also tracked the PS4 stage till the morning of March 21. POEM-3 was also supported by other Centres like URSC, LPSC and IISU. ISRO will continue its commitment to providing a cost-effective orbital experiment platform. As the growing menace due to space debris, especially with multiple small satellite constellations coming up, poses a significant threat to space activities, including satellite launches, human spaceflight, and space exploration missions, ISRO, being a responsible space agency, is committed to mitigating this threat through the development and implementation of advanced debris tracking systems, space-object deorbiting technologies, and responsible satellite deployment practices, thus safeguarding orbital environments for present and future space endeavors.

Source: https://www.isro.gov.in/PSLVC58_POEM3_accomplish_zero_orbital_debris_mission.html

INSAT-3DS begins imaging the Earth

INSAT-3DS, the meteorological satellite, has initiated Earth imaging operations. The first set of images by the meteorological payloads (6-channel Imager and 19-channel Sounder) was captured on March 7, 2024. The satellite was launched on February 17, 2024. After completing orbit-raising operations, the satellite reached the designated geostationary slot for the In Orbit Testing (IOT) on February 28, 2024. IOT of the Satellite Communications was conducted between February 29, 2024, and March 3, 2024. As part of Meteorological Payload IOT, the first session of imaging for Imager and Sounder payloads was carried out on March 7, 2024. The payload parameters are found to be nominal, complying with payload specifications. Thus, all the payloads of INSAT-3DS have been tested to perform nominally. Imager and Sounder payloads onboard 3DS are similar to the payloads flown on 3D and 3DR. Significant improvements have been achieved in radiometric accuracy, black body calibration, thermal management, and imaging throughput, among others. The payloads are designed and developed at the Space Applications Centre (SAC), Ahmedabad. The first images are processed and released at the Master Control Facility, Hasan. The 6-channel imager equipment captures images of the Earth's surface and atmosphere across multiple spectral channels or wavelengths. The use of multiple channels allows for gathering information about various atmospheric and surface phenomena, such as clouds, aerosols, land surface temperature, vegetation health, and water vapour distribution. The imager could be

configured to capture specific features of interest. The 19-channel sounder captures radiation emitted by the Earth's atmosphere through channels carefully chosen to capture radiation emitted by different atmospheric constituents and properties like water vapour, ozone, carbon dioxide, and other gases, while others may be designed to measure temperature variations in different layers of the atmosphere. These Payloads generate over 40 geophysical data products such as Sea Surface Temperature, Rainfall (precipitation) Products, Land Surface Temperature, Fog Intensity, Outgoing Longwave Radiation, Atmospheric Motion Vectors, High-Resolution Winds, Upper Tropospheric Humidity, Cloud Properties, Smoke, Fire, Mean Surface Pressure, Temperature Profiles, Water Vapor Profiles, Surface Skin Temperature, Total Ozone, etc., for the user community. The data collected derive information about the vertical structure of the atmosphere, crucial for weather forecasting, climate monitoring, and understanding atmospheric processes.



Source: https://www.isro.gov.in/INSAT-3DS_imaging_Earth.html

Dr G Sateesth Reddy, President, AeSI stated Divyastra, calls it a gamechanger for forces.

The 'Mission Divyastra', the successful flight test of the Agni-5 missile conducted by the Defence Research and Development Organisation (DRDO), the former chief of the agency, G Satheesh Reddy, on Wednesday said it was a 'game-changer' for armed forces. The missile is equipped with the MIRV (multiple independently targettable reentry vehicle) technology, enabling it to launch multiple warheads at different targets at the same time. Prime Minister Narendra Modi came out in praise of the DRDO after the successful launch of 'Mission Divyastra', which put India in an elite club of nations to have developed the MIRV tech. Speaking to ANI on Wednesday, the former DRDO chief said, "We have developed long-range missiles, with the Agni-5 being the latest in our inventory. The Agni-5 is equipped with the MIRV tech, enabling the launch of multiple warheads at the same time. We have multiple payloads now that can be used to strike targets lying at a distance of a few hundred kilometres simultaneously. The enemy wouldn't have a chance to react and strike back, as its missile defence would be disabled. So, 'Divyastra' is undoubtedly a game-changer for our armed forces. It is equipped with a technologically advanced system and will add significantly to the might of our defence forces." He added that Prime Minister Narendra Modi directed that this mission be accomplished through the use of advanced technologies. "Having already developed long-range missiles, the MIRV technology was something our scientists had been working on for a couple of years. If this tech can be used in Agni-5, it could be put to use in other missiles as well. However, the need for this tech would depend on the strike range of the missile, whether it merits being MIRV-enabled, what range you want to strike at and other such factors," he added. "But having worked on similar technologies before, I can say that the PM, himself, directed our scientists to pursue a mission of

this kind. I believe that it was on his orders that the scientists took up this mission in earnest and developed this missile. The flight test met with success and all mission objectives were accomplished," Reddy added. Underscoring the contribution of women scientists, who were majorly involved in this mission, the former DRDO chief added, "Many women scientists are working in defence research and development, contributing a lot to the development of new-age technologies. They are working in various positions (in the DRDO). DRDO News DRDO Technology News 2 Be it project directors, program directors, lab directors or director generals, our women scientists are at the front and centre of the development of new defence techs. They have been playing a very important role in the emergence of many new technologies and systems development. As for the MIRV, many women scientists, technological officers and technicians have worked on it. The contribution of women in the development of MIRV has been immense."

Source:https://www.business-standard.com/external-affairs-defence-security/news/ex-drdo-chairmanreddy-hails-divyastra-calls-it-a-game-changer-for-forces-124031400045_1.html

BUSINESS

MoD signs contracts worth Rs 8073 Cr with HAL for acquisition of 34 Advanced Light Helicopters (ALH) Dhruv Mk III for Indian Army & Indian Coast Guard

Consequent upon approval of the Cabinet Committee on Security (CCS), the Ministry of Defence signed two contracts for a combined value of Rs 8073.17 crore with Hindustan Aeronautics Limited (HAL), Bengaluru on 13 March 2024 for acquisition of 34 Advanced Light Helicopters (ALH) Dhruv Mk III along with Operational Role Equipment for Indian Army (25 ALHs) and Indian Coast Guard (09 ALHs) under Buy (Indian-IDDM - Indigenously Designed, Developed & Manufactured) category marking a significant move towards indigenisation in defence manufacturing. The ALH Dhruv Mk III UT (Utility), the Indian Army version, is designed for Search & Rescue, Troop Transportation, Internal Cargo, Recce/ Casualty Evacuation etc. It has proved its performance in high altitude regions like Siachen Glacier and Ladakh. The ALH Mk III MR (Maritime Role), the ICG version, is designed for Maritime Surveillance and Interdiction, Search and Rescue, Rappelling Operations and also for Cargo & Personnel Transportation, Pollution Response using external cargo carrying capability and Medical Casualty Evacuation. It has proved its mettle even in adverse atmospherics conditions over sea and land. The project will generate employment of an estimated 190 Lakh Man-Hours during its duration. It will also entail supply of equipment from more than 200 MSMEs and 70 local vendors will be involved in the indigenisation process which is likely to have a positive impact on employment generation in this sector, thus furthering the vision of 'Aatmanirbhar Bharat'.

Source: https://pib.gov.in/PressReleasePage.aspx?PRID=2014340

EVENT

The Aeronautical Society of India – CFD Division presents CFD Symposium 2024

For more details: https://sites.google.com/bitmesra.ac.in/aesicfd2024

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