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New Thippasandra Post
Bangalore 560 075
Karnataka, INDIA
Phone No : +91 80 25273851
Email: editoraesi@yahoo.com
Website: www.aerjournalindia.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

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Head Quarters

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

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ISRO releases Chandrayaan-2 data as spacecraft completes 2 years in lunar orbit

The Chairman of Indian Space Research Organisation K Sivan inaugurated a Lunar Science Workshop 2021, to commemorate the completion of two years of operation of Chandrayaan-2 spacecraft around the lunar orbit. Chandrayaan-2 data product and science documents were released by Sivan, also Secretary in the Department of Space (DoS), along with data from Chandrayaan-2 orbiter payloads, Bengaluru-headquartered ISRO said in a statement. The eight payloads onboard Chandrayaan-2 are conducting scientific observations of the Moon by remote sensing and in-situ techniques, it said. “The science data are being made available for analysis by academia and institutes, for a greater participation to bring out more science from Chandrayaan-2 mission,” ISRO said. The two-day workshop, organised by ISRO, is being live-streamed on the space agency’s website and Facebook page, for effectively reaching the students, academia and institutes, and to engage the scientific community to analyse Chandrayaan-2 data. In addition, there will be lectures on the Chandrayaan-2 mission, tracking, operations, and data archival aspects.



Source: <https://www.deccanherald.com>

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CURRENT AFFAIRS

In a first, Union Ministers Nitin Gadkari and Rajnath Singh, IAF chief land in a C-130J Super Hercules on a highway in Rajasthan

Union Defence Minister Rajnath Singh and Minister for Road Transport & Highways Nitin Gadkari inaugurated an Emergency Landing Field (ELF) on National Highway-925 at Gandhav Bhakasar Section at Barmer, in Rajasthan. According to an official statement, the National Highways Authority of India (NHAI) has developed a 3-km stretch as an Emergency Landing Facility (ELF) for the Indian Air Force which is just 40 km off the Pakistan border. Visuals of the inauguration commencing with Union Ministers Rajnath Singh and Mr Nitin Gadkari and Air Chief Marshal RKS Bhadauria landing at the strip in a C-130J Super Hercules transport aircraft have surfaced. Visual of a Sukhoi Su-30 MKI fighter aircraft landing at the National Highway as part of the EFL demonstration has also surfaced. The dignitaries are currently attending an event at Jalore to celebrate the historic feat. As per the Indian Air Force, Chief of Defence Staff General Bipin Rawat was also present to witness the landing demonstration at the National Highway EFL. The demonstration will also see Jaguars and Su-30 MKIs landing and taking off from the strip. Several fighter jets had landed on the strip in plausibly a trial just ahead of the inauguration.

About the Emergency Field Landing (EFL)

The 3-km emergency landing strip has been constructed as part of the two-lane paved shoulder of Gagariya-Bakhasar and Satta-Gandhav under the ambitious Bharatmala Pariyojana. As per an official statement, the project will not just increase the connectivity between the villages of Barmer and Jalore district but also enhance the vigilance of the Indian Army on the western border. In a bid to strengthen the security network, 3 helipads (size 100 x 30 metres each) have been constructed in Kundanpura, Singhania and Bakhasar villages under this project as per the requirements of the defence forces. The construction of ELF had commenced in July 2019 and was completed successfully in January 2021.

Source: <https://www.opindia.com/>

India is completely 'atmanirbhar' in missile technology: DRDO chief

India has achieved "complete self-reliance" in missile technology and the most advanced missiles can now be developed in the country, DRDO chairman Dr G Satheesh Reddy said. Delivering a lecture during an online event hosted by the JNU, he also asserted that if a country has to become prosperous and 'Atmanirbhar' (self-reliant), "we need to work on advance technology" and that is where the role of academic institutions will come in a "big way". Reddy recalled the decades of 1980s and 90s in the evolution of the Defence Research and Development Organisation (DRDO) and hailed the role of scientists, including former president Dr APJ Abdul Kalam, known as the 'Missile Man' of India, who worked on missile technologies that provided a "quantum jump" in development of advanced systems and platforms. He mentioned the five missiles — Prithvi, Agni, Akash, Trishul and Nag — developed by India under the Integrated Guided Missile Development Programme (IGMDP). "We developed, Prithvi, Agni, Akash, Trishul, Nag under the IGMDP. Agni was also a technology demonstrator for the country in going out of the atmosphere and returning to the atmosphere. "And, then we joined a select club of countries with ballistic missiles which can intercept an enemy missile and kill it. And, then many more missiles with long-range and more capabilities," he said. "Today I can confidently say that we are having complete 'Atmanirbharta' in the missile technology, and we can develop the most advanced missiles in the country," Dr Reddy said. He also spoke about the anti-satellite (A-SAT) test that India conducted in March 2019, shooting down one of its satellites in space with an A-SAT missile to demonstrate this complex capability, joining the elite club of countries — the US, Russia and China — which have such capabilities. The lecture on 'Defence Technologies for India's National Security' was organised by the School of Engineering of the JNU, and its vice-chancellor Mr M Jagadesh Kumar, several faculty and students also attended the online event. Reddy, who is the secretary in the Department of Defence R&D, underlining the importance of indigenous technology, said the IAF had recently ordered 83 LCA Tejas aircraft. On a question on drone technology, he said as these technologies are coming up, asymmetric warfare is gaining an upper hand. "Drone technology is coming up in a big way, and drone-based weapons is also

taking a big shape. It had been seen that in the recent conflict also, drone-based technology played a role. Lot of players in the industry are working on it, and a lot of systems being developed, particularly by the youth,” the DRDO chief said, adding that anti-drone technology has been demonstrated by the organisation. In his address, Reddy asserted that in the last six-seven years, he has seen students and innovators going beyond ICT and choosing subjects like material science and laser technology which will be important in the sector of defence technologies, adding that the ecosystem has undergone a change. He pitched for academic institutions to play a larger role in achieving the vision of ‘Atmanirbhar Bharat’. “Today, if our country has to be self-reliant, if we have to become ‘Atmanirbhar’ and prosperous, we need to work on advance technology and that is where the role of academic institutions will come in a big way,” Dr Reddy said. He spoke of the centres of excellence that have come up at various IITs, IISc and the Jadavpur University among others, and opportunities for students to work as a junior research fellow and a senior research fellow at the DRDO. Reddy added that the DRDO is working on various projects with more than 300 academic institutions. In the advanced technology domain, he said, some of the areas in which DRDO is working on include anti-drone system, artificial intelligence (AI), cyberspace, secure systems and communications. Dr Reddy emphasised on the synergetic links needed between the DRDO, the academia and the industry, saying the landscape is so huge, it cannot be done alone, and added that industry sector is coming up as a development partner for the organisation. The DRDO, along with the All India Council for Technical Education (AICTE), has also launched an M.Tech course in defence technology. More than 40 engineering institutions have responded to offering this course, which has six disciplines. Besides, B.Tech elective courses also there, he said. The DRDO, together with the higher education department, is also sponsoring PhD programmes on defence technology-related subjects for students who will also work at its labs, and about 40 have already joined, he added.

Source: <https://www.indiatoday.in/>

Chandrayaan-2 orbiter payloads made discovery-class findings, says ISRO

The observations of the Chandrayaan-2 orbiter payloads have yielded discovery-class findings, according to the Indian Space Research Organisation (ISRO). There were eight scientific payloads hosted on the orbiter craft. They are: Chandrayaan-2 Large Area Soft X-ray Spectrometer (CLASS), Solar X-ray Monitor (XSM), CHandra's Atmospheric Compositional Explorer 2 (CHACE 2), Dual Frequency Synthetic Aperture Radar (DFSAR), Imaging Infra-Red Spectrometer (IIRS), Terrain Mapping Camera (TMC 2), Orbiter High Resolution Camera (OHRC), and Dual Frequency Radio Science (DFRS) experiment. Earlier this week, ISRO opened up its scientific discussions on Lunar Science to “the people of the country, to engage the Indian academia, institutes, students, and people from all disciplines and walks of life”, in the form of a two-day ‘Lunar Science Workshop & Release of Chandrayaan-2 Data’. The discovery of Chromium and Manganese on the lunar surface, which are available in trace quantities, by the CLASS payload was announced. The observations of microflares of the Sun, during the quiet-Sun period, which provide important clues on the coronal heating problem of the Sun, were made by the XSM payload. The first-ever unambiguous detection of the hydration features of the Moon was achieved by Chandrayaan-2 with its infra-red spectrometer payload IIRS, which captured clear signatures of Hydroxyl and water-ice on the lunar surface, ISRO said. The DFSAR instrument could study the subsurface features of the Moon, detected signatures of the sub-surface water-ice, and achieved high resolution mapping of the lunar morphological features in the polar regions, it was stated. “The observations (of Chandrayaan-2 orbiter payloads) have been yielding intriguing scientific results, which are being published in peer-reviewed journals and presented in international meetings,” Dr Sivan said. The science data archived in Indian Space Science Data Centre (ISSDC) at Byalalu, near here, are being disseminated to public through its ‘PRADAN’ portal. The questions received from the academia, institutes and students were addressed by the ISRO scientists during the two-day deliberations. A panel discussion provided the opportunity to academia, institutes and students to interact with the ISRO scientists on lunar science and Chandrayaan-2, ISRO said. Chandrayaan-2 is the second spacecraft in the Indian series of Lunar exploration satellites.

Source: <https://www.deccanherald.com>

ISRO's NETRA in Bengaluru to soon receive information from US agency about threats to space assets

The 'NETRA' in Bengaluru will soon start collaborating with the Combined Space Operation Center (CSpOC) located at the Vandenberg Air Force Base in California to protect satellites of India and the United States from natural and man-made threats. India and the United States will sign a Memorandum of Understanding on Space Situational Awareness by the end of this year, creating a framework for sharing data and services to ensure the long-term sustainability of outer space activities, according to a joint statement issued after Prime Minister Narendra Modi's meeting with President Joe Biden at the White House in Washington D.C. The agreement will help the Indian Space Research Organization's 'NETRA' in Bengaluru to receive from the CSpOC in the US data about space debris and other objects in the space and potential threat they could pose to the safety and security of the new launches as well as the existing satellites and other space assets. The ISRO opened its NETRA – Network for Space Object Tracking and Analysis – within the ISTRAC campus at Peenya in Bengaluru on December 14 last year. The US Joint Space Operation Command Center (JSpOC) transitioned into the CSpOC – a US-led multinational initiative involving the UK, Australia, Canada, France, Germany and New Zealand. It receives inputs from the Space Surveillance Network and share data with the nations having Space Situational Awareness agreement with the US. Mr Modi also discussed India-US bilateral cooperation in the space sector with Biden's Vice President Kamala Harris, who heads the National Space Council of America.

Source: <https://www.deccanherald.com>

Made for mission life of 6 months, India's Mars probe completes 7 years in orbit

India's Mars Orbiter spacecraft has completed seven years in its orbit, well beyond its designed mission life of six months. "Indeed, a satisfying feeling," K Radhakrishnan who as the then Chairman of Indian Space Research Organisation (ISRO) led the Mars Orbiter Mission (Mangalyaan) team told PTI on the milestone. MOM is the maiden interplanetary mission of ISRO. Launched on November 5, 2013, the probe was successfully inserted into Martian orbit on September 24, 2014 in its first attempt. MOM is primarily a technology demonstration venture and all the mission objectives were successfully met, according to officials of Bengaluru-headquartered India's national space agency. The main lessons learnt were in the field of design and realisation of systems and subsystems, launch for interplanetary mission, insertion into other planet's orbit, operation of the spacecraft and scientific instruments around Mars orbit, they said. The lessons learnt have raised the confidence of ISRO scientists for taking up future interplanetary missions. ISRO has been continuously monitoring the spacecraft and its five scientific instruments, and officials said scientific analysis of the data being received from MOM spacecraft is in progress. On the health of the spacecraft, Mr M Annadurai, who was the Programme Director of MOM, said the spacecraft's "moving elements are facing some issues and some of the redundancies we have to switch over." "The spacecraft's health is reasonably good considering that we are in the seventh year," Mr Annadurai told PTI. He expects the spacecraft to have a mission life of probably another one year. On the reasons for the long mission life, Mr Annadurai said ISRO had done corrections after learning lessons from the Chandrayaan-1 venture, in terms of reconfiguring the spacecraft and optimisation of fuel management, among others. Noting that Earth remote-sensing satellites typically have a mission life of seven to nine years, he said it was a very satisfying moment that India could establish that around Mars also, a spacecraft can be in operation for such a long period. On some criticism in some quarters that scientific output of the MOM was "low", Mr Annadurai said it was more of a technology-demonstration mission. He pointed out that the spacecraft was launched by PSLV as GSLV was not in operational condition then. ISRO could apportion only about 15 kg for scientific instruments, and the time available for scientists to develop them was only 18-19 months. "I don't think we could have done better than what we have done," Mr Annadurai said.

Source: <https://www.deccanherald.com>

New version of Akash missile successfully flight-tested

A new version of the Akash missile was successfully flight-tested from the integrated test range at Chandipur in Odisha, officials said. The missile — 'Akash Prime' — intercepted and destroyed an unmanned target mimicking an

enemy aircraft in its maiden flight test, they said. The flight testing took place at around 4:30 pm, the officials said. "In comparison to the existing Akash system, Akash Prime is equipped with an indigenous active RF seeker for improved accuracy. Other improvements also ensure more reliable performance under a low-temperature environment at higher altitudes," said an official. The modified ground system of the existing Akash weapon system was for the flight test. Defence Minister Rajnath Singh has congratulated the Defence Research and Development Organisation (DRDO), Indian Army, Indian Air Force and other stakeholders on the successful trial of the Akash prime missile. He said the successful flight test proves the competence of the DRDO in designing and developing world-class missile systems. DRDO Chairman Dr G Satheesh Reddy also congratulated the team involved in the successful flight trial of the missile.

Source: <https://www.deccanherald.com>

Tamil Nadu firm to set up unit in Hosur for supplying components for Boeing

Tamil Nadu-based Aerospace Engineers Private Limited has won a long-term contract from Boeing, the world's largest commercial and defence aircraft manufacturer, to produce and supply critical aviation components and parts. The company will invest Rs 150 crore for setting up the new factory at Hosur, the industrial city located just outside Bengaluru, and expanding its existing Salem facility over the next 24 months that will generate employment for 1,000 persons. The state government is already working on transforming Hosur into a hub for manufacturers of electric scooters and their accessories. This is the first time that a company based out of Tamil Nadu is entering into a direct contract with Boeing. Aerospace Engineers Private Limited, which is an MSME unit based in Salem, handed over the contract order to Chief Minister M K Stalin at the Secretariat here. Government officials said the contract won by the Salem-based company is a boost to the state government's aerospace policy and Stalin's dream of 'Make in Tamil Nadu' products making it to every part of the globe. The state government is developing an aerospace park in Sriperumbudur near Chennai for making the state a major hub for manufacturing components for the aerospace industry. Officials said 14 plots have so far been allocated to aerospace industries of which two firms have launched production. The cooperation between Aerospace Engineers Private Limited and Boeing is a significant milestone and will provide an impetus to the growing aerospace and defence ecosystem in Salem & Hosur and Tamil Nadu Defence Industrial Corridor," a senior official said. Aerospace Engineers Private Limited was started in 1988 and is dedicated to manufacturing and supplying high-precision and high-quality parts and sub-assemblies to customers in the aerospace and defence industry.

Source: <https://www.deccanherald.com/>

DRDO successfully flight-tests surface-to-air missile Akash-NG

Defence Research & Development Organisation (DRDO) successfully flight-tested the New Generation Akash Missile (Akash-NG), a surface-to-air Missile from Integrated Test Range (ITR) off the coast of Odisha on July 21, 2021. The flight trial was conducted at around 12:45 PM from a land-based platform with all weapon system elements such as Multifunction Radar, Command, Control & Communication System and launcher participating in deployment configuration. The missile system has been developed by Defence Research & Development Laboratory (DRDL), Hyderabad in collaboration with other DRDO laboratories. The launch was witnessed by the representatives of Indian Air Force. In order to capture flight data, ITR deployed a number of Range stations like, Electro Optical Tracking System, Radar and Telemetry. The flawless performance of the entire weapon system has been confirmed by complete flight data captured by these systems. During the test, the missile demonstrated high manoeuvrability required for neutralising fast and agile aerial threats. Once deployed, the Akash-NG weapon system will prove to be a force multiplier for the air defence capability of the Indian Air Force. Production agencies Bharat Electronics Limited (BEL) and Bharat Dynamics Limited (BDL) also participated in the trials. Raksha Mantri Shri Rajnath Singh has congratulated DRDO, BDL, BEL, Indian Air Force and the Industry for the successful test. Secretary Department of Defence R&D and Chairman DRDO applauded the efforts of the team and said the missile will strengthen the Indian Air Force.

Source: <https://pib.gov.in/>

India & US sign Project Agreement for Air-Launched Unmanned Aerial Vehicle

Ministry of Defence and US Department of Defence signed a Project Agreement (PA) for Air-Launched Unmanned Aerial Vehicle (ALUAV) under the Joint Working Group Air Systems in the Defence Technology and Trade Initiative (DTTI) on July 30, 2021. The PA for ALUAV falls under the Research, Development, Testing and Evaluation (RDT&E) Memorandum of Agreement between Ministry of Defence and US Department of Defence, which was first signed in January 2006 and renewed in January 2015. The agreement is a significant step towards deepening defence technology collaboration between the two nations through co-development of defence equipment. The PA for co-development of ALUAV has been overseen by the Joint Working Group on Air Systems and is a major accomplishment for DTTI. The PA outlines the collaboration between Air Force Research Laboratory, Indian Air Force, and Defence Research and Development Organisation towards design, development, demonstration, testing and evaluation of systems to co-develop an ALUAV Prototype. The Aeronautical Development Establishment (ADE) at DRDO and the Aerospace Systems Directorate at the Air Force Research Laboratory (AFRL), along with the Indian and US Air Forces, are the principal organisations for execution of PA. The agreement was signed by the co-chairs of the Joint Working Group Air Systems under DTTI, Assistant Chief of Air Staff for Plans Air Vice Marshal Narmadeshwar Tiwari from the Indian Air Force and Director, Air Force Security Assistance and Cooperation Directorate Brigadier General Brian R. Bruckbauer from the US Air Force.

Source: <https://pib.gov.in>

India set to deploy long-range missile tracking ship

India is finally set to deploy its first specialized research ship to track incoming nuclear-tipped ballistic missiles and aircraft at long ranges as well as monitor low earth orbit (LEO) satellites, in a major boost to the country's early-warning military capabilities. The indigenously-built 15,000-tonne missile range instrumentation ship, packed with longrange radars, dome-shaped tracking antennae and advanced electronics, will be commissioned as INS Dhruv in the presence of national security advisor Ajit Doval and Navy chief Admiral Karambir Singh at Visakhapatnam on September 10, said sources. The development comes at a time when a similar Chinese vessel is currently prowling in the Indian Ocean Region (IOR) on yet another surveillance and monitoring mission. China regularly sends such ships and survey vessels to the IOR to map oceanographic and other data useful for navigation and submarine operations, among other purposes. With INS Dhruv, India joins a select group of countries like the US, Russia, China and France to have such specialized vessels. The 175-meter-long missile-tracking vessel, earlier codenamed 'VC 11184' as part of a classified project, has been under-construction at the Hindustan Shipyard Ltd at Vizag since 2013-2014, as was earlier reported by TOI. The ship, which will be manned by personnel from the Navy, National Technical Research Organisation (NTRO) and Defence Research and Development Organization (DRDO), has become ready for commissioning after a battery of tests over the last couple of years. "INS Dhruv is a huge ship, with a wide array of advanced technical equipment and even a helicopter deck. It will act as an early-warning system on the high seas to detect and track hostile ballistic missiles, with even multiple manoeuvrable warheads, launched from land or submarines against Indian mainland targets," said a source. The two-tier BMD system currently being developed by DRDO has AAD (advanced air defence) and PAD (Prithvi air defence) interceptor missiles to intercept enemy missiles in the 2,000-km class. INS Dhruv, with such powerful sensors, can also be used to monitor LEO satellites being used by an adversary for military reconnaissance, spying and communications if required, said the source. INS Dhruv, of course, will help in monitoring the flight trajectories and telemetry data of the Agni land-based missiles as well as the 'K' series of submarine-launched ballistic missiles launched by India during trials.

Source: <https://timesofindia.indiatimes.com/>

Leverage opportunities in private industry for future space missions, says ISRO Chairman K. Sivan

Thiruvananthapuram: the Indian Space Research Organisation (ISRO) is fully committed to enabling private industry and the academia to effectively participate in the country's space programme, ISRO Chairman K. Sivan said. Dr. Sivan was addressing the ninth convocation of the Indian Institute of Space Science and Technology (IIST) in virtual mode.

Dwelling on the space sector reforms kicked off by the Central government, he said India had succeeded in laying a strong foundation for the space programme, but cannot go on protecting the old system in the new environment. "That phase is over. We need to move on. For this, we have to leverage the opportunities in the private industry to generate more cash flow and investment," he said, adding that in the changed scenario, the next few years will prove crucial. From an essentially government-funded, government-conducted activity, the space programme is transforming into a private-funded and private-conducted one. All entities under the Department of Space have revised their roles and mandates, he said.

Source: <https://www.thehindu.com/>

Gaganyaan: ISRO readies for Crew Escape System test vehicle flights

The Indian Space Research Organisation (ISRO) is preparing for multiple flights of the specially designed test vehicle that will be used to test the Crew Escape System (CES), which will be a crucial element of India's first human space flight mission (Gaganyaan). Being built at the Vikram Sarabhai Space Centre (VSSC), the vehicle is expected to be ready by the end of this year and ISRO is planning at least one flight before the proposed uncrewed mission now scheduled for mid-2022. VSSC director S Somnath told TOI: "...The design work on CES is done and all the reviews have been completed. Most of the systems of the Test vehicle have been realised and the vehicle is in the integration phase and should be ready by the end of this year. The whole CES has to be tested a few times before we put it in the unmanned flight." ISRO chairman K Sivan said the new vehicle will be used to ensure that there's a flawless mechanism for crew escape, which is a very important aspect of Gaganyaan as it helps deal with any exigency during travel or stay of the astronauts. As reported first by TOI last year, the vehicle is built for the in-flight escape of the crew. The propulsion will be on top of the crew module so that it is able to pull the crew away by lifting the module and take them to a safe place. "We're looking at at least one test vehicle mission before the uncrewed mission. The vehicle is meant for testing an abort. During the flight, we may need to abort at different stages, like high dynamic pressure, critical flight events, etc. The test vehicle will be used to test abortions up to the first stage of the flight. It won't go to orbit," Sivan explained. Crew Module & GSLV-Mk3 Aside from the CES and the test vehicle, VSSC is responsible for the GSLV-Mk3 — the launch vehicle to be used for Gaganyaan — and some elements of the crew module. "All design work on the launch vehicle is complete and we have begun testing. Dr Sivan, while pointing out that VSSC is also responsible for the structural design of the crew module, said all the systems inside the module — avionics, control systems, computers, sensors, etc — and the service module will be built by the UR Rao Satellite Centre (URSAC), while multiple centers will contribute to the Environmental Control and Life Support System (ECLSS). "For the ECLSS, which is a very important part of the crew module, LPSC (Liquid Propulsion Systems Centre) will have a major responsibility. They will build the pressure control system, 20 while VSSC will build the thermal control system and SAC (Space Applications Centre) will develop the crew display, instrumentation etc," Sivan said. He added that the design phase of the crew module has been completed and that various centers have already begun fabrication of the systems.

Source: <https://timesofindia.indiatimes.com/>

Amrita University to offer M.Tech in Defence Technology

Kollam: Amrita Vishwa Vidyapeetham, a leading multi-disciplinary teaching and research institution here, has become one of the pioneers in offering M.Tech in Defence Technology, the post-graduate programme jointly developed by Defence Research and Development Organisation (DRDO), and All India Council for Technical Education (AICTE). The course is developed and being offered at the university now with the objective of meeting the burgeoning skill needs of India's fast-growing defence sector. The university seeks admission for the academic year 2021-22 from engineering students with undergraduate degrees. Since Defence Technology is a multi-disciplinary domain, students from a wide range of engineering streams - from chemical engineering to computer science, can apply, a university statement said here. M. Tech. in Defence Technology courses has been designed to produce postgraduates who will have the necessary theoretical and experimental knowledge, skills and aptitude in various defence systems and contemporary technologies

to carry out R&D. The program will be based on class lectures and main thesis work, it said. During the program, the students will be given the opportunity to do their main thesis work at DRDO labs, defence PSUs, and private defence industries, it said. According to the university statement, India's defence sector is fast expanding with the central government continuing its emphasis on defence-indigenisation to make the country, currently the world's third-largest importer of weapons and defence equipment, self-reliant. Hence, the domestic defence market is booming and the defence industry in the public and the private sector are on the hiring spree, it said. On the launch of M.Tech in Defence Technology, G Satheesh Reddy, Chairman, DRDO, said there is an urgent need to expand the research base for developing advanced technology and for accelerating India's tech self-reliance in defence. "Amrita has been working with DRDO on many of the advanced technologies - particularly in the defence R&D. I am sure that the university will be a fountainhead of talent for the robust defence R&D, and manufacturing ecosystem for the defence industry in the country," he said. P Venkat Rangan, Vice-Chancellor of Amrita University.

Source: <https://timesofindia.indiatimes.com/>

Anti-tank missile completes all trials

The helicopter-launched Nag Anti-Tank Guided Missile (ATGM), Helina, being developed indigenously, has completed all trials and the process for issuing of Acceptance of Necessity (AoN) by the Army has started, said Sachin Sood, Project Director of Helina and Dhruvastra at the Defence Research and Development Laboratory (DRDL) Hyderabad, a laboratory of the Defence Research and Development Organisation (DRDO). "The launcher and missile are ready. There are some Human-Machine Interface [HMI] to be realised, which are going on now," Dr. Sood told The Hindu. While the cost estimate was yet to be done, each missile was expected to cost under ₹ 1 crore, and around 500 missiles and 40 launchers would be required initially, he added. Once the AoN is issued, the Request for Proposal (RFP) would be issued. Some firing trials would be done from the first production lot by the Army at a later stage. Helina is a third-generation fire-and-forget class ATGM mounted on an indigenous Advanced Light Helicopter (ALH), and has a minimum range of 500 metres and a maximum range of 7 kilometres.

Source: <https://www.thehindu.com/>

TECHNOLOGY

NAL adopts Dassault Systèmes solutions to design civil aircraft in India

Dassault Systèmes announced that National Aerospace Laboratories (NAL), a constituent of Council of Scientific and Industrial Research (CSIR) has adopted the Passenger Experience industry solution experience based on the 3DEXPERIENCE platform to design civil aircraft in India, specifically the Saras Mk-2 program. NAL is also using DraftSight, a 2D and 3D Computer Aided Design (CAD) solution for 2D design standardization in the manufacturing of civil aircraft. The DraftSight solution unifies essential 2D drafting, advanced 2D CAD or all-in-one 2D and 3D design with full 3D capabilities for modelling, prototyping, manufacturing and laser cutting. With this adoption and by replacing the existing 2D CAD tools with DraftSight, NAL has expanded its usage of technology solutions from Dassault Systèmes. It has been using the 3DEXPERIENCE platform in its overall mission and mandate to develop aerospace technologies with strong science content, to design and build small and medium-sized civil aircraft, and support the nation's regional connectivity plan such as UDAN (Ude Desh Ka Aam Nagrik). "The 3DEXPERIENCE platform-based Passenger Experience solution has been deployed in designing the cabin and cockpit of the Saras Mk-2 program. Virtual twin-based insights offered by this solution helped us to configure the cabin for various use cases and scenarios," said Mr Jitendra J Jadhav, Director, NAL, in a statement. Saras Mk-2 will be a 19-seater aircraft with features like high cruise speed, lower fuel consumption, short landing and take-off distances, low cabin noise, pressurized cabins and low acquisition and maintenance costs. It will be operable from high and hot airfields, and from semi-prepared airfields. In a statement, Deepak NG, Managing Director, India, Dassault Systèmes said, "As systems in the aerospace and

defense industry become more complex to design, build and deliver, OEMs and suppliers need to accelerate innovation, drive efficiencies and adopt collaborative platforms to allow for greater agility on production rate. Dassault Systèmes is enabling companies in the sector by providing new ways to conceptualize, design, manufacture, test, certify and sustain new air and space vehicles.”

Source: <https://economictimes.indiatimes.com>

Rolls-Royce's all-electric 'Spirit of Innovation' takes to the skies for the first time

We are pleased to announce the completion of the first flight of our all-electric 'Spirit of Innovation' aircraft. At 14:56 (BST) the plane took to the skies propelled by its powerful 400kW (500+hp) electric powertrain with the most power-dense battery pack ever assembled for an aircraft. This is another step towards the plane's world-record attempt and another milestone on the aviation industry's journey towards decarbonisation. Warren East, CEO, Rolls-Royce, said: "The first flight of the 'Spirit of Innovation' is a great achievement for the ACCEL team and Rolls-Royce. We are focused on producing the technology breakthroughs society needs to decarbonise transport across air, land and sea, and capture the economic opportunity of the transition to net zero. This is not only about breaking a world record; the advanced battery and propulsion technology developed for this programme has exciting applications for the Urban Air Mobility market and can help make 'jet zero' a reality." Business Secretary Kwasi Kwarteng said: "The first flight of Rolls-Royce's revolutionary Spirit of Innovation aircraft signals a huge step forward in the global transition to cleaner forms of flight. This achievement, and the records we hope will follow, shows the UK remains right at the forefront of aerospace innovation. "By backing projects like this one, the Government is helping to drive forward the boundary pushing technologies that will leverage investment and unlock the cleaner, greener aircraft required to end our contribution to climate change." The aircraft took off from the UK Ministry of Defence's Boscombe Down site, which is managed by QinetiQ and flew for approximately 15 minutes. The site has a long heritage of experimental flights and the first flight marks the beginning of an intense flight-testing phase in which we will be collecting valuable performance data on the aircraft's electrical power and propulsion system. The ACCEL programme, short for 'Accelerating the Electrification of Flight' includes key partners YASA, the electric motor and controller manufacturer, and aviation start-up Electroflight. The ACCEL team have continued to innovate while adhering to the UK Government's social distancing and other health guidelines. Half of the project's funding is provided by the Aerospace Technology Institute (ATI), in partnership with the Department for Business, Energy & Industrial Strategy and Innovate UK. In the run up to COP26, the ACCEL programme is further evidence of the UK's position at the forefront of the zero-emission aircraft revolution. We congratulate everyone who has worked on the ACCEL project to make the first flight a reality and look forward to the world speed record attempt which will capture the imagination of the public in the year that the UK hosts COP26." Rolls-Royce is offering our customers a complete electric propulsion system for their platform, whether that is an electric vertical takeoff and landing (eVTOL) or commuter aircraft. We will be using the technology from the ACCEL project and applying it to products for these exciting new markets. The characteristics that 'air-taxis' require from batteries are very similar to what is being developed for the 'Spirit of Innovation' so that it can reach speeds of 300+ MPH (480+ KMH) – which we are targeting in our world record attempt. We are committed to ensuring our new products will be compatible with net zero operation by 2030 and all our products will be compatible with net zero by 2050.

Source: <https://www.rolls-royce.com/>

Scientists develop modular device for extraterrestrial experiments

Researchers at the Indian Institute of Science (IISc) and the Indian Space Research Organisation (ISRO) have developed a modular, self-contained device to cultivate microorganisms, which could enable scientists to carry out biological experiments in outer space. In a study published in *Acta Astronautica*, the team showed how the device can be used to activate and track the growth of a bacterium called *Sporosarcina pasteurii* over several days, with minimal human involvement. Understanding how such microbes behave in extreme environments could provide valuable insights for human space missions such as "Gaganyaan," India's first crewed spacecraft set to be launched in 2022. Assistant Professor Koushik Viswanathan of IISc's Department of Mechanical Engineering and a senior author of the study that the device developed by the IISc-ISRO team uses an LED and photodiode sensor combination to track bacterial growth

by measuring the optical density or scattering of light, similar to spectrophotometers used in the lab. It also has separate compartments for different experiments. Each compartment or “cassette” consists of a chamber where bacteria suspended as spores in a sucrose solution and a nutrient medium can be mixed to kickstart growth, by flicking on a switch remotely. Data from each cassette is collected and stored independently. Three cassettes are clubbed into a single cartridge, which consumes just under 1W of power. The team also had to ensure that the device was leak-proof and unaffected by any change in orientation. “This is a non-traditional environment for the bacteria to grow. It is totally sealed and has a very small volume. We had to see whether we would get consistent [growth] results in this smaller volume,” says Alope Kumar, Associate Professor in the Department of Mechanical Engineering, and another senior author. “We also had to make sure that the LED going on and off doesn’t generate much heat, which can change the bacterial growth characteristics.” Using an electron microscope, the researchers were able to confirm that the spores grew and multiplied into rod-shaped bacteria inside the device, as they would have under normal conditions in the lab. “Now that we know this proof-of-concept works, we have already embarked on the next step getting a flight model [of the device] ready,” Viswanathan said. This would include optimising the physical space that the device can take up and its performance under stresses such as vibration and acceleration due to gravity. The device can also be adapted for studying other organisms such as worms, and for non-biological experiments.

Source: <https://www.deccanherald.com>

ISRO exploring possibility of developing next-generation astronomy satellite

The Indian Space Research Organisation is exploring the possibility of developing a next-generation astronomy satellite, an official indicated. ISRO’s first mission dedicated for astronomy, AstroSat, launched on September 28, 2015 with its design life of five years, completed six years of its operation. “It (AstroSat) is expected to last some more years”, Dr A S Kiran Kumar who as the then Chairman of ISRO led the mission team, and is presently serving as the chair of the apex science committee at the space agency, told PTI. “We can expect some more results to come which will be path-breaking”. Asked about the possibility of ISRO launching AstroSat-2, he said: “Not AstroSat-2. Next generation...thinking is going on...depending on how planning happens... follow-on to this (AstroSat) in a different manner are being looked at”. According to ISRO officials, data from AstroSat is widely utilised for the study of various fields of astronomy, from galactic to extra-galactic and from users from all over the world. The multi-wavelength space observatory, which has five unique X-ray and ultraviolet telescopes working in tandem, had detected extreme-UV light from a galaxy, called AUDFs01, 9.3 billion light-years away from Earth. The discovery was made by an international team of astronomers led by Dr. Kanak Saha, at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune and reported in ‘Nature Astronomy’. This team included scientists from India, Switzerland, France, the USA, Japan and the Netherlands. AstroSat has also observed for the very first time rapid variability of high energy (particularly >20keV) X-ray emission from a black hole system, officials noted. “AstroSat has been a very successful mission and it has produced results which are globally acclaimed...”, Kiran Kumar said. “Large number of papers have also got published”

Source: <https://www.deccanherald.com>

BUSINESS

Top 3 Indian companies in the space race

When you think of companies that are revolutionizing the space industry, one often thinks of companies such as Space X, Blue Origin, and Virgin Galactic. But what if I told you that there were companies right here in India who were doing just as exciting work as these companies? Companies that were building rockets, launch vehicles and satellites, with the latest technology and all at a fraction of the cost. India’s space tech industry, although at a nascent stage, is

doing incredible work. The sector has also received increasing investor interest thanks to a number of policy changes and government initiatives. With the global space economy poised to grow over US\$2 tn in the next two decades, the Indian space tech industry is slated to contribute immensely to this growth. Here are the top 3 Indian companies dabbling in the space race.

#1 Agnikul Cosmos

Founded in 2016, Agnikul Cosmos is an IIT Madras incubated space tech start-up currently working on developing its own small-lift launch vehicle called Agnibaan, capable of placing a 100 kg payload into a 700 km orbit. Driven by LOX/Kerosene engines in all its stages, Agnibaan is configurable by the customer. Yes, Agnibaan doesn't fly with the same number of engines all the time. The mission, the satellite and the launch port decide how many engines go on the first stage. The launch vehicle will be manufactured using 3D printing for which Agnikul has signed an MoU with EOS India, a global leader in 3D printing technology. The first commercial launch is expected in 2022. The start-up recently test-fired a fully 3D printed semi-cryo rocket engine. In May 2021, Agnikul raised US\$11 m in a Series A funding. It previously raised US\$ 3.1 m in May 2020 from institutional investors and a seed round of funding from Speciale Invest in 2019. It has also received an investment from industrialist Anand Mahindra.

#2 Skyroot Aerospace

Similar to Agnikul, Skyroot Aerospace is building rockets for launching payloads (satellites for now and in future humans as well) to space. The startup has been actively developing its Vikram series of launch vehicles for the past two years. The series is named after the father of the Indian Space program – Dr Vikram Sarabhai. It's plan in the near term is to commercialise Vikram-1 and roll out the follow-on variants Vikram-2 and 3. These are essentially the same with a 20% upgrade but together cover the largest payload ranges from launching 1 kg to 700 kg of satellites. This is not possible using existing vehicles in the market. It's targeting the first orbital launch of Vikram 1 around mid-2022. It has already test-fired a solid propulsion rocket engine named Kalam-5. A scaled-up version will be built and tested at ISRO's facilities before powering the Vikram rocket by December 2021. The startup has raised US\$11 m in its series A round of funding. It had previously raised US\$1.5 m in 2018. On the start-up's board of directors, sits the Solar Group, a major space and defence supplier. Other notable investors include former WhatsApp global business chief Neeraj Arora, and Myntra and CureFit founder Mukesh Bansal.

#3 Pixxel

While Agnikul and Skyroot Aerospace are building launch vehicles, Pixxel is aiming to put a constellation of more than 30 earth observation micro-satellites in space. The startup primarily focuses on two things - developing the technology and setting up the infrastructure to build a constellation of satellites. The startup also has a machine learning platform to mine actionable insights from data. Pixxel's satellite constellation can provide global coverage every 24-hours, to detect, monitor, and predict global phenomena. Satellite imagery and remote sensing data are invaluable tools for use cases such as weather, agriculture, commodities, and insurance. Pixxel had planned to launch its first satellite 'Anand' in February 2021 but the launch was shelved for technical reasons. Going ahead, the space tech startup plans to deploy the first phase of a constellation, consisting of six to eight satellites by December 2022. It will deploy the entire constellation by December 2023. In March 2021, the startup raised \$7.3 m in its seed round. It had raised close to \$5 m in August 2020 from existing investors and is already in talks to raise another US\$15–20 m after the launch of its first satellite in space.

Why is the space sector exciting right now?

In May 2020, Finance Minister Nirmala Sitharaman had announced the inclusion of private players in the space sector. Following this, the Union Cabinet announced the formation of an autonomous agency, IN-SPACe (Indian National Space Promotion and Authorisation Centre), an extension of ISRO, to help private players in space-related activities and regulate private tech innovation in the space. With these policy changes and reforms, the sector is now

seeing growing participation of private players in a domain that until now was largely under government control. As a result, India now has around 100 active space tech start-ups. However, they are not alone. With the space sector energised, heavyweights are also showing renewed interest. India's telecom czar Sunil Bharti Mittal is putting his wealth and credibility behind broadband from space. The Tatas have also revived their telecom ambitions and are getting into satellite communication. Sensing the opportunity, global tech giants have also come forward to help India charts its new space journey. Amazon Web Services (AWS), which is the cloud arm of Amazon, is interested in helping the country transform the space sector with its data storage and cutting-edge solutions and tap into the multi-billion dollar market. With these exciting developments, the Indian space tech industry is at the early stage of a space revolution. It is only a matter of time before India has its own SpaceX and Virgin Galactic.

Source: <https://www.livemint.com/>

India's Dynamatic Technologies gets Boeing contract to produce aero structures for fighter jet

Bengaluru-headquartered Dynamatic Technologies has been awarded a contract for manufacturing assemblies for Boeing's newest tactical fighter, F-15EX Eagle II. This is a first where aerostructures for the latest and most advanced F-15EX Eagle II will be made in India, it said in a statement. Dynamatic Technologies will supply the F-15EX aerostructure assembly requirements from the financial year 2022. It will manufacture these aerostructures from its manufacturing facility in Bengaluru. "Dynamatic has been associated closely with Boeing as a strategic tier-1 supplier partner for over a decade," CEO & Managing Director, Dynamatic Technologies Limited, Mr Udayant Malhotra, said. "The award for manufacturing aerostructures for the F-15EX Eagle II to Dynamatic is a testimony of our partnership with Boeing," he added. President, Boeing India, Mr Salil Gupte, said, "We see tremendous potential for India to contribute to the global aerospace industry as an industrial and technology partner." The award of aerostructure assemblies for the latest and most advanced version of the F-15 aircraft family is a reflection of Boeing's focus on 'Aatmanirbhar Bharat' and a testimony to the world-class capability of our industrial partners in India, he said. Dynamatic Technologies is also partnering with Boeing to help grow the Indian aerospace and defence ecosystem with advanced manufacturing capabilities, training and skill development in alignment with the Skill India' initiative of the Government of India, it was stated. The company is also a Tier 1 supplier for the assembly of Flap Track Beams (FTBs) for the Airbus 330 family of aircraft. FTBs are instruments that control the speed, direction and balance of an aircraft. Dynamatic Technologies was trading at Rs 3,060.00, up Rs 220.05, or 7.75 percent. It has touched an intraday high of Rs 3,081.05 and an intraday low of Rs 2,876.50.

Source: <https://www.moneycontrol.com/>

HAL, Rolls-Royce Sign Pact for Make-in-India Adour Engine Parts for Global Markets

HAL and Rolls-Royce have signed an agreement for Make-in-India Adour engine parts to support Rolls-Royce's international defence customer base. The agreement was exchanged between Mr. B Krishna Kumar, Executive Director (Engine & IMGT), HAL and Mr. Abhishek Singh, Senior Vice President – Defence, India and South East Asia, Rolls Royce here, today. Through this partnership, Rolls-Royce aims to strengthen the ecosystem for Adour engines in India by building on HAL's existing capabilities for manufacturing and supporting the Adour engines for Indian customers over several decades. This follows the MoU signed by Rolls-Royce and HAL during the Aero India 2021 to establish an Authorized Maintenance Centre for Adour at HAL to support international military customers and operators. On the occasion, Mr. R. Madhavan, CMD, HAL said, "With over 30 years' experience of supporting repair and maintenance services for the Adour engines in India, HAL has the capability and capacity to support a large defence customer base. This is the first order for supply of spares for the Adour Global Supply chain. We plan to be a key player in the supply chain of Adour engines and expect more orders to follow. We look forward to working with Rolls-Royce to build on this capability to serve global market for supply of spares and MRO of Adour engines.

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

CARE Upgrades HAL's Long Term Rating to AAA

The CARE Ratings Limited has upgraded the present HAL Long Term ratings from 'CARE AA+ Outlook Stable' to 'CARE 'AAA Outlook Stable'. HAL's short term rating has remained the same as A1+. This is done on the basis of recent developments including operational and financial performance of HAL for FY 2021 (Audited) and Q1 FY22 (Unaudited). The financial year 2020-21 was significant for HAL in terms of securing the largest ever defence contract of 83 LCA MK-IA for the Indian Air Force. This helped the company surpass the order book position in excess of Rs. 80,000 crores. HAL has taken various cost cutting and austerity measures that include indigenization of various components, increasing outsourcing efforts and rationalization of manpower.

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

Indian Navy signs contract with BEL for supply of Naval Anti drone system

Indian Navy has signed contract with Navratna Defence PSU Bharat Limited (BEL) for supply of the first indigenous comprehensive Naval Anti Drone System (NADS) with both hard kill and soft kill capabilities in New Delhi on August 31, 2021. The contract was signed in the presence of senior Naval officers and DRDO representatives. Indian Navy has provided consistent support and has led in the joint development of the anti-drone system with Defence Research and Development Organisation (DRDO) and BEL. The NADS, developed by DRDO and manufactured by BEL, is the first indigenously developed anti-drone system to be inducted into the Indian Armed Forces. Multiple Units of BEL, namely Bangaluru, Hyderabad, Pune and Machilipatanam; and DRDO Labs, namely Electronics & Radar Development Establishment (LRDE), Bangaluru; Defence Electronics Research Laboratory (DLRL) and Centre for High Energy Systems and Sciences (CHESS), Hyderabad and Instruments Research & Development Establishment (IRDE) Dehradun; in close collaboration with the Indian Navy, were involved in the making of this fully indigenous system, as part of the Atmanirbar Bharat initiative to counter drone threats of adversaries. The NADS can instantly detect and jam micro drones and use a laser-based kill mechanism to terminate targets. The anti-drone system was first deployed to provide security cover for the Republic Day Parade this year and later during the Prime Minister's Independence Day Address to the Nation from the ramparts of the Red Fort. The system, which offers 360-degree coverage, was also deployed in Ahmedabad for the Modi-Trump roadshow. The BEL is to sign similar contracts with Army and Air Force also.

Source: <https://pib.gov.in/>

Army to buy more than 100 armed drones from Bengaluru firm joint venture

The Army, under emergency procurement powers, has signed a contract for more than 100 explosive-laden drones to be used as force multipliers in Balakot-like missions. To be manufactured in Bengaluru, the drones will have a range of about 100km, reports Chethan Kumar. The requirement for what the Army calls "loitering munition" will be fulfilled by 'SkyStriker' drones to be made and supplied by Bengaluru-headquartered firm Alpha Design in a joint venture with Israeli firm Elbit Security Systems. The contract signed is worth around Rs 100 crore. According to Elbit systems' website, SkyStriker is a cost-effective loitering munition capable of longrange precise tactical strikes. Co bags 2 orders for radars, identification systems The drone improves performance, situational awareness and survivability by providing direct-fire aerial-precision capabilities to manoeuvrable troops and special forces. The 'suicide drone' as some describe it — as it crashes into the target with the explosives — is an autonomous system that can locate, acquire and strike operator-designated targets with a 5kg warhead installed inside the fuselage. Its electric propulsion offers a minimal acoustic signature, allowing covert operations at low altitude, making it a silent, invisible and surprise attacker. Col (ret'd) HS Shankar, CMD of Alpha Design, told TOI: "Location details (GPS) will be loaded onto the drone before launch. Upon launching, it will hover around the area, pick up the target, relay the information back to ground control equipment and strike only after getting clearance. Ground control can change targets after the launch, and

even call it back in case a mission has to be aborted.” The Alpha-Elbit JV has already exported about 100 such drones — manufactured based on Elbit’s technology — and has orders for another 100 exports. Alpha owns 51% in the JV. 2 more defence contracts Aside from the Army contract for its JV, Alpha Design has independently bagged two more defence contracts from the Indian Air Force in the past week. The first is for six Very High Frequency radars. the IAF already has long-distance surveillance radars — P18 radars — that can capture targets beyond 200km procured in 1980 and 1990s. Given their age, the IAF was looking at whether it should upgrade P18s or procure new ones at the same cost and decided to buy instead. Under the emergency procurement powers, the IAF issued EOIs and RFPs which got responses from four companies: defence PSU BEL and three private firms — Alpha Design, Astra Microwave and Data Patterns. While all four companies met the technical requirements, Alpha emerged as the lowest bidder and bagged the Rs 200 crore contract signed last week. The second, also an IAF contract, is for around 60 Identification of Friend-or-Foe (IFF) systems that will be integrated with ground radars. This technology was developed by the Centre for Airborne Systems (CABS) under DRDO and transferred to three firms: Alpha, BEL and Data Patterns. All of them had built prototypes that were approved by the authorities concerned but Alpha emerged as the lowest bidder to bag the Rs 80+ crore contract, signed.

Source: <https://timesofindia.indiatimes.com>

AWARDS

Award for DRDO Scientist

APJ Abdul Kalam Missile Complex, DRDO, Advanced Systems Laboratory (ASL)’s project director N. Kishore Nath has been conferred the prestigious Institution of Engineers (India) - M.P. Baya National Award 2020 in recognition of his significant R&D contributions and technological advancements in mechanical engineering. The award was conferred as part of Engineers’ Day celebrations at IEI, Udaipur, Rajasthan. Dr. Nath is widely known for his contributions in design and development of Agni missile systems and advanced technologies for numerous defence and aerospace applications in India. He obtained B.Tech in Mechanical Engineering from JNTU Anantapur and pursued his ME and Ph.D from Osmania University.

Source: <https://www.thehindu.com/>

IEI award for DRDO Scientist

Dr APJ Abdul Kalam Missile Complex, DRDO, Defence Research and Development Laboratory (DRDL) project director Jaiteerth Raghavendra Joshi has been conferred with the prestigious Institution of Engineers (India) Bharat Ratna Sir Mokshagundam Visvesvaraya Award - 2020 in recognition of his significant R&D contributions in the development of missiles and aerospace systems and technologies. The award was conferred as part of Engineers Day celebrations, a press release said. He obtained B.Tech in Mechanical Engineering from Osmania University and Ph.D in Mechanical Engineering from NIT Warangal. He has made wide-ranging contributions to Prithvi, and Agni, and in his career spanning three decades, Dr Joshi has contributed immensely in the fields of missile technology.

Source: <https://www.thehindu.com/>

Prestigious IETE Award Bestowed on HAL Engineer

A young engineer from HAL, Mr Prikshat Sharma, has been bestowed with the prestigious IETE (The Institution of Electronics and Telecommunication Engineers) award for the year 2021 for his contribution to the development of Integrated Avionics System Testing Rig for avionics rotatable tables of LCA aircraft, the first ever in-house facility established for LCA production program. Mr Sharma works as Deputy General Manager at HAL’s LCA Tejas Division and received the award at the digital event held today on the occasion of the 64th IETE Convention. The award consists of a citation, a medal and a plaque. Mr Sharma shares the award with Prof (Dr) Janakarajan Ramkumar, IIT Kanpur

Instituted by Dr R K Tyagi, former Chairman of HAL in memory of his late father Devi Singh Tyagi in 2016, the award is presented to a technocrat or a scientist or an engineer or an academican for outstanding contribution in the field of avionics and defence electronics that results in strategic and commercial advantage towards meeting the national objective of 'Make in India'. "LCA is a very important project for all of us and we are happy that one of our key executives received the award this year", says Mr. R Madhavan, CMD, HAL. The Automated Test Equipment (ATE) which Mr Sharma was instrumental in developing performs a complete functional test of LRUs (Line Replaceable Units) by simulating all the necessary communication interfaces available on an aircraft. With the commissioning of this ATE, the cycle-time and man-hour requirements for Pre-Installation (PI) checks comes down drastically as it avoids multiple to and fro commutation to various agencies. This is a huge leap in self-sufficiency in production activities of Tejas fighter

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

Innovate to meet challenges in space tech: DRDO Chief

Thiruvananthapuram: G Satheesh Reddy, DRDO Chairman and secretary of the department of defence R&D, called for the contribution of young minds in science and space technology. The major challenges the space programmes face at present are in the areas of payload and debris management, he said. Reddy was delivering the ninth convocation address of Indian Institute of Space Science and Technology (IIST) here. "Artificial intelligence-based satellites, space-based communication systems for defence in space, ground and under water, cyber security need for mini and micro payloads, etc, are the areas in which the young minds of the nation have to come up with innovative ideas," he said. Speaking on the occasion, Dr K Sivan, president, governing body of IIST/secretary of department of space & ISRO chairman, pointed out that space technology is a critical tool which is applicable in all areas of development. Welcoming the gathering, Mr S Somanath, director of IIST, said the institute has put in every effort and engaged all its resources to ensure that the process of teaching-learning continues unabated and uncompromised. The status of forthcoming projects such as INSPIRESAT-1, ARIS-2 payload, and RPA-V payload for Venus mission, system for future advanced spacecraft, etc, were presented by IIST chancellor Dr BN Suresh at the convocation ceremony. A total of 223 degrees were awarded in virtual mode during the occasion. UG topper Mr Shashank Tomar and PG topper Mr Sandeep CR were awarded with gold medals. Parthsarathi Samantha and Raghav Hariharan were awarded the excellence certificates for the best all-round performance in academic, co-curricular and extra curricular activities.

Source: <https://timesofindia.indiatimes.com/>

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