E-NEWS

EVERY MONTH FROM THE AERONAUTICAL SOCIETY OF INDIA

VOLUME - 16 | APRIL 2021 | RELEASE - 04

Covering the Period from
(01 Marchto 31 March 2021)

Two years since ASAT test, DRDO working on several key space technologies

BHEL supplies 100th space-grade battery to ISRO

List of Newly Elected Members/Upgraded Members (Refer Page No 11-12)

DRDO conducts successful flight test of Solid Fuel Ducted Ramjet technology

The Defence Research and Development Organisation (DRDO) successfully conducted a flight test of solid fuel ducted ramjet (SFDR) technology from a test range in Odisha, official sources said.During the test all subsystems including the ground booster motor have performed as expected, the DRDO said.The successful demonstration of SFDR technology has provided DRDO the technological advantage which will enable it to develop long range air-to-air missiles.At present only a handful of countries have the technology, it said.The test was carried out at around 10.30 am from the integrated test range (ITR) launch platform at Chandipur, they said.During the flight test, air launch scenario was simulated using a booster motor. Subsequently, the nozzle-less booster accelerated it to the required Mach number for Ramjet operation, the DRDO said.The performance of the missile was monitored using the data captured by electro optical, radar and telemetry instruments deployed by ITR and confirmed successful demonstration of the mission objectives, it said.The launch was monitored by senior scientists of various DRDO labs, including Defence Research and Development Laboratory, Research Centre Imarat and High Energy Materials Research Laboratory, the sources said.Defence Minister Rajnath Singh congratulated the scientists of DRDO, Indian Air Force and the industry on the successful flight test of SFDR.The secretary to the department of defence research and development and DRDO chairman Dr G Satheesh Reddy too congratulated the team which wass involved in the flight test, the sources added.

Source: https://www.deccanherald.com

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

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

CURRENT AFFAIRS

Two years since ASAT test, DRDO working on several key space technologies

Two years since the Anti-Satellite (ASAT) test under Mission Shakti demonstrated India's capability to shoot down satellites in Low Earth Orbit (LEO), there is lot of focus within the country on space-based technologies and the Defence Research and Development Organisation (DRDO) is working on several of them, a senior defence official said. The Defence Space Agency (DSA) has also taken shape and there is lot of work going on in Electronic Intelligence (ELINT), Communication Intelligence (COMINT), and areas like space-based tracking systems, the official said. On March 27, 2019, the DRDO demonstrated ASAT capability by destroying a live orbiting satellite in LEO of around 300 km with a new interceptor missile in a "hit to kill" mode. The interceptor missile is a three stage missile having two solid rocket boosters and a "hit to kill" capable "kill vehicle" (KV), the official said. ASAT capability has been fully demonstrated and there is no need for more tests, a second defence official said. "Technically, the KV had the capability to neutralise the target satellites in the entire LEO region. However, as a responsible nation for peaceful use of space, India had chosen a much lower orbit of around 300 km for capability demonstration with the purpose of avoiding threat of debris to global space assets," the first official stated. This ensured that the debris would decay in a matter of weeks, the official said. On the KV, the official said the KV with innovative design homed onto the target satellite. The advanced terminal guidance with the strap down Imaging Infra-Red (IIR) seeker and ring laser gyro based inertial navigation system guided the KV to hit the target satellite at closing speeds of more than 10 km/sec, he added. The electro optical tracking system tracked the entire engagement and captured the "direct hit" which was also corroborated by the last image frame of the onboard IIR seeker, the official said.

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

ISRO, JAXA review cooperation on joint lunar polar exploration satellite mission

Indian and Japanese space agencies reviewed their ongoing cooperation to launch a joint lunar polar exploration (LUPEX) mission. Scientists from Indian Space Research Organisation (ISRO) and Japan Aerospace Exploration Agency (JAXA) have been working on the mission that aims to send a lander and rover to the Moon's south pole around 2024.Secretary in the Department of Space and ISRO Chairman K Sivan and JAXA President Hiroshi Yamakawa led their delegations at a bilateral meeting held on virtual mode. "Apart from reviewing on-going cooperation in earth observation, lunar cooperation and satellite navigation, both sides have agreed to explore opportunities for cooperation in space situational awareness and professional exchange programme", an ISRO statement said."On this occasion, both agencies signed an 'Implementing Arrangement' for collaborative activities on rice crop area and air quality monitoring using satellite data", the Bengaluru headquartered space agency said. On March four, India and Italy decided to explore opportunities in the field of earth observation, space science and robotic and human exploration.On February 28, ISRO successfully launched the 637-kg Brazilian satellite Amazonia-1 on board PSLV-C51 rocket from Sriharikota spaceport. Brazil's Minister of Science, Technology and Innovation, Marcos Pontes visited ISROs Satish Dhawan Space Centre (SDSC), Sriharikota in Andhra Pradesh's Nellore district, about 100 kms from Chennai, and witnessed the launch.Union Minister Jitendra Singh, who heads the DoS, also had a virtual interaction with Pontes and officials of the Brazilian space agency. "Brazil has requested India's support in procurement of material and systems for its launch vehicle programme," a DoS statement said."Cooperation possibilities in future space science missions, utilising ISRO's PS4-orbital platform (PS4-OP) space weather studies etc. were discussed", the official statement said. PS4-OP refers to a novel idea formulated byISROto use the spentPS4stage (fourth stage of PSLV) to carry out in- orbit scientific experiments for an extended duration of one to six months. Dr Sivan also had a virtual meeting with Head of Australian Space Agency, Enrico Palermo, on February 17."Both leaders have also reviewed the status of on-going cooperation activities in earth observation, satellite navigation, space situational awareness and establishment of transportable terminal in Australia to support India's 'Gaganyaan' programme", ISRO had said at the

time. According to ISRO, India has always recognised that space has dimension beyond national considerations, which can only be addressed along with international partners.

Source: https://www.deccanherald.com

India, France working on third joint space mission, says ISRO Chairman

India and France are working on their third joint satellite mission, even as the bilateral space collaboration is entering into multiple domains, including human spaceflight programme, ISRO Chairman Dr K Sivan said.Sivan, also Secretary in the Department of Space, said many French companies are keen to tap into opportunities thrown up by recent reforms injected into the space sector by the Government."France is the biggest partner of India in space", he said at the DST (Department of Science and Technology) Golden Jubilee Discourse on 'unlocking India's space potential - geospatial data & mapping', an event presented on virtual mode by the National Council for Science and Technology Communication and 'Vigyan Prasar'.According to ISRO officials, ISRO and French space agency CNES (Centre National dEtudes Spatiales) have undertaken two joint missions 'Megha-Tropiques', which was launched in 2011, and 'Saral-Altika' in 2013."Currently, we are working for the third one (mission)", Dr Sivan said. Officials said ISRO and CNES have completed the feasibility study to realise the earth observation satellite mission with thermal infrared imager, TRISHNA (Thermal infraRed Imaging Satellite for High resolution Natural resource Assessment) and are working towards finalising an implementing arrangement for the joint development. Dr Sivan said India is also working with France on joint experiments and accommodation of scientific instruments in space missions."Indo-French space collaboration is expanding into multiple domains including space exploration and human space flight programme," he said.ISRO officials said the two space agencies have also finalised all interface control documents for accommodating CNES's 'ARGOS' instrument in ISROs OCEANSAT-3 satellite. ARGOS instrument has been delivered at Bengaluru for integration with the satellite."Discussions on establishing 'NavIC' (an independent regional navigation satellite system developed and maintained by India) reference station in France and CNES 'Scintillation' receivers in India are also progressing well", they said. ISRO-CNES HSP (Human Space Programme) Working Group had a number of discussions on medical aspects of human spaceflight and finalising an implementation arrangement to formalise cooperation in the field of space medicine, it was noted.Sivan said with the recent reforms initiated by the government in the space sector, the Indo-French space cooperation is expected to grow further involving industries, academia and research institutes.He said many French companies want to "make use of" reforms in the sector and "they are going to involve". So, the reforms would not only strengthen space cooperation at government-to-government level but industry- to-industry interaction is going to get a "fresh relook" in the changed environment, Dr Sivan added.

Source: https://www.deccanherald.com

TECHNOLOGY

Dr. K. Sivan, Chairman, ISRO / Secretary, DOS inaugurates 3 Space Technology Incubation Centres and releases YUKTI-Sanchita 2021

Dr. K. Sivan, Chairman ISRO / Secretary DOS inaugurated three Space Technology Incubation Centre and dedicated it to the Nation on March 18, 2021, in an online programme held amongst ISRO and the esteemed National Institute of Technology's.ISRO signed bilateral Memorandum of Understanding (MoU) with Visvesvaraya National Institute of Technology, Nagpur (for Western region), Maulana Azad National Institute of Technology, Bhopal (for Central region), and National Institute of Technology, Rourkela (for Eastern region) for setting up the Space Technology Incubation Centre in their campus. On this occasion, Chairman ISRO / Secretary DOS briefed about S-TIC programme and encouraged the students to explore their entrepreneurship skill in space domain. In his presidential address, he especially emphasised that the S-TIC concept is conceived with one selected major academic institute taking the lead

role in a particular region and providing opportunities for final year graduate, post–graduate and research scholars as future budding entrepreneurs. Projects of practical relevance linked to the ongoing missions or future missions of ISRO will be made available to the students at STIC. The research outcome of these students will be translated into a Proof-of-Concept or prototype through industries within their region. Sri R. Umamaheswaran, Scientific Secretary, ISRO emphasised the need for inter-disciplinary approach and close team work among various discipline of Science and Technology for accomplishing the objectives of S-TIC. He further stated that the setting up of the S-TICs, one each at VNIT Nagpur, MANIT Bhopal and NIT Rourkela, will be a major boost up for space related activities in these regions and wished that these S-TIC will produce many space entrepreneurs and space leaders, who will potentially be able to mark the human foot prints in deep space. He further asserted that the saplings, we are planting in form of S-TIC at these prestigious Institutes have a great potential to grow as a big tree, firmly establishing its roots in deep depth of knowledge in the domain of Space Science and Technology. Today the MoU was signed in an online mode from ISRO side by Dr. P.V. Venkitakrishnan, Director Capacity Building Programme Office, ISRO Headquarters and Prof. Pramod Madhukarrao Padole, Director, VNIT, Nagpur from VNIT side; Prof. Narendra Singh Raghuvanshi, Director, MANIT, Bhopal from MANIT side; and Prof. Animesh Biswas, Director, NIT Rourkela from NIT Rourkela side, in the presence of Sri R. Umamaheswaran, Scientific Secretary, ISRO and Dr. K. Sivan, Chairman ISRO / Secretary DOS. The S-TIC at VNIT Nagpur will be the focal centre for western region of Space Technology Incubation activities including the states of Gujarat, Maharashtra, Rajasthan and UTs of Dadra & Nagar Haveli and Daman & Diu. Similarly, S-TIC at MANIT Bhopal will be the focal centre for Space Technology Incubation activities including the states of Chhattisgarh, Madhya Pradesh and Uttar Pradesh. The S-TIC at NIT, Rourkela will be the focal centre for eastern region of Space Technology Incubation activities including the states of Bihar, Jharkhand, Odisha, West Bengal and UT of Andaman & Nicobar. With setting up of three new S-TICs today, the goal of opening one Space Technology Incubation Centre in each six region of country has been accomplished by ISRO. At present three S-TIC's have already been functioning, one each at National Institute of Technology, Agartala (for North-Eastern region), Dr. B R Ambedkar National Institute of Technology, Jalandhar (for Northern region) and National Institute of Technology, Tiruchirappalli (for Southern region). Dr. K. Sivan, Chairman ISRO / Secretary DOS also released YUKTI-Sanchita 2021 (Youth Upgradation by Knowledge Transformation through Incubators - Sanchita), a compilation of 108 Product Development / Innovative Project Proposals from Centres / Labs/ Units of DOS/ISRO. It can be referred by the Academia, Industry and Start-ups to prepare a detailed proposal for execution of the projects. Mr Jiwan Kumar Pandit, Associate Director, CBPO, ISRO-HQ thanked all the participants from various academic institutions for their active participation. This is one of the major steps by DOS / ISRO to achieve the development and indigenisation of space grade components / products / processes in tandem with objectives of " Aatmanirbhar Bharat".

Source: https://www.ISRO.gov.in/

ISRO makes breakthrough demonstration of free-space Quantum Key Distribution (QKD) over 300 m

For the first time in the country, Indian Space Research Organisation (ISRO) has successfully demonstrated free-space Quantum Communication over a distance of 300 m. A number of key technologies were developed indigenously to accomplish this major feat, which included the use of indigenously developed NAVIC receiver for time synchronization between the transmitter and receiver modules, and gimbal mechanism systems instead of bulky large-aperture telescopes for optical alignment. The demonstration has included live videoconferencing using quantum-key-encrypted signals. This is a major milestone achievement for unconditionally secured satellite data communication using quantum technologies. The Quantum Key Distribution (QKD) technology underpins Quantum Communication technology that ensures unconditional data security by virtue of the principles of quantum mechanics, which is not possible with the conventional encryption systems. The conventional cryptosystems used for data-encryption rely on the complexity of mathematical algorithms, whereas the security offered by quantum communication is based on the laws of Physics. Therefore, quantum cryptography is considered as 'future-proof', since no future advancements in the computational power can break quantum-cryptosystem. The free-space QKD was demonstrated at Space Applications Centre (SAC), Ahmedabad, between two line-of-sight buildings within the campus. The experiment was performed at night, in order to ensure that there is no interference of the direct sunlight. The experiment is a major breakthrough towards ISRO's goal

of demonstrating Satellite Based Quantum Communication (SBQC), where ISRO is gearing up to demonstrate the technology between two Indian ground stations.

Source: https://www.ISRO.gov.in/

After enhancing ties with Australia, ISRO eyes new opportunities with Italy

Close on the heels of the launch of a Brazilian satellite by ISRO, India and Italy have decided to explore opportunities in the field of earth observation, space science and robotic and human exploration.The Indian Space Research Organisation (ISRO) held a bilateral meeting with Italian Space Agency (ASI) on virtual mode, as part of its strategy to strengthen international partnerships.ISRO Chairman and Secretary in the Department of Space (DoS) Dr K Sivan and ASI President Giorgio Saccoccia led their respective delegations."Both sides reviewed the on-going cooperation and agreed to form more thematic working groups to explore cooperation opportunities in earth observation, space science, robotic exploration and human exploration", Bengaluru- headquartered ISRO said in a statement.On February 28, ISRO successfully launched the 637-kg Brazilian satellite Amazonia-1 on board PSLV-C51 rocket from Sriharikota spaceport.Brazil's Minister of Science, Technology and Innovation, Marcos Pontes visited ISRO's Satish Dhawan Space Centre (SDSC), Sriharikota in Andhra Pradesh's Nellore district, about 100 kilometres from Chennai, and witnessed the launch.The Minister and his delegation later had a meeting with an ISRO team led by Dr Sivan, and both sides agreed to work together to enhance the bilateral space cooperation and take it to the higher level.Union Minister Mr Jitendra Singh, who heads the DoS, also had a virtual interaction with Pontes and officials of the Brazilian space agency."Brazil has requested India's support in procurement of material and systems for its launch vehicle programme," a DoS statement said."Cooperation possibilities in future space science missions, utilising ISRO's PS4-orbital platform (PS4-OP), space weather studies etc. were discussed", the official statement said.PS4-OP refers to a novel idea formulated byISROto use the spentPS4stage (fourth stage of PSLV) to carry out in-orbit scientific experiments for an extended duration of one to six months.Sivan also had a virtual meeting with the Head of Australian Space Agency, Enrico Palermo, on February 17."Both leaders reviewed the status of on-going cooperation activities in earth observation, satellite navigation, space situational awareness and establishment of transportable terminal in Australia to support India's 'Gaganyaan' programme", ISRO had ...According to ISRO, India has always recognised that space has dimension beyond national considerations, which can only be addressed along with international partners.

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

ISRO develops radar for joint earth observation satellite mission with NASA

ISRO has completed the development of a Synthetic Aperture Radar (SAR) capable of producing extremely high-resolution images for a joint earth observation satellite mission with the US space agency NASA. NASA-ISRO SAR (NISAR) is a joint collaboration for a dual-frequency L and S-band SAR for earth observation."NISAR will be the first satellite mission to use two different radar frequencies (L-band and S-band) to measure changes in our planet's surface less than a centimetre across", according to NASA (National Aeronautics and Space Administration).NASA and Bengaluru-headquartered ISRO (Indian Space Research Organisation) signed a partnership on September 30, 2014, to collaborate on and launch NISAR. The mission is targeted to launch in early 2022 from ISRO's Sriharikota spaceport in Andhra Pradesh's Nellore district, about 100 kms north of Chennai.NASA is providing the mission's L-band SAR, a high-rate communication subsystem for science data, GPS receivers, a solid-state recorder and payload data subsystem. ISRO is providing the spacecraft bus, the S-band radar, the launch vehicle andassociated launch services for the mission, whose goal is to make global measurements of the causes and consequences of land surface changes using advanced radar imaging.The S-band SAR payload of the NISAR satellite mission was flagged off by the Secretary in the Department of Space and ISRO Chairman K Sivan on March 4 through virtual mode. The payload has been shipped from ISRO's Ahmedabad-based Space Applications Centre (SAC) to NASA's Jet Propulsion Laboratory (JPL) at Pasadena in the US for integration with the latter's L-band SAR payload, an ISRO statement said."NISAR would provide a means of disentangling highly spatial and temporally complex processes ranging from

ecosystem disturbances to ice sheet collapses and natural hazards including earthquakes, tsunamis, volcanoes and landslides", ISRO said.NASA added that the mission will measure Earth's changing ecosystems, dynamic surfaces and ice masses, providing information about biomass, natural hazards, sea-level rise and groundwater, and will support a host of other applications."NISAR will observe Earth's land and ice-covered surfaces globally with 12-day regularity on ascending and descending passes, sampling Earth on average every six days for a baseline three-year mission", NASA said on the mission's website."This allows the mission to observe a wide range of Earth processes, from the flow rates of glaciers and ice sheets to the dynamics of earthquakes and volcanoes". NISAR uses a sophisticated information-processing technique known as SAR to produce extremely high-resolution images.Radar penetrates clouds and darkness, enabling NISAR to collect data day and night in any weather. The instrument's imaging swath the width of the strip of data collected along the length of the orbit track is greater than 150 miles (240 kilometres), which allows it to image the entire Earth in 12 days, it was stated.Over the course of multiple orbits, the radar images will allow users to track changes in croplands and hazard sites, as well as to monitor ongoing crises such as volcanic eruptions. The images will be detailed enough to show local changes and broad enough to measure regional trends.As the mission continues for years, the data will allow for a better understanding of the causes and consequences of land surface changes, increasing our ability to manage resources and prepare for and cope with global change, according to NASA."NASA requires a minimum of three years of global science operations with the L-band radar, and ISRO requires five years of operations with the S-band radar over specified target areas in India and the Southern Ocean", it said.

Source: https://www.deccanherald.com

BUSINESS

Project-75I : Defence Ministry to take up big deals for armed drones, submarines in April

Multi-billion deals for 30 armed drones from the U.S. and six advanced submarines under Project-75I are likely to be taken by the Defence Acquisition Council (DAC) in April for approval, a government official said. "All the procedures have been completed and the deals are likely to be taken up at the next meeting of the DAC for approval," the official said. "There is no DAC in March, the next one is scheduled in April."India has been looking to procure 30 armed drones, 10 for each service, from the U.S. but the process has been repeatedly delayed over the last couple of years. While the Navy has a pressing requirement for the High Altitude Long Endurance (HALE) drones, there have been questions on their utility for the Army and Air Force, given the high cost of the platform.The three Services have since finalised the Qualitative Requirements and the all the processing has been completed. The case is now ready to be put up before the DAC, the official stated.Last November, the Navy inducted two MQ-9B Sea Guardian unarmed drones procured from the U.S. on lease for one year.The U.S. has given in principle approval for the sale of these armed drones to India sometime back and the deal came up for discussion during the India-US 2+2 ministerial dialogue last October.However, since the stand-off with China in Eastern Ladakh last May, the need for long endurance drones to maintain continuous surveillance of the border has been acutely felt and the armed forces are in the process of procuring drones of several other categories as well.Submarine dealIn January 2020, the DAC had shortlisted Mazgaon Docks Limited (MDL) and Larsen & Toubro (L&T) as the Indian partners for the P-75I deal worth over ?45,000 crore. Once the DAC clears it, the Navy will issue the Request For Proposal (RFP) to the two Indian companies who would respond to it in partnership with a foreign Original Equipment manufacturer (OEM).The delay in the P-75I deal was the extra caution at each step of the process as this was being done for the first time, the official stated.This project is being processed through the Strategic Partnership (SP) model of the Defence Procurement Procedure (DPP), which aims to promote the role of Indian industry in defence manufacturing and build a domestic defence industrial ecosystem.While there are two Indian companies shortlisted, there are five foreign OEMs selected. They are Daewoo

Shipbuilding & Marine Engineering (DSME)(South Korea), Naval Group (France), Navantia (Spain), Rosoboronexport (Russia) and TKMS (Germany).

Source: The Hindu

Aligning a missile deal with destination Manila

Earlier this month, India and the Philippines signed the "Implementing Arrangement" for "procurement of defense material and equipment procurement". This agreement lays the groundwork for sales of defence systems such as the highly anticipated export of the BrahMos cruise missile, through the government-to-government route.As the Secretary, Philippine Department of National Defense publicly acknowledges, the archipelagic country's intention of purchasing the missile, and a potential export deal for India, moves one step closer to reality. This deal will be of great significance for multiple reasons, and even though the procurement process is progressing steadfastly, there are many challenges that lie ahead.

Features of the system

Research and development of the BrahMos cruise missile systems began in the late 1990s. Manufactured by BrahMos Aerospace Limited, a joint venture between the Defence Research and Development Organisation and the joint stock company Military Industrial Consortium NPO Mashinostroyenia (earlier known as the Federal State Unitary Enterprise NPOM of Russia), this is the first supersonic cruise missile to enter service. Capable of attaining a speed of Mach 2.8 (almost three times the speed of sound), it has a range of at least 290 km (a new version can reach up to 400km).Travelling with such velocity means that it would be difficult for air defence systems utilising surface-to-air missiles to intercept the BrahMos while making it easier for it to target and neutralise advanced fighter jets such as the Chinese J-20 fighter aircraft moving at less than Mach 2. Even so, efforts to increase the speed and range of the missile in its next iterations are under way, with a goal of achieving hypersonic speeds (at or above Mach 5) and a maximum range of 1,500 km.Early naval and land variants of the BrahMos were inducted into service by the Indian Navy in 2005 and the Indian Army in 2007. Subsequently, an air-launched variant was successfully tested in November 2017 by the Indian Air Force from its Sukhoi-30MKI fighter jet, giving the missile a dominating presence in all three domains.

Export as a goal

These advanced and powerful capabilities of the BrahMos not only augment the strength of the Indian military but make it a highly desirable product for other countries to procure as well. Exporting the system, hence, has been on the agenda for more than a decade. Doing so would boost the credibility of India as a defence exporter, help it meet the target of $5 billion in defence exports by 2025, and elevate its stature as a regional superpower. Countries such as Vietnam, the Philippines, Indonesia, the United Arab Emirates, Argentina, Brazil, and South Africa have so far shown an interest in acquiring the systems.

Geo-political impact

The implications of the Philippines becoming the first country to import the BrahMos would be wide-ranging and consequential in the Indo-Pacific. To begin with, it would caution China, with whom the Philippines has been engaged in a territorial conflict in the South China Sea, and act as a deterrent to Beijing's aggressive posturing. Indeed, this is why China has been wary of the Association of Southeast Asian Nations (ASEAN) countries acquiring defence systems such as the BrahMos. Further, taking lessons, other nations threatened by Chinese belligerence may come forward to induct the BrahMos into their arsenal, thereby boosting India's economic, soft, and hard power profile in the region and providing the Indo-Pacific with a strong and dependable anchor with which they can protect their sovereignty and territory.

Possible hurdles

The Government of India has prioritised making the country 'Atmanirbhar' in the defence manufacturing sector and establishing itself as a major defence exporter. The Philippines, on the other hand, has decided to buy the BrahMos out of geopolitical and strategic necessities. Nonetheless, two major roadblocks still remain in the Manila deal.The first is the Countering America's Adversaries Through Sanctions Act (CAATSA), which aims to sanction individuals and entities who engage in a "significant transaction" with a listed entity. So far, Turkey and China have been penalised under CAATSA for purchasing the S-400 Triumf air defense systems from Russia. NPO Mashinostroyenia is one of the listed Russian entities. And since 65% of the components, including the ramjet engine and radar seeker used in the BrahMos, are reportedly provided by NPO Mashinostroyenia, the export of the missile systems may attract sanctions. Remarkably, the United States, of which India is a major defence partner, has maintained ambiguity over whether it will introduce sanctions over India's acquisition of the S-400, licensed production of the AK-203 assault rifle, and export of the BrahMos. Hesitant of being sanctioned themselves, countries may shy away from purchasing the BrahMos. However, there is an excellent case for India to receive a waiver from CAATSA, especially vis-à-vis the BrahMos that can help contain a confrontational China.The second issue pertains to financing. A regiment of the BrahMos, including a mobile command post, four missile-launcher vehicles, several missile carriers, and 90 missiles, reportedly costs around $275.77 million (?2,000 crore). Ravaged by the COVID-19 pandemic, many countries which are interested in the BrahMos would find it difficult to purchase it. The cost of the systems has been a major hurdle in moving forward to reach a deal with the Philippines. To remedy this, India has offered a $100 million line of credit, and the Philippines is thinking of purchasing just one battery of the BrahMos, consisting of three missile launchers with two to three missile tubes each.With India determined to develop itself as a hub of defence manufacturing, how it handles the sale of the BrahMos would be an important factor in its potential emergence as a net provider of regional security in the Indo-Pacific.

Source: The Hindu

BHEL supplies 100th space-grade battery to ISRO

State-owned engineering firm BHEL said it has achieved a milestone of supplying 100 space-grade battery to the Indian Space Research Organisation (ISRO) for its Chandrayaan 3 mission."Bharat Heavy Electricals Limited (BHEL) has achieved the unique milestone of supplying its 100th battery to ISRO for its very important and critical mission, Chandrayaan 3," a company statement said.Over the last 16 years, BHEL has been supplying batteries to ISRO for its critical mission applications like INSAT, GSAT, IRNSS series and RISAT series.These are manufactured at the Electronic Systems Division (ESD) of BHEL in Bengaluru, with the highest standards of quality, reliability and safety.These batteries use various types of chemistry, including Nickel-Cadmium, Nickel-Hydrogen and Lithium-Ion.As part of this series, the 100th battery was handed over to ISRO by Mr AK Jain, Executive Director, BHEL-EDN. The vehicle carrying this battery was flagged-off by Mr M Sankaran, Deputy Director/CPA of ISRO, Bengaluru at ESD, in the presence of senior officials of State-owned engineering firm said it has achieved a milestone of supplying 100 space-grade battery to the Indian Space Research Organisation (ISRO) for its Chandrayaan 3 mission."Bharat Heavy Electricals Limited (BHEL) has achieved the unique milestone of supplying its 100th battery to ISRO for its very important and critical mission, Chandrayaan 3," a company statement said.Over the last 16 years, BHEL has been supplying batteries to ISRO for its critical mission applications like INSAT, GSAT, IRNSS series and RISAT seriesThese are manufactured at the Electronic Systems Division (ESD) of BHEL in Bengaluru, with the highest standards of quality, reliability and safety.These batteries use various types of chemistry, including Nickel-Cadmium, Nickel-Hydrogen and Lithium-Ion.As part of this series, the 100th battery was handed over to ISRO by AK Jain, Executive Director, BHEL-EDN. The vehicle carrying this battery was flagged-off by M Sankaran, Deputy Director/CPA of ISRO, Bengaluru at ESD, in the presence of senior officials of ISRO and BHEL.The BHEL's ESD also fabricates and supplies space-grade solar panels for satellites of ISRO for the last two decades and more than 650 sq meters of BHEL-made panels are used in various satellites.Further, BHEL has completed testing of nearly 75,000 multi-junction solar cells at its premises, prior to use in the fabrication of panels. The company takes immense pride in its association with all of ISRO's launch vehicles. and BHEL.The BHEL's ESD also fabricates and supplies space-grade solar panels for satellites of ISRO for the last

two decades and more than 650 sq meters of BHEL-made panels are used in various satellites.Further, BHEL has completed testing of nearly 75,000 multi-junction solar cells at its premises, prior to use in the fabrication of panels. The company takes immense pride in its association with all of ISRO's launch vehicles.

Source: https://www.deccanherald.com

Making our own passenger airplane

When Laura Tyson, economist and Bill Clinton's adviser, wrote that a dollar worth of shoes is not the same as a dollar worth of computers, she meant the effect technology and manufacturing will have on jobs, economic multipliers, and trade. India's space vehicle and combat aircraft development have shown great technology spinoffs and have been economic multipliers. But space vehicles or combat aircraft are not civil aircraft. The first cousin to a civil aircraft is a military transport aircraft as these, too, are certified to civil aircraft regulations. But the commonality ends there. Civil aircraft development is to be seen in terms of hard, cold numbers of ownership, fuel and maintenance costs. The internet is strewn with stories of failures of manufacturers and airlines who lost sight of this. Global 20-year forecasts show that the fleet sizes for single-aisle aircraft (A320 and B737) is around 32,000, widebodies around 8,000, and of regional aircraft, about 5,000. Over 75% of the market is held by single-aisle aircraft because they represent the middle of the market, have scale and are versatile to be deployed on most networks that see cyclic demand. These aircraft have eaten into the widebody market, especially in Covid times. Regional aircraft have always faced a challenge, buffeted by competition between surface transport and single-aisle aircraft.The Indian market represents a sweet spot. The present reduction in demand from Covid is just a blip. New route networks into Tier-I cities by Indigo and SpiceJet have been stable and price elastic. The government's 'Udan' has done what the Essential Air Services in the US did not. It will aid the growth of India's smaller cities and create a more even economic-geography. Even in India, single-aisle aircraft play a predominant role (over 75% of the fleet), while regional aircraft are route development aircraft, till the single-aisle aircraft take over.India has had its experiments with civil aircraft development and manufacturing. The HS-748 (Avro) was part of Indian Airlines, till the airline turned into an all-jet fleet in the 1980s. Vayudoot used the Dornier-228 as its mainstay, till the airline collapsed. Both these aircraft are now military transports, still used extensively by the IAF and Indian Navy, and one needs to give them credit for that. HAL, NAL and private companies have had their tryst with civil aircraft development, but the challenges are— among others— international certification and economies of scale.Frequently, Brazil and China are cited as case studies. The Brazilian company Embraer was born during the Cold War, when Brazil was the non-Communist bulwark for the US, in the times of Castro of Cuba and Allende of Chile. It got help and a bit of the US market for its small aircraft, and there was no looking back. Equally, China was cultivated during Richard Nixon's time and Deng Xiaoping used China's market potential, offsets and low labour costs to encourage civil-aircraft parts manufacturing for global companies. The country now manufactures a regional jet and a single-aisle aircraft which is close to Chinese certification and has an assembly line for the A320.We are at the cusp of a dramatic technology revolution in civil aircraft. Electric propulsion, or even hydrogen, could be a reality sooner than we think. In India, the government plans a hydrogen mission and is focused on electric vehicles. The unmanned air-taxi revolution, with dedicated airspace and certification to carry passengers, will impact regional air mobility. So, smaller conventional aircraft will see competition from a new source. Much of this will come from startups, with unmatched energy to innovate, and it is wise to give them the space. But, even as things change, some challenges remain the same: international safety certification, scale and operating economics.India, with its post-Covid geopolitical status and its market, stands a chance like never before, if its policymakers take pragmatic decisions involving the size of aircraft they would support, the technologies that can be developed or co-developed, and the countries to align with. This could further integrate India into the global supply chain and give China a run for its money.Lastly, experience has shown that it is not easy to achieve viability or financial closure on civil aircraft projects. An imaginative combination of financial instruments that securitises and values spinoffs, economic multipliers, trade and offsets, private sector and international participation is required. Technology pragmatism and cold operating economics are what one needs to go by. More than anything else, it is the strategic plan to harness the energy of the startups, the wisdom of the private sector in market understanding and delivery, and the utilisation of public technology infrastructure that will be vital.Policymakers

should consider the unprecedented opportunity to push for new technologies that will have spinoffs across the board while recognising the coming revolution in regional air mobility and partnering to manufacture a right-sized aircraft.(The writer is a former Programme Director (Civil Aircraft) at NAL and has served on various committees on aviation policy and the CII National Committee on Civil Aviation)

Article By
Dr Satish Chandra (Retd)
Programme Director, Civil Aircraft
NAL, CSIR, Bangalore

Source: https://www.deccanherald.com

New membersof AeSI elected in 220th Grading Committee Meeting

Sl. No.	Name	Designation	Grade	Member No.	Branch
1	Mr. Rajiv Kumar Sharma	Sr. Aircraft Maintenance Engineer	Member	M-20669	Bangalore
2	Air Cmde Puneet Surindernath Sarin	Air Cmde	--do--	M-20670	Nasik
3	Dr. Arun Kumar Perumal	Professor	--do--	M-20671	Chennai
4	Mr. Vishwajit	Manager	--do--	M-20672	Nasik
5	Mr. Chandrashekhar Shashikant Bhamare	Senior Manager	--do--	M-20673	Nasik
6	Mr. Asit Baran Modak	Manager	--do--	M-20674	Nasik
7	Mr. Ramesh Hathile	Senior Manager	--do--	M-20675	Nasik
8	Mr. Babulal Choudhary	Senior Manager	--do--	M-20676	Nasik
9	Mr. Ashish Kumar Gaikwad	Manager	--do--	M-20677	Nasik
10	Mr. Alok Kumar Parida	Senior Manager	--do--	M-20678	Nasik
11	Mr. Gaurav Yadav	Manager	--do--	M-20679	Nasik
12	Mr. Umesh Tripathi	Senior Manager	--do--	M-20680	Nasik
13	Mr. Subrato Samir Banerjee	Manager.	--do--	M-20681	Nasik
14	Mr. BalasubramanyamSasanapuri	Lead Tech. Specialist	--do--	M-20682	Hyderabad
15	Capt G Rishi Menon	Director	--do--	M-20683	Kochi
16	Mr. K Vamsi Krishna Reddy	Scientist	--do--	M-20684	Hyderabad
17	Dr. Amit Kumar Tripathi	Scientist E	`	M-20685	Bangalore
18	Mr. Rajendra Kumar Meena	Senior Manager	--do--	M-20686	Nasik
19	Mr. Sandeep S. P	Consultant	Associate Member	AM-7578	Bangalore
20	Mr. Prashant Sharma	Advance Lead Engineer	--do--	AM-7579	Bangalore
21	Mr. Sushane Sharma	Air Technical Officer	Graduate	G-13482	Kochi
22	Mr. Viraj Simpi	Air Technical Officer	--do--	G-13483	Kochi
23	Mr. E Shanmukha Sai	Air Electrical Officer	--do--	G-13484	Kochi
24	Mr. Hitanshu Austin	Air Technical Officer	--do--	G-13485	Kochi
25	Mr. Prakash Dejappa Pujari	Air Technical Officer	--do--	G-13486	Kochi
26	Mr. Tanmay Sharma	Air Technical Officer	--do--	G-13487	Kochi
27	Mr. Navdeep Kumar	Student Officer	--do--	G-13488	Kochi
28	Mr. Shubham Verma	Air Technical Officer	--do--	G-13489	Kochi
29	Mr. Manish Choudhary	Student Officer	--do--	G-13490	Kochi
30	Mr. Devdatta Mishra	Air Technical Officer	--do--	G-13491	Kochi
31	Mr. Vivek Pant	Air Technical Officer	--do--	G-13492	Kochi
32	Mr. Ponnamanda Suresh Chandra	Air Technical Officer	--do--	G-13493	Kochi
33	Mr. Deepak R. N.	Student Officer	--do--	G-13494	Kochi
34	Mr. Chintapalli Sai Krishna	Air Technical Officer	--do--	G-13495	Kochi
35	Mr. Rishabh A Upadhyay	Air Technical Officer	--do--	G-13496	Kochi
36	Ms. Tineema Babu	ELP(SK)	--do--	G-13497	Kochi
37	Mr. Baburaj G	MCMECH (AR) II	--do--	G-13498	Kochi
38	Ms. K R Resmi	Chargeman(AE)	--do--	G-13499	Kochi
39	Mr. PrithivirajChidhambararaj	Nil	--do--	G-13500	Bangalore
40	Mr. Ashish Goyal	AeSI Graduate	--do--	G-13501	Delhi
41	Mr. Kunal Pachauri	AeSI Graduate	--do--	G-13502	Agra
42	Ms. Thara Rekha I V	AeSI Graduate	--do--	G-13503	Kochi
43	Mr. Indra Kumar Chauhan	AeSI Graduate	--do--	G-13504	Bangalore

New 'Fellow' members of AeSI elected in 232nd Governing Council Meeting

S. No.	Name of the Members	Designation	Grade	Member No.	Branch
1	Mr. S. ManickaVasagam	Chief of Projects	Fellow	F-872	Bangalore
2	Ms. Harpreet A. De. Singh	CEO	-do-	F-873	Mumbai
3	Mr. Umamaheswaran R	Scientific Secretary	-do-	F-874	Bangalore
4	Dr. P. V. Venkitakrishnan	Director	-do-	F-875	Bangalore
5	Prof. V. Ganesan	Professor Emeritus (Retd)	-do-	F-876	Chennai
6	Mr. A. N. Viswanatha Rao	Scientist-G	-do-	F-877	Bangalore
7	Dr. S Geetha	Outstanding Scientist	-do-	F-878	Trivandrum
8	Mr. Yatindra Kumar	Former Secretary (Admin)	-do-	F-879	Delhi
9	Prof. RadhakantPadhi	Professor	-do-	F-880	Bangalore