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Every Month From The Aeronautical Society of India

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CURRENT AFFAIRS

Indian Air Force successfully carries first-ever mid-air refuelling of fighter aircraft Tejas

Indigenously developed Air-to-Air Missile Astra successfully test fired

TECHNOLOGY

India's PSLV rocket successfully puts into orbit two UK Satellites NovaSAR, s1-4

The total lift-off weight of the two satellites was 889 kg. NovaSAR weighing 445 kg is an S-Band Synthetic Aperture Radar satellite intended for forest mapping, land use and ice cover monitoring, flood and disaster monitoring. S1-4 weighing 444 kg is a high-resolution Optical Earth Observation Satellite, used for surveying resources, environment monitoring, urban management and for disaster monitoring. After the successful launch, ISRO Chairman Dr K Sivan said: "The PSLV rocket preciously placed two of our customer satellites in 583 km orbit. The success will give added energy for industry to make PSLV." At 10.08 p.m. the four staged/engine PSLV-CA rocket, standing 44.4 metres tall and weighing 230.4 tonnes, blasted off from the first launch pad. With the fierce orange flame at its tail lighting up the night skies here, the rocket slowly gained speed and went up and up enthralling the people at the rocketport while the rocket's engine noise like a rolling thunder adding to the thrill. Just under 18 minutes into the flight, the rocket slung NovaSAR and S1-4 into the orbit. Answering a question raised in the Rajya Sabha, the Minister of State in the Prime Minister's Office, Jitendra Singh, said in August: "In the last four years more than 200 foreign customer satellites have been launched. Considering the future launch demand for increased number of nano and small satellites, there are plans to increase the number of PSLV launches and also develop dedicated small launcher to cater to this high market demand." According to him, as on August 9, 237 foreign satellites belonging to international customers from 29 countries have been successfully launched using PSLV. With the successful launch of two British satellites, the total number of foreign satellites launched by India goes up to 239. "We have an order book of Rs 980 crore, with Rs 500-600 crore contracts in pipeline for launch services in this fiscal (2018-19) and next fiscal (2019-2020)," S. Rakesh, Chairman-cum-Managing Director, Antrix Corp, said in a recent interaction with IANS. India on 16 September successfully put into orbit two British earth observation satellites, NovaSAR and S1-4, in copybook style. Two satellites aboard the Indian rocket - Polar Satellite Launch Vehicle(PSLV) - belonged to Surrey Satellite Technologies Ltd (SSTL), UK. The satellites were put into sun-synchronous orbit under a commercial arrangement with Antrix Corp Ltd, the commercial arm of the Indian Space Research Organisation(ISRO), the Indian space agency.

Source: https://www.firstpost.com/

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CURRENT AFFAIRS

Mr R Madhavan takes charge as HAL CMD

R Madhavan has taken charge as the Chairman and Managing Director of Hindustan Aeronautics Ltd. Till now, Mr Suvarnu Raju was the CMD. Prior to this, Mr Madhavan was heading the Accessories Division of HAL at Lucknow as an Executive Director. “Maintaining the numero uno position of HAL in aerospace industry while delivering world-class products and services through increased indigenisation would be my key focus areas,” Madhavan said. The emphasis would be to build on the core competence of the company and emerge as the preferred supplier in the aerospace industry, he added. Born in 1962, Madhavan is a Mechanical Engineer from NIT, Raipur and a Post Graduate in M. Tech. from IIT Madras. He had joined HAL as a management trainee in July 1982 and has a comprehensive management and engineering experience. His diverse skill sets in varied fields like production, quality, customer services and management helped him hold key positions within the organisation. Madhavan spearheaded the successful absorption of technology for the production of Su-30 airframe and engine accessories from raw material phase at HAL’s Accessories Division, Lucknow. He has contributed to `Make in India’ drive by developing MSME vendors for aerospace manufacturing. His focus areas would also include design and development, order book position and product mix which meets the customer requirements.

Source: https://www.thehindubusinessline.com/

A SpiceJet take-off powered by a blend of bio-jet and ATF

India takes first step towards using bio fuel to fly aircraft Its environmental advantages are well-known. Airlines across the world have used it to power their flights and, on August 27, India too took tentative steps in this field when SpiceJet operated a Bombardier Q-400 aircraft powered by a blend of bio-jet and aviation turbine fuel (ATF) on a 40-minute flight between Dehradun and Delhi. Virgin Atlantic was among the first airlines to use biofuel in 2008 when it used a fuel derived from a mixture of Brazilian babassu nuts and coconuts on its Boeing 747 aircraft to fly between Heathrow and Amsterdam. In 2016, KLM Cityhoppers’ E190, flying from Oslo to Amsterdam, were powered by biofuel produced from camelina plant oil. In the same year, Cathay Pacific operated the longest biofuel flight at that time when taking delivery of its first Airbus A-350-900 aircraft. And earlier this year, Qantas operated the world’s first dedicated biofuel flight between the US and Australia. The 15-hour trans-Pacific flight was operated with blended biofuel, saving 18,000 kg in carbon emissions.

Many advantages to biofuels

The advantages of using biofuel are many. These fuels are environmentally friendly. Further, airlines are also looking at them to cut down on the high ATF costs. Says the Sustainable Aviation Fuel Users Group (SAFUG), “Sustainable biofuels may offer a solution to this problem since their production can be spread worldwide, and across a number of different crops, thereby reducing airlines’ exposure to the fuel cost volatility that comes with having a single energy source.” Japan Airlines, Singapore Airlines, Lufthansa, Cathay Pacific and South African Airways are among the 28 airlines that are part of the Grouping. Further, biofuels can also provide economic benefits to parts of the world that have large amounts of land that is either unviable or marginal for food crops, but is suitable for growing second-generation biofuel crops. Biofuel that can be used as jet-fuel can be prepared using animal fat, vegetable oil and agricultural waste. The SpiceJet flight used jatropha plant sourced from nearly 500 farmer families in Chhattisgarh for fuelling its flight. The blending was done by CSIR-Indian Institute of Petroleum.

Source: https://www.thehindubusinessline.com/

Indian Air Force successfully carries first-ever mid-air refuelling of fighter aircraft Tejas

Dry run of mid-air refuelling of Tejas fighter jet by an Indian Air Force aircraft was successfully conducted, a defence source said. The test conducted involved a dry linkup, meaning no fuel was actually transferred between Indian Air Force Il-78 tanker and Tejas fighter jet through its air-to-air refuelling probe, the source told PTI here. Nine more tests will be held which would also include wet tests where the actual transfer of fuel takes place from the tanker to the fighter, the source added. India’s indigenously built light combat aircraft Tejas, the smallest and lightest multi-role supersonic fighter aircraft in its class, had commenced operations from the Sulur Air Force Station in Tamil Nadu on July 2, two years after its induction into the Indian Air Force. The fighter jet, part of the ‘Flying Daggers’ of the 45 Squadron, was formally operationalised at a ceremony attended by Air Officer Commanding-in-Chief (Southern Air

Command) RKS Bhadauria. Designed by the Aeronautical Development Agency (ADA) and manufactured by Hindustan Aeronautics Limited (HAL), the single-engine, tailless aircraft would cater to the diverse needs of the Indian Air Force (IAF) and the Indian Navy. The Southern Air Command based in Kerala capital Thiruvananthapuram has been entrusted with the responsibility of integrating the fighter aircraft, equipped with a satellite-aided Inertial Navigation System, in the Air Force's concept of operations. The aircraft has a digital computer-based attack system and autopilot mode. It can fire air-to-air missiles, carry bombs and precision guided ammunition.

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

ISRO to fund research in twelve cities

Indian Space Research Organisation (ISRO) will soon look for innovative ideas from around the country by facilitating research in various cities. A total of 12 centres — six Space Tech Incubation Centres and six Regional Academic Centres for Space — will be set up across the country. Each of the incubation centres and regional academic centres will be granted Rs 2 crore from ISRO. Apart from it, six academic chairs will also be set up in varsities. The first such incubation centre in National Institute of Technology (NIT), Agartala, was remotely inaugurated by Tripura Chief Minister Biplab Kumar Deb, during the first edition of Spacetronics, organised by India Electronics and Semiconductor Association, in Bengaluru. Other ISRO incubation centres will come up in Trichy, Jalandhar, Bhubaneshwar, Nagpur, and Indore. All the incubation centres will be established at NITs in these cities, ISRO Chairman Dr K Sivan said. "ISRO will fund the institutions to establish the required facilities in these incubation centres. We don't want to go to places where research is already being carried out," he said. The Regional Academic Centre for Space will come up in Jaipur, Patna, Kanyakumari, Varanasi, Kurukshetra, and Guwahati, he said. "We are very clear that across India there millions of individuals with talent. So, we have decided to expand horizontally," he said. While incubation centres will work on products, regional academic centres will work on projects. ISRO will give ideas and based on the efficiency of their innovation, they will be absorbed by ISRO, he said. First of the academic chairs by ISRO — Prof Satish Dhawan Chair — will be instituted at University of Jammu and will be inaugurated on October 11, Dr K Sivan added.

'Tripura engineers ready to work for 1/3 salary back home'

Engineers from Tripura working in Bengaluru and earning a salary of Rs 1.5 lakh per month are ready to work for '50,000 back in their home state, Tripura CM Mr Biplab Kumar Deb said. "There are 12,000 engineers from Tripura working in Bengaluru. I am making a website to compile the engineers, who will be invited to come back to Tripura and work for its development," he said.

Source: http://www.newindianexpress.com

ISRO's GSAT-29 launch in October

Satellite will help propel PM's Digital India programme; it will work to provide Internet access to villagers across the country The Indian Space Research Organisation (ISRO) which has embarked on an ambitious plan to have a rocket launch every second week from now on will launch the GSAT-29 next month. The launch of the GSAT-29 satellite will propel Prime Minister Mr Narendra Modi's Digital India programme. One of the targets of the mission is to ensure that Village Resource Centres (VRC) in rural areas can successfully bridge the digital divide. According to the space agency GSAT-29 is configured around ISRO's Enhanced I-3K Bus and will be the payload for second developmental flight of GSLV MK3. It carries Ka x Ku multi-beam and optical communication payloads for the first time. The GSAT-29 which is classified as a high throughput satellite will be launched on board the GSLV MK3-D2. The October launch of the GSLV MK3 is the second one involving ISRO's heaviest launch vehicle. Last year, the first developmental flight of GSLV MK3 was carried out when the GSLV MK3-D1 successfully launched the GSAT-19 satellite. Apart from the buzz surrounding the GSAT-29's launch as it is part of the Digital India mission, the October launch would also be watched closely as the GSLV MK3 is the rocket which has been earmarked for the Human Space Mission or the Gaganyaan. Gaganyaan aims to send a three-member crew to space for a period of five to seven days by 2022. The spacecraft will be placed in a low earth orbit of 300-400 km. ISRO has lined up a series missions involving the GSLV MK3 before the Gaganyaan mission becomes a reality as the launcher has to be Human rated for the mission. After the GSAT-29, another launch is planned involving a PSLV during which 30 commercial satellites would be launched. ISRO has said that it will have a very busy second half for 2018 starting with the successful launch of two foreign satellites on September 16.

Source: https://bangaloremirror.indiatimes.com/

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Bengaluru to get Boeing's second-largest electronics, avionics facility

Global aerospace major Boeing is setting up an electronics manufacturing and avionics Assembly facility in this tech hub at an investment of Rs 11.52 billion, said. "We have allotted 36 acres of land for Boeing India to set up the facility in the state-run Aerospace Park at Devanahalli near the airport in north Bengaluru," a senior official of the state Industry Department told IANS here. Boeing India President Mr Pratyush Kumar met state Chief Minister Mr H.D. Kumaraswamy at the state secretariat to discuss the project. "As part of Boeing's Engineering and Technology Centre in India, the facility will create about 2,600 direct jobs when set up and commissioned," said the official. Though the US-based aircraft maker's investment proposal was cleared by the previous Congress government in December 2017, approvals and formalities got delayed due to the state Assembly elections and formation of the new coalition government by the Janata Dal-Secular (JD-S) and the Congress in May. The facility will be Boeing's second-largest after its engineering and technology centre at Seattle in Washington district on the US west coast. "The state cabinet approved the Boeing's proposal early this month for land allotment and other statutory clearances," added the official. Boeing's India arm plans to commence the project work in the next three months and complete first phase by 2019. Karnataka Udyog Mitra Managing Director Mr B.K. Shivakumar had told IANS earlier that Boeing would also be making aircraft components and subsystems at the new facility for civil and military versions. The aerospace behemoth has presence in this tech hub with a global research and development centre since a decade.

Source: https://www.business-standard.com/article

Domestic aviation traffic saw 17% growth in August

Domestic aviation traffic registered a growth of 17% in the month of August, with airlines ferrying a total of 11.3 million passengers as opposed to 9.6 million same time last year, according to the Directorate General of Civil Aviation's monthly data. Gurgaon-based budget carrier SpiceJet was at the top in terms of two key parameters — seat occupancy and punctuality. The airline saw an average of 93.6% seats on its planes being sold. It was followed by GoAir (84.6%), IndiGo (82.8%), Air India (82.3%) and Jet Airways (82.0%). It also saw an on-time performance (OTP) of 87.4%, implying that as many flights departed and arrived as per schedule. IndiGo and Go Air shared the second place with an OTP of 87.2%, followed by Vistara (83.6%), Jet Airways (82.6%) and Air India (75.3%). Market leader IndiGo cornered 41.9% of the domestic market share. Jet Airways has a market share of 13.8%, Air India 12.7%, SpiceJet 12.4% and Go Air 8.9%.

Source: https://www.aviationindia.net/

India's Mars Orbiter Mission completes four years in orbit: ISRO

India's maiden interplanetary mission — the Mars Orbiter Mission (MOM) — has completed four years orbiting the red planet, according to ISRO. The mission, launched by the Indian Space Research Organisation (ISRO) on November 5, 2013, successfully placed itself into Martian orbit on September 24, 2014 in its first attempt. Although the designed mission life of MOM was six months, the satellite has continued to beam back science data from Mars for the past four years. "It's been 4 years since I am around! Thank you for your love and support," the ISRO's Mars Orbiter twitter handle said. The tweet included an image taken by the orbiter of Olympus Mons — the largest known volcano of the solar system. MOM is built with full autonomy to take care of itself for long periods without any ground intervention. The spacecraft came out of communication 'blackout' during this period. MOM is the only Martian artificial satellite which could image the full disc of Mars in one view frame and also image the far side of the Martian moon Deimos. The Mars Colour Camera has acquired over 980 images so far. The mission has also helped scientists successfully prepare a global atlas of Mars.

Source: http://defencenews.in/

ISRO Likely To Launch Chandrayaan-2 On January 3 Next Year

Indian Space Research Organisation (ISRO) Chairman Dr K Sivan has said that India's second lunar mission, Chandrayaan-2 is likely to be launched on January 3, 2019. Chandrayaan-2 will be the first mission in the world going near the South Pole. After the successful launch of PSLV C-42 into orbit, Dr K Sivan talked about the upcoming launches scheduled over the next few months. He said, "Chandrayaan-2 is planned for a window from January 3 to February 16, 2019, that we are targeting. It can happen anytime during that window. But we are aiming for the beginning of the window, January 3." Talking about the successful launch of the NovaSAR and S1-4 earth observation

satellites of UK, Dr K Sivan said, “Today I am extremely happy to announce that PSLV-C42 carrying two customer satellites NovaSAR and S1-4 placed them precisely in orbit. Within the next six months, 10 satellite missions and eight launch vehicle missions would be launched - one every two weeks.” Reacting on ISRO scientist Nambi Narayanan who was granted compensation by the Supreme Court after being arrested in an alleged spying case, Dr K Sivan said, “ISRO isn’t in the picture. The case is only against Kerala government. When it was decided that he (Nambi Narayan) is wrongly arrested, he returned to ISRO.” The Supreme Court on September 14 granted compensation of Rs. 50 lakh to Mr Narayanan, who was arrested in an alleged spy scandal in 1994. The apex court had observed that the arrest of Mr Narayanan was “needless” and “unnecessary”. A three-judge bench of the top court, headed by Chief Justice of India Mr Dipak Misra, had also announced setting up of a committee which would be headed by retired Supreme Court judge DK Jain to investigate the role of Kerala police officials in the arrest of Mr Narayanan. The ISRO successfully launched PSLV C-42 into orbit carrying two international satellites — Nova SAR and S1-4 from the Satish Dhawan Space Centre in Sriharikota. The two earth observation satellites have been developed by Surrey Satellite Technologies Limited (SSTL), the United Kingdom under a commercial arrangement with Antrix Corporation Limited, Department of Space. Both the British satellites that weigh around 889 kilograms, were launched into a 583 km Sun Synchronous Orbit. NovaSAR is an S-Band Synthetic Aperture Radar satellite intended for forest mapping, land use, ice cover monitoring, flood and disaster monitoring. S1-4 is a high-resolution Optical Earth Observation Satellite, used for surveying resources, environment monitoring, urban management and for disaster monitoring.

Source: http://defencenews.in

India’s first indigenously developed fast breeder reactor at Kalpakkam may achieve criticality in 2019

The country’s first indigenously developed 500-megawatt (mw) prototype fast breeder reactor at Kalpakkam in Tamil Nadu is expected to achieve criticality next year, a senior official said. The project, which was earlier expected to be commissioned in 2012, has missed several deadlines. “Our indigenously developed prototype fast breeder reactor of 500 mw is now undergoing sodium commissioning. We expect criticality next year,” Department of Atomic Energy (DAE) secretary Mr Sekhar Basu said at the 62th General Conference of International Atomic Energy Agency (IAEA) held in Vienna. Achieving criticality means that the reactor is fully operational and safe. The design of the country’s first fast breeder reactor, called Prototype Fast Breeder Reactor (PFBR), was done by the Indira Gandhi Centre for Atomic Research (IGCAR). Bharatiya Nabhikiya Vidyut Nigam (Bhavini), a public sector company under DAE, has been given the responsibility to build the fast breeder reactors in the country. In a statement issued by the DAE, Mr Basu said that India’s plans to build 21 reactors by 2030 was well on track. “I am glad to inform that the implementation of this programme is well on track. In addition, our discussions with foreign partners for bringing different technology is on,” he told the gathering.

Source: https://defenceupdate.in/

21 Nuclear Reactors By 2030- Plan Well “On Track”: Atomic Energy Agency

India’s plan to build 21 nuclear reactors by 2030 by using different technologies is on track, Atomic Energy Department Secretary Mr Sekhar Basu said. The Secretary was speaking at the 62nd General Conference of the International Atomic Energy Agency (IAEA) hosted by Austria, an official release said. “During the last general conference we talked about our plans to build the 21 reactors by 2030… implementation of this programme is well on track with foreign partners bringing in different technologies.” “We have placed two Russian designed pressurised light water reactors and two pressurised heavy reactors being built with Indian technology under the IAEA safeguards. Thus, in all, 26 Indian nuclear facilities are placed under IAEA safeguards,” he added. A pact was signed in March between Indian and France to establish six nuclear power reactors of European pressurized reactor (EPR) technology to enhance India’s international cooperation in the field. The release said that under IAEA aegis, over 150 persons from Africa and Asia have been trained in cancer care and two radionuclide generators developed to fight cancer.

Source: https://defenceupdate.in/

Government may clear purchase of two more AWACS for around $800 million

India is finally back on track to acquire two more airborne warning and control systems (AWACS), which are potent force-multipliers as “eyes in the sky”, for around $800 million in a tripartite venture with Israel and Russia after price wrangling kept the acquisition derailed for several years. Defence ministry sources said a fresh procurement case for

the two AWACS, with Israeli Phalcon early-warning radar systems mounted on Russian Ilyushin-76 heavy-lift aircraft, is now with the Cabinet Committee on Security for the final nod. This project has been hanging fire since the first three such Phalcon AWACS were inducted by the IAF in 2009-2011 under a $1.1 billion deal inked by India, Israel and Russia in 2004. “The finance ministry had earlier objected to the sharp price hike being demanded by Russia. But a good deal has been achieved now,” said a source. AWACS or AEW&C (airborne early-warning and control) aircraft are considered critical in modern warfare because they can detect and track incoming fighters, cruise missiles and drones much before ground-based radars, direct friendly fighters during air combat with enemy jets, and keep tabs on enemy troop build-ups and warships. China has close to 30 such airborne surveillance platforms, developing its own Kong Jing-2000 “Mainring”, KJ-200 “Moth” and KJ-500 aircraft. Pakistan, in turn, has eight Chinese Karakoram Eagle ZDK-03 AWACS and Swedish Saab-2000 AEW&C, and is on course to get more from China. But the IAF is making do only with three Phalcon AWACS, with a 400-km range and 360-degree coverage, as of now. The force also now has two “Netra” AEW&C aircraft, under which indigenous 240-degree coverage radars with a 250-km range have been fitted on three smaller Brazilian Embraer-145 jets, in a Rs 2,425 crore project approved in October 2004. A much more ambitious indigenous AWACS-India project worth Rs 5,113 crore was also approved by the defence ministry in March 2015 for 360-degree coverage indigenous AESA (active electronically scanned array) radars to be mounted on two Airbus A-330 wide-body jets. But these two AWACS will be ready only by 2024-2025 at the earliest, with six more to be ordered at a later stage. AWACS, incidentally, are also a crucial constituent of IACCS (integrated air command and control system), the fully-automated air defence network with data links being progressively built to integrate the wide array of military radars with each other as well as with civilian radars to plug surveillance gaps in Indian airspace. Five IACCS nodes have already been established at Barnala (Punjab), Wadsar (Gujarat), Aya Nagar (Delhi), Jodhpur (Rajasthan) and Ambala (Haryana). Under Phase-II of the IACCS, worth around Rs 8,000 crore, four new major nodes and 10 sub-nodes are now slated to come up. While three nodes will be in eastern, central and southern India, the fourth is meant for the strategically-located Andaman and Nicobar Island archipelago.

Source: https://defenceupdate.in/

Tejas Mk1, Mk1A, and Mk2 will be the mainstay of IAF’s inventory

With the number of the Indian Air Force’s fighter squadrons expected to decrease quickly from the present 31 as the current fleet ages, there has been a decisive endeavor to accelerate the recapitalization of the fighter fleet. The majority of the new fighters are to bear the “Make in India” label. By 2032, the Indian Air Force plans to have at least 18 squadrons of Indian-made fighters, said the Deputy Chief of Air Staff, Air Marshal R. Nambiar, at a conference held in Delhi this month. Nambiar said that the squadrons of the indigenously built fleet would include the Light Combat Aircraft (LCA) Mk1, Mk1A, and Mk2 that, in 10 years, “would be the mainstay of our inventory.” LCA variants would replace the MiG-29s, Jaguars, and Mirage 2000s. He said of the LCA: “It is a wonderful aircraft but deliveries are too slow.” With the India-Russia fifth-generation fighter aircraft (FGFA) project showing little signs of moving ahead, it is the twin-engine, stealthy Advanced Medium Combat Aircraft (AMCA) program that the Indian Air Force is now looking at “as a replacement for the Sukhoi Su-30s, which will start showing their age by then,” noted Nambier. He said that the air force “has put its money where its mouth is” and has already released a facility in Coimbatore in South India to the Defence Research Development Organisation to start work on two AMCA technology demonstrators. In the meantime, the Minister of Defense, Ms Nirmala Sitharaman, confirmed to Parliament the feasibility study for the development of AMCA had already been completed. While optimistic about the project, Mr Ashis Kumar Ghosh, the AMCA project director, said that there have been numerous challenges. “AMCA is in the fifth-gen, 25-ton weight category, to be operated [partially] stealthy and with internal weaponry. The most important [challenge] is developing the technology indigenously while retaining common design drivers, yet being different. We would like to fly with a readily available engine, and the swing role has to be performed, as asked for by the air force.” He added that an increase in survivability was planned with “stealth, electronic warfare, and performance.” Realization of the plan is to first fly two technology demonstrators of a fifth-generation aircraft. ”Once the airframe is ready and flown, we will start to add others in a phased manner. This helps in de-risking the program as we can start work on different aspects simultaneously.” He added that a quality, skilled manufacturing ecosystem was essential for the AMCA to be built. Vendors, he said, would be dealing with a “high geometric complexity. Too many requirements are required for stealth. If you cannot maintain proper tolerances, it becomes a challenge.” As the first of 36 Rafales are delivered from September next year until 2022, an official indicated that Dassault Aviation could likely be given an additional order in later years, as they would most likely be cheaper. With two squadrons established at different bases in India, and able to absorb additional aircraft, there would be no further need to equip additional bases with the necessary tooling and equipment. Regarding the Request for Information released for 114 multi-role combat aircraft (MRCA), with a Request for Proposal that will be issued late next year at the earliest and implemented after three to four years, there is cynicism among many OEMs

who feel that this, too, might experience the fate of the earlier MRCA that was canceled by the previous government. Additionally, 85 percent of the MRCA project has to be “Made in India” by a Strategic Partner (SP)/Indian Production Agency. While it has a straightforward intent, the perplexing SP model is slow with decision-making and the final draft has yet to be implemented, leaving future vendors in a state of uncertainty.

Source: https://defenceupdate.in/

India’s first missile tracking ship is readying for sea trials

Once ready, it will be India’s first, a force multiplier and cruise the country into a global elite club. Hindustan Shipyard Limited (HSL) is gearing up to undertake sea trials of India’s first missile tracking ship by the first week of October. The keel of the ship, which was laid on June 30, 2014, is being built for the National Technical Research Organisation, the technical intelligence agency working directly under the supervision of the Prime Minister’s Office and the National Security Adviser. Considered a “topmost secret project”, a lot of confidentiality is being maintained in executing the project costing about ?750 crore. It will be named after its induction into the Indian Navy. For now, it is simply referred as VC 11184.This will be the first of its kind ocean surveillance ship being built as part of the efforts under the NDA government to strengthen the country’s strategic weapons programme. When asked about the commencement of sea trials, HSL Chairman and Managing Director Rear Admiral L.V. Sarat Babu told The Hindu that the sea trials would be carried out either by September-end or the first week of October and they were confident of handing over the vessel to the Indian Navy by the year-end. “This would put India in the elite of club of a few countries that have such a sophisticated ocean surveillance ship,” the Rear Admiral pointed out. Declining to comment further, he said they had successfully completed the basin trials sometime ago.

300-strong crew

The ship was built inside the covered dry dock. It has the capacity to carry 300-strong crew with hi-tech gadgets and communication equipment, powered by two diesel engines, and a large deck capable of helicopter landing. HSL, set up in 1941, achieved a total income of ?651.67 crore and a value of production of ?644.78 crore during 2017-18, the highest since inception. It is poised to get orders for construction of five fleet support ships costing ?9,000 crore and finalise request for proposal for design collaborator for construction of two Special Operation Vessels called mini submarines. It is also banking on the order for medium refit of Russia-made third Sindhughosh class submarine INS Sindhuratna for which it has submitted technical bids. Visakhapatnam is considered a strategic location on the East Coast for the Indian defence forces as it is home for Ship Building Centre to build nuclear powered submarine INS Arihant class, Naval Alternate Operational Base at Rambilli, the second naval base after Eastern Naval Command headquarters, training centre for Marine Commandos and headquarters of the submarine arm.

Source: https://defenceupdate.in/

TECHNOLOGY

ISRO Plans Its First Overseas Ground Base At North Pole

Two years after China opened a ground station at the North Pole, the Indian Space Research Organisation (ISRO) has drawn up plans to set up what will be its first overseas ground station in the region, primarily to augment the Indian Remote Sensing (IRS) operations that are crucial not just for civilian needs like disaster management but also for the armed forces. ISRO has a full-fledged IRS programme with a constellation of earth observation satellites, with the National Remote Sensing Centre (NRSC), Hyderabad responsible for data acquisition and processing, data dissemination, aerial remote sensing and decision support for disaster management. “So far as the station at North Pole goes, ISRO is serious about it. But the plan will take some time to materialise as it involves huge logistical challenges, international approvals and co-operation. But we will surely have it,” one scientist said. The scientist added that any hardware installation is a complex task, and given the region’s extreme conditions—considered more difficult to deal with than the South Pole—the challenges will be more.

Work going for the setting up of data reception station at Antarctica in 2013.

Elaborating the need for this, another scientist explained that with the advancements in high-resolution satellite programs of IRS, the complexity and role of ground stations have increased multifold. “High-resolution satellites need

frequent visibilities with larger processing power, data storage capacity onboard, data downlink of stored image to ground stations for meeting the global and Indian user requirements," the scientist said. Presently, the global requirements are met through NRSC's IMGEOS at Shadnagar, which was commissioned in 2011 and AGEOS in Antarctica, which was commissioned in 2013 and partly through SVALBARD ground station (not ISRO's). "However, ISRO wants to achieve a 14-orbit coverage, to realise which the ground station at North Pole is important... Because this will provide an opportunity to download the complete data within the same orbit and enable the usage of on-board resources in every orbit and to transfer the raw data in near real-time to Shadnagar," the scientist said. Further, the space agency, which was supposed to establish a second data reception antenna at AGEOS in Antarctica this year, will only be able to do it sometime next year. The AGEOS, at Bharati Station, Larsemann Hills, Antarctica is receiving IRS data from satellites like Resourcesat-2, Risat-2, the Cartosat family of satellites, Saral and Ocean sat, and transferring the same to Shadnagar. While the existing data receive antenna at Antarctica already supplements Earth Observation (EO) data collection for ISRO, the second one is meant for two specific projects. "The proposal was to set up a second data reception antenna system to support reception from two specific projects immediately and future ones later," the scientists said, adding that there has been some delay in establishing this, and that it is likely to be completed next year.

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

CECRI's research draws Boeing, global players

The Central Electro-Chemical Research Institute (CECRI) at Karaikudi, Tamil Nadu, one of the 38 Government-owned research laboratories under the Council for Scientific and Industrial Research (CSIR), is getting assignments from a marquee customer — Boeing. Boeing approached CECRI four years ago after seeing a research paper by S Mohan, chief scientist. The aircraft manufacturer asked CECRI to develop an electrolyte for chrome-plating to replace the toxic electrolyte it was using. "It took us three years to develop it," said Mohan, who developed for Boeing a 'trivalent electrolyte' which is more benign than the toxic 'hexavalent' form. The project was completed recently. CECRI and Boeing jointly own the patents. Since then, Boeing has given four such assignments to the institute. "Right now, four such jobs are underway," Mohan told BusinessLine. One is for developing a 'smart paint' with self-healing properties. "If a scratch occurs, the first instance of corrosion triggers an 'inhibitor' in the paint which spreads itself and repairs the scratch, said Mr S Sathiyanarayanan, senior principal scientist, at Karaikudi. Another one is a corrosion data-base for various alloys used in aerospace. Boeing will give the alloys, and CECRI will test it for various corrosion parameters. It will then hand over the data to the aircraft major. The job which began in 2015 is in its third phase. "Every year, they give us about 20 samples," Mr Sathiyanarayanan said. The other assignments are for fabricating special alloys using 3D printing technology and testing them for corrosion properties; and developing a 'wash primer', a thin coat for steel surfaces. All these assignments might earn CECRI about ₹ 2-3 crore, but the institute is happy to have a high-profile company among its customers.

Others follow

Two other global biggies have followed Boeing in giving assignments to CECRI — Airbus and Applied Materials. CECRI refused to comment because of non-disclosure agreements. But it is learnt that these projects have just been received. CECRI has also developed a process for Tata Steel to recover tin from slag from its steel plants. Principle John Berchmans who handled the project said that while a kg of tin costs ₹ 1,400, recovering the metal with CECRI's process costs ₹ 300 a kg. It is learnt that Tata Steel is now considering putting up a pilot project for this purpose.

Source: https://www.thehindubusinessline.com

ISRO developing vehicle to launch small satellites

IT has been a steady climb up the rungs of the Indian Space Research Organisation (ISRO) for the low-profile Dr K Sivan, who took over from Mr A.S. Kiran Kumar as its Chairman on January 12. Dr K Sivan was earlier Director, Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram. He first came into the limelight on January 5, 2014, when ISRO's Geosynchronous Satellite Launch Vehicle (GSLV-D5) flight, with an indigenously developed cryogenic engine, put the communication satellite GSAT-14 into a perfect orbit. He was the Mission Director for that crucial flight. A graduate in aeronautical engineering from the Madras Institute of Technology in 1980, Dr K Sivan took his M.E. in aerospace engineering from the Indian Institute of Science, Bengaluru, in 1982. He joined ISRO the same year in the Polar Satellite Launch Vehicle (PSLV) project and went on to contribute to its mission planning, design, integration and execution. He obtained his PhD in aerospace engineering from IIT Bombay in 2006. He was instrumental in establishing parallel computing and building a hypersonic wind tunnel facility at the VSSC. He came up with innovative

strategies for sending India's spacecraft to Mars by an uprated PSLV. Frontline met Dr K Sivan for an interview in his office at the ISRO headquarters in Bengaluru in the context of ISRO's major technology demonstration of a crew escape system, the first in a series of tests as part of India's efforts to send astronauts into space (human spaceflight); the upcoming Chandrayaan-2 mission; and ISRO's efforts to involve industries in building launch vehicles and satellites. Excerpts from the interview:

At what stage is the Chandrayaan-2 mission? Is the composite module, comprising the spacecraft, the lander and the rover, ready? It is going to be a highly complex mission.

As you said, Chandrayaan-2 is going to be a complex mission, and I will say that it is the most complex mission that ISRO has ever undertaken. This is the word that experts used when we called for a discussion on it. It is a very, very complex mission. In February or March, we had a review by eminent national experts. A point that came up for discussion was that the failure rates have been very high for spacecraft missions to the moon. Only 50 per cent have succeeded. Many of the missions failed during the landing phase, that is, the descent phase. The landing phase is new for Chandrayaan-2. We have already established the orbiter in Chandrayaan-1. The new thing is the rover. Of course, the rover has to come out of the lander, which is also new for us. We call it a complex mission because it is equivalent to three projects being done together [that is, the orbiter, the lander and the rover]. The second aspect is that when we talk about the launch vehicle, the Chandrayaan-2 mission is much more complex [than previous missions where we merely put a satellite into orbit]. After the orbiter is put into the lunar orbit, the lander has to separate and come down from the orbiter and land at a specified, predecided location on the moon. When there is such complexity, the national committee of experts asked for a lot of improvements, including redundancy and robustness in the system. When the lander lands, it should be a stable landing. It should not bump. So they suggested that we carry out a lot of simulation tests. We worked on their suggestions and found out that the lander configuration of Chandrayaan-2 needed additional modifications. The other aspect is the additional tests we introduced. We have redesigned Chandrayaan-2. Work on the lander portion is going on. Subsequent to the GSAT-6A mission, our own apex committee with former ISRO Chairman Dr K. Kasturirangan as the chairman suggested improvements in harnessing. [After the GSLV-F08 lifted off from Sriharikota on March 29, 2018, and put GSAT-6A into its initial orbit, communication from the satellite was lost on April 1 during its third orbit-raising operation. Power did not flow into the satellite's electronic components. So no command could be given to the satellite.]

The apex committee said, "Please check whether there is any failure mode" in Chandrayaan-2. We found that there was no failure mode. They suggested some improvements in the harnessing scheme, that is, the wiring. They suggested changes in the harnessing; that required changes in the orbiter also. So work is going on. We are now targeting the launch of Chandrayaan-2 by the end of this year. Because of these modifications, additional propellant margins are required in the original Chandrayaan-2 that had been planned. With all these changes, the mass of Chandrayaan-2 has increased from whatever we anticipated. When the mass increases, the project can still achieve the mission provided the launch vehicle can put the satellite into a higher orbit. The mass is 3.8 tonnes now.

The mass of the earlier composite module of Chandrayaan-2 was 3.2 tonnes. It has gone up to 3.8 tonnes now.

Earlier, we had thought of a 22,000 kilometre orbit [for 3.2 tonnes]. Now because of the increase in mass, the orbit has also increased. The orbit should be around 37,000 km. It should now be 170 km x 37,000 km instead of 170 km x 22,000 km. It is 170 km by 37,000 km. Since the mass has increased, the spacecraft has to be put into a higher orbit. Only then it is possible to reach the moon. Because of this, our old plan of launching Chandrayaan-2 by GSLV-MkII is not possible. We have changed Chandrayaan-2 to GSLV-MkIII for this reason.

GSLV-MkII is capable of putting a 2.8-tonne satellite into orbit. The original Chandrayaan-2 composite module weighed 3.2 tonnes and you were talking about building an enhanced GSLV-MkII.

You are right.

Mr Umamaheswaran R., now Associate Scientific Secretary, ISRO, told me in October 2016 that GSLV-MkII can put 3.2 tonnes into an initial orbit of 180 km by 20,000 km.

Yes. We enhanced the GSLV-MkII with high thrust engines and so on. With the enhancement, the number is 2.7 tonnes into GTO [geostationary transfer orbit]. Now, 3.2 tonnes has become 3.8 tonnes. And 22,000 km has become 37,000 km. This combination cannot be launched by GSLV-MkII.

What are the challenges that ISRO faced in developing the lander after Russia, which was to build it, backed out? It has a throttleable engine for soft landing on the moon. The lander should do in-place navigation.

Although you have defined the place where the lander should land on the moon, it should be able to change its mind if there are hazards.

Considering the mass of the lander, the thrust level should be very large, around 3.2 kilonewtons or 4 kilonewtons. Making a throttleable engine of 3 kilonewtons or 4 kilonewtons is a totally new development for us. But we wanted to make use of available technologies. We have a LAM [liquid apogee motor] with a 400 newton thruster, and we have been using it on our satellites. We enhanced it to 800 newtons. It was not a major, new design change. [The propulsion system aboard the lander will comprise a cluster of 4x800 N throttleable engines and eight numbers of 50 N control thrusters. This configuration will lead to considerable saving in the weight of propellants, enabling more scientific instruments to be carried on board.] Another challenge is that we are landing on the moon for the first time. When we are doing the landing, the sensors should be perfect. Any error in the sensors may lead to the end-phase—we will not know whether we have reached the lunar ground or if we are above it. To get clarity on this, we will be, for the first time, attempting to land the lander into an in-between orbit: orbiter to lander, and then landing. We will first make the lander to go into an orbit between the orbiter's orbit and the landing. It will be an orbit with an apolune [farthest point from the moon] equal to 22,000 km and perilune [closest point to the moon] of 100 km. After checking the lander's performance and confirming whether the orbit is correct, we will start the landing manoeuvre. So it will be a step-by-step, cautious procedure from the moon orbit to landing. In the process, we have the time to check the performance of the systems. That way we can ensure that everything is done as per plan, and subsequently make sure that we are right and only then continue. That way, we gain confidence. The third aspect is that we have done simulation tests on bringing the real electronics in the loop.

Have you done a lot of simulation tests with the lander?

We have done a lot. We are going to do a lot more wherein the lander will have all the electronics and software. We will be simulating the actual phenomena during landing at Mahendragiri in Tamil Nadu. That way, the tests we are doing will be close to reality. We expect that with these points we will have the confidence to go ahead.

What are the experiments the lander and the rover will do?

The lander will insert a probe, a kind of in situ measurement. The rover will do in situ measurements by moving about, but the lander will do it by staying in one place. In the lander a system will come out, a probe will go inside the lunar soil, study the soil profile, and so on. It will do a good amount of tests. It will test the lunar soil characteristics.

Prime Minister Narendra Modi announced in his Independence Day speech that India would send astronauts, including a woman, to space in 2022 as part of ISRO's human space flight (HSF) programme. Do you think you can meet this deadline, given the project's vast complexity?

This is an excellent gift from the Prime Minister to the nation. This project is going to enhance the level of science and technology in the country. It will inspire our youth. Not only ISRO but a lot of other organisations, including industries, academia and research institutes, will participate in the programme. That way it will be a national project and bring dividends to science and technology. We are happy about the Prime Minister's announcement. The schedule is very tight, but we will meet it.

How many flights of GSLV-MkIII should you do before it is declared a man-rated vehicle, capable of taking astronauts to space?

We will use GSLV-MkIII. We will make it a man-rated vehicle. But its payload-carrying capacity will come down if you make it a man-rated vehicle. This vehicle is capable of carrying 10 tonnes of payload into low-earth orbit. By man-rating it, we will meet the requirements of our human space flight programme. It demands seven tonnes of payload [that is, the crew capsule will weigh seven tonnes]. Mk-III will be able to meet this payload demand. We chose MkIII because it is a simple vehicle. It has fewer number of stages. We will launch the vehicle 10 to 15 times before we use it for the HSF.

Will you send three astronauts into space in India's first manned mission?

Yes.

Will it include a woman?

Probably. Nowadays, women are stronger than men.

What are the technologies that you have to work on for the mission?

We have developed the crew module. We have to do the Pad Abort Test [PAT] at different times of the day. We have to build the environment-control and life-support systems for the crew. We have to build the ergonomics of the entire

system. The interface between man and the instrumentation should be done. Our non-technical activities will include those relating to the Indian Air Force and the Coast Guard. The selection and training of astronauts should be done immediately. The schedule is very tight, but we will do it.

With regard to the HSF programme, the very first step you took was the Space Capsule Recovery Experiment (SRE) where you brought back a satellite to earth in January 2007. It re-entered the earth's atmosphere and you recovered it from the sea near Chennai. Then you did CARE—Crew Module Atmospheric Re-entry Experiment—where you put a 3.75-tonne unmanned crew module into a sub-orbit and made it splash down in the Bay of Bengal in December 2014. You did a PAT on July 5 to demonstrate the safe recovery of the crew module in case of any exigency on the launch pad. With the help of parachutes, the crew module splashed down in the sea. I have seen space suits that VSSC has developed for astronauts.

We do the technology development well in advance not only for the HSF, but for any technology. We developed the cryogenic stage and demonstrated it in 2014. When I joined ISRO in 1982, close to my room, there was a group working one cryogenic development. In ISRO, we always work on development of technologies. All the technology developments we do in ISRO are linked to a project. Before the activity fructifies into a project, technology development will happen. One such technology development is the PAT. This particular crew escape system requires a complex motor, with the unique characteristics of giving the highest thrust within the shortest time. So its nozzle geometry will be different, It is like a reverse motor. We have to make use of aerodynamics to tilt the vehicle to 1800°. Only then, when the module is separated, it will be turned on by its own aerodynamics. Then, there will be favourable conditions for the parachutes to open and the module will be brought back to the earth. This is the mission profile. This profile during the mission, that is, the production of the entire system—the crew escape module, then the aerodynamic module, the realisation of the electronic components—we did in a fantastic way and they performed very well during the PAT.Along with these functional tests, we did five stage experiments, which we have to do in space. So we did the qualification of the crew escape system and were able to demonstrate five additional, new products on that day. We got a test bed to carry out the tests.

What were the five new tests?

New technologies. One experiment is wireless communication. We demonstrated a wireless instrument system during the PAT. Then we demonstrated a digital telemetry transmitter. Right now, we use the analog system. It is bulky and consumes a lot of power. The digital system will be compact and power consumption will be lower. The third technology was the Ka-band altimeter. This will be used in Chandrayaan-2 when the lander is coming down. Another technology we demonstrated was the MSS [Mobile Satellite Services] via GSAT-6. Right now, any data we want to get from the cloud is acquired through ground stations. They track a satellite or an aircraft. We need ground stations to track the entire flight trajectory, wherever the vehicle is going. If you have a long trajectory, we need a ground station to acquire the data. But in the MSS link via GSAT-6, the data will go from the flight system to the GSAT-6 satellite. The GSAT-6 can reflect the data and relay it to a ground station. So we don't have to plan all the ground stations. The fifth experiment we did was the NAVIC System. NAVICS is now working for slow-moving systems, static systems. We are now releasing it for moving systems, [to see] whether it will work for highly accurate vehicles. These vehicles will have 100 G [100 times the gravitational force experienced in normal conditions]. NAVICS will function in this condition also.

You have been passionate about ISRO-industry collaboration. You have talked about how Indian industry can build and integrate a launch vehicle by 2020. In this context, you have been talking about a mini-PSLV.

We are now in the process of developing a launch vehicle for small satellites. That is planned to be fully realised by the industry.

Is this a mini-PSLV?

It is an SSLV, or Small Satellite Launch Vehicle. We are planning that to be fully realised by the industry. Right now, its development phase is part of ISRO. After development is over, it will be given to industry for production.

What are the dimensions of this vehicle?

It is a small vehicle. I am not able to recollect the dimensions of the vehicle. It will weigh less than 100 tonnes.

What will be the weight of the satellite that it can put into orbit?

It can put a 500-kg satellite into a 500-km orbit.

Is there a lot of demand for putting small satellites into orbit?

Basically, this [SSLV] is to cater to the market for small satellites. This vehicle will be cost-effective. It will take the lowest integration time, about 72 hours. The launch operations will be carried out by three or four people only.

From the Mission Control Centre?

No Mission Control Centre. Somewhere some PC [personal computer] will be there. The PC can even be in the guest house!

So a 100-tonne rocket can be launched with the help of a PC in a guest house?

Not because of the size of the rocket, but because we wanted to introduce an innovation in this type of vehicle. We are adding new technology. The vehicle will be more and more autonomous.

What are the industries that will be realising this vehicle—L&T, MTAR?

We had a brief discussion with L&T. They wanted to produce it. Many people are there for this project. Our Antrix [the marketing company of the Department of Space] is working on that.

What are the rocket motors that L&T will produce in its Coimbatore plant?

They will be producing solid motors. There, too, we are talking of small motors. We are going to industry for the production of PSLVs. Out of the government's recent approval of Rs.10,400 crore for 30 PSLVs and 10 GSLV-MkIIIs, nearly 85 per cent, Rs.9,000 crore, will be with industry only. It will be a big bonus to industry. It can plan now. Industry has to come up with new ideas as to how it will meet the large demand for spacecraft as well as launch vehicles.

Industry is already playing an important role in supplying components for building ISRO's satellites. When will industry be able to build a satellite on its own?

When we are talking about launch vehicles, whether it is a PSLV or satellites—100 per cent building them—industry can do it only when the entire technology is transferred to it with proper documentation. Then industry can produce them. In the recent satellite launches, industry did make some important contributions.

In all the launches, in the launch vehicles, industry is doing its work. We are not doing the work. Industry is doing the work and we are getting the name. In every launch, in every vehicle of ISRO, 85 per cent of the cost of the vehicle is lying with industry, mainly on materials and the manufacturing cost. These materials form 16 per cent of the total weight of the vehicle. Sixteen per cent of the items of the vehicle account for 85 per cent of the cost of the vehicle. This 85 per cent is lying with industry.

A unique system in the VSSC is that whenever we add extra manpower, we convert it into a work package and that work package is given to a vendor. After he finishes the work, he gets the money and goes away. A similar approach is being adopted. The satellite is not made in the industry. It is made by the industry. It is made by industrial labour.

Team Indus could not mobilise enough cash to send a rover to the moon using ISRO's PSLV. This despite big Indian industrialists being associated with TeamIndus. So are you really confident that Indian industry can do it, that is, build launch vehicles and satellites?

I do not want to talk about TeamIndus. I am not fully involved in that. But I strongly believe that our industry can do it. Also, every component is made now by the industry. As much as 85 per cent of the package is made in the industry. These people are now fabricating rocket components. After fabricating them, they give it to us as vendors. We tell them, "Don't be a vendor. We want to make you a partner." It is like somebody is employed in a person's house. Suddenly, the house owner's son is marrying the employee's daughter. The employer becomes the father-in-law.

Can you give me the list of industries that are making important contributions to ISRO's launch vehicles and satellites? What are the components they manufacture?

We have HAL. It is making all the aluminium light alloy structures, core-based shroud, propellant tanks for the engines, payload fairings, inter-stage structures, and so on. Godrej is fabricating the engines and its components. Then we have L&T, which is doing the solid motor casings. Walchandnagar Industries is also producing motor casings. Another big fish, MTAR, is producing the control components for the engines. MIDHANI is producing metallic materials like maraging steel. Bharat Forge is giving some forgings. Bay Forge, near Chennai, is also doing the forgings. Along with the big fish, there are medium industries such as Sri Venkateswara Mechanical, Electrical and Engineering Industry in Hyderabad. It is supplying us strap-on motor casings. Then there is KELTRON.

Source: https://www.frontline.in/

ISRO opens first of its six planned incubation centres: eyes import substitution in key electronic components

The Indian Space Research Organisation (ISRO) opened the first of its six planned Technology Incubation Centres at Agartala, a strategic move aimed at leveraging the huge untapped potential of academia-industry partnerships. The space agency will allocate Rs 2 crore to build the necessary facilities for the incubation centre, to be set up at the National Institute of Technology (NIT), Agartala. ISRO chairman, Dr K Sivan, offered to buy back the space mission prototypes built by the Centre. “These could be linked to aerodynamics, propulsion systems or any area,” he said. Over the next months, five more incubation centres will be launched, all in locations with zero space activity but with a strong presence of academic institutions and the industry. On ISRO’s agenda are centres in Jalandhar, Nagpur, Indore, Bhubaneswar and Tiruchirapalli, all to be established through academia tie-ups and industry partnerships. To extend ISRO’s reach, Dr K Sivan also unveiled plans to launch regional academic centres for space research in Patna, Jaipur, Varanasi, Kurukshetra, Guwahati and Kanyakumari. “These centres can give us seed ideas. Who knows, products developed from their prototypes might even be part of Gaganyaan,” he said. Establishing Chairs in six universities across the country is another ISRO strategy. First in the pipeline is a Satish Dhawan Chair at the Jammu and Kashmir University, to be inaugurated on October 11. Tripura Chief Minister Mr Biplab Kumar Deb said the incubation centre would give his state an opportunity to steer ahead in the Information Technology (IT) and manufacturing sectors.

Spacetronics 2018

At the first edition of Spacetronics 2018, organised by the India Electronics and Semiconductor Association (IESA) at the Leela Palace hotel here, the focus was on indigenisation to beat the high cost of imported electronics Currently, electronic components make up 6-7% of ISRO’s total project cost. If the technology is available here, as Dr K Sivan pointed out, this gap could be addressed. IESA chairman Mr Anil Kumar Muniswamy was confident that a design-lead manufacturing strategy focused on Intellectual Property would be the way forward. Across sectors, space included, the market for consumption of electronics is poised to grow to $800 billion (Rs 58 lakh crore) by 2026. But, as Mr Muniswamy informed, India’s capacity to locally produce the electronics is limited to only about $120 billion (Rs 8.7 lakh crore).

Source: http://www.indiandefensenews.in/

Indigenously developed Air-to-Air Missile Astra successfully test fired

A pre-induction trial of India’s indigenously developed beyond visual range air-to-air missile (BVRAAM) ‘Astra’ was successfully conducted over Bay of Bengal near Chandipur in Odisha, defence sources said. The missile was fired from a fighter aircraft of the Indian Air Force in the afternoon and targeted an unmanned aerial vehicle ‘Banshi’ which it successfully engaged, the sources said. ‘Astra’ was successfully test fired by the IAF from a Su-30 aircraft that had taken off from Air Force station, Kalaikunda, a defence statement said. The missile successfully engaged a maneuvering target with high precision, meeting the mission objectives, it said. The statement said, “In the series of trials held to date, Astra has been launched in the complete Su-30 flight envelope. The flight test assumes significance as it was part of the series of final pre-induction trials”. Astra has undergone more than 20 developmental trials, says the statement. Defence Minister Ms Nirmala Sitharaman lauded the efforts of Indian Air Force, DRDO and associated team members who were involved in the mission. India has attained a high level of capability in the indigenous design and development of advanced weapon systems. The final development flight trials of Astra were successfully conducted in September last year, the sources said, adding that a total of seven trials were conducted against pilotless target aircraft successfully from September 11 to 14, 2017. The missions included engagement of target at very long range, engagement of high maneuvering target at medium range and multiple launches of missiles in salvo to engage multiple targets. All the sub-systems including the indigenous RF Seeker performed accurately, meeting all the mission

parameters and objectives. Two missiles were also launched in the combat configuration with warhead and the targets were neutralised, the sources said. This effort for building a state-of-the-art BVRAAM by Defence Research and Development Organisation together with IAF completed the development phase of the weapon system successfully. Hindustan Aeronautics Limited played a role in modifying the aircraft for weapon integration, the defence sources said adding more than 50 public and private industries have contributed in building the 'Astra' weapon system.

Source: http://www.defencenews.in/

India will fly its first small rocket next year: ISRO Chairman

The Indian space agency expects to fly its first small rocket with a carrying capacity of about 500-700 kg sometime next year, according to a top official. "The developmental work for our small rocket that can carry satellites weighing around 500 kg is on. The first flight of the small rocket is expected to happen sometime next year," ISRO Chairman, Dr K Sivan told IANS. He said the small rocket will be launched from the existing rocketport at Sriharikota in Andhra Pradesh. In a recent interaction with IANS in Bengaluru, Mr S.Rakesh, Chairman-cum- Managing Director, Antrix Corporation said the low-cost small rocket requires a dedicated launch pad with a simple vertical launch mechanism. "Though SSLV will be initially launched from our rocketport at Sriharikota in Andhra Pradesh, we want to have a separate spaceport for it later," Mr Rakesh had said. Queried about Mr Rakesh's views on the separate spaceport Dr K Sivan said initially the small rocket will be flown from Sriharikota. Antrix may have its own plans for the future. Incidentally, Antrix is calling Indian nationals to apply for the post of `Head, Manufacturing & Marketing of Space Systems'. The job description being: "Preplanning activities of new Space Transport Systems which Antrix is envisaging to put into production. Establishment of production facilities in co-ordination with ISRO and Industries for Technology Transfer and production of the System." Dr K Sivan also said the Indian Space Research Organisation (ISRO) is evaluating the various proposals it has received for its lithium-ion battery technology and is expected to complete the process in a month's time. "In a month or so the first level of screen of the proposals will be over," Dr K Sivan said. Over 130 companies had shown interest in the Indian space agency's lithium-ion cell technology. In June this year, ISRO had announced its decision to transfer this technology to the Indian industry on a non-exclusive basis for usage in automobiles for Rs 1 crore. The Vikram Sarabhai Space Centre located in Kerala, will transfer the technology to the successful Indian industries or start-ups on a non-exclusive basis to establish production facilities in the country that can produce cells of varying sizes, capacities, energy densities and power densities catering to the entire spectrum of power storage requirements, ISRO had said. At present, the lithium ion battery is the most dominant battery system finding applications for a variety of societal needs including mobile phones, laptops, cameras and many other portable consumer gadgets apart from industrial applications and aerospace. Recent advances in the battery technology have made it the preferred power source for electric and hybrid electric vehicles also.

Source: http://defencenews.in

India conducts successful Exo-Atmospheric Interceptor Missile test at night

India successfully conducted an interceptor missile test off the Odisha coast, achieving a major milestone in developing a two-layer Ballistic Missile Defence system, defence sources said. The interceptor was launched from Dr Abdul Kalam Island, earlier known as Wheeler Island of the Integrated Test Range (ITR), at about 8.05 pm, the sources said. This Prithvi Defence Vehicle (PDV) mission is for engaging the targets in the exo-atmosphere region at an altitude above 50 km of the earth's atmosphere, a Defence Research and Development Organisation (DRDO) scientist said. "Both the PDV interceptor and the target missile were successfully engaged," DRDO sources said. In an automated operation, radar-based detection and tracking system detected and tracked the enemy's ballistic missile. The computer network with the help of data received from radars predicted the trajectory of the incoming ballistic missile. The PDV that was kept fully ready took off once the computer system gave the command for lift-off. The interceptor guided by high-accuracy Inertial Navigation System (INS) supported by a Redundant Micro Navigation System moved towards the estimated point of the interception, the sources said. Once the missile crossed the atmosphere, the Heat Shield ejected and the IR Seeker dome opened to look at the target location as designated by the mission computer. With the help of Inertial Guidance and IR Seeker the missile moved for interception. All events were monitored in real-time by the Telemetry/Range Stations, at various other locations. Interceptor was successfully test fired last from the same base on February 11, 2017.

Source: http://defencenews.in/

Smaller anti-tank missile to follow Nag's success

For a country that has developed intercontinental ballistic missiles, the failure to develop a 4 km range missile to destroy battle tanks is a conundrum. Last year, the Defence Research and Development Organisation (DRDO) completed the development of the Nag, the last of its Integrated Guided Missile Development Programme (IGMDP) missiles that began in 1983. Successful trials of the Nag in 2016 and 2017 have finally put the missile on the path to induction by the army, 35 years after the programme began. The Nag's luck seems to have rubbed off on a new project to build a smaller man-portable anti-tank guided missile (MPATGM). The MPATGM was successfully tested by the DRDO on September 15 and 16 at an army firing range in Ahmednagar, Maharashtra, and met all its performance parameters. "The successful test of the Nag has given us a lot of confidence and we have now mastered most of the critical technologies pertaining to anti-tank guided missiles (ATGMs)," says a senior DRDO official. Among the most difficult aspects is the development of an infra-red seeker that is able to distinguish a target from the clutter of a battlefield, especially in high temperature conditions. While each 4 km range Nag missile weighs over 40 kg and is carried into battle by a NAMICA (Nag missile carrier)-tracked vehicle based on an armoured personnel carrier, the MPATGM is a comparative feather-weight at 14.5 kg and, as its designation suggests, is meant to be hefted into the battlefield by soldiers. Once launched, the missile can home in to attack the top of enemy tanks, where they are most vulnerable, at ranges of between 200 m and 2.5 km. The missile, being developed in collaboration with Hyderabad-based private sector firm VEM Technologies, is an emerging success story for a public-private partnership. The MPATGM would complete all its trials in the next six months and be handed over to the army for user evaluation next year. Going by the Nag experience, these are radical timelines. The MPATGM project was started three years ago under the government's Make in India programme to meet the army's requirement of over 80,000 ATGMs by fielding an indigenously designed, developed and manufactured missile. In January this year, the defence ministry scrapped a plan to import 8,000 'Spike' ATGM missiles and 300 launchers from Israel. Instead, the Cabinet Committee on Security is to shortly greenlight a government-to-government deal for purchasing 5,000 Spike ATGMs from Israel. The rest of the army will get the DRDO-built MPATGM over the next few years.

Source: http://defencenews.in/

India :- Building Fifth Generation Fighter Aircraft

India's effectiveness as a major power and a rising great power depends greatly on its ability to project deterrence and influence from its military power. Modern military capability is critically dependent on the nation's aerospace capability, which is demonstrated through the nation's ability to design, develop and manufacture its own fighter aircraft, with most of its ingredients within the country. While India has achieved significant technological progress in various fields, its military continues to be heavily dependent on imports, most of all at the cutting edge fighter aircraft technologies. The highlight of the 2017 Republic Day fly-past was the flight by three LCAs, our fourth generation fighter aircraft, the culmination of more than three decades of work. Yet, much of the LCA continues to be import dependent. In the context of a renewed effort at indigenisation through 'Make in India', it is time for us to review our past programmes and make appropriate corrections in order to achieve our fighter aircraft capability as a reality. This is even more compelling from a security perspective, when we see the rapid progress made by China in this area, in particular with their Fifth generation aircraft progressing towards operational reality. While India has produced many fighter aircraft under licence in the last 60 years, there have been just two indigenous fighters that have been designed, developed, and produced within the country. The first fighter was the HF-24 Marut, which was designed in the late 1950s and early 1960s. Prime Minister Nehru displayed visionary approach to bring in the legendary German aircraft designer, Dr Kurt Tank, to head the design effort for India. He not only brought his core team, but with their assistance created an exceptional design capability for HAL in a short span of time. It is another matter that the country squandered that wealth of capability and experience created. The HF-24 was an exceptionally advanced design for its time. Dr Kurt Tank's leadership and programme management was outstanding. At a time when technical wherewithal in India was extremely limited, he ensured that the programme was managed very efficiently. The first flight of the prototype took just four years from the drawing board, and the series production commenced in less than 10 years. Contrast this with 16 years for the first flight of the LCA, and more than three decades for establishing its series production, albeit incomplete as the SOP (Standard of Preparation) of the aircraft is still not frozen due to incomplete development process. Successful fighter aircraft programmes in various countries flow from efficient programme management. This includes strong interface between the user, industry, and the development agencies. Fundamentally, the programme management needs to be done by the user as it is important to synergise the conflicting pulls of costs, impractical development aspirations, and most importantly operational necessities of the user. It is very important to achieve the right balance with the cost of the programme, technology development time frames, operational urgencies, and technological continuities with previous

programmes in the context of experience and research data base. Success of these principles are clearly evident in the China's programmes of JF-17 (a programme that commenced with LCA, but has already clocked more than 5000 hours of operational flying with more than four squadrons in operational service), J-10, J-11, and now their J-20/J-31 Sweden's Gripen; French Rafale; etc. All of these aircraft were contemporaries in development with the LCA, but have entered operational service decade ago. The LCA has suffered primarily from poor programme management, besides a host of other technological issues. The HF- 24 aircraft, in spite of its under-powered engines, had acquitted itself well in the 1971 war. Despite this the aircraft was phased out prematurely in the early 1980s. One of the primarily reasons was lack of any support for further development and derivative work on this excellent design. As a result, the decade of 1970s was a lost decade where much of the HF-24 experience was lost or squandered away. The world over nations and aerospace industries build on experiences gained from one fighter aircraft programme to another. In India's case, the HF-24 and the LCA had nothing in common. The LCA's development was driven more by the DRDO than the user, the IAF. Moreover, the industry (HAL), which should really have been the main driver and the lead agency, was pushed into a subsidiary role. ADA (Aeronautical Development Agency) was created as a separate Society to coordinate the interactions between various agencies to develop the LCA. ADA was effectively made another DRDO vehicle that took charge of the LCA programme. This relegated the critical roles of the user (Indian Air Force) and the industry (HAL) into secondary ones with adverse impact on the overall programme management. The net result is that the LCA has taken excessively long time, has exceeded budgetary provisions, and most importantly, has failed to meet the user's critical operational requirements. In order to get away from the criticism of poor programme management, ADA has subsequently sought to address the deficiencies in performance through infusion of imported technologies in radar, weapons, and sensors. But this cannot address the basic performance non-compliance which flow from poor design decisions implemented right in the beginning.

Lessons for the AMCA

There are many lessons to be learnt from the LCA experience and these need to be implemented for future programmes like the Advanced Medium Combat Aircraft (AMCA). The most important lesson is the fact that ADA should be restructured to run a programme efficiently with cost, operational, and national imperatives in a well balanced manner. It also needs to be well integrated with the industry. This can only be done by the user or user's representative. All over the world, the user or the military service takes over the programme management immediately after the technology demonstration phase. For example, the USAF's fifth generation fighter F-22, was managed by the USAF appointed programme manager for its entire 18 years of development time after first two years of technology demonstration phase by the industry, namely Lockheed Martin. Although the LCA programme made some significant achievements, it is still largely an inefficient and an incomplete fighter aircraft programme. This style of programme management has been too costly and inefficient for India. India now intends to move on to the next generation fighter aircraft programme, the AMCA. If we need to address various problems, we must adopt the following recommendations, which will establish a viable fighter aircraft industry and capability through the 'Make in India' strategy. These are listed below: ADA (Aeronautical Development Agency) has to be restructured as a National Fighter Aircraft Design and Development agency, and should be headed by a professional with Air Force operational experience. He must have a long tenure, and must have the freedom to take operational, technological, and financial decisions in order to achieve time-bound, cost-efficient, and operationally compliant programme management. Assistance from foreign OEMs must be strategically selected with long-term and risk-sharing partnership. For example, if the GOI chooses a single-engine fighter for manufacture of at least 200 aircraft for the IAF, this OEM should be so chosen that India gains strategically on a long-term basis. This OEM should be involved in assisting ADA and the industry in developing, manufacturing, and exporting derivative models of the LCA. It will then be a 50% risk sharing partner for the development, manufacture, and sale of the AMCA under ADA's program management. The AMCA must become India's FGFA, and be IAF's main stay over the next 20-30 years. Derivatives of the AMCA will meet the navy's requirements, as well could become the basis of India's export drive. The AMCA programme should lead to indigenisation of aerospace materials, aggregates, radars, avionics, sensors, weapon systems, communications, components, and complete control of all its algorithms. The development of aero engine capability can be followed up subsequently, as this would take much longer time, face more hurdles, and incur significantly higher costs. In summary, it is evident that the current manner of fighter aircraft programme management has been a failure. In order to achieve a success in our 'Make in India' strategy, the next generation fighter aircraft development (AMCA) must undergo significant change through restructuring of ADA and placing it under the control of a user led professional programme management.

Source: https://defenceupdate.in/

India seeks Russia's help for Gaganyaan mission to put man in space by 2022

India has sought cooperation from Russia in specific areas of its manned space programme — life-support systems, crew modules and training of astronauts — to fulfil its mission of putting an Indian in space by 2022, according to officials familiar with the development. India plans to complete Gaganyaan, the country's first manned space mission, in the next four years in sync with Prime Minister Mr Narendra Modi's statements in his Independence Day speech from the ramparts of the Red Fort on August 15. "We have decided that by 2022, when India completes 75 years of Independence, or before that, a son or daughter of India will go to space with a tricolour in their hands," Mr Modi said in his address to the nation. If successful, India will be the fourth country in the world to launch a manned space mission after Russia, the US and China. Russia has been a close partner of India in space programmes for four decades, with the cooperation extending to lunar and Mars missions. The former Soviet Union helped launch India's first two satellites, Aryabhatta and Bhaskara. In 2004, India and Russia signed two space-related agreements during Russian President Vladimir Putin's visit. The strengthening of cooperation in this field, including helping India for the manned space mission, came up during a meeting in Moscow between Union external affairs minister Ms Sushma Swaraj and Russia's deputy prime minister for defence and space industry Mr Yuriy Borisov about a week ago. "The two sides discussed threadbare the space cooperation at that meeting and decided to strengthen their ties in the field of joint scientific research and use of outer space for peaceful purposes. In this context, particular discussion took place on the human space programme, including life support system, crew module and astronaut training," said a diplomat who asked not to be named. Advanced technologies in remote sensing, ground stations for satellite navigation systems (Glonass and Navic) and space solar power systems were also discussed, the diplomat added. Glonass, or global navigation satellite system, is Russia's version of GPS (global positioning system). Navic is the operational name of the Indian regional navigation satellite system. It provides accurate real-time positioning and timing services. It covers India and a region extending 1,500km around it, and the country has plans to extend its coverage area. Soon after Mr Modi's announcement, the chief of the Indian Space Research Organisation (ISRO) confirmed the timeline for the human space programme and said the pilots and the crew would spend at least seven days in space. "(The) PM has given the target of 2022, and it's our duty to meet it," ISRO chief Dr K Sivan said last month. A second Indian space programme official said India has completed several technologies linked to the human space programme, on which it has been working since 2014, and Russian help would complement India's efforts. "We have credible prowess in this field. For example, we have creditably and credibly competed some technologies such as the escape system and crew module," the official said. The manned mission is expected to cost ISRO around $1.45 billion, according to the space agency. India has also lined up two unmanned expeditions before the human space programme takes off. Former ISRO chairman G Madhavan Nair said, "We certainly we have the capability to launch a human space mission by 2022." He said the 2022 target for a human space mission will be "achievable" with Russia's help in a few areas.

Source: https://defenceupdate.in

Satellite control set to give drones more sting

India is set for a quantum jump in the way it undertakes drone operations by upgrading from existing ground control stations to satellite-control of military unmanned aerial vehicles (UAVs) to boost their range, endurance and flexibility. This significant capability boost will come with the launch of GSAT-7A, an advanced military communications satellite built by ISRO, in November. "The satellite is specially geared for RPA (remotely-piloted aircraft) operations," said a defence ministry source. The GSAT-7A, developed for IAF at a cost of around Rs 700-800 crore, will be the country's second dedicated military satellite after GSAT-7 or 'Rukmini' was launched for the Navy in 2013. This comes at a time when India is in advanced negotiations with the US to acquire armed Predator-B or weaponised Sea Guardian drones, which are high-altitude, long-endurance UAVs that can fire 'Hellfire' missiles or 'smart' bombs at enemy targets before returning to their bases to re-arm for the next mission like manned fighter jets. Predator and Reaper armed drones used against Taliban targets in the Afghanistan-Pakistan region are controlled through satellites and flown by ground-based "pilots and weapon operators" at the Creech Air Force Base in Nevada (US) over 7,500 miles away. But Indian armed forces as of now control their Israeli-origin surveillance drones like the Heron and Searcher-II UAVs through a network of ground and ship-based stations, which limits their operations to 'radio line of sight' missions. "With the GSAT-7A up in space in geosynchronous orbit, IAF will be able to hugely extend the reach, flexibility and endurance of its UAVs for beyond line of sight missions. The footprint of the satellite, with steerable beams, will cover India and its extended neighbourhood," said a source. IAF will get another satellite, GSAT-7C, within a couple of years to boost its network-centric operations. The force is also involved with the plan to launch an additional five satellites at a later stage to augment the Indian Regional Navigation Satellite System (IRNSS) or 'NavIC' project being put in place through a constellation of seven satellites to rival the US-owned Global

Positioning System (GPS). There are over 320 military satellites currently orbiting the earth, with the US owning 50% of them, followed by Russia and China. India, however, has lagged far behind in utilisation of the final frontier of space for military purposes, refusing to even approve the long-standing demand of the armed forces for an Aerospace Command, as earlier reported by TOI. The Indian armed forces for long have been largely using "dual-use" remote sensing satellites like the 'Cartosat' and 'Risat' series, while also leasing some foreign satellite transponders, for surveillance, navigation and communication purposes. China, in sharp contrast, has taken huge strides in the military space arena, testing even ASAT (anti-satellite) weapons against 'low-earth orbit' satellites since January 2007. "China is developing multiple counterspace capabilities to degrade and deny adversary use of space-based assets during a crisis or conflict. In addition to the development of directed-energy weapons and satellite jammers, China is also developing direct-ascent and co-orbital kinetic kill capabilities," warns the latest report by Pentagon.

Source: https://defenceupdate.in/

India successfully test fires short-range tactical ballistic missile Prahaar

Amidst downpour, India successfully test-fired surface-to-surface short-range tactical ballistic missile Prahaar from a defence facility off Odisha coast paving the way for its induction.Mounted on a mobile launcher the indigenously developed missile was flight tested from the launching complex-III of the Integrated Test Range (ITR) at about 1.35 pm. "The missile blasted off from a canister travelled the desired range before zeroing on the target. All systems functioned normally. The mission achieved a copybook success," said a defence official. Equipped with state of the art navigation, guidance and electromechanical actuation systems with the latest onboard computer, the missile achieved the terminal accuracy of fewer than 10 meters. It went up vertically and then manoeuvred as coordinated. "The missile was launched from a road-mobile launcher, which can carry six missiles at a time and can be fired in salvo mode in all directions covering the entire azimuth plane. There was not a single degree deviation during the entire flight path," the official told The New Indian Express. Having a strike range of 150 km, Prahaar has no parallel in the world in its range category. It fills the vital gap between multi-barrel rocket Pinaka and medium-range ballistic missile Prithvi. Unlike Prithvi, it can engage multiple targets in different directions. The missile capable of carrying different types of warheads will operate as battlefield support system to the Indian Army. It has a greater manoeuvring capability, acceleration and can be deployed in different kinds of terrain making it more effective against strategic targets. The weapon has sophisticated inertial navigation and electro-mechanical actuation system. It can be transported to anywhere within a short span of time. It was the second test of the missile, which was first tested on July 21, 2011. It will be indicted in the army after few more tests, the official said. Fuelled by solid propellant Prahaar missile is about 7.32 meter long and its diameter is 420 mm. While its launch weight is about 1.28 tonne, it can carry a payload of 200 kg. The missile system is developed to provide the Indian Army with a cost-effective, quick reaction, all weather, all terrain, high accurate battlefield support tactical system. Prior to the test, 4228 people including 3593 adults and 635 children from 634 families in five hamlets located within two km radius of the test range were shifted to two temporary shelters and mariners were alerted.

What makes Prahaar lethal

- Strike range is 150 km
- Small, lean and slim having a length of 7.32 meter and diameter 420 mm
- Weighs around 1.28 tonne
- Can carry warhead up to 200 kg
- Uses solid propellant and travels at a speed of Mach 2
- Highly manoeuvring with better accuracy
- Launcher can carry six missiles having different kind of warheads meant for different targets
- Can be fired in salvo mode in all directions covering the entire azimuth plane
- Can be deployed in both stand-alone and canisterised mode
-

Source: https://defenceupdate.in

Airports now have sharper vision, thanks to desi Drishti

Descending from the puffy clouds as the runway slowly looms into sight, the first-time flyers in the aircraft cabin and pilots in the cockpit would be silently praying for a perfect weather and safe landing. For, poor weather has been the cause of many accidents in the aviation sector. The visibility haze is still a main issue. However, aircraft turning back due to bad weather is a thing of the past. Even in dense fog, pounding rain or raging sandstorm, when visibility in an airport dips to as low as 50 metres, pilots with the help of 'Drishti' and Instrument Landing Systems (ILS) are able to land the

aircraft safely on the tarmac. What will surely warm the hearts of many is that 'Drishti', a transmissometer for precise reporting of visual range at airports, is a desi product. Drishti system was developed in the workshop of city-based CSIR-NAL (National Aerospace Laboratories). "Drishti is installed in all categories of airports and Air Force bases across the country has crossed a century,'' declares Ms V Shubha, a distinguished scientist, CSIR (Airport Instrumentation) -NAL and also a cricket buff. The sophisticated instruments helping pilots while flying out of or approaching airports with an accurate runway visual range, cost just one-third of the price of systems imported from other countries. A mini version of Drishti is also being installed on highways, hilly terrains and railway stations particularly in northern India surrounded with thick fog between November and February, informs Ms Shubha while retracing the journey of Drishti at a symposium organised in Bengaluru on the occasion of Sir M Visvesvaraya's birth anniversary. Nearly four years ago, aviation experts had hailed that a milestone was achieved in the field of navigation safety, when CSIR-NAL and India Meteorological Department (IMD) signed an agreement to install indigenous transmissometers in all airports. Transmissometers providing an accurate runway visual range is a mandatory system required at all airports as per International Civil Aviation Organisation and World Meteorological Organisation . Until then, IMD was importing the instruments. Ms Shubha with her brilliant academic record (first rank in BSc Hons (physics), MSc Physics (electronics) and fellowship for highest marks in Physics) and demonstrated passion for work, seemed a natural choice for the huge responsibility of making a success of the contract with IMD. Having joined NAL as a research fellow (in 1974), she had quickly moved up the ranks handling different scientific positions. Until then, as head of materials science division, her world was restricted to fabricating complicated products that were able to withstand high heat, alloys, rare earth materials, among others. Ms Shubha grabbed the opportunity to develop a robust and completely indigenous instrument. In 2011, Drishti was first installed at Indira Gandhi International (IGI) airport in New Delhi, which used to be severely affected by fog during winter. Soon IMD was in talks with CSIR-NAL to install more Drishti transmissometers at different airports resulting in partnership agreement being signed in May 2014. Shubha is also hailed for grooming many skilled workers by encouraging them to make components locally for Drishti. The speciality of Drishti and another system developed by the team, 'Aviation Weather Monitoring System (AWMS)', includes integration of data like wind speed, wind direction, pressure, temperature, humidity on a single computer for Air Traffic Control (ATC) room and pilots, says Ms Shubha. As it is web-enabled, the data can be accessed and maintenance carried out from any location in the country. "Drishti system installed at IGI airport in 2011 has never had a failure of maintenance until today,'' informs Ms Shubha and beams that they 'Made in India' even before it became a catchphrase. AWMS with many novel features is also another 'Made in India' product. The website of IGI airport cites a survey by the Ministry of Civil Aviation which declares that by installing Drishti at IGI airport in Delhi (first airport in the country to have Drishti in all its three runways), overall flight operations had increased during low visibility by 67 per cent. After Mangaluru International Airport (MIK), Kempegowda International Airport (KIA) became the state's second airport in Karnataka to install the Drishti transmissometer. So far, CSIR-NAL has supplied 101 systems. Tatas had procured 54 Drishtis for 18 Air Force (IAF) bases. MIA is the first airport in the country to incorporate AWMS. During dense fog, dust storm or heavy rains, Drishti transmissometer had provided accurate measurements and had performed better than the imported instruments. It is a valuable indigenous innovation meeting all international standards and is easy to maintain.

Source: https://defenceupdate.in/

DRDO successfully flight-tests MPATGM anti-tank missile for first time

In a major boost to Prime Minister Mr Narendra Modi's 'Make in India' initiative in defence, the DRDO today successfully carried out the first test of the indigenously designed and developed Man Portable-Anti-Tank Guided Missile (MP-ATGM), which would help the Army destroy enemy tanks during a war. The first test of the missile was successfully completed in the Ahmednagar district of Maharashtra. A few more tests of the indigenous weapon system need to be carried out before it is offered to the Army for user trials, government sources told MyNation. The MP-ATGM is supposed to be the anti-tank missile of the Army for future as the force needs close to 75,000 such missiles for future battles. The homegrown missile would help in this direction in a big way, the sources said. For meeting the emergency requirements of the Army, the government is looking to buy around a couple of thousand Spike anti-tank guided missiles from Israel while the majority of the requirements would be fulfilled by indigenous missiles. The requirements of the Army are so huge that they will be met with the missile systems supplied by the Israelis along with the ones to be produced by DRDO in future as it is also developing the man-portable ATGMs, sources said. The Army needs third-generation ATGMs, with a strike range of over 2.5 km and fire-and-forget capabilities, to equip all its 382 infantry battalions and 44 mechanised infantry units. Sources said this combination of buying arms and equipment from abroad and allowing indigenous makes at the same time will balance the need for taking care of

national security requirements along with the need to promote the indigenous industry. The Ministry of Defence has been in talks with Israel and the US for a long time to get the third generation anti-tank missiles. The ministry had ultimately zeroed in on the Spike missiles under an old deal, which is likely to cost around Rs 3,000 crore. The government had also withdrawn an earlier tender for buying around 5,000 Spike missiles after finding the price of the deal too high. An American missile system on offer was rejected too — after the terms and conditions of procuring it were not found to be compliant to the Indian defence procurement procedure guidelines.

Source: https://defenceupdate.in/

China has experienced one of the world's largest seaplane

Soon he will go to high speed tests on the water, reports Xinhua news Agency. As reported by the company universal aircraft in the Chinese aircraft Corporation, test aircraft AG600 was held from 2 to 13 September on a jet airport of the city of Jingmen in Central Hubei province, where he made eight low and mid speed slides for a total duration of 552 minutes. During testing, developers test aircraft for aerodynamic and hydrodynamic control, stability and water resistance. The results of the tests showed that all aircraft systems operate normally and stably. The amphibious aircraft AG600 developed in-house China designed specifically to fight forest fires and rescue operations at sea. He has successfully performed its first test flight over land 24 Dec 2017. In some of the world's media, including Xinhua, it was argued that AG600 is "the world's largest plane-an amphibian. In fact, the largest in aviation history seaplane is the Hughes H-4 Hercules", built in 1947, is one of the four largest aircraft in the world. Hughes H-4 Hercules — transportation wooden flying boat, designed by the American company Hughes Aircraft under the leadership of millionaire Howard Hughes. This 136-ton aircraft, initially designated PC-1 and received the unofficial nickname Spruce Goose, was the largest ever built flying boat, and its wingspan of 98 meters remained the record till 31.05.2017, when he was presented transport aircraft Stratolaunch with a wingspan of 117 meters. The aircraft was designed to transport 750 soldiers in full gear.

Source: https://stopru.com/

BUSINESS

Lockheed, Tata in JV to make F-16 jet wings

In a major boost to the 'Make in India' initiative, American security and aerospace giant Lockheed Martin announced that the wings of its F-16 fighter jets will be produced in India. Maryland-based Lockheed Martin has entered into an agreement with Tata Advanced Systems Limited (TASL) for the project. Lockheed officials insisted that the planned F-16 wing production to India was not contingent on India selecting the F-16 for the Indian Air Force. Lockheed has offered to move its entire F-16 manufacturing base to India. India is yet to make a decision on it. Producing F-16 wings in India will support the Centre's 'Make in India' initiative, company officials said. "Building F-16 wings in India is a natural next step that builds on our... partnerships with Tata on the C-130J [Super Hercules airlifter] and S-92 [helicopter]," said Mr Vivek Lall, VP, strategy and business development, Lockheed Martin Aeronautics.

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

Pvt sector to get Rs 9K cr for space launch vehicles

A bonanza awaits the private sector in space vehicle manufacturing. Indian Space Research Organisation (ISRO) chairman Dr K Sivan said the private industry will get over Rs 9,000 crore out of the Rs 10,400 crore announced by Prime Minister Mr Narendra Modi for the manufacture of 40 launch vehicles. At the launch of the sixth edition of Bengaluru Space Expo-2018 (BSX-2018) here, Dr K Sivan invited the industry to grab this opportunity, graduating from being a vendor to an active manufacturing partner. "Over the next three years, 59 satellites will be launched. ISRO's costs will be very huge. It cannot stick to the time frames without the industry," said Dr K Sivan. The industry has already moved up from making spares to building subsystems. This will be extended to small satellites and rockets. "Small satellite launchers will make a big impact with enormous use in communications. These will be easy to productionise. The industry will have to take our load." Dr K Sivan talked about ISRO's plan to mass produce, with active industry support, small satellite launchers that could rocket 500 to 700kg satellites to low-orbits. "These small satellite vehicles can be totally integrated in 72 hours, and will be autonomous in adapting itself. The requirement is for 50 to 60 such vehicles every year," he said. ISRO wants the industry to partner with it for making SSLV, PSLV and

satellites, so that the space agency could devote fully to its ambitious manned mission project, Gaganyaan over the next four years. Dr K Sivan explained, “Gaganyaan project is new to ISRO as life science, selection of crew and their safety is involved. It will boost ISRO’s capability.” To boost industry partnership, ISRO is also in the process of building six incubation centres across the country. “We want to involve small-scale industries and entrepreneurs with innovative ideas. We want to use the best brains,” said Dr K Sivan. Mr Jean Yve Le Gall, president of the French space agency CNES, spoke about Indo-French partnerships in satellites, launchers and planetary exploration. “We will be doing the same for the human spaceflight,” he said. Organised by the Confederation of Indian Industry (CII), ISRO and its commercial wing Antrix, BSX-2018, will stay alive at the Bengaluru International Exhibition Centre (BIEC) till September 8.

Source: https://m.dailyhunt.in/

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