E-NEWS
EVERY MONTH FROM THE AERONAUTICAL SOCIETY OF INDIA

VOLUME - 14 | MAY - 2019 | RELEASE - 05

CURRENT AFFAIRS

World's largest plane successfully completes maiden flight

What is Nirbhay missile? All you want to know about India's indigenous 1,000-km nuclear-capable missile

After PSLV-C45 success, ISRO eyes next PSLV for RISAT launch

After the successful launch of PSLV-C45, ISRO centres in Kerala are focused on the next PSLV mission in May for launch of RISAT-2BR 1, a Radar Imaging Satellite for strategic surveillance and then Chandrayaan- 2 moon mission. "It is satisfying, that this PSLV-C45 mission successfully placed the electronic intelligence satellite EMISAT and 28 commercial satellites in orbit. Then the rocket fourth stage PS4 gets separated to serve as orbital platform for experiments with three payloads. This was a special mission with many firsts including first three orbit mission, first PS4 stage using solar panel. Now, focus is on by ISRO centres for the next PSLV missions and then the GSLV-MK III mission for Chandrayaan - 2," ISRO chairman Dr K Sivan told TOI from Sriharikota. The next window for Chandrayaan-2 mission is by April end, if not, then it will be in June, said an official at ISRO. Vikram Sarabhai Space Centre (VSSC) director Mr S Somanath said, "Tests are on for the PSLV-C46 mission in May for launch of RISAT 2BR 1, a Radar Imaging Satellite for reconnaissance and strategic surveillance. It will be followed by PSLVC47 mission to launch earth observation satellite Cartosat-3 in June. The date for launch of Chandrayaan-2 is yet to be finalised". On the successful launch of PSLV-C45, he said, it's a unique mission with new configuration, new mission plan that placed electronic intelligence satellite EMISAT in orbit at an altitude of 749 km, then the 28 satellites in orbit at a height of 504 km and a new forth stage that served as an orbital platform at 485 km height with three payloads for experiments, all successfully accomplished. One of the payloads was from Indian Institute of Space Science and Technology (IIST). Called `Advanced retarding potential analyser for Ionosphere Studies (ARIS), this payload weighing about 3 kg is a first of its kind `space weather station' to study electrons and ions in the ionosphere, said Mr Umesh Katane, team leader of ARIS. Further, Payloads with less weight and with lesser power consumption for space transportation are planned to be developed by IIST students, he said.

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

Publisher

Journal of Aerospace Sciences
And Technologies
Aeronautical Society of India
Bangalore Branch Building
New Thippasandra Post
Bangalore 560 075
Karnataka, INDIA
Telefax: +91 80 25273851
Email: editoraesi@yahoo.com
Website: www.aerojournalindia.com

Publication Team

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

Advertisement – Tariff

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

Head Quarters

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

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

CURRENT AFFAIRS

India space debris may have doubled after Mission Shakti

NASA warns of risk to International Space Station The amount of Indian space debris may have almost doubled in the aftermath of the Mission Shakti anti-satellite strike but this is still significantly less than the existing space debris generated by China, Russia and the United States. Data from SPACE-TRACK.org, a public access repository maintained by the U.S. defence wing that tracks space activity, notes only 80 pieces of “space debris” attributable to India in orbit. This, however, doesn’t include debris from MICROSAT-R, the DRDO satellite that was pulverised by India’s anti-satellite missile. NASA criticised India for the test, describing it as a “terrible, terrible” thing that had endangered the International Space Station (ISS) and led to the creation of nearly 400 pieces of orbital debris. NASA administrator Mr Jim Bridenstine said some of the debris posed a risk to astronauts on board the ISS. Mr Bridenstine said of the nearly 400 pieces, only 60 were being tracked and 24 of them were going above the apogee of the ISS (the farthest point from the earth of the ISS’ orbit). The latter posed the maximum risk to the ISS, he said. Prior to the March 27 test, for India’s 80 pieces, there were 4,091 pieces of debris by the U.S., 4,025 by Russia and China’s 4,038, according to SPACE-TRACK. Orbital debris are tracked by a variety of ground-based radar and space stations. The speeds at which these objects — between 1mm to 10 cm across — hurtle through space travel makes them extremely dangerous, various studies have showed. That said, the International Space Station is among the most fortified space objects. It has debris shields deployed around the crewed modules, each composed of two metal sheets, separated by about 10 cm. The outer bumper shield exploits the impact energy to shatter the debris object, such that the inner back wall can withstand the resulting spray of smaller-sized fragments. Between the walls, fabric with the same functionality as in bullet-proof vests is deployed. This design enables the shield to buffer against debris objects up to 1 cm in size. The U.S. Space Surveillance system can calculate if an object will veer too close to the ISS and — if need be — the station can be moved out of the orbit of the offending projectile. By the end of 2012, the Station had performed more than 15 of these manoeuvres, according to the ESA

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

A-SAT space debris means no harm to ISS or anyone

BENGALURU: Using an interceptor ballistic missile without an explosive warhead and targeting a satellite at low earth orbit of less than 300 Km, ensured that space debris caused by India’s March 27 anti-satellite (A-SAT) experiment, named Mission Shakti, may not be as harmful as it is being made out to be. The debris causing ‘serious danger’ to the International Space Station, raised by NASA Administrator Mr Jim Bridenstine, could be bit too alarmist, Indian space scientists feel. Experts, like Prof Roddam Narasimha, say that despite NASA administrator Mr Bridenstine raising concerns that India’s test had increased the risk to the ISS by 44 percent due to space debris, “there is no such cause for worry”. Bridenstine had based his worries on estimates provided by NASA and the Combined Space Operations Centre (part of US Strategic Command). interestingly, Mr Bridenstine himself said after his town hall talk on April 1, which was live-streamed by NASA TV when he raised these concerns — as quoted by space.com — “The good thing is (about India’s A-SAT mission), it’s low enough in Earth orbit that over time this (the space debris) will all dissipate.” Scientists from India’s Defence Research and Development Organisation (DRDO), which conducted the March 27 2019 test, and Indian Space Research Organisation (ISRO) have confirmed that the low-earth orbit space debris caused by the test would dissipate within eight days. The debris, they said , will fall to earth, but will burn in the planet’s atmosphere. Compared to that, the 2,000-odd pieces of space debris (several hundreds bigger that a golf ball) caused by the Chinese A-SAT test, conducted on January 11, 2007, are still orbiting the earth as that experiment was conducted at an altitude more than twice that of the Indian A-SAT test — 865 Km above earth. Prof Roddam Narasimha, Indian aerospace scientist and fluid dynamicist who was Director of the Bengaluru-based National Aerospace Laboratories, downplayed the threat to the ISS, saying: “The altitude at which India conducted the test was below that of the ISS. Yes, there will be debris, and space debris should not be caused, but compared to what other countries (USA, Russia and China) have done this is nothing.” NASA and Combined Space Operations Centre reportedly identified 400 pieces of space from India’s A-SAT test. This included 60 pieces which were larger than 10 cm in diameter, and 24 of which were travelling through the orbit of the ISS, which led them to raise the risk rate to ISS by 44 percent. Prof Narasimha also pointed out that had the DRDO’s ballistic missile — developed under India’s ballistic defence missile programme — carried an explosive warhead, the explosion could have provided a powerful thrust to the space debris, pushing the debris to a higher altitude. However, the March 27 test, according the official release,

was a “kinetic kill” test, which means there was no warhead used on the missile. It was the sheer velocity (8 Km/sec) of the missile which successfully targeted the satellite, which caused it to disintegrate without causing an explosion. According to space.com, which reported Bridenstine’s livestreamed town hall talk on April 1, he had said describing the Indian test: “That is a terrible, terrible thing, to create an event that sends debris in an apogee that goes above the International Space Station…And that kind of activity is not compatible with the future of human space-flight that we need to see happen. “We are charged with commercializing low Earth orbit; we are charged with enabling more activities in space than we’ve ever seen before for the purpose of benefiting the human condition, whether it’s pharmaceuticals or printing human organs in 3D to save lives here on Earth, or manufacturing capabilities in space that you’re not able to do in a gravity well…All of those are placed at risk when these kind of events happen — and when one country does it, then other countries feel like they have to do it as well.”

Source: http://www.newindianexpress.com/

STARTING MAY, ISRO TO LAUNCH A STRING OF ‘DEFENCE’ SATELLITES

Between now and early 2020, the space above India looks set to see an unprecedented rush of satellites meant solely or mainly for the country’s military. Starting May, the Indian Space Research Organisation (ISRO) plans to send up at least eight earth observation (EO) satellites of varied hues and at the rate of almost one a month. Communication satellite GSAT-32 is also in the offing next year to replace GSAT-6A, which was lost in a failed launch and was meant to mainly serve the ground forces. Until now, such defence-use satellites were spaced out over a few years; or were put up only once a year as in the case of the CARTOSAT-2 series high-resolution imaging satellites. Looking at the last three launches, we could even say the train has already started. HysIS, launched in November; MICROSAT-R in January; and the EMISAT sent into orbit on April 1 2019 are all for what is called “strategic use”.

DRDO Payloads

While traditionally, payloads for ISRO’s satellites come from the Space Applications Centre, the payloads of the MICROSAT-R and EMISAT were from the Defence Research and Development Organisation (DRDO), said officials, who spoke on condition of anonymity. Soon after EMISAT’s launch, ISRO Chairman and Secretary, Department of Space, Dr K.Sivan, announced that the next mission would be the radar imaging satellite RISAT-2B, followed by a high resolution mapping satellite CARTOSAT-3. Both are understood to be useful militarily and seen as overdue assets.

Equal Treatment

In a recent interaction, Dr. Sivan had told that the space agency does not distinguish how ISRO’s EO satellites serve various departments and national agencies. “To us, every satellite is just that, another satellite of national relevance. We don’t worry about its demarcation [as a military or a civil one],” he said. This is also how successive Chairmen of ISRO have argued the case for ISRO’s production of ‘military’ satellites.

Objects of Desire

CARTOSAT-3 will have 30 cm resolution, which is at a par with the world’s best, according to public information already put out by ISRO. It means the satellite can clearly ‘see’ and capture images of guns, devices, objects or human movement at that scale from space. There are already half-a-dozen CARTOSAT-2 series satellites in orbit, though these possess a lower resolution capability than the upcoming CARTOSAT-3. Radar imaging satellites like India’s RISAT series can provide almost an uninterrupted view of earth, day or night, rain or shine, a handy feature for the forces to detect border infiltration. And so, we should see many more RISATs or next-gen CARTOSATs coming up as the military’s objects of desire from the UR Rao Satellite Centre in Bangalore. A few of them would serve civil agencies as well. RISAT-2B, which was earlier planned after RISAT-2A and was not due before next year, is now slated to fly in May. Explaining the move, Dr. Sivan said, “We brought a few of them forward based on the demand, either from the civilian or other side. After all, if their national requirement is now, what is the point in putting them up later?” While the RISAT-1 of 2012 is dead, RISAT-2 of 2009 (said to have been imported from Israel) still works. A number of foreign satellites that have been flown to space on the PSLV are also for earth observation, space situational awareness and ship monitoring, which again may be useful as military information. Dr. Sivan said ISRO launches satellites for any legitimate customer, Indian or international. “Often, what is useful for civil purpose can also be useful for strategic purposes. To us a satellite is just a payload and makes no difference,” he said.

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

Lander glitch benches Chandrayaan-2

Bengaluru: Vikram, the lander on India's ambitious mission that envisages a probe on the Moon, suffered minor damage in two of its four legs during a test late February, putting Chandrayaan-2 on the bench until May. Finding a suitable launch window could see the mission take off only in the second half of the year. A source said the rover and orbiter were in good health and did well on all parameters in tests. However, after the Lander Drop Test, it was found Vikram needed to be strengthened in its legs. "It appears not all parameters were set correctly," the source added. ISRO has formed a 12-member special task force, headed by Mr Srinivasan RK from UR Rao Satellite Centre, to address the anomaly during the Lander Drop Test and submit a report to the centre director Mr Kunhikrishnan P. ISRO chairman Dr K Sivan told: "Some structural damage was found. We'll do some modifications, but we cannot say Chandrayaan-2 is delayed as we're looking for an optimal launch window." This mission, unlike Chandrayaan-1, involves a lander unloading a rover to study and take measurements. ISRO, which has been aiming to launch Chandrayaan-2 for a while, thought it could achieve it in April after several changes to Vikram's configuration resulted in two missed targets — October 2018 and January 2019. The committee will propose modifications and everything needs to be tested again. We'll need more than two months to launch," the source said. An option to save time is to simulate the weight to test the legs separately and later integrate them. "We'll need a launch window that provides clear 14 days given that our systems will be powered completely by solar energy," Dr Sivan said. Another scientist said the site chosen for the landing is known to have evening sunlight for 14 days and complete darkness for another fourteen days. "We need the Earth, Moon and Sun positioned in the right place. We want to get clear sunlight for 14 days before finalising the date," Sivan said. ISRO to launch five military satellites ISRO will launch five advanced military satellites — four new-series Risat satellites and one Cartosat-3 satellite — this year that will enhance surveillance capabilities of India, reports Mr Surendra Singh. The resolution of Cartosat-3 will be 0.2 metre that can capture images of a gun from space. Two new remote sensing Gisat satellites with military and civilian use will also be launched. New Delhi: Starting 2019 with the lift-off of two DRDO satellites, ISRO will launch five military satellites this year that will enhance surveillance capabilities of India. It is scheduled to launch four new series Risat satellites and an advanced Cartosat-3 satellite. ISRO chairman Dr K Sivan told, "In May, PSLV-C46 rocket will launch Risat-2B and thereafter in June-end, PSLV-C47 will launch Cartosat-3. Cartosat-3 is the advanced version with the capability to zoom up to a resolution of 0.2 metre, which is considered the best in the world." The resolution of Cartosat-3 will be so refined that it will be able to capture clear images of small objects like a gun. Sivan said Risat2BR1 will be launched in July, Risat-2BR2 in October and Risat-1A in November. "We will launch a new series of remote-sensing satellite Gisat-1 and Gisat-2 in September and November, which have both military and civilian use.

Source: https://epaper.timesgroup.com/

India's leap in the space

It remains to be seen whether political will sustains subsequent steps crucial to consolidate this momentum. Prior to the televised 10-minute address in Hindi shortly after noon on March 27 by Indian Prime Minister Mr Narendra Modi, few had expected that he would be announcing the beginning of a new space age for India. Mr Modi declared that India had successfully conducted an anti-satellite (ASAT) missile test, lauded the scientific establishment, emphasized that this was a measure for national security without contravening any international law, and assured that the step wasn't aimed toward any specific state. The exercise, dubbed as "Mission Shakti," involved the use of a direct ascent hit-to-kill, where a missile from Earth, without any explosive warhead, destroys the targeted satellite upon impact through kinetic energy alone. The Indian space program marks a half-century of operation this year, as the Indian Space Research Organization (ISRO), the sixth largest in the world, was established in 1969. It has carved out a niche not only through exemplary cost-effectiveness and innovative societal applications, but by hosting the largest constellation of civilian satellites in the Indo-Pacific region, the success of the Mars Orbiter Mission, and creating the world record of launching 104 satellites from a single rocket. With the ISRO being oriented toward civilian projects, the ASAT test was under the aegis of the Defence Research and Development Organization (DRDO). The architect of the indigenous missile program, the DRDO had been publicly expressing the intention for an ASAT test since 2012. The test was conducted by adapting India's indigenous Ballistic Missile Défense interceptor vehicle, which targeted a functioning Indian satellite at a height of 300 km in low-Earth orbit within 3 minutes. The selection of a target in low-Earth orbit aimed to prevent space debris, since space pollution is a universal concern. Satellites enable features from civilian to military, scientific and commercial – and thereby, outer space is integral to the functioning of modern societies, as a diverse range of services and devices ranging from missiles to mobiles, banking to navigation, meteorology to disaster management are irreversibly dependent upon it. The strategic utility of space was evident from the early

years of the Cold War, when both the United States and the erstwhile Soviet Union demonstrated a wide array of space weapons including anti-satellite missiles. As the Space Age dawned with the advent of Sputnik in 1957, research and development of various types of anti-satellite systems can be traced on the both sides of the Iron Curtain to this time – however, the 1980s marked the crest, with U.S. President Ronald Reagan's Strategic defence Initiative. That was followed by a prolonged trough. Incidentally, subsequent proposals to restrict an arms race in space have been languishing at the United Nations Conference on Disarmament since the 1980s, owing to opposition primarily from the United States. The European Union, Russia, and China have in the recent past put forward various proposals ostensibly to prevent the weaponization of outer space, but platitudes notwithstanding, consensus remains elusive. Ending decades of stability, China conducted an ASAT test in 2007 and the United States responded a year later. Since then the United States, China, and Russia have accelerated their military space activities in varying degrees and the arrival of new technologies like hypersonic glide vehicles and nano-satellites further complicates the picture. While there hasn't been any conflict in space itself and establishing weapons in space is proscribed as per the Outer Space Treaty of 1967, strategic applications of space technology are nevertheless widespread. Deploying a weapons system in space denotes weaponization of space and is in contravention of the Outer Space Treaty; in contrast militarization of space entails utilizing space for military purposes and is legitimate. India has consistently opposed the weaponization of space and upholds space as the common heritage of mankind — but the Chinese ASAT test in 2007 aggravated India's security concerns and catalysed the establishment of an Integrated Space Cell within the Ministry of defence. Outer space being integral to key strategic and civilian functions, securing assets in space has emerged a crucial priority. India now joins the select quartet of countries in the world possessing the ability to project hard power in space along with the United States, Russia, and China. The tests seem to be driven by considerations of security, demonstrating technological prowess, and by the rightful Indian insistence on having a voice at the high table of global politics: a recurring theme of Indian diplomacy. As the Ministry of External Affairs underlined, "India expects to play a role in the future in the drafting of international law on prevention of an arms race in outer space… in its capacity as a major space faring nation with proven space technology." Further, the assertion of upholding international conventions signalled India's desire to be perceived as a responsible global player – the Chinese ASAT test of 2007, for instance, had been condemned globally for a lack of transparency and generating the largest amount of space debris in history. The unequivocal assertion about the military nature of the tests is welcome for a country where enduring amnesia about the role of force in international relations circumscribes its emergence as a great power. Space assets had been harnessed for intelligence, surveillance, and reconnaissance (ISR) functions before — with the cross-border raids and aerial strikes like that of post-Uri and Balakot being facilitated through satellite reconnaissance and remote sensing, for example – but the ASAT test establishes a new aspect to the deterrence matrix. Still, the optimal utility of space power cannot be realized in the absence of an integrated Space Command and a cohesive space doctrine.. The test conclusively establishes India as a pre-eminent space power, but it remains to be seen whether political will sustains subsequent steps crucial to consolidate this momentum.

Source: https://www.orfonline.org/

World's largest plane successfully completes maiden flight

The world's largest aircraft, developed by aerospace venture Stratolaunch, completed its first flight test. With a dual fuselage design and wingspan greater than the length of an American football field, the airplane took off from Mojave Air and Space Port in California at 6:58 am (Pacific Time), said Stratolaunch in a statement, Xinhua reported. Achieving a maximum speed of 189 miles (302.4 km) per hour, the plane flew for 2.5 hours over the Mojave Desert at altitudes up to 17,000 feet. As part of the initial flight, the pilots evaluated aircraft performance and handling qualities before landing successfully back at the Mojave Air and Space Port, according to the company's statement. "What a fantastic first flight," said Mr Jean Floyd, CEO of Stratolaunch. "Today's flight furthers our mission to provide a flexible alternative to ground launched systems. We are incredibly proud of the Stratolaunch team, today's flight crew, our partners at Northrup Grumman's Scaled Composites and the Mojave Air and Space Port," he added. Regarding initial results from test flight, Stratolaunch said the test team performed a variety of flight control manoeuvers to calibrate speed and test flight control systems, including roll doublets, yawing manoeuvres, pushovers and pull-ups, and steady heading side slips. Moreover, it conducted simulated landing approach exercises at a max altitude of 15,000 feet mean sea level. Stratolaunch was founded by the late Microsoft co-founder Paul Allen in 2011 to develop the large carrier airplane as a flying launch pad for orbital-class rockets.The aircraft has a world-record wingspan of 385 feet, and is 238 feet long. It is wider than any airplane on the planet. It weighs half a million pounds, according to a CNN report. "A historic milestone for the #Stratolaunch team with this record setting aircraft taking flight! This is about going to the edge of

space and beyond!" tweeted Mr Thomas Zurbuchen, associate administrator for NASA Science Mission Directorate. "I only wish the late @PaulGAllen could see this - his memory and impact lives on," he tweeted. Dozens of photographers, industry bloggers and aerospace enthusiasts gathered this week to glimpse the unique twin-fuselage plane.

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

Should the Indian Navy worry about China's new warship?

China's massive naval parade at Qingdao on April 23 2019 to mark the 70th anniversary of the creation of the People's Liberation Army Navy turned out to be an anti-climax as smog played spoilsport. However, one ship among the 32 PLAN vessels on display triggered plenty of curiosity as its silhouette emerged through the smog—the first of China's Type 055 class destroyers. The vessel, designated the Nanchang, is considered to be the largest surface warship, excluding aircraft carriers and amphibious assault ships, built in Asia. The Type 055 class destroyer has a length of 180 metres and displaces over 11,000 tonnes. In comparison, the Indian Navy's future destroyer, the INS Imphal, which was launched last week, has a displacement of 7,300 tonnes and length of 163 metres. The INS Imphal is a ship of the Project 15B Visakhapatnam class and features modifications over the preceding Project 15A Kolkata class. Both the Project 15A and 15B class are derivatives of the Delhi class destroyers, designed in the late 1980s. Moreover, the beam (width of the ship at its widest point) of the Nanchang is estimated to be over 20 metres, while the INS Imphal has a beam of around 17 metres. The difference in beam means the Nanchang has more space for equipment and also for future modifications. According to various Chinese news outlets, the Type 055 Nanchang has 112 vertical launch cells for a variety of missiles meant for anti-air, anti-ship and land-attack purposes. Ships like the Imphal and Kolkata class have 32 Barak-8 missiles in ready-to-fire mode in vertical launch cells and 16 Brahmos anti-ship missiles. The Type 055 is expected to carry both supersonic anti-ship missiles and cruise missiles for attacking targets on land. While the Type 055 can carry far more missiles, the Indian Navy's destroyers are considered on par with their Chinese counterparts in terms of electronics and weaponry. The Project 15A and Project 15B class ships use the Israeli MF STAR radar, which can detect targets over 450km away. The Type 055 class uses an 'X band' radar, mounted on a high mast, for detecting small, low-flying targets and a larger radar system fitted on its superstructure for long-range detection. The Israeli-origin Barak-8 missile, while having a shorter range than the HHQ-9 system on the Type 055 destroyer, has an advanced radar seeker and a dual pulse rocket motor for higher probability of intercepting its target. So, the Type 055 Nanchang is much bigger than the Indian Navy's destroyers, but in terms of quality of weapons and radars, it is more of an even match. However, the Indian Navy's biggest worry may well not be the Type 055 itself, but the rate at which China is building this and other classes of warships. In 2018, the South China Morning Post had reported the PLAN had launched four Type 055 ships since 2017 and was building four more. A report on China's naval modernisation by the US government's Congressional Research Service in August 2018 quoted Chinese media reports that talked of a need for "at least 10" Type 055 class ships. In 2018, the Pentagon's Annual Report to Congress on China's military noted that seven Type 052D class destroyers had been put into service and six more were being built. The Type-052D is roughly comparable in dimensions to the Project 15A and Project 15B class ships of the Indian Navy. The same Pentagon report noted China had commissioned 24 Type 054A class frigates, which displace around 4,000 tonnes, and several more were being constructed. Interestingly, China is supplying Pakistan four Type 054A class ships. The Pentagon also noted that China had built more than 35 Type 056 class corvettes, small missile-armed warships that weigh less than 2,000 tonnes. To understand the scale of Chinese naval construction, it would be prudent to understand when the first of these aforementioned ships were launched: the first Type 056 entered service in 2013, the first Type 054A frigate entered service in 2008 and the first Type 055 was launched in 2017. According to the China Power Project of the Center for Strategic and International Studies, "Between 2014 and 2018, China launched more submarines, warships, amphibious vessels and auxiliaries than the number of ships currently serving in the individual navies of Germany, India, Spain, and the UK." The China Power Project also identifies a key factor facilitating Beijing's frenetic build-up: China has leveraged its world-beating commercial shipbuilding capabilities to the military space. The CSIS notes, "The same state-owned companies that dominate China's commercial shipbuilding industry are also major players in the military space." Most major Indian Navy projects such as the Project 15A and 15B have faced delays due to issues in supply of components by vendors, integration of various systems and shipyard inefficiencies. The four Project 15B destroyers are three years behind schedule, caused in part by delay in delivery of equipment, including gas turbines, from Russia and Ukraine. The Type 055 is likely to worry the Indian Navy not by the number of missiles it carries, but more for the fact that it is a symbol of China's naval shipbuilding prowess.

Source: http://defencenews.in/

Cabinet approves Continuation of Phase 4 of GSLV

The Union Cabinet chaired by Prime Minister Narendra Modi approved the ongoing Geosynchronous Satellite Launch Vehicle (GSLV) continuation programme Phase-4 consisting of five GSLV flights during the period 2021-2024. The GSLV Programme – Phase 4 will enable the launch of 2 tonne class of satellites for Geo-imaging, Navigation, Data Relay Communication and Space Sciences. The GSLV Continuation Programme – Phase 4 will meet the launch requirement of satellites for providing critical Satellite Navigation Services, Data Relay Communication for supporting the Indian Human spaceflight programme and the next interplanetary mission to Mars. This will also ensure the continuity of production in the Indian industry. The GSLV Continuation Programme – Phase 4 will meet the demand for the launch of satellites at a frequency up to two launches per year, with maximal participation by the Indian industry. All the operational flights would be completed during the period 2021-24. The operationalization of GSLV has made the country self-reliant in the launching capability of 2 tonne class of satellites for communication and meteorological satellites. The GSLV Continuation Programme will sustain and strengthen the capability and self-reliance in the launching of similar satellites for national requirements including next generation navigation satellites, data relay communication satellites and interplanetary missions. GSLV has enabled independent access to space for 2 tonne class of satellites to Geosynchronous Transfer Orbit (GTO). One of the very significant outcomes of the GSLV Continuation Programme is the mastering of the highly complex cryogenic propulsion technology, which is an essential technological capability to launch communication satellites to GTO. This has also paved the way for the development of a high thrust Cryogenic engine and stage for the next generation launch vehicle i.e. GSLV Mk-lll. With the recent successful launch of GSLV-F11 on December 19 last year, GSLV has successfully orbited 10 national satellites. GSLV with the indigenous Cryogenic Upper Stage has established itself as a reliable launch vehicle for communication, navigation and meteorological satellites and also to undertake future interplanetary missions. GSLV Continuation Programme was initially sanctioned in 2003, and two phases have been completed and the third phase is in progress and expected to be completed by Q4 of 2020-21.

Source: http://defencenews.in/

3 Indian teams from Mumbai, Punjab & Ghaziabad win awards at NASA Rover Challenge

Three Indian student teams won awards in NASA's annual Human Exploration Rover Challenge at the US Space and Rocket Centre in Huntsville, Alabama. The team from KIET Group of Institutions in Ghaziabad won the "AIAA Neil Armstrong Best Design Award" in the college/university division, NASA said in a statement late. The Mukesh Patel School of Technology Management and Engineering from Mumbai won the "Frank Joe Sexton Memorial Pit Crew Award" in the college/university division. The Mukesh Patel school also won the System Safety Challenge Award at the competition hosted by NASA's Marshall Space Flight Center in Huntsville and held at the US Space and Rocket Centre. Lovely Professional University from Phagwara, Punjab, won the STEM Engagement Award. The International Space Education Institute of Leipzig, Germany, won first place in the high school division with 91 points and the University of Puerto Rico Mayaguez - Team 1 won the college/university division with 101 points. NASA astronaut and two-time spaceflight veteran Mrs Sunita "Suni" Williams also interacted with teams and participating in the activities. "The creativity, skill and resourcefulness demonstrated each year on the rover course are the very traits that paved our path to the Moon in 1969, and the ones that will continue to carry NASA forward to the Moon again in 2024," said Bob Musgrove, Acting Manager of the Office of STEM Engagement at Marshall. Nearly 100 teams took part in the competition, hailing from 23 states, the District of Columbia and Mr Puerto Rico, as well as a record number of countries, including Bangladesh, Germany, India, Mexico, Morocco and Peru. The competition challenges high school and college teams to design, build and test human-powered roving vehicles inspired by the Apollo lunar missions and future exploration missions to the Moon, Mars and beyond.

Source: http://defencenews.in

Pentagon defends India's ASAT test, says country is concerned over "threats" in space

India is concerned about the "threats" it faces in space, the Pentagon has said, defending the country for acquiring anti-satellite (ASAT) missile test capabilities. On March 27, India achieved a historic feat by shooting down its own low-orbit satellite with a ground-to-space missile, making the country a space power. The test made India the fourth country in the world after the US, Russia and China to have the ASAT capabilities. "The first lesson from the Indian ASAT is just the simple question of why did they do that. And the answer should be, I think to all the committee

looking at it, is that they did that because they are concerned about threats to their nation from space," US Strategic Command Commander General John E Hyten told members of the powerful Senate Armed Services Committee. "And therefore, they feel they have to have a capability to defend themselves in space," Hyten told Senate Armed Services Committee while responding to a question from Senators on the need for India to do anti-satellite missile test, and the debris it generated in the space. After India's test, NASA termed as a "terrible thing" the country's shooting down of one of its satellites, saying it created about 400 pieces of orbital debris, endangering the International Space Station (ISS). NASA Administrator Mr Jim Bridenstine had said about 60 pieces were tracked and out of which 24 are going above the apogee of the ISS. Hyten advocated for the development of some kind of international norms of behaviour in space. "And where those norms of behaviour should begin, from my opinion, is with debris, because as the combatant commander responsible for space today, I don't want more debris," said the top Pentagon commander. Raising the issue, Mr Senator Tim Kaine said India announced last month that it had successfully conducted a test of an anti-satellite weapon. "So, they had something in low earth orbit. They used an anti-satellite weapon to down, and it resulted in - the estimate's right now 400 pieces of debris, 24 which are large enough to potentially pose a threat to the International Space Station," he said. "There have been other instances like this. There was a Chinese - a similar effort in 2007 that led to the catalogued 100,000 pieces of debris, many of which are still observing in debris fields that pose danger to other assets in space," he said. There was a collision in '09 between a working US satellite and a sort of defunct Soviet era satellite that -kind of a fender bender that produced debris. Then this debris causes challenges, he added. "If we think that space is going to be more of a traffic jam, more satellites for all kinds of purposes up there, what should we be thinking about as a Senate in this committee or in Foreign Relations about sort of the rules?" he asked. "What should the rules environment be, and what should we be doing to try to promote rules? India is an ally. We're not talking about an adversary doing something. We're talking about them testing some capacity, but then that creates challenges for all kinds of uses of space. How should we be solving problems like that?" Mr Kaine asked.

Source: http://defencenews.in/

NASA and ISRO briefly stopped working together after the Mission Shakti A-SAT Test

Following India's 'Mission Shakti' anti-satellite test on 27 March, NASA had reportedly stopped all cooperation with ISRO under the 'NASA-ISRO Human Space Flight Working Group' collaboration between the two national space agencies. NASA suspended any and all of its activities under the collaborative program two days after the test was carried out, only resuming a few days later, a SpaceNews report said. On 27 March, India's Defense Research and Development Organisation (DRDO) intercepted one of the country's own satellites using a powerful missile under Mission Shakti. This was intended as a test of anti-satellite capabilities in India's defense arsenal. In a letter addressed to Dr K Sivan, Chairman of ISRO, on 29 March, NASA's associate administrator for international and interagency relations Al Condes said that NASA was suspending its participation in a working group between the two agencies in matters related to human spaceflight. "It is NASA's view that human spaceflight is simply incompatible with the purposeful creation of orbital debris generated by anti-satellite testing," the letter, provided by NASA to SpaceNews, reads. NASA Administrator Jim Bridenstine had publicly condemned India's anti-satellite missile test in the days after it happened. He pointed out that the 60 pieces of trackable debris and the 400-odd piece whizzing around were a hazard to space programs globally. A week after the test, Mr Bridenstine also announced that some of the debris was gradually moving to higher altitudes and posing a threat to the space station and the astronauts aboard. "That is a terrible, terrible thing, to create an event that sends debris in an apogee that goes above the International Space Station," Mr Bridenstine had said. The reasons for NASA temporary pulling out of the collaboration also came with conditions under which the partnership can continue. "The administrator has asked me to inform you that NASA is immediately suspending activities under the NASA-ISRO Human Space Flight Working Group until it receives assurances from ISRO that India will refrain from future anti-satellite tests that could have an impact on human space flight activities in low Earth orbit," Mr Condes said, according to SpaceNews. Mr Bridenstine had to address US Congress members in a hearing of the House Science Committee on 2 April with regard to a NASA budget request. Two days later, on 4 April, came a second letter addressed to Dr Sivan, just as the number of objects linked to the test in orbit going above the space station had increased. The letter said that the cooperation between the two agencies would resume, along with work on several working groups including that for Human Space Flight. NASA had no plans to reduce "cooperative engagements" with India or do "anything asymmetric," Mr Bridenstine said, citing NASA's lunar project hitching a ride on ISRO's upcoming Chandrayaan-2 moon mission as an example. While Bridenstine spoke of the mission to media, neither of the two official letters to the ISRO Chief made mentions of changes to the original plans for the Chandrayaan-2 mission, which carries a laser retroreflector instrument developed by NASA.

Source: http://defencenews.in

ISRO's chandrayaan-2 mission on hold after moon lander vikram damaged during tests

The Indian Space Research Organisation's (ISRO) second mission to the moon, Chandrayaan-2, has been put on hold yet again. This time, the setback comes from a mishap with the moon lander, which sustained damage during preliminary tests ahead of the original plan to launch in April. ISRO had sought a window in mid-April to launch the Chandrayaan-2 mission. However, the Vikram moon lander now has two minor injuries on its legs, leaving the space agency in a fix. Chairman of ISRO, Dr K Sivan, continued to convey that this isn't a 'delay' or a 'postponement', while the new launch window will most likely be in May. ISRO has also put together a 12-member task force led by Mr D Srinivasan RK, that will assess the damage and look into any anomalies that may have caused it during the lander drop test, where the Vikram lander ran into problems. Both, the rover (which will be released from the lander after it makes a soft landing on the surface) and the orbiter, were found to be fit and successfully passed all the necessary tests and parameters for the mission. But the lander's drop test, the legs were simply not strong enough to support the added weight from the changes made since the previous version. ISRO engineers have accommodated many changes to the lander since the Chandrayaan-2 mission was first conceived, the report adds. "Some structural damage was found during the test. And then it has been found that this was because the test configuration and orientation were wrong," Dr K Sivan told ToI. "We will now do some modifications, but we cannot say that Chandrayaan-2 is delayed or postponed as we are looking for an optimal launch window." Chandrayaan-2 may not be delayed by longer, and could still launch in the same window as originally planned, provided the repairs and corrections to the lunar lander can still be made and satisfactorily tested by then.

Source:http://defencenews.in/

What is Nirbhay missile? All you want to know about India's indigenous 1,000-km nuclear-capable missile

Another Made in India nuclear boost! Defence Research and Development Organisation (DRDO) has recently successfully test fired the Nirbhay missile from Integrated Test Range (ITR) on Abdul Kalam Island off Odisha's Chandipur coast. This was the sixth test for the Nirbhay missile. The missile successfully met all the mission objectives. According to DRDO, the Nirbhay missile also showcased its sea-skimming capability to cruise at very low altitudes. The successful test of the nuclear-capable cruise missile adds much-needed strike and deterrance power to India's defence preparedness. The missile took off vertically and subsequently turned horizontal into the desired direction. Its booster got separated, wing was deployed, the engine started and cruised all the intended waypoints. The first test of the Nirbhay missile was conducted in 2013. What is India's Nirbhay missile? Made in India nuclear power! Nirbhay is an indigenously designed and developed long range sub-sonic cruise missile. It is a nuclear-capable cruise missile and can carry warheads of up to 300 kg. With this test, India has also sent a stern message to Pakistan and China as the Nirbhay missile is capable of targetting any object within 1,000 km range. The Nirbhay missile is capable of loitering and cruising at 0.7 Mach at an altitude as low as 100 metres. It covered the designated target range in 42 minutes and 23 seconds. The two-stage missile is 0.52 metre wide and 6 metre long. It has a wing span of 2.7 metre. The Nirbhay missile can carry warheads at a speed of 0.6 to 0.7 Mach. During the launch time, its launch weight was around 1500 kg. The state-of-the-art Nirbhay missile can eventually be deployed from multiple platforms – sea, land, aircraft and underwater. The latest test was conducted from the land. DRDO is also planning to develop ship, aircraft and submarine-launched version of this cruise missile. Su-30 MKI fighter planes will be equipped with such missiles once they are ready. DRDO wants to increase Nirbhay's range to 1,500 km.

Source: http://defencenews.in/

A-SAT test's success a proud moment for defence scientists: DRDO chief

Many precision technologies developed indigenously as part of India's ballistic missile defence programme, commenced around 20 years ago, have been critical in making the March 27 anti-satellite missile test successful, Defence Research and Development Organisation (DRDO) Chairman Dr G Satheesh Reddy said. "We have been one of the four countries in the world that have been actively pursuing a ballistic missile defence programme….The basic technologies and ideas emerged out of the ballistic missile defence programme gave the confidence to take up the critically complex mission like anti-satellite missile test, or Mission Shakti," Dr Reddy said while participating in an event here. The technological capability to carry out such critical mission that required accurate and precise equipment, sensors and systems emerged from the background of the technologies that had been developed for ballistic defence system. "That is how the discussions started 2-3 years ago and approval to go for the anti-satellite mission came in 2016," he said narrating the chronological sequence of the March 27 test. Anxiety, enthusiasm, and tension that the scientists

involved in the programme went through in those 3 minutes between the missile launch and the destruction of the target satellite were quite memorable and would last a lifetime, the DRDO chief said. Nearly 150 to 200 scientists were part of the mission. “Even for the scientists who have worked on the mission, imagining that type of situation was a dream,” Dr Reddy said. Explaining the nitty-gritties involved, he said the mission required a lot of precision as the relative velocity between the satellite, which was moving at nearly 7.8 km per second and the kill vehicle with a velocity of 3 km per second, was around 11 km per second. As there is no warhead involved, the seeker had to hit and destroy the satellite at its geometric centre, Dr Reddy said. “This required centimetres of accuracy. That is the type of accuracy and precision, that is the type of timing and synchronisation and that is what our scientists have done and achieved,” the DRDO Chairman said to the thunderous applause from the gathering, mainly consisting of school and college students. According to him, the entire operation was an automatic operation, right from the missile launch to the satellite destruction and hence the algorithms need to be very precise. The scientists carried out nearly 1,000 simulations before the actual mission was conducted. The entire mission was indigenously designed and built, with Indian industry contributing by developing around 2,000 subsystems used in the mission. Nearly 150 to 200 Indian firms have contributed to it, Dr Reddy said.

Source: http://defencenews.in

Serial production of A-SAT missile is government’s decision: Former DRDO chief

Dr S Christopher, former DRDO Director-General told Times Now that he is extremely happy how the current DRDO Chairman Dr G Satheesh Reddy and his team completed the successful anti-satellite (A-SAT) missile project in record time and in a short time. He said he is extremely happy how the project brought glory to the country. “I am happy that Dr S Reddy and his team have taken it forward in a very short time and brought glory to the country. It’s a proud moment. Talking about the system, it was a fallout of earlier programs”. When asked if he thinks that weaponisation of ASAT missile is something India should pursue? “We don’t have to weaponise in case of a direct hit. However, its government’s decision if serial production of these assets are required.”

Source: http://defencenews.in

PSLV-C45 successfully launches EMISAT and 28 customer satellites

India’s Polar Satellite Launch Vehicle (PSLV-C45) today successfully launched EMISAT and 28 international customer satellites from Satish Dhawan Space Centre (SDSC) SHAR in Sriharikota. This flight marked the first mission of PSLV-QL, a new variant of PSLV with four strap-on motors. PSLV-C45 lifted off at 9:27 Hrs (IST) from the Second Launch Pad and injected India’s EMISAT into a 748 km sun-synchronous polar orbit, 17 minutes and 12 seconds after lift-off. After separation, the two solar arrays of EMISAT were deployed automatically and the ISRO Telemetry Tracking and Command Network at Bengaluru assumed control of the satellite. In the coming days, the satellite will be brought to its final operational configuration. Following the separation of EMISAT, the vehicle’s fourth stage engines were restarted twice to place the 28 international customer satellites precisely into a sun-synchronous orbit of 504 km height. The last customer satellite was placed into its designated orbit 1 hour and 55 minutes after lift-off. About 3 hours after lift-off, the fourth stage (PS4) of the vehicle was moved to a lower circular orbit of 485 km after two restarts to establish it as an orbital platform for carrying out experiments with its three payloads. EMISAT is a satellite built around ISRO’s Mini Satellite-2 bus weighing about 436 kg. The satellite is intended for electromagnetic spectrum measurement. The 28 international customer satellites, together weighing about 220 kg, are from four countries, namely, Lithuania (2), Spain (1), Switzerland (1) and USA (24). These foreign satellites were launched as part of commercial arrangements. The payloads carried by PS4 are Automatic Identification System from ISRO, Automatic Packet Repeating System from AMSAT, India and Advanced Retarding Potential Analyzer for ionospheric studies from Indian Institute of Space Science and Technology. ISRO Chairman Dr K Sivan congratulated the launch vehicle and satellite teams involved in the mission. ”Today’s PSLV mission was unique in several ways. It was a four strap-on new variant, the vehicle achieved three different orbits and for the first the PS4 stage is powered by solar panels,” Dr Sivan said. He added that a new PSLV team executed today’s mission. Dr Sivan also placed on record the significant involvement of the industry in this mission. So far, PSLV has launched 46 national satellites, 10 satellites built by students from Indian Universities and 297 international customer satellites, including the satellites launched today. In its next mission, PSLV-C46 will launch RISAT-2B in May 2019.

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

TECHNOLOGY

Indian Army building new tunnels, caves to house firepower

The Indian Army, in order to stock up on ammunition in a sensitive environment, has set about constructing caves and semi-underground tunnels at mountain ranges near the northern border. The project, which is on a pilot basis currently, envisions caves at four locations, to be built at a total cost of around Rs 15 crore. There are a total of four proposed tunnels, including one in Tawang sector and one in Jammu and Kashmir. The Army has also roped in the National Hydroelectric Power Corporation Ltd (NHPC), a public sector undertaking, to construct the caves or tunnels. A memorandum of understanding (MoU) will soon be signed with the NHPC in this regard. The Army is also increasing its ammunition stockpile. Last year, it had finalised a Rs 15,000 crore long-term plan to get domestic private sector players to manufacture seven different types of ammo. It also signed 19 contracts worth Rs 11,740 crore to get Smerch rockets, Konkurs anti-tank guided missiles, 125-mm armour-piercing fin-stabilised discarding sabot ammunition for its T-90S and T-72 tanks, and other ammunition. Once the stocks arrive, the Army would need specialised areas to store them. To this end, sources said, the tunnels and caves would be constructed. NHPC was chosen for the task because it has the "best technical expertise, capability and capacity" to construct these without any glitches. "Further, it is also cost-effective," the source said, adding that each such cave or tunnel would have a capacity between 150 to 250 metric tonnes. Initially, the plan was to construct a cave at a high altitude area for stocking ammunition, but the project ran into technical issues, like seepage and dampness which may have damaged the goods. To resolve this issue, NHPC approached the Army and displayed its capabilities.

Source: defencenews.in/

India to Flight Test First Subsonic Engines For Military Drones

India will soon begin flight tests of its first 400 kg thrust class Small Turbofan Engine (STFE) as a power plant for unmanned air vehicles (UAVs) targeted for subsonic applications. The state-funded Gas Turbine Research Establishment (GTRE) realised six prototype engines with 95% indigenous components last year. They will be used as propulsion units for drones and have been bench-tested for maximum power and extremely cold weather conditions for 90 minutes of continuous operation. The GTRE test was tested at Bengaluru in southern India as well as at Leh in northern-most India, according to the Defence Research and Development Organisation (DRDO). "The GTRE tested the engine for max power setting at Bengaluru for 90 minutes continuous operation. During peak winter, the engine was tested at Leh at (-15 degree Celsius)", DRDO's statement read. In March 2018, DRDO invited expressions of interest from Indian industries willing to work under technology transfer terms for manufacturing and assembly of the engine. "Further efforts are on to flight test the engine and to manufacture the same through Indian industries," the document read further. The Indian Defence Ministry last year released a document titled "Technology Perspective and Capability Roadmap 2018" that talked about the government's intention to acquire more than 400 military drones, including combat and submarine-launched remotely piloted aircraft, in the next decade. "The medium-altitude, long-endurance (MALE) combat RPA (remotely piloted aircraft) should have the capability to fly up to 30,000 feet altitude with extended satellite communication ranges and endurance of more than 24 hours", a Defence Ministry official said. The Defence Research and Development Organisation is likely to use the engine in the Nirbhay subsonic cruise missile that it successfully test fired last week from the Integrated Test Range (ITR) at Chandipur in Odisha. It was the sixth development flight trial with the objective to prove the repeatability of the boost phase and cruise phase using way point navigation at very low altitudes.

Source: http://defencenews.in/

AstroSat Picture of the Month of March, 2019

A star relives its youth while dancing with its wizened companion in NGC 5466 This month we bring you yet another Globular Cluster, NGC 5466, located around 52000 light years from us in the constellation Bootes. However, we are going to turn our attention away from the cluster itself, and look at one particular star. This star, called NH 84, is a very special kind of star, and is what astronomers call a Blue Straggler Star, or BSS. Why are these special and how does it relive its youth? If you have read our previous APOMs on Globular Clusters (here, here and here), you may remember that almost all stars in a cluster are born together at the same time. You may also recall that stars are born, live sedately for a long time, and then die in various spectacular ways. The more massive a star is, the faster it

will evolve, and the faster it will die. More massive stars are also usually bluer and hotter, whereas less massive stars are redder and cooler. If we start with a bunch of stars that are born at the same time, like in a Globular Cluster, then as time goes by, we expect to see less and less hot blue stars, since they would have died already. Instead, we would only see the cooler, redder and older stars. Which is why astronomers were very surprised when, in 1953, Allan Sandage found young hot blue stars in old star clusters. How did these stars retain their youth in the face of time? The answer was very surprising indeed, and involved two stars instead of one. The most common way this happens is in binary star systems, i.e., two stars orbiting each other. Snehalata Sahu of the Indian Institute of Astrophysics and her colleagues imaged the cluster NGC 5466 using the UltraViolet Imaging Telescope on AstroSat and identified many Blue Straggler Stars. In particular, they looked at one of them, NH 84, carefully and discovered that it had to be such a binary system. The bright star was a BSS which had swallowed up material from its companion star, and become more massive and bluer, reliving its youth. The poor companion, though, continued on to become a very hot and dense White Dwarf. How did these astronomers know that the companion is a White Dwarf? They deduced this based on the brightness of NH 84 that they measured in the ultraviolet wavelengths, which is where the White Dwarf shines the most. The BSS itself has a surface temperature of 8000 Kelvin, is about as massive as our Sun, and about 45% bigger. The White Dwarf, on the other hand, is 32000 Kelvin, is about half as massive as our Sun, but only 2% of its size! This is only the second such BSS–White Dwarf pair that astronomers have found in Globular Clusters. Recently, another team led by Mr Subramaniam had discovered, using the UVIT, another binary system where a BSS was orbiting an evolved aged star whose youth it had stolen. This latest discovery was possible because of the superior resolution and sensitivity of AstroSat in the ultraviolet. The authors are now chasing after the other Blue Straggler Stars in this cluster. Let us wait and see what discoveries await them. The paper describing the results is accepted for publication by the Astrophysical Journal and can be found here. The accompanying science story, through India.

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

BUSINESS

Boeing plans to build 21st-century aerospace ecosystem in India

Eyeing India's multi-billion dollar fighter jet market, Boeing has offered to build a 21st-century aerospace ecosystem in India for co-developing F/A-18 Super Hornet upgrades as part of the country's advanced medium combat aircraft (AMCA) programme. Two major American fighter jets manufacturers - Boeing and Lockheed Martin - are in the race for the Indian fighter jet market. Lockheed Martin has offered to shift its entire F-16 manufacturing base from the US to India. "What we're talking about is a complete ecosystem of capability it's building up supply chain, it's building up engineering capacity, technical mechanical capacity. It is bringing the build, not the kit, to India," Mr Marc Allen, president of Boeing International and a member of the Boeing Executive Council, told PTI. Last month, Mr Allen was named the senior vice president of Boeing and president of Embraer Partnership and Group Operations. Boeing has offered that future F/A-18 Super Hornet upgrades can be co-developed with India, maximising performance, affordability, indigenisation for decades. The McDonnell Douglas F/A-18 Hornet is a twin-engine, supersonic, all-weather, carrier-capable, multirole combat jet, designed as both a fighter and attack aircraft. As a result, Allen argued, the impact will be transformational - building a next-gen warfighter in India and a 21st-century aerospace ecosystem with Hindustan Aeronautics Limited (HAL) and Mahindra along with Boeing industry's partners (GE Aviation, GKN Aero, Northrop Grumman and Raytheon). "And that's why the idea of being able to service, both the Indian Navy and the Indian Air Force requirements together is so vital because it creates a volume that supports industrial development at a massive scale," Mr Allen said in response to a question. Boeing says that the 'Make in India' programme for the Super Hornet has been envisioned for aircraft made in India for India. The Super Hornet production line will exist in the US to meet the immediate needs of its American and international customers. India is to build an entirely new line, leveraging Boeing's commercial and defence experience, Mr Allen said. The Super Hornet is the airplane that fits the requirement of both the Indian Navy and Airforce, he asserted. Boeing says that the Super Hornet offering for India co-opts the expertise of a public-private partnership with HAL and Mahindra to make the F/A-18 Super Hornet in an advanced Factory-of-the-Future in India. The partnership, it asserts, will harness productivity opportunities in India to deliver more-for-less (more capability for less cost) to its Indian customers and worldwide. Noting that its current F/A-18 production involves 60,000 jobs and 800 suppliers in 44 US States, Boeing officials say that this can be replicated in India. This partnership will create jobs and industrial capacity in India and also helps Boeing stay globally competitive. The future production with Indian partners will involve maximising indigenous content and producing the F/A-18 in India thereby creating a 21st-century aerospace ecosystem, Mr Allen said as he refuted giving a direct answer to the

question of the minimum number of fighter jet orders it needs from India to develop that ecosystem. “We have not framed up our responses to the government’s request for information around a minimum order now, but what we’ve done is that show us your requirements and we’ll show you what’s possible inside your requirements. But certainly, the government recognises the programmatic constraints that the more it’s able to invest in a broader program that can cover multiple services, the more capacity for industrial development it will get, he said. “We will shape our bid to the number. There’s less we can do at a lower number in terms of what’s Made in India. And to get to the full up ecosystem, the more the purchases, the more that can be done. It’s a sliding scale. And remember it’s also a sliding timescale,” he said. But at the same time, Mr Allen said that Boeing is not waiting for the competition to begin building the ecosystem. Boeing, Mr Allen said will continue to invest millions of dollars in supplier development, training, tooling and quality systems and skill development at its Indian suppliers. Allen said Boeing plans to expand its footprint in India from 3,000 engineers to 5,000 in the next couple of years. “We’re on our incredible trajectory of that growth. We’ve also opened up the Apache fuselage manufacturing operation. It’s a joint venture - Boeing and Tata that works out of Hyderabad,” he said.

Source: https://www.businesstoday.in/

China to build moon station in ‘about 10 years’

Beijing plans to send a manned mission to the moon and to build a research station there within the next decade, state media reported, citing a top space official. China aims to achieve space superpower status and took a major step towards that goal when it became the first nation to land a rover on the far side of the moon in January. It now plans to build a scientific research station on the moon’s south pole within the next 10 years, China National Space Administration head Mr Zhang Kejian said during a speech marking “Space Day”, the official Xinhua news agency reported. He also added that Beijing plans to launch a Mars probe by 2020 and confirmed that a fourth lunar probe, the Chang’e-5, will be launched by the end of the year. Originally scheduled to collect moon samples in the second half of 2017, the Chang’e-5 was delayed after its planned carrier, the powerful Long March 5 Y2 rocket, failed during a separate launch in July 2017. China also announced its Long March-5B rocket will make its maiden flight in the first half of 2020, carrying the core parts of a planned space station. The Tiangong—or “Heavenly Palace”—will go into orbit in 2022, the China Manned Space Engineering Office said. It is set to replace the International Space Station—a collaboration between the United States, Russia, Canada, Europe and Japan—which is due to be retired in 2024. Mr Beijing last week also said it would launch an asteroid exploration mission and invited collaborators to place their experiments on the probe. The current Chang’e-4 moon lander carried equipment from Germany, the Netherlands and Sweden. China now spends more on its civil and military space programmes than do Russia and Japan, and is second only to the United States. Although opaque, its 2017 budget was estimated at $8.4 billion by the Organization for Economic Cooperation and Development.

Source: https://phys.org/

HAL resumes tests of jet trainer

Hindustan Aeronautics Ltd (HAL) said it has resumed test-flying its intermediate jet trainer (IJT) in a modified version after a gap of almost three years. The first renewed test from its Bengaluru facilities was “flawless”, a statement said: “Its success is an important step [in] the IJT programme.” HAL had halted flight tests of the IJT in 2016 after the aircraft encountered problems while undergoing critical spin tests. Meanwhile, in-house research, design and technical teams modified the aircraft, which has been produced in a limited series. “HAL continued its R&D efforts and undertook modification of IJT LSP4 aircraft based on extensive and comprehensive wind tunnel studies,” HAL Chairman and Managing Director (CMD) Dr R. Madhavan was quoted as saying. The trainer aircraft, called the HJT-36, is being developed as the second-level trainer for new pilots of the Indian Air Force (IAF) and the Indian Navy. The beginners start with a basic trainer (now the Swiss-made Pilatus) and then move on to the more complex Hawk advanced jet trainer (AJT) before they take up flying fighters or transport planes for the Forces. The IJT is aimed at easing this transition. Taken up in 1999, the IJT programme has produced two IJT prototypes. The plane flew for the first time in March 2003. The IAF alone is reported to need 85 intermediate trainers.

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

L&T MBDA seeks approval for SEZ unit to assemble missile sub-systems

L&T MBDA Missile Systems Ltd, a joint venture between engineering conglomerate Larsen & Toubro and France's MBDA, has urged the government to grant a provisional Letter of Approval (LoA) for the company's proposed Special Economic Zone (SEZ) unit in Coimbatore to start construction of facilities. L&T MBDA is awaiting an industrial licence, and export orders with "critical delivery timelines" were piling up, the company said. "The unit assured that the manufacturing operations will not start until the grant of industrial license under the Arms Act 1959 by the Department for Promotion of Industrial and Internal Trade (DPIIT). "The unit also assured that it will abide by conditions as required by the Department of Commerce," according to the agenda note to be considered by the Board of Approval (BoA) for SEZs in its meeting on April 22. Assembly, integration. The proposed SEZ unit is to come up at the Aspen Infrastructures Ltd SEZ, Coimbatore, Tamil Nadu, and will focus on assembly, integration, and functional testing of missile sub-systems and missile weapon systems. The BoA on SEZ, in its meeting in November 2018, had considered a request for LoA by L&T MBDA Missile Systems, but at that time it had not given its approval. Instead, it directed that the proposal for grant of licence may be expeditiously processed on file after receiving necessary application/documents from the unit and clearances from relevant departments. An application for industrial licence was subsequently made to the DPIIT, and is under its consideration. The unit, however, is continuously pressing hard for a LoA for their SEZ unit pending issuance of industrial licence by the DPIIT, as it would allow it to enter into a lease agreement with the SEZ developer and undertake construction of manufacturing facilities. "The unit has mentioned that it has already received export orders with critical delivery timelines. The missile sub-assemblies to be produced by the unit are to be exported to France for integration into missiles by the unit's customerMBDA, which will supply the missiles to the Indian Armed Forces. "To meet the timeline the unit needs to construct specific manufacturing facility for execution of these export orders," the agenda pointed out. The matter of the unit was examined by the Department of Commerce, and it was decided to place the request for the examination of the BoA at its next meeting. L&T's joint venture with MBDA, the French missiles systems company jointly held by Airbus Group, BAE Systems and Leonardo, was incorporated in April 2017 as an Indian company, with L&T holding 51 per cent stake and MBDA holding the remaining 49 per cent. "To begin with, the JV company will look to develop and supply fifth-generation anti-tank guided missiles for coastal and high-speed target drones," both companies said in a joint statement.

Source: http://defencenews.in

Army set to get its first consignment of Spike anti-tank guided missiles under emergency purchases

The Israeli Spike anti-tank guided missile (ATGM) is a weapon system the Indian army has been looking for, particularly to protect its infantrymen and then, its tanks against enemy armour. Now, after months of waiting, the Army will get its first consignment— a small one, though— of the Spike. The Rs 280 crore deal gets the Army 210 missiles and 12 launchers with delivery expected soon. The deal is part of the 'emergency purchase' mechanism that the armed forces are allowed, and in the wake of the Indian Air Force's strike on terror camps in Balakot, deep inside Pakistan and the Pakistani Army moving some of its troops right to the border, much required. According to the rules, the Army vice chief is allowed Rs 300 crore for emergency purchases, and last weekend, this was cleared after the Army Commanders' Conference. Senior army officials said the previous effort— a much larger deal— was stuck; discussions were still going on with the Defence Research and Development Organisation (DRDO). While that deal related to a weapon-system that was 'third-generation,' this purchase is of a new, 'fourth-generation' missile with superior performance. The Emergency Purchase provision was used primarily because such purchases during the time of elections are usually more difficult. The Spike is likely to be effective against reactive armour; the 4 km range is also a positive. Of course, it is a small order. But if the Spike proves to be effective, a larger order could happen in the future.

Source: http://defencenews.in

Indian missiles sought after by many foreign countries: Sitharaman

Asserting that several foreign countries want to get Indian missiles in their inventory, Defence Minister Mrs Nirmala Sitharaman said there was an export potential of sale of homegrown defence products. The statement assumes significance as traditionally India has been a major arms importer and still depends on foreign vendors for around 50 per cent of its military hardware requirements. "You did talk about integrated missiles programme, which has yielded a lot of results. Today, missiles are so sought after by many countries... I want to highlight that there exists a market

outside other than the Indian armed forces," the Defence Minister said while addressing an event organised by the Vivekananda International Foundation. The Defence Minister said that a lot of countries are keen to have some kind of engagement with India and "want to purchase from you. India has immense potential to be an exporter of different equipment. I can also say, even a shipbuilding warship building capability is very well recognised outside. There are several countries which are saying, help us to give that capacity to us." The Defence Minister cited the example of aerospace PSU — HAL to suggest that a long term plan was required to establish India as an exporter of defence products. "I keep telling them (on increasing exports) yes, you have grievances about the Air Force not paying you on time. But there are also disputes about you not supplying on time," she said, while explaining that despite increasing the production capacity of the HAL, it would take a lot of time to produce the existing orders of the Indian forces. The Defence Minister also brought out that she has taken up a proposal with the Finance Ministry which may help her Ministry and the armed forces to retain the money allocated to them in the budget. Mrs Sitharaman also said that she has now asked the Defence Attaches posted outside the country to brief the Defence Ministry once a year about the developments in their countries of posting and regularly update it about their work.

Source: http://defencenews.in

FY 2018-19: HAL Turnover Crosses 19,400 Crores

Hindustan Aeronautics Limited recorded a turnover of over Rs. 19,400 crores (provisional and unaudited) for the financial year ended on March 31, 2019 (corresponding figure for the previous year was Rs. 18,284 crores). The Company has posted a revenue growth in excess of 6% during 2018-19 as compared to 3.8% during 2017-18. The performance of the Company in 2018-19 has encouraged us to focus more on design and development of indigenous products and technologies, develop aerospace and defence manufacturing eco-system and to be more dedicated towards meeting the current and future requirements of customers, says Shri R. Madhavan, CMD-HAL. This strategy will also help HAL to be on the growth track in meeting the expectations of the shareholders, he adds. The HAL expects continued "Excellent" MoU rating for the FY 2018-19 from Government of India for meeting all the relevant parameters related to its performance. In the FY 2018-19, HAL has produced 41 new aircraft / helicopters and 98 new engines and has carried out overhaul of 213 aircraft / helicopters and 540 engines. HAL's R&D projects are on track and are tailor made for the requirement of the armed forces. HAL has produced 12 new ALHs against the contract of 40, out of which six were produced ahead of schedule for the Indian Army.

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

BOOK RELEASE

Book Release : The Incredible Journey of Indian AWACS

Defence Scientific Information and Documentation Centre (DESIDOC), Delhi, brought out a monograph titled "The Incredible Journey of Indian AWACS" authored by Mr K Ramchand, Mr S Krishnasamy and Mr BR Srikant. The monograph chronicles the enthusiasm and excitement of the relentless pursuit of development of an Airborne Early Warning and Control (AEW&C) System and is an inspiring narrative of scientists, engineers and men in uniform who battled against all odds to design and operate an Indian AEW&C System Every Chapter of the monograph mirrors the innumerable hurdles, which were conquered with key personalities recounting their experience in employing unique skills to achieve the desired results ultimately resulting in India's entry into the exclusive league of nations with a capability to design, develop, and fly an indigenous AEW&C System. For more information and order please contact: Director, DESIDOC DRDO, Metcalfe House Delhi-110054.

Source: http://defencenews.in/

ADVERTISEMENTS