E-NEWS
EVERY MONTH FROM THE AERONAUTICAL SOCIETY OF INDIA

VOLUME - 15 | SEPTEMBER - 2020 | RELEASE - 09

CURRENT AFFAIRS

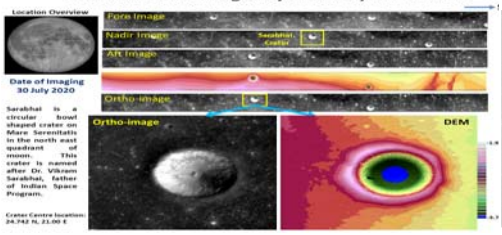
First rockets produced by private sector successfully test fired

BEML teams up with IIT-Kanpur for pilotless aircraft & unmanned aerial

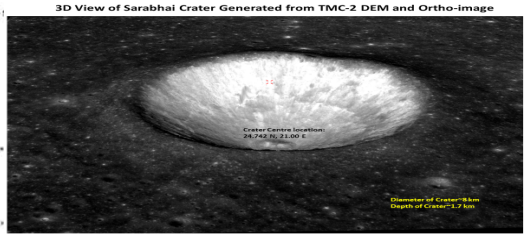
Chandrayaan-2 imaged Sarabhai crater on the Moon

On 30th July 2020, Terrain Mapping Camera – 2 (TMC-2) onboard ISRO's Chandrayaan – 2 captured the Sarabhai Crater on Mare Serenitatis in the north east quadrant of the Moon. Mare Serenitatis, which host the Sarabhai crater is one of the lunar mare region on the Moon, with vast lava plains creating a near flat surface. To the east and ~250-300 km of Sarabhai crater is the landing site of Apollo 17 and Luna 21 missions.Sarabhai crater is named after an Indian astrophysicist Dr. Vikram Ambalal Sarabhai, regarded as the Father of Indian Space program, and the Founder of Physical Research Laboratory and a distinguished cosmic-ray and space scientist.

Sarabhai Crater Imaged by Chandrayaan-2 TMC-2



3D View of Sarabhai Crater Generated from TMC-2 DEM and Ortho-image



The birth centenary of Dr. Sarabhai is being celebrated by ISRO. The Digital Elevation Model (DEM) and 3D view of the crater generated using the Fore, Nadir and Aft images from TMC-2 reveals average depth of the crater as ~1.7 km from the raised crater rim and average slope of the crater walls is in the range 25-30°. This Sarabhai crater outer region is dominated by numerous smaller craters of varying diameter distributed over the flat Mare plains, and is devoid of any large crater (diameter >10 km) in its vicinity (~100 km around). The raised rim, the gradient inner walls and the small hummocky floor makes the Sarabhai crater an excellent example to understand the impact processes on the lava filled region of the Moon.

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

Publisher

Journal of Aerospace Sciences And Technologies
The Aeronautical Society of India
Bangalore Branch Building
New Thippasandra Post
Bangalore 560 075
Karnataka, INDIA
Phone No : +91 80 25273851
Email: editoraesi@yahoo.com
Website: www.aerojournalindia.com

Publication Team

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

Advertisement – Tariff

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

Head Quarters

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

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

CURRENT AFFAIRS

Govt to focus on reducing use of imported components in indigenously developed platforms

The defence ministry will focus on significantly bringing down percentage of imported components in indigenously developed military platforms and weapons systems like light combat aircraft Tejas and Akash missiles. The Indian armed forces have been using a plethora of indigenously developed platforms and weapons which have various imported components and electronic systems.Defence Minister announced that India will stop import of 101 military systems and weapons like transport aircraft, light combat helicopters, conventional submarines and cruise missiles by 2024 to promote India's domestic defence industry.

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

IAF team aims higher

The Suryakiran aerobatic team of the Indian Air Force, known for its spectacular manoeuvres, is preparing for a nine-plane display early next year.The team, which forms the 52nd squadron of the IAF, is the only current military nine-aircraft aerobatic team in Asia.

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

ISRO will allow private sector to set up own launchpad at Sriharikota: K Sivan

Kicking off the process of "unlocking" the space sector, Indian space research organisation (ISRO) will allow the "private sector to set up their own launchpad at the Sriharikota launch centre" (SHAR). "The space agency has started the process of involving the private sector in space activities. We will allow the private entities to set up their own launch facility at Sriharikota that they can use for launching their spacecraft or rocket. Currently, ISRO has two launchpads and two rocket assembly buildings at Sriharikota. Dr Sivan Chairman said that ISRO is also ready to share its expertise for free with the private sector in areas where monetary support is not involved like providing technical support."Department of space is in the process of setting up Indian National Space Promotion and Authorisation Centre (IN-SPACe) (which is being set up to promote, hand-hold, monitor and supervise space activities by the private sector). But we don't want the industry to wait till it is set up. If private entities are interested, they can apply for it (using ISRO's space assets) now itself.

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

First rockets produced by private sector successfully test fired

In a major boost for Make in India, the first ever rockets fully manufactured by the private sector have been successfully test fired by the army, signalling that single source dependency on Ordnance Factory Board (OFB) will soon be a thing of the past. The rockets have been manufactured by the private sector after a technology transfer agreement with the Defence Research and Development Organisation (DRDO). The rockets have been manufactured by Economic Explosives Ltd (EEL) and are the first munition of its kind made by the private sector in India. They are also a success story for DRDO that has been engaging with the private sector to transfer manufacturing technology for home developed systems.

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

IAF prepares for PM Modi, French Defence Minister at Rafale induction ceremony

The air force if planning for a high-profile Rafale induction ceremony which may include Prime Minister Narendra Modi and French defence minister Florence Parly at the air force station in Ambala where the first five aircraft have been stationed.Sources said that preparations are on for a formal ceremony that is likely to take place in the coming weeks though a final date has not been decided on. The five Rafale jets are being integrated into the air force ecosystem and have already proven their mettle with successful weapons firing at a test range after arrival.French defence minister Parly, who had earlier pledged support for India as the China crisis unfolded and had requested for a bilateral visit, is likely to be part of the formal ceremony at Ambala, sources said.

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

BEML teams up with IIT-Kanpur for pilotless aircraft & unmanned aerial vehicles

Bengaluru-headquartered BEML it would collaborate with IIT-Kanpur for joint indigenous development of pilotless target aircraft (PTA) and tactical unmanned aerial vehicles (UAVs).Both the organisations would synergise respective capabilities and undertake feasibility study, design and development, testing and validation of tactical UAVs and PTA, BEML said in a statement."The jointly developed products will substitute the currently imported UAVs and PTA and aims to achieve self- reliance at a reduced cost," it said.This, it said, would also help foster innovation and technology development in defence and aerospace by engaging various industries, including MSMEs, start-ups, individual innovators, R&D institutes and academia."This will enable BEML achieve a quantum jump in defence and aerospace business and provide a big thrust in 'Atmanirbharta' in the defence sector.

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

Government to sell up to 15% stake in HAL via OFS

The government will sell up to 15 per cent stake in state-run aerospace and defence company Hindustan Aeronautics (HAL) through an offer for sale (OFS), at a floor price of Rs 1,001 per share. The offer could fetch the exchequer around Rs 5,020 crore.Through the OFS, the government proposes to sell 3,34,38,750 equity shares, constituting 10 per cent paid-up share capital of the company, with an option to sell an additional 5 per cent stake or 1,67,19,375 equity shares (oversubscription option), HAL said in a regulatory filing.

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

ISRO checking space enthusiast's claim that Chandrayaan-2's rover Pragyan is intact on Moon

Space enthusiast Shanmuga Subramanian, who found the debris of India's moonlander Vikram, that Chandrayaan-2's rover Pragyan seems to be intact on the moon's surface and had rolled out a few metres from the lander.In a series of tweets along with the pictures of the moon surface, Subramanian said: "Chandrayaan-2's Pragyan "ROVER" intact on Moon's surface & has rolled out few metres from the skeleton Vikram lander whose payloads got disintegrated due to rough landing.""We have received communication from him (Subramanian). Our experts are analysing the same," K. Sivan, Chairman, Indian Space Research Organisation (ISRO), told IANS."It seems the commands were sent to the lander blindly for days & there is a distinct possibility that the lander could have received commands and relayed it to the rover... but the lander was not able to communicate it back to the earth," Subramanian said.There is also the possibility of the rover rolling out of the lander when it impacted the moon surface.Tweeting a picture taken by NASA's Lunar Reconnaissance Orbital (LRO), Shanmugam said the white dot might be the skeleton lander devoid of other payloads and the black dot might be the rover.According to him, the rover may be still intact on the moon's surface. Latest pictures from LRO (Jan 4, 2020) showed rover tracks on the moon from the lander.He said the debris he had found earlier might be from one of the payloads. The debris found by NASA might be of other payloads, transmitting antenna and thrusters.Vikram lost contact with ISRO following its launch from Chandrayaan-2 moon orbiter on September

6 last year when it tried to make softlanding near the moon's south pole.July 21, 2020 marked a year of the launch of India's second moon mission by a Geosynchronous Satellite Launch Vehicle (GSLV)-MkIII-M1.It was on July 22, 2019, when the GSLV rocket, nicknamed 'Bahubali', blasted off from the second launch pad at India's rocket port in Sriharikota in Andhra Pradesh carrying Chandrayaan-2 Orbiter Vikram (lander) and Pragyan (rover).

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

First S-400 unit to be delivered by end of 2021

Russia has said that the first regiment of S-400 anti-air system will be delivered to India by the end of 2021 and that the delivery period of further batches could be compressed if required. India has ordered five regiments of the cutting edge system that is designed to take down targets at a range of over 400 km."The schedule of fulfilling the contract has been discussed in detail with Indian partners and the delivery of the first regiment is expected by the end of 2021," the official representative of Russian Federal Service for Military-Technical Cooperation said at the Army 2020 expo at Kubinka, outside Moscow."Further acceleration (of the timeline) is technically impossible, given the technology-related stages of production, acceptance trials and transfer of the equipment," the official representative added.

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

Defence Minister launches 2 missile test equipment

Defence Minister Mr Rajnath Singh launched the Konkurs missile test equipment and Konkurs launcher test equipment which have been indigenously designed and developed by Bharat Dynamics Limited (BDL). Earlier, these products were being imported from Russia.The two indigenised products were virtually launched by the minister from Delhi. Chief of defence staff General Bipin Rawat, defence secretary Ajay Kumar, secretary (defence production) Raj Kumar, senior officials from the Ministry of Defence and CMD, BDL, Commodore (retired) Siddharth Mishra, directors and senior officials were present.According to officials, the two products were launched as part of Atmanirbhar Bharat week being celebrated from August 7-14. The Konkurs missile test equipment is designed for checking the serviceability of Konkurs-M anti-tank guided missiles. Konkurs launcher test equipment is designed and developed for checking the serviceability of Konkurs-M missile launchers.The realisation of these indigenous equipment will take forward the Atmanirbhar Bharat Abhiyan initiated by the Government of India and will lead to substantial foreign exchange savings for the country in the future, officials said.

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

Defence Minister Inaugurates HAL-IISc Skill Development Centre Established in Karnataka

Mr. Rajnath Singh, Defence Minister, inaugurated the HAL-IISc Skill Development Centre (SDC) established at IISc's Challakere campus in Chitradurga district (Karnataka), 225 km from Bengaluru through a video conference today. Speaking on the occasion, the Defence Minister said knowledge is power and skilled workforce is basic necessity for innovation and creativity. The SDC is a sound example of synergistic collaboration between the country's flagship aerospace giant and the best in class premier academia, he added.Top officials present on the occasion included General Bipin Rawat, Chief of Defence Staff, Dr. Ajay Kumar, Defence Secretary, Mr Raj Kumar, Secretary (Defence Production), Mr R Madhavan, CMD, HAL, Mr Alok Verma, Director (HR), HAL, Prof. G Rangarajan, Director, IISc.The centre will impart skills to various beneficiaries ranging from local community members to high-end engineering professionals to usher true 'Make-in-India', says Mr. Madhavan."We are grateful to HAL for supporting us and partnering with us on this critical national initiative," says Prof. Rangarajan. "We eagerly look forward to working closely with HAL, to realize our shared vision of training hundreds of aspiring young workers and professionals from across the country".

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

TECHNOLOGY

Skyroot India's first private company to test upper-stage rocket engine

Aerospace startup Skyroot Aerospace has successfully test fired an upper-stage rocket engine, becoming the first Indian private company to demonstrate the capability to build a homegrown rocket engine.The 3-D printed rocket engine – Raman, named after Nobel laureate CV Raman – has fewer moving parts and weighs less than half of conventional rocket engines with a similar capacity.The Hyderabad-headquartered firm, backed by CureFit founders Mukesh Bansal and Ankit Nagori, and Solar Industries, claimed that the engine was capable of multiple restarts, enabling the launch vehicle to insert various satellites into multiple orbits in a single mission. It will conduct more tests of the Raman engine over the next six months.Founded by Pawan Kumar Chandana and Naga Bharath Daka, both former scientists at the Indian Space Research Organisation (ISRO), Skyroot plans to build a family of rockets. The first rocket, which can hurl satellites of 250-700 kgs into a lower earth orbit, is expected to be launched by end-2021."We demonstrated India's first 100% 3D-printed bi-propellant liquid rocket engine injector. Compared to traditional manufacturing, this reduced the overall mass by 50%, reduced the total number of components and lead time by 80%," Chandana said.The company has designed in-house software for launch vehicle guidance, navigation, and control functions, and is testing onboard its avionics modules.Skyroot had so far raised 31.5 crore from investors to develop a family of rockets named after Vikram Sarabhai, the founder of India's space programme, with the capability to launch 250-700 kg satellites into low-earth orbit. The space startup is now in talks to raise 90 crore by mid-2021.Over the years, India has emerged a global hub to launch small satellites using the polar satellite launch vehicles (PSLV).As the country opens its space sector to private players, startups such as Skyroot, Agnikul and Bellatrix are building small launchers, with 3-D printed engines, hoping to bring down the cost of launching satellites and capturing a bigger pie of the global small satellite launch market.Research firm Frost & Sullivan expects more than 10,000 small satellites to be launched globally in the next decade.V Gnanagandhi, another former ISRO scientist and a senior vice president at Skyroot, who is leading its liquid-propulsion team, said: "This test has qualified a unique monolithic design of injector with complex internal channels and demonstrated high performance for hypergolic rocket propellants."

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

Bangalore based start-up developing air launched drones with US Air Force Research labs

A Bangalore based start-up is part of the first Indo-US technology collaboration project in the aerospace sector and will work with the US Air Force Research labs to develop future air launched drones for the armed forces.NewSpace Research and Technologies Pvt Ltd, a start-up that lists itself as a 46 member team, is part of a project selected under the Indo-US Defence Technology and Trade Initiative (DTTI) to do-develop air launched unmanned aerial vehicles, ET has learnt.While the company did not offer comments when contacted by ET, it is learnt that it has been selected for a futuristic program that involves collaboration with the US Air Force Research Labs, the Indian Air Force and the Defence Research and Development Organisation (DRDO).Details of the project have not been shared yet but is likely to involve drones that act as force multipliers for combat aircraft on mission. The project would be one of the first success stories for the intergovernmental DTTI that has yet to show significant results, despite intense efforts by both India and US.At a seminar last month, top Pentagon official Ellen M Lord, Under Secretary of Defence for Acquisition and Sustainment had referred to the air launched drones program but had not mentioned the name of the Indian start-up being involved.Experts have welcomed the move to involve the private sector in the Indo-US technology sharing initiative. "A lot of the work under DTTI isn't terribly advanced, certainly not the kind that requires high-level enabling S&T research from organisations like DRDO and DARPA. Given that, it makes sense to involve private businesses, particularly the more agile and specialised outfits, to collaborate on meeting high level requirements set out by the militaries of both sides," aviation expert Angad Singh with the Observer Research Foundation (ORF) says.He adds that projects like these need to focus on development of technology and not be treated as an arms sale. "The key thing is to frame DTTI as cooperative tech development — where both sides contribute and both benefit from the outcomes — rather than one-sided arms sales or technology transfer from the USA to India," Singh said.While the US side seems

to be keen to work with Indian companies and start ups, as is clear from the selection for the first aviation project, it remains to be seen how things go ahead, given that traditionally such initiatives have been driven by the DRDO that is bound to a set governmental procedure and pace.

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

IISc, ISRO develop space bricks for lunar habitation

In what could be a significant step forward in space exploration, a team of researchers from the Indian Institute of Science (IISc) and Indian Space Research Organisation (ISRO) has developed a sustainable process for making brick-like structures on the moon.It exploits lunar soil and uses bacteria and guar beans to consolidate the soil into possible load-bearing structures, an IISc said in a statement. These “space bricks” could eventually be used to assemble structures for habitation on the moon’s surface, the researchers suggest. “It is really exciting because it brings two different fields — biology and mechanical engineering — together,” says Aloke Kumar, assistant professor in the department of mechanical engineering, IISc, one of the authors of two studies that were recently published.The cost of sending one pound of material to outer space is about Rs 7.5 lakh. The process developed by IISc and ISRO team uses urea — which can be sourced from human urine — and lunar soil as raw materials for construction on the moon’s surface. This decreases the overall expenditure considerably. The process also has a lower carbon footprint because it uses guar gum instead of cement for support. This could also be exploited to make sustainable bricks on Earth.Some micro-organisms can produce minerals through metabolic pathways. One such bacterium, called Sporosarcina pasteurii, produces calcium carbonate crystals through a metabolic pathway called the ureolytic cycle: it uses urea and calcium to form these crystals as byproducts of the pathway. “Living organisms have been involved in such mineral precipitation since the dawn of the Cambrian period, and modern science has now found a use for them,” says Kumar.To exploit this ability, Kumar and colleagues at IISc teamed up with ISRO scientists Arjun Dey and I Venugopal. They first mixed the bacteria with a simulant of lunar soil. Then, they added the required urea and calcium sources along with gum extracted from locally sourced guar beans. The guar gum was added to increase the strength of the material by serving as a scaffold for carbonate precipitation. The final product obtained after a few days of incubation was found to possess significant strength and machinability.”Our material could be fabricated into any freeform shape using a simple lathe. This is advantageous because this circumvents the need for specialised moulds – a common problem when trying to make a variety of shapes by casting. This capability could also be exploited to make intricate interlocking structures for construction on the moon, without the need for additional fastening mechanisms,” explains Koushik Viswanathan, assistant professor in the Department of Mechanical Engineering, IISc, another author.

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

BUSINESS

Centre to encourage government-to-government deals to meet $5 billion military export target

In order to meet an ambitious target of $5 billion worth of military exports annually by 2025, the Centre will encourage government-to-government deals, using lines of credit to friendly foreign nations and branding of home developed products at international shows.Spelling out its export promotion strategy, the defence ministry has marked out a target for Defence PSUs and the Ordnance Factory Board achieve 25% of their revenues from exports within the next five years in a draft policy.The targets would be difficult to meet, specially for PSUs that depend on the Indian armed forces as their only customer, necessitating a series of steps that have been spelled out, including an even more proactive role for Indian missions abroad and an aggressive marketing campaign.An active campaign to push through direct government deals would go a long way, along the model used by top exporters like Russia and the US. “Subject to strategic considerations, domestically manufactured defence products will be promoted through government-to-

government agreements and lines of credit or funding," the draft policy reads.The government is also looking to position some PSUs as export promotion agencies for specific nations, with their earnings directly linked to the business generated, incentivising performance. These PSUs are yet to be identified but would be companies that have exposure in the identified nations.Among major systems India is looking at offering through direct government talks are the Brahmos cruise missile system, the Akash air defence system, the Tejas Light Combat Aircraft and a range of choppers manufactured indigenously. Other products include torpedoes, fast attack craft and a range of naval systems. Achieving the $5 billion target is an uphill task, given that exports last year were pegged at $1.2 billion - a huge jump from the past.

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

CAG drops audit of Rafale offset deal

Eight months after the Comptroller and Auditor General (CAG) submitted its performance audit on defence offset contracts to the government, a top source in the federal auditor has revealed that the report has no mention of any offset deals related to Rafale aircraft purchased from French company Dassault Aviation. The government is yet to table the report before Parliament.The Ministry of Defence (MoD) has denied any information related to the Rafale offset deals to the auditor. According to people involved with the audit, the MoD has informed the federal auditor that Dassault Aviation, the French manufacturer of Rafale, has said that it will share any details of its offset partners only after three years of the contract.India received the first set of five Rafale fighters last month from France.

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

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