



E-NEWS

EVERY MONTH FROM THE AERONAUTICAL SOCIETY OF INDIA

VOLUME - 17

NOVEMBER 2022

RELEASE - 11

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Covering the Period from
(01 October to 31 October 2022)



Indigenously Built Light Combat Helicopter Marks a New Chapter

INS Arihant launches Submarine Launched Ballistic Missile



Publisher

Journal of Aerospace Sciences
And Technologies
The Aeronautical Society of India
Bangalore Branch Building
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Advertisement – Tariff

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

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Eminent Indian Aeronautical and Aerospace Personalities in India

No : 3

A.P. J. Abdul Kalam (1931-2015)

A.P.J. Abdul Kalam, in full Avul Pakir Jainulabdeen Abdul Kalam,

(born October 15, 1931, Rameswaram, India—died July 27, 2015, Shillong),

Dr. APJ Abdul Kalam was an Indian aerospace scientist who served as the 11th President of India from 2002 to 2007. He was born on October 15, 1931, raised in Rameswaram, Tamil Nadu, and studied Physics and



aerospace engineering. APJ Abdul Kalam was elected as the 11th President of India in 2002 with the support of both the ruling Bharatiya Janata Party and the then opposition Indian National Congress party. Also referred to as ‘People’s President’, APJ Abdul Kalam returned to his civilian life of education, writing, and public service after serving only one term.

Read APJ Abdul Kalam’s Biography and learn more about his education, achievement, inventions, full name, quotes, and other important details.

APJ Abdul Kalam Biography

Full Name

Avul Pakir Jainulabdeen Abdul Kalam

Birth Date

October 15, 1931

Continued.....

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

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Birth Place	Rameswaram, Madras Presidency, British India
1997	Indira Gandhi Award for National Integration
1998	Veer Savarkar Award
2007	King Charles II Medal (Royal Society, UK)
2014	Doctor of Science (Edinburgh University, UK)

Also on this day of History (15 October)

There are a few other events that took place on the same date as that of the birth of APJ Abdul Kalam.

- 1542: Birth of Mughal Emperor Akbar at Amarkot, Sindh
- 1676: East India Company permitted by the monarch of England to mint rupee and paisa coins at Bombay.
- 1918: Death of Sai Baba of Shirdi.
- 1932: The first Indian commercial airliner Tata Sons Ltd. started.
- 1943: Death of poet and freedom fighter Baba Kanshi Ram.
- 1990: Nelson Mandela awarded the Bharat Ratna.
- 1997: Arundhati Roy received the Booker Prize.

Even while he was the head of the Indian space programme, he devoted substantial efforts towards boundary layer research. His most important contributions are presented in the seminal book *Boundary Layer Theory* by Hermann Schlichting.

He was a popular professor at the Indian Institute of Science, (IISc) located in Bangalore. He is credited for setting up the first supersonic wind tunnel in India at IISc. He also pioneered research on relaminarization of separated boundary layer flows, three-dimensional boundary layers and trisonic flows.

Prof. Satish Dhawan carried out pioneering experiments in rural education, remote sensing and satellite communications. His efforts led to operational systems like INSAT- a telecommunications satellite, IRS - the Indian Remote Sensing satellite and the Polar Satellite Launch Vehicle (PSLV) that placed India in the league of space faring nations.

Following his death in 2002, the Indian satellite launch centre at Sriharikota, Andhra Pradesh, located about 100 km north of Chennai in South India was renamed as the Prof. Satish Dhawan Space Centre.

Education

University of the Punjab in Lahore (undivided India at that time and now in Pakistan)
BA in Mathematics and Physics,
MA in English Literature
BE in Mechanical Engineering, 1945
University of Minnesota, Minneapolis
MS in Aeronautical Engineering, 1947

California Institute of Technology,
Aeronautical Engineer's Degree, 1949
PhD in Aeronautics and Mathematics, 1951, (with Prof Hans W. Liepmann as his advisor)

Date of birth

25 September 1920(1920-09-25) Srinagar, India

National Recognition:

Padma Vibhushan, Indira Gandhi Award

Fields

Mechanical and Aerospace Engineering

Institutions:

Indian Space Research Organization, Indian Institute of Science, California Institute of Technology, National Aerospace laboratories, Indian Academy of Sciences and Indian Space Commission.

Doctoral advisor:

Dr.Hans W. Liepmann.

Known for

Indian space program.

Career

Indian Institute of Science, Bangalore, India

- Senior Scientific Officer, 1951
- Professor and Head of the Department of Aeronautical Engineering, 1955
- Director, 1962-1981
- California Institute of Technology, USA
- Visiting Professor, 1971-72
- National Aerospace Laboratories, Bangalore, India
- Chairman, Research council, 1984-93
- Indian Academy of Sciences
- President, 1977-1979
- Indian Space Research Organisation
- Chairman, 1972-1984
- Indian Space Commission
- Chairman, 1972-1984

Awards

- Padma Vibhushan, (India's second highest civilian honour), 1981
- Indira Gandhi Award for National Integration, 1999
- Distinguished Alumnus Award, Indian Institute of Science
- Distinguished Alumnus Award, California Institute of Technology, 1969

CURRENT AFFAIRS

Inauguration of Integrated Cryogenic engine Manufacturing Facility (ICMF)

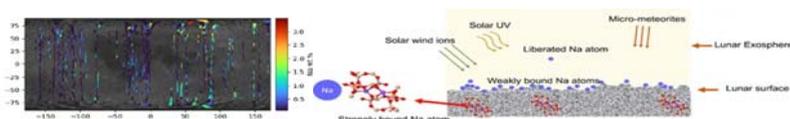
Hon'ble The President of India inaugurated the integrated cryogenic engine manufacturing facility (ICMF) at HAL, Bengaluru, in the august presence of Hon'ble Governor and Hon'ble Chief Minister of Karnataka, Hon'ble minister of state for health and family welfare Dr. Bharati Pawar, Dr. K Sudhakar, minister of health and family welfare, Karnataka, CMD, HAL and, Chairman, ISRO/ Secretary, DoS. ICMF is established in Bengaluru by HAL to realise the cryogenic and semi-cryogenic engines required for the Indian space programme with a project cost of Rs. 208 crores . ICMF caters to manufacture and assembly of the engines under one roof. The facilities house many indigenous fabrication equipment, machinery, and surface treatment utilities. Recalling the benefits of Satellites for the citizens, Hon'ble The President of India considered the ICMF inauguration as one of the major initiatives toward Atmanirbhar Bharat (self-reliant India) and hoped that it would contribute to building a stronger India by 2047 through the next 25 years of Amrit kal. CMD, HAL and Chairman, ISRO acknowledged and appreciated efforts rendered by all the stakeholders. While CMD, HAL congratulated ISRO for becoming the sixth country to master cryogenic technology. Chairman, ISRO recalled the very long association with HAL since the SLV days and continued trusted support for realising critical systems for ISRO.

Source: <https://www.isro.gov.in/inaugurationICMF.html>

X-rays from the Moon reveal a new lunar map in sodium

The X-ray spectrometer CLASS on the Chandrayaan-2 Orbiter has mapped the abundance of sodium on the Moon for the first time. The serene radiance that fills the vast expanse of a night sky is the reflection of sunlight from the Moon's surface, a major part of which is from the bright lunar highlands. The rock and soil samples that the Apollo 11 astronauts brought to Earth showed that these regions which are remnants of an ancient lunar crust, are mainly composed of silicate minerals in the group plagioclase feldspar series. While these are common minerals found on Earth, lunar samples have a variety of the mineral that contain more of the element Calcium than Sodium (which is an alternative) following the general trend in compositional differences between Earth and Moon. A loss of volatile elements including alkalis like sodium and potassium on the Moon could be traced back to the time when Earth and Moon formed together in a Solar system that was young and fiery. Successive laboratory investigations of the returned samples (Apollo, Luna and Chang'e) widened the range of compositions but the fundamental conclusions have remained. However, the returned samples are from a few specific regions of the Moon which do not necessarily represent the global lunar composition. Sodium is one of those elements that do not have a telltale signature in the visible or near-infrared wavelengths and has thus not been targeted via remote sensing observations. Chandrayaan-1 X-ray Fluorescence Spectrometer (C1XS) detected sodium from its characteristic line in X-rays which opened up the possibility of mapping the amount of sodium on the Moon.

In a recent work published in The Astrophysical Journal Letters, Chandrayaan-2 mapped the abundance of sodium on the Moon (Figure 2) for the very first time using its large area X-ray spectrometer, CLASS. Built at the U R Rao Satellite Centre of ISRO in Bengaluru, CLASS provides clean signatures of the sodium line thanks to its high sensitivity and performance. The study finds that a part of the signal could be arising from a thin veneer of sodium atoms weakly bound to the lunar grains



These sodium atoms can be nudged out of the surface by solar wind or Ultra Violet radiation more easily than if they were part of the lunar minerals. Also shown is a diurnal variation of the surface sodium that would explain the continuous supply of atoms to the exosphere, sustaining it. An interesting aspect that widens the interest in this alkali element is its presence in the wispy atmosphere of the Moon, a region so thin that the atoms there rarely meet. This region termed an 'exosphere' begins at the surface of the Moon and extends several thousand kilometers merging into the interplanetary space. Potter and Morgan in 1988 measured from ground, sodium atoms in the lunar exosphere. Since then, ground telescopes have taken images of this faint sodium glow around the Moon, which is just the color of light emitted by a sodium vapor lamp. What has been elusive is the source of these atoms on the Moon's surface. The new findings from Chandrayaan-2, provide an avenue to study surface-exosphere interaction on the Moon, which would aid development of similar models for Mercury and other airless bodies in our Solar System and beyond.

Source:<https://www.isro.gov.in/SodiumISRO.html>

LVM3 M2 / OneWeb India-1 Mission

In its second operational flight, LVM3 launch vehicle placed 36 satellites of OneWeb to their intended orbits taking off at 0007 Hrs. on October 23, 2022, from the second launch pad at Satish Dhawan Space Centre, Sriharikota, Andhra Pradesh. This was the fifth flight of LVM3. This was a dedicated commercial mission for a foreign customer through NSIL. A total of 36 OneWeb Gen-1 satellites of about 150 kg each totaling about 5,796 kg were launched to a circular low-earth orbit of about 601 km with a 87.4 degree inclination. The separation of satellites involved a unique maneuver of the cryogenic stage to orientation and re-orientation covering 9 phases spanning 75 minutes. OneWeb confirmed the acquisition of signals from the satellites.

OneWeb Gen-1 satellites utilize a bent-pipe technology approach to offer communication in Ku-band and Ku-bands. They are arranged in 12 orbital planes with 49 satellites in each plane at 1200 km. Calling the launch of LVM3 M2 a historic event, Shri S. Somanath, Chairman, ISRO lauded the synergistic efforts between ISRO, NSIL, OneWeb in realizing the mission in a record time. He specifically acknowledged the design and development of an inertial navigation system at LPSC for C25 operations. This was one of the biggest commercial orders executed by ISRO. With this launch, the LVM3 enters into global market in a grand manner.



Source:https://www.isro.gov.in/mission_lvm3_gallery.html

Army Expects to Boost Fire Power

In the next five years, the Indian Army's Regiment of Artillery would see major force accretion with the induction of several guns, including indigenous ones. These include the Dhanush, Sharang, M777 Ultra Light Howitzer (U Towed

Artillery Gun System (ATAGS). the induction of all 145 guns should be completed in the next few years, a defence source said. Similarly, with their deployment and performance in high altitude regions, the Army is now going in for 100 more K9-Vajra tracked self indigenous Dhanush artillery systems, developed based on the Swedish Bofors guns, has been inducted and operationalised in high altitude area along the Northern Borders after extensive validation. By March 2023, the Army should receive 18 guns to form the second Dhanush regiment, the source said. On the Sharang guns, the up-gunned 130mm artillery guns to regiments have been operationalised so far with the 4th regiment in process. The order for up gunning 300 guns is being executed by three different DPSUs carved from the erstwhile Ordnance Factory Board. "Three Sharang regime artillery regiments are to be equipped with Sharang. So, it should be done in five years," the source explained. The Army received the first Sharang gun in February 2020 and the entire process of acquiring these guns is expected to be completed in four years of time. the source stressed on the need to upscale the capacities and capabilities of the domestic industry and the need to evolve a "conglomerate or consortium culture". "This is what will timelines." 14 officials said it would be a potent platform to meet the operational requirements of the IAF and the Indian Army. They said state-of-the-art technologies and systems compatible with stealth features such as reduced visual, aural, radar and IR signatures crashworthiness features for better survivability have been integrated into the LCH for Several key aviation technologies like a glass cockpit and composite airframe structure have been indigenised, they said. production version will consist of further modern and indigenous systems, they The IAF has already accepted four LCH helicopters. The officials said IAF plans to procure "We are already working with DRDO and HAL to integrate weapons on the helicopter," said one of the officials. The helicopter has been tested under stringent operating conditions including at sea level, in desert regions and in Siachen. In February 2020, it was declared ready for production. The Army has a plan to acquire 95 LCH largely for a combat role in the mountains.

Source:<https://www.thehindu.com/news/national/army-looking-at-major-accretion-of-indigenous-artillery-guns-in-inventory/article65959031.ece>

Induction of Indigenously Built Light Combat Helicopter Marks a New Chapter: Air Chief

Induction of the indigenously designed and developed Light Combat Helicopter (LCH) adds unique capability to the combat potential of the Indian Air Force (IAF) said Air Chief Marshal (ACM) V. R. Chaudhari as the twin formally inducted into the 143 Helicopter Unit 'Dhanush' at the Jodhpur Air Force Station. induction of LCH underlines the fact that just the indigenous equipment," said Defence Minister Rajnath Singh, who presided over the induction ceremony. Stating that the LCH met the requirements of modern warfare and necessary quality parameters under varied conditions of operations, Mr. Singh said it fully met the requirements of both the Army and the Air Force. in Bengaluru last week. The ceremony saw a 'sarwa dharam puja' followed by a ceremonial water cannon salute to the helicopter. Mr. Singh also took a sortie in the LCH after the induction. "The LCH is at par or better than similar attack helicopters available globally. Selection of the Unit have been specifically selected based on professional comp operationalisation," ACM Chaudhari said. High altitudes The twin-engine LCH, designed and developed by HAL, is a 5 helicopter. It was conceptualised after the 1999 Kargil conflict when the need for such dedicated platform capable of operating in high altitudes was felt. It is the only attack helicopter in the world which can land and take load of weapons and fuel significantly augmenting the high altitude areas. The helicopter has a combat radius of 500 km and go up to a service ceiling of 21,000 feet which makes it ideal to operate at high altitude areas of the Siachen glacier. Speaking at the event, C.B. Ananthkrishnan, Chairman and Managing Director of Hindustan Aeronautical Limited HAL, said four LCH had been delivered to the IAF and four more would be delivered within this financial year. More than 200 vendors were involved in production of sub 70 vendors involved in indigenisation, he stated. The HAL had also initiated detailed production planning to gear up for exports, he added. helicopters was signed between the Unit 'Dhanush' which is operating the LCH was raised on June 1, 2022. 6 Apart from Singh, Chief of Defence Staff General Anil Chauhan and IAF chief Air Chief Marshal VR Chaudhari were present at the event.

Source:<https://www.hindustantimes.com/india-news/special-moment-says-pm-modi-as-iaf-101664812630198.html>

IAF to Arm More Sukhois with BrahMos Missiles, even as Plan Afoot to Upgrade Entire Fleet Indigenously

The IAF is going to arm more Sukhoi-30MKI jets with the precision-strike BrahMos supersonic cruise missiles, whose range has been extended from 290 to 450-km, even as a blueprint is also being drawn to indigenously upgrade all the 260 such Russian-origin fighters in the combat fleet. Impressed with the first test of 450-km BrahMos from a Sukhoi-30MKI jet in the Bay of Bengal in May, IAF plans to send another 20-25 jets for the structural, electrical, mechanical and software modifications required to carry the 2.5-tonne missile to defence PSU Hindustan Aeronautics (HAL). "These Sukhois will be in addition to the original 40 jets earmarked for BrahMos missiles. Thirty-five of the first 40 Sukhois with the 290-km BrahMos have been delivered back to IAF by HAL," a source said. IAF considers the combination of Sukhois, which have a combat radius of almost 1,500-km without mid-air refueling, and the 450-km range conventional (non-nuclear) BrahMos missiles to be a deadly weapons package with strategic reach. These air-to-ground BrahMos missiles can carry out pinpoint strikes on high-value military targets, underground nuclear bunkers, command-and-control centres on land or aircraft carriers and other warships on the high seas. With the Army, Navy and IAF inking contracts worth around Rs 38,000 crore over the years for BrahMos missiles, which fly almost three times the speed of sound at Mach 2.8, a 800-km missile variant is also in the works, as was first reported by TOI. The 272 twin-seat Sukhois (10 have crashed), with the bulk of them being licensed produced by HAL at an overall cost upwards of \$12 billion from Russia, constitute the backbone of the existing IAF combat fleet. Technical parameters for the major Sukhoi upgrade are now being refined. "We have decided this upgrade will be done indigenously with a plethora of indigenously-designed weapons, electronic warfare systems and the like. We are looking at upgrading 84 Sukhois in the first tranche," IAF chief Air Chief Marshal V R Chaudhari said. The design and development phase will take four to five years, following which the actual major upgrade will kick off. The "spiral upgrade" of Sukhois with new weapons and sensors, in any case, has been underway for the last 10 years. "BrahMos and Astra air-to-air missiles, for instance, have been added to Sukhois indigenously," IAF vice chief Air Marshal Sandeep Singh said. The Sukhois will also be armed with the 'Rudram' new generation anti-radiation missiles (NGARMs), which are designed to destroy a variety of enemy surveillance, communication and radar targets on the ground from stand-off distances. After Rudram-1 with a strike range of 150- km, the DRDO is also developing Rudram-2 (350-km range) and Rudram-3 (550-km) air-to-ground missiles. The Sukhoi fleet upgrade becomes crucial since the IAF is currently grappling with just 31 fighter squadrons (16-18 jets in each) when the sanctioned strength is 42 to deter China and Pakistan.

Source: <https://timesofindia.indiatimes.com/india/iaf-to-arm-more-sukhois-with-brahmos-missiles-even-as-plan-afoot-to-upgrade-entire-fleet-indigenously/articleshow/94670805.cms>

Make Use of Defence TDF Scheme, MSMES Told

A senior official in the Defence Research and Development Organisation (DRDO) has urged micro, small and medium enterprises in Telangana and Andhra Pradesh to avail themselves of the growth opportunities that the Technology Development Fund (TDF) scheme offers and help achieve the goals of Atmanirbhar Bharat. Scientist 'F' additional director DTDF Shiv Kumar, addressing a meeting organised by the Federation of Telangana Chambers of Commerce and Industry and FAPCCI, said this while highlighting the Telugu States' contribution to the indigenous efforts of DRDO. Describing the TDF scheme as a step towards Atmanirbhar Bharat in defence sector and how it offered opportunities to startups and MSMEs, he said since its launch, 58 projects worth Rs. 275 crore had been awarded under the scheme. It encourages participation of public/private firms and is focussed on promoting and providing financial aid to them to develop cutting-edge technologies for defence sector. In a release on the meeting, FTCCI said under TDF funding, up to Rs. 50 crore is available to the firms, especially MSMEs and startups. The entity must be owned and controlled by a resident Indian citizen with a minimum 51% ownership. FTCCI president Anil Agarwal said the scheme aims to provide a major fillip to the defence manufacturing sector. In addition to the funding for development of indigenous technology, it also provides various other benefits. Five entities from Telangana and Andhra Pradesh have been awarded projects under TDF scheme. "But the number is too small and we hope that this programme helps

in reaching out to many more units to avail the scheme,” he said. FAPCCI president Karunendra S. Jasti said the Andhra Pradesh government has identified defence manufacturing as a thrust sector for industrial development.

Source:<https://www.thehindu.com/news/cities/Hyderabad/make-use-of-defence-tdf-scheme-msmestold/article66002607.ece/amp/>

INS Arihant launches Submarine Launched Ballistic Missile

The country's first ballistic missile nuclear submarine (SSMN) INS Arihant carried out a successful launch of a Submarine Launched Ballistic Missile (SLBM), validating India's second strike nuclear capability. "The successful user training launch of the SLBM by INS Arihant is significant to prove crew competency and validate the SSBN programme, a key element of India's nuclear deterrence capability," the Ministry said. In November 2019, India formally declared its nuclear triad, stated in its nuclear doctrine, operational after INS Arihant completed its first deterrence patrol which means Arihant has begun prowling the deep seas carrying ballistic missiles equipped with nuclear warheads. Without confirming the particular missile, a defence source said it was not the longer K-4 SLBM but the older SLBM in use. INS Arihant is presently armed with K-15 SLBM with a range of 750 km. The missile was tested to a predetermined range and impacted the target area in the Bay of Bengal with very high accuracy, the statement said. "All operational and technological parameters of the weapon system have been validated." A robust, survivable and assured retaliatory capability is in keeping with India's policy to have 'Credible Minimum Deterrence' (CMD) that underpins its 'No First Use' commitment, the statement added. In 1998, India conducted nuclear tests under Phokran-II and in 2003, India declared its nuclear doctrine based on CMD and a NFU policy while reserving the right of massive retaliation if struck with nuclear weapons first. 6 The Agni series of missiles constitute the backbone of India's nuclear weapons delivery, which also includes the Prithvi short range ballistic missiles and fighter aircraft. India has also completed its nuclear triad and operationalised its second strike capability, with ballistic missile submarine INS Arihant undertaking deterrence patrols. The second indigenous SSBN Arighat, which is in advanced stages of sea trials, is scheduled to be commissioned within this year, though no official announcement has been made. In January 2020, the Defence Research and Development Organisation (DRDO) had successfully test fired a 3,500 km range SLBM K-4 from a submerged pontoon off Visakhapatnam coast. Once inducted, these missiles will be the mainstay of the Arihant class of SSBNs giving India the stand off capability to launch nuclear weapons submerged in Indian waters. As reported by The Hindu earlier, Arihant was quietly commissioned into service in August 2016. It has a displacement of 6,000 tonne and is powered by an 83 MW pressurised light-water reactor with enriched uranium. The Advanced Technology Project (ATV) project began in 1980s and the first of them, Arihant, was launched into water in 2009 by then Prime Minister Dr. Manmohan Singh. Given India's publicly stated position of NFU, the SSBN is the most dependable platform for a second-strike. As they are powered by nuclear reactors, these submarines can stay underwater indefinitely without the adversary detecting it. The other two platforms — land based and air launched — are far easier to detect.

Source:<https://www.thehindu.com/news/national/ins-arihant-launches-submarine-launched-ballisticmissile/article66010395.ece>

India Successfully Test Fires Medium-Range Ballistic Missile

India successfully test-fired indigenously-developed new generation medium-range ballistic missile Agni Prime from the Odisha coast, Defence Research and Development Organisation (DRDO) sources said. The sleek missile was test fired from a mobile launcher from the APJ Abdul Kalam Island around 9.45 a.m., they said. The solid-fuelled canisterised missile met all mission parameter during the test, they added. All its navigation was tracked and monitored by radars and telemetry equipment positioned along various points, the officials said. The missile's strike range is between 1,000 km and 2,000 km, they said. The last trial of the missile was conducted on December 18 last year from the same base, which was also successful.

Source:<https://www.thehindu.com/news/national/india-successfully-test-fires-medium-range-ballisticmissile/article66040035.ece>

Science Must Become Priority of Space Missions, We Need More Money for it: ISRO Chief Somanath

The LVM3 launch vehicle successfully placed 36 satellites of the privately owned OneWeb consortium. However, you have recently indicated that the Chandrayaan-3 mission (to place a rover on the moon) will now likely only be in June 2023. Are commercial launches more important to ISRO than scientific missions? The entire space sector is based on demand. When there is demand, I have to fulfil it. We have had only four science missions but have 53 satellites in orbit. The science component has always been very, very small. Science was never a priority but it must become the priority in the future. We've always had a very limited budget for science but we need more money so that we can do science missions. We are not doing enough in science but if we prioritise science, we will not get money. The space policy, that will define the future of commercial space applications in India, has been on the anvil for a while. Is it expected soon and will it spell out the functions of New Space India Limited (NSIL). (NSIL is a public sector company and commercial arm of the ISRO). The policy doesn't talk about the structure of the organisation. Policy only spells out the intent and that is to have more non-governmental entities enter the space sector. The elements of this and how we can achieve this 'intent' is what the policy will spell out. In the future, does ISRO aspire to be NASA (National Aeronautics and Space Administration), in the sense more focussed on ambitious science missions? NASA is the national space agency of the United States and decides that country's space activities. ISRO is the national space agency of India but the way both operate could be different because the U.S. ecosystem already has a developed industry. In India, there is no industry capable of doing anything (space launches, satellite manufacturing) independently. Thus, ISRO's role is to mentor and develop the industry ecosystem here. Once we get to that point, we could discuss the role of ISRO. Right now, I'm not interested in a comparison with another country. We have our own model.

Source:<https://mail.google.com/mail/u/0/#inbox/KtbxLwHPvbNCntMRXQHgpBgkhhFbqBZsJq>

ISRO officially confirms end of Mars mission after eight years in orbit

The Indian Space Research Organisation (ISRO) confirmed on Monday that the Mars Orbiter craft has lost communication with ground station, it's non-recoverable and the Mangalyaan mission has attained end-of-life. The ISRO gave an update on the Mars Orbiter Mission and the national meet held on September 27 to commemorate the MOM, on the event of completion of its eight years in the Martian orbit. It was also discussed that despite being designed for a life-span of six months as a technology demonstrator, the MOM has lived for about eight years in the Martian orbit with a gamut of significant scientific results on Mars as well as on the Solar corona, before losing communication with the ground station, as a result of a long eclipse in April 2022, the national space agency said. During the national meet, ISRO deliberated that the propellant must have been exhausted, and therefore, the "desired altitude pointing" could not be achieved for sustained power generation, ISRO said. "It was declared that the spacecraft is non-recoverable, and attained its end-of-life", an ISRO statement said. "The mission will be ever-regarded as a remarkable technological and scientific feat in the history of planetary exploration". MOM was launched on November 5, 2013, and after completing 300 days of interplanetary journey, it was inserted to the Martian orbit on September 24, 2014. "Equipped with a five scientific payloads onboard, during these eight years, the mission has gifted significant scientific understanding on the Martian surface features, morphology, as well as the Martian atmosphere and exosphere," ISRO said.

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

What is the C-295MW transporter?

The C-295MW is a transport aircraft of 5-10 tonne capacity which will replace the legacy Avro aircraft in the Indian Air Force (IAF) procured in the 1960s. The Request For Proposal (RFP) was issued to global firms in May 2013 and the sole bid by Airbus and TASL was approved by the Defence Acquisition Council in May 2015. On September 24, 2021 the Ministry of Defence (MoD) signed a ₹ 21,935 crore contract with Airbus Defence and Space for the acquisition of 56 C-295MW aircraft along with associated equipment.

Of the 56 aircraft contracted, 16 will come in fly-away condition from Spain between September 2023 and August 2025. The remaining 40 will be manufactured here to be delivered between September 2026 and 2031 at the rate of eight aircraft per year. Nearly 240 engineers will be trained at the Airbus facility in Spain for the project, the MoD said. The C-295 has very good fuel efficiency and can take off and land from short as well as unprepared runways, according to Air Marshal Sandeep Singh, Vice Chief of IAF. The IAF will base its first C-295 squadron in Vadodara by converting the Avro squadron located there, as the fly-away aircraft start coming in, he stated. With the procurement of these aircraft, India has become the 35th C-295 operator worldwide. With 285 aircraft ordered and 38 operators in 34 different countries, the aircraft has achieved more than 5,00,000 flight hours. The Navy and the Coast Guard have also expressed interest in the C-295 and it can be used in civilian roles as well as exported in the future. The C-295 is also a potential replacement for the AN-32 aircraft, the workhorse of the IAF with over 100 of them in service. To questions on this Air Marshal Singh said that the AN-32s will be in service upto 2032 and beyond and that they would make a decision on its replacement in five years or so from now.

How will this affect the domestic aircraft manufacturing ecosystem?

Over the last two decades, Indian companies, both public and private, have steadily expanded their footprint in the global supply chains of major defence and aerospace manufacturers supplying a range of components, systems and sub-systems. For instance, Boeing's sourcing from India stands at \$1 billion annually, of which over 60% is in manufacturing, through a growing network of 300+ supplier partners of which over 25% are micro, small and medium enterprises (MSME). "Boeing has the broadest and most capable engineering teams in the country with over 3,000 employees, and we're investing in a 43-acre, \$200 million centre of excellence to further grow in the years to come," a company statement said. Tata in a joint venture (JV) with Boeing, manufactures aero-structures for its AH-64 Apache helicopter, including fuselages, secondary structures, vertical spar boxes fuselages and vertical fin structures for the 737 family of aircraft. It also makes Crown and Tail-cones for Boeing's CH-47 Chinook helicopters. Similarly, Lockheed Martin has joint ventures with TASL in Hyderabad which has manufactured more than 180 empennages for the C-130J Super Hercules transport aircraft and delivered 157 S-92 helicopter cabins. The latter facility manufactures aerospace components for commercial helicopters and aircraft and has expanded to include aircraft engine components for aerospace industry companies as well. One of the JV's also began manufacturing complex fighter wings with over 70% of detail parts produced indigenously. The JVs till date have clocked \$600 million worth of exports and produced over \$200 million in Indian industry revenue. The U.S. simplifying its export regulations for India through a series of measures has added further impetus to this, experts noted. As U.S. and India pursue the Indo-Pacific strategy, India's strengths coupled with U.S. and European technology prowess can be a force for good in the world, noted Kriti Upadhyaya, Founder IndUS Tech Council who works closely with companies in both countries. The domestic defence manufacturing ecosystem will get a boost with the C-295 project as it will lead to the development of a strong private industrial aerospace ecosystem not only in and around Vadodara but across the country. Bengaluru and Hyderabad already have developed such aerospace and defence domains over the years. The C-295 project is expected to create more than 15,000 skilled direct and indirect jobs across the aerospace ecosystem, with more than 125 suppliers qualified on global quality standards across India. Manufacturing of over 13,400 detail parts, 4,600 sub-assemblies and all the seven major component assemblies will be undertaken in India, along with tools, jigs and testers, Tata said.

Is India's civil aviation sector growing?

India has a much bigger footprint in civil aviation manufacturing than defence, in addition to being a major market itself. Both Airbus and Boeing do significant sourcing from India for their civil programmes. According to Airbus every commercial aircraft manufactured by them today is partly designed and made in India. "We buy manufactured parts and engineering services worth \$650 million every year from more than 45 Indian suppliers", the company said. Stating that India, which is moving ahead with the mantra of 'Make in India' and 'Make for the Globe', continues to enhance its potential by becoming a major manufacturer of transport planes, Mr. Modi said, "And I can visualise the day when the world's biggest passenger planes will also be manufactured in India and will also carry the tag of 'Make in India'. Since 2007, Airbus has had a wholly domestic-owned design centre here which has more than 650 engineers who specialise in high-tech aeronautical engineering and work across both fixed- and rotary-wing Airbus aircraft programmes. Airbus which has design, management and training centres in India, added, "Our centres have the capacity to skill more than 8,000 pilots and 2,000 engineers over the next 10 years with plans for further expansion."

Today in India, we have the world's fastest growing aviation sector and we are about to reach the top three countries in the world in terms of air traffic, Mr. Modi said. "Crores of new passengers are going to be air passengers in the next 4-5 years... It is estimated that in the coming 10-15 years, India will need about 2000 more passenger and cargo aircraft." Another major growing area is Maintenance, Repair and Overhaul (MRO) for which India can emerge as the regional hub, Ms. Upadhyaya remarked adding, "However, the private defence sector is still nascent and a conducive and stable regulatory and policy environment will be an important enabler." This moment is akin to the automobile clusters that have emerged in the country turning India into a major exporter of cars to the world. With the right momentum, a realistic roadmap and enabling policy framework, a similar story can be scripted to make the country a hub for aircraft manufacturing. On October 30, Prime Minister Narendra Modi laid the foundation stone for the C-295 transport aircraft manufacturing facility in Vadodara to be set up by Airbus Defence and Space and Tata Advanced Systems Limited (TASL) Indian companies, both public and private, have steadily expanded their footprint in the global supply chains of major defense and aerospace manufacturers supplying a range of components, systems, and subsystems India has a much bigger footprint in civil aviation manufacturing than defense, in addition to being a market itself. Both Airbus and Boeing do significant sourcing from India for their civil programmes

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

TECHNOLOGY

UPDATE ON THE MARS ORBITER MISSION (MOM) AND THE NATIONAL MEET ORGANISED ON 27 SEPTEMBER, 2022

ISRO had organized a one day National meeting to commemorate the Mars Orbiter Mission, on the event of completion of its eight years in the Martian orbit. The event witnessed active participation from several academic and research institutes, that included IISc, Bangalore, Bangalore University, NIT-Rourkela, Tripura University, Gorakhpur University, to name a few, as well as the centres and units of ISRO/DOS. The event was live-streamed to the ISRO website, and the ISRO social media platforms. Shri Shantanu Bhatwadekar, Scientific Secretary, ISRO, during his prelude address, mentioned that the Mars Orbiter Mission was launched on 5th Nov, 2013, and after completing 300 days of interplanetary journey, it was inserted to the Martian orbit on September, 24, 2014. Equipped with a suit of five scientific payloads onboard, during these eight years, the mission has gifted significant scientific understanding on the Martian surface features, morphology, as well as the Martian atmosphere and exosphere. Dr. K. Radhakrishnan, Member Space Commission, during his special address, mentioned about the unique lessons learnt from this mission; despite being realized in a remarkably short turn-around time, the MOM mission has added enormous values to the domains of science, technology, and management. It was an enormous feat to have reached the Martian orbit successfully in the maiden attempt, he mentioned. Shri. A.S. Kiran Kumar, Member Space Commission mentioned about the criticality of

the payload operations in the Martian orbit, given the conflicting requirements of the payload operations, radio delay, and white-out and black-out conjunctions. During the inaugural address, Shri S. Somanath, Chairman, ISRO / Secretary, DOS, summarized the major scientific feats of the mission. He mentioned that the Mars Orbiter Mission has gifted an understanding of the composition of several gases in the Martian exosphere, quantified the altitude where the Martian atmosphere has a transition from the CO₂ rich regime to atomic Oxygen-rich regime during the local evening. The mission is also credited with the discovery of 'suprathermal' Argon-40 atoms in the Martian exosphere, which gave some clue on one of the potential mechanisms for the escape of atmosphere from Mars. Chairman, ISRO further mentioned that the observation of the Martian dust storm from the MOM spacecraft gifted an understanding of the dynamics of the dust on the planet, as well as a potential mechanism of escape of the Martian atmosphere. The Atmospheric optical depth was estimated with the help of the MOM observations and the studies reported the presence of lee-wave clouds above the southern wall of Valles Marineris. The MOM spacecraft photographed, for the first time, the far side of Deimos, one of the natural satellites of Mars. The mission could capture the full disc image of Mars because of its elliptical orbit; it also generated an atlas of Mars with the help of the colour camera onboard the mission. The mission also captured the time-variation of the Martian polar ice caps; it also measured the Martian apparent albedo that indicated the reflecting power of the Martian surface. The mission also gave an opportunity to classify extra-terrestrial landslides using machine learning models. During the meet, it was also presented that there has been a high demand for the Mars Orbiter Mission data globally. So far, more than 7200 users have registered to download the MOM data from the portal of the Indian Space Science Data Centre (ISSDC), and about 27000 downloads of science data have been carried out so far. Among the registered users, about 400 are international users from 50 countries. The mission has also contributed to Human Resource Generation in the domain of planetary sciences; it has generated several Ph.D holders, while many of the research scholars are using the data from the mission to pursue their doctoral work. The deliberations during the national meet covered topics on the challenges faced by the Mars Orbiter Mission, lessons learnt from them, how to access the mission data from the portal of the Indian Space Science Data Centre (ISSDC), as well as a series of detailed presentations on the science outcomes by the principal investigator teams as well as the academia partners. A session was dedicated to a panel discussion on 'Future Exploration of the Inner Solar System: Scope and the Focus Areas' with the participation of Indian academia/institutes and ISRO/DOS. It was also discussed that despite being designed for a life-span of six months as a technology demonstrator, the Mars Orbiter Mission has lived for about eight years in the Martian orbit with a gamut of significant scientific results on Mars as well as on the Solar corona, before losing communication with the ground station, as a result of a long eclipse in April 2022. During the national meet, ISRO deliberated that the propellant must have been exhausted, and therefore, the desired attitude pointing could not be achieved for sustained power generation. It was declared that the spacecraft is non-recoverable, and attained its end-of-life. The mission will be ever-regarded as a remarkable technological and scientific feat in the history of planetary exploration.



Source:https://www.isro.gov.in/MOM_NationalMeet_2022SEP.html

Indigenously Built Light Combat Helicopter Marks a New Chapter:

Air Chief Induction of the indigenously designed and developed Light Combat Helicopter (LCH) adds unique capability to the combat potential of the Indian Air Force (IAF) and marks a new chapter, said Air Chief Marshal (ACM) V. R. Chaudhari as the twin-engine helicopter was formally inducted into the 143 Helicopter Unit 'Dhanush' at the Jodhpur

Air Force Station. induction of LCH underlines the fact that just as the country trusts the IAF, the IAF equally trusts the indigenous equipment,” said Defence Minister Rajnath Singh, who presided over the ceremony. Stating that the LCH met the requirements of modern warfare and necessary der varied conditions of operations, Mr. Singh said it fully met the requirements of both the Army and the Air Force. The Army had formally received its first LCH The ceremony saw a ‘sarwa dharam puja’ followed by a ceremonial cannon salute to the helicopter. Mr. Singh also took a sortie in the LCH after the induction. “The LCH is at par or better than similar attack helicopters available globally. Selection of the Unit have been specifically selected based on professional competence to ensure quick operationalisation,” ACM Chaudhari said. engine LCH, designed and developed by HAL, is a 5-8 tonne class dedicated combat helicopter. It was conceptualised after the 1999 Kargil conflict when the need for such a dedicated platform capable of operating in high altitudes was felt. It is the only attack helicopter in the world which can land and take-off at an altitude of 5,000 m (16,400 ft) with considerable load of weapons and fuel significantly augmenting the firepower of the IAF and the Army in The helicopter has a combat radius of 500 km and go up to a service ceiling of 21,000 feet which makes it ideal to operate at high altitude areas of the Siachen glacier. Ananthkrishnan, Chairman and Managing Director of Hindustan Aeronautical Limited HAL), said four LCH had been delivered to the IAF and four more would be delivered within this financial year. More than 200 vendors were involved in production of sub-systems and components, apart from 70 vendors involved in indigenisation, he stated. The HAL had also initiated detailed production planning to gear up for exports, he added. The contract for 10 Limited Series Production (LSP) helicopters was signed between the IAF and the HAL on March 30, 2022, and the 143 Helicopter Unit ‘Dhanush’ which is operating the LCH was raised on June 1, 2022. Apart from Singh, Chief of Defence Staff General Anil Chauhan iaf-inducts-madeTue, 04 Oct 2022 Indigenously Built Light Combat Helicopter Induction of the indigenously designed and developed Light Combat Helicopter (LCH) adds and marks a new chapter, engine helicopter was formally inducted into the 143 Helicopter Unit ‘Dhanush’ at the Jodhpur Air Force Station. “The as the country trusts the IAF, the IAF equally trusts the indigenous equipment,” said Defence Minister Rajnath Singh, who presided over the ceremony. 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Ananthkrishnan, Chairman and Managing Director of Hindustan Aeronautical Limited HAL), said four LCH had been delivered to the IAF and four more would s and components, apart from 70 vendors involved in indigenisation, he stated. The HAL had also initiated detailed production The contract for 10 Limited Series Production (LSP) IAF and the HAL on March 30, 2022, and the 143 Helicopter 7 Extensive testing The first prototype of the helicopter took first flight on March 29, 2010, and has since undergone extensive testing and evaluation. The LCH is armed with 20 mm nose gun, 70 mm rockets, antitank guided missile ‘Dhruvastra’ and air-to-air missile ‘Mistral-2’ of MBDA which has a maximum interception range of 6.5 km. In March 2020, the Cabinet Committee on Security (CCS) which met under the chairmanship of Prime Minister Narendra Modi approved procurement of 15 LSP variants of the LCH at the cost of ₹ 3,887 crore along with infrastructure sanctions worth ₹ 377 crore. Of the 15 helicopters, 10 are for the IAF and five for the Army. The LCH will eventually be deployed along the Line of Actual Control with China in addition to the AH-64E Apache helicopters in service. Both the Army and the IAF have a larger requirement of the LCH and the contract is yet to be worked out. The Army raised its first LCH Squadron on June 1, 2022 at Bengaluru with one LCH presently and it will be operationalised in the eastern sector in the first week of November 2022, sources said. As reported by The Hindu earlier, the Army plans to acquire 95 LCH of which seven units, with each having 10 helicopters, are planned to be deployed for combat role in the mountains. The LSP LCH contains approximately 45% indigenous content by value which will progressively increase to more than 55% for Series Production version, the Defence Ministry had stated earlier. Light combat helicopters have already been included in the import embargo list. The LCH is equipped with requisite agility, manoeuvrability, extended range, high altitude performance and round-the-clock, all-weather combat capability to perform roles of Combat Search and

Rescue (CSAR), Destruction of Enemy Air Defence (DEAD), Counter Insurgency (CI) operations, against slow moving aircraft and Remotely Piloted Aircraft (RPAs), high altitude bunker busting operations, counter-insurgency operations in jungle and urban environments and support to ground forces, the Defence Ministry had stated. State-of-the-art technologies and systems compatible with stealth features such as reduced visual, aural, radar and infrared signatures and crashworthiness features for better survivability have been integrated in the LCH, Mr. Ananthakrishnan said. The IAF operates the older Mi-25 and Mi-35 Russian attack helicopters which are in the process of being phased out and has inducted 22 AH-64E Apache attack helicopters from the U.S. The Army will also start receiving the Apache attack helicopters from early 2023 onwards, six of which have been contracted under an estimated \$800 mn deal from the U.S. in February 2020. In all, the IAF operates a wide mix of around 500 rotary platforms which includes around 90 Mi17s, over 130 Mi-17V5s, over 70 ALH including the weaponised variant, 22 AH-64E Apache attack helicopters, one squadron of Mi-35 attack helicopters and 15 CH-47F Chinook heavy lift helicopters. The Army Aviation currently operates utility helicopters but does not have dedicated attack helicopters in its fleet, though it operates the weaponised version of the Advanced Light Helicopter.

Source:<https://www.thehindu.com/news/national/iaf-inducts-indigenously-built-light-combathelicopter/article65965662.ece>

IISc-ICMR to Collate Indian Disease Data

An MoU signed by the Indian Institute of Science (IISc) and the Indian Council for Medical Research (ICMR) seeks to bridge this gap. The organisations will collaborate to develop 'gold standard' datasets that represent the Indian population. Researchers can use these datasets to develop AI algorithms that can read images and give accurate diagnoses. The agreement was signed on September 16. "International studies have shown that AI algorithms are on a par or even better than expert radiologists in diagnosis. So machines can be trained to do this, but this requires good datasets," says Raghu Dharmaraju of ARTPARK, a non-profit promoted by IISc that is coordinating and managing the programme. Currently, a few startups in India do use AI for diagnosis, but the datasets they use are too small or are taken from other countries. "The imaging datasets we use should represent Indian population's diversity," says Dharmaraju. Hence the initiative will collect data from institutions across the country in the 'hub and spoke' model. Hub institutions, like AIIMS Delhi, are those with expertise in specific diseases. A panel of experts, including those from hub institutions, will develop and fine-tune the dataset. Imaging datasets have to be created for each disease, and the Science & Technology News 24 plan is to start with oral cancer, according to IISc director Govindan Rangarajan. "There is possibility of expansion to esophageal cancer, TB, and cervical cancer," he says. ICMR scientist Dr Harpreet Singh believes the applications hold immense potential. "AI algorithms can differentiate between X-rays of those with and without TB, for example. They could help predict oral and cervical cancer, which are prominent causes of death in India. AI algorithms are not going to replace doctors, but will give them additional evidence to take decisions," he says. Datasets can also help evaluate the accuracy of the AI algorithms existing in the market. "Then we can probably tell whether a software program that shows accuracy for US datasets is accurate for India also," he says. Dharmaraju of ARTPARK says AI algorithms would be useful in various settings. "Small towns may have X-ray or even CT equipment, but the radiologists may not have as much training as experts at AIIMS," he explains. So images from these settings can be uploaded and sent to teleradiology firms or researchers, who can use AI algorithms to help make quick diagnosis. This would be helpful in emergencies like stroke. Dharmaraju adds in countries like the US and Singapore, teleradiology companies provide services to even large hospitals, given the volume of images to be diagnosed. In addition to radiology images, AI algorithms may also be used with mobile phone images to screen for leprosy and cataract. The list of diseases and hubs under the project is being prepared now, and is likely to be finalised by Dec.

Source:<https://www.deccanherald.com/science-and-environment/iisc-icmr-to-collate-indian-diseasedata-1150587.html>

DRDO Tests Unmanned Weaponised Boats in Maharashtra

Defence Research and Development Organisation (DRDO) tested its three unmanned remotely controlled weaponized boats in Maharashtra on October 6. These boats can be used for surveillance purposes and patrolling. DRDO collaborated with private defence manufacturing start-up Sagar Defence Engineering to develop these unmanned weaponized boats. According to the 3 developers induction of these boats in future will also reduce the risk of loss of lives during operations. Some variants of these boats use an electric propulsion system with lithium batteries, while others have a petrol engine on board. This comes ahead of the Defence Expo 2022 which is to be held from October 18 in Gujarat

Source: <https://www.thehindu.com/videos/watch-drdo-tests-unmanned-weaponised-boats-inmaharashtra/article65975659.ece>

Army to Get Drones for Precision Strikes

Having deployed around 350 artillery systems and 'winterised' howitzers along the frontier during the continuing military confrontation with China in eastern Ladakh, the Army has now kicked off acquisition of a variety of drones and surveillance devices to more accurately direct long-range and high-volume firepower against enemy targets. The RFPs (request for proposal) for the indigenous procurement of 80 mini remotely piloted aircraft systems (RPAS), 10 runway-independent RPAS, 44 upgraded longrange surveillance systems and 106 inertial navigation systems will be issued within the next few days. The existing much larger unmanned aerial vehicles (UAVs), like the Israeliorigin Herons and Searcher-IIs, are being used for strategic surveillance by the Army Aviation wing. "The new smaller RPAS, with an operational range from 15- 20-km to 60-90-km, in turn, are needed by artillery units for tactical over-the-hill surveillance in high-altitude areas. If they perform well, the Army will go in for larger numbers," a source said. These RPAS are different from the loitering munitions or kamikaze drones and the autonomous surveillance and armed drone swarms (A-SADS) also being procured by the 12-lakh strong Army, as was reported by TOI last month. Army chief General Manoj Pande recently said "a significant level" of border infrastructure has been developed in the forward areas of eastern Ladakh over the last two years, which included habitats for 35,000 troops as well as garages for 450 tanks and other armoured vehicles, and 350 artillery systems and howitzers. The artillery systems deployed in the 30- month standoff range from old 105mm field guns and Bofors howitzers and the 'upgunned' Dhanush and Sharang guns to the new M777 ultra-light howitzers and K-9 Vajra self-propelled tracked guns. They also include the indigenous Pinaka multi-launch rocket systems as well as similar Russian-origin Smerch and Grad units. While the artillery guns have strike ranges from 30 to 40-km, the rockets can go up to 90-km. "The new RPAS with dayand-night capability are consequently needed by forward observation posts to look deeper and then direct, correct and analyse artillery fire. An indigenous LORROS (long range reconnaissance and observation system) is also about to begin trials. The existing Israeli Lorros were inducted two decades ago," the source said. The Army said the new manportable mini-RPAS, with an allup weight of 15-kg, should have a mission range of not less than 15-km and at least 90 minutes of operational endurance. The runway-independent RPAS, in turn, should be capable of vertical take-off and landing at an altitude of 13,000-feet with a minimum 36 four-hour endurance. "With electro-optical payloads, the RPAS should be ideal for a dynamic sensor-shooter linkage, reducing fixed-wing launch and recovery challenges," the source said.

Source: <https://timesofindia.indiatimes.com/india/army-to-get-drones-for>

LCA to be Integrated with Lighter BrahMos-NG Supersonic Cruise Missile in Few Years

In few years from now, the indigenous Light Combat Aircraft (LCA) Tejas will be able to carry and launch the BrahMos supersonic cruise missile. This will be possible once the lighter version 10 of the supersonic cruise missile, BrahMos-NG (next generation), is ready, according to the company officials. "The BrahMos-NG development is expected to make first flight in two years and will be ready for production in 2-3 years after that, according to a BrahMos official. The

focus of the development as of now is on the air-launched version,” a BrahMos official said on the sidelines of DefExpo-2022. “The NG will weigh almost half as much as the current air-launched version, making it possible to be mounted on the LCA in future, the official said. Stating that during the development phase it is being integrated on the Su-30MKI, the official said it would later be integrated on the LCA and also other fighters of the Air Force. The current air-launched missile weighs 2.65 tonnes, which will come down to 1.33 tonnes with the NG. With this, a SU-30MKI will be able to carry up to four BrahMos-NG missiles, while the LCA can carry two missiles, the official added. BrahMos is a joint venture between DRDO and Russia’s NPO Mashinostroyeniya and the missile derives its name from Brahmaputra and Moskva rivers. The missile is capable of being launched from land, sea, sub-sea and air against surface and sea-based targets and has been long inducted by the Indian armed forces. The range of the missile was originally capped at 290 km as per obligations of the Missile Technology Control Regime (MTCR). Following India’s entry into the club in June 2016, DRDO officials had stated that the range would be extended to 450 km and to 600 km at a later stage. The ER version has been tested several times both by the Navy and IAF.

Source: <https://www.thehindu.com/news/national/lca-to-be-integrated-with-lighter-brahmos-ng-supersonic-cruise-missile-in-few-years/article66040783.ece>

BUSINESS

SVIMS and DRDO Deliberate on Manufacture of Biomedical Implants

The Tirumala Tirupati Devasthanams’ (TTD) Sri Venkateswara Institute of Medical Sciences (SVIMS) and the Defence Research and Development Organisation (DRDO) have achieved 2 3rd DRDO Kisan Jawan Vigyan Mela held Tawang The 3rd DRDO Kisan Jawan Vigyan Mela was conducted today in the Defence Research Laboratory R&D Centre (RDC) at Changbu, Tawang. The mela has been organised as a part of celebration of DRL Tezpur. The villagers, self help groups, head of offices of Tawang district, and ex servicemen participated in the mela. The chief guest GS Commandant 38th Battalion SSB Tawang praised DRL about its commendable job in s and stressed that we need to double the income of farmers. The DRL and DRDO will be contributing milestone contribution, civil and military interaction will increase through this mela. The people of Tawang has always supported defence personnel s continue to strengthen borders. Earlier in his Welcome address Dr BJ Gogoi Officer incharge DRL RDC Tawang informed about DRDO, its activities and future plans which included expansion of DRL RDC Tawang and its infrastructure development. He informed tha 50 advance weather prediction system will be installed in different parts of Arunachal sister The Chief Coordinator of the mela Dr. Ajitabh Bora, Sc E of DRL informed that this mela is on the line of jai jawan jai kisan jai vigyan and jai anusandhan slogan given by the Prime Minister and first and second Kisan Jawan Vigyan mela were conducted in DRL RDC Salari in West Kameng district in 2018 and 2019. The aim of this mela is to provide platform for interaction of cientists, through kisan sabha. He further informed that DRDO mainly deals with defence but its benefit should go to civilians also. Providing good quality organic vegetables is a horticulture therapy to jawans, this mela also action, demonstration and promotion of modern agro technologies in border areas to check migration of villagers from border villages to urban areas, food processing units and mushroom spawn producing units are being created to facilitate self help groups b lending the resources. He said there is an instruction from the govt to every dept villages along Himalayan border areas and accordingly DRDO has adopted few villages in <https://arunachal24.in/arunachal-3rd-drdo-kisan-jawan-vigyan-mela-held-tawang/> Sun, 02 Oct 2022 SVIMS and DRDO Deliberate on Manufacture of Biomedical Implants e Tirumala Tirupati Devasthanams’ (TTD) Sri Venkateswara Institute of Medical Sciences (SVIMS) and the Defence Research and Development Organisation (DRDO) have achieved Fri, 30 Sep 2022 3rd DRDO Kisan Jawan Vigyan Mela held Tawang The 3rd DRDO Kisan Jawan Vigyan Mela was conducted today in the Defence Research Laboratory R&D Centre (RDC) at Changbu, Tawang. The mela has been organised as a part of The villagers, self help groups, head of offices of Tawang district, and ex servicemen participated in the mela. The chief guest GS

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Source: <https://www.thehindu.com/news/national/andhra-pradesh/andhra-pradesh-svims-and-drdo-deliberate-on-manufacture-of-biomedical-implants/article65959588.ece>

IAF Formally Inducts Indigenously Helicopter

The Indian Air Force (IAF) will induct on October 3, 2022 the first batch of indigenously developed Light Combat Helicopter (LCH), in a boost to its combat prowess as the multi platform is capable of firing a range of missiles and other weapons. state-run aerospace major Hindustan Aeronautics Ltd (HAL), has been primarily designed for deployment in high-altitude regions. Jodhpur in presence of Defence Minister Rajnath Singh and Chief of Air Staff A VR Chaudhari, officials said. completed various weapons firing tests, they said. In March, the Prime Minister Narendra Modi approved the procurement of 15 indigenously developed Limited Series Production (LSP) LCH at a cost of Rs 3,887 crore. The defence ministry had said 10 helicopters would be for the IAF and five will be for the Indian Army. Dhruv. It has a number of stealth features, armoured and crash-worthy landing gear for better survivability, officials said. requisite agility, manoeuvrability, extended range, hig combat capability to perform a range of roles including combat search and rescue (CSAR), destruction of enemy air defence (DEAD) and counter The helicopter can also be deployed in high insurgency operations in the jungles and urban environments as well as for supporting ground forces. The helicopter can also be used against slow 13 around protection has been improved. The Mark 1-A has a better gunner sight (a equipped with automated target tracking capabilities than its predecessor, the Arjun 1. This facilitates attack even while the MBT is moving, enabling the tank's crew to find and track mobile targets automatically. Aside from the standard armor-piercing fin-stabilized discarding sabot (APFSDS) and high explosive squash head ammunition, it also has integration for thermobaric and penetration blast ammunition. The Arjun Mark

1A is said to have a maximum cruising range of 500 the road of 58 kilometers per hour and 40 kilometers per hour Trenches up to 2,430 mm broad, whether created naturally or artificially, can also be traversed. The tank can cross a 1.4-meter-deep water obstacle without special The Arjun MK II or MK1A is powered by a German V-90 turbocharged, charge cooled diesel engine producing 1030 kW at 2,400 rpm. The Arjun Mk II has an epicyclic gearbox, a hydrodynamic torque converter, a mechanical lock mic retarder, and four forward and two reverse gears. <https://eurasianimes.com/indias-arjun-tanks-to-get-artificial-intelligence-capabilities> Sun, 02 Oct 2022 Formally Induct Indigenously-Built Light Combat Helicopter on October 3 will induct on October 3, 2022 the first batch of indigenously developed Light Combat Helicopter (LCH), in a boost to its combat prowess as the multi platform is capable of firing a range of missiles and other weapons. The LCH, developed by aerospace major Hindustan Aeronautics Ltd (HAL), has been primarily designed for altitude regions. It will be inducted into the IAF inventory at a ceremony in Jodhpur in presence of Defence Minister Rajnath Singh and Chief of Air Staff A VR Chaudhari, officials said. The 5.8-tonne twin-engine helicopter has already completed various weapons firing tests, they said. In March, the Prime Minister Narendra Modi-led Cabinet Committee on Security (CCS) curement of 15 indigenously developed Limited Series Production (LSP) LCH The defence ministry had said 10 helicopters would be for the IAF and five will be for the Indian Army. The LCH has similarities with Advanced Light Heli Dhruv. It has a number of stealth features, armoured-protection systems, night attack capability worthy landing gear for better survivability, officials said. The LCH is equipped with requisite agility, manoeuvrability, extended range, high altitude performance and all combat capability to perform a range of roles including combat search and rescue (CSAR), destruction of enemy air defence (DEAD) and counter-insurgency (CI) operations. The helicopter can also be deployed in high-altitude bunker-busting operations, counter insurgency operations in the jungles and urban environments as well as for supporting ground The helicopter can also be used against slow-moving aircraft and remotely piloted aircraft A has a better gunner sight (a equipped with automated target tracking capabilities than its predecessor, the Arjun 1. This facilitates attack even while the MBT is moving, enabling the stabilized discarding sabot (APFSDS) and high explosive squash head ammunition, it also has integration for thermobaric and penetrationblast ammunition. The Arjun Mark 1A is said to have a maximum cruising range of 500 the road of 58 kilometers per hour and 40 kilometers per hour Trenches up to 2,430 mm broad, whether created naturally or artificially, can deep water obstacle without special 90 turbocharged, chargecooled diesel engine producing 1030 kW at 2,400 rpm. The Arjun Mk II has an epicyclic gearbox, a hydrodynamic torque converter, a mechanical lock-up clutch, a capabilities-to-detectSun, 02 Oct 2022 Built Light Combat will induct on October 3, 2022 the first batch of indigenouslydeveloped Light Combat Helicopter (LCH), in a boost to its combat prowess as the multi-role The LCH, developed by aerospace major Hindustan Aeronautics Ltd (HAL), has been primarily designed for It will be inducted into the IAF inventory at a ceremony in Jodhpur in presence of Defence Minister Rajnath Singh and Chief of Air Staff Air Chief Marshal engine helicopter has already led Cabinet Committee on Security (CCS) curement of 15 indigenously developed Limited Series Production (LSP) LCH The defence ministry had said 10 helicopters would be for the IAF The LCH has similarities with Advanced Light Helicopter protection systems, night attack capability The LCH is equipped with h altitude performance and all-weather combat capability to perform a range of roles including combat search and rescue (CSAR), insurgency (CI) operations. busting operations, counterinsurgency operations in the jungles and urban environments as well as for supporting ground moving aircraft and remotely piloted aircraft (RPAs) of adversaries. Officials said it would be a potent platform to meet the operational requirements of the IAF and the Indian Army. systems compatible with stealth features such as reduced visual, aural, radar and IR signatures and crashworthiness features for better survivability have been integrated into the LCH for deployment in combat roles. composite airframe structure have been indigenised, they said. The future series-production version will consist of further modern and indigenous systems, they said. The IAF has already accepted four LCH helicopters. The officials said IAF plans to procure more LCH in the near future. "We are already working with DRDO and HAL to integ weapons on the helicopter," said one of the officials. stringent operating conditions including at sea level, in desert regions and in Siachen. In February 2020, it was declared ready for production. largely for a combat role in the mountains.

Source:<https://www.thehindu.com/news/national/iaf-combat-helicopter-on-october-3/>

Indian Space Economy Set to Grow \$13bn by 2025

Indian space economy is set to reach \$13 billion by 2025, according to a joint report prepared by EY and the Indian Space Association (ISpA), an apex industry association of space and satellite companies in the country. The report also said the space launch segment would grow fastest at a CAGR of 13% spurred by growing private participation, latest technology adoption and low cost of launch services. satellite services and application segment would form the largest share of the space economy accounting for 36% of the space economy by 2025, as per the study. There are 19 over 100 space tech start-ups in the country and investments in space tech start-ups increased 196% y-o-y in 2021, the survey said. On the country's satellite manufacturing opportunity, it said in 2020 it was \$2.1 billion and this would reach \$3.2 billion by 2025. Also, by 2025, satellite manufacturing would be the second fastest-growing segment in the Indian space economy. Space parks that are coming up across the country would give a fillip to companies operating across the space value chain, especially manufacturing, found the study."With the rapidly growing space ecosystem, India is all prepared to grow to \$13 billion by 2025. We believe as India looks forward to the New Space Policy, the private industry's role is set to create a revolution in the current value chain of the Indian space economy," said Jayant D Patil, Chairman, ISpA.

Source:<https://www.thehindu.com/business/indian-space-economy-set-to-grow-13-bn-by2025/article65993436.ece>

Russia Joins Race to Supply Light Battle Tanks to Indian Army

Russia will field its Sprut-SDM1 light amphibious tank for the Indian Army's upcoming tender for light tanks and has submitted technical details of the same, according to an official from Rosoboronexport. "In response to India's request, we have submitted our technical proposals. We are ready to hold consultations and show the tank to the Indian side," a Rosoboronexport official said ahead of the DefExpo to be held from October 18 to 22 in Gandhinagar. Stating that Rosoboronexport will definitely take part in the Indian tender for the supply of light tanks, the official stated, "We are ready to transfer technologies and provide assistance in launching the manufacture of the tank in India." Following the standoff with China in eastern Ladakh, the Indian Army is prioritising the procurement of a light tank, named 'Zorawar', for deployment in the mountains. In April 2021, the Army had issued a Request For Information (RFI) for the procurement of 350 light tanks weighing less than 25 tonnes in a phased manner, along with performance-based logistics, niche technologies, engineering support package, and other maintenance and training requirements. The project, which has already received in-principle approval, is planned to be procured under the 'MakeI' acquisition category of the Defence Acquisition Procedure (DAP)-2020, in line with the 'Make in India' initiative. The Acceptance of Necessity (AoN) from the Defence Acquisition Council is expected shortly. The Defence Research and Development Organisation (DRDO) and Larsen & Toubro (L&T) are jointly developing a light tank as per the Army's specifications. 39 Light amphibious combat vehicle Talking of the features of the Sprut-SDM1, the Rosoboronexport official said it was the only light amphibious combat vehicle in its class having firepower of a main battle tank and equipped with a 125 mm tank gun. "All the ammunition produced in India for T-72M1 and T-90S tanks can be used by the Sprut-SDM1," he stated. The Sprut can cross water obstacles and fire its gun while afloat, disembark from a ship, operate day and night on terrain — in the high mountains in conditions of thin air, at very high and low temperatures, the official elaborated. The tank is equipped with a guided missile system designed to defeat armoured targets, including those equipped with ERA, at ranges up to 5 km, he added. As reported by The Hindu earlier, in the last two years China has deployed the third-generation modern light tank ZTQ 15 (Type 15), latest ZTL-11 wheeled Armoured Personnel Carriers and the CSK series of assault vehicles along the Line of Actual Control (LAC) in eastern Ladakh.

Source:<https://www.thehindu.com/news/national/russia-has-submitted-technical-proposals-on-lighttank-for-indian-armys-tender-official/article66018004.ece>

EVENT

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