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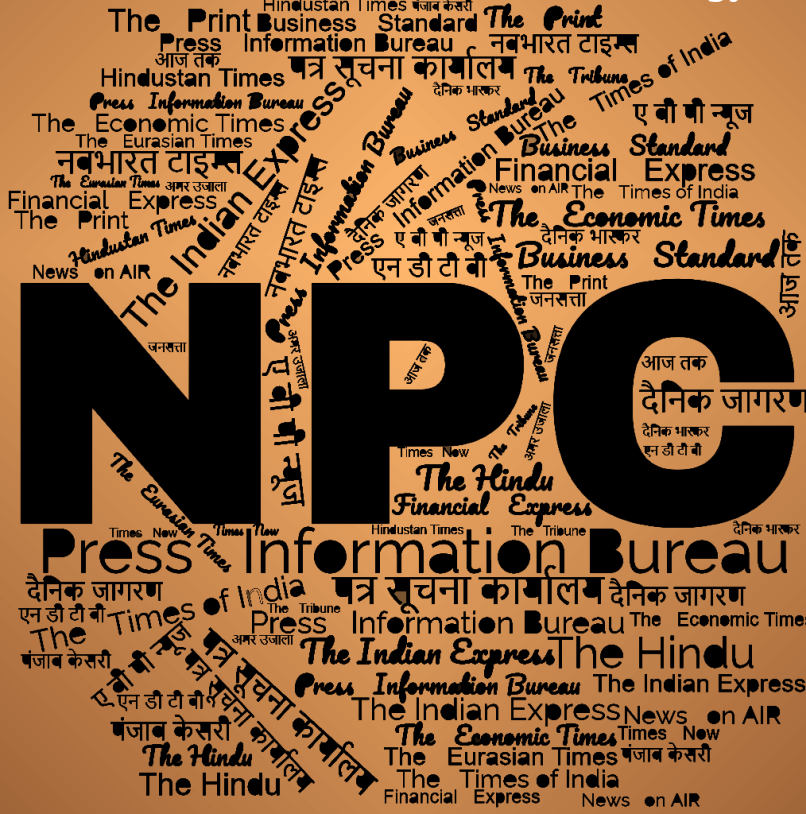
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# समाचार पत्रों से चयित अंश Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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**THE TIMES OF INDIA***Wed, 10 May 2023***IIT-M and DRDO develop underwater sensor technology**

Researchers from Indian Institute of Technology Madras (IIT-M) and Defence Research and Development Organisation (DRDO) have developed a thin-membrane based sensor technology for underwater communication. The indigenous technology, which can be used in defence applications, will help in the making and fabricating low-cost sensing devices than depending on international foundries where the fabrication cost is high. Researchers said they developed piezoelectric MEMS (micro electro mechanical system) technology where they fabricated 100mm diameter piezoelectric thin films. The film was fabricated with good uniformity and higher piezoelectric properties, where it has the capability to generate electric charge upon mechanical stress or vibration or vibrate when an electric charge is applied. The film was used to make thin film membrane based piezo MEMS (micro electro mechanical system) acoustic sensors. The piezo thin films are one of the vital components of piezo MEMS devices and are considered for acoustics and vibration-sensing applications. “This technology is matured enough to convert it as a system with the support of Indian Industry. This technology will be a disruptive technology in this domain and our country achieved ‘Aatma Nirbhar Bharat’ in underwater materials and micro device processing technology,” said O R Nandagopan, director, DRDO Industry Academia-Ramanujan Centre of Excellence.

Researchers said the piezo thin film and the MEMS process technology will support the next generation sonar programme of DRDO for the Indian Navy. “The facility for the fabrication is established at IIT Madras and also at DRDO Industry Academia - Ramanujan Centre of Excellence,” said Prof Amitava Das Gupta, department of electrical engineering, IIT Madras.

<https://timesofindia.indiatimes.com/city/chennai/iit-m-and-drdo-develop-underwater-sensor-technology/articleshow/100116820.cms>

*Tue, 09 May 2023***IIT Madras Collaborates with DRDO to Develop Technology for Underwater Acoustic Sensors**

Scientists from the Defence Research and Development Organisation (DRDO) and researchers from the Indian Institute of Technology Madras have teamed up to create a cutting-edge Piezoelectric MEMS (Micro Electro Mechanical System) technology sensor for underwater communications. This sensor will be beneficial for defence applications, particularly in the naval forces. The Indian Navy’s Next Generation SONAR initiative by DRDO will use this sensor to support both innovative and modern technological advances. The indigenous invention of this

technology allows India to fabricate the devices at a lesser cost than the internationally available foundries, where production costs are high and the availability of foundries is restricted. The establishment of cutting-edge piezo MEMS technology helps India expand beyond the limits of defence capabilities and undertake strategic operations for key applications. To create high-performance thin films and transform “piezo thin film” into sophisticated, futuristic naval sensors and equipment for underwater applications, “piezoelectric MEMS technology” is required. Piezo Thin Films are one of the most important components of piezo MEMS devices and are used in acoustics and vibration sensing. In order to make “Thin film membrane based Piezo MEMS Acoustic sensors,” IIT Madras researchers and DRDO scientists collaborated with numerous partners to build a piezo MEMS process technology. The fabricated PZT thin film-based acoustic sensor outperforms the traditional PVDF-based acoustic sensor in terms of functionality.

In a statement issued in the press release, Dr O.R. Nandagopan, Director, DRDO Industry Academia- Ramanujan Centre of Excellence (DIA-RCoE), IIT Madras, stated, “This technology is matured enough to convert it as a system with the support of Indian Industry. This technology will be a disruptive technology in this domain and our country achieved ‘Aatma Nirbhar Bharat’ in underwater materials and micro device processing technology.” Prof. Amitava Das Gupta, Department of Electrical Engineering, IIT Madras, highlighted that the fabrication facility has been built at IIT Madras as well as at the DRDO Industry Academia - Ramanujan Centre of Excellence.

The most significant challenge in the Piezo MEMS process technology, according to Dr. Varadarajan, Scientist, DRDO, is the necessity for excellent dependability and durability in the hostile underwater environment, due to the high pressure and corrosive characteristics of seawater.

<https://www.news18.com/education-career/iit-madras-collaborates-with-drdo-to-develop-technology-for-underwater-acoustic-sensors-7763425.html>

## DRDO on Twitter

DRDO Retweeted

**ADG PI - INDIAN ARMY** @adgpi

Gen Manoj Pande #COAS and Chairman #DRDO presided over the Joint Session between #IndianArmy and @DRDO\_India. #COAS appreciated the yeoman service of #DRDO by developing numerous weapon platforms, equipment & products for the security need of the Nation. 1/2

4:34 pm · 9 May 2023 · 32.8K Views



**Press Information Bureau  
Government of India**

**Ministry of Defence**

*Tue, 09 May 2023*

### **Sea Phase of ASEAN-India Maritime Exercise – 2023**

The inaugural ASEAN India Maritime Exercise (AIME-2023) successfully culminated in the South China Sea on 08 May 2023. Approximately 1400 personnel manning nine ships participated in the Sea Phase of the multilateral naval exercise. India's indigenously designed and built ships-destroyer INS Delhi & stealth frigate INS Satpura, maritime patrol aircraft P8I and integral helicopters exercised with ASEAN naval ships from Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam.

The two-day sea-phase witnessed a wide spectrum of evolutions at sea including tactical manoeuvres, cross deck landings by helicopters, seamanship evolutions and other maritime operations. Apart from honing skills in the maritime domain the exercise enhanced interoperability and demonstrated the ability of Indian & ASEAN navies to operate as an integrated force to promote peace, stability and security in the region.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1922815>



**NewsOnAIR**

*Tue, 09 May 2023*

### **ASEAN-India Maritime Exercise: Exhibiting India- ASEAN's Growing Cooperation in Defence Sector**

Exhibiting India-ASEAN's growing relationship in the defence sector, the ASEAN-India Maritime Exercise (AIME-2023) was conducted between both sides and successfully culminated in the South China Sea on May 8, 2023. The exercise, which was held from May 2 to 8, witnessed the participation of approximately 1400 personnel manning nine ships in the sea phase of the multilateral naval exercise. The Harbour Phase of the exercise was conducted at Changi Naval Base, Singapore, from May 2 to 4, 2023, while the exercise witnessed its Sea Phase from May 7 to 8, 2023, in the South China Sea.

“The AIME-23 is aimed at promoting maritime cooperation and enhancing trust, friendship and confidence amongst ASEAN and Indian Navies,” said a statement released by the Ministry of Defence. India’s indigenously designed and built INS Delhi and INS Satpura, maritime patrol aircraft P8I and integral helicopters exercised with ASEAN naval ships from Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam. Further, the sea phase witnessed a wide spectrum of evolutions at sea, including tactical manoeuvres, cross-deck landings by helicopters, seamanship evolutions, and other maritime operations.

Earlier this month, Admiral R. Hari Kumar, Chief of the Naval Staff (CNS), Indian Navy, met the crew of INS Delhi and INS Satpura at Changi Naval Base during his visit to Singapore. CNS urged all personnel participating in the exercise to utilise the opportunity provided by AIME to refine procedures, learn best practices, and enhance interoperability with the ASEAN navies.

In addition, AIME also showcases India’s commitment to ‘Act East’ in its endeavour to ensure ‘Security and Growth for all in the Region (SAGAR). “Apart from honing skills in the maritime domain the exercise enhanced interoperability and demonstrated the ability of Indian and ASEAN navies to operate as an integrated force to promote peace, stability and security in the region,” said the Ministry of Defence.

India and ASEAN have been actively working to enhance their defence cooperation in recent years. It is evident that the defence domain is an important aspect of the growing India-ASEAN relationship, driven by shared security concerns and increasing geopolitical importance.

<https://newsonair.com/2023/05/09/asean-india-maritime-exercise-exhibiting-india-aseans-growing-cooperation-in-defence-sector/>



*Tue, 09 May 2023*

## **Army's Common Uniform for Officers of Brigadier Rank and Above from Aug 1**

Indian Army will adopt a common uniform for Brigadier and above rank officers irrespective of the parent cadre and appointment. The decision was taken after detailed deliberations during the recently concluded Army Commanders' Conference claimed Sources.

Different types of uniforms and accoutrements have specific associations to respective arms, regiments and services in the Indian Army.

This recognition of distinct identity within the Arms or Regiment or Services is essential for junior leadership and the rank and file to further strengthen camaraderie, esprit de corps and regimental ethos which is the bedrock of soldiering. At the unit or battalion level, a distinct sense of identity reflects a strong bond among officers and men in the same regiment.

However, to promote and strengthen a common identity and approach in service matters amongst senior leadership, beyond the boundaries of regimentation, the decision was taken to adopt a common uniform.

This will also reinforce the Indian Army's character to be a fair and equitable organisation.

The decision was taken after detailed deliberations during the recently concluded Army Commanders Conference and extensive consultations with all stakeholders.

The headgear, shoulder rank badges, gorget patches, belts and shoes of senior officers of Brigadier and above ranks will now be standardised and common. The flag-rank officers will not wear any lanyards in the common uniform. The changes will be implemented from 01 August 2023.

In the Indian Army, Brigadier and above officers are those who have already commanded units/battalions and are mostly posted at headquarters or establishments where officers from all Arms and Services work and function together. A standard uniform will ensure a common identity for all senior-rank officers while reflecting the true ethos of the Indian Army. There is no change to the uniform worn by Colonels and below-rank officers.

<https://www.indiatoday.in/india/story/indian-army-adopts-common-uniform-for-brigadier-and-senior-officers-august-1-2376817-2023-05-09>



*Wed, 10 May 2023*

## **India's Dhruv Chopper Needs Critical Safety Upgrade: Panel**

A design review of a “safety-critical system” of the Dhruv advanced light helicopter, involved in a string of accidents including one last week, may be in order, according to a top government regulatory body responsible for the certification of the airworthiness of military aircraft.

The Bengaluru-based Centre for Military Airworthiness and Certification (CEMILAC) wrote to the three services and the coast guard about this on April 23. It has ordered the design review of a “safety-critical system” on board the India-made helicopter by an expert panel to improve its airworthiness even though the helicopter has a stable and mature design, officials familiar with the matter said on Tuesday, asking not to be identified.

The call for the design review comes on the back of the ALH's troubling safety record. In the past five years, it has been involved in 12 accidents. The army grounded its ALH fleet for a comprehensive safety check after a helicopter crash-landed in Jammu & Kashmir's Kishtwar on May 4, killing a soldier and injuring the two pilots. The helicopter is operated by the army, air force, navy, and coast guard.

CEMILAC, which functions under the Defence Research and Development Organisation (DRDO), reached the conclusion that the design review of the booster control rods is mandatory after an expert committee, formed in the backdrop of a navy ALH ditching (emergency landing in water) into the Arabian Sea on March 8, explored the possible failures that led to the incident, the officials said.

These rods allow pilots to control the helicopter's motion, and any failure can severely affect power input to the rotor blades and cause accidents.

Most of the military's ALHs are currently grounded for comprehensive checks after the string of accidents. The Indian Air Force's latest light combat helicopters (LCH), which inherit several features of the ALH, were also grounded, the officials said. The regulatory body has red-flagged the drastic reduction in the fatigue life of the rods, the officials said. The design review is critical as the Indian armed forces operate more than 300 multi-role ALHs, designed and developed by state-run aircraft maker Hindustan Aeronautics Limited. HAL began delivering these helicopters in the early 2000s.

The committee, constituted by the CEMILAC chief executive (airworthiness), found that the most probable cause of the navy ALH incident on March 8 was a technical failure — an error in the assembly of serrated washers in the booster control rods, said one of the officials cited above.

It has recommended short and long-term measures to enhance the safety of the twin-engine ALH, Hindustan Times has learnt.

The design, development and qualification of the steel booster control rods that are tolerant to assembly errors shall be expedited, and the compliance of the new design shall be aimed for implementation in six months to one year, CEMILAC wrote in a letter dated April 23 to HAL, the three services, and the coast guard.

“Though the helicopters are matured from the design point of view, having been exploited for more than 3 lakh hours, still there is scope to review the design/lifting aspects of the safety-critical system by an expert committee as a long-term measure,” said the April 23 letter accessed exclusively by HT. It was written by CEMILAC director (helicopters and missiles) DM Isack.

The CEMILAC-constituted committee’s finding related to the malfunctioning of the booster control rods on the navy ALH is in line with the failure analyses done by Council of Scientific and Industrial Research-National Aerospace Laboratories (CSIR-NAL), Bengaluru, and HAL’s Rotary Wing Research & Design Centre (RWR&DC), said a second official, who also asked not to be named.

“The drastic reduction in the fatigue life of the control rod with wrongly assembled serrated washers has been verified experimentally at RWR&DC, HAL as part of the committee’s investigation,” the letter said.

A coast guard and an army ALH were involved in accidents after the March 8 navy incident. The coast guard helicopter made a forced landing in Kochi on March 26, followed by the precautionary landing by the army ALH on May 4 in Kishtwar.

On May 4, the pilots reported a technical fault to the air traffic control before the incident, which led to the army suspending ALH operations for the second time in less than two months.

The three services grounded their ALH fleets for safety checks after the navy ALH ditched into the sea following unexplained loss of power. The navy choppers are still grounded, while IAF is clearing its ALHs for flying in batches after the mandatory checks. The army had resumed ALH operations a few weeks before the May 4 crash landing after which it grounded the helicopter again.

The LCH, inducted last October, was also grounded. It is capable of targeting enemy air defences, slow moving aircraft, high-altitude bunkers as well as carrying out counter-insurgency operations.

CEMILAC has prescribed measures for the resumption of ALH and LCH operations.

Clearance for both platforms, limited to 100 flight hours each, will be given after mandatory inspections, the officials said. Further clearance for up to 500 flight hours or one year, whichever is earlier, will be based on the successful completion of two critical tests by HAL, they said.

These tests involve the flight testing of two helicopters with instrumented control rod assembly for verifying the multi-axis loads on the control rods, and the fatigue testing of the rods with correctly assembled serrated washers to confirm their original capability, the officials said. The top regulatory body has also called for evolving an accelerated life testing (ALT) methodology to pinpoint any other potential failure modes and to assess the life of the ALH’s integrated dynamic system (IDS), the officials said. The main gearbox, upper controls and rotor head as a single unit is called IDS.



“It is critical to fix the flaws on the ALH as there are flight safety implications. It plays an important operational role and India operates a large number of ALHs. Also, there are many potential foreign customers who are watching the helicopter closely,” said Air Marshal Anil Chopra (retd), director general, Centre for Air Power Studies.

A defence ministry spokesperson declined to comment on the design review.

The armed forces grounded their ALH fleets last year too after an army Rudra helicopter (armed version of Dhruv ALH) crashed in Arunachal Pradesh in October 2022, killing all five personnel on board.

To be sure, it is not uncommon for an aircraft fleet to be grounded for inspection after an unexplained crash or incident.

The Dhruv ALH is a multi-mission helicopter in the 5.5-tonne class.

ALH operations have been hit in the past too -- the helicopters were grounded in 2006 following tail rotor problems, and later again in 2014 after a fatal crash.

The July 2014 crash, which left the chopper’s seven-man crew dead near Sitapur in Uttar Pradesh, was one of the worst crashes involving the helicopter. The aircraft involved had logged only two hours of flying after being serviced at Bareilly.

In another incident, former Northern Army commander Lieutenant General Ranbir Singh and eight others were injured in a crash in the Poonch sector in October 2019.

The grounding of the ALH comes at a time when HAL is looking at tapping the export potential of the chopper. It is currently in talks with the Philippines for a possible order. In 2015, Ecuador unilaterally terminated a contract with HAL after four of the seven ALHs it bought from the Indian firm were involved in crashes.

<https://www.hindustantimes.com/india-news/indian-military-s-dhruv-helicopter-fleet-grounded-after-string-of-accidents-design-review-ordered-for-safety-critical-system-101683656231941.html>

## Business Standard

*Tue, 09 May 2023*

### **Grene Robotics Acquires Deep-tech Defence IP from Apogee C4I LLP**

In 2021, a small Hyderabad-based firm, Grene Robotics, introduced the Indrajaal, which it billed as the world’s only comprehensive, autonomous, anti-drone security system. Each Indrajaal system covers areas as large as 4,000 square kilometres.

On Tuesday, Grene Robotics went a step further, completing the acquisition of command, control, communications, computers, intelligence, surveillance, reconnaissance, and targeting (C4ISRT) platform from Apogee C4I LLP — a first-of-its-kind indigenous defence technology company.

Currently, many anti-drone systems are treated as if drones are the only low radar cross section (RCS) threat in the tactical battle area. Numerous systems qualify as low-RCS weapons, including loitering munitions, smart bombs, rocket showers, nano and micro drones, etc.

However, existing air defence systems are not geared to address low-RCS threats. Grene Robotics believes that all low RCS threats should be grouped and dealt with using a single system.

“Indrajaal is the world’s only anti-drone system that can defend against all classifications and all levels of autonomous drones. With the integration of Apogee’s advanced deep-tech platform, we aim at bolstering Indrajaal’s anti-drone capabilities further,” said Kiran Raju, founder and chief executive officer, Grene Robotics.

“We have funded all our operations ourselves over several years. As far as innovation for defence excellence (iDEX) is concerned, we won an iDEX challenge three years ago. Next-generation threat identification was the problem statement we attempted under the airspace management segment,” said Raju.

With funding sources inadequate, Grene Robotics has continued looking for funds within its resources for the past 14 years. As part of this, it has strategically acquired deep-tech intellectual property from Apogee C4I to enhance its drone and anti-drone defence programme.

This move is expected to significantly strengthen Grene Robotics’ capabilities in the defence sector. It will also lead to greater implementation on a national and international level, establishing Grene Robotics as a global leader in counter-drone security systems.

“The combined capabilities of Grene Robotics and Apogee C4I will help set a new industry standard for anti-drone solutions, future-proofing protection against emerging low-RCS threats,” said Wing Commander M V N Sai (retired), director of emerging technologies, Grene Robotics.

According to Vamsi Vellanki, who handles finances for Grene Robotics, the global anti-drone market will reach US \$12.6 billion by 2030, with a compound annual growth rate of 27.65 per cent from 2022 to 2030.

“Grene Robotics employs 70 people, at least 45 of whom have been with the company for 14 years. They have been investing in the company. A lot of money has been sunk in this process; more than \$30 million has been spent,” says Raju.

[https://www.business-standard.com/technology/tech-news/grene-robotics-enhances-anti-drone-capabilities-buys-deep-tech-defence-ip-123050901051\\_1.html](https://www.business-standard.com/technology/tech-news/grene-robotics-enhances-anti-drone-capabilities-buys-deep-tech-defence-ip-123050901051_1.html)



*Tue, 09 May 2023*

## **Making ‘Make in India’ Work for the Aerospace and Defence Sector**

*By Prof. S Raghunath & Prof G Shainesh*

The private sector generated over 20 percent of the Rs 80,000 crore turnover for the aerospace and defence sector in India. Leading business groups like L&T, Tatas, Mahindras, Hindujas and Bharat Forge have made significant investments during the last decade while public enterprises and organizations including HAL, BEL, BEML and NAL continue to scale up their operations with new programs to meet the government’s ambitious aspirations under ‘Atmanirbhar Bharat Abhiyan’ and ‘Make in India’ schemes. The market opportunities and offset clauses in the government’s defence procurement policies have attracted several global players to set up operations and form joint ventures in India. These include leaders like Airbus, BAE, Boeing, Collins Aerospace, Dassault Aviation, Israel Aerospace Industries, Pilatus, Lockheed Martin, Raytheon, Rafael, Safran and Thales.

Several initiatives have been launched to achieve self-reliance in defence manufacturing and innovation. Defence Industrial Corridors, Positive Indigenisation Lists, DRDO's Technology Development Fund and Innovations for Defence Excellence (iDEX) and Defence Testing Infrastructure Scheme (DTIS) are some of the prominent ones. Local manufacturing of aerospace equipment and aircraft for defence and commercial applications will create significant opportunities for Indian companies, including Micro, Small & Medium Enterprises (MSMEs).

The path breaking Tata-Airbus joint venture for manufacturing the military transport plane, C295, will result in the full development of a complete industrial ecosystem. Involving all stages of the complete lifecycle of the aircraft, it will comprise manufacturing, assembly, testing, qualification, delivery and maintenance. Over 60 percent of the more than 30,000 detail parts, sub-assemblies, and component assemblies will be manufactured locally involving over two dozen MSME suppliers in this first-of-its-kind 'Make in India' aerospace programme in the private sector. In addition, an indigenously developed electronic warfare (EW) suite developed by BEL and Bharat Dynamics will be deployed on these crafts. However several critical systems such as engines, landing gear, avionics, and the EW suite will continue to be provided by Airbus for integration into the aircraft.

This transition from being assemblers of sub-systems imported from the original equipment manufacturers (OEMs) to creators of equipment, platforms and systems will require a thriving indigenous research, design, development and manufacturing infrastructure driven by a significant scaling up of the research and development ecosystem.

Four connected issues have to be addressed on a war footing to boost the R&D ecosystem. These include development costs, enabling technology transfer, intellectual property rights (IPRs) and testing & trial facilities.

**Development Costs** – To achieve higher levels of indigenization for defence projects, companies need to invest in design, development, prototyping, trials and followed by participation in a competitive bidding process to win a production order. Such comprehensive programs usually span 3-5 years for development, 2-3 years for trials and acceptance which is then followed by a production order. The installation and commissioning of plant and equipment takes another 12-24 months followed by industrialization pre-production of 12-18 months. Given this long gestation period, companies need to upfront commit significant investments for the development in anticipation of a production order down the road which may or may not even fructify. Other uncertainties include scaling down the production quantity, specification changes or a decision not to go ahead with the production order post-development for strategic reasons by the defence ministry.

The ministry provides up to 70 percent funding for such prototype development subject to a cap of Rs 250 crores. However, this support is inadequate given the size of investments required. In the absence of commitments for a production order, definite timeline or production quantity, these development costs get added to the balance sheet of vendors to be amortized later when the production order is received or to be written off, if the order is not received within a reasonable timeframe.

In a few defence programs, the prototype development is awarded to two different development agencies with the understanding that the production order will be issued to L1:L2 (the two lowest-cost bidders) in a certain proportion. However, L2 is forced to execute the production order for the prototype developed by L1. This makes the entire investment made by L2 in its own prototype development redundant while increasing its execution risks. This process also increases the likelihood of the commercial bid prevailing over the technical superiority of the prototype. Given the financial risks and uncertainties of the development efforts not translating into a production

order, even large industrial groups find it difficult to justify supporting such investments, especially when they participate in multiple such programs simultaneously.

Companies incorporate such risks into the bid pricing which then drives up the cost of the end product. An alternative option for de-risking is by enhancing the funding support from 70% to say 90% without any cap. In addition to reducing the development risk, it will encourage all bidders to price the product more competitively as their development cost will be significantly lower.

### **Enabling Technology Transfer**

The 'Make in India' programs have been designed to reduce dependence on OEMs by developing domestic capabilities. Local players will be successful only if the OEMs transfer the technologies. However, most OEMs extend transfer of technology (ToT) for low-value items which are not part of the core proprietary technology items. Such skewed technology transfers lead to lifelong dependence on the OEMs. Many times the low-value technology loses its relevance after the production order is completed. Mandating norms for higher levels of technology transfer in return for access to the booming market, low-cost labour, favourable policies and tax incentives is another way to bring technology. Incentivising OEMs to set up 'Centers of Excellence' (CoEs) and 'R&D Centres' in India to participate in the 'Make in India' Programs can be done by extending the offset clauses. Provided incentives similar to Production Linked Incentives (PLI) will attract domestic players to invest in R&D and build long-term capabilities to address the domestic demand and tap the global markets.

### **Intellectual Property Rights (IPR)**

The IPR, under the 'Make in India' programs, belongs to the Government as a fallback mechanism in case the development agency goes into insolvency or encounters project delays. Such an arrangement prevents the development agency from using the IPR's for product development for adjacent markets on their own or to further develop these products for global markets without the approval of the Government. Alternatives including the option of passing the IPR to the development agency for a royalty or one-time fees for development programs funded by the government, will be very progressive. Of course, such arrangements will exclude IPs with implications for national security.

### **Testing & Trial Facilities**

The testing and trial facilities require significant investments in land, infrastructure and personnel. Given the security restrictions for defence projects and huge investment requirements, it is financially not feasible for private players. In addition, significant time is lost between trials, sometimes years, waiting to use the public infrastructure with the defence services and the laboratories. Alternatively, significant costs have to be incurred to carry out these trials abroad. Incentivising investments and expanding the capacities will significantly lower delivery timelines while reducing the cost of the end product.

Establishing the envisaged next-generation indigenous domestic defence eco-system will necessitate a robust and state-of-the-art testing and trial infrastructure. On account of the stringent standards and specifications required in the defence industry, private players venturing into this sector or existing MSMEs face the mammoth challenge of catering to the testing requirements of these products.

Opening up the test facilities in defence laboratories and public sector organizations to the start-ups and MSMEs in equipment development and manufacturing under the Defence Testing Infrastructure Scheme (DTIS) is the first right step. Such progressive initiatives will boost investments in the indigenous design and production industry. Setting up an independent nodal umbrella body for testing, trial and certification requirements of defence systems will improve

access to existing facilities while reducing the need for investments to recreate the capital-intensive infrastructure.

Addressing these issues will help us switch to a 'Make by India' pathway requiring our research and development to match and then exceed global standards. It seems to be a tall order, but not necessarily unachievable, as we will have to start aspiring to conceive in India and not just 'Make in India'. Centres of Excellence that attract the best engineers, scientists and managers will enable a quantum leap in the number of IPs being created. Developing IPs will be a long and arduous haul yet that positioning will take 'Make In India' to the next level of moving from being Tier 1 and Tier 2 suppliers to innovators and new product creators.

Partnerships between global aerospace firms including Collins Aerospace and Boeing with technical and research institutions including IISc, IIM Bangalore, IITs and RVCE promote collaborative research for technology development. The future pool of researchers will emerge from such partnerships.

While the market for civilian and defence systems in the aerospace sector is being created, it is time to develop a strong research base in India and a robust supply chain for components and sub-systems, most of which were being sourced from abroad. The development of the ecosystem for the aerospace industry will, as an offshoot, accelerate the development of the supply chain of critical subsystems and components of allied sectors like drones and space.

Public funding for investments in several critical future technologies will be foundational for future innovations both for commercial and military applications: artificial intelligence (AI), robotics, autonomous vehicles, augmented and virtual reality, and blockchains. The line demarcating products designed for commercial versus military purposes is blurring with these new technologies.'

<https://www.financialexpress.com/business/defence-making-make-in-india-work-for-the-aerospace-and-defence-sector-3080378/>

## THE TIMES OF INDIA

Wed, 10 May 2023

### **Fighting Unfit: Latest MiG-21 Crash is Symptomatic of Deeper Malaise and One that's Undermining India's Defence Preparedness**

**Editorial**

The latest MiG-21 crash has killed three civilians and injured three more – wreckage from the burning aircraft fell on a village home in Rajasthan. The inglorious history of MiG-21 crashes in this country is beginning to look both like a tragedy and a farce. The Russian aircraft, of 1960s vintage, should have been phased out decades ago. That three squadrons of the MiG-21 continue to be in service is a huge indictment of defence planning and modernisation.

It is shocking that 55 military personnel have lost their lives in more than 50 aircraft and helicopter accidents in just over five years. The MiG-21 as well as the Cheetah/Chetak helicopters have been major culprits. Far from ensuring India's military capabilities, these flying coffins have de facto become weapons against the armed forces themselves. The MiG-21s are supposed to be replaced by the indigenous Tejas fighter. But the latter's low rate of production and induction has meant that

less than 40 are in service against an order of 123. This gap is precisely why the MiGs continue to fly despite lack of modern avionics and poor spare parts.

The situation also raises serious questions about the country's defence preparedness at a time when it is locked in a border standoff with China and continues to face traditional and nontraditional threats from Pakistan. In fact, the number of fighter squadrons is down to 31 as against a sanctioned strength of 42. 5. Add to this serviceability issues and the actual number of fighters at our disposal at a given time is even fewer. True, the induction of 36 Rafale fighters has boosted airpower in per aircraft terms. But absolute numbers matter – since India must always prepare for a two-front war across a vast northern border and massive coastline.

Here's what GoI and the military brass across the services also need to ask themselves – will we actually go into combat in the 21st century with hopelessly outdated Russian platforms? The latter's poor performance in the Ukraine war has already raised serious concerns within India's security establishment. Plus, that war itself has jammed up the supply of spares as well as the proposed \$2. 2 billion deal for the purchase of additional MiG-29s and Su-30 MKIs by India. Diversify the procurement programme, speed up indigenous production and phase out the remaining MiG-21s well before the 2025 deadline – do it on war footing.

<https://timesofindia.indiatimes.com/blogs/toi-editorials/fighting-unfit-latest-mig-21-crash-is-symptomatic-of-deeper-malaise-and-one-thats-undermining-indias-defence-preparedness/>

## THE TIMES OF INDIA

Wed, 10 May 2023

### **India, Israel Eye Stronger Water, Agri & Defence Ties**

Foreign minister S Jaishankar and his visiting Israeli counterpart Eli Cohen reviewed the strategic partnership between the two countries with focus on enhancing cooperation in defence, security, water and agriculture. Cohen, who also called on PM Narendra Modi later in the day, cut short his three-day visit because of the deteriorating security situation at home following Israel's bombing of the Gaza Strip, in which three Palestinian militants were killed.

“The main pillars of our strategic partnership - agriculture, water, defence and security - are taking our ties forward. New agreements in water and agriculture today underline the potential to do more. Discussed cooperation in high tech, digital & innovation, as also connectivity, mobility tourism, finance, and health,” tweeted Jaishankar after his meeting with Cohen.

“Noted the progress in I2U2 and cooperation in multilateral forums. Exchanged perspectives on our respective regions, Ukraine and Indo-Pacific. Initialed an agreement in the area of mobility,” he added.

According to an Israel readout, both countries noted progress in I2U2 and held discussions on cooperation in security, economy, technology, innovation, connectivity and health.

Cohen also opened the CII India-Israel business forum. Three MoUs were signed during the event, marking a new era of cooperation and partnership between the business communities of both nations.

Both countries also signed letter of intent to establish two centers of water technology in India.

<https://timesofindia.indiatimes.com/india/india-israel-eye-stronger-water-agri-defence-ties/articleshow/100113921.cms>

# THE TIMES OF INDIA

Tue, 09 May 2023

## **India Asks Israel for Joint Ventures by its Armament Companies for Co-production of Weapon Systems in Tune with Make-in-India**

India on Tuesday asked Israel for stepped-up investments and joint ventures by its armament companies for co-production of weapon systems in tune with the 'Make-in-India' policy.

Defence minister Rajnath Singh underlined the government's priority for indigenisation in accordance with the 'Aatmanirbhar Bharat' policy during a meeting with the Israeli delegation led by foreign minister Eli Cohen.

"Rajnath Singh acknowledged the cooperation being extended by Israeli companies and encouraged them for more investments in India and for forging joint ventures with Indian partners to manufacture defence equipment in India," a MoD official said.

"The Israeli minister affirmed continued cooperation of Israel in India's endeavour for indigenisation. He conveyed Israel's willingness to cooperate and partner in advanced technologies," he added.

Israel has been among the top four arms suppliers - along with US, Russia and France - to India for over two decades now. The Indian armed forces, for instance, are now inducting the next-generation Barak-8 surface-to-air missile systems under three joint DRDO-Israel Aerospace Industries projects worth over Rs 30,000 crore.

India has earlier procured a wide array of Israeli weapon systems, ranging from Phalcon AWACS (airborne warning and control systems) and Heron, Searcher-II and Harop drones to Barak anti-missile defence systems and Spyder quick-reaction anti-aircraft missile systems.

<https://timesofindia.indiatimes.com/india/india-asks-israel-for-joint-ventures-by-its-armament-companies-for-co-production-of-weapon-systems-in-tune-with-make-in-india/articleshow/100106658.cms>

# THE TIMES OF INDIA

Tue, 09 May 2023

## **Imran Khan Arrest: Indian Defence Forces Keeping Close Watch on Developments in Pakistan, Tighten Vigil Along Borders**

Amid the deteriorating situation in Pakistan after former Pakistan PM Imran Khan's arrest on Tuesday, the Indian defence forces are keeping a close watch on the developments there.

"Indian defence forces are on a vigil and are keeping a close watch on the situation in Pakistan, in view of the developments there. Strong vigil being maintained by the forces along the Line of Control and the international border," defence sources told here.

PTI chief Imran Khan was arrested on Tuesday from Islamabad High Court in connection with the Al-Qadir Trust case.

The main concerns for the Indian side are that the Pakistan Army may try to open up a new front along the LoC by blaming Indian forces or other means to relieve the pressure from internal factors, the sources said.

Till evening, the Pakistani troops had not cut down any numbers from forward locations with India but the situation may get clearer tomorrow, they added.

India has been on high vigil to stop Pakistani infiltration already but now the situation is tense in Pakistan and there are fears that Pakistan Army may try something drastic to maintain supremacy in Pakistan.

PTI chief Imran Khan's arrest has triggered several violent protests across Pakistan including at the the General Headquarters (GHQ) in Rawalpindi and the residence of the Corps Commander in Lahore, which was once the house of Mohammed Ali Jinnah, following the arrest of former prime minister Imran Khan on Tuesday afternoon.

People have taken to the streets, resorted to violence, arson and even raised many slogans to register their resentment against the arrest of ex-PM of Pakistan and PTI chief Imran Khan, across Pakistan including Lahore, Rawalpindi, Islamabad, Faisalabad, Karachi, Quetta, Mardan, Bannu, and Chilas.

The protesting mob resorted to stone pelting on houses, offices and vehicles, burning banners and tyres and blocking roads.

Several videos surfacing on social media platforms show groups of men, some with their faces covered, entering the gated premises of GHQ with sticks, which they later were seen using to hit the walls.

Such violent protests are an aberration in the history of Pakistan, where citizens are seen vandalising the Pak Army GHQ and the residence of the Corps Commander, which has controlled the nation since its independence, showing the growing popularity of Imran Khan.

Meanwhile, in Faisalabad, a mob pelted stones on Pakistan Interior Minister Rana Sanaullah's house.

The PTI Chairman was taken into custody while on the grounds of the Islamabad High Court (IHC), where he was there for biometric verification in two cases.

Five police officers have been injured in the protests while 43 protesters have been arrested.

In the wake of these protests, section-144 has been implemented in Islamabad and in Peshawar.

Khan has been detained in connection with the Al-Qadir Trust case, according to NAB, which has confirmed the development. According to the report, the NAB head issued the arrest warrants for him on May 1.

Earlier, in an exclusive interview with ANI, Tilak Devasher, National Security Advisory Board (NSAB) member and a security expert made similar speculations regarding the same, saying that India has to be on guard and should be more watchful after these developments in Pakistan.

"We have to be on our guard as in recent cases the majority have shown that people who are there will try and divert attention from what is happening in Pakistan but as far as the army itself is concerned or the government, I think they are going to be very, very busy in the next couple of days," Tilak Devasher said.

<https://timesofindia.indiatimes.com/india/imran-khan-arrest-indian-defence-forces-keeping-close-watch-on-developments-in-pakistan-tighten-vigil-along-borders/articleshow/100109384.cms>





Tue, 09 May 2023

## Japan, South Korea to Link Radar Systems to Track N.Korea Missiles -Source

Japan and South Korea are set to agree early next month to link their radars via a U.S. system to share real-time information on North Korea's ballistic missiles, a person with knowledge of the matter said on Tuesday.

Defence ministers from Japan, South Korea and the United States plan to reach an agreement on the sidelines of an Asian defence summit to be held in Singapore early next month, said the person, who declined to be identified because the discussions are not public.

The Japanese government's top spokesperson, Hirokazu Matsuno, said no decision has been made yet on the planned agreement, without elaborating.

South Korea's presidential office said the country would form a group with Japan and the United States to share information about North Korea's missiles, news agency Yonhap reported.

The system was currently in the works, the report said, citing a senior official.

A South Korean defence ministry spokesperson told a briefing earlier that the three countries have been in talks to boost information sharing but nothing had been finalised.

With North Korea launching ballistic missiles at an unprecedented pace in the past year, the three countries in November agreed to speed up information-sharing. Japan and South Korea are independently linked to the United States' radar systems but not to each other.

Ties between the United States' Asian allies have warmed in recent months in the face of the North Korean threat. Resuming their "shuttle diplomacy", Japanese Prime Minister Fumio Kishida met with South Korean President Yoon Suk Yeol in Seoul on Sunday, where they confirmed progress in defence cooperation.

Defence ministers from Japan and South Korea are separately arranging to meet on the sidelines of the IISS Shangri-La Dialogue to be held in Singapore from June 2-4, in what would be the first such meeting since November 2019.

<https://www.reuters.com/world/asia-pacific/japan-skorea-link-radar-systems-track-nkorea-missiles-source-2023-05-09/>



Tue, 09 May 2023

## Kyiv's hard-kill of Russian Hypersonic Missile

*By Dr Ajey Lele*

On May 06, 2023, the Ukrainian Air Force has claimed that they had shot down a Russian Kinzhal Hypersonic missile. The incoming missile, which is expected to have travelled with a speed, five times more than the speed of sound, was successfully engaged by the Patriot Air Defence missile

system. If this claim is correct, then this single incident could have some impact on global perception about nuclear deterrence.

In the Ukraine conflict, on March 19, 2022 Russia had fired hypersonic missiles on the targets in Ukraine. This was the first time ever in history, the use of hypersonic missiles in actual war had happened. Since then, on a few occasions these missiles have been used by Russia on Ukrainian targets. Particularly, the attack carried out on Mar 09, 2023, the simultaneous attack using six missiles was known to be very lethal. The 'Kh-47 Kinzhal', also called as 'Dagger' has been designed to travel at speeds of more than 10 Mach (1 Mach equals the speed of sound). Experts always felt that use of this missile in the Ukraine conflict was not a military necessity and it was nothing but a disproportionate use of force. However, for Russia, more than the target on Ukrainian soil, the messaging was more important and that was obviously meant for the NATO forces.

From a threat perspective, along with Russia, the US is also concerned about the progress made by China's hypersonic weapon program. The existing missile defence structures are known for their capabilities to rout any incoming supersonic missile attack. It is difficult for existing missile defence systems to stop the hypersonic missiles like Kinzhal, which travel towards the target with very high-speeds. Hence, it is very surprising how a Patriot Air Defence missile system was able to lock-on and neutralise the threat. This could be a fluke, and the Ukraine air defence could have got an accidental success. However, any definitive conclusion in this regard could be reached only after the proper analysis of data. Ukraine is not ready to share any more information, since that could help Russia in their planning.

Patriot (Phased Array Tracking Radar for Intercept on Target) is a vintage surface-to-air missile (SAM) system, manufactured by the US defense contractor Raytheon. This system has been operational since 1984 and various improved versions are also available. This system has proven its worth in various wars including the 1991 Gulf war, the 2003 invasion of Iraq by the US and the ongoing Syrian civil war since 2014. The success rate of this system is around 95%. Mainly states like Israel and Saudi Arabia are known to be using these systems, which are known to cost approximately US\$1 billion per installation. Some time back, the US and the Netherlands each had agreed to donate a Patriot system to Ukraine. Ukrainian soldiers had undergone training at Oklahoma for using this system.

Along with the Patriot system, the US also has THAAD (Terminal High Altitude Area Defence) missile defence system, which has been operational since 2008 and is mainly designed for shooting down short, medium, and intermediate-range ballistic missiles. This system is deployed in states like Israel, Romania, South Korea, Turkey, and UAE. However, with threat from hypersonic missiles being at the doorstep, the US Missile Defence Agency (MDA) and Space Development Agency (SDA) have started developing a system to defend against hypersonic weapons. MDA has requested \$225 million for hypersonic missile defence in its fiscal 2023 budget. The development program is under fast-track stage. The US defence department is also known to be planning to develop directed energy systems and laser technologies for use in ballistic and hypersonic missile defence applications.

It is expected that the US would try to analyse the success achieved by Ukraine's air defence structure in downing the hypersonic threat. A very critical assessment about this recent performance of the Patriot Air Defence missile system would be carried out. Irrespective of any technical assessment of the performance of the Patriot system, the US would be very keen to keep the mystery around performance tricking. Today, Russia is not very sure if the 'kill' happened accidentally or did, the Patriot system performed beyond expectations. With no likely clarity in this regard in near future, possibly the Russian forces may restrict themselves from using hypersonic missiles over Ukraine theatre for now.

Nuclear tipped hypersonic weapons are known to be capable of penetrating the existing missile defence structures. Immediately, after the first hypersonic missile was fired during March 2022 by Russia, the US is known to have started reassessing their global strike capabilities. Perhaps somewhere, there was a realisation within the US administration that the Russian success puts a dent on their existing nuclear deterrence architecture. By successfully demonstrating the presence of war tested missiles in their arsenal Russia had 'made a statement' and they should have stopped at that. But, unnecessarily using more and more hypersonic missiles in Ukraine theatre, its novelty has got lost. Now with the Ukrainian claim of successful hypersonic missile interception, a significant amount of doubt has been created about the quality of Russia's hypersonic program. During the last one year, with successful use of hypersonic missiles on some occasions, Russia could be said to have gained some tactical advantages. However, Kyiv downing their hypersonic missile, is a strategic loss for Russia.

<https://www.financialexpress.com/business/defence/kyivs-hard-kill-of-russian-hypersonic-missile/3080409/>



*Tue, 09 May 2023*

## **US Announces \$1.2 Billion Aid to Ukraine for Air Defence, Ammunition**

The United States on Tuesday announced a new \$1.2 billion security assistance package for Ukraine to boost the country's air defences and provide it with additional artillery ammunition.

Ukraine is readying for a highly anticipated spring offensive against invading Russian troops, but the latest assistance will not immediately arrive on the battlefield as it must still be procured from the defence industry or partners.

This avoids depleting US stocks but means the assistance will take longer to reach Kyiv than equipment drawn directly from existing American military inventories.

The package underscores the continued US commitment to Ukraine "by committing critical near-term capabilities, such as air defence systems and munitions, while also building the capacity of Ukraine's armed forces to defend its territory and deter Russian aggression over the long term," the Defense Department said in a statement.

It features unspecified air defence systems and munitions as well as equipment to integrate Western systems with Ukraine's existing gear, which is mainly of Soviet vintage. Ukraine's air defences have played a key role in countering Russia's invasion, preventing Moscow's forces from gaining control of the skies and helping shield the country against missile and drone attacks.

### **Anti-drone, artillery ammo**

Secret US documents from late February that were allegedly leaked online by a junior member of the Air National Guard detailed looming munitions shortages for Soviet systems that make up a significant chunk of Ukrainian medium and high-range protection.

Kyiv's international supporters have worked to bolster its existing defences with a mix of cutting-edge systems such as Patriot and NASAMS, as well as older equipment.

The package also includes ammunition for counter-drone systems meant to counter the threat of Iranian-made uncrewed aircraft that Russia has used for strikes in Ukraine, as well as 155 mm rounds -- a key type of artillery ammunition for Ukraine's forces.

It will also provide commercial satellite imagery services as well as support for training and maintenance.

The latest assistance brings total US military aid to Ukraine since Russia invaded the country in February 2022 to more than \$36 billion.

The United States has spearheaded the push for international support for Ukraine, quickly forging an international coalition to back Kyiv after Russia invaded in February 2022 and coordinating aid from dozens of countries.

Kyiv has pushed for some items that its international supporters have been reluctant to provide, including Patriot air defence systems and advanced heavy tanks -- which were eventually delivered -- and others such as Western fighter aircraft, which have not been pledged so far.

<https://www.ndtv.com/world-news/us-announces-1-2-billion-aid-to-ukraine-for-air-defence-ammunition-4019658>

## THE ECONOMIC TIMES

*Tue, 09 May 2023*

### **China in Touch with All Parties in Seeking Ukraine Ceasefire: Foreign Minister**

Chinese Foreign Minister Qin Gang said on Tuesday that Beijing would maintain lines of communication with all parties to the war in Ukraine, including Germany, in seeking a ceasefire.

"As a permanent member of the United Nations Security Council and responsible major country, China will neither watch the fire from the other bank nor add fuel to the fire," Qin said alongside German counterpart Annalena Baerbock during a visit to Berlin.

Commenting on a European Union proposal to blacklist several Chinese companies as part of a new package of sanctions against Russia, Qin said Beijing "firmly opposes some countries in using their so-called laws to impose long-arm jurisdiction and unilateral sanctions on other countries, including China.

"China will make necessary responses and resolutely safeguard the legitimate rights and legitimate interests of Chinese enterprises," Qin said.

The EU's executive has proposed blacklisting Chinese companies and curbing exports to nations seen as involved in bypassing Russia trade restrictions under the latest set of sanctions against Moscow for its invasion of Ukraine.

Baerbock said that negotiations on the new package of sanctions were ongoing, but that generally it was important to prevent Russian defence companies "from gaining access to war-relevant goods", and to ensure "that sanctioned dual-use goods don't fall into the wrong hands".

Diplomatic sources have told Reuters the EU executive's proposal focuses on combating circumvention of existing trade restrictions through third countries, after the EU identified China, Turkey, the United Arab Emirates as well as countries in central Asia and the Caucasus as potential culprits.

Germany itself is increasingly wary of China as a strategic rival as well as its largest trading partner, and has considered a series of measures as it reassesses bilateral relations.

<https://economictimes.indiatimes.com/news/defence/china-in-touch-with-all-parties-in-seeking-ukraine-ceasefire-foreign-minister/articleshow/100106759.cms>

## Science & Technology News



*Tue, 09 May 2023*

### **NASA to Send 'Snake-Robot' to Find Alien Life on Saturn's Icy Moon**

Saturn's rings are mad beautiful. And the fact that they can be observed with basic stargazing equipment has meant that astronomers even in the medieval times were able to observe them with not-so-advanced technology of the times. But there's more to Saturn than just rings. The most unique planet in our solar system has a large number of satellites one of which, has long piqued scientific interest for search for extraterrestrial life.

Enceladus, one of Saturn's satellites is unique in a way that it has an icy surface. The laws of physics say that where there is ice, there are very high chances of water underneath. And where there is water, there is life, at least as per our most conventional scientific understanding.

Drilling ice on earth is challenging enough, how to do that on a surface that's literally millions of kilometres away? NASA has a unique solution.

The space agency is planning to send a snake-like robot to check out surface of Enceladus.

The snake-robot has a long winding name. Exobiology Extant Life Surveyor (EELS). It is being developed by NASA's Jet Propulsion Laboratory (JPL).

According to JPL , EELS is a "snake-like, self-propelled robot". It is made of segments with "first-of-a-kind rotating propulsion units". These will help it to grip surfaces and even move underwater.

This robotic snake is 16-foot long and weighs 220 pounds. At its head, EELS has machinery that'll help it map Enceladus in 3D. It'll send real time images. The body of EELS will have a payload that'll enable scientists to measure the sub-surface pressure.

JPL is currently testing the robot. As per media reports, the robot underwent testing at Athabasca Glacier in Canada's Jasper National Park. "We are early in the project, but it is achievable in our lifetime," EELS Deputy Project Manager Rachel Etheredge said last year, as quoted by CBS News. "...It's an ambitious collaboration, and we're motivated by the shared excitement we have for this concept, and the potential science we could gather with EELS."

"The EELS system is a mobile instrument platform conceived to explore internal terrain structures, assess habitability and ultimately search for evidence of life," NASA says of its development. "It is designed to be adaptable to traverse ocean-world-inspired terrain, fluidised media, enclosed labyrinthian environments and liquids."

<https://www.wionews.com/science/nasa-to-send-snake-robot-to-find-alien-life-on-saturns-icy-moon-590602>

