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सतह से हवा में मार करने वाली मिसाइल का हुआ सफल परीक्षण, अधिकारी बोले- कुछ ही मिनटों में टारगेट को किया ध्वस्त

भारत ने रविवार को सतह से हवा में मार करने वाली मध्यम दूरी की मिसाइल के सेना के संस्करण का ओडिशा के चांदीपुर से परीक्षण किया। रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने यह जानकारी दी। डीआरडीओ ने कहा कि मिसाइल परीक्षण सुबह 10.30 बजे किए गए। इसने ट्वीट किया, “ एमआरएसएम-आर्मी मिसाइल तंत्र उड़ान का बालासोर के समेकित परीक्षण रेंज से 10.30 बजे परीक्षण किया गया, जिसने लंबी दूरी वाले हवाई लक्ष्य को बेध दिया। मिसाइल ने लक्ष्य को ध्वस्त कर दिया।” इस मिसाइल को रक्षा अनुसंधान एवं विकास संगठन ने इजरायल के IAI कंपनी के साथ मिलकर बनाया है। इजरायल से भारत को मिली बराक मिसाइल (Barak Missile) भी MRSAM ही है। सतह से हवा में मार करने वाली मिसाइल आर्मी वेपन सिस्टम में कमांड पोस्ट, मल्टी फंक्शन राडार, मोबाइल लॉन्चर सिस्टम होता है। यह इजरायल की खतरनाक मिसाइल बराक-8 (Barak-8) पर आधारित है।

16 किलोमीटर तक टारगेट को गिरा सकती है मिसाइल

एक बार लॉन्च होने के बाद MRSAM आसमान में सीधे 16 किलोमीटर तक टारगेट को गिरा सकती है। वैसे इसकी रेंज आधा किलोमीटर से लेकर 100 किलोमीटर तक है। यानी इस रेंज में आने वाले दुश्मन यान, विमान, ड्रोन या मिसाइल को नेस्तानाबूत कर सकती है। MRSAM मिसाइल का वजन करीब 275 किलोग्राम होता है। लंबाई 4.5 मीटर और व्यास 0.45 मीटर होता है। इस मिसाइल पर 60 किलोग्राम वॉरहेड यानी हथियार लोड किया जा सकता है। यह दो स्टेज की मिसाइल है, जो लॉन्च होने के बाद धुआं कम छोड़ती है। बता दें कि, इससे पहले 23 मार्च को सतह से सतह पर मार करने वाली ब्रह्मोस सुपरसोनिक क्रूज मिसाइल का सफल परीक्षण किया था। अंडमान और निकोबार द्वीपसमूह में क्रूज मिसाइल का सफल परीक्षण किया गया था। रक्षा अधिकारी ने बताया था कि मिसाइल ने सीधे अपने टारगेट पर हिट किया था। एयर चीफ मार्शल वीआर चौधरी (Air Chief Marshal VR Chaudha) ने इस सतह से सतह पर मार करने वाली सुपरसोनिक क्रूज मिसाइल के सफल परीक्षण पर बधाई भी दी थी।

<https://www.punjabkesari.in/national/news/surface-to-air-missile-successfully-test-fired-1571447>

DRDO और नौसेना को बड़ी कामयाबी, हवाई खतरों को नाकाम करने में सक्षम मिसाइल का सफलतापूर्वक परीक्षण, जानें इसकी खासियत

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) और भारतीय नौसेना द्वारा एकीकृत परीक्षण रेंज (आईटीआर) ने शुक्रवार को ओडिशा के तट चांदीपुर में नौसैनिक जहाज से एक वर्टिकल लॉन्च शॉर्ट रेंज सरफेस टू एयर मिसाइल (वीएल-एसआरएसएम) का सफलतापूर्वक उड़ान परीक्षण किया।

वीएल-एसआरएसएम एक जहाज-जनित हथियार प्रणाली है जो समुद्री-स्कमिंग लक्ष्यों सहित निकट सीमा पर विभिन्न हवाई खतरों को बेअसर करने के लिए काम करती है।

रक्षा मंत्रालय ने एक बयान में कहा कि प्रक्षेपण उच्च गति वाले नकली विमान के हवाई लक्ष्य के खिलाफ किया गया था, जो सफलतापूर्वक हुआ। आईटीआर, चांदीपुर द्वारा तैनात कई ट्रेकिंग उपकरणों का उपयोग करके स्वास्थ्य मापदंडों के साथ वाहन के उड़ान पथ की निगरानी की गई।

रक्षा मंत्री राजनाथ सिंह ने डीआरडीओ, नौसेना और उद्योग को सफल परीक्षण के लिए बधाई दी और कहा कि यह हवाई खतरों के खिलाफ भारतीय नौसेना के जहाजों की रक्षा क्षमता को और बढ़ाएगा।

नौसेनाध्यक्ष एडमिरल आर. हरि कुमार ने वीएल-एसआरएसएम के सफल उड़ान परीक्षण के लिए भारतीय नौसेना और डीआरडीओ की सराहना की और कहा कि इस स्वदेशी मिसाइल प्रणाली के विकास से नौसेना की रक्षात्मक क्षमता और मजबूत होगी।

<https://www.navjivanindia.com/india/big-success-for-drdo-and-navy-successfully-test-fired-missile-capable-of-thwarting-air-threats>

Business Standard

DRDO, Navy successfully test short-range, anti-air missile to protect ships

Indian naval warships just became more heavily protected and difficult to strike with aircraft and anti-ship missiles, with the successful flight-test of the Vertical Launch Short Range Surface to Air Missile (VL-SRSAM) on Friday.

The VL-SRSAM, which the Defence Research & Development Organisation (DRDO) has indigenously developed for the Indian Navy, was fired from an Indian warship at a high-speed aerial target that was mimicking an incoming enemy aircraft.

India's most modern naval warships, such as the Visakhapatnam-class destroyers and Nilgiri-class frigates, are equipped with multiple layers of defence against their biggest threats: enemy aircraft and sea-skimming anti-ship missiles.

The first line of defence is provided by the Indo-Israeli medium range surface to air missiles (MRSAMs), which are capable of shooting down hostile aerial threats at ranges out to 70 kilometres. However, the MR-SAM can only engage targets that are flying at altitudes above 30 metres.

If the incoming aircraft or anti-ship missiles is a "sea skimmer", that is flying at an altitude below 30 metres, the warship will use a VL-SRSAMs to destroy the target. The VL-SRSAM can engage incoming aircraft at any altitude between 3 metres and 4,000 metres and at a distance of 25-30 kilometres.

During mid-course flight, the VL-SRSAM missile uses a fibre-optic, gyroscope-based, inertial guidance mechanism. With-lock-on-before-launch (LOBL) and lock on after launch (LOAL) capability, the missile receives mid-course update via datalink. Then, in the terminal phase, the missile switches to active radar homing.

The VL-SRSAM is an indigenous upgrade to the two-decade-old Israeli Barak 1 surface-to-air missile system on board Indian warships. It is derived from the DRDO's highly successful Astra Mark-1 air-to-air missile, which was recently fired successfully from a Sukhoi-30MKI fighter.

Several countries that have developed successful air-to-air missiles have modified them into other formats: The US converted the AIM-7 Sparrow into the RIM-7 Sea Sparrow. The French MICA missile has a land-launched variant called VL-MICA.

The platform provides an integrated solution that incorporates both the missile and weapon control system (WCS). Equipped with 360 degrees interception capability, it can detect and engage threats from different directions.

The VL-SRSAM missile has a smokeless exhaust and a jet-vane-driven thrust vector control that enables quick reaction time on vertical launch. The VL-SRSAM system is conceived for area as well as point defence to protect naval platforms.

Each vertical launch system (VLS) holds forty missiles in a twin, quad-pack canister configuration. Each carries eight missiles for hot launch, which can be installed in an arrangement of multiple launch systems based on availability of space on the warship.

In its first tests, the DRDO successfully test-fired two VL-SRSAMs on February 22, 2021. The maiden launch tested the efficacy of the VLS and missile's maximum and minimum range. Both the missiles fired successfully intercepted their targets with pinpoint accuracy.

In the second test on December 7, 2021, the VL-SRSAM was successfully fired by the DRDO from the Integrated Test Range, Chandipur, off the coast of Odisha. The launch was conducted from a vertical launcher against an electronic target at a very low altitude. The aim was to validate integrated operation of all weapon system components including the vertical launcher unit with controller, canisterised flight vehicle and weapon control system.

The DRDO has planned to offload the manufacture of the VL-SRSAM to a private sector firm, making it one of the first major weapons platforms to be produced by a private industry under the aegis of Atmanirbhar Bharat (self-reliant India) project. However, the company that will manufacture the VL-SRSAM has not yet been identified.

There are also plans to use it as a short-range air defence system for Indian Air Force.

https://www.business-standard.com/article/current-affairs/drdo-navy-successfully-test-short-range-anti-air-missile-to-protect-ships-122062401002_1.html

अमर उजाला

Sat, 25 Jun 2022

डीआरडीओ ने विकसित की तकनीक, 90 दिन में हो सकेगा पॉलिथीन का खात्मा

पर्यावरण में फैल रहे प्रदूषण को रोकने में बड़ी बाधा माना जा रहा पॉलिथीन खत्म करने का उपाय ढूँढ़ लिया गया है। केंद्रीय रक्षा मंत्रालय के रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) हैदराबाद ने एक ऐसी तकनीक विकसित की है, जिसके सहारे सैकड़ों वर्षों तक खत्म न होने वाला पॉलिथीन सिर्फ 90 दिनों में खत्म किया जा सकेगा।

इस तकनीक को शुक्रवार को एमएसएमई की ओर से एक होटल में वर्ल्ड एमएसएमई-डे के उपलक्ष्य में आयोजित कार्यशाला में डीआरडीओ हैदराबाद के वैज्ञानिक (एफ) डॉक्टर के. वीरा ब्राह्माम ने उद्यमियों से साझा किया। उन्होंने उद्यमियों को पॉलिथीन बैग के रिप्लेसमेंट में बायोडिग्रेडेबल एंड कंपोस्टेबल बैग की जानकारी दी। एमएसएमई केंद्र के सहायक निदेशक सतपाल ने बताया कि ये कार्यक्रम एमएसएमई-विकास संस्थान करनाल और वर्ल्ड रिसोर्स इंस्टीट्यूट (डब्ल्यूआरआई) इंडिया, आईएससी और टाइफैक के सहयोग से आयोजित किया गया। जिसका विषय था एमएसएमई में नई तकनीक व क्लीन/ग्रीन एनर्जी को विकसित करना।

बतौर मुख्य अतिथि पहुंचे डॉक्टर के. वीरा ब्राह्माम ने डीआरडीओ द्वारा तैयार पॉलिथीन बैग के रिप्लेसमेंट में बायोडिग्रेडेबल एंड कंपोस्टेबल बैग बनाने की तकनीक की विस्तृत जानकारी दी। उन्होंने बताया कि इस नई तकनीक से कैसे हम सदियों तक न खत्म होने वाली पॉलिथीन को सिर्फ 90 दिनों में खत्म कर सकते हैं। कार्पोरेट डिवीजन प्रोग्राम हेड, जनरल मैनेजर ट्रैक ईईएसएल गिरजा शंकर ने ईईटी को अपनाने के लिए योजनाओं व कार्यक्रमों की जानकारी दी।

उद्यमियों को मिल रहा लाभ

एमएसएमई के संयुक्त निदेशक प्रदीप ओझा ने कहा कि एमएसएमई विकास संस्थान ने उर्जा के क्षेत्र में सोलर एनर्जी स्कीम, एनर्जी एफिशिएंसी स्कीम पर कार्यशाला करके हरियाणा एवं आसपास के क्षेत्रों के उद्यमियों को लाभ मिल रहा है। साथ ही ईईएसएल, राज्य सरकार, डब्ल्यूआरआई, क्लीन एवं ग्रीन एनर्जी अपनाने पर सघन कार्य करेंगे। सहायक निदेशक सतपाल ने बताया कि पॉलिथीन को 90 दिन में पूर्णतः

खत्म करने की तकनीक प्रदूषण को नियंत्रित रखने में क्रांतिकारी कदम है।

मृदा उर्वरा के लिए भी घातक

पॉलिथीन मृदा उर्वरा के लिए घातक तो है ही, पशु भी इसे खा लेते हैं, उनके पेट में भी ये खत्म नहीं होती है, लेकिन अब नई तकनीक का लाभ मिल सकेगा। प्रोजेक्ट डायरेक्टर बलवान सिंह गोलन ने एमएसएमई के लिए अक्षय और स्वच्छ ऊर्जा पर अपने विचार व्यक्त किए। सहायक निदेशक एमएसएमई सुनीता कत्याल ने उद्योगों को दी जा रही सुविधाओं व स्कीमों में दी जाने वाली अनुदान की जानकारी दी। इसमें जीरो डिफेक्ट-जीरो इफेक्ट सर्टिफिकेशन योजना के पत्रक का विमोचन भी किया गया। अतिथियों का स्वागत सहायक निदेशक मीनू धीमान ने कराया। वर्ल्ड रिसोर्स इंस्टीट्यूट इंडिया की वरिष्ठ प्रबंधक काजोल ने कार्यक्रम का संक्षिप्त परिचय दिया। कार्यक्रम 27 जून वर्ल्ड एमएसएमई डे तक चलेंगे। मौके पर हरियाणा चैंबर ऑफ कामर्स एंड इंडस्ट्रीज के राज्य प्रधान रजनीश कुमार गर्ग ने कहा कि एमएसएमई को नई तकनीक अपनाने के लिए वित्त उपलब्ध कराने में समस्या आती है, इसलिए उद्योग इनको अपनाने में हिचकते हैं। हरियाणा फार्मास्यूटिकलस मेन्युफैक्चर्स एसोसिएशन के राज्य प्रधान आरएल शर्मा ने आश्वस्त किया कि वे व उनके उद्यमी अपने उद्योगों में क्लीन एवं ग्रीन एनर्जी को विकसित करेंगे।

प्रदर्शनी में लगाए चौदह स्टॉल

यहां एक विशेष प्रदर्शनी लगाई गई। जिसमें करीब 14 स्टॉल लगाए गए। द्वितीय सत्र में टेक्नोलॉजी प्रोवाइडर्स ने प्रदर्शनी एवं प्रेजेंटेशन के माध्यम से लगभग 10 तकनीक प्रदाताओं ने विभिन्न नवीन व क्लीन तकनीकों पर विस्तार से बताया। एमएसएमई को अपनाने के लिए प्रेरित किया। जिसमें यमुनानगर के हेमंत कुमार गुप्ता की लकड़ी के कचरे से मजबूत खिड़की दरवाजे बनाने की तकनीक आकर्षण का केंद्र रही।

तृतीय सत्र में अक्षय और स्वच्छ ऊर्जा के लिए वित्तपोषण मॉडल और योजनाएं वित्त एमएसएमई पर राज्य सरकार एवं वित्तीय संस्थानों जैसे सिडबी, जिला एमएसएमई हरियाणा सरकार, ईईएसएल द्वारा क्लीन एनर्जी स्कीम प्रोग्राम पर प्रेजेंटेशन दी गई।

<https://www.amarujala.com/haryana/karnal/drdo-developed-technology-polythene-can-be-eliminated-in-90-days-karnal-news-knl1125655140>



Fri, 24 Jun 2022

लद्दाख में बढ़ी सेना की ताकत! 'मेड इन इंडिया' लड़ाकू वाहनों से लैस हुए जवान

लद्दाख में तैनात सैनिकों की ताकत को बढ़ाने के मकसद से वहां के अग्रिम क्षेत्रों में मेड इन इंडिया इन्फैंट्री कॉम्बैट व्हीकल्स को शामिल कर लिया गया है. उत्तरी सेना के कमांडर लेफ्टिनेंट जनरल उपेंद्र द्विवेदी ने व्यक्तिगत रूप से इस युद्धक वाहन को चलाया और कहा कि इन लड़ाकू वाहनों के इस्तेमाल से सेना के जवान क्षेत्र के दुर्गम इलाकों में बड़ी आसानी से जा सकेंगे.

उत्तरी सेना के कमांडर लेफ्टिनेंट जनरल उपेंद्र द्विवेदी ने एएनआई को बताया, “कोई भी आसानी से वाहन चला सकता है और चालक वाहन के अंदर से 1800 मीटर दूर तक देख सकता है. इतना ही नहीं, वाहन पर लगे हथियार को अंदर से नियंत्रित किया जा सकता है.” इन्फैंट्री प्रोटेक्टेड मोबिलिटी व्हीकल्स (आईपीएमवी) नाम के वाहनों को इस साल अप्रैल में भारतीय सेना को दिया गया था और लद्दाख के पहाड़ी इलाकों में इसका परीक्षण किया गया है.

इन इन्फैंट्री प्रोटेक्टेड मोबिलिटी व्हीकल्स (आईपीएमवी) (कोसंयुक्तरूपसे रक्षा अनुसंधान और विकास संगठन) डीआरडीओ (और टाटा समूह द्वारा विकसित किया गया है).

<https://hindi.news18.com/news/nation/corona-update-17073-news-cases-21-deaths-reported-in-india-active-cases-94420-4349005.html>

R. REPUBLICWORLD.COM

Fri, 24 Jun 2022

Made In India Infantry Combat Vehicles Inducted Into Indian Army In Ladakh's Leh

In a major boost to the Armed forces, the Indian Army, on Friday, inducted new Made in India Infantry Combat Vehicles into its machinery in Leh, Ladakh. As part of the indication, Northern Army Commander Lt General Upendra Dwivedi drove the ICV. Several jawans boarded the vehicle with weapons and successfully completed the first ride in the newly inducted Army machinery.

Speaking about the new Infantry Combat Vehicles made under the Make in India initiative, Northern Army Commander Lt General Upendra Dwivedi made positive comments on the vehicle's capabilities. Inducting the ICVs into the Indian Army, Lt General Dwivedi said, “One

can easily drive the vehicle. The driver can see 1800 meters away from it. The weapon mounted on it can be controlled from inside.”



It is pertinent to note that the vehicle was inducted into the force some time ago and has been developed jointly by India's Defense Research and Development Organisation (DRDO) and Tata Group.

Lt General Upendra Dwivedi had arrived in Leh on Monday for a four-day-long visit to Ladakh to review the operational preparedness of troops in the Union Territory. The Northern Commander reviewed the operational preparedness, training, and progress of induction of modern weapon systems, equipment and logistics assets during the visit.

<https://www.republicworld.com/india-news/general-news/made-in-india-infantry-combat-vehicles-inducted-into-indian-army-in-ladakh-leh-articleshow.html>



Sun, 26 Jun 2022

Garuda Aerospace to Set Up Drone Factory in Malaysia With Hiilse Drones

India's Garuda Aerospace on June 22 announced that it has teamed up with Malaysia-based HiiLSE Drones to set up a 2.42 hectare drone factory in Malaysia. According to a release, Garuda Aerospace will be investing Rs 115 crore into the partnership and will be aiming to provide drone technologies to both government and private sectors across the region. In a statement, HiiLSE Drones founder and CTO, Shanmugam S Thangavilo said a drone manufacturing plant in Malaysia will reduce costs and help in creating 3,000 jobs centred around drone expertise. Agnishwar Jayaprakash, Founder and CEO of Garuda Aerospace said the drones manufactured will be equipped with advanced artificial intelligence, machine learning and deep learning technologies. Earlier, Jayaprakash had told IANS that the company was in the process of closing a \$30 million series-A funding by the end of July. The drone also recently announced that it has secured cricketer Mahendra Singh Dhoni as a shareholder and a brand ambassador for the company.

<http://www.indiandefensenews.in/2022/06/garuda-aerospace-to-set-up-drone.html?m=1>



Sun, 26 Jun 2022

Indian Navy Issues Request for Information (RFI) for Procurement of 4 X 300 Ton Sullage Barges

The Indian Navy under Ministry of Defence, is planning to procure 4 X 300 Ton Sullage Barges from registered Indian Shipyards. With a view to identify probable shipyards who can undertake the construction of 4 X 300 Ton Sullage Barge, the shipyards are requested to forward information as sought in the RFI. The aim of seeking the RFI is also to finalise the specifications for the said barges with inputs from the Shipyards. As per the RFI the Barge shall be capable of receiving sullage from ships and submarines alongside and at anchorage for discharge. The 4 X 300T Sullage Barges are proposed to be acquired. The anticipated delivery time lines for the first barge is maximum of 18 months followed by delivery of each barge every 03 months. Vendors are to indicate their comments on the build period and timelines for delivery. Three barges will be delivered at Visakhapatnam and one at Kochi.

<http://www.indiandefensenews.in/2022/06/indian-navy-issues-request-for.html?m=1>

Progress Made in Deliberations for Tri-Services Theaterisation Plan: IAF Chief Air Chief Marshal VR Chaudhari

Definite progress has been made in ongoing deliberations for the theaterisation plan and the Indian Air Force (IAF) remains fully committed to the tri-services integration for enhancing comprehensive national combat power, Air Chief Marshal VR Chaudhari said on Sunday. In an interview to PTI, the Chief of Air Staff said the IAF is hopeful that the final structures, as and when they come out, would be potent, robust and capable of tackling the existent and future threats. "The process of theaterisation of the Indian Armed forces is at a deliberation stage. There are a few issues which are being discussed and definite progress has been made in this aspect," he said. As per the plan, each of the theatre commands will have units of the Army, the Navy and the Air Force and all of them will work as a single entity looking after security challenges in a specified geographical territory under an operational commander.

At present, the Army, Navy and the Air Force have separate commands. Initially, a plan was firmed up for the creation of an Air Defence Command and Maritime Theatre Command. "While the deliberations are ongoing, we are hopeful that the final structures, as and when formed, would be potent, robust and capable of tackling the existent and future threats," the Chief of Air Staff said. "Therefore, the joint structures that we may form shall be specific to our environment, adequately deliberated and war-gamed to clearly announce tasks and roles of each service," he said. Air Chief Marshal Chaudhari said the three services are on the "same page" when it comes to these broad aspects of formulation of joint structures. "The IAF remains fully committed to integration that brings about transformation and enhancement of the comprehensive national combat power," he said. We are sanguine that the armed forces will meet the aspirations of the nation and arrive at a model that is most effective and is future ready," the IAF Chief added. He said the IAF is committed to joint operational planning based on principles of achieving enhanced combat power and efficiency in operations of armed forces.

The Chief of Air Staff was asked about the perception that the IAF is not very keen on the theaterisation initiative. The theatre commands are being planned to integrate the capabilities of the three services and to ensure optimal utilisation of their resources. The Department of Military Affairs headed by India's first Chief of Defence Staff Gen Bipin Rawat last year had asked all the three services to carry out independent studies on the theaterisation plan for its rollout. The deliberations on the theaterisation plan slowed down a bit following the death of Gen Rawat in a helicopter crash in December last. "My vision for the IAF is to build on the strong foundations of our service and make it further effective and ever ready to protect the the sovereignty of our nation," the IAF chief said, in replying to a separate question.

"We aim to achieve this through enhancement of entire spectrum of our operational capabilities, induction of modern technology and by ensuring better serviceability and availability of our assets," he said. Air Chief Marshal Chaudhari said the coming years would demand more rigorous, regular and realistic training in multi-domain warfare. "Agility in thought and action through seamlessly integrated command and control structures should provide us with enhanced responsiveness and lethality," he said. "At the same time, we continue to work tirelessly to provide better working and living conditions for all our air warriors through improvement in our infrastructure and evolving transparent and contemporary human resource policies,"

<https://economictimes.indiatimes.com/news/defence/deliberations-for-tri-services-theaterisation-plan-iaf-air-chief-marshal-vr-chaudhari/articleshow/92469458.cms>

‘Start-Ups Being Encouraged to Take Cyber Security Technology to Public’

Ajay Kumar Sood, Principal Scientific Adviser to the Government of India and Chairman of the Society of Electronic Transactions and Security (SETS), on Saturday said start-ups were being encouraged to take cybersecurity technology to the public. Speaking to The Hindu after taking part in the 21st Foundation Day celebrations of SETS, he said it may not be possible for government agencies like SETS to take products they develop to the public and this was where start-ups, especially those in deep tech, come in. “There is no choice but to have a very close relationship with industry. There is money in cryptography, but how to get technology, which is front-end. If Indian companies have to be one up, organisations like SETS are the key,” he said, adding, “you cannot keep private and government players in separate silos.”

Prof. Sood said in the last five years, the number of start-ups had increased from 70 to 67,000 and some of these were into deep tech. “Deep tech is one of the subjects that is on the agenda of the monthly meetings with the Prime Minister,” he added. Prof. Vijay Raghavan, former Principal Scientific Adviser, explained how a small institution could attain greater value and stated five factors— a select portfolio of problems, quality employees, development of state-of-the-art hardware and software, collaboration with academia and collaboration with the industry. N. Sarat Chandra Babu, Executive Director, SETS; V.S Subramanian, Northwestern University, the U.S.A; N. Sitaram, former DS&CC, DRDO and Chairman Governing Council, SETS; Parvinder Maini, Scientific Adviser; and D. Lakshmanan, Chief Administrative and Accounts Officer, SETS, participated in the event.

Later, Prof. Sood launched a technology called Quantum Random Number Generator, developed by SETS. He also spent some time inspecting the technical equipment and laboratories on the SETS campus.

<https://www.thehindu.com/news/cities/chennai/start-ups-being-encouraged-to-take-cyber-security-technology-to-public/article65565078.ece>



Sun, 26 Jun 2022

Sumbarine Project 75I Moving Ahead Under the Strategic Partnership Model Only—Defence Secretary Ajay Kumar

by Manish Kumar Jha

India is gearing up for the critical and mega projects in defence and aerospace for building next generation submarine under the Project 75I and fighter jets like AMCA, Tejas 2 and 114 MRFA. These are the definitive and ambitious projects for building next generation advance capabilities and laying ground for marine and aerospace industrial ecosystem in India. In an exclusive interaction, Defence Secretary Ajay Kumar speaks with Manish Kumar Jha of Financial Express

on such crucial issues which are going to impact and drive military modernization. He also talks about military transport aircraft—C295 and some of breakthroughs in advanced tech like sensors, super semiconductors and military drones through iDEX.

The Indian navy's crucial P75I is still under discussion. While the project is being pursued under the Strategic partnership (SP) model, are you also deliberating to broaden the scope under different category –Buy and make in India? Also, the Indian vendors have yet to finalize on the third strategic partners—a foreign OEM for design and other elements, including critical AIP system. Some of them shown their inability to participate based on AIP clause? Could you clarify?

Defence Secretary: So, the government is taking P75I forward and government is also taking strategic partnership forward. On the specific status, DG Acquisition will know better. As you know, this is the first time that we are doing strategic partnership model which is large in size. It has several connotations where three parties are involved. Here, you have Indian strategic partners, the foreign OEMs and the Services. So, it is different kind of process compared to what we have followed in the past. As I understand, the processes are moving forward. Certain agreements and clauses are required to be tweaked to be able to adjust to such unique situation. And those are under discussion and we expect to finalize it very shortly. But you see the more important point is, today, increasingly, our main focus is atmanirbharta. In this process, we are saying— develop our own technology. In this budget, govt has opened defense technology, R&D for the private sectors and other players.

Therefore, from our perspective today, our priority is to see how we can develop more technologies in India. It is an exciting opportunity for all; whether it is DRDO, whether it is DPSUs or the private industry or startups.

Manish K Jha: There are concerns also regarding the Unlimited liability which stretches over the span many years. Could you talk about the recommendation as suggested by the empowered committee?

These specific clauses could not be discussed in open domain. Because, this is a contractual arrangement, which is you know, in some sense private and it would not be proper to talk about specific contract in details.

Manish K Jha: So, what stage are we at it?

Defence Secretary: Yes. Now, it is moving forward.

Manish K Jha: Another key project for the MRFA is under speculation to bring it under 'Buy Global, Make India'. How do you look at building the aerospace ecosystem for the proposed combat jet? Do you see it as priority?

Defence Secretary: Our top priority is atmanirbharta (self- reliant). We have given orders for make in India— 83 LCA Tejas. We are pursuing LCA Mk2. We are pursuing AMCA and DRDO has accepted very ambitious timelines to realize this under that time line. Also, today, we have transport aircraft C295 being built in India. We have basic trainer aircraft—40 of them— are being designed, developed and manufactured in India. Very shortly, we will have the intermediate jet trainer built in India. We have the Dornier as the transport aircraft. You know, Dornier as a civil fixed-wing aircraft, which has been certified by DGCA now and being

exported as well. A civil aircraft, modified version of Dornier is being made in India that we use for regional connectivity. So, as far as we are concerned, our top priority is make in India.

So, any proposal that we are pursuing today is make in India. There is no proposal that is pending with us today. But everything that we have pursued in the last two and a half years is largely make in India.

Manish K Jha: You mentioned C295 transport aircraft. Could you talk about the progress in setting assembling line and manufacturing components/sub systems?

Defence Secretary: It is moving at good pace and it is being monitored by a committee headed by DG Acquisition. The project is moving as per schedule. The transport aircraft C-295 has 13200 detailed parts, 4600 sub-assemblies and all seven major component assemblies. These are outer wings, center wings, box, nose fuselage, center fuselage, appendages and doors. These key components will be done in India. Besides, two testers for these parts and major sub-assemblies will be done in India. Assemblies of aerostructure, including the subassemblies will be all done in India. The various systems such as engines, landing gear, avionics, EW suite will be done in India. For the first time, we are in the process of introducing the testing and certification system by the industry for the product. And this will be in line with the best global practice. We are using this learning to actually enable our industrial ecosystem system to start doing own testing and certification for other airworthy products also. So, overall, 96 percent of the total manhour per hour which Airbus used to employ at its manufacturing facility of Spain is planned to be undertaken here in India. The ninety six percent— is the level of indigenization. There are going to be more than 125 MSMEs suppliers who will contribute in manufacturing C-295 in India.

These supplies will be NADCAP certified. National Aerospace and Defense Contractors Accreditation Program (NADCAP) is a global certification agency. So, we will have 125 new NADCAP certified suppliers for the global supply chain. NADCAP is the global quality assurance system. More than 42.5 lakh manhours of work will be generated in India and large number of jobs will be created. So, it's one of the very intensely make in India projects.

Manish K Jha: Based on such acquisition, there are indications that MRFA will be brought under the same model—which is 'Buy Global, Make in India'. Could you please clarify and outline the facts?

Defence Secretary: You know, we don't have to do Buy Global. The important thing is today, make in India is possible to such an extent and next time or effort will be to go further than this. So, it is important to the recognize the maturity of the Indian industry ecosystem as part of this effort.

Manish K Jha: Talks are on with French entity Safran for the aeroengine. Do we get the full matrix of technology which will enable India to further design, develop and manufacture aeroengine?

Defence Secretary: So, there is no agreement which has been concluded with anyone so far that I am aware of. Such discussions are going on but nothing has been concluded.

Manish K Jha: Drones' ecosystem is building up in the country. There is also 'no- import' policy which is the right step for encouraging local effort. But we also need to develop some key component like – sensors. How do you look at this? How do we get to design and manufacture military grade –best in class–UAVs in India?

Defence Secretary: I will call it exploding. It is growing at a fantastic pace and capabilities that our industry and startups have shown, we are very proud of it. As regards, today, we have focused on aatmnirbharta. A lot of sensors are being developed under iDEX. One of our startups made 100-megapixel camera which we have been traditionally importing and the cost of the camera is nearly 1/10. It is a fraction of the cost at which we are importing. Camera is a very important part of drones. With this new wave of defense innovation, one of our startups—QNu—have done quantum crypto computing technology at a distance of 150 km, which is the farthest in the world. They are working with the Indian Army. To my knowledge, the best that has been done elsewhere, is 90 km only and we are now working to see how that can be further optimized. The point is today, we have moved.

There is a see-through armor capability that has been created which is again different kind of sensors. Another startup has created capabilities for the soldiers to monitor their health and well-being on a real-time basis. So, lot of capabilities are under development and need to continue this process. So, you will see now more and more sensors getting developed here. When I was in the Ministry of IT, we started a center — National center for Electronics on IoT, which was only about developing the sensors. It's based in Bangalore and works along with NASSCOM. They have done some wonderful work on sensors. Another Center— national Center for Flexible Electronics, which is again about sensors.

So, the point you made is important. And the government has come out with a new policy for semiconductors design that is creating capability for using our own semiconductors in various kind of electronic gadgets.

Manish K Jha: Is it about laying ground for the semiconductors industry?

Defence Secretary: It is not about FAB. These are two different things. I am talking about the design part. It is like having your own car or using a taxi, but you still need a vehicle to go. If you don't have your own fab, you can go to somewhere and get your chip fabricated but creating the chip ourselves in India that is the mission. Which has become super semiconductor mission and that has been created. Program of massive scale has been sanctioned which is worth billions of dollars. Today, all these things are creating the ecosystem for sensors, which you mentioned.

Manish K Jha: You have been focusing a lot on iDEX. Please share some of the breakthroughs in advance technology in defence and aerospace? Does iDEX have sufficient fund to drive such advance projects?

Defence Secretary: As far as money is concerned, they don't need money, they just need facilitation. This whole thought of thousands of crores of rupees for innovation is not required. In many cases, It is just the facilitation and hand-holding which make the difference. You see a lot of our Innovation is happening. We have marked 500 crores for iDEX for the number of projects and we have even spent less than half of it. So, fund is available and there is no dearth of money for innovation. So, it's not a question of money, money is not a constraint if required and it can be made available for good projects.

<https://www.financialexpress.com/defence/sumbarine-project-75i-moving-ahead-under-the-strategic-partnership-model-onlydefence-secretary-ajay-kumar/2571775/>

Sun, 26 Jun 2022

All You Want to Know About Lockheed C-130 J Super Hercules & Embraer C-390 Millennium

By Prashant Prabhakar

An updated version of the Lockheed C-130 Hercules, the Lockheed Martin C-130J Super Hercules is a four-engine turboprop military transport aircraft with new engines, flight deck and other systems. The C-130 Hercules primarily performs the tactical portion of the airlift mission and is capable of operating from rough, dirt strips and is the prime transport for airdropping troops and equipment into hostile areas. The flexible design of the Hercules enables it to be configured for many different missions, allowing one aircraft to perform the role of many. It is designed in such a way that it can be rapidly reconfigured for the various types of cargo such as palletized equipment, floor-loaded material, airdrop platforms, container delivery system bundles and aeromedical evacuation. The C-130J is the latest addition to the C-130 fleet and has replaced aging C-130Es and some of the high time C-130Hs. With a demonstrated performance of more than 2 million flight hours supporting tactical airlift, search and rescues, special operations and refueling missions around the globe, the C-130J Super Hercules is the most advanced C-130 ever designed.

Specifications and performance

Crew	3 (two pilots, and one loadmaster are minimum crew)
Payload main	42,000 lb (19,051 kg)
Max weight take-off	155,000 lb (70,307 kg)
Powerplant	4 ×Rolls Royce 2100 AE engines
Propellers	6-bladed Dowty R391 composite constant-speed fully-feathering reversible-pitch propellers
Cruise speed	644 km/h
Range	3,300 km at max normal payload
Service ceiling	28,000 ft with 42,000 lb

The C-130J Hercules is the only model in production and as of March 2022, 500 C-130J aircraft were delivered to 26 operators in 22 countries.

India's C-130J Hercules

Powered by four Rolls-Royce AE2100 engines and Dowty six-bladed props that provide the aircraft with a great deal of power, the aircraft has operated for the past several years in the mountainous areas of Afghanistan (in conditions similar to India) and shown exceptional performance. The heart of the new Super Hercules advanced technology is its modern flight station with multi-function, LCD screen for aircraft flight control, operating, and navigation systems. In addition to the four displays on the instrument panel, pilots use holographic head-up displays as primary flight instruments, a precedent among military transports

The Embraer C-390 millennium

Produced by the Brazilian Aerospace Manufacturer Embraer, the **Embraer C-390 Millennium** is a medium-size, twin-engine, jet-powered military transport aircraft and can be configured to perform various conventional operations such as troop, VIP and cargo transportation, and more specialised logistical operations such as aerial refuelling as a tanker. The C-390 has been marketed as a jet-powered alternative to the C-130 Hercules produced by Lockheed Martin and is the largest and most complicated aircraft ever built by Embraer. Having made its first flight in February 2015, the KC-390 can carry out a range of missions, including humanitarian support, medical evacuation (MEDEVAC), search and rescue, and aerial refuelling. Designed to be reconfigured in less than three hours to support different missions, it is powered by two turbofans, can be refuelled in-flight and also used for mid-air refuelling of other aircraft. Featuring fly-by-wire technology, which considerably reduces pilot workload, the aircraft uses computed air release point (CARP) technology to provide greater accuracy during air dropping, thereby reducing crew workload.

Avionics

The cockpit is equipped with Collins Aerospace's Pro Line Fusion avionics system which features five 15in, night vision imaging system (NVIS) compatible, high-resolution LCD displays. The advanced avionics system also enables enhanced situational awareness, due to its synthetic vision capabilities and graphical flight planning.

The self-protection suite

The self-protection suite (SPS) of the tactical aircraft includes detection and countermeasures such as radar warning receiver (RWR), missile approach warning system (MAWS), laser warning system (LWS), enhanced vision system (EVS), and directional infrared counter measures (DIRCM). Additionally, it also features ballistic armour protection against 7.62mm bullets and is equipped with chaff and flare systems to distract and counter incoming missile threats.

Propulsion system

The aircraft's propulsion system features two International Aero Engines' (IAE) V2500-E5 engines, each providing an upward thrust of approximately 31,330lb (138kN) and a fully electronic aircraft-to-engine interface.

Landing gear

The KC-390 is equipped with double chamber shocker absorber system and modern hydraulic systems that enable the aircraft to operate with heavy payloads and land even on semi-prepared airfields.

Specifications and performance

Crew	Three flight crew (2 pilots, 1 loadmaster)
Max take-off weight	86,999 kg
Powerplant	2 × IAE V2500-E5 turbofan
Cruise speed	870 km/h
Range	5,820 km
Service ceiling	36,000 ft
Armament (Headpoints)	3 with a capacity of POD Optical / IR Rafael Litening II / IFR Cobham 900E

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Wikipedia

According to Embraer, the company is in talks with Indian authorities with its C-390 Millennium offering. It has collaborated with Defence Research and Development Organisation (DRDO) to produce three 'Netra' AEW&C on the Embraer ERJ145 platform which is operated by the Indian Air Force (IAF).

<https://www.financialexpress.com/defence/all-you-want-to-know-about-lockheed-c-130-j-super-hercules-embraer-c-390-millennium/2573244/>

THE HINDU

Sun, 26 Jun 2022

Iran Launches Rocket into Space as Nuclear Talks to Resume

Iranian state television said on Sunday that Tehran had launched a solid-fueled rocket into space, drawing a rebuke from Washington ahead of the expected resumption of stalled talks over Tehran's tattered nuclear deal with world powers. It's unclear when or where the rocket was launched, but the announcement came after satellite photos showed preparations at Imam Khomeini Spaceport in Iran's rural Semnan province, the site of Iran's frequent failed attempts to put a satellite into orbit. State-run media aired dramatic footage of the blastoff against the backdrop of heightened tensions over Tehran's nuclear program, which is racing ahead under decreasing international oversight. Iran had previously acknowledged that it planned more tests for the satellite-carrying rocket, which it first launched in February of last year. Ahmad Hosseini, spokesman for Iran's Defense Ministry, said Zuljanah, a 25.5 meter-long rocket capable of carrying a payload of 220 kilograms (485 pounds), would gather data in a low-earth orbit. It was not immediately clear whether it reached its intended orbit. Zuljanah is named for the horse of Imam Hussein, the grandson of the Prophet Muhammad. The White House said it was aware of Iran's announcement and criticized the move as "unhelpful and destabilizing." It said it was committed to using sanctions and other measures to prevent further advances in Iran's ballistic missile program.

The launch comes just a day after the European Union's foreign policy chief, Josep Borrell, traveled to Tehran in a push to resuscitate negotiations over Iran's nuclear program that have stalemated for months. A few significant sticking points remain, including Tehran's demand that Washington lift terrorism sanctions on its paramilitary Revolutionary Guard. Borrell said on Saturday that talks over the nuclear deal would resume in an unnamed Persian Gulf country in the coming days, with Iranian media reporting that Qatar would likely host the negotiations. Former President Donald Trump withdrew the U.S. from the nuclear deal in 2018 and reimposed crushing sanctions on Iran. Tehran responded by greatly ramping up its nuclear work and now enriches uranium closer than ever to weapons-grade levels. In a further escalation that limits the international community's view into its nuclear program, Iran removed over two dozen International Atomic Energy Agency cameras from its nuclear sites this month. The agency's director called the move a "fatal blow" to the tattered nuclear deal.

As confrontations continue between Iran and the West after the unraveling of the nuclear deal, Tehran's rocket launches have raised alarm in Washington. The U.S. warns that such launches defy a United Nations Security Council resolution calling on Iran to steer clear of any activity related to ballistic missiles capable of delivering nuclear weapons. The U.S. intelligence community's 2022 threat assessment, published in March, claims such a satellite launch vehicle "shortens the timeline" to an intercontinental ballistic missile for Iran as it uses "similar technologies." Iran, which long has said it does not seek nuclear weapons, maintains its satellite launches and rocket tests do not have a military component. Even as Iran's government has sharpened its focus on space, sending several short-lived satellites into orbit and in 2013 launching a monkey into space, the program has seen recent troubles.

There have been five failed launches in a row for the Simorgh program, a type of satellite-carrying rocket. A fire at the Imam Khomeini Spaceport in February 2019 also killed three researchers.

The launch pad used in the preparations for the launch of the Zuljanah rocket remains scarred from an explosion in August 2019 that even drew the attention of then-President Trump. He later tweeted what appeared to be a classified surveillance image of the launch failure. Satellite images from February suggested a failed Zuljanah launch earlier this year, though Iran did not acknowledge it. Meanwhile, Iran's paramilitary Revolutionary Guard in April 2020 revealed its own secret space program by successfully launching a satellite into orbit. The Guard operates its own military infrastructure parallel to Iran's regular armed forces.

<https://www.thehindu.com/news/international/iran-launches-rocket-into-space-as-nuclear-talks-to-resume/article65567970.ece>

Science & Technology News



पत्र सूचना कार्यालय
भारत सरकार

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डीएसटी-आईआईएससी का एनर्जी स्टोरेज प्लेटफॉर्म तेजी से चार्ज होने वाली सॉलिड-स्टेट बैटरी को सक्षम करने की दिशा में आगे बढ़ रहा है

शोधकर्ताओं ने पूर्ण ठोस-अवस्था (सॉलिड – स्टेट) लिथियम मेटल बैटरी में फास्ट चार्ज - डिस्चार्ज की दरों को सक्षम करने के लिए एक अभिनव अंतर्सतही अभियांत्रिक प्रविधि (इंटरफेसियल इंजीनियरिंग एप्रोच) के बारे में जानकारी दी है। उन्होंने पाया है कि टंगस्टन जैसी नैनोस्कोपिक दुर्दम्य (रिफ्रैक्टरी) धातु की परतें इन बैटरियों के प्रदर्शन में सुधार कर सकती हैं जो विद्युत गतिशीलता जैसे उद्देश्यों के लिए महत्वपूर्ण हैं। पारंपरिक एलआई -आयन बैटरी में एक ग्रेफाइट एनोड, एक तरल इलेक्ट्रोलाइट और एक संक्रमण धातु कैथोड का उपयोग किया जाता है। हालांकि तरल इलेक्ट्रोलाइट्स ज्वलनशील होते हैं और उच्च तापमान पर खराब हो जाते हैं जिससे बैटरी का जीवनकाल बिगड़ जाता है और बहुत बार स्थिति बिगड़ने पर बैटरी में आग भी लग जाती है। परन्तु एक सिरेमिक ठोस इलेक्ट्रोलाइट के साथ तरल इलेक्ट्रोलाइट को एक पारंपरिक एलआई -आयन बैटरी में बदलने और उसके साथ ही ग्रेफाइट एनोड के स्थान पर एक धात्विय लिथियम एनोड के प्रयोग से एलआई-आयन बैटरी सुरक्षित और सक्षम हो सकती है तथा एक बार चार्ज करने पर ही लंबे समय तक चलती है।

हालांकि, ठोस –अवस्था (सॉलिड स्टेट) बैटरियों के साथ एक लंबे समय से चली आ रही चुनौती लिथियम डेंड्राइट्स की मात्रा में वृद्धि हो जाना भी है जो इसके सेल्स को शॉर्ट सर्किट कर देता है तथा यह समस्या फास्ट चार्जिंग के दौरान

बढ़ जाती है। सैकड़ों सॉलिड -स्टेट हाफ सेल्स और उसके बाद के नैनो - लाक्षणिक गुणों पर किए गए व्यापक मौलिक वैदुत- रासायनिक (इलेक्ट्रोकेमिकल) मापनों के आधार पर, भारतीय विज्ञान संस्थान (आईआईएससी) के शोधकर्ताओं ने अनुभव किया कि डेंड्राइट का विकास होना एक गहरी मौलिक प्रक्रिया का प्रकटीकरण था : अर्थात लिथियम रिक्तियों (वॉयड्स) का विसरित विकास जो इस प्रक्रिया के दौरान बन रहे हैं। शोधकर्ताओं ने पहचाना कि डिस्चार्ज के दौरान लिथियम वॉयड्स के बढ़ने से चार्ज के दौरान डेंड्राइट का विकास होता है। विकल्प राज, विकटर वेंचुरी, वरुण आर कंकानाल्लू, बिभात्सु कुइरी, वेंकटसुब्रमण्यम विश्वनाथन और नागा फनी बी एतुकुरी की टीम ने पाया कि सूक्ष्म रिक्तियों (वॉयड्स) के किनारों पर, एलआई - आयन धाराएं (करेंट्स) केंद्रित रहती हैं। इन किनारों पर धाराएं सेल में औसत धाराओं की तुलना में लगभग 10000 गुना अधिक हैं। इसलिए डेंड्राइट के विकास को रोकने के लिए वॉयड्स की वृद्धि को रोकना आवश्यक है।

लिथियम एनोड और ठोस इलेक्ट्रोलाइट के बीच दुर्दम्य (रिफ्रैक्टरी) धातुओं की एक अल्ट्राथिन परत के साथ प्रयोग करते हुए, शोधकर्ताओं ने देखा कि लिथियम के लिए इसकी कम घुलनशीलता के कारण टंगस्टन लिथियम रिक्ति गति को बाधित करने के लिए एक आदर्श पदान्वेषी है और इसलिए यह रिक्ति (वॉयड्स) वृद्धि में देरी करता है। उन्होंने कम्प्यूटेशनल विधियों के माध्यम से अपने काम की पुष्टि करने के लिए कार्नेगी मेलॉन विश्वविद्यालय के शोधकर्ताओं के साथ सहयोग किया। सुपरकैपेसिटर और पावर डेंस पर इस कार्य को आगे बढ़ाने में विज्ञान और प्रौद्योगिकी विभाग (डीएसटी) के प्रौद्योगिकी मिशन डिवीजन (ऊर्जा, जल और अन्य) द्वारा चलाए गए एनर्जी स्टोरेज प्लेटफॉर्म के तहत विज्ञान और प्रौद्योगिकी विभाग - ऊर्जा संरक्षण और भंडारण प्लेटफॉर्म हेतु सामग्री (डीएसटी-एमईसीएसपी) कार्यक्रम के लिए सामग्री के तहत बनाई गई सुविधाओं और उपकरणों की अहम भूमिका रही है। यह शोधकार्य नेचर मैटेरियल्स में प्रकाशित हुआ है। शोधकर्ताओं ने अपने प्रयासों में सहायता देने के लिए विज्ञान और प्रौद्योगिकी विभाग (डीएसटी) प्रौद्योगिकी मिशन डिवीजन - ऊर्जा, जल और अन्य (टीएमडी-ईडब्ल्यूओ) के वैज्ञानिक- ई डॉ. रंजीत कृष्ण पाई डीएसटी और टीएमडी-ईडब्ल्यूओ के पूर्व प्रमुख (स्वर्गीय) श्री डॉ. संजय बाजपेयी की सहायता तथा इसे और आगे विस्तृत करने के लिए टीएमडी - ईडब्ल्यूओ की वर्तमान प्रमुख डॉ. अनीता गुप्ता द्वारा दी गए सहयोग को स्वीकार किया। डीएसटी ने इस कार्यक्रम की अवधारणा को मूर्त रूप देने के लिए एक ही छत के नीचे ऊर्जा अनुसंधान के लिए कई आवश्यक सुविधाएं प्रदान की हैं । शोधकर्ताओं की टीम अब इस उपलब्धि के बाद ऐसे पूर्ण ठोस-अवस्था (सॉलिड – स्टेट) सेल्स को विकसित करने की इच्छुक है जो एक घंटे से भी कम समय में चार्ज करने में सक्षम हो सकते हैं तथा पारंपरिक एलआई -आयन कोशिकाओं की वर्तमान लागत के बराबर या उससे कम लागत पर 45 डिग्री सेल्सियस के उच्च तापमान अथवा उच्चतर पारंपरिक एलआई -आयन कोशिकाओं (सेल्स) के उच्च तापमान को सहन करते हुए 1000 या अधिक चक्रों की पेशकश कर सकती है।

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1836987>



**Press Information Bureau
Government of India**

Ministry of Science & Technology

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DST-IISc Energy Storage Platform Moves Towards Enabling Fast-Charging Solid-State Batteries

Researchers have reported on an innovative interfacial engineering approach to enable fast charge-discharge rates in solid-state lithium metal batteries. They have found that nanoscopic refractory metal layers like Tungsten could improve the performance of these batteries which are crucial for purposes like electrical mobility. Conventional Li-ion batteries employ a graphite anode, a liquid electrolyte, and a transition metal cathode. However, the liquid electrolytes are flammable and degrade at high temperatures leading to poor battery life and in extreme cases lead to battery fires. Replacing the liquid electrolyte in a conventional Li-ion battery with a ceramic solid electrolyte and simultaneously replacing the graphite anode with a metallic lithium anode could enable safer Li-ion batteries that also last long on a single charge. However, a long-standing challenge with solid state batteries is the growth of lithium dendrites that short circuits the cells and this is accentuated during fast charging. Based on extensive fundamental electrochemical measurements performed over several hundreds of solid-state half cells and subsequent nano-characterization, researchers from the Indian Institute of Science (IISc) realized that dendrite growth was a manifestation of a deeper fundamental process: diffusive growth of lithium voids that are forming during discharge. The researchers identified that the growth of lithium voids during discharge leads to dendrite growth during charge.

The team consisting of Vikalp Raj, Victor Venturi, Varun R Kankanallu, Bibhatsu Kuiri, Venkatasubramanian Viswanathan and Naga Phani B Aetukuri found that at the edges of the microscopic voids, Li-ion currents are concentrated. The currents at these edges are around 10000 times larger than average currents in the cell. Hence it is necessary to impede void growth to prevent dendrite growth. Experimenting with an ultrathin layer of refractory metals between the lithium anode and the solid electrolyte, the researchers noted that tungsten is an ideal candidate to impede lithium vacancy motion due to its low solubility for lithium and therefore delay void growth. They collaborated with researchers from Carnegie Mellon University to corroborate their work through computational methods. Facilities created under the Materials for Energy Conservation and Storage Platform (DST-MECSP) program, Technology Mission Division (Energy, Water and Others), Department of Science and Technology (DST) under the DST-IISc Energy Storage Platform on Supercapacitors and Power Dense Devices has been pivotal in taking the work forward. The work is published in Nature Materials.

The researchers acknowledged the support from to Dr. Ranjith Krishna Pai, Scientist 'E' (TMD-EWO), DST and (Late) Shri. Dr. Sanjay Bajpai, Former Head (TMD-EWO), DST for conceptualizing this program which brought several essential facilities for energy research under a single roof and Dr. Anita Gupta, Head (TMD-EWO), DST, for extending it. The team now intends to build on this advance to develop full solid-state cells that could enable charging in less than an hour, offer up to 1000 or more cycles while withstanding high temperatures of 45 °C or higher outcompeting conventional Li-ion cells at a cost that is at par or lower than the cost of conventional Li-ion cells.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1836958>



Sun, 26 Jun 2022

Stronger Security for Smart Devices to Efficiently Protect Against Powerful Hacker Attacks

Engineers demonstrate two security methods that efficiently protect analog-to-digital converters from powerful attacks that aim to steal user data. Researchers are racing against hackers to develop stronger protections that keep data safe from malicious agents who would steal information by eavesdropping on smart devices. Much of the effort into preventing these “side-channel attacks” has focused on the vulnerability of digital processors. Hackers, for example, can measure the electric current drawn by a smartwatch’s CPU and use it to reconstruct secret data being processed, such as a password.

MIT researchers recently published a paper in the *IEEE Journal of Solid-State Circuits*, which demonstrated that analog-to-digital converters in smart devices, which encode real-world signals from sensors into digital values that can be processed computationally, are vulnerable to power side-channel attacks. A hacker could measure the power supply current of the analog-to-digital converter and use machine learning algorithms to accurately reconstruct output data. Now, in two new research papers, engineers show that analog-to-digital converters are also susceptible to a stealthier form of side-channel attack, and describe techniques that effectively block both attacks. Their techniques are more efficient and less expensive than other security methods. Minimizing power consumption and cost are critical factors for portable smart devices, says Hae-Seung Lee, the Advanced Television and Signal Processing Professor of Electrical Engineering, director of the Microsystems Technology Laboratories, and senior author of the most recent research paper.

“Side-channel attacks are always a cat and mouse game. If we hadn’t done the work, the hackers most likely would have come up with these methods and used them to attack analog-to-digital converters, so we are preempting the action of the hackers,” he adds. Joining Lee on the paper is first-author and graduate student Ruicong Chen; graduate student Hanrui Wang; and Anantha Chandrakasan, dean of the MIT School of Engineering and the Vannevar Bush Professor of Electrical Engineering and Computer Science. The research will be presented at the IEEE Symposium on VLSI Circuits. A related paper, written by first-author and graduate student Maitreyi Ashok; Edlyn Levine, formerly with MITRE and now chief science officer at America’s Frontier Fund; and senior author Chandrakasan, was recently presented at the IEEE Custom Integrated Circuits Conference. The authors of the *IEEE Journal of Solid-State Circuits* paper are lead-author Taehoon Jeong, who was a graduate student at MIT and is now with Apple, Inc, Chandrakasan, and Lee, a senior author.

A noninvasive attack

To conduct a power side-channel attack, a malicious agent typically solders a resistor onto the device’s circuit board to measure its power usage. But an electromagnetic side-channel attack is noninvasive; the agent uses an electromagnetic probe that can monitor electric current without touching the device. The researchers showed that an electromagnetic side-channel attack was just as effective as a power side-channel attack on an analog-to-digital converter, even when the probe was held 1 centimeter away from the chip. A hacker could use this attack to steal private data from an implantable medical device. To thwart these attacks, the researchers added randomization to the ADC conversion process. An ADC takes an unknown input voltage, perhaps from a biometric sensor, and converts it to a digital value. To do this, a common type of ADC sets a threshold in the center of its voltage range and uses a circuit called a comparator to compare the input voltage to the threshold. If the comparator decides the input is larger, the ADC sets a new threshold in the top half of the range and runs the comparator again.

This process continues until the unknown range becomes so small it can assign a digital value to the input. The ADC typically sets thresholds using capacitors, which draw different amounts of electric current when they switch. An attacker can monitor the power supplies and use them to train a machine-learning model that reconstructs output data with surprising accuracy.

Randomizing the process

To prevent this, Ashok and her collaborators used a random number generator to decide when each capacitor switches. This randomization makes it much harder for an attacker to correlate power supplies with output data. Their technique also keeps the comparator running constantly, which prevents an attacker from determining when each stage of the conversion began and ended. “The idea is to split up what would normally be a binary search process into smaller chunks where it becomes difficult to know what stage in the binary search process you are on. By introducing some randomness into the conversion, the leakage is independent from what the individual operations are,” Ashok explains.

Chen and his collaborators developed an ADC that randomizes the starting point of the conversion process. This method uses two comparators and an algorithm to randomly set two thresholds instead of one, so there are millions of possible ways an ADC could arrive at a digital output. This makes it nearly impossible for an attacker to correlate a power supply waveform to a digital output. Using two thresholds and splitting the chip into two halves not only allows random starting points, but it also removes any speed penalty, which enables it to run almost as fast as a standard ADC. Both methods are resilient against power and electromagnetic side-channel attacks without hurting the performance of the ADC. Ashok’s method only required 14 percent more chip area, while Chen’s did not require any additional area. Both use much less power than other secure ADCs.

Each technique is tailored for a specific use. The scheme Ashok developed is simple, which makes it well-suited for low-power applications like smart devices. Chen’s technique, which is more complex, is designed for high-speed applications like video processing. “For the past half-century of ADC research, people have focused on improving the power, performance, or area of the circuit. We’ve shown that it is also extremely important to consider the security side of ADCs. We have new dimensions for designers to consider,” Chen says. Now that they have shown the effectiveness of these methods, the researchers plan to use them to develop detection-driven chips. In these chips, protection would only turn on when the chip detects a side-channel attack, which could boost energy efficiency while maintaining security.

“To create secure low-power edge-devices, it is necessary to optimize every single component of the system. The notion of secure analog and mixed-signal circuits is a relatively new and important research direction. Our research shows it is possible to essentially with high accuracy infer the data at the output of analog-to-digital converters by leveraging advances in machine learning and fine-grained measurement techniques,” Chandrakasan says. “Through optimized circuit methods such as optimizing switching schemes, it is possible to create power and EM side-channel secure circuits, enabling fully secure systems. This is going to be critical in applications such as health care, where data privacy is critical.”

<https://scitechdaily.com/stronger-security-for-smart-devices-to-efficiently-protect-against-powerful-attacks/amp/>

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India's First Private Space Company to Test its Deployer on ISRO'S June 30 Pslv-C53 Mission

India's first private space company - Dhruva Space - will soon test its deployer on Indian Space Research Organisation's mission. ISRO announced that it will be launching - the second dedicated commercial mission of its commercial arm NewSpace India Limited (NSIL) - 'PSLV-C53' carrying three satellites from Singapore on June 30. The launch vehicle carrying DS-EO satellite along with two other co-passenger satellites is scheduled to lift off at 6:00 pm from the Second Launch Pad at Satish Dhawan Space Centre in Sriharikota. The countdown of 25 hours leading to the launch begins at 5:00 pm on June 29. The mission, which is designed to orbit DS-EO satellite along with two other co-passenger satellites from ST Electronics, Singapore, proposes to demonstrate the utilization of the spent upper stage of the launch vehicle as a stabilized platform for scientific payloads subsequent to the separation of the satellites, according to news agency PTI.

This will be the 55th mission of PSLV and 15th mission using the PSLV-Core Alone variant, and is the 16th PSLV launch from the second launch pad. A four stage, 44.4 m tall PSLV-C53 has a lift-off mass of 228.433 t, and would inject DS-EO satellite into an orbit with semi-major axis of 6948.137 + 20 km, at an altitude of 570 km measured from the equator, with a low inclination of 100+ 0.20. The three satellites are- DS-EO, a 365 kg and NeuSAR, a 155 kg satellite both belonging to Singapore and built by Starec Initiative, Republic of Korea, and the third satellite is a 2.8 kg Scoob-1 of Nanyang Technological University (NTU), Singapore. The PSLV Orbital Experimental Module (POEM) activity performs in-orbit scientific experiments using the spent PS4 stage as an orbital platform, ISRO said, it is the first time that the PS4 stage would orbit the earth as a stabilized platform, reported PTI. POEM carries six payloads including two from Indian Space Start-ups M/s Digantara and M/s Dhruva Aerospace, enabled through IN-SPACE and NSIL.

<http://www.indiandefensenews.in/2022/06/indias-first-private-space-company-to.html?m=1>

