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DRDO News

DRDO Technology News

Wed, 18 May 2022

देश में बनी पहली एंटी-शिप मिसाइल ने परीक्षण में लगाया सटीक निशाना, नौसेना की बढ़ेगी ताकत

भारतीय नौसेना ने आत्मनिर्भर बनने की दिशा में एक कदम और बढ़ा लिया है. भारतीय नौसेना ने बुधवार को स्वदेश में बनी पहली एंटी-शिप मिसाइल का ओडिशा में सफल परीक्षण किया. जिसमें नौसेना ने डीआरडीओ के सहयोग से आईटीआर बालासोर, ओडिशा में सीकिंग 42 बी हेलीकॉप्टर से पहली देश में विकसित नौसेना एंटी-शिप मिसाइल की पहली फायरिंग सफलतापूर्वक की. नौसेना ने इस मिसाइल परीक्षण के दो वीडियो भी जारी किए हैं. दोनों वीडियों में मिसाइल लांचिंग को दिखाया गया है. सीकिंग 42 बी हेलीकॉप्टर से मिसाइलों को लांच किया जाता है और मिसाइल अपने लक्ष्य को साधने में सफल रहती है.

इस अवसर पर नौसेना के वरिष्ठ अधिकारियों ने कहा, यह फायरिंग विशिष्ट मिसाइल प्रौद्योगिकी में आत्मनिर्भरता हासिल करने की दिशा में एक महत्वपूर्ण कदम है और इससे भारतीय नौसेना के स्वदेशीकरण की पुष्टि होती है. आपको बता दें कि इससे ठीक एक महीने पहले ही भारतीय नौसेना ने अंडमान और निकोबार कमान के साथ मिलकर ब्रह्मोस सुपरसोनिक क्रूज मिसाइल के जहाज-रोधी संस्करण का सफलतापूर्वक परीक्षण किया था. इसके ठीक एक महीने बाद ही नौसेना ने स्वदेशी में विकसित एंटी-शिप मिसाइल की पहली फायरिंग को सफलतापूर्वक अंजाम दिया.

https://www.abplive.com/news/india/naval-anti-ship-missile-developed-by-drdo-being-test-fired-off-odisha-coast-watch-2126345

Wed, 18 May 2022

Homemade air-launched anti-ship missile tested, 1st for Indian navy

India today test-fired its first homemade air-launched anti-ship missile made by the Defence Research and Development Organisation (DRDO). In a footage released by the Indian Navy, a Seaking 42B helicopter loaded with the missile is seen flying over the sea test range in Balasore, off the Odisha coast, while another helicopter is seen following it for observation. The anti-ship missile separates from the Seaking for a few metres before its motor fires up and it flies fast towards the target.

An Indian Navy helicopter test-fires an air-launched anti-ship missile

"It is the first indigenous air launched anti-ship missile system for Indian Navy," the DRDO said in a statement today. "The missile followed the desired sea-skimming trajectory and reached the designated target with a high degree of accuracy, validating the control, guidance and mission algorithms. All the sub-systems performed satisfactorily," the defence research body said. "The sensors deployed across the test range and near impact point tracked the missile trajectory and captured all the events," it said. The Navy tweeted the test-firing of the homemade anti-ship missile is a significant step towards achieving self-reliance in niche missile technology and reaffirms the Navy's commitment to indigenisation.

The missile used many new technologies including a homemade launcher for the helicopter. Senior officers of the DRDO and the Indian Navy saw the test-firing. Defence Minister Rajnath Singh later congratulated the DRDO, the Navy and associated teams for the successful test-firing.

https://www.ndtv.com/india-news/watch-homemade-air-launched-anti-ship-missile-tested-1st-for-indian-navy-2986259

IDN INDIAN DEFENCE NEWS
Global Defence, Aerospace & Security

Thu, 19 May 2022

Smaller, slower than Brahmos, but deadly: Why Desi Anti-Ship Missile matters

The Indian Navy said the 'Naval Anti-Ship Missile' was fired by a SeaKing helicopter off the missile test range at Balasore. The Indian Navy noted the test was carried out in cooperation with the DRDO, which developed the weapon. It tweeted, “This firing is a significant step towards achieving self-reliance in niche missile technology and reaffirms the Indian Navy's commitment to indigenisation.” The DRDO said the missile test was successful.

What we know about the new weapon?

References to a new, indigenous anti-ship missile first came in 2018 when then defence minister Nirmala Sitharaman shared a list of new DRDO projects that were in the technology demonstration phase. The list included a 'Naval Anti-ship Missile-short range'. The project has since been referred to by its acronym NASM-SR. The document shared by Sitharaman showed a fund allocation of Rs 434.06 crore for the project. Further details of the new weapon emerged at DefExpo 2020, where the DRDO showed schematics of the NASM-SR. The missile tested on Wednesday appeared to be visually similar to the NASM-SR. The data shared by the DRDO showed the proposed weapon had a weight of 380kg and a range of up to 55km and was meant for launch from helicopters. The DRDO claimed the weapon would travel at a speed of 0.8 Mach (slower than the speed of sound) and would have an imaging infra-red seeker, which would home in on the heat emissions of its targets.

The weapon would have a warhead of 100kg, capable of sinking patrol boats and damaging larger warships. The NASM-SR, on approach to its target, can cruise at just 5metres above sea level, making it difficult for enemy radars to detect and track and shoot down with surface-to-air missiles or guns. This low-level capability of anti-ship missiles is known as sea skimming. There has been speculation the DRDO would develop newer variants of the NASM, with longer range, which could potentially make the weapon useful in attacking land targets.

Why the new weapon matters?

The Indian Navy is not new to helicopter-launched anti-ship missiles. It had equipped its Sea King helicopters with the British-built Sea Eagle missiles in the 1980s. The Sea Eagle had a range of around 100km and weight of around 600kg and used a radar seeker. The heavier weight of the missile would increase the take-off weight of the Sea King helicopter, reducing its range in flight. In comparison, the NASM-SR imposes a lower weight penalty on the Sea King and similar helicopters. Moreover, the use of an IIR seeker means the NASM-SR is impervious to radar jamming by enemy warships and also less likely to be detected on approach as it is not using a radar to track its target.

While the supersonic BrahMos remains the Indian Navy's primary anti-ship missile, the Russian-origin weapon is hamstrung by its weight of over 2 tons. While India and Russia are working to develop a lighter version of the BrahMos for fighter jets, the missile would still be too heavy for practical use on a helicopter or even smaller ships. In addition to helicopters, missiles such as the

NASM-SR can be easily adapted for launch from land-based vehicles and small ships. It could act as a potent upgrade to the Indian Navy's fleet of offshore patrol vessels that do not have anti-ship missiles at present.The Italian-designed Marte missile, a weapon in a similar weight category, has been adapted for use on helicopters, aircraft, ships and land-based systems.

What about 'small' warhead?

The lighter warhead of the NASM-SR is capable of doing significant damage. The recent sinking of the Russian warship Moskva in the Black Sea and the loss of British warships in the Falklands War of 1982 show that modern navy ships have enough flammable material on board (fuel, wiring, weapons, electronics etc.) that can exacerbate the damage done by even small anti-ship missiles. With China furiously building up its navy and the Pakistan Navy also moving to replenish its surface fleet, a weapon like the NASM-SR would add a potent option for the Indian Navy.

http://www.indiandefensenews.in/2022/05/smaller-slower-than-brahmos-but-deadly.html?m=1

THE HINDU

Thu, 19 May 2022

From Making Missiles to Biodegradable Carry Bags

Little had 46-year-old K. Veera Brahmam realised that when he joined the Defence Research Development Organisation (DRDO)'s Advanced Systems Laboratory (ASL) in Kanchanbagh in the early 2000s, he will not only be working on Agni and other missiles, but also have the opportunity to come out with game-changing biodegradable carry bags within three months to a year! "Plastic pollution is the bane for not only our country but the entire world. We have been working on various polymers for missile technology, and chanced upon the idea of making something as durable as plastic which will not affect nature, by using corn starch and polybutylene-adipate-terephthalate. It got quick approvals from our director M.R.M. Babu and and DRDO chairman G. Satheesh Reddy," he said on Wednesday.

In less than two years and during the pandemic, the ASL team of scientists worked on the product and collaborated with city based 'ecolastic products' firm for testing and standardisation in its facility. The product was then offered to the Tirumala Tirupathi Devasthanam seven months ago as carry bags for 'prasadam' last year. Having gained public approval, the DRDO lab has decided to pass over the technology 'free of cost' to 20 firms from across the country from the hands of Dr. Reddy at the ASL to begin with. "We have 45 more firms waiting in the pipeline and after assessing their credentials, we will hand over the technology to them too. We will support the industries and ensure quality is maintained as the DRDO reputation will be on the line," informed ASL director Mr. Babu. "If plastic covers are for single use and take 300-400 years for bacterial degradation, why should we use them? The idea germinated from this thought. We are also working on the technology to make bio-degradable plastic bottles, milk sachets and wrappings for parcels and industrial use", said Mr. Brahmam, a post-graduate in physics and PhD holder from the Sri Venkaeswara University, Tirupati. Later, Dr.Satheesh Reddy handed over the technology transfer to the chosen firms from across the country, including one from

Arunachal Pradesh. Top defence scientists like Agni programme director G. Rama Guru and ASL associate director P.V.G. Brahmanandam were among those present.

https://www.thehindu.com/news/cities/Hyderabad/from-making-missiles-to-biodegradable-carry-bags/article65426650.ece

THE HINDU

Thu, 19 May 2022

'Defence labs must think of dual-use products as social responsibility'

Defence labs must come out with "at least two dual-use products where the technology can be used for defence as well as societal needs as spin offs", remarked Defence Research and Development Organisation (DRDO) chief G. Satheesh Reddy, who is also Secretary of department of Defence Research and Development. "We work on so many technologies for the strategic sector of defence, but every scientist should also think about benefits in terms of societal needs as part of what is becoming popular as scientific social responsibility," he said on Wednesday. Addressing scientists and industry representatives at the DRDO's Advanced Systems Laboratory, before handing over the technology transfer papers for biodegradable carry bags, he said with the help of Technology Development Fund, various defence labs can identify the dual-use technologies and make use of the industry and startups for testing and commercial production.

"We can support the industry through hand-holding in the initial stages for funding, design and technology," said the DRDO chairman. The Central government is keen to take the biodegradable carry bag technology to every nook and corner of the country in view of the mounting plastic waste disposal challenge, he added. "Our objective is to have 500-600 such facilities across the country in each district by encouraging the small scale industry and the new entrepreneurs. The need will only increase as the product gains acceptance as this single-use product is biodegradable and the material can also used for making other products," he pointed out. Mr. Reddy said the industry, while ensuring that quality is maintained, could think of innovations in product use like considering making bags for packaged foods and the like. The NITI Aayog has taken cognisance of this development and written to the various departments to promote the technology and make use of it.

Expressing happiness over a US-based firm showing interest in the technology, he said modalities could be worked out to share the same with firms abroad. Earlier, Dr. Reddy hailed the successful test of maiden flight-test of indigenously-developed naval anti-ship missile off the Odisha coast from a helicopter and congratulated the scientists for the same. "The missile has been designed and developed by the Research Centre Imarat in collaboration with other DRDO labs, Indian Navy and the industry. All the parameters and trajectories went according to the plan, including skimming of the sea surface by the missile," he said, and added that Defence Minister Rajanath Singh had asked him to "personally convey his best wishes to the scientists".

https://www.thehindu.com/news/cities/Hyderabad/defence-labs-must-think-of-dual-use-tech-as-scientific-social-responsibility/article65426624.ece

DRDO On Twitter

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Wed, 18 May 2022 5:11 PM

Indigenisation of Defence items with the industry in full swing; A user-friendly dashboard on SRIJAN portal to monitor & intensify Indigenisation progress

In continuous pursuit to achieve self-reliance in defence manufacturing and minimise imports under 'Aatmanirbhar Bharat', Department of Defence Production (DDP), Ministry of Defence has intensified the drive for indigenisation of defence items by its DPSUs. The progress is being reviewed on weekly basis by Defence Secretary Dr Ajay Kumar. A comprehensive user-friendly

'Dashboard' on its SRIJAN Portal has been developed to monitor the status of progress of indigenisation. This dashboard enables real-time end-to-end updates of various activities being taken up by the respective DPSUs during the process of indigenisation. It provides transparent information, analytics and various customised reports to assess the performance of the DPSUs.

Relevant information like details of items to be indigenised, tentative order quantity, concerned DPSU, route of indigenisation to be adopted, details of in-charge Nodal Officer, details of expression of Interests, Requests for Proposal, project sanction order etc. have been kept in public domain to make it accessible to the industry. The dashboard will be accessible by industry shortly. The industry partners can view the details on the dashboard and avail opportunity as per their capabilities in order to become partners in 'Aatmanirbhar Bharat'. Moreover, the Ministry will monitor the actions taken by the DPSUs through this dashboard. It is expected that the dashboard is likely to become a game changer to intensify the indigenisation process.

It may be mentioned that DDP had notified two Positive Indigenisation Lists in December 2021 and March 2022 in respect of DPSUs. The first list contains 2,851 items, out of which 2,500 items are already indigenised and 351 items are being indigenized. The second report notified 107 major Line Replacement Units/Sub-systems for indigenisation. These items pertain to Hindustan Aeronautics Limited (HAL), Bharat Electronics Limited (BEL), Mazagon Dock Shipbuilders Limited (MDL), Hindustan Shipyard Limited (HSL), Garden Reach Shipbuilders & Engineers Ltd (GRSE), Goa Shipyard Limited (GSL), Armoured Vehicles Nigam Limited (AVNL), Munitions India Limited (MIL), Bharat Dynamics Limited (BDL) and Bharat Earth Movers Limited (BEML). The weekly review at the level of Defence Secretary and the monitoring through dashboard has resulted in substantial progress and the DPSUs are now getting good responses from the industry.

Out of 107 items, DPSUs have already issued Expression of Interest (EoIs) for 98 items and the action is on for issuing EoIs for remaining nine items. Out of the 98 EoIs, 28 cases have already progressed in next stages and 70 EoIs are in active stage. The BEL has already issued five Project Sanction Orders (PSO) to the Industry for development of items under Make –II route. Further, 11 items, including nine items of AVNL and two items of GRSE, are in Prototype Design & Development stage under various routes.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=1826393

The Indian EXPRESS

Thu, 19 May 2022

Defence ministry to develop centralised payment system for armed forces

The Defence Accounts Department (DAD) of the Defence Ministry is developing a centralised system for the Armed Forces and other defence institutions who have different legacy systems for their pay, allowances, pensions and gratuities, said Rajnish Kumar, the Controller General of Defence Accounts (CGDA) on Wednesday. Kumar visited the office of Principal Controller of Defence Accounts (Officers) in Pune on Wednesday, where he presided over the inauguration of

various projects and addressed officials. “The three premier entities we cater to — the Army, Navy and the Air Force and other entities including Border Roads, DRDO and Coast Guard — have different legacy IT systems for matters related to payments of any kind. Traditionally, DAD has been dealing with these entities in the different IT platforms, but that is not the way forward. Over the past one year, we have been developing a centralised system to deal with the variety of entities through the integrated platform. The modern IT world provides tools for this. The United States’ Department of Defence, which deals with equally complex systems, has done the same,” said Rajnish Kumar.

“We have got various verticals like pay and personnel claims, seller payments, internal audit, pensions and others. All these verticals will be brought under the centralised system. We have worked on all aspects of the new system, including cyber security. We expect to complete the system by the end of the current financial year. By incorporating various AI tools, we will have a foolproof, safe and effective centralised system. A dedicated system for making payments of third party sellers will start functioning this month-end,” he added. Principal Controller of Defence Accounts (Officers) Dr Rajeev Chavan, Deputy Controller Lehana Singh and Assistant Controller T Satish Kumar were present on the occasion. When asked about the issue of over 58,000 military veterans not getting pensions in April, CGDA Rajnish Kumar said this was because these veterans were not able to complete the annual procedure of submitting a life certificate. The non-disbursement of these pensions was not related to the newly launched System for Pension Administration — Raksha — also known as SPARSH.

“The veterans were supposed to upload their life certificate on the SPARSH system for verification by November last year and the deadline was extended to April this year. But many could not do so by the end of April. Since the system is automated, they did not get their pension. But after receiving complaints from veterans, a one-time waiver has been given to avoid hardship and the payments were made within 48 hours. They have now been asked to complete the procedure furnishing life certificates this month,” he said.

Kumar said SPARSH has been successfully disbursing pensions to over five lakh military veterans who have retired after 2016. The remaining 28 lakh pensioners of the Armed Forces and defence civilians will soon be incorporated into the system in phases over the coming years, he said.

Meanwhile, the Ministry of Defence Wednesday requested those defence pensioners who are yet to complete their annual identification and life certification, to complete the process by May 25 to ensure smooth processing of their monthly pensions. The MoD said that as per the data updated on May 17, as many as 43,774 pensioners who have migrated to SPARSH have not completed their annual identification, neither online nor through their respective banks. Further, nearly 1.2 lakh legacy pensioners and pre-2016 retirees, who continue to be on the old system of pension, have not completed their annual identification through any of the means available, it said.

https://indianexpress.com/article/cities/pune/defence-ministry-to-develop-centralised-payment-system-for-armed-forces-7924630/

FINANCIAL EXPRESS
Read to Lead

Wed, 18 May 2022

Drones to be made smarter, more intelligent to reduce dependence on humans: Vipul Singh, CEO, and Co-founder of AUS

Aarav Unmanned Systems (AUS) a Bangalore-based Commercial Drone Technology startup was the first to build and deploy PPK GPS-based Survey grade fully autonomous drones in India. It is also providing not only faster but also cost effective UAV-based land surveying solutions to various enterprises across GIS Surveying/Mapping, Industrial inspection & Precision agriculture. Vipul Singh, CEO, and Co-founder of AUS, discusses with Huma Siddiqui, various aspects of usage of drones and his startup's vision and plans.

Discovering the Role of Automation and AI

There is a massive role already being played by Artificial Intelligence (AI). Drones are well on the way to being used in every nook and corner of our country for fundamental use cases around agriculture, boosting our rural areas' infrastructure, and so forth. Automation plays an important role in making these operations scalable, reliable, and secure. Drones have to be made smarter and more intelligent to reduce their dependence on humans. Adapting drone technology to individual use cases and requirements will become vertical-specific capabilities in the coming years. These capabilities can be fine-tuned, learned, improved, and adapted only through AI, ML, or deep learning and automation. Drones will be collecting massive amounts of data, and AI and automation will have a big role to play in extracting value from these data sets.

The company's vision and plan

AUS's vision is to enable prosperous and sustainable lives, ecosystems, and enterprises across the world by embracing innovation and excellence in technology platforms. We plan to expand as much as possible and use drone technology to add value to enterprises and ordinary people's lives. We want to help enterprises and governments achieve ESG principles and targets. Also, we want to offer a sustainable approach to implementing Government projects and running private enterprises. So solutions that enable a better world by improving industrial efficiency, increasing the efficiency of solar energy, improving the design and implementation of critical infrastructure in an economy, making our environment cleaner, reducing carbon footprint, making our forests and wildlife more healthy, making agriculture produce more consumable, increasing farmers income – these are top of mind for us. More about the drones used in mining processes like Mine planning, site surveys, Environment analysis, Asset mapping, and others.

We at AUS create a 3D twin of the mine with a very high level of detail and accuracy. This model reflects the smallest features (as small as 3 cm) on the ground, with a global positioning accuracy of about 10 cm. Since the mining sites are always at a high activity level, we collect data with high accuracy and high resolution at regular intervals. Our proprietary systems at the back end analyze this data and find changes at the mining site That impact parameters like performance and efficiency, maintaining safety and compliance, planning, and in fact, how to make these sites more environmentally friendly. Our technology and systems lend overall sustainability and productivity to client operations and provide insights and business intelligence

on the various parameters to improve efficiency, safety, and productivity. Extracting these parameters and tracking them at a very detailed level is the main offering of our solution.

Drones in Urban development

Drones can obtain data with a resolution of 3 cm and an accuracy of 10 cm, but the satellite data currently available only provides a resolution of about 50 cm. You can almost create a 3D twin of a city with dimensions, colors, and texture details. Many analyses can be performed on these models, including traffic movements, future infrastructure expansion, critical utilities, and permitted and unauthorized construction tracking. You can also simulate floods, rain, traffic movements, large vehicles, and disaster scenarios. This makes it easier to plan city expansion. You can also simulate different conditions that may occur in the future to make your city more resilient. The drone data and analysis we provide can help plan macro and micro-projects with minimal deviation and damage or disruptions in the city. It also accommodates cities in certain regions that are more energy-efficient and self-sufficient. Imagine the possibilities. If you know every corner of the city where every small alley and every house is mapped, you can plan and execute the project in great detail and efficiently.

AUS Drones – Autonomous drones that can be operated by any user without specialized training Drones are automated, but they require specially trained people to operate them. A drone operator would monitor and adjust operations according to the environment. Whether it is a hilly area, a densely populated or sparse area, the weather conditions, obstacles, etc. Since an autonomous infrastructure does not yet exist, manual intervention is required to exchange the collected data. Drone operators also have many duties related to maintenance, inspection, data security, and security. Human resources need to be properly trained to achieve scalability, reliability, and efficiency.

In the future, we believe drones will be intelligent enough to handle these scenarios. However, for now, considering various operating conditions, monitoring the performance of the drone in flight, and making sure that the machine is in good condition, the operator plays an important role.

Do the drones of your company work in the construction and utility fields?

Wherever there is a lot of movement on earth if you know the right data parameters to be monitored and collected and the technique by which this should be done, then combining these together can create a lot of potential for drone tech. In construction, drone data is used to make design and planning more accurate and productive, without missing out on any data. With drones, you can collect almost all types of data that are available with a very high degree of accuracy, which is not the case for conventional methods. This reduces field time for planning and decision making – some of this can be automated and are already being automated with algorithms. Progress can be tracked both quantitatively and qualitatively – productivity, financial efficiency, quality, and safety.

Drones can be used in Infra projects?

Infra projects can be made time-efficient and cost-efficient. Development of roadways gets delayed because of inadequate or ineffective surveys. Some of the pertinent factors of conditions may be missed out for various reasons – human limitations, changing conditions by the time surveying is complete, and so on. When these conditions are revealed during construction, it

causes delays. With drone technology, we are eliminating these scenarios. As discussed in the previous question, the impact that we create is multi-dimensional, as far as a project is concerned. Additionally, the data that drones provide can also be used for the upkeep of roadways as well. Many times, improper use, encroachment, etc. leads to deteriorating road conditions. With drone technology, we are able to identify these feature changes since the latest data is regularly available. At AUS we are able to move into a mode of taking preventive measures rather than reactive measures.

Drone pilot jobs in India and hiring

Currently, there is a huge shortage of drone pilots. There are over 7,000 vacancies for drone pilots nationwide. There is a big mismatch between the supply and demand of talent in this space. With an emphasis on drone adoption and agricultural applications in rural areas, there is potential for over 100,000 job opportunities over the next three years. This presents an opportunity for rural youth to find a career in the world of technology. All one needs is a high school degree, a technical understanding, and the ability to speak a common language and English. Governments, academia, businesses like us, and drone users need to make more efforts to disseminate the knowledge needed to educate, certify, and hire young people, and to create infrastructure and hiring pipelines. Drone pilots earn anywhere between Rs 20,000 to Rs 50,000 per month, depending on complexity and location. The aptitude, right attitude, and training can get the youth into a rewarding career in the drone sector.

https://www.financialexpress.com/defence/drones-to-be-made-smarter-more-intelligent-to-reduce-dependence-on-humans-vipul-singh-ceo-and-co-founder-of-aus/2530030/lite/

ANI

Wed, 18 May 2022

Defence minister witnesses P-8I aircraft's surveillance, anti-submarine warfare capabilities

Defence Minister Rajnath Singh during his visit to Mumbai undertook a sortie on the Indian Navy P8I Long Range Maritime Reconnaissance Anti-Submarine Warfare aircraft over the Arabian sea on Tuesday. He undertook a mission sortie onboard Indian Navy's P8I aircraft along with Chief of Naval Staff Admiral R Hari Kumar and other senior Navy officers. "My trust in the Indian Navy has increased many folds. Indian Navy is fully capable to keep the nation safe", said Singh. "I got the opportunity to experience the capabilities of the Indian Navy closely. I have been informed in detail about the aircraft by CNS Admiral R. Hari Kumar and Commanding officer of the squadron Sudeep" he said.

After he launched two indigenous frontline warships - INS Surat and INS Udaygiri - at Mazagon Docks Limited (MDL) in Mumbai on Tuesday, he undertook a mission sortie on the Indian Navy P8I Long Range Maritime Reconnaissance Anti-Submarine Warfare aircraft. During the mission, long-range surveillance, electronic warfare, imagery intelligence, ASW missions and Search and Rescue capabilities employing the state-of-the-art mission suite and sensors were demonstrated. "I got to know how dedicatedly and responsibly the Indian Navy is guarding the borders. I want

to congratulate all of them for the service," he said. The P8I's state-of-the-art sensors like multi-mode radars, electronic intelligence system, sonobuoys, EO/IR camera, etc, and advanced weapons like Harpoon Anti-shipping Missile and Mk54 torpedo, provide the Navy with a very potent platform with significant capability to deter and destroy.

The induction of P8I aircraft commencing 2013, has significantly enhanced the Indian Navy's persistent surveillance operations in the Indian Ocean Region (IOR). These aircraft also have been utilised along the IB/ LoC/ LAC to keep an eye on adversaries' movement. The aircraft has operated along land frontiers in conjunction with the Indian Army and Air Force to harness its multi-mission capability during tri-services operations. (ANI)

https://www.aninews.in/news/national/general-news/defence-minister-witnesses-p-8i-aircrafts-surveillance-anti-submarine-warfare-capabilities20220518200726/

ThePrint

Wed, 18 May 2022

Defence ministry intensifies drive for indigenisation of defence items

The defence ministry on Wednesday said it has intensified the drive for indigenisation of defence items being carried out by state-run manufacturers. It said the progress of the indigenisation process by the defence public sector undertakings (DPSUs) is being reviewed on weekly basis by Defence Secretary Ajay Kumar.

The ministry said a comprehensive user-friendly 'dashboard' on the SRIJAN portal has been developed to monitor the status of progress of the indigenisation process. "This dashboard enables real-time end-to-end updates of various activities being taken up by the respective DPSUs during the process of indigenisation," the ministry said in a statement. "It provides transparent information, analytics and various customised reports to assess the performance of the DPSUs," it said.

The ministry said relevant information like details of items to be indigenised, tentative order quantity, concerned DPSU, route of indigenisation to be adopted, details of in-charge nodal officer, requests for proposal and project sanction order have been kept in public domain to make it accessible to the industry. "The dashboard will be accessible by industry shortly. The industry partners can view the details on the dashboard and avail opportunity as per their capabilities in order to become partners in 'Aatmanirbhar Bharat'," the ministry said. In a major push towards defence indigenisation, Defence Minister Rajnath Singh last month unveil the third list of over 100 military systems and weapons that will be put under import restrictions under a staggered timeline of over three-and-half years.

The defence ministry said orders worth more than Rs 2,10,000 crore are likely to be placed on the Indian industry in the next five years as part of the items covered in the third list. The first "positive indigenisation" list of 101 items that included towed artillery guns, short-range surface-to-air missiles, cruise missiles and offshore patrol vessels was issued in August 2020. In May last year, the government approved restrictions on the import of an additional 108 military weapons

and systems such as next-generation corvettes, airborne early warning systems, tank engines and radars under a staggered timeline of four-and-half years. In the last few years, the government has taken a series of measures to promote domestic defence production.

India is one of the largest importers of arms globally. According to estimates, the Indian armed forces are projected to spend around USD 130 billion (one billion is equal to 100 crores) in capital procurement in the next five years. The government now wants to reduce dependence on imported military platforms and has decided to support domestic defence manufacturing.

https://theprint.in/india/defence-ministry-intensifies-drive-for-indigenisation-of-defence-items/961530/

THE ECONOMIC TIMES

Wed, 18 May 2022

US seeks to wean India from Russia weapons with arms-aid package

The US is preparing a military aid package for India to deepen security ties and reduce the country's dependence on Russian weapons, people familiar with the matter said. The package under consideration would include foreign military financing of as much as $500 million, according to one person, which would make India one of the largest recipients of such aid behind Israel and Egypt. It's unclear when the deal would be announced, or what weapons would be included.The effort is part of a much larger initiative by President Joe Biden's administration to court India as a long-term security partner, despite its reluctance to criticize Russia for its invasion of Ukraine, according to a senior US official who asked not to be named.

Washington wants to be seen as a reliable partner for India across the board, the official added, and the administration is working with other nations including France to make sure Prime Minister Narendra Modi's government has the equipment it needs. While India is already diversifying its military platforms away from Russia, the US wants to help make that happen faster, the official said. The major challenge remains how to provide India major platforms like fighter jets, naval ships and battle tanks, the official said, adding that the administration is looking for a breakthrough in one of these areas. The financing package being discussed would do little to make those types of systems -- which can cost billions or tens of billions of dollars -- more affordable, but it would be a significant symbolic sign of support. India's Foreign Ministry didn't immediately respond to a request for comment. Officials at the State Department and US embassy in New Delhi didn't immediately respond to a request for comment.

India is the world's largest buyer of Russian weapons, although it has scaled back that relationship of late. Over the past decade, India has bought more than $4 billion worth of military equipment from the US and more than $25 billion from Russia, according to the Stockholm International Peace Research Institute, which collects data on arms transfers. India's dependence on Russia for weapons against neighbors China and Pakistan is a big reason Modi's government has avoided criticizing Russian President Vladimir Putin over the war in Ukraine. As the US,

Europe, Australia and Japan piled economic sanctions on Russia, India has held off and instead continued imports of discounted Russian oil.

While the US and its allies were initially frustrated with India, they have sought to woo Modi's government as a key security partner -- including against China in the Indo-Pacific region. Modi is set to join a summit with Biden next week in South Korea. The meeting will include leaders from the Quad, a partnership between the U.S., India, Japan and Australia that has drawn criticism from China. Modi also received an invitation to join the Group of Seven leaders in Germany next month. Defense Secretary Lloyd Austin made the point about China when he spoke at a news conference in April with Secretary of State Antony Blinken, Indian Defense Minster Rajnath Singh and Foreign Minister Subrahmanyam Jaishankar. "We're doing all this because the United States supports India as a defense industry leader in the Indo-Pacific and a net provider of security in the region," Austin said. "And we all understand the challenges that we face there. The People's Republic of China is seeking to refashion the region and the international system more broadly in ways that serve its interests." Links between the US and India have steadily deepened over the past two decades, with the two sides reaching agreements that allow for more interoperability between their military platforms.

Backing for India is a rare point of bipartisan unity in Washington, and the Biden administration has signaled that it isn't interested in sanctioning New Delhi over its recent decision to buy the S-400 missile defense system from Russia. Turkey's purchase of the same system deeply damaged US ties with the NATO ally. Still, it remains to be seen how far India will go in accepting US military assistance. Russia has historically supplied the majority of India's military hardware, including fighter jets and missiles, as well as almost all its tanks and helicopters. Modi's government has told the US the alternatives to moving away completely from Russian weapons imports are too expensive, according to people familiar with the situation, who asked not to be identified because they are not authorized to speak with the media.

https://economictimes.indiatimes.com/news/defence/us-seeks-to-wean-india-from-russia-weapons-with-arms-aid-package/articleshow/91632757.cms?from=mdr

Wed, 18 May 2022

First meeting of NATO national cyber coordinators

Senior cyber coordinators from all NATO Allies met in Brussels today (18 May 2022) for the first time. They discussed the new strategic environment following Russia's invasion of Ukraine and its implications for the cyber threat landscape. They also reviewed progress in the area of cyber defence, including efforts to increase resilience to cyber threats. "Today's North Atlantic Council meeting of senior cyber coordinators was an important step along the path to NATO's Summit in Madrid," NATO Deputy Secretary General Mircea Geoană said. "There is an urgent need to step up our approach to cyber defence, and this collective effort also means engaging with our partners, including in the private sector."

Allies have expressed concern that cyber threats to the security of the Alliance are complex, destructive, coercive, and becoming ever more frequent. NATO is a strong platform to share information, to exchange national approaches and responses, as well as to consider possible collective responses. Allies are also providing practical support to partners, including Ukraine.At the Madrid Summit next month, Allies will take further decisions to bolster the Alliance's deterrence and defence. Cyber defence plays a key role and this is expected to be reflected in NATO's next Strategic Concept.

https://www.nato.int/cps/en/natohq/news_195493.htm

Science & Technology News

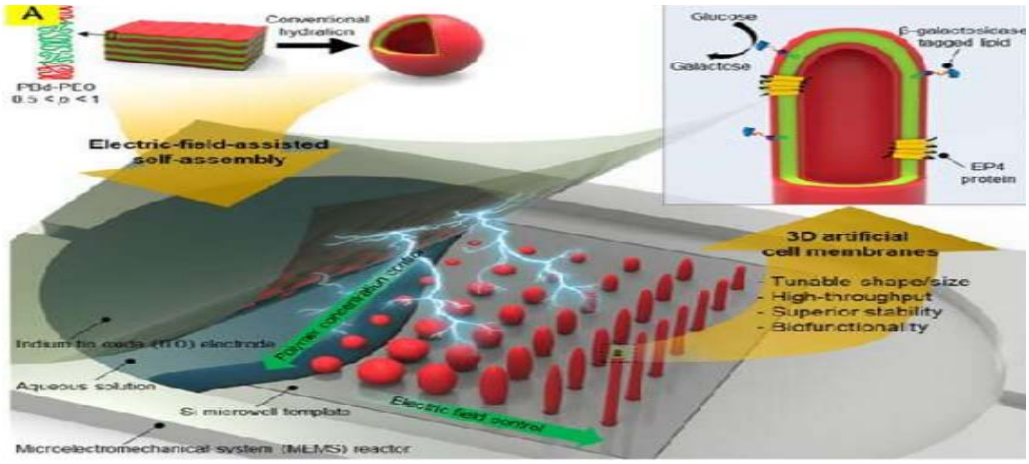
Wed, 18 May 2022

Extending the lifespan of artificial cell membranes from five days to almost two months

The cell membrane, which contains a hydrophilic exterior and a hydrophobic interior, opens and closes ion channels like a water faucet and converts a physicochemical stimulus into an electrical signal that is then transmitted to cells. Until recently, the limited ability of an artificial cell membrane structure to only last a maximum of five days has been a hurdle. The Korea Institute of Science and Technology (KIST, President Seok-Jin Yoon) announced that the research team led by Dr. Tae Song Kim of the Brain Science Institute has succeeded in developing an artificial cell membrane that can be kept stable for over 50 days on a silicon substrate. This is the longest time reported in the field. In addition to creating, in 2018, an artificial cell membrane lasting for five days, Dr. Kim's team demonstrated in 2019 the transfer of a positive ion to the inside of a structure with an artificial cell membrane with a protein attached to the surface, confirming its biosensor application potential.

However, durability of at least one month is essential for life science research utilizing artificial cell membranes and the practical commercialization of biosensors. To extend the limit of five days of stability of an artificial cell membrane, the KIST research team focused on a material called block copolymer (BCP). A BCP is a macromolecule consisting of two or more blocks, which can be repeatedly aligned as a long row of blocks of counteracting properties that mimic the hydrophilic and hydrophobic nature of the human cell membrane.

Dr. Kim's research team developed a technology that regularly arranges tens of thousands of holes with a diameter of 8 μm on a silicon substrate and inserts a specific amount of BCP solution into each hole through surface treatment, and dries it. Then, a soap bubble-shaped, an elongated oval-shaped, or a thin tubular-shaped BCP double-layer structure is tunably created by applying an electric field between the upper plate electrode of the microfluidic channel and the lower silicon substrate.



Schematic diagram of manufacturing double-layer structures of various sizes and shapes by controlling the concentration and electric-field of the block copolymer (PBd-PEO) by applying electric fields to the upper and lower layers of the substrate.

This process led to the discovery of the possibility of maintaining a structure with a specific shape depending on the concentration of the solution and the applied electric field and frequency. This suggests a means to freely control the size and shape of artificial cell membranes, from a sphere, like a soap bubble, to a cylinder, like a tube.

The KIST research team finally created an artificial cell membrane that can be kept stable for over 50 days by filling the outside of a three-dimensional double-layered BCP structure with a porous hydrogel that exhibits excellent elasticity and resilience characteristics similar to that of a human body substance. In addition, an artificial organ structure was produced by replicating an epithelial cell in the small intestine, which consists of thousands of tubular structures (cilia) using a BCP double-layered structure, proving its usage potential as a material for artificial organs through binding with β-galactosidase.

Dr. Kim says that "while global research on artificial cell membranes has been focusing on placing a two-dimensional planar structure on a silicon substrate, the team has succeeded in extending the stability period of an artificial cell membrane by more than ten times following the development of the first three-dimensional artificial cell membrane structure fabrication technology. The research, which has presented a path for large area array fabrication of artificial cell membranes, is expected to further develop into a platform technology for biological functionality research that identifies the roles of ultra-sensitive biosensors resembling cell functions, drug screening for new drug development, and neurotransmitters and hormones in the brain."

https://phys.org/news/2022-05-lifespan-artificial-cell-membranes-days.html

Wed, 18 May 2022

On-chip Photodetection: 2D material Heterojunctions for "Post-Moore Era" microelectronics

Photonic integrated circuits (PICs) use photons as information carriers and feature ultra-high transmission speed, low delay, and anti-electromagnetic crosstalk. These advantages are expected to solve the bottleneck problems of microelectronic chips in terms of speed, power consumption, and integration density. It is of key significance to promoting breakthroughs in microelectronics technology, quantum information technology, and micro-sensing technology in the "post-Moore era."Currently, driven by the application of information technology, photonic integrated chips have made great progress. For example, silicon PIC is compatible with the mature CMOS technology for low-cost and large-scale production; Silicon nitride PIC could tolerate moderately high optical power and large fabrication errors; and Lithium niobate PIC could achieve perfect electro-optic modulations with low driven voltage and high linearity.

However, one of the handicaps in these PICs is the monolithic integration of waveguides and photodetectors with a single material. To support the light transmission in the waveguide, the PIC materials cannot absorb the optical signal, making it impossible to realize the integrated photodetector out of a single material. To solve this, hetero-integrations of absorptive bulk materials (such as Ge, III-V compound semiconductors, etc.) on PICs have been implemented. Although it still presents open challenges such as the high costs, complicated fabrication processes, and material interface issues. Recently, two-dimensional (2D) materials have emerged as an attractive photon-absorption material for chip-integrated photodetectors. 2D materials have no surface dangling bonds, which eliminates the lattice-mismatch constraints to hetero-integrate them with PICs. The family of 2D materials has a rich variety of electronic and optical properties, including semi-metallic graphene, insulating boron nitride, semiconducting transition metal dichalcogenides, and black phosphorus. As a consequence, chip-integrated photodetectors operating at various spectral ranges could be constructed by choosing appropriate 2D materials.

In a new paper published in the journal *Light Science & Application* on April 20, 2022, a research team, led by Professor Xuetao Gan from Key Laboratory of Light Field Manipulation and Information Acquisition, Ministry of Industry and Information Technology, and Shaanxi Key Laboratory of Optical Information Technology, School of Physical Science and Technology, Northwestern Polytechnical University, China have reported that integrating van der Waals PN heterojunctions of 2D materials on optical waveguides can provide a promising strategy to realize chip-integrated photodetectors with low dark current, high responsivity, and fast speed. With the 2D layered structure and no dangling bonds, researchers can stack 2D materials with different properties in different orders by "stacking wood" to form van der Waals heterostructures with atomically flat interfaces. The "arbitrary combination" of van der Waals heterojunctions can not only give the advantages properties of a single material, but also generate novel properties, achieving a leap of 1+1>2, as shown in Figure 1.

In this research, the researchers made full use of natural p-doped BP and n-doped $MoTe_2$ for hetero-stacking, and successfully fabricated an efficient van der Waals PN heterojunction. Second, since there are no dangling bonds on the surface of 2D materials, compared with traditional semiconductors, 2D materials do not need to consider lattice mismatch when integrating with various photonic integration platforms. Finally, the preparation of source-drain electrodes can also be integrated on the photonic platform through the "stacking wood" technology and placed on both sides of the material, without the cumbersome processes such as photolithography. This also greatly simplifies the fabrication process of the device, avoiding the contamination of the device interface in processes such as photolithography, which greatly improves the performance of the device.

https://scitechdaily.com/on-chip-photodetection-2d-material-heterojunctions-for-post-moore-era-microelectronics/amp/