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समाचार पत्रों के चयनित अंश
Newspapers Clippings

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

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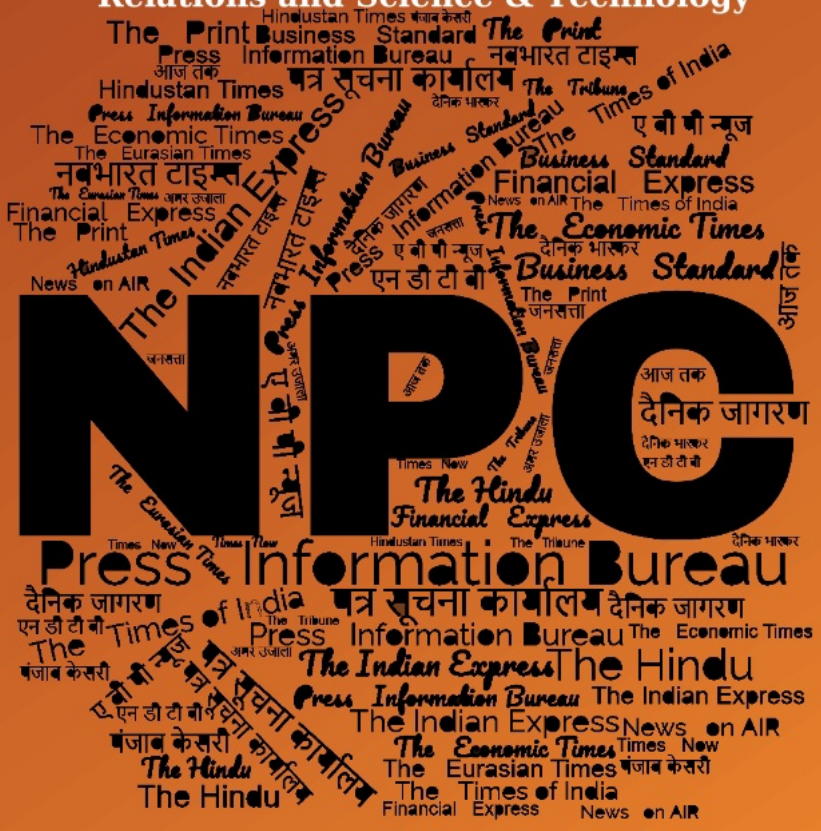

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DRDO News

Press Information Bureau
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Tue, 12 Nov 2024

DRDO hands over Authority Holding Sealed Particulars of P-7 Parachute System to Directorate General of Quality Assurance

The Authority Holding Sealed Particulars (AHSP) of P-7 Parachute System has been handed over to the Directorate General of Quality Assurance (DGQA) by the Aerial Delivery Research and Development Establishment (ADRDE), Agra, a DRDO laboratory. Secretary, Department of Defence R&D and Chairman DRDO Dr Samir V Kamat handed over the AHSP in a ceremony held at DRDO Bhawan in New Delhi on November 11, 2024.

ADRDE has successfully designed, developed and qualified the P-7 Parachute System. Gliders India Limited (Ordnance Parachute Factory), GIL (OPF), Kanpur has fabricated the parachute system, which is capable of safely dropping payloads of up to 9.5 ton from IL -76 Aircraft at an altitude of up to four kms.

Indian Army can rapidly deploy their Light Field Gun & Jeep at the border and conflict areas by air dropping with this system. Army has placed an indent on GIL (OPF), Kanpur for supply of 146 P-7 Heavy Drop Parachute System. The system has successfully completed General Staff Evaluation and been inducted into the services.

https://pib.gov.in/PressReleasePage.aspx?PRID=2072833

नवभारत टाइम्स

Wed, 13 Nov 2024

दुश्मनों का खेल खत्म! भारत की लंबी दूरी की क्रूज मिसाइल पहले ही टेस्ट में पास

भारत ने मंगलवार को रक्षा क्षेत्र में एक और बड़ी कामयाबी हासिल की है। देश की इस सफलता से दुश्मनों के पसीने छूटना तय माना जा रहा है। दरअसल मंगलवार को डिफेंस रिसर्च एंड डेवलपमेंट ऑर्गेनाइजेशन (DRDO) ने ओडिशा

के तट पर चांदीपुर के इंटीग्रेटेड टेस्ट रेंज (ITR) से लंबी दूरी की लैंड अटैक क्रूज मिसाइल (LRLACM) का पहला उड़ान परीक्षण किया।

यह परीक्षण मोबाइल आर्टिकुलेटेड लॉन्चर से किया गया। परीक्षण के दौरान सभी सबसिस्टम उम्मीद के मुताबिक काम करते रहे और अपने मेन टारगेट को पूरा किया। मिसाइल के प्रदर्शन पर नजर रखने के लिए ITR की ओर से अलग-अलग जगहों पर रडार, इलेक्ट्रो-ऑप्टिकल ट्रैकिंग सिस्टम (EOTS) और टेलीमेट्री जैसे कई रेंज सेंसर लगाए गए थे ताकि उड़ान पथ को पूरी तरह से कवर किया जा सके। भारत रक्षा क्षेत्र में तेजी से आगे बढ़ रहा है। दुनिया के ताकतवर देश भी भारत के रक्षा उपकरणों की तारीफ कर रहे हैं। उसी क्रम में भारत ने आज एक और ऐतिहासिक कामयाब हासिल की है।

रक्षा मंत्री राजनाथ सिंह ने दी बधाई

DRDO ने लंबी दूरी की जमीन पर हमला करने वाली मिसाइल के इस परीक्षण को एक बड़ी सफलता बताया है। रक्षा मंत्री राजनाथ सिंह ने प्रथम उड़ान के सफल परीक्षण पर डीआरडीओ, सशस्त्र बलों और उद्योग जगत को बधाई दी है। उन्होंने कहा कि यह भविष्य के स्वदेशी क्रूज मिसाइल विकास कार्यक्रमों का मार्ग प्रशस्त करता है। वहीं रक्षा अनुसंधान एवं विकास विभाग के सचिव और डीआरडीओ के अध्यक्ष डॉ. समीर वी कामत ने इस सफल लॉन्चिंग पर डीआरडीओ की पूरी टीम को बधाई दी।

https://navbharattimes.indiatimes.com/india/india-drdo-successfully-test-fires-long-range-cruise-missile/articleshow/115224252.cms

THE HINDU

Wed, 13 Nov 2024

DRDO carries maiden test of land attack long range cruise missile

Defence Research and Development Organisation (DRDO) on Tuesday (November 12, 2024) conducted the maiden flight-test of a Long Range Land Attack Cruise Missile (LRLACM), with a range of 1,000 km, from the Integrated Test Range, Chandipur off the coast of Odisha from a mobile articulated launcher. This is a new variant of the Nirbhay LRLACM with improved features, officials confirmed. The Defence Acquisition Council had approved procurement of the LRLACM of over 1,000 km range in July 2020.

During the test, all sub-systems performed as per expectation and met the primary mission objectives. The missile performance was monitored by several range sensors like Radar, Electro Optical Tracking System and telemetry deployed by ITR at different locations to ensure complete coverage of the flight path.

“The missile followed the desired path using way point navigation and demonstrated its capability to perform various manoeuvres while flying at various altitudes and speeds. The missile is also equipped with advanced avionics and software to ensure better and reliable performance,” DRDO said in a statement.

The missile has been developed by the Aeronautical Development Establishment, Bengaluru along with contribution from other DRDO laboratories and Indian industries. Bharat Dynamics Limited, Hyderabad and Bharat Electronics Limited, Bengaluru are the two Development-cum-Production-Partners for LRLACM and they are engaged in the missile development and integration, DRDO said.

“LRLACM is a Defence Acquisition Council-approved, Acceptance of Necessity-sanctioned, Mission Mode Project. It is configured to launch from ground using mobile articulated launcher and also from frontline ships using universal vertical launch module system,” DRDO stated.

Complementing DRDO on the successful launch, Defence Minister Rajnath Singh said this paves the way for future indigenous cruise missile development programmes. The original Nirbhay, with a range of 1,000 km and meant to fly very low to the ground to avoid detection by enemy radar called terrain hugging capability, was tested multiple times which also saw couple of failures. Once inducted, the LRLACM, similar to U.S. Tomahawk cruise missile, will give Indian armed forces a long range standoff capability to strike targets on land.

https://www.thehindu.com/news/national/drdo-carries-maiden-test-of-land-attack-long-range-cruise-missile/article68861163.ece

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Tue, 12 Nov 2024

Inauguration Of C-295 Full Motion Simulator At Air Force Station Agra

Air Marshal Ashutosh Dixit, AOC-in-C CAC inaugurated the IAF C-295 Full Motion Simulator (FMS) facility on 11 Nov 24 at Air Force Station Agra. A significant proportion of the pilot's training can be undertaken in the simulator thereby saving precious flying hours on the aircraft.

The state of the art simulator enables the pilots to train in near realistic environment by simulating various missions like tactical airlift, para-dropping, para-trooping, medical evacuation, disaster

relief and also enables simulation of several critical situations that can be encountered in actual operations, ensuring that our pilots are battle ready. It will allow pilots to hone their skills in handling high risk emergencies that require time critical decisions, thereby enhancing the overall flight safety of military operations.

The induction of C-295 aircraft into IAF will give a fillip to the aerospace ecosystem of the country, marking the beginning of "Atmanirbhar Bharat" in private sector production of transport aircraft in India.

https://pib.gov.in/PressReleasePage.aspx?PRID=2072680

Press Information Bureau
Government of India

Ministry of Defence

Tue, 12 Nov 2024

Govt is creating 'Adaptive Defence' in India to deal with emerging challenges: Raksha Mantri at inaugural Delhi Defence Dialogue

"Adaptive Defence is not merely a strategic choice, but a necessity in today's fast-paced world"

Shri Rajnath Singh calls for adopting a collaborative approach to deal with contemporary problems

"Interconnectedness is as much a blessing as it is a challenge; If our threats are transnational, so should be our solutions"

Raksha Mantri Shri Rajnath Singh has voiced Prime Minister Shri Narendra Modi-led Government's unwavering resolve to create an 'Adaptive Defence' in the country to counter the challenges posed by the fast-changing world in today's times. He was addressing the inaugural Delhi Defence Dialogue (DDD) organised by Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA), on the theme 'Adaptive Defence: Navigating the Changing Landscape of Modern Warfare', in New Delhi on November 12, 2024.

Raksha Mantri said that 'Adaptive Defence' is a strategic approach where a nation's military and defence mechanisms continuously evolve to counter emerging threats effectively. "'Adaptive Defence' is not merely responding to what has happened but anticipating what could happen, and preparing for it proactively. In essence, it involves cultivating a mindset and capability to adapt, innovate & thrive, even in the face of unpredictable and evolving circumstances. Situational awareness, flexibility at strategic and tactical levels, resilience, agility, and integration with the

futuristic technologies are the keys to understand and create adaptive defence. It must be the mantra of our strategic formulations and operational responses," he stated.

Shri Rajnath Singh described 'Adaptive Defence' as not merely a strategic choice but a necessity. "As the threats to our nation have evolved, so too must our defence systems and strategies. We should be prepared for all future contingencies. It is more than just protecting our borders; it is about securing our future," he said.

Raksha Mantri pointed out that traditional notions of war are being reshaped by emerging technologies and evolving strategic partnerships, with new perspectives, doctrines and concepts of operations emerging within the Armed Forces in keeping with the changing nature of threats & challenges. He termed the present age as Grey Zone and Hybrid warfare where traditional ways to defend have been challenged. Continuous adaptation is the best strategy to deal with the emerging challenges, he said.

Shri Rajnath Singh threw light on the diverse range of security challenges faced by India, from the traditional border-related threats to unconventional issues such as terrorism, cyber-attacks, and hybrid warfare. He asserted that the Government recognised the need for an adaptive defence strategy in a changing geopolitical & technological scenario, and has taken several initiatives to build a robust & self-reliant ecosystem. It includes establishing the institution of the Chief of Defence Staff, promoting jointness among the three Services, improvising the training curriculum and forging new defence partnerships around the world.

Raksha Mantri emphasised that, in the present age of digitisation and information overload, the world is facing an unprecedented scale of psychological warfare. He stated that the Government is determined to employ adaptive defence strategies to counter the menace of information warfare against national security.

Shri Rajnath Singh reiterated the Government's commitment to keep India among the leading countries working on emerging technologies in cyberspace and Artificial Intelligence (AI). A country of the size and potential of India has to have the capability and wherewithal to deal with the imminent global innovations of AI in defence, he said.

Raksha Mantri stated that drones and swarm technologies are bringing fundamental changes in the ways & means of warfare. "India is aiming to become a drone hub of the world. Several initiatives have been taken in this regard. This would not only help the Indian economy but also significantly contribute to our Make in India and the Aatmanirbhar Bharat programme. We are already working to improve Research & Development through reliable certification mechanisms, and facilitate Indian Intellectual Property creation in this sector. Additionally, we have also introduced rewards for innovation through the schemes of iDEX and ADITI," he added.

Shri Rajnath Singh called for adopting a collaborative approach to deal with contemporary problems of defence and security. He stressed that the actors involved in these matters are not only states, but non-state as well. "The current geopolitical dynamics and cross-border issues make a collaborative approach to defence essential. The ambiguities of the cyberspace, AI and the vast potential of quantum & nanotechnologies further demand collaboration and sharing of knowledge, perspectives, information & strategies, if possible," he said.

Raksha Mantri exuded confidence that DDD will help in analysing the aspects of jointness and integration. “Jointness cannot and should not be restricted to the military domain of individual countries. Our interconnectedness is as much a blessing as it is a challenge. If our threats are transnational so should be our solutions,” he said.

Raksha Mantri was of the view that it is rare to find a technological solution today that is completely designed, developed, manufactured and consumed within the same country. This is the nature of globalisation and the inter-dependence that it has created. “The logic of both economies of scale and the sources of expertise demand that the solutions should be logically collaborative. And our inter-connectedness allows and facilitates such collaborations without the limitations of geography,” he said.

Shri Rajnath Singh expressed confidence that by bringing together policymakers, military experts and scholars, DDD will generate innovative ideas and collaborative strategies to enhance the country’s defence posture. He termed it is a vital initiative that aspires to strengthen the strategic vision emphasising a comprehensive approach and facilitating informed discussions that contribute to national, regional and global security. “We intend to foster strategic partnerships, promote indigenous defence production, and find ways to adapt to emerging technologies,” he stated.

Raksha Mantri enumerated the robust steps taken by the Government to deal with contemporary threats. The decisions include unveiling of Defence Acquisition Procedure 2020; establishment of Defence Industrial Corridors in Uttar Pradesh & Tamil Nadu; notification of positive indigenisation lists; increase in FDI limit and launch of the Innovations for Defence Excellence (iDEX) initiative.

He said: “Aatmanirbhar Bharat Abhiyan, with focus on self-reliance in the defence sector, forms the bedrock of our vision. The emphasis on indigenous capabilities aligns with our aim to reduce dependence on foreign suppliers. This must not be seen as an isolationist approach, as we are very much open to foreign investment, collaboration, joint R&D and co-production within the broader framework of ‘Make in India’ initiative.”

Shri Rajnath Singh added that the ‘Make in India’ campaign has witnessed success through indigenous projects such as Light Combat Aircraft ‘Tejas’, INS Vikrant, and DRDO’s missile programmes. “Today, we are also witnessing the fruits of our endeavour in the rising exports of defence items. Currently, India is exporting defence items to over 100 nations, with the top three destinations for defence exports in 2023-24 being the USA, France, and Armenia. We hope to achieve the target of Rs 50,000 crore worth of defence exports by 2029,” he stated.

The DDD is a flagship platform of MP-IDSA for addressing the multifaceted challenges of defence and security in India. As the landscape of warfare becomes increasingly complex, the platform is designed to discuss the evolving landscape of international security and defence strategies, with a focus on India’s defence. The dialogue aims to exchange views and foster collaboration among defence experts, policymakers, and military leaders. Further, as India navigates a complex geopolitical landscape, the DDD serves as a critical forum for addressing the need for a robust defence strategy that not only addresses immediate threats but also anticipates future challenges.

DG, MP-IDSA Ambassador Sujan R Chinoy, Vice-Chief of the Air Staff Air Marshal SP Dharkar, civil & military officials and distinguished participants from within the country & abroad were present on the occasion.

https://pib.gov.in/PressReleasePage.aspx?PRID=2072663

THE ECONOMIC TIMES

Tue, 12 Nov 2024

Akashteer: Transforming India's air defence with cutting-edge technology

In a remarkable stride towards modernising India's defence capabilities, the Indian Army has achieved a major milestone through the development and phased induction of Project Akashteer.

This ambitious initiative, a key part of the Army's "Decade of Transformation" and "Year of Tech Absorption," aims to provide India with a robust and responsive air defence network, meeting the demands of contemporary aerial threats with agility and precision.

Recently, a real-time validation of Project Akashteer was carried out simulating scenarios as expected in future wars. A senior officer from the military hierarchy witnessed the validation appreciated the achievements of the project and commended the team involved in developing the Akashteer.

He acknowledged their efforts and mentioned that it has realised a transformative leap in the Indian Army's air defence capabilities.

Project Akashteer introduces a fully automated and integrated air defence system, offering unparalleled responsiveness and reliability. Here's a closer look at the groundbreaking features of this transformative initiative:

Comprehensive Sensor Fusion: Akashteer has achieved a "bottoms-up" fusion of all air defence sensors, integrating land-based sensors from both the Army Air Defence (AAD) and the Indian Air Force (IAF). This ensures a seamless and unified air picture that is accessible to the lowest operational units of Army AD, enhancing coordination and situational awareness across the force. Automated Operations for Faster Response: In air defence, every second is critical.

Akashteer's automation replaces manual data entry, which previously consumed precious time. With no human input required, the system operates at maximum efficiency, allowing timely responses to fast-moving aerial threats. To illustrate, an aircraft at supersonic speeds can travel up to 18 kilometres in a single minute--Akashteer ensures that not a moment is lost in defence readiness.

Decentralised Engagement Authority: By decentralising the authority to engage hostile aircraft, Akashteer empowers units on the front lines, enabling rapid engagement decisions while maintaining controlled freedom to prevent friendly-fire incidents. This decentralisation is

particularly critical for units stationed along the Northern and Eastern Commands, which are already equipped with Akashteer systems. Advanced Real-Time Air Picture: Akashteer consolidates live data from various sources, including 3D Tactical Radars, Low-Level Lightweight Radars, and the Akash Weapon System, providing a multi-dimensional view of the airspace.

This integrated picture is invaluable for both strategic planning and immediate threat response, giving Indian forces an edge in defending India's skies. Built-in Redundancy and Scalability: The system is designed with robust communication redundancy, ensuring connectivity even under adverse conditions.

Additionally, Akashteer offers both software and hardware upgrade capabilities, making it a future-proof platform able to adapt to evolving technological and operational needs. Flexible Deployment Across Formations: Recognising the varied operational needs, Akashteer has been tailored to provide mobile, adaptable platforms for strike formations, while pivot formations have been equipped with hardened, land-based systems.

This flexibility enables the system to effectively support a range of tactical scenarios, reinforcing India's defence on multiple fronts. Akashteer's phased induction is already underway. Out of a total requirement of 455 systems, 107 have been delivered, with an additional 105 expected by March 2025.

The remaining units will be delivered by March 2027, ensuring comprehensive coverage across the Indian Army's defence units and formations. Through Project Akashteer, the Indian Army is positioning itself at the forefront of air defence technology, ensuring a secure and vigilant airspace over India. This significant achievement underscores the commitment of India's defence forces to innovate and enhance capabilities in response to ever-evolving security dynamics.

https://economictimes.indiatimes.com/news/defence/akashteer-transforming-indias-air-defence-with-cutting-edge-technology/articleshow/115218211.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

Govt starts process of procuring surveillance helicopters with accessories

The government has started the process of procuring surveillance helicopters with accessories and issued a Request for Information (RFI) for it on Tuesday. The RFI says the surveillance helicopters, along with the accessories, are planned to be procured in the spirit of the 'Make in India' and 'Atmanirbhar Bharat' programmes.

"The preferred categorisation for the project as per provisions of Chapter-II of DAP-2020 may be indicated by the vendors with due justification," it adds. The ministry of defence intends to procure "surveillance copters with accessories", according to the RFI document.

This RFI is being issued with a view to "finalise SQRs (Service Qualitative Requirements), decide procurement category and identify probable Indian vendors who are capable to supply surveillance copter along with accessories within two years of award of contract/supply order".

The first part of the RFI incorporates the intended use of the equipment and the operational requirement that should be met by the surveillance copter with accessories.

The RFI also mentions the terrain conditions under which the "surveillance copters" will be employed -- plain and desert terrain as occurring along the western borders of India, high altitude (up to 4,500 metres) or mountainous terrain as occurring in India.

The surveillance copters with accessories should be operational by day and night and in commonly encountered weather conditions in all kind of terrains in the country, the RFI says. "Surveillance Copter be modular in design, thereby lending itself to future upgrades through simple modifications, not leading to design or structural

change. It should also facilitate integration and installation, without impacting the performance of any system/sub-system," it added.

https://economictimes.indiatimes.com/news/defence/govt-starts-process-of-procuring-surveillance-helicopters-with-accessories/articleshow/115219168.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

Govt begins process of procuring ATVs for deployment along northern borders

The government has started the process of procuring All-Terrain Vehicles (ATVs) for deployment along the northern borders for the Indian Army and issued a Request for Information (RFI) for it on Tuesday.

According to the RFI, an ATV will provide cross-country mobility to the infantry detachments for surveillance, mobile platforms for employment of weapons and mobile platform for logistic resupply in operations. The vehicle will ensure rapid move through terrains where "unprepared or no roads exists," it said.

"The Ministry of Defence, government of India is desirous of procuring AllTerrain Vehicle (ATV) for deployment along Northern Borders for the Indian Army. With the view to identify probable vendors who can undertake the said project, the OEMs or Vendors are requested to forward information on the product which they can offer," according to the RFI document.

The first part of the three-part RFI incorporates operational characteristics and broad technical requirements that should be met by the vehicle, tentative date of the issue of the RFP (Request for Proposal) and the approximate quantity required to be procured. The mandatory characteristics for the ATV sought by the Army include technical and physical characteristics.

The seating capacity should be for a minimum of four personnel, including a driver, and it should have disc brakes; transmission should be automatic; and it should be wheeled.

On heliportability, the RFI says, "By service helicopters held with Indian armed forces (Chinook/Mi26) with tie-downs points in front and rear of vehicle for under slung and should be Para-droppable".

The equipment should be based on (Global Navigation Satellite System) GNSSbased navigation system to include NAVSTAR, Global Navigation Satellite System (GLONASS) and Indian Regional Navigation Satellite System (IRNSS).

The operator should have the option of selecting, deselecting and blocking any of the available GNSS service," it added.

https://economictimes.indiatimes.com/news/defence/govt-begins-process-of-procuring-atvs-for-deployment-along-northern-borders/articleshow/115219067.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

We are going to enter era in which combat may be between machines and humans, says CDS Gen Anil Chauhan

Chief of Defence Staff Gen Anil Chauhan on Tuesday underlined the evolving nature of warfare and said a combat has always been between humans but now the world is going to enter an era in which it may be between a machine and human being and later between machines. He said this during an interaction session held at the Manohar Parrikar Institute for Defence Studies and Analyses in New Delhi.

"Since, again... warfare has evolved, combat has always been between a human and a human. That human may be well-protected, well-armed differently, he could be mounted on a mobile platform, it could be a horse in earlier days, it could be an attack helicopter now, but combat was always between two humans," he said.

"Now, we are going to enter an era in which a combat may be between a machine and human being, a machine which is totally autonomous, and tomorrow it could be between machines and machines. That's a big difference in warfare which is going to take place, and that's what I foresee, because of robotics," the CDS said.

He also spoke of the domains such as space and cyberspace which are now among key domains when it comes to future warfare, different from the traditional domains of air, land and maritime.

https://economictimes.indiatimes.com/news/defence/we-are-going-to-enter-era-in-which-combat-may-be-between-machines-and-humans-says-cds-gen-anil-chauhan/articleshow/115227010.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

JSW Defence announces partnership with US firm to indigenise, manufacture Unmanned Aerial System

JSW Defence on Tuesday announced a strategic partnership with a US firm to indigenise and manufacture its 'VBAT', an Unmanned Aerial System (UAS), and said the collaboration marks a significant step in boosting India's defence capabilities by bringing in world-class UAS technology to the country. In a statement, Mumbai-based JSW Group also said as part of the partnership with Shield AI, the conglomerate will invest around USD 90 million in the next two years, with USD 65 million allocated in the first 12 months to establish JSW's global compliance programme, a manufacturing facility to ensure "proper technology licensing, and training of manpower".

"This investment will enable JSW to establish a local supply chain and create an advanced facility in India for manufacturing, assembling and testing VBAT aircraft. This effort will enable large-scale production of V-BATs in India to serve the needs of the Indian armed forces and also function as a global production hub for Shield AI," it said.

The V-BAT is a fixed-wing, vertical take-off and landing (VTOL), long endurance intelligence, surveillance, reconnaissance (ISR) platform, currently deployed by multiple armed forces around the world, including the United States' Marine Expeditionary Units (MEUs), the statement said.

It provides cutting-edge ISR functionality in a highly tactical system, capable of being forward deployed in complex and adversarial territory in order to provide a range of flexible solutions to special forces, front-line infantry, armoured and artillery units. V-BAT has a unique patented ducted design with the advantage of a small logistics footprint and ease of rapid deployment, the JSW Group said.

JSW Defence, part of the USD 24 billion JSW Group, announces partnering with Shield AI Inc, a leading US defense technology to "indigenise and manufacture Shield AI's 'V-BAT', a Group 3 Unmanned Aerial System," the statement said.

"This collaboration marks a significant step in boosting India's defense capabilities by bringing in world-class UAS technology to the country," it added. Founded in 2015, Shield AI is a venture-backed defence technology company whose mission is to protect service members and civilians with intelligent systems. In pursuit of this mission, Shield AI is building the world's best AI pilot, it said.

"Our collaboration with Shield AI is in keeping with our commitment to induct mission-critical technologies for deployment by the Indian armed forces and play an integral role in indigenising defence technology in India. Through this partnership, we will be able to supply indigenous V-BATs at scale, provide flight operator training, and end-to-end maintenance, repair and overhaul (MRO) services to the Indian armed forces," Parth Jindal of JSW Group was quoted as saying in the statement.

"The JSW Group has always believed in bringing world-class products and services with state-of-the-art technology into India and this partnership is yet another milestone in this journey," he said.

Sarjan Shah, Shield AI's managing director for India, said, "Shield AI has been an early mover on investing deeply in India, in line with both governments' desire for a closely integrated defence supply chain between the US and India. This partnership with JSW has been crafted over a multi-year period to transform the depth, scale and scope of India's indigenous capabilities in the field of military unmanned systems. We look forward to doing a lot more with our partners in India."

https://economictimes.indiatimes.com/news/defence/jsw-defence-announces-partnership-with-us-firm-to-indigenise-manufacture-unmanned-aerial-system/articleshow/115226910.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

India-US ties will determine whether this is 'century of light' or 'century of darkness' : Trump's NSA nominee Mike Waltz

Emphasising that the US-India relationship is the "most important" ties of the 21st century, Congressman Mike Waltz, named National Security Advisor by President-elect Donald Trump, has recently said that this partnership which will "determine whether this is a century of light or a century of darkness".

Waltz, who is the Co-Chair of the Congressional India Caucus, had made these remarks at an event hosted by US India Strategic and Partnership Forum (USISPF) at Stanford University for the INDUSUSX Summit in September.

"The bottom line is, in my view, this (US-India) is the most important relationship of the 21st century. This will determine whether this is a century of light or a century of darkness," he said.

In his video message to the summit, which he could not attend due to his engagements in the election, Waltz encouraged further collaboration to maintain a free and open Indo-Pacific and protect India's sovereignty, particularly along the Line of Control (LoC).

"Consider my office and my team an open door to further this relationship as we press forward, and keeping the Indo-Pacific free and open and protecting Indian sovereignty particularly on the Line of Control (LoC) and ensuring that the world that we leave behind for our children and grandchildren is in line with our shared values," he said.

Waltz said he was excited about the tremendous momentum in the relationship between the oldest and the largest democracies in the world.

"Let's keep the momentum (in the US-India relationship) going," he said. Waltz, who recently visited India in August with his co-chair, Congressman Ro Khanna, to participate in the Independence Day celebrations, reflected on the "incredible" address by Prime Minister Narendra Modi at the Red Fort.

"It was an amazing event," he said, adding that the growing momentum in USIndia relations is also evident through initiatives like iCET and INDUS-X.

Waltz highlighted several areas of cooperation, from joint production of Apache helicopter fuselages by Boeing and Tata to advancements in ship repair, quantum computing, artificial intelligence, and data management -- all crucial as both nations advance further into the 21st century.

https://economictimes.indiatimes.com/news/defence/india-us-ties-will-determine-whether-this-is-century-of-light-or-century-of-darkness-trumps-nsa-nominee-mike-waltz/articleshow/115227879.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

India, China to patrol once every week in Demchok and Depsang, complete one round of patrol each

Armies of India and China have agreed to carry out one coordinated patrol every week in the Demchok and Depsang areas in eastern Ladakh sector and have already completed one round of patrolling there.

The two sides had started coordinated patrols in the first week of the month after completing disengagement in both Demchok and Depsang in the last week of October. The two sides have agreed to carry out one patrol each by both sides every week in Depsang and Demchok. In each area, one patrol would be carried out by Indian troops and one patrol would be done by the Chinese troops, defence sources told ANI.

The two sides reached the agreement for disengagement from Depsang and Demchok in Eastern Ladakh along the Line of Actual Control after multiple rounds of talks at political, diplomatic and military levels. Indian and Chinese sides will continue to hold ground commanders-level of engagements at regular intervals in these areas.

The two sides have also carried out verification patrols to ascertain the process of disengagement after the agreements were reached. India and China had commenced troop disengagement from two friction points at Demchok and Depsang Plains in eastern Ladakh after being engaged in a four-year military standoff.

Relations between India and China were tense since a violent clash occurred in the Galwan Valley in June 2020, causing the most serious military conflict between the two nations in decades.

https://economictimes.indiatimes.com/news/defence/india-china-to-patrol-once-every-week-in-demchok-and-depsang-complete-one-round-of-patrol-each/articleshow/115224183.cms

THE ECONOMIC TIMES

Wed, 13 Nov 2024

Army to test indigenously designed and developed light battle tank in 2025

The indigenously designed and developed light battle tank will be tested and evaluated by the Army next year, a top officer has said, adding that plans are underway to fund a project to develop a futuristic lighttank as well, with the industry taking the lead.

Developed in response to the Army's requirements for high-altitude battlefields like eastern Ladakh, the tank is a joint project between DRDO and L&T. It is currently undergoing developmental trials and will be handed over for user evaluation shortly.

Speaking at the Indian Armour Symposium, Lt Gen Vivek Kashyap, director general of Armoured Corps, said that a future light battle tank will be developed as well with the help of the industry. The officer said two industry partners will be identified after technical evaluation and will develop their own variants based on Army requirements.

The project will be partially funded by the Army and the system that emerges better in the competitive process will be selected for induction in larger numbers. Indian tanks have more mobility and higher accuracy fire power than the Chinese Type 15 tanks that have been deployed on the Ladakh border.

The weight of the tank has been kept at 25 tonnes for higher mobility at extreme altitudes. The senior officer also said that plans to develop nextgeneration main battle tanks under Project Ranjit are underway.

https://economictimes.indiatimes.com/news/defence/army-to-test-indigenously-designed-and-developed-light-battle-tank-next-year/articleshow/115228487.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

India is aiming to become a drone hub of the world: Defence Minister Rajnath Singh at Delhi Defence Dialogue

Union Defence Minister Rajnath Singh on Tuesday said that India is aiming to become a drone hub ofthe world and it would not only help the Indian economy but also significantly contribute to Make in India and the Atmanirbhar Bharat programme.

He was speaking at Delhi Defence Dialogue organised on theme "Adaptive Defence: Navigating the Changing Landscape of Modern Warfare" at Manohar Parrikar Institute for Defence Studies

and Analyses. He said the government has taken several initiatives to make India as drone hub of the world.

"We are already working to improve Research & Development thorough reliable certification mechanisms, and Indian Intellectual Property creation in this sector. Additionally, we have also introduced rewards for innovation through the schemes of iDEX and ADITI," he said.

"Drones and swarm technologies are bringing fundamental changes in the ways and means of warfare. The development has changed the post-World War II understanding of warfare completely.

The traditional notions and concepts of warfare in all three dimensions - land, air and water - have been rapidly changing. These dimensions are being seen as overlapping due to drone and swarm technology interventions", he added.

On increasing defence exports the Raksha Mantri said, "We are also witnessing the fruits of our endeavour in the rising exports of defence items from India. Currently, India is already exporting defence items to over 100 nations, with the top three destinations for defence exports in 2023-24 being the USA, France, and Armenia. We hope to achieve the target of Rs 50,000 crores worth of defence exports by 2029."

"India is committed to remain among the leading countries working on emerging Technologies in cyberspace and Artificial Intelligence. They have already issued the AI framework and guidelines for the DRDO projects and programmes. The system laboratories of the DRDO has AI technology groups to introduce AI features in all the products. There is an AI roadmap for each Defence Public Sector Undertaking," he added.

"The Government of India is determined to employ adaptive defence strategies to counter the menace of information warfare against national security," The Defence Minister further added. Delhi Defence Dialogues is a flagship platform of MP-IDSA for addressing the multifaceted challenges of defence and security in India.

As the landscape of warfare becomes increasingly complex, the platform is designed to discuss the evolving landscape of international security and defence strategies, with a focus on India's defence. The dialogue aims to exchange views and foster collaboration among defence experts, policymakers, and military leaders.

Further, as India navigates a complex geopolitical landscape, the DDD serves as a critical forum for addressing the need for a robust defence strategy that not only addresses immediate threats but also anticipates future challenges.

https://economictimes.indiatimes.com/news/defence/india-is-aiming-to-become-a-drone-hub-of-the-world-defence-minister-rajnath-singh-at-delhi-defence-dialogue/articleshow/115209686.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

Govt sanctions first all-women reserve battalion for CISF

A first-ever all-women CISF reserve battalion comprising more than 1,000 personnel has been sanctioned by the Union government keeping in mind the burgeoning duties of the force at airports and other vital installations. Officials told PTI that the unit will be raised from within the sanctioned manpower of the force of about two lakh personnel.

The Union home ministry issued a sanction order this week approving an exclusive women reserve unit in the force with a total strength of 1,025 personnel led by a senior commandant-rank officer, they said. The Central Industrial Security Force (CISF) has 12 reserve battalions under its establishment at present.

As the name suggests, these units are kept in reserve and used as reinforcement when the force gets a new job like temporary duties of conducting elections and permanent tasks of guarding an installation like the Parliament House complex that came under CISF cover this year, an official said.

The force has a huge women interface at facilities like the 68 civil airports that it guards, the Delhi Metro and historical monuments like the Taj Mahal and the Red Fort.

The force had projected a requirement of having an all-women reserve battalion which has been recently sanctioned, a home ministry official said.

Apart from these installations, the 1969-raised CISF provides a counterterrorist security cover to a number of facilities in the nuclear and aerospace domain apart from those in the private sector like the Infosys offices in Bengaluru and Pune, Reliance refinery in Jamnagar (Gujarat), among others.

https://economictimes.indiatimes.com/news/defence/govt-sanctions-first-all-women-reserve-battalion-for-cisf/articleshow/115218303.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

India, Nepal annual border talks in Kathmandu this week

India and Nepal will hold their annual border talks in Kathmandu later this week over a host of issues related to curbing trans-frontier crimes and timely sharing of intelligence inputs.

An Indian delegation led by Sashastra Seema Bal (SSB) Director General Amrit Mohan Prasad will travel to the neighbouring country for bilateral discussions with their Nepalese counterparts -- Armed Police Force (APF) -- scheduled between November 16-18, official sources said.

This will be the eighth edition of this bilateral meeting. These annual talks have been taking place since 2012 and are alternatively held in India and Nepal. An APF delegation visited New Delhi for the talks in November 2023.

The meeting aims to serve as a vital platform for both forces to engage in discussions on various issues related to the unfenced India-Nepal border. The SSB is the designated force to guard this 1,751 km long front on India's eastern side running along the states of f Bihar, Sikkim, Uttar Pradesh, Uttarakhand and West Bengal.

The agenda of the meeting is expected to revolve around measures that can be undertaken by both sides for effective collaboration to combat trans-border crimes and facilitate a prompt exchange of critical information between the forces, officials told PTI.

They said the Indian delegation will have members from the ministries of external affairs and home, and a joint record of discussions is expected to be signed by the two sides on November 18 at Kathmandu at the end of the talks. The APF delegation will be led by its Inspector General (IG) Raju Aryal.

The India-Nepal border is prone to illegal crossovers by anti-national elements including third country nationals as it is unfenced and open. Security and intelligence agencies have nabbed terrorists, fraudsters and criminals from this border a number of times. The SSB chief is also expected to call on Nepal's Home Minister Ramesh Lekhak and other senior government officials.

https://economictimes.indiatimes.com/news/defence/india-nepal-annual-border-talks-in-kathmandu-this-week/articleshow/115214992.cms

THE HINDU

Tue, 12 Nov 2024

Jaipur-based South Western Command establishes think tank Gyan Shakti

As Rajasthan looks to expand the defence industrial base in the State, the Army’s Jaipur-based South Western Command has established a think tank Gyan Shakti to provide a platform for debate and interaction between armed forces, industry, State government and the academia on defence and security related matters at regional and national level. The Chief Minister of Rajasthan has enunciated a vision to turn the State into a $350 billion economy by 2029.

“This think tank, will harness the invaluable wisdom, experience and vast domain knowledge of the veteran community, on matters of defence and national security. This will not only give a boost to the transformation initiatives of the Indian Army but also encourage them to participate in ongoing prospects of nation-building, and contribute to the government’s objectives of Rising Rajasthan and Viksit Bharat by 2047” , South Western Army Commander Lt. Gen. Manjinder Singh said on Monday.

He was speaking at the inaugural seminar on ‘atmanirbharta in defence manufacturing: opportunities in Rajasthan’ in collaboration with the Federation of Indian Chambers of Commerce and Industry. Future wars will be intense, prolonged and will necessitate high volume indigenous defence production close to conflict zones, thus enabling faster delivery times, the Army Commander stated.

“Rajasthan, which has the largest land border with our western adversary boasts of all the ingredients necessary for a viable defence manufacturing ecosystem,” he said. The State has well developed logistics infrastructure connectivity contiguous to the border, adequate real estate and shorter turnaround time for delivery of war waging material and sustenance of forces and skilled manpower, he stated.

However, the defence manufacturing ecosystem in the State, is negligible, Lt. Gen. Singh pointed. There exists a need to cultivate the immense potential of the State’s MSMEs and further elevate their industrial capacity to meet the demands of the defence sector as also of defence exports, he added. Noting that the registration process for the new think tank has commenced, the Army Commander announced that 67 veterans have already registered to be a part of this institution. Stating that subject matter experts, industry and government are working in isolated compartments, he said the think tank aims to “create a combined pool of talent of all stakeholders, which would then become a repository of knowledge and be ideally suited to advise the industry and the government on the way forward”.

The seminar was attended by over 29 industries including MSMEs and 23 different stalls were established by various defence agencies, start-ups and manufacturing agencies, the Defence PRO said in a statement. The seminar also aimed to recognise the significant potential of State of Rajasthan in development of defence ecosystem and bring together all stake holders to charter a path for establishment of defence manufacturing, maintenance and repair hub in Rajasthan, Col. Amitabh Sharma, Defence PRO Jaipur said in a statement.

Some of the systems on display include thermal weapon sights for various small arms, HHTI with display, exoskeleton, 3D camouflage solution for soldiers, BMP armoured vehicles, tanks and air defence platforms, in ear noise reduction headset for radios, infrared beacons and patches, long range sound guns among others.

https://www.thehindu.com/news/national/jaipur-based-south-western-command-establishes-think-tank-gyan-shakti/article68859917.ece

THE WEEK

Tue, 12 Nov 2024

In a major milestone for Indian Army, LCH Prachand conducts high-altitude firing

In what has been billed as a "historic milestone" for the Indian Army, the Light Combat Helicopter (LCH) HAL Prachand of the Army successfully conducted high-altitude firing.

Designed for precision in extreme terrains, Prachand's performance reinforces India's capability in high-altitude operations, the IV Corps, or the Gajraj Corps, of the Indian Army said in a tweet.

Built by Hindustan Aeronautics Limited (HAL), Prachand light combat helicopter is an attack helicopter that can track slow-moving aerial targets and conduct search and rescue missions.

This LCH can also perform anti-tank operations, and counter-insurgency operations and provide close air support apart from engaging in high-altitude warfare.

The LCH was developed with a primary focus on engaging slow-moving aerial threats, including enemy helicopters and drones, and incorporates a Low Observable (LO) design, which minimises its visual, aural, radar, and infrared signatures. The two-seater aircraft, equipped with advanced weapons systems—70 mm rockets, a 20 mm turret gun, and helicopter-launched anti-tank guided missiles—and fitted with radar and laser warning receivers, can operate both as anti-infantry and anti-armour helicopter.

Nearly 45 per cent of the LCH's components are indigenously sourced, and plans are on to increase this to 55 per cent in future models. The aircraft was officially inducted into the Indian Air Force in October 2022.

https://www.theweek.in/news/defence/2024/11/12/in-a-major-milestone-for-indian-army-lch-prachand-conducts-high-altitude-firing.html

Wed, 13 Nov 2024

Kudos to Indian Army, BRO: 1,200 kg gun installed at 17,500 feet mountain peak

Indian Army builds bunker at 17,500 feet: A video going viral on social media captures the indomitable spirit of the Indian Army and the Border Road Organisation (BRO). The Indian Army and BRO not only built a bunker at 17,500 feet but also carried a 1200 kg artillery gun atop the mountain to secure its borders.

At 17,500 feet where it is difficult even to breathe, the Indian Army did a remarkable job of carrying a heavy gun to a significant height in the Ladakh sector. The drone footage shows BRO and Indian Army jawans constructing a bunker at the top of a mountain in Ladakh.

After building the bunker, the army lifted the 1200 kg artillery gun and installed it at the bunker in order to secure its border with China, reports suggest.Watch the video that shows the indomitable spirit and tireless efforts of of the Indian Army and the BRO in safe guarding the Indian borders.

https://www.news9live.com/videos/india-videos/kudos-to-indian-army-bro-1200-kg-gun-installed-at-17500-feet-mountain-peak-2748725

Tue, 12 Nov 2024

Owner's Pride: IIT Kanpur’s 'Swadeshi' Drone Takes Flight For Use In Indian Defence

IIT Kanpur is making waves in defence innovation with a newly developed indigenous drone for the Indian Army. Known as 'swadeshi' version of Kamikaze drone, it is an advanced device that has been crafted by experts at the institute with a specific focus on military utility. Designed to assist in battlefield operations, the drone can identify and eliminate enemy tanks, weapons, and personnel within minutes. Its recent tests in IIT Kanpur’s labs have shown promising results, and if the Army approves, full-scale trials are expected within the next 6 to 8 months.

Key Specifications: Developed over two and a half years by IIT Kanpur’s Aerospace Engineering Department, the working drone boasts a carrying capacity of up to 2 kilograms. According to Professor Subramanyam Saderla, the drone operates at speeds of 35–40 kilometers per hour, with potential acceleration to 180 kilometers per hour. This drone’s minimum operational range is 100 kilometers, which can be extended based on requirements. Notably, this type of high-capacity drone is a first for the Indian military.

Strategic Market Target: While the exact production cost is yet to be determined, IIT Kanpur envisions a revenue goal of Rs 1,500 crore within the next five years from this drone technology. Professor Saderla shared that this drone functions as a ‘suicide drone,’ meaning it can strike targets independently and remain under the full control of the Army, allowing operators to destroy it if necessary after deployment.

Features and Capabilities: The working drone operates on a rechargeable system, with an operational endurance of 3 to 4 hours per charge. Equipped with infrared sensors and GPS, it provides real-time, precise location data on enemy targets, allowing for long-range identification and tracking. Despite its advanced features, the drone operates soundlessly, providing stealth capabilities. The drone can capture high-quality photos and videos, further enhancing its role in reconnaissance. Recently, Defense Minister Rajnath Singh visited IIT Kanpur and observed the drone in action, appreciating its potential importance for national defense.

Earlier, IIT Kanpur had unveiled a groundbreaking solar-powered drone named 'Maral', designed to transform aerial surveillance. Developed in collaboration with leading engineers, Maral’s innovative design features integrated solar panels that allow it to operate solely on sunlight, offering extended flight times and reducing dependence on conventional fuel sources. This advanced drone promises to set new standards in monitoring technology, combining sustainability with enhanced surveillance capabilities.

With Union Defence Minister Rajnath Singh stressing on India's aim of becoming a hub of drone technology, such innovations would be the need of the hour. While addressing the Delhi Defence

Dialogue on Tuesday Singh said such innovations align with Make in India and Atmanirbhar Bharat programme while helping boost the economy.

Kamikaze drones, also known as loitering munitions or suicide drones, are unmanned aerial systems (UASs) that are designed to attack targets by crashing into them. They are often used in modern-day conflicts, like the ones used during the Russia-Ukraine war and the Israel-Hamas conflict.

https://www.etvbharat.com/en/!bharat/iit-kanpur-deadly-indigenous-kamikaze-drone-for-indian-army-ready-for-use-enn24111203172

Business Standard

Tue, 12 Nov 2024

India-Indonesia conclude 9th edition of 12-day Garuda Shakti Exercise

The closing ceremony for the 9th edition of the India-Indonesia Joint Special Forces Garuda Shakti Exercise was held at Cijantung, Indonesia on November 12.

In a post on X, the Additional Directorate General of Public Information, Indian Army said, "The Closing Ceremony of the 9th edition of India-Indonesia Joint Special Forces Exercise Garuda Shakti was held at Mokopassus, Cijantung, Indonesia. The Closing Ceremony was attended by Sandeep Chakravorty, Ambassador of India to Indonesia, Captain Shiv Kumar Defence Attache, from Indian Embassy and Kolonel Inf J. S. Aling of the Indonesian Army. Exercise Garud Shakti has enabled both the contingents to enhance their capabilities to conduct joint military operations in Counter Terrorism environment in sub conventional domain. "Forging Bonds for a United Future."

Showcasing the strong defence cooperation between India and Indonesia, an Indian Army special contingent of 25 personnel particpated in the joint exercise 'Garud Shakti'.

The 9th edition of the India-Indonesia Joint Special Forces Exercise Garud Shakti was conducted from November 1 to November 12. The Indian Army personnel reached Cijantung in Jakarta, Indonesia, to participate in the exercise.

"The exercise is designed to develop bilateral military cooperation and strengthen bond between two armies through conduct of discussions and rehearsal of tactical military drills," said a statement from the Ministry of Defence. Troops are representing the Indian contingent from The Parachute Regiment (Special Forces) and the Indonesian contingent of 40 personnel is being represented by Indonesian Special Forces Kopassus.

In the post on X, the Indian Army noted, "Exercise #GarudShakti has enabled both the contingents to enhance their capabilities to conduct joint military operations in Counter Terrorism environment in sub-conventional domain".

In a video released from the exercise by the Indian Army, it was seen that the two armies engaged in different terrains and combat techniques. Underwater training, close-range shooting, and exercises in urban and jungle terrain were a few of the many areas of collaboration.

As the two countries share best practices, this exercise falls on the heels of 2024 being declared as the "Year of Tech Absorption" by the Indian Army.

India and Indonesia share warm and friendly ties. This year is significant as both countries celebrate 75 years of diplomatic relations and mark a decade of India's 'Act East' policy, of which Indonesia is an important pillar.

The exercise comes days after Indonesia saw the oath-taking ceremony for the country's 8th President, Prabowo Subianto. India was represented by Minister of State for External Affairs Pabitra Margherita.

The External Affairs Ministry stated that Margherita's participation in the inauguration ceremony reaffirms India's commitment to further strengthening the Comprehensive Strategic Partnership between India and Indonesia.

https://www.business-standard.com/external-affairs-defence-security/news/india-indonesia-conclude-9th-edition-of-12-day-garuda-shakti-exercise-124111300383_1.html

#SWARAJYA

Tue, 12 Nov 2024

Defence Update: India Sends First Akash Weapon System Battery To Armenia, Second Missile Export After BrahMos

India achieved a significant milestone in its defense exports with the dispatch of the first Akash weapon system battery to Armenia, marking the second missile system India exported after BrahMos.

Developed by the Defence Research and Development Organization (DRDO), the Akash is a surface-to-air missile (SAM) capable of targeting fighter jets, cruise missiles, drones, and other aerial threats within a 25-kilometer range.

Bharat Electronics Limited (BEL), which manufactures the Akash system, equips each battery with a Rajendra 3D passive electronically scanned array radar and four launchers, each armed with three interlinked missiles, The New Indian Express reported.

Sanjeev Kumar, Secretary of Defence Production, officiated the send-off of the first Akash Weapon System Battery to a "Friendly Foreign Country," according to a BEL statement on Monday, highlighting India's expanding defense manufacturing and export capabilities.

The export of the Akash Missile System was approved by the Union Cabinet in December 2020. Defense Minister Rajnath Singh noted that the export version of the Akash missile differs from the

model used by the Indian armed forces and emphasised that over 96 per cent of its components are sourced domestically.

The Akash was first inducted into the Indian Air Force in 2014 and into the Indian Army in 2015. In 2022, Armenia agreed to acquire 15 Akash systems in a deal worth approximately Rs 6,000 crore, making it the first country to purchase this system from India.

The same year, India secured a major export contract with the Philippines to supply BrahMos supersonic cruise missiles, the first major defense export order for the country. The Philippines received its initial BrahMos shipment in April, marking the completion of this landmark deal.

The Akash system is highly mobile and can be deployed on both wheeled and tracked vehicles. BEL supported the deal by supplying critical Ground Support Equipment, including Surveillance Radars, Missile Guidance Radars, and C4I systems. Interest in the Akash system has been shown by countries like Vietnam, Egypt, and the Philippines. Traditionally, Armenia has relied on Russia for defense, with 94 per cent of its arms imports from 2011 to 2020 sourced from Russia. While Armenia and Azerbaijan engage in peace talks, both nations continue to enhance their military capabilities.

https://swarajyamag.com/news-brief/defence-update-india-sends-first-akash-weapon-system-battery-to-armenia-second-missile-export-after-brahmos

THE ECONOMIC TIMES

Tue, 12 Nov 2024

China military displays upgraded Z-20 helicopter at Zhuhai air show

With sleek looks mirroring the U.S. UH-60 Black Hawk, the Chinese military's advanced Z-20 helicopter packs a punch but may make its biggest impact at sea, analysts said as it was displayed at China's biggest air show in Zhuhai on Tuesday.

The Z-20's potential at sea to plug gaps in the Chinese navy's ability to protect itself from submarines is attracting scrutiny from regional defence attaches and security scholars charting its evolution after a decade of development. State media recently highlighted the first armed assault version of the helicopter, and on Tuesday the military showcased the Z-20J armed naval variant - a key step towards a full-blown anti-submarine platform, the Z-20F.

Although China is fielding ever-more advanced warships as part of its longterm military modernisation, it struggles to shield them, including its emerging aircraft carrier fleet, from undersea attacks - a capability already finely honed by many of its rivals.

Pentagon reports and Western analysts have long noted that weaknesses in the People's Liberation Army Navy's (PLAN) anti-submarine capabilities could hurt longer-range naval deployments in a conflict.

The Pentagon's latest public report on China's military modernisation, released in October 2023, noted a naval version of the Z-20 was under development. "The Z-20F is similar to the U.S. Navy's SH-60 and will provide significant improvements in ASW (anti-submarine warfare) capabilities over the smaller... helicopters the PLAN currently operates," the Pentagon report said.

Singapore-based security scholar Collin Koh said the navy's Z-8 and Z-9 helicopters were too heavy and too light, respectively, limiting the kind of ships they can operate from, their range and payloads of sensors and weapons. They are also based on 1980s European designs obtained before defence technology sanctions took effect against Beijing after the 1989 Tiananmen crackdown. "The Z-20 is therefore the answer," said Koh, of the S. Rajaratnam School of International Studies.

He said he expected the Z-20 to soon become the standard naval and antisubmarine helicopter, given its ability to land on ships ranging from corvettes and destroyers to aircraft carriers. The Taiwan navy's academic publication, Navy Professional Journal, in December 2022 published a lengthy piece on the development of China's antisubmarine helicopters, noting some of the Z-20F's capabilities exceeded that of the U.S. MH-60R, made by Sikorsky Aircraft, a unit of Lockheed Martin.

"The entry into service of the Z-20F will effectively extend the operational distance for antisubmarine combat for destroyers and corvettes," it said, adding it would be double the range of the existing fleet.

Modern anti-submarine tactics involved helicopters operating far from their host ships, hunting and tracking enemy vessels with various sensors, coordinating with ships and other aircraft. Most also carry lightweight weapons, such as depth charges and torpedoes, but generally other platforms are used to attack submarines.

Tuesday's display followed state media reports in May that Z-20 now had an assault capability and said anti-submarine versions were being developed. No date was given. In its latest annual assessment of international military deployments, the London-based International Institute for Strategic Studies notes that China has so far fielded 15 Z-20 helicopters for search and rescue work.

https://economictimes.indiatimes.com/news/defence/china-military-displays-upgraded-z-20-helicopter-at-zhuhai-air-show/articleshow/115204984.cms

THE ECONOMIC TIMES

Tue, 12 Nov 2024

UK clears world's most advanced jet that will be 10,000 times 'faster', think three steps ahead of enemy

Amid rising geopolitical tensions across the globe, United Kingdom's Prime Minister Keir Starmer has recently greenlighted a new multibillion-pound fighter jet with Italy and Japan that could be

the only one to exist after US to be a sixth generation jet, reported The Financial Times quoting its sources. As per the ambitous project, GCAP is intended to expand each nation's defence capabilities to address rising threats from Russia and China.

It merges Japan's F-X programme with the UK and Italy's Tempest project, with the aim of delivering a supersonic jet by 2035. Britain's biggest defence companies, BAE Systems and Rolls-Royce, are working together alongside industrial partners Leonardo of Italy and Mitsubishi Heavy Industries of Japan on the programme.

The Global Combat Air Programme strategically important partnership, bringing together the governments of the UK, Italy and Japan, and their respective industries, led by BAE Systems (UK), Leonardo (Italy) and Mitsubishi Heavy Industries (Japan) to collaborate on shared military and industrial objectives in the delivery of a next generation combat air capability.

Why is Tempest so special?

The combat aircraft, called Tempest in the UK, is set to be in service in 2035 and will be one of the world's most advanced, interoperable, and adaptable and connected fighter jets in service.

It will boast an advanced intelligent weapons system, a software-driven interactive cockpit, integrated sensors and a powerful next generation radar capable of providing 10,000 times more data than current systems, giving it a battle-winning advantage.

Tempest will provide several modes of operation, combining manned, unmanned and optionally-manned platforms, with onboard and offboard data processing and a range of pilot decisions aids when manned flight is being conducted. This is called scalable autonomy. Scalable autonomy will be key in the future as operating environments become more complex and threats become more sophisticated and dangerous. Tempest needs a range of high-density power and propulsion system to be world beating.

"This integrated power approach reduces the number of energy exchanges, maximising the potential of the gas-turbine as the primary power source," said Royal UK Force on Project Tempest.

The new generation jets are expected to have cockpits without a single physical dial or screen. Instead, pilots will wear a next generation augmented and virtual reality helmet that will project interactive cockpit displays and controls directly in front of their eyes. As per the statement on the project, the Tempest operator will be able to think and act two to three steps ahead of their adversary because of the advanced and highly-integrated sensors, non-kinetic effects, and communications systems.

This huge advantage will allow them to take the fight to the enemy and deliver a range of missions including team defence and surveillance. All of these systems will be highly-integrated, and designed to work seamlessly together, unlike current fighter jets that tend to be separate pieces of equipment, such as separate radar and electro-optics.

Operators will be able to make decisions with more confidence because they are not relying on single sensors. Instead, multiple types of sensors will work in concert to gather information which is automatically cross-checked and cross-referenced by the Tempest system. Tempest will

constantly mine and coordinate data from multiple sources, such as other aircraft, to provide extremely reliable and useable information, that can in turn be shared with other aircraft in a ‘combat cloud’.

Tempest needs to support existing weapons, planned weapons, and the weapons of the future. For instance, the next generation Beyond Visual Range Air-to-Air Missile Meteor and the network enabled precision surface attack missiles of the SPEAR family of weapons, will be optimised for Tempest.

Effectors will be used to protect Tempest by helping to assess and evaluate incoming threats, and then in managing the deployment of the appropriate method to defeat it. We're also working to make effectors part of Tempest's sensor network, to further enhance the information available to pilots and operators. Tempest will have the capability to carry weapons internally, rather than being attached externally, to be highly survivable in a combat role.

https://economictimes.indiatimes.com/news/defence/uk-clears-worlds-most-advanced-jet-that-will-be-10000-times-faster-think-three-steps-ahead-of-enemy/articleshow/115205902.cms

The EurAsian Times

Tue, 12 Nov 2024

France Sidelines ‘Superior’ Israeli PULS Rockets For Pinaka Mk.2; Real Reason Why Paris Wants Indian MBRLS?

France is considering purchasing the Indian 214-mm Pinaka MBRLS (Multiple Barrel Rocket Launch System) as part of its program to replace the American M270 MLRS missile systems. France’s interest in the Pinaka system is surprising because several European countries are contemplating purchasing the Israeli PULS multi-caliber rocket system as a replacement for the M270 MLRS.

PULS Multi-Caliber Rocket System

The Israeli PULS (Precise and Universal Launching System) is an advanced, modular, multi-caliber rocket artillery system developed by Israel’s Elbit Systems. Designed for maximum flexibility, PULS supports a range of rocket calibers, enabling operators to choose different munitions based on mission requirements.

PULS Can Launch

- 122 mm rockets with 40 km range
- 160 mm rockets with 45 km range
- 306 mm rockets with 150 km range
- Heavy rockets and missiles like the EXTRA and Predator Hawk, capable of 300 km range

PULS uses a modular architecture and is designed to be platform-agnostic. It can be integrated on a variety of wheeled or tracked chassis, including 4×4, 6×6, and 8×8 configurations. The system can be configured for different terrains, such as open deserts, urban areas, or rugged mountainous regions.

PULS can be integrated into existing command-and-control networks or operate autonomously, receiving targeting data directly from UAVs, radar, or forward observers. Its versatility, combined with precise targeting capabilities, makes it highly suitable for modern battlefield environments where adaptability, speed, and accuracy are critical.

Pinaka MBRLS

India's Pinaka Mk.2 is an advanced MBRLS developed by the Defence Research and Development Organisation (DRDO). Pinaka Mk.2 is an extensive upgrade to the Pinaka Mk.1 MBRLS, which the DRDO developed to replace the obsolescent Russian GRAD BM-21.

Pinaka Mk.1 MBRLS

The Pinaka Mk.1 is a free-flight artillery rocket area bombardment system designed to supplement the Indian Army's existing 105 mm artillery guns, which have a range of 37.5 km. Featuring quick reaction time and a high rate of fire, a single Pinaka system fires a salvo of 12 HE rockets from a multi-barrel launcher in 44 seconds.

A 214 mm bore Pinaka rocket has a payload of 100 kg. A salvo fire can neutralise an area of 1000x800m. It can be fitted with various warheads, such as anti-tank mines and blast-cum-pre-fragmented high explosives. Pinaka Mark I development started in 1988, and a prototype version was deployed in combat in the Kargil War of 1999. After it was proven in user trials in 2002, production orders were placed. As of November 2020, four Pinaka regiments were in service, and another six were under procurement.

Pinaka Mk.2 MBRLS

Pinaka Mk.2 214 mm rockets feature a 250 kg warhead and use a new propulsion system with canard-based aerodynamic controls. They have an extended range of up to 60-75 km, significantly greater than the 40 km range of the Mk.1 version.

Additionally, the rockets are guided to their target using a combination of inertial navigation (INS) and satellite navigation (SATCOM). Pinaka Mk.2 includes a digital fire control system (FCS) that coordinates with battlefield command and control (C2) systems. Mounted on a Tatra high-mobility vehicle, the Pinaka Mk.2 system is designed for quick deployment and shoot-and-scoot tactics, allowing it to evade enemy counter-battery fire.

Why France Wants Pinaka, Not PULS

Clearly, the Israeli PULS MLRS is more potent and versatile than the Pinaka Mk.2. It's being speculated that France is looking at the Pinaka, not the PULS like other EU nations, because of its recent fallout with Israel over the latter's brutality against the Palestinians in Gaza and Lebanon.

Of course, the French don't say that. "We are evaluating the Pinaka multi-barrel rocket launcher system because we need a system like that. We are evaluating the system among the other systems

offered by the top countries offering such systems. India is among the top countries producing weapons," French Army's Brigadier General Stephane Richou told ANI.

"This is much more than business partnership, and this is cooperation, and this is a common future together," he said.

It's interesting to note that the DRDO earlier partnered with Sagem of France to improve the accuracy of the Pinaka rockets. In June 2010, Sagem reportedly delivered its Sigma 30-Ring Laser Gyroscope (RLG) system for integration with 2 Pinaka regiments. The system was to be integrated by Tata Power SED and Larsen & Toubro.

Unlike conventional gyros, RLGs are very accurate and robust. An RLS-based INS system can accurately track a rocket's flight path and provide guidance inputs in the absence of SATNAV signals due to jamming.

The Sigma 30 system can be used with a wide range of artillery platforms, including self-propelled howitzers, mortars, and multiple rocket launchers. It is also compatible with various fire control systems, enabling seamless integration with existing artillery and command systems.

It's highly likely that the Sigma 30 RLG has been integrated into series production Pinak Mk-2 rockets. Using a combination of Sigma 30 INS and SATNAV, Pinaka Mk-2 rockets can achieve an accuracy of less than 30 m. During trials, DRDO officials claimed that the rockets could strike within 10 meters of the target.

"This high accuracy means that just two (Pinaka Mk.2) rockets must be fired to assure a kill probability of more than 99 percent," said Dr V Venkateswara Rao, the ARDE director.

Assured Upgrades

The Indian Army has given ARDE the nod for developing Pinaka MBRL (Multiple Barrel Rocket Launcher) variants with 120 km and 300 km range. It's not known if the longer-range Pinaka missiles proposed for development will feature terminal guidance. Hopefully, they will.

Conclusion

There are other good reasons why France could be looking at India's Pinaka MBRLS.

India is no longer just a good market for French military hardware; it's also a credible partner for joint weapon system development. Joint weapon system development by India and Russia yielded good results, and the French, too, now likely see the potential.

A closer partnership in defense manufacturing with India will allow France to tap into the country's talent pool, cutting costs and reducing dependence on its traditional partners.

https://www.eurasiantimes.com/france-sidelines-superior-israeli-puls/#google_vignette

The EurAsian Times

Tue, 12 Nov 2024

China's 6th-Gen Fighter Jet? Beijing Unveils "Supersonic Aircraft" Capable Of Dropping "Munitions From Space"

China has revealed a bold new vision for future air combat by unveiling a sleek, futuristic fighter jet that Beijing claims can break through the Earth's atmosphere and operate in space. The jet has already become the highlight of the Zhuhai Airshow 2024, which kicked off on November 12.

Dubbed the "Baidi" or "White Emperor," this cutting-edge aircraft model is showcased as part of China's ambitious Project Nantianmen, a research initiative to explore future aerospace technologies. Social media users began sharing images of this next-generation fighter jet on November 11.

According to information provided at the airshow, the Baidi is envisioned as an "integrated space-air fighter," capable of supersonic flight and breaking through the Earth's atmosphere to operate in space, a feature that places it at the forefront of next-generation aviation.

The Aviation Industry Corporation of China, a state-owned aerospace and defense conglomerate, created the aircraft model. The aircraft's specifications remain largely under wraps, but its placard offers some insights into its features. The Baidi's internal weapons bay has been expanded to accommodate heavy air-to-ground munitions, signaling its role in versatile combat scenarios.

It further added, "The Baidi Type B fighter has also received a comprehensive avionics upgrade, enhancing cockpit ergonomics and simplifying maintenance procedures, which effectively boosts its deployment capability and operational efficiency."

The Baidi's appearance at the Zhuhai Airshow, just a day after the 75th anniversary of the People's Liberation Army Air Force (PLAAF) on November 11, further highlights its importance in China's long-term military modernization plans.

Its sleek, otherworldly design has drawn comparisons to the future of warfare, offering a glimpse into China's aspirations for a more advanced, multi-domain air force. One of the most striking aspects of the Baidi's design is its cockpit. Hong Kong-based CMP reported that Global Times, a publication affiliated with the Chinese Communist Party, was granted access to the prototype before the airshow's official opening.

The reporter described the cockpit as "extremely spacious" and noted the presence of a "futuristic" canopy. Military observers remain cautious, noting that while the Baidi is an exciting concept, its true capabilities and future development are still uncertain.

Some speculate that the aircraft could be a prototype for future PLAAF models, though this has not been officially confirmed. Despite these uncertainties, Baidi's introduction marks a step in China's ongoing efforts to position itself as a global leader in aerospace technology and military innovation.

The Race For Sixth-Generation Aircraft

The competition to develop sixth-generation aircraft has reached a fever pitch, with several nations racing to establish dominance in this new era of aviation technology. While China has showcased what appears to be a mockup of its sixth-generation aircraft, the United States is currently ahead in the race, particularly with its development of the B-21 Raider.

The B-21 Raider, which is considered the first operational sixth-generation aircraft, is a cutting-edge bomber that has been under development since 2011. The US awarded major development contracts for the project in 2015, but the details were kept under wraps for several years. The US military did not reveal the bomber to the public until 2022. After making its first successful flight in November 2023, the B-21 underwent an extensive testing phase, with at least three units currently being evaluated. So far, none of the tests have encountered any major issues, and the bomber is scheduled to enter service in the mid-2020s.

In contrast, China is also working on its sixth-generation bomber, known as the H-20. However, it is reported that it will take several more years before the H-20 is ready for public unveiling. Yet, given China's tendency to surprise the global community with its rapid advancements, it remains uncertain when the H-20 will be fully operational and unveiled to the world.

Other countries' programs are also underway, with nations worldwide advancing their sixth-generation fighter jet projects. These include the USA's Next Generation Air Dominance (NGAD) program, the UK-led Global Combat Air Program (GCAP), and the German-French Future Combat Air System (FCAS).

The NGAD program, however, has faced significant challenges, primarily due to soaring costs, which have prompted a reassessment by the US Pentagon. Meanwhile, the FCAS project has encountered delays owing to disagreements between France and Germany. On the other hand, the UK government recently gave the go-ahead to the GCAP, a joint project between the UK, Japan, and Italy, as reported by the EurAsian Times.

If the program progresses as planned, the GCAP could emerge as the world's second sixth-generation aircraft—unless China surprises the global community with an unexpected, early unveiling of its own fighter jet. Despite these advancements, the precise criteria for a sixth-generation fighter remain undefined. This leaves room for flexibility, as each country may set its own "sixth-generation" technology standards. However, these next-generation fighters are expected to feature enhanced capabilities, including high-speed supersonic flight, all-direction stealth, and the integration of directed-energy weapons such as lasers and high-powered microwave systems, all of which will demand even greater engine power.

The country that first develops and deploys such a fighter jet could set the benchmark for the future of military aviation.

https://www.eurasiantimes.com/chinas-6th-gen-fighter-beijing-unveils/

Press Information Bureau
Government of India

Ministry of Science & Technology

Tue, 12 Nov 2024

Inauguration of DSIR-CRTDH Conclave-2024 on 13th November 2024 at CSIR-Institute of Minerals & Materials Technology (CSIR-IMMT), Bhubaneswar supported by Department of Scientific and Industrial Research,

The Department of Scientific and Industrial Research (DSIR) is mandated to promote, develop, utilize, and transfer indigenous technology, with a mission to stimulate industrial research in the country, foster an environment conducive to innovation, and drive the development and application of new technologies. In line with this mission, DSIR has been implementing the “Common Research and Technology Development Hubs (CRTDHs)” program, designed to encourage Micro, Small, and Medium Enterprises (MSMEs) to conduct industrial R&D and innovation activities while strengthening R&D infrastructure in Public Funded Research Institutions (PFRIs). Recognizing the vital role of MSMEs in India's economy, this program focuses on building R&D infrastructure to support scientific advancements, technological innovation, and socio-economic growth.

The CRTDH program, launched in 2014-15, has now reached its 10th year, successfully supporting 18 CRTDHs across the country. These hubs have made remarkable achievements and generated inspiring success stories among stakeholders, advancing the vision of “Atma Nirbhar Bharat” and reinforcing the momentum of the “Vocal for Local” movement. It is essential to showcase these sustained achievements to a wider range of stakeholders, including those not yet part of the CRTDH network. In this spirit, DSIR is organizing the DSIR-CRTDH Conclave 2024 on November 13-14 at CSIR-IMMT in Bhubaneshwar, where all 18 CRTDHs will participate and present their accomplishments over the two-day event. This gathering will foster collaboration with a broader range of stakeholders, unlocking the vast potential of underutilized resources. DSIR has previously held three successful conclaves: at CSIR-Centre for Cellular & Molecular Biology (CCMB), Hyderabad in 2019; CSIR-Indian Institute of Toxicology Research, Lucknow in 2022; and IIT Gandhinagar in 2023.

The DSIR-CRTDH Conclave 2024 will begin on November 13, 2024, with a welcome note by Dr. Ramanuj Narayan, Director of CSIR-IMMT Bhubaneswar. The inauguration will be led by Dr. N. Kalaiselvi, Secretary, DSIR & Director General, CSIR, who will also deliver the inaugural address.

The conclave will feature addresses from Dr. Vipin C. Shukla, Scientist G & Head-CRTDH, DSIR, Shri Hemant Sharma, IAS, Principal Secretary of the Micro, Small & Medium Enterprise Department, Government of Odisha, Smt. Pranati Chhotray, IAS, Director of Handicrafts, Government of Odisha, and Shri P.K. Gupta, Director of the Micro, Small & Medium Enterprises Development Institute, Cuttack, Ministry of MSME, Government of India.

The event will also include the inauguration of an exhibition showcasing products and prototypes developed by various CRTDHs, along with MSMEs and start-ups incubated at these hubs. In addition to displaying posters, the exhibition will highlight the achievements and activities of the CRTDHs. This exhibition will provide an opportunity for participants to learn about the accomplishments of different CRTDHs and offer MSMEs/start-ups the chance to interact with other CRTDHs also with whom they may not currently be associated with.

Total four technical sessions will be conducted during two days' event, which will have detailed deliberation on the challenges, learning, and success stories of different CRTDHs and MSMEs associated with them. Each session will have keynote address of an eminent expert and will continue with experience sharing by CRTDH PIs and MSMEs. The Conclave will follow with formulation of action items for various stake holders.Dr. Suman Mazumdar, Scientist -E, DSIR&Coordinator for Conclave 2024, will extend vote of thanks.

The event will be attended by DSIR officer Dr Ranjeet Bairwa, Scientist E and Member Secretary - CRTDH and Dr. Yatendra S. Chaudhary, Senior Principal ScientistPI of CRTDH, CSIR-IIMT, Bhubaneswar, representatives from Micro, Small and Medium Enterprises (MSMEs) and start-ups and industry associations to explore the benefits of CRTDH in their R&D endeavors.

https://pib.gov.in/PressReleasePage.aspx?PRID=2072750

THE ECONOMIC TIMES

Tue, 12 Nov 2024

Zombie birds! Scientists turn deceased birds into high-tech drones

Researchers at New Mexico Tech's Institute of Mining and Technology in Socorro have started creating drones and robots from the preserved bodies of dead birds. According to a report by USA Today, these "animatronic" bird drones, still in the testing phase, are intended to help study bird formations, coloration, communication patterns, and other ecological dynamics.

Lead researcher and mechanical engineering professor Mostafa Hassanalian explained that these bird-like drones address challenges that traditional drones face in wildlife monitoring. "Drones generate a lot of noise. For instance, if you're monitoring elephants in Africa, the noise often frightens animals, causing them to scatter," Hassanalian noted.

The team’s "nature-inspired robotic systems" are designed to more seamlessly observe wildlife without causing disturbances. The researchers have created three types of these “zombie birds.” One prototype is a drone with flapping wings, crafted using a taxidermy pheasant's head and wings to blend in naturally among real pheasants.

Additionally, they’ve engineered two robotic versions of mallard ducks: a flying drone and a swimming robot. The flying drone uses the same design as the pheasant model, while the swimming version replicates a duck’s natural movement, with feet that glide smoothly through water, making it useful for studying aquatic life.

Their latest creation involves stationary pigeons equipped with a camera in the neck, allowing for real-time video or broadcasting. Notably, all birds used in these projects were already deceased, Hassanalian emphasized. He also hinted that the technology could potentially serve for future surveillance applications.

https://economictimes.indiatimes.com/news/science/zombie-birds-scientists-turn-deceased-birds-into-high-tech-drones/articleshow/115219089.cms

THE HINDU

Wed, 13 Nov 2024

Team at Kolkata institute engineers bacteria to solve maths problems

At the Saha Institute of Nuclear Physics, Kolkata, synthetic biologist Sangram Bagh has a major and somewhat unusual goal: to build intelligent bacteria. Despite being single-celled, bacteria are very sensitive and responsive to their environments.

Organisms that are generally called intelligent — including dolphins, chimpanzees, octopuses, crows, and humans — are on the other hand multicellular, with brains composed of billions of specialised cells called neurons.

The bacteria that compute

But in a major breakthrough, Bagh’s lab has engineered bacteria that can decide whether a given number is prime and whether an alphabet is a vowel. These could earlier be done only “by humans or computers”, Bagh said, “but now genetically engineered bacteria are doing the same. Such observations raise new questions about the meaning of intelligence.”

Bagh’s team introduced ‘genetic circuits’ in bacteria that could be activated by a combination of chemical inducers. Then they combined bacteria with different engineered circuits in a solution to build bacterial ‘computers’ that behaved like artificial neural networks. In this setting, each type of engineered bacteria was a “bactoneuron” and the combination of bactoneurons behaved like a multicellular organism capable of abstract mathematics.

The team reported its findings in Nature Chemical Biology in September. The paper's publication has stirred significant interest among synthetic biologists — experts who engineer new abilities in organisms.

For example Pawan Dhar, executive director of the C.V.J. Centre for Synthetic Biology and Biomanufacturing, Kochi, said, "We've entered a new era where bacteria can be programmed to solve mathematical problems through chemical conversations". The creation of these bacterial computers could herald significant advances in the pharmaceutical industry and medical sciences and in the biomanufacturing sector, Dhar added.

Switching the computer on

In an artificial neural network (ANN), processing units called nodes are connected to each other in layers. Each node takes in an input (or inputs), performs a computation on it, and produces an output — which can be the ANN's output or the input for another node. ANNs with more layers can perform more complex computational tasks.

Bagh's team used tools from molecular biology to introduce transcriptional genetic circuits in Escherichia coli, a bacteria commonly used in research. During transcription, a bacteria transcribes a part of its DNA into RNA and reads from that RNA to make proteins. The microbe knows to begin transcription when proteins called transcription factors recognise specific DNA sequences called promoters, and kick off transcription.

The team built the genetic circuits in bacteria by introducing synthetic promoters that could be recognised by four transcription factors, individually or together.

"The transcription factors and promoters and their interactions formed various feed-forward, feedback, and combination mechanisms," the authors wrote in their paper. (Machine-learning models use these mechanisms to perform their calculations.) In this way the researchers created 14 bactoneurons that could be brought together in different combinations, each working like a single-layered ANN.

They tested each combination for its ability to perform specific tasks. A combination could be switched 'on' by the presence or absence of four chemical compounds in the solution containing the bacteria.

The chemistry of input and output

Conventional computers manipulate the voltage of electrical devices made of silicon to perform calculations. High voltage is the 'on' state, represented by 1, and low voltage is the 'off' state, represented by 0.

To mimic this in a bacterial computer, Bagh's team coded their problems first in the language of 0s and 1s and translated this to the presence (1) or absence (0) of the chemical inducers. For example, to ask a bacterial computer if a number between 0-9 is prime, the team first converted it to binary, then used the 0s and 1s in the binary form to present or withhold the chemicals. E.g., the presence of chemicals one, two, and three (111), and the absence of chemical four (0) would be read by the bacterial computer as '7', while the absence of chemicals one, three and four, and the presence of chemical two would signal '4'.

Similarly, the team understood the output by checking for the presence or absence of red and green fluorescent proteins, engineered into the bacteria along with the genetic circuits. In ANNs, the relationship between the output and the input of a node is captured in an equation called the activation function.

When we write f(x, y) = z, we're using the language of mathematics to say the value of z depends in a specific way on the values of x and y. Similarly, the activation function says the value of the bactoneuron's output depends on (i) the strength of the input; (ii) its relative importance with respect to other inputs, called the weight; and (iii) a constant added to the weighted sum of all inputs, called the bias.

A node is activated when the weighted sum of the inputs plus the bias crosses a threshold. The weighted sum is calculated by multiplying the weight of each input with its strength and adding such terms for all inputs. For example, for inputs x and y with weights w and w , the weighted sum would be w x + w y.

Answers in the light According to Bagh, all ANNs have a similar activation function in form. The differences arise due to the inputs and their weights. Whether each bactoneuron produced red or green fluorescent protein was contingent on an activation function that captured whether a certain concentration of chemical inducers, their weights (i.e. each inducer's ability to trigger a genetic circuit relative to other inducers), and a bias (which the team is yet to explain in molecular terms) crossed a threshold.

According to Bagh, the team did this "by designing, constructing, and optimising the artificial genetic circuits such that the given chemical signals are recognised and processed by the circuits to produce specific fluorescent proteins (output)." The presence of the fluorescent proteins could be interpreted as 1 ('on') and their absence as 0 ('off'). A combination of 0s and 1s could be used to read the output as "yes" or "no". When the team asked the bactoneuron computer if 7 is prime, it responded "yes" by expressing green fluorescent protein (1) but not the red (0).

The computer could also say whether a number between 0 and 9 was a perfect power (a number that can be expressed as one integer raised to another; e.g. 8 is a perfect power because 8 = 2) and whether a letter between A and L was a vowel. Encouraged by this success, the team upped the ante by having the computers answer more complex questions. They were able to say whether adding three to an integer would create a prime number (e.g. "is 2 + 3 a prime number?") and whether the square of a certain number could be expressed as the sum of three factorials.

Next level: optimisation

Finally, the researchers tested whether the bactoneurons could solve problems that couldn't be settled with yes/no answers. For this, they asked one computer to find the maximum number of pieces cutting a pie using a fixed number of straight cuts would create.

This is an example of an optimisation problem, where researchers try to identify the best solution from a pool of possible solutions. The team input the number of straight cuts in the form of chemical signals again, including certain compounds and leaving others out.

Since the output in this case would have to be a number, the team modified some bactoneurons to express other fluorescent proteins (blue and orange) in addition to the green and the crimson ones.

The presence or absence of these fluorescence proteins could be read in binary and converted to decimal. When they asked the computer to solve the problem for two straight cuts, it didn't express the orange fluorescent protein (0), expressed the blue fluorescent protein (1), and didn't express either the green or crimson fluorescent proteins (00).

0100 in binary is 4 in decimal, and the correct answer. Then they asked it to solve for four straight cuts, and the computer responded by expressing the orange fluorescent protein (1), not expressing the blue (0), and expressing both the green and crimson ones (11). Together, 1011 is the code for the decimal number 11, again the correct answer.

Breaking new ground

Areejit Samal, a professor of computational biology at the Institute of Mathematical Sciences, Chennai, said a striking feature of the work of Bagh et al. is that the bacterial computers are able to work on progressively more complex mathematical and computational tasks. Calling the paper "groundbreaking", Dhar, the Kochi-based synthetic biologist, said the future may not be far off where such biocomputers "recognise the molecular patterns of cancer at its earliest stages, signal their presence to physicians, and administer localised treatments before tumours ever form."

He added that as scientists engineer bacterial computers with the ability to perform more complex tasks, "computational tasks could be outsourced to microbes, reducing the need for traditional silicon-based computers."

Whereas for Dhar the study reinvigorated his hunger for more innovations in biocomputing, for Bagh, his engineered bactoneurons are a gateway to "think about the biochemical nature of intelligence."

https://www.thehindu.com/sci-tech/science/saha-institute-kolkata-bacteria-solve-maths-problems-bactoneurons-intelligence/article68859080.ece

THE HINDU

Tue, 12 Nov 2024

IISc scientists find a way to break down 'biofilm barriers' by using cow's gut enzyme to aid entry of drugs

A team of scientists at the Indian Institute of Science (IISc) has devised a way to break down 'biofilm barriers' to aid entry of drugs. The IISc said that most of the disease-causing bacteria secrete matrix-like layers around themselves called biofilms.

These biofilms act as thick barriers, limiting the entry of drugs, and helping the bacteria become resistant to antibiotics. To break down this biofilm barrier, the team has used an enzyme from the cow's digestive tract.

Klebsiella pneumoniae (K. pneumoniae) is an opportunistic bacterium that infects patients in hospitals, causing conditions like pneumonia, urinary tract infections, and meningitis. It wounds

diabetics, leading to complications that may sometimes result in amputation of a limb. K. pneumoniae secretes a tough matrix-like biofilm made up mostly of sugars, fats, proteins, and DNA. Strings of sugar molecules in this matrix come together to form polysaccharides, which play a key role in making the biofilm stronger.

The IISc team decided to develop a biocompatible strategy to break down these polysaccharides, and disrupt the protective biofilm. They realised that polysaccharidedegrading enzymes could serve the purpose, and that a cow's gut was the ideal place to look for them.

The bovine gut harbours microbial enzymes that digest different kinds of complex polysaccharides, such as cellulose and hemicellulose, which the animal takes in from plant food. Cellulosic polysaccharides are very similar to the ones in the bacterial biofilms.

The team focused on a set of enzymes called glycoside hydrolases (GH), looking closely at their protein structures to identify the ones that could potentially break down polysaccharides efficiently.

They zoomed in on the one they called GH-B2, found in the rumen, the largest stomach compartment, and artificially synthesised it in the lab. When they tested the lab-made GH-B2 on four different strains of K. pneumoniae isolated from different patients, they found that it successfully broke down biofilms in all four.

Debasis Das, assistant professor, the department of inorganic and physical chemistry (IPC) and corresponding author of the study, said that such a broad activity of the enzyme was surprising, as the strains were different in terms of their serotypes.

https://www.thehindu.com/news/national/karnataka/iisc-scientists-find-a-way-to-break-down-biofilm-barriers-by-using-cows-gut-enzyme-to-aid-entry-of-drugs/article68855983.ece

THE TIMES OF INDIA

Tue, 12 Nov 2024

SpaceX successfully launches communications satellite Koreasat-6A

SpaceX successfully launched the Koreasat-6A communications satellite for KT SAT Corporation Ltd., South Korea's national satellite operator, from Cape Canaveral, Florida, on Monday. As per SpaceDaily, the launch took place at 12:22 pm EST, with the Falcon 9 rocket placing the satellite into geosynchronous transfer orbit about 35 minutes after liftoff.

The Koreasat-6A, developed by Thales Alenia Space, is designed to replace the older Koreasat-6 and is equipped with six broadcast transponders and 20 fixed satellite service (FSS) transponders. This will enhance communication and broadcast services across South Korea from its geostationary orbit at 116° East. Koreasat-6A also plays a crucial role in supporting the Korea

Augmentation Satellite System (KASS), which improves the accuracy of Global Navigation Satellite Systems (GNSS).

KASS, which was developed by Thales Alenia Space in partnership with South Korea's space agency KARI, will now benefit from the satellite's services, enhancing positioning accuracy for air navigation, shipping, and other location-based services. This system, which entered operational service at the end of 2023, had previously relied on the MEASAT-3D satellite but will now be bolstered by Koreasat-6A's capabilities.

A key moment during the launch was the successful recovery of the Falcon 9 first-stage booster, which landed at Cape Canaveral's Landing Zone 1 about 10 minutes after liftoff. This was the booster's 23rd flight, setting a record tied with two other SpaceX boosters.

The achievement is part of SpaceX's ongoing efforts to reduce costs and improve turnaround times with reusable rocket technology. This launch marks SpaceX's 107th successful mission of the year and its 364th successful booster landing across all Falcon 9 and Falcon Heavy missions.

KT SAT, the South Korean satellite operator, is focused on expanding its satellite services across Asia, the Middle East, and Africa. The launch of Koreasat-6A is part of KT SAT's strategy to improve its satellite infrastructure, including its move towards multi-orbit satellite capabilities.

KT SAT plans to combine its geostationary satellite services with SpaceX's Starlink low-earth orbit network, which will provide faster internet and more flexible communication solutions, particularly for remote areas and applications such as overland transportation. With the successful deployment of Koreasat-6A, South Korea is poised to further enhance its satellite communication infrastructure, offering a wider range of services to support both traditional broadcasting and advanced navigation systems.

https://timesofindia.indiatimes.com/science/spacex-successfully-launches-communications-satellite-koreasat-6a/articleshow/115214450.cms

The Indian EXPRESS

Tue, 12 Nov 2024

NASA and ISRO new NISAR satellite will help monitor Earth's surface changes

The Indian Space and Research Organisation (ISRO) is preparing to launch a satellite that will help us track Earth's "surface motions down to fractions of an inch." Developed in partnership with NASA, the new satellite dubbed NISAR (NASA-ISRO Synthetic Aperture Radar) will help humans track the motion of glaciers, ice sheets, and sea ice and map the changes to the planet's vegetation.

According to NASA's Jet Propulsion Laboratory, NISAR will measure the motion of the entire planet's land and ice-covered surface every 12 days, giving researchers a clearer picture of our

planet's surface changes over time. This level of accuracy is achieved by using a pair of radars, which consist of L-band and S-band systems built by NASA and ISRO, respectively.

The US Space Agency says these instruments enable the satellite to collect measurements during both day and night and can even see through clouds using the L-band, which can even penetrate dense vegetation to measure the motion of the ground.

While NISAR won't be able to predict earthquakes, it will help us determine the areas that are most susceptible to them. NASA says that in areas like California, researchers will be able to use the satellite to focus on areas where an earthquake could happen. In areas that are not well monitored, it can help find new earthquake-prone areas.

"From the ISRO perspective, we are particularly interested in the Himalayan plate boundary. The area has produced great magnitude earthquakes in the past, and NISAR will give us unprecedented information on the seismic hazards of the Himalaya," said Sreejith K M, ISRO's solid Earth science lead for NISAR at the Space Applications Center in Ahmedabad.

For volcano researchers, NISAR will help detect land movements prior to eruption and can give us a bigger picture of why volcanoes deform and if these deformations are a sign of an eruption. Since the satellite will keep an eye on Earth's land surface as well, it can be useful to keep an eye on structures like levees, aqueducts and dams and understand how earthquakes affect them.

https://indianexpress.com/article/technology/science/nasa-isro-nisar-satellite-earth-surface-activity-9665686/

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Scientists develop soft, flexible semiconductors

Researchers from the University of Chicago have combined a softstretchable hydrogel with traditionally rigid and brittle semiconductors to develop a gel that retains its semiconductive ability for transmitting information between living tissue and material.

The material is both a semiconductor and a hydrogel at the same time, which makes it suitable for applications in wearable electronics as well as biomedical implants, including pacemakers, biosensors and drug delivery devices. There are also non-surgical applications as well, such as better readings from skin-based sensors, and improved treatments for wounds. The gel has a large degree of hydration which makes it similar to and compatible with living tissue.

The hydrogel is porous as well, allowing for transport or diffusion of nutrients and chemicals. Hydrogels are typically made by dissolving a material in water and adding gelation chemicals. Semiconductors however, cannot dissolve in water. The researchers dissolved the semiconductor in an organic solvent, that was then mixed with water.

The gelation chemicals were then introduced to the dissolved precursors of semiconductors and hydrogels. The hydrogel bonds directly with tissues, reducing immune response and inflammation, and the hydrogel is also porous, providing an enhanced biosensing response and stronger photo-modulation effects. The material provides better results than either hydrogels or semiconductors.

The semiconducting hydrogel has been patented

A paper describing the findings has been published in Science. First author of the paper, Yahao Dai says, “When making implantable bioelectronic devices, one challenge you must address is to make a device with tissue-like mechanical properties. That way, when it gets directly interfaced with the tissue, they can deform together and also form a very intimate bio-interface.” The researchers have patented the hydrogel semiconductor, and are now looking to commercialise the technology through the support of the Polsky Centre for Entrepreneurship and Innovation at the University of Chicago.

https://www.news9live.com/science/scientists-develop-soft-flexible-semiconductors-2747963