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समाचार पत्रों से 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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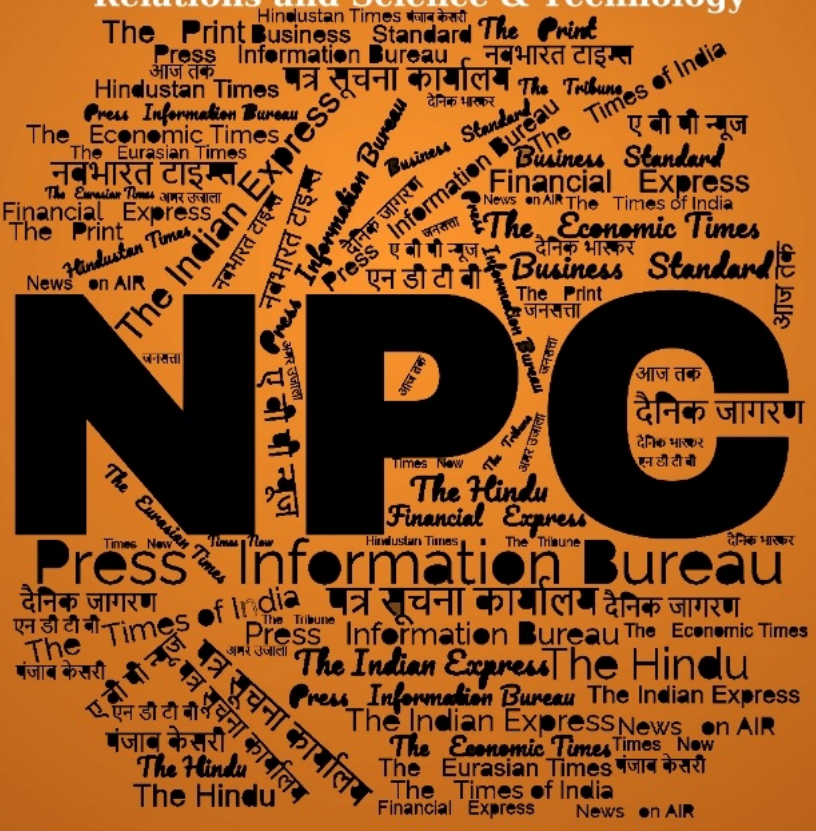

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Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Wed, 11 Sep 2024

IAF Set To Host The Indian Defence Aviation Exposition-II At Jodhpur

Exercise Tarang Shakti-24 is one of the largest multinational air exercise being conducted by the Indian Air Force in Jodhpur. On the sidelines of this exercise, lAF will also host the India Defence Aviation Exposition IDAX-24 which will be inaugurated by Hon'ble Raksha Mantri on 12 Sep 24.

This edition of IDAX at Jodhpur, scheduled from 12-14 Sep 24, will have a grand participation from industry and host a wide range of products, technologies. This will be an opportunity for the FFCs and Indian audiences to witness, experience and interact with participants from Indian Aviation Industry including DPSUs, DRDO, Private Industries (Tier-I, Il, III) and top notch Start-Ups. IDAX aims to showcase indigenous skills and indomitable spirit of Indian Aviation Industries to a wide spectrum of decision-makers and end users from Global Air Forces participating in Tarang Shakti 2024. Participation of Friendly Foreign Countries in the exposition will help India's Aerospace industry seek export opportunities, integrate into the supply chain of Foreign OEMs and ensure collaboration for co-production/ co-development of Indian's Defence needs.

IAF's Directorate of Aerospace Design (DAD) will participate in the exposition with partner startups. These startups are expected to showcase niche technologies and products like RF Gun to counter unmanned aerial threat, High Altitude Pseudo Satellite (HAPS), Loitering ammunition, Air-launched Flexible asset, Augmented Reality /Virtual Reality (AR/VR) smart glasses tech tool for training, Expandable Active Decoys, Real-time aircrew health monitoring system and Foldable field mats to mitigate quick runway repair, highlighting the growing strength and potential of India's aerospace sector.

lAF has been playing a pivotal role in nurturing innovators, startups, and MSMEs identifying, developing and implementing innovative solutions. Through dedicated mentoring and guidance, DAD is steering these entities toward developing cutting-edge technologies that align with the future requirements of the lAF, thereby strengthening the government's push towards 'Atmanirbharta' (self-reliance).

This Exposition would be the best platform for the Aviation and Defence Sector Industrial Partners to connect with IAF’s Innovation Directorate and decision-makers, and witness showcasing of

indigenous products. Personnel or companies interested in joining the Nation's Atmanirbharta Campaign in partnership with IAF may visit https:\\idax24.com.

https://pib.gov.in/PressReleasePage.aspx?PRID=2053715

Press Information Bureau
Government of India

Ministry of Defence

Wed, 11 Sep 2024

IAF Aircraft Set Course For Exercise Eastern Bridge VII at Oman

An IAF contingent comprising MiG-29s, Jaguars and C-17s is ready to set course to participate in Exercise Eastern Bridge in Oman. This is the seventh edition of the Exercise that is scheduled from 11 to 22 September 2024 at Air Force base Masirah, Oman.

The bilateral exercise endeavors to enhance interoperability between Royal Oman Air Force and the Indian Air Force and shall provide a platform for both teams to engage in a series of joint training missions designed to strengthen strategic cooperation and operational readiness.

Exercise Eastern Bridge VII aims to improve tactical and operational skills, foster mutual understanding and bolster the ability of both air forces to collaborate effectively in diverse scenarios. The exercise will include complex aerial maneuvering, air to air and air to ground operations, and logistical coordination, reflecting the evolving defense needs and strategic interests of both nations.

Underscoring the enduring partnership between the Royal Oman Air Force and the Indian Air Force, this exercise highlights their commitment to regional security and stability. The participating teams are expected to benefit from the shared expertise and operational experience gained during this extensive training period.

https://pib.gov.in/PressReleasePage.aspx?PRID=2053702

Press Information Bureau
Government of India

Ministry of Defence

Wed, 11 Sep 2024

5th India-Philippines Joint Defence Cooperation Committee meeting held in Manila

Defence Secretary invites Philippines to partner with Indian defence Industry in co-development & co-production of equipment

The fifth meeting of India-Philippines Joint Defence Cooperation Committee (JDCC) was held in Manila on September 11, 2024. The meeting was co-chaired by Defence Secretary Shri Giridhar Aramane and his counterpart Senior Undersecretary, Ministry of National Defence of Philippines Mr Irineo Cruz Espino.

During the meeting, both sides exchanged wide-ranging discussions on bilateral as well as multilateral issues. The co-chairs reviewed the outcomes of third Service-to-Service interactions held on September 10, 2024, and expressed happiness at the overall enhancement in bilateral defence cooperation across all sectors.

The Defence Secretary appreciated the Self Reliance Defence Posture Act of the Philippines government for modernising its Armed Forces. He highlighted that India has also laid out a similar vision for 'Aatmanirbhar Bharat'. Under this vision, the Indian defence Industry is continuously enhancing its manufacturing capabilities and is exporting equipment to the world, he added.

The Defence Secretary invited the Philippines to partner with the Indian defence industry in co-development and co-production of equipment. The Philippines also invited investments in long-term equity partnership towards promoting assured supply chains. It acknowledged and appreciated India's functioning and proven template of defence Industry indigenisation.

Both sides affirmed the commitment to support each other to achieve the goal of self-reliance in defence production. They appreciated the operationalisation of White Shipping Information Exchange and opening of defence wing at Embassy of India, Manila in near future.

While welcoming the Philippines as a coordinating country for India in ASEAN Defence Ministers' Meeting Plus, the Defence Secretary discussed ways and means to strengthen cooperation in multilateral forums. India and the Philippines have a vigorous and multifaceted relationship which has expanded into several strategic areas, including defence and security.

During the visit, the Defence Secretary also called on Secretary of National Defense, Philippines (Defence Minister of Philippines) Mr Gilbert Eduardo Gerardo Cojuangco Teodoro Jr. and conveyed the greetings of Raksha Mantri Shri Rajnath Singh. Earlier, he was received with a full Guard of Honour at the headquarters of the Armed Forces of the Philippines.

The JDCC construct has been established under the ambit of the Memorandum of Understanding on defence cooperation between India and the Philippines signed in 2006. In the 75th year of diplomatic relations and 10 years of Act East policy, the co-chairmanship of JDCC is upgraded to Secretary-level.

https://pib.gov.in/PressReleasePage.aspx?PRID=2053803

Press Information Bureau
Government of India

Ministry of Defence

Wed, 11 Sep 2024

Headquarters Integrated Defence Staff Conducts the Second Joint Doctrine Review Conference - 2024

The second edition of "Joint Doctrine Review Conference (JDRC-2024)" was conducted at the Manekshaw Centre on 11 Sep 24. The conference was chaired by Lt Gen Vipul Shinghal AVSM,

SM the Deputy Chief of Integrated Defence Staff (Doctrine, Organisation and Training). In his Keynote Address he highlighted the importance of developing robust and adaptive Joint Doctrines, utilising collective insight and collaborative approach.

This second edition of the conference was attended by senior military leaders, Doctrine Development Agencies of Headquarters Integrated Defence Staff and the three Services and members from reputed Think-Tanks. JDRC-2024 aimed at synergising the efforts towards Doctrine formulation between HQ IDS and the three Services.

The Conference, an annual event organised by HQ IDS, serves as a common platform for all stakeholders of Doctrine formulation, to brainstorm, share best practices and undertake professional discussions on doctrinal issues.

https://pib.gov.in/PressReleasePage.aspx?PRID=2053856

Press Information Bureau
Government of India

Ministry of Defence

Wed, 11 Sep 2024

IAF Conducts Symposium On 'Air Domain Awareness' During Exercise Tarang Shakti 2024

As part of Exercise Tarang Shakti, India's largest multinational air exercise aimed at enhancing interoperability and operational coordination among Friendly Foreign Countries (FFCs), the Indian Air Force (IAF) organized a multinational symposium on 'Air Domain Awareness' on 11th September, at Jodhpur.

The theme of the symposium was "Collaborative Approach to Facilitate Air Domain Awareness Towards Enhancing Regional Security."

The event saw participation from over 50 delegates, representing 27 nations involved in Exercise Tarang Shakti. Air Marshal Surat Singh AVSM VM VSM, Director General Air (Operations), IAF, welcomed the participants and delivered the keynote address.

International delegates shared their concepts of air domain awareness and discussed strategies to tackle challenges from both national and regional perspectives.

The symposium fostered an open exchange of ideas among subject matter experts on emerging challenges related to air situational awareness and airspace management. Discussions focused on policy matters and technological solutions for effective information sharing.

The closing address was delivered by Air Vice Marshal PV Shivanand VM, Assistant Chief of Air Staff Operations (Air Defence).

https://pib.gov.in/PressReleasePage.aspx?PRID=2053906

THE ECONOMIC TIMES

Thu, 12 Sep 2024

India's new $52.8 million submarine shield: How this new tech can fortify the nation's waters against growing Chinese forays

The US has approved a $52.8 million sale of High Altitude Anti-Submarine Warfare (HAASW) sonobuoys to India. This sale aims to enhance India's antisubmarine warfare capabilities, particularly through the use of MH60R helicopters. Sonobuoys are air-launched sensors that relay underwater sounds to processors, assisting in anti-submarine warfare operations.

According to the Defence Security Cooperation Agency, "The proposed sale will improve India's capability to meet current and future threats by enhancing its capacity to conduct anti-submarine warfare operations from its MH-60R helicopters. India will have no difficulty absorbing this equipment into its armed forces."

India's request included AN/SSQ-53O, AN/SSQ-62F, and AN/SSQ-36 sonobuoys, amounting to an estimated cost of $52.8 million. Congress has 30 days to review the sale as per the Arms Export Control Act.

The sonobuoys will be deployed from the Navy’s recently acquired Sikorsky MH-60R helicopters, six of which have been delivered. This acquisition is part of India’s efforts to strengthen its defenses against rising submarine activity in the Indian Ocean, particularly from China.

"This proposed sale will support the foreign policy and national security objectives of the United States by helping to strengthen the United StatesIndia strategic relationship and improving the security of a major defence partner which continues to be an important force for political stability, peace, and economic progress in the Indo-Pacific and South Asia regions," the notification said.

Strategic Purchase to Counter Submarine Threats

The procurement of these sonobuoys was approved by U.S. Secretary of State Antony Blinken during Defence Minister Rajnath Singh’s visit to Washington DC. This sale, approved under the U.S. Foreign Military Sales program, is part of the broader India-U.S. strategic partnership aimed at enhancing India's maritime security.

The acquisition was necessitated by increasing submarine activity in the Indian Ocean, especially from China, prompting India to focus on strengthening its underwater detection capabilities. With these sonobuoys,

the Indian Navy’s ASW fleet will be better equipped to detect and counter potential threats in the region. According to a statement from the U.S. Department of State, the sonobuoy sale includes “advanced sonar technologies that will significantly enhance India’s capabilities in ASW operations.” The sonobuoys are designed to operate in both active and passive modes, giving the Indian Navy flexibility in detecting and tracking adversarial submarines.

Advanced Sonobuoy Types

The Indian Navy is procuring three types of sonobuoys, each with specific features aimed at maximizing ASW efficiency: AN/SSQ-53G: This sonobuoy utilizes Directional Frequency Analysis and Recording (DIFAR) technology to detect underwater sounds passively, making it difficult to detect by adversaries.

It operates at depths of up to 300 meters and can be launched from an altitude of up to 9,144 meters. The sonobuoy offers both Electronic Function Selection (EFS) and Command Function Select (CFS) capabilities. EFS allows operators to set sensor modes before launch, while CFS enables them to adjust settings remotely after deployment. "This sonobuoy will provide the Navy with discreet detection capabilities," a defense source explained.

AN/SSQ-62F: Known for its Directional, Coherent, Active Sonar System (DICASS), this fifth-generation sonobuoy actively emits sound waves (pings) and analyzes the echoes to detect submarines. It can operate at depths of up to 460 meters and includes GPS for accurate location reporting. This sonobuoy will be instrumental in locating adversarial submarines by actively sending out sound pulses.

According to defense experts, “the ability to pinpoint submarine positions in real time gives the Indian Navy a significant edge.” AN/SSQ-36: This sonobuoy provides crucial water temperature data to enhance the accuracy of other sonar systems. Water temperature affects sound propagation, and this sonobuoy directly measures sound speed in water, improving overall ASW detection capabilities. “It plays a supporting role but is vital for refining the accuracy of sound detection,” an Indian Navy officer explained.

How Sonobuoys Work

Sonobuoys are expendable, electro-mechanical acoustic devices used to detect underwater sounds, such as those made by submarines or ships. They are typically dropped from aircraft in canisters and automatically activate upon hitting the water. An inflatable system with a radio transmitter remains on the surface for communication with the monitoring aircraft or ship, while sensors are submerged below the surface to detect underwater sounds.

Sonobuoys can operate in two modes:

- **Passive Mode:** These sonobuoys listen for underwater sounds without emitting any signals, providing stealthy detection.
- **Active Mode:** These sonobuoys send out sound waves and measure the echoes to locate submarines or other objects.

The sonobuoys remain operational for approximately 24 hours, after which they become expendable. They transmit their acoustic data back to monitoring systems, enabling real-time tracking of enemy submarines.

Strategic Importance ofthe Deal

India’s acquisition of these advanced sonobuoys is a significant step in countering growing submarine threats in the Indo-Pacific region, especially from China. The Indian Ocean has seen increased Chinese submarine patrols, and these sonobuoys will allow India to monitor and respond more effectively to such activities.

The sonobuoys' ability to operate in both active and passive modes enhances the Navy's flexibility in a wide range of operational scenarios. “The Indian Navy’s new sonobuoys will raise the probability of detecting enemy submarines and bolster our overall maritime security,” an official from India’s Ministry of Defence said.

This deal also highlights the growing defense cooperation between India and the United States. The Indian Navy has been integrating more U.S. technology, including MH-60R helicopters and P-8I surveillance aircraft, which also deploy sonobuoys in ASW missions.

Bolstering U.S.-India Defense Ties

This sonobuoy deal is part of a larger strategy to strengthen defense ties between India and the United States. The collaboration reflects the deepening security partnership between the two nations, particularly in the Indo-Pacific region.

With this purchase, India is further aligning itself with U.S. defense technologies to counter regional threats, especially from China. As India continues to build its naval strength, the sonobuoy acquisition will provide the Navy with advanced tools to safeguard the nation's maritime interests.

The deal also underscores the broader defense cooperation that is expected to grow in the coming years between the two countries.

https://economictimes.indiatimes.com/news/defence/indias-new-52-8-million-submarine-shield-how-this-new-tech-can-fortify-the-nations-waters-against-growing-chinese-forays/articleshow/113275409.cms

THE ECONOMIC TIMES

Wed, 11 Sep 2024

BEL receives order worth Rs 850 crore for supply of indigenous Multi Function Radar to protect naval ships

Government owned Bharat Electronics Ltd (BEL) on Wednesday announced that it received orders worth Rs 1,155 crore. This includes an order worth Rs 850 crore from Cochin Shipyard Limited (CSL) for the supply of indigenous Multi Function Radar in X Band, said the company in an exchange filing. The fully indigenous radar is designed by DRDO and manufactured by BEL. It is capable of detecting, acquiring and tracking airborne targets to provide protection to naval ships.

Additionally, BEL secured orders valued at Rs. 305 crore following following the last disclosure on 22 August 2024. This includes navigational complex system for ships, thermal imagers, communication equipment, fire control system, gun control system, spares, and services. With these orders, BEL has now received orders worth Rs.7, 075 core in the current financial year, said the filing.

https://economictimes.indiatimes.com/news/defence/bel-receives-order-worth-rs-850-crore-for-supply-of-indigenous-multi-function-radar-to-protect-naval-ships/articleshow/113255289.cms

THE ECONOMIC TIMES

Wed, 11 Sep 2024

Defence Ministry clears Navy's Rs 2,500 crore plan for unmanned vessels with capabilities to attack submarines

Amid increasing use of unmanned warfare, the Defence Ministry has given approval to the Indian Navy's plans worth over Rs 2,500 crore to build 100-tonne unmanned underwater vessels. The proposal for building the 100- tonne unmanned underwater vessels was given clearance at a high level defence ministry meeting held recently, defence sources told here.

The underwater vessels in the Extra Large category would weigh over 100 tonnes and would be equipped with strike capabilities against enemy submarines and surface vessels, they said. The vessels would give the Navy a niche capability in the underwater domain. It would also help the force to carry out multiple operations, former Navy Vice Chief Vice Admiral SN Ghormade said when asked about the capability.

The Navy has plans of using such vessels for a plethora of tasks such as laying mines and mine clearing operations, surveillance, and launching weapons, the sources said. The Indian Navy would be issuing a tender for the project in the next few months, and Indian shipyards would be bidding for it under the Aatmanirbharta initiative and offering it under the Make-1 procedure, the sources said.

The Navy would want the vessels with capability to remain underwater for very long hours at long distances from the shore to keep an eye on the movement of suspicious vessels and other activities and safeguard national interests. The Indian Navy has been working towards preparing itself for warfare of the future by upgrading its capabilities in the unmanned domain.

The force has been working on unmanned surface vessels, which have also been used in the ongoing conflicts across the globe for destroying larger vessels and assets. The Navy has also focused on increasing its unmanned long range surveillance capabilities with the induction of drones like the MQ-9B and Drishti Hermes 900, along with the ones planned for the future.

https://economictimes.indiatimes.com/news/defence/defence-ministry-clears-navys-rs-2500-crore-plan-for-unmanned-vessels-with-capabilities-to-attack-submarines/articleshow/113266858.cms

THE ECONOMIC TIMES

Thu, 12 Sep 2024

US to sell anti-submarine warfare sonobuoys to India, Pentagon notifies Congress

The US has decided to sell High Altitude Anti-Submarine Warfare (HAASW) sonobuoys worth USD 52.8 million to India, a move that would enhance New Delhi's capacity to conduct anti-submarine warfare operations. Sonobuoys are airlaunched, expendable, electromechanical sensors designed to relay underwater sounds to remote processors. These are effective and affordable antisubmarine warfare (ASW) that are capable of being used by airborne ASW warfighters.

"The proposed sale will improve India's capability to meet current and future threats by enhancing its capacity to conduct anti-submarine warfare operations from its MH-60R helicopters. India will have no difficulty absorbing this equipment into its armed forces," the Defence Security Cooperation Agency said in a notification to the Senate Foreign Relations Committee this week.

As per the Arms Export Control Act, Congress has 30 calendar days to review the sale.

According to the Congressional notification, India had requested to buy AN/SSQ-53O High Altitude Anti-Submarine Warfare (HAASW) sonobuoys; AN/ SSQ-62F HAASW sonobuoys; and AN/SSQ-36 sonobuoys. The estimated total cost is USD 52.8 million.

"This proposed sale will support the foreign policy and national security objectives of the United States by helping to strengthen the United StatesIndia strategic relationship and improving the

security of a major defence partner which continues to be an important force for political stability, peace, and economic progress in the Indo-Pacific and South Asia regions," the notification said.

On August 23, Antony Blinken, the Secretary of State approved the foreign military sale to India of Anti-Submarine Warfare Sonobuoys and related equipment for an estimated cost of USD 52.8 million.

https://economictimes.indiatimes.com/news/defence/us-to-sell-anti-submarine-warfare-sonobuoys-to-india-pentagon-notifies-congress/articleshow/113274473.cms

ThePrint

Wed, 11 Sep 2024

Centre operationalises 220 kV Srinagar-Leh Line to connect Ladakh border areas with National Grid

Emphasising the significance of border infrastructure development, Defence Minister Rajnath Singh said Wednesday that the Centre has operationalised the 335-kilometre long 220-kilovolt Srinagar-Leh Electricity Line, also known as Srinagar-Leh Transmission System, to connect border areas of Ladakh to the National Grid.

After making the announcement at the Border Area Development Conclave in New Delhi, Singh added that the transmission and distribution infrastructure in states in the Northeast is also being strengthened. “High-speed Internet has been provided to over 1,500 villages through BharatNet broadband project. In the last four years alone, more than 7,000 border villages have been provided with Internet connection and our focus has been on Ladakh and Arunachal Pradesh.”

Singh stressed that the government has been “fully committed” towards development of border villages.

Providing an estimate of the efforts put in by the Border Roads Organisation (BRO) in the last ten years for the development of border areas, he said, “Border Roads Organisation (BRO) has constructed over 8,500 kilometres of roads and more than 400 permanent bridges. The Atal Tunnel, Sela Tunnel and Shinkun-La Tunnel (which is going to be the world’s highest tunnel), will prove to be milestones in border area development.”

Singh added that the ongoing efforts have not only ensured “prompt military deployments in sensitive regions”, but also “connected the people residing in border areas with the rest of the country”.

Emphasising that building roads, bridges and tunnels in border areas was imperative for national security, the defence minister said it was important to make the lives of the people in these border areas better, in collaboration with the respective state governments.

Village development, tourism promotion

Referring to the Vibrant Villages programme, Singh said the government’s objective was to transform the villages along the northern borders into ‘model villages’. He added that special focus was on villages in Uttarakhand, Himachal Pradesh and Arunachal Pradesh, which have been reeling under limited connectivity and lack of proper infrastructure.

Singh also explained the role of the Army. “The government, along with the Indian Army, is ensuring the participation of people residing in border areas in their development.”

The government, he added, aims to promote tourism in border states. The influx of tourists, particularly in Ladakh, Sikkim and Arunachal Pradesh, had increased by 30 percent between 2020 and 2023, said Singh.

Moreover, there has been a significant increase in tourism in Kashmir, the defence minister said, adding that the government’s consistent efforts were aimed at turning Jammu & Kashmir from a “terrorist hotspot” to a “tourist hotspot”.

Speaking at the same event, Chief of Army Staff General Upendra Dwivedi said that the development of border areas was a core component of national security because of its strategic imperative. “Developed areas with strong economic or tourist activity act as a deterrence to the adversary. It basically discredits [the] adversary claims.”

https://theprint.in/defence/centre-operationalises-220-kv-srinagar-leh-line-to-connect-ladakh-border-areas-with-national-grid/2263143/

THE HINDU

Wed, 11 Sep 2024

Eastern Naval Command chief opens VR & AR Lab at Naval Dockyard

Vice Admiral Rajesh Pendharkar, Flag Officer Commanding in Chief of Eastern Naval Command, inaugurated Virtual Reality & Augmented Reality (VR & AR) Lab at Naval Dockyard here on Wedneday. The facility would enable use of VR & AR tools to speed up installation of new equipment and enhance quality of work during refits, according to a release here.

https://www.thehindu.com/news/cities/Visakhapatnam/eastern-naval-command-chief-opens-vr-ar-lab-at-naval-dockyard/article68630788.ece

THE HINDU

Wed, 11 Sep 2024

Developed border areas act as deterrence to adversary’s claims: Army Chief

Our objective is to transform the villages along the Northern borders, especially in Uttarakhand, Himachal Pradesh, and Arunachal Pradesh, which are suffering from limited connectivity and infrastructure, into a ‘Model Village’, Defence Minister Rajnath Singh said on Wednesday (September 11, 2024). We aim to connect them to the mainstream of development, he stated.

Describing border area development as a core component of national security, Army Chief General Upendra Dwivedi said developed area with a strong economic and tourist activity acts also as a deterrence to the adversary.

“It basically discredits adversary claims or who otherwise claim this is theirs or taken away. People are there on ground to confirm what is correct and what is not,” he said speaking at a conclave on border area development.

The Union government has approved the Vibrant Village Programme for development of border villages as a Centrally sponsored scheme on February 15, 2023, with financial outlay of ₹4,800 crore for the financial years 2022-23 to 2025-26, for the development of the 2,967 villages in 46 blocks in 19 districts bordering China and Nepal in the States of Arunachal Pradesh, Himachal Pradesh, Sikkim, Uttarakhand, and Union Territory of Ladakh.

The objective of VVP is comprehensive development of these villages to improve the quality of life of people and thereby reversing outmigration, according to the Ministry of Home Affairs. It is also an effort to counter China’s model villages called Xiaokang (moderately prosperous) villages opposite Uttarakhand, Sikkim, and Arunachal Pradesh very close to the LAC raising apprehensions in the security establishment.

Talking of development in the border areas, Mr. Singh said the government, along with Indian Army, is ensuring the participation of people residing in border areas in their development. “We are encouraging the youth to enrol in the NCC. Many government schemes are being run with the sole aim of development.”

Talking of the progress achieved in border area development in the last 10 years, Mr. Singh said, “The Border Roads Organisation (BRO) has constructed over 8,500 kms of roads and more than 400 permanent bridges. Atal Tunnel, Sela Tunnel and Shikun-La Tunnel, which is going to be the world’s highest tunnel, will prove to be milestones in border area development.”

Elaborating he said they started the 220 Kilo-Volt Srinagar-Leh Electricity Line to connect the border areas of Ladakh with the National Electricity Grid. In addition, the transmission and distribution infrastructure of north-eastern States is being strengthened, he noted.

“High-speed internet has been provided to over 1,500 villages through the Bharat-Net broadband project. In the last four years alone, more than 7,000 border villages have been connected with internet connection, and our focus has been Ladakh and Arunachal Pradesh,” the Minister said.

He stated that the ongoing efforts have not only ensured prompt military deployments in sensitive regions, but have also connected the people residing in border areas with the rest of the country. Mr. Singh stressed that while building roads, bridges, and tunnels in border areas is imperative for national security, it is also important in making the lives of the people in these regions better, in collaboration with the State governments.

Adding to this, Gen. Dwivedi described infrastructure development; smart borders comprising communication networks and power supply; economic development with employment generation; border area tourism and empowerment of next generation by providing skill enhancement and education opportunities as key pillars of the vision of border area development.

In addition to development of villages and roads, setting of mobile towers for 4G communications is underway under the Unified Service Obligation Fund, under which corporates can provide telecom services in rural and remote areas under the CSR obligations. Under this mobile towers are being set up in strategically sensitive areas like Kibithu, Walong, and Hayuliang. Phase-I covering Lohit and Debang regions should be completed by December this year, officials said.

https://www.thehindu.com/news/national/developed-border-areas-act-as-deterrence-to-adversarys-claims-army-chief/article68631199.ece

THE WEEK

Wed, 11 Sep 2024

India's defence, aerospace capabilities set for greater heights with Lockheed Martin-Tata teaming up deal

US-based defence technology company Lockheed Martin and Tata Advanced Systems Limited have entered into a teaming agreement that is expected to give a major fillip to India's defence and aerospace capabilities.

The two companies have agreed to set up a Maintenance, Repair and Overhaul (MRO) facility to support the Indian Air Force's highly advanced military transport aircraft C-130J Super Hercules fleet as well as the C-130J fleet operated by other countries.

The teaming agreement also explores the possibility of Lockheed Martin expanding C-130J manufacturing and assembly in India to produce aircraft for Medium Transport Aircraft (MTA) programme of the Indian Navy, subject to government approval.

The IAF is looking to acquire up to 80 MTAs and had issued a request for information in this regard.

"Collaborating with Lockheed Martin on the C-130J platform proposition for IAF's MTA project is a milestone for Tata Advanced Systems," CEO and MD of Tata Advanced Systems Sukaran Singh said.

The announcement also marks the entry of Tata Advanced Systems into the defence MRO space in India for large aircraft platforms.

Rod McLean, vice president and general manager of the Air Mobility and Maritime Missions line of business at Lockheed Martin said the teaming agreement demonstrates his company's "commitment to a self-reliant India.

The two companies already have a long-standing partnership through the Tata Lockheed Martin Aerostructures Ltd., (TLMAL) joint venture, established in 2010.

https://www.theweek.in/news/defence/2024/09/11/indias-defence-aerospace-capabilities-set-for-greater-heights-with-lockheed-martin-tata-teaming-up-deal.html

Hindustan Times

Thu, 12 Sep 2024

Induction of Apache hits supply chain wall

Six months after the Indian Army raised its first squadron of US-made AH-64E Apache attack helicopters at Jodhpur to strengthen its posture against Pakistan, not a single Apache has been inducted into service as the manufacturer Boeing grapples with lingering supply chain hurdles that have slowed down production, senior officials aware of the development said on Wednesday.

Another hurdle to the Apache project related to India's low ranking in a US government programme that prioritised foreign customers. This issue, however, has been resolved after months-long discussions between the two sides.

Still, the first helicopter is expected to be delivered only next year, almost a year behind the original delivery schedule, the officials said.

The 451 Army Aviation squadron was raised at Nagtalao near Jodhpur on March 15, anticipating that US aerospace giant Boeing will begin delivering the choppers weeks thereafter, but it has now emerged that supply chain bottlenecks in the aerospace industry have held up the deliveries, said one of the officials cited above, who asked not to be named.

The helicopter base is fully ready to operate the Apaches. In 2020, the army ordered six Apache attack helicopters from the US for more than ₹4,100 crore.

"The first helicopter is unlikely to be delivered before next year as Boeing has conveyed to us that it is facing supply chain problems. Also, earlier there were some issues related to India's rating being low on the US Defense Priorities and Allocations Systems Program (DPAS), but that was resolved in April-May 2024," said a second official, who also asked not to be named.

Issues related to DPAS, which covers 22 critical components fitted on the Apaches, including engines, gearboxes and weapons, were resolved after six months of discussions but supply chain issues linger, HT has learnt.

The US uses DPAS to prioritise defence-related contracts throughout the US supply chain to support military, homeland security, critical infrastructure and other requirements. It is also used to provide military or critical infrastructure assistance to foreign countries.

Boeing's technical assistance field teams are in Nagtalao to lay the groundwork for the induction, including training air, ground and maintenance crews.

Asked to comment on the Apache induction, a Boeing spokesperson said the firm "continues to work closely with the customer (Indian Army) in this regard".

Armed with fire-and-forget Hellfire missiles, the Apache can track up to 128 targets a minute and prioritise threats. The missiles equip the gunships with heavy anti-armour capabilities.

"The Apaches will add teeth to strike formations along the western border with Pakistan as well as augment capabilities along the northern border with China as they will come with a full complement of weapons, including missiles, rockets and guns," said Lieutenant General AK Suri (retd), who headed the Army Aviation Corps until July 31.

Apart from the Apaches, another crucial project that has been hit by supply chain bottlenecks is the delivery of F404 engines to Hindustan Aeronautics Limited (HAL) by US firm GE Aerospace for the ongoing light combat aircraft (LCA Mk-1A) programme. The delivery of the engines is delayed by around 10 months.

Boeing started the production of Apaches for the army at its Mesa facility in Arizona in August 2023, targeting deliveries the following year. This was after the joint venture Tata Boeing Aerospace Limited (TBAL) delivered the army's first Apache fuselage from its facility in Hyderabad.

The Indian Air Force operates a fleet of 22 such helicopters. India placed orders worth $ 3.1 billion for 22 Apache helicopters and 15 Chinook heavy-lift choppers for IAF in 2015. IAF has inducted all the Boeing-made helicopters, and both platforms have operated extensively in Ladakh amid the ongoing military standoff with China along the contested Line of Actual Control (LAC).

The Army Aviation Corps is modernising its capabilities with attack helicopters, light combat helicopters (LCH), light utility helicopters (LUH) and unmanned aerial vehicles.

In June, the defence ministry issued a tender to HAL for the proposed acquisition of 156 LCHs to sharpen the capabilities of the army and the air force. The new helicopters, 90 for the army and 66 for IAF, are estimated to cost ₹50,000 crore.

The army will also start phasing out its ageing Cheetah and Chetak helicopters in around three years, with the entire fleet set to be replaced with new locally made utility choppers over the next eight to 10 years.

It will induct in the next three to four years the MQ-9B remotely piloted aircraft systems to be imported from the US. The acquisition of these drones, in a government-to-government deal, will significantly boost the Indian military's strength as the versatile platform has the capability to strike targets with its on-board weapons, it can carry out intelligence, surveillance and reconnaissance; and its other roles include electronic warfare, defensive counter air and airborne early warning.

India is pursuing a deal worth almost $3.1 billion to buy 31 such drones -- 15 for the navy, and eight each for the army and IAF.

To be sure, in August, India and the US signed an agreement to ensure the mutual supply of defence goods and services to enable the acquisition of the industrial resources they need from one another to resolve unanticipated supply chain disruptions and meet national security needs.

The Security of Supply Arrangement (SOSA) will allow India and the US to request priority delivery of the goods and services from defence firms in both countries for executing contracts and subcontracts.

https://www.hindustantimes.com/india-news/armys-apache-induction-hits-supply-chain-wall-101726081276697.html

FINANCIAL EXPRESS
Read to Lead

Wed, 11 Sep 2024

Brazil expands defence ties with India: Focus on importing Indian platforms ahead of key leadership meeting

In the lead-up to a pivotal meeting between Indian Prime Minister Narendra Modi and Brazilian President Luiz Inácio Lula da Silva at the BRICS Summit next month, defence cooperation between Brazil and India is rapidly gaining momentum. Brazil has shown keen interest in Indian defence platforms, with high-level military visits aimed at deepening defence relations and exploring potential procurement opportunities from India.

On Wednesday, Brazilian Air Force Commander Lieutenant Brigadier Marcelo Kanitz Damasceno met with Indian Army Chief General Upendra Dwivedi. The meeting highlighted Brazil's interest in India's defence products and platforms and discussed ways to enhance bilateral defence cooperation. This dialogue marks an important step forward in the increasingly robust defence relationship between the two nations.

Series of High-Level Military Visits from Brazil

This latest visit by the Brazilian Air Force Chief is part of a broader pattern of high-level military engagements between the two nations. Since August 2023, Brazil has sent multiple top defence officials to India, each focused on exploring different areas of collaboration:

- **Brazilian Army Chief (Aug 28 – Sept 2, 2023):** Strengthened ties between the two armies, focusing on technical cooperation and joint training programs.
- **Navy Vice-Chief (Sept 4-6, 2023):** Discussed naval collaboration, particularly in the area of maritime security.
- **Navy Chief Admiral Marcos Sampaio Olsen (August 19-24, 2024):** Focused on enhancing maritime cooperation, including operational engagements and technical exchanges.
- **Army Vice-Chief (Sept 25-27, 2023):** Reviewed potential collaboration in ground defence technologies.

These visits underscore Brazil's strategic interest in India's defence capabilities and highlight the strong momentum behind this bilateral relationship.

Strengthening Defence Cooperation: Key Platforms in Focus

Brazil's defence interests in India are multifaceted, with an emphasis on technology transfer and platform procurement. During his visit, Lieutenant Brigadier Damasceno toured key defence installations, including Hindustan Aeronautics Limited (HAL) in Bangalore, where India's premier defence systems are developed.

According to a senior diplomat, the Brazilian Air Force Commander has shown particular interest in several Indian defence products, including the Light Combat Aircraft (LCA) Tejas, which represents India's capability to produce indigenous fighter jets. Additionally, Brazil has shown interest in the Prachand and Rudra attack helicopters.

"The Air Chief is keen to emphasize the Brazilian offer of both the E-145 for the NETRA program and the C-390 for India's Multi-Role Transport Aircraft (MTA) program. He showed interest in Indian defence products, especially the Tejas," stated a top diplomat, emphasizing the wide-ranging scope of discussions.

Brazil Attends India's Largest Air Exercise as Observer

Lieutenant Brigadier Damasceno's visit to India also includes observing Exercise Tarang Shakti on Thursday (Sept 12, 2024), India's largest multinational air exercise currently taking place in Jodhpur. This exercise, involving ten countries with deployed assets, showcases India's advanced air capabilities, including the Tejas, Su-30 MKI, Mirage-2000, Rafale, and AWACS systems, among others. Brazil's presence as an observer reflects its interest in understanding India's operational capabilities and strengthening joint military exercises in the future.

Brazil's participation in defence exercises, even as an observer, is a significant indication of the country's growing focus on joint operational engagements. This engagement comes on the heels of similar visits by the Brazilian Navy and Army leadership, further reinforcing the strategic intent to build robust defence cooperation.

A Long History of Collaboration

India and Brazil share a deep and multifaceted relationship, which extends beyond defence cooperation. The two countries have been `Strategic Partners since 2006' and collaborate in various multilateral forums, including BRICS, G-20, IBSA, and the International Solar Alliance. However, defence cooperation has been a core element of this partnership since the `2003 defence

cooperation agreement', which formalized collaboration between the two countries' militaries. Since then, seven meetings of the Joint Defence Committee (JDC) have taken place, with the most recent held in New Delhi in December 2021.

Anticipation Ahead of Modi-Lula Meeting

The upcoming BRICS Summit, where Prime Minister Modi and President Lula are expected to meet on the sidelines, will likely further accelerate defence cooperation between India and Brazil. Defence is expected to be a key agenda item as both countries seek to leverage their strategic partnership. India's defence manufacturing sector, particularly its indigenous platforms, offers Brazil cost-effective and reliable solutions to meet its own defence requirements.

For Brazil, which has been modernizing its armed forces, India represents a key partner capable of providing advanced technologies while fostering deeper defence-industrial cooperation. As the diplomatic and defence engagements between the two countries continue to expand, the Modi-Lula meeting could serve as a significant milestone in shaping the future of India-Brazil defence relations.

https://www.financialexpress.com/business/defence-brazil-expands-defence-ties-with-india-focus-on-importing-indian-platforms-ahead-of-key-leadership-meeting-3608431/

The EurAsian Times

Wed, 11 Sep 2024

After Bombing Indian Air Force's Runways, C-130s Could Now Be Made In India To Replace IAF's AN-32s

From bombing Indian military positions during the India-Pakistan war of 1965 to possibly being 'Made in India' for the Indian Air Force (IAF), the C-130 has come a full circle. In the race to supply Medium Transport Aircraft (MTA) to the IAF to replace its aging fleet of An-32s, American defense giant Lockheed Martin has joined hands with Tata Advanced Systems Limited (TASL) to manufacture the C-130J Super Hercules tactical airlifter to be made in India.

The agreement entails establishing a Maintenance and Repair Facility for the 12 C-130Js presently operated by the IAF and other global Super Hercules fleets. It will also include setting up manufacturing and assembly in India should the IAF decide to go with C-130Js. For its global operators, the production line for the C-130Js will continue to be at the Marietta, Georgia, facility.

"Collaborating with Lockheed Martin on the C-130J platform proposition for IAF's (Indian Air Force's) MTA project is a milestone for Tata Advanced Systems," said Sukaran Singh, the CEO and managing director of Tata Advanced Systems. The offer has been an interesting one as the American-made C-130s had fought from Pakistan's side during the 1965 India-Pakistan war. The cargo aircraft supplied to the Pakistan Air Force (PAF) was modified to become a bomber and raid Indian runways.

The other important mission carried out by PAF's C-130 fleet, as reported by the EurAsian Times, was the audacious para commando attack planned by Pakistan. The commandos were inserted by C-130B to cripple three frontline airbases of the IAF in Punjab – Pathankot, Halwara (near Ludhiana) and Adampur (near Jalandhar).

The IAF is looking for a new transport aircraft in the 18 to 30-tonne cargo-carrying capacity range. In the request for information for the MTA, the IAF has asked the foreign vendors to provide a general estimate of the cost of aircraft and associated equipment for a batch of 40, 60, and 80 aircraft.

The IAF has asked OEMs to furnish information about the scope of technology transfer; methods to enhance indigenization and to set up a dedicated manufacturing line, including design, integration, and manufacturing processes in India; capability to undertake indigenous manufacture of systems, subsystems, components, and spares; and making India a regional or global hub for manufacturing and maintenance, repair and overhaul (MRO) of the equipment.

The other companies in the fray are the Brazilian firm Embraer Defense & Security, which has partnered with Indian company Mahindra to manufacture the C-390 Millennium multi-mission aircraft in India. European Airbus Defense and Space is also offering its A-400 M aircraft. Lockheed Martin also has the advantage as the C-130J is already in the IAF's fleet. The IAF operates 12 Super Hercules for tactical airlifting. Embraer has so far supplied eight jets to India for VVIP travel and use as airborne early warning and control aircraft. This gives Embraer and Lockheed an advantage over Airbus in the deal.

Herculean Advantage Over Competitors

The American airlifters have been game-changers for the IAF and have displayed their capability post the Galwan clash force build-up along the Line of Actual Control with China. The strategic airlifter C-130J Super Hercules can carry 20 tonnes, compared to the Russian An-32 airlift capability of 4-6 tonnes.

"With the induction of C-17s and C-130s, the IAF's strategic airlift capability has seen a quantum jump. Along with this maneuverability and onboard avionics of the two aircraft are far superior to the previous transport aircraft because of being new. Another capability C-130J has is to land and take off from unprepared surfaces," a source told the EurAsian Times earlier. In 2020, the Indian and Chinese troops remained entrenched on their respective sides. The Chinese PLA had pitched over 80 tents on their side.

The Indian Armed Forces did not waste time and swung into action. Its entire transport fleet, including the C-130s and C-17s, was deployed. They airlifted 68,000 troops, 330 infantry vehicles, and over 90 tanks and artillery guns, outfoxing China.

The Russian An-32 and IL-76s have been the mainstay of the IAF's airlift capability. It was an An-32 that reactivated the strategic airbase of Daulat Beg Oldie (DBO) in the northern Himalayas after 43 years. However, with the limited load-carrying capacity of the Russian transport aircraft, the IAF decided to land a C-130J here.

The C-130J landed at DBO, the world's highest airfield at 16,614 feet, close to the Line of Actual Control (LAC) with China around ten years ago. The procurement is expected to involve technology transfer and setting up a manufacturing line in the country for high-level indigenization.

C-390 vs C-130J

The Lockheed Martin C-130J Super Hercules, introduced in 1999, has four turboprop engines and is mostly used as a military transport aircraft. Lockheed Martin's C-130 Hercules had received a complete upgrade with the C-130J that contained new engines, a flying deck, and other equipment.

In 2020, the Royal Netherlands Air Force chose the C-390 Millenium over the C-130J. Because of its speed and load capacity, the Brazilian-origin aircraft could complete a mission with fewer aircraft than the competition.

The KC-390 (cruising at 470kt true airspeed) is a lot faster than the C-130J (cruise 248kt) and has a high operational ceiling (36,0000 ft compared to 28,000ft of the C-130J). The range of the KC-390 is a little less (1,750 miles compared to the C-130J's 2,100 miles).

According to Embraer, a fleet of six KC-390s flying 1,350nm (2,500km) round trips could deliver 500 tonnes and 1,000 passengers in less than two days. The company says that is 40 percent faster than the C-130J. Compared to the C-130J, the KC-390 is 15 percent faster, carries 18 percent heavier cargo, and costs 41 percent less. Despite having a 15 percent lower range than the C-130J, the KC-390 includes aerial refueling as a standard feature (only a few specialized sub-variants of the C-130 feature an aerial refueling capability.

The C-390, the most modern military transport aircraft on the market, can carry a larger payload (26 t) than other medium-sized military transport aircraft and flies 870 km/h (470 knots).

https://www.eurasiantimes.com/after-bombing-indian-air-forces-c-130s-could/

Science & Technology News

THE ECONOMIC TIMES

Wed, 11 Sep 2024

Is helium the hidden villain behind space missions?

Two NASA astronauts aboard Boeing's Starliner will stay on the International Space Station for months because of a faulty propulsion system whose problems included helium leaks. Back on Earth, SpaceX's Polaris Dawn mission has been delayed because of helium issues on ground equipment. Boeing's Starliner spacecraft landed uncrewed in a New Mexico desert late on Friday.

Past missions have that have been affected by pesky helium leaks include ISRO's Chandrayaan 2 and ESA's Ariane 5. Why do spacecraft and rockets use helium, and what is so tricky about it?

Why Helium?

Helium is inert - it does not react with other substances or combust - and its atomic number is 2, making it the second lightest element after hydrogen. Rockets need to achieve specific speeds and altitude to reach and maintain orbit. A heavier rocket requires more energy, not only increasing fuel consumption but also needing more powerful engines, which are more expensive to develop, test, and maintain.

Helium also has a very low boiling point (-268.9°C or -452°F), allowing it to remain a gas even in super-cold environments, an important feature because many rocket fuels are stored in that temperature range. The gas is non-toxic, but cannot be breathed on its own, because it displaces the oxygen humans need for respiration.

How Is It Used?

Helium is used to pressurize fuel tanks, ensuring fuel flows to the rocket's engines without interruption; and for cooling systems. As fuel and oxidiser are burned in the rocket's engines, helium fills the resulting empty space in the tanks, maintaining the overall pressure inside. Because it is non-reactive, it can safely mingle with the tanks' residual contents.

Is It Prone To Leaks?

Helium's small atomic size and low molecular weight mean its atoms can escape through small gaps or seals in storage tanks and fuel systems. But because there is very little helium in the Earth's atmosphere, leaks can be easily detected - making the gas important for spotting potential faults in a rocket or spacecraft's fuel systems.

In May, hours before Boeing's Starliner spacecraft made an initial attempt to launch its first astronaut crew, tiny sensors inside the spacecraft detected a small helium leak on one of Starliner's thrusters that NASA spent several days analysing before deeming it low-risk. Additional leaks were detected in space after Starliner launched in June, contributing to NASA's decision to bring Starliner back to Earth without its crew.

The frequency of helium leaks across space-related systems, some engineers say, have highlighted an industry-wide need for innovation in valve design and more precise valve-tightening mechanisms.

Are There Alternatives?

Some rocket launches have experimented with gases such as argon and nitrogen, which are also inert and can sometimes be cheaper. Helium, however, is much more prevalent in the industry.

Europe's new Ariane 6 rocket ditched the helium of its predecessor Ariane 5 for a novel pressurization system that converts a small portion of its primary liquid oxygen and hydrogen propellants to gas, which then pressurizes those fluids for the rocket engine. That system failed in space during the final phase of Ariane 6's otherwise successful debut launch in July, adding to the global rocket industry's long list of pressurization challenges.

https://economictimes.indiatimes.com/news/science/nasa-and-spacex-in-crisis-is-helium-the-hidden-villain-behind-space-missions/articleshow/113264782.cms

THE HINDU

Wed, 11 Sep 2024

If their ancestors help, weak cancer cells can form tough tumours

Scientists have cracked the mystery of how some cancer cells that ought not to survive could actually take help from their ‘neighbours’ to succeed and form drug-resistant tumours instead.

Drug resistance is one of the world’s major crises of the 21st century. When a pathogen that causes an infection or disease becomes drug-resistant, drugs that could cure these conditions become less effective. Pathogens acquire this ability in the form of certain genetic mutations although some non-genetic factors are also in play.

When a cancer takes root in a person’s body, the cancer cells can also become drugresistant in the same way. Simple logic dictates that when the person takes a drug to destroy these cells, the drug-resistant cells will proliferate while the non-resistant cells won’t. However, the genetic changes that conferred drug-resistance to the cells will also have undermined their overall ‘fitness’.

When the person isn’t taking a drug to treat the cancer, the drug-resistant cells should thus have a harder time surviving than their non-resistant peers. They are said to suffer a ‘growth penalty’.

How the evolutionarily less-fit cells survive such conditions is a puzzle scientists have been trying to solve for years.

A complex ecosystem

In past studies, scientists have tried to understand drug resistance by separating the corresponding cells from a larger population, making copies of them in the lab, and investigating them further.

The researchers behind the new study realised this approach removes an important bit of context that could affect the cells' prospects: the influence of other cells in their surroundings, especially the ancestors from which they 'deviated' by accumulating genetic changes.

Jeff Maltas, a postdoctoral research fellow at Cleveland Clinic and the lead author of the study, said scientists have appreciated the idea of tumours as a complex ecological system. He said his team's idea came from multiple disciplines plus previous reports of high mutation rates within a tumour that had changes in pH and oxygen levels, among other conditions.

In a study published in 2022, for example, some members of the same team of researchers and others showed that even in the absence of a drug, drug-resistant mutant cells undergo large changes in growth rate. The authors attributed this to the environment in which the cells existed.

A surprise in a model

Conventionally, mutated cells have a certain growth rate in the presence of a drug and a lower one in its absence. In the new study, the researchers built a mathematical model based on the idea that these growth rates depend on the presence of a drug and on the cells' environment. When cultured alone, drug-resistant cells grew more slowly than the cells from which they were 'descended'. But when these cells and their ancestors were cultured together, the former grew much faster.

The model also revealed that the more ancestral cells there are in the same culture, the drug-resistant daughter cells also proliferated faster — so much so that the growth penalty vanished. The resulting tumour would be resistant to the drugs to come. The researchers also found that even when there is no drug, the interactions between the evolving drug-resistant cells in the tumour's environment still promoted drug resistance.

The implication is that drug-resistant cells could be present in larger numbers, perhaps more than a clinician or medical researcher might expect, even before treatment begins. The authors wrote in their paper that their work "both complements and builds off of recent studies from a wide range of disciplines, ranging from theoretical population genetics and ecology to clinical trials across several biological kingdoms."

The ancestral advantage

The researchers also proposed a mathematical framework to explain why drug resistance is common and validated it with experiments using lung cancer cells. First, they engineered three drug-resistant mutations in lung cancer cells in the lab and grew them together with different amounts of drug-sensitive ancestor cells. Then they observed how the different abundances of mutations in the cells affected their growth rate.

https://www.thehindu.com/sci-tech/science/if-their-ancestors-help-weak-cancer-cells-can-form-tough-tumours/article68519485.ece

Wed, 11 Sep 2024

World's Strongest Battery Could Make Electric Cars Go 70% Further on a Single Charge!

Imagine a future where your electric car drives 70% longer on a single charge, your laptop weighs half as much, and your mobile phone is as thin as a credit card. Thanks to groundbreaking research from Chalmers University of Technology in Sweden, this futuristic vision is coming closer to reality. Scientists have developed the world's strongest structural battery, which not only stores energy but also works as part of the vehicle or device's structure, reducing both weight and energy consumption.

What is a Structural Battery?

Unlike conventional batteries that simply store energy, a structural battery does double duty. It's a material that can store energy while also functioning as a load-bearing part of the product. In simpler terms, think of it like a car chassis that doubles as the battery.

This innovation reduces the overall weight of the vehicle or device, leading to greater energy efficiency. This new battery developed at Chalmers is made from a carbon fibre composite, which makes it stiff and strong—like aluminium—while also being able to store electrical energy. The researchers are confident that this battery will radically change how we build electric cars, mobile phones, laptops, and even airplanes!

How It Can Change Electric Vehicles

One of the most exciting applications of this new battery technology is in electric vehicles (EVs). With today's standard batteries, a lot of energy is consumed just to carry the heavy battery pack. However, with a structural battery, the battery itself would be part of the car's structure, significantly reducing its weight.

This lower weight means that less energy is needed to run the vehicle, making it much more efficient. According to lead researcher Leif Asp, the structural battery could potentially increase the driving range of electric cars by up to 70% on a single charge! This means that with the same size battery, your EV could travel much farther without needing to recharge.

Why Lighter is Better: Less Energy, More Efficiency

To put it simply: the lighter the vehicle, the less energy it needs to move. That's why this innovation is so important. By making batteries that are also part of the vehicle's structure, the overall weight is reduced, and so is the energy consumption.

In earlier stages of research, the team developed a battery with an energy density of 24 watt-hours per kilogram (Wh/kg), which was about 20% as efficient as traditional lithium-ion batteries. But now, they've managed to increase this to 30 Wh/kg, bringing them closer to commercially viable products.

Though the energy density is still lower than today's standard lithium-ion batteries, the overall energy required is reduced because the structural battery reduces the vehicle's weight significantly.

Key Benefits of Structural Batteries

The advantages of structural batteries go beyond just weight reduction. Here are a few key benefits:

Lighter Vehicles: Less weight means less energy needed for movement, increasing range and efficiency.

Increased Safety: These batteries use a semi-solid electrolyte, which reduces the risk of fire compared to liquid electrolytes.

Sustainability: The design eliminates the need for conflict metals like cobalt and manganese, which are often used in traditional lithium-ion batteries.

Multifunctionality: The battery not only stores energy but also strengthens the structure, making it perfect for electric cars, planes, and even handheld gadgets.

What's Next? Commercialisation and Beyond

While this breakthrough is exciting, there's still a long way to go before we see this technology in our everyday lives. The battery is currently in the labscale phase, and a lot more engineering work is needed to scale up production for mass-market use. However, the team at Chalmers is optimistic. They've already started Sinonus AB, a venture company aimed at bringing this technology to market.

The most immediate applications could be in lightweight gadgets like laptops or mobile phones, which could soon be thinner and lighter than ever. For instance, imagine a credit card-thin smartphone or a laptop that weighs half as much as today's models. These products are expected to hit the market before structural batteries make their way into electric vehicles.

How Does This Work?

The structural battery uses carbon fibre as both the positive and negative electrodes. The carbon fibre in the anode acts as a reinforcement and as a conductor for electrical energy. In the cathode, it also provides a structure for lithium to attach to, eliminating the need for traditional metals like copper and aluminium. Unlike most batteries that use a liquid electrolyte, this one uses a semi-solid electrolyte, which makes the battery safer and less prone to overheating or catching fire.

The Future of Lightweight, Energy-Efficient Vehicles

The potential for structural batteries is massive, especially for industries like automotive and aerospace, where weight is a critical factor in energy consumption. A lighter electric car means a more energy-efficient ride, while a lighter plane could use far less fuel. As the technology evolves and moves towards commercialisation, it's clear that this breakthrough could have farreaching impacts across multiple sectors.

https://www.news9live.com/science/worlds-strongest-battery-electric-cars-go-further-2690630

DECCAN HERALD

Wed, 11 Sep 2024

IISc-incubated startup hot-tests aerospike rocket engine

Bengaluru-based startup SpaceFields has announced the successful hot-firing of its aerospike rocket engine. The static-test campaign for the 168-mm rocket motor was conducted at

SpaceFields' propulsion test facility at the Indian Institute of Science (IISc) campus in Challakere, in Chitradurga district. The successful testing of what the company called India's first aerospike engine could complement efforts to increase the efficiency traditional bell-nozzle engines provide.

Apurwa Masook, CEO of the IISc-incubated startup, noted that aerospike nozzles are designed to be altitude-compensating – these enable the engines to have optimum efficiency across a range of pressure regimes, "a unique capability" that ensures a significant upgrade on the currently used bell nozzles. In effect, aerospike engines can reduce the staging and the amount of fuel to bring the same mass to orbit.

"At high altitudes, the aerospike nozzle is able to expand the engine exhaust to a larger effective nozzle area ratio and hence, can increase the thrust and specific impulse," Masook said.

Aerospikes come with potential applications in single-stage to orbit (SSTO) rockets that use only one engine. For the static-fire test, SpaceFields used an HTPB-based composite propellant.

A maximum recorded pressure of 11 bar and a peak thrust of 2000N was achieved; a total impulse of 54485.9 N was generated. The engine is built with Titanium grade 5 as the main metal. A Glass Fibre Reinforced Polymer-based ablative thermal insulation was used to protect the spike from the hot gases.

The patent for the insulation system was recently granted, SpaceFields said.

https://www.deccanherald.com/india/karnataka/bengaluru/iisc-incubated-startup-hot-tests-aerospike-rocket-engine-3186455