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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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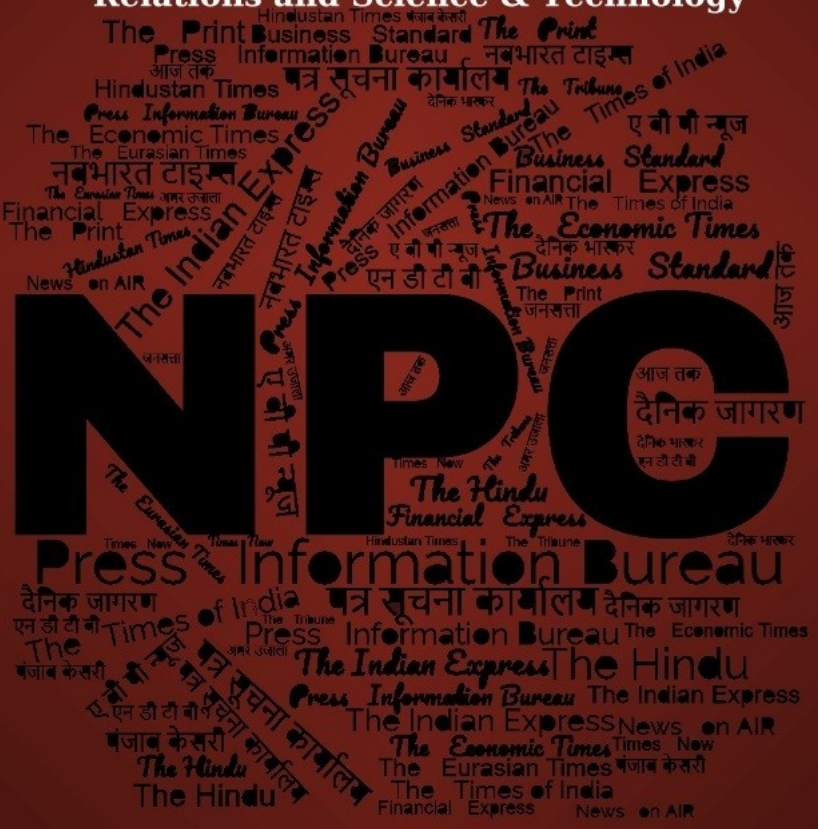

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CONTENTS

Press Information Bureau
Government of India

Ministry of Defence

Wed, 28 Aug 2024

DRDO's young scientists complete end-to-end testing of 6-qubit quantum processor based on superconducting circuit technology

Scientists from DRDO Young Scientists Laboratory for Quantum Technologies (DYSL-QT), Pune and Tata Institute of Fundamental Research (TIFR), Mumbai have completed end-to-end testing of a 6-qubit quantum processor based on superconducting circuit technology. The demonstration was carried out in front of the apex committee overseeing the DYSL-QT. This included submitting a quantum circuit from a cloud-based interface, the execution of the programme on the quantum hardware and updating the cloud interface with computed results.

The project being executed at TIFR Mumbai's Colaba campus is a three-way collaboration between DYSL-QT, TIFR and Tata Consultancy Services (TCS). The DYSL-QT scientists put together the control and measurement apparatus using a combination of commercial off-the-shelf electronics and custom-programmed development boards. The qubits were designed and fabricated at TIFR and the quantum processor architecture is based on a novel ring-resonator design invented at TIFR. The cloud-based interface to the quantum hardware is developed by TCS.

The scientists are now working on optimising various aspects of the system performance before it becomes ready for operation. Plans are underway to provide wider access to this system for education, research and eventually as a test bed for testing superconducting quantum devices for analysis. The next development target is to scale up the number of Qubits and assess the scaling trends with respect to technology challenges, development effort/time and monetary resources required for development, operations & commercialisation of various sizes of quantum computers. This will involve a holistic view from the quantum theory to engineering to business feasibility.

https://pib.gov.in/PressReleasePage.aspx?PRID=2049356

THE ECONOMIC TIMES

Wed, 28 Aug 2024

India plans to develop 5.5 generation fighter jet prototype by 2028

India plans to have the first prototype of its indigenous 5.5 generation fighter jet ready by 2028. This project aims to develop the Advanced Medium Combat Aircraft (AMCA), a stealth aircraft capable of carrying a significant weapons load.

The timeline and roadmap for the project were recently reviewed in a meeting between the Indian Air Force (IAF) and the Defence Research and Development Organisation (DRDO).

Senior defence officials disclosed that the AMCA would weigh around 27 tonnes and would feature capabilities allowing it to carry missiles in a concealed configuration for enhanced stealth. These features would make it conventionally capable of carrying a larger array of weapons.

"If engine production and other concerned activities move in time, the first prototype would be ready by 2028," said the officials.

They also added that the aircraft would need at least six to seven years for development and preparation for future warfare.

The project involves the selection of a development-cum-production partner comprising both a public sector unit and a private sector firm. Mass production of the AMCA is expected to start by 2035. The roadmap for the LCA Mark 2 program was also discussed.

The 4.5 generation fighter, initially expected by early 2025, has been delayed by approximately a year. This delay is attributed to lag in the release of approved funds and issues connected to the engine deal for the next indigenous fighter.

The LCA aircraft will be powered by American GE engines. LCA Mark 1 and Mark 1A will use GE-404 engines, while LCA Mark 2 will be equipped with the more advanced GE-414 engines, manufactured with indigenous content. India's focus is firmly set on advancing its indigenous aircraft capabilities, ensuring that its air force is prepared for future challenges and warfare scenarios.

https://economictimes.indiatimes.com/news/defence/india-plans-to-develop-5-5-generation-fighter-jet-prototype-by-2028/articleshow/112873090.cms

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Wed, 28 Aug 2024

Vice Admiral Rajesh Dhankhar Takes Over As Director General Project Seabird

Vice Admiral Rajesh Dhankhar NM, assumed duties of the Director General Project Seabird, with a charter to oversee largest defence infrastructure project currently progressing at the Karwar Naval Base, from Vice Admiral Tarun Sobti, on 28 August 2024.

The change of guard took place at the Headquarters, Project Seabird, New Delhi. VAdm Rajesh Dhankhar was commissioned into the Indian Navy on 01 July 1990 and is a specialist in Navigation & Direction.

The Flag Officer is an alumnus of the prestigious Naval Academy, Defence Services Staff College, and has undergone the Higher Command Course in Japan. During his illustrious career spanning 34 years, the Flag Officer has tenanted specialist appointments onboard warships Pondicherry, Godavari, Kora and Mysore.

The officer has also done instructional tenures in the erstwhile Project 15 Training Team, Navigation & Direction School and at the MIDS Wing Officer's Cadet School, Singapore.

His command appointments include Executive Officer onboard INS Delhi, and as Commanding Officer onboard INS Gharial, Mumbai and Vikramaditya. His notable staff appointments include those as Joint Director and Director at Directorate of Naval Plans, Principal Director/ Commodore (Pers) at the Directorate of Personnel.

In Flag rank, he has tenanted duties of Chief Staff Officer (Training), Flag Officer Sea Training, Commandant Naval War College and the Flag Officer Commanding Eastern Fleet. The Flag officer has also tenanted additional duties of the Chairman, Carrier Acceptance Trials Team to oversee the acceptance trials of INS Vikrant.

The Flag Officer is a recipient of the Nao Sena Medal (Gallantry) in 2015 for Non-Combatant Evacuation Operations (NEO) of Indian nationals from Aden and Al-Hodeida, Yemen.

During his tenure as Fleet Commander, over the past ten months, the Eastern Fleet maintained high level of combat readiness and operational tempo undertaking multiple Mission Based and operational deployments, and numerous bilateral and multilateral engagements including MILAN 24 with friendly foreign navies.

https://pib.gov.in/PressReleasePage.aspx?PRID=2049306

THE ECONOMIC TIMES

Wed, 28 Aug 2024

India likely to commission second nuclear submarine INS Arighat on Thursday

The Indian Navy is likely to commission its second nuclear submarine INS Arighat on Thursday.

The commissioning of the second boat is expected to be done in presence of the top defence, national security and military officials, sources said.

The submarine INS Arighat is the second boat of the Arihant class indigenous nuclear submarines and will be supporting the existing INS Arihant which was inducted in 2009.

The Indian Navy has already developed and tested long-range nuclear missiles from the two boats even as it prepares to induct the third boat shortly with two more set to be ready by the year 2035-36. The Indian nuclear-powered ballistic submarines have been named the Arihant class which is a Sanskrit word meaning the 'Destroyer of the Enemy'.

The name befits the strategic significance of a nuclear-powered submarine. Among the many options considered, the name 'Arihant' was selected and approved at all levels because of its subtlety and appropriateness in conveying the resolve.

The Indian government has been planning to build both nuclear and conventional boats for its long-term submarine acquisition and capability development plan.

India is working on having five Arihant class boats along with the six nuclear attack submarines to be built in three blocks. In the conventional arena, the Indian Navy has already got six new Kalvari class boats and will get 15 more new boats in Project 75 India, Project-76 and Project-75 AS.

https://economictimes.indiatimes.com/news/defence/india-likely-to-commission-second-nuclear-submarine-ins-arighat-on-thursday/articleshow/112865651.cms

THE HINDU BusinessLine

Wed, 28 Aug 2024

Army puts on hold acquisition of 200 drones from Dhaksha Unmanned Systems

The Indian Army has put on hold acquisition of 200 logistic drones from Chennai-based Dhaksha Unmanned Systems Private Ltd, a subsidiary of agri solution provider Coromandel International, following allegations that the company is using Chinese parts in their unmanned aerial vehicles (UAVs).

On August 7, last year, Coromandel International put out a media statement announcing that Dhaksha Unmanned Systems had bagged an order to supply 200 medium-altitude logistics drones and accessories to the Indian Army.

The company said it's the only player in the country to receive type certificates from the Directorate General of Civil Aviation (DGCA) for three drone models in medium and small categories for agriculture and surveillance applications.

Sources in the Army told businessline that the contract with Dhaksha for acquisition of logistic drones has been held up and no procurement process is being pursued owing to charges that the company was using Chinese parts for making their UAVs.

The action was initiated on the basis of inputs from the security agencies, said sources.

Advice of caution

In a letter on June 25, the Ministry of Defence (MoD) told industry associations — SIDM of CII, FICCI, and ASSOCHAM — to "sensitise" their association members to exercise "caution" while procuring defence items from Dhaksha and two other companies.

The company has told Army authorities that they took spares from Indian companies and not Chinese. But Army sources said that the ultimate accountability lies with them.

A spokesperson of Dhaksha said the allegations of use of Chinese parts in the company drones are "untrue and unsubstantiated". "We do not use any Chinese components in our defence drones," the spokesperson clarified.

"As part of the process, the company had submitted all the information and documents related to sourcing of its components to the Defence Ministry, and has successfully submitted documents towards completion of the quality and process audit," the company said.

But Dhaksha did not share any evidence with businessline to show that the MoD was reviewing its June 25 communication, which specifically mentions the company. On the specific issue of contract being kept on hold, the spokesperson stated that the company has not received any such information from the authorities.

DGMI directives

The Director General Military Intelligence (DGMI) had issued directives and advisory way back in 2010 and 2015 on the use of components/items of Chinese origin in security-related equipment, an MoD internal note highlighted.

As per these directives, hardware and software of system and sub-system, which are sensitive and critical, must not be from Chinese origin due to security implications.

The DGMI also specified that even for non-critical items, the original equipment manufacturer (OEM) should supply components of non-Chinese origin and that they must be tested to rule out embedded malwares.

Not just China, defence officials are also said to have made it clear to the industry that equipment or spares from countries sharing land borders with India will not be acceptable for security reasons.

The move to check use of Chinese drones is borne out of apprehension that sensors fitted into the platform and flight controllers share real-time data and location on the servers based in the inimical country.

https://www.thehindubusinessline.com/news/army-puts-on-hold-acquisition-of-200-drones-from-dhaksha-unmanned-systems/article68577549.ece

The Indian EXPRESS

Wed, 28 Aug 2024

IAF inks MoU with PES engineering college for research, development programmes

A Memorandum of Understanding (MoU) was signed between The Software Development Institute (SDI) of the Indian Air Force (IAF) and the PES College of Engineering, Mandya (Karnataka), on Wednesday to engage academic and engineering research and development. The Software Development Institute of the IAF is a premier research development facility for advanced software technologies. It gives support to the operational needs of the IAF.

According to the IAF, the agreement includes provisions for final-year engineering students of the PES College of Engineering to undertake internship-based projects. These projects will form an integral part of the college curriculum, providing practical experience and contributing to real-world problem-solving, the IAF said.

The IAF and the students will collaborate on developing new products and processes, leveraging their combined expertise to address emerging technological needs and challenges. Also, tailored training programmes will be designed to equip the IAF with cutting-edge skills and knowledge. This will help in addressing IAF's evolving requirements and enhancing its operational capabilities, the IAF said in a statement. The MoU will be effective for a period of five years during which the education institution and the IAF will work together.

Air Vice Marshal K N Santosh, Commandant Software Development Institute of IAF, said "Teaming with the PESCE marks another significant milestone aimed at Academic / Defence engineering R&D collaboration. Through this collaboration, SDI Air Force aims to provide an opportunity for interns to gain avionics software experience through hands-on projects, thereby facilitating students' transition smoothly into high-demand job roles."

He added, "The MoU would aid SDI to design, engineer and develop new software products / processes to meet the demands of harnessing newer technology, and thereby enhance its own Op capability. This is in the spirit of Atmanirbhar Bharat and Vision 2047."

https://indianexpress.com/article/cities/bangalore/iaf-mou-pes-engineering-college-research-development-programmes-9537746/?ref=latestnews_hp

THE HINDU BusinessLine

Wed, 28 Aug 2024

Defence Ministry cautions firms using Chinese parts for drones

The Ministry of Defence (MoD) has taken action against Indian companies using Chinese spares and parts to manufacture and sell drones in India.

The Department of Defence Production (DDP) of the MoD sent a letter on June 25 to industry bodies, FICCI, Assocham and CII's Society of Indian Defence Manufacturers (SIDM), asking them to "sensitise" and "caution" associated manufacturers from procuring items from companies using Chinese spare parts for making drones in India. The MoD has placed an order for 200 logistic drones from Dhaksha Unmanned Systems Pvt. Ltd on hold and scrutinising all firms supplying drones to the armed forces.

"It has come to the notice of the Department of Defence Production, Ministry of Defence, that Dhaksha Unmanned Systems Pvt. Ltd; Sky Industries, Gandhinagar; and Garuda Aerospace Pvt. Ltd are reportedly engaged in selling/supply of UAVs/drones to Indian Defence Forces which include assembly and integration of Chinese components," the DPP letter to industry bodies said.

"All the Industry associations are hereby requested to sensitise their members engaged in defence manufacturing to exercise caution while procuring defence items from said three companies and remain vigilant while procuring from other players in this field," the DPP stressed in the letter. The Union Home Minister is also believed to be conducting internal inquiries to identify similar business malpractices jeopardising the country's security.

Companies' stance

When asked their response, a spokesperson for Dhaksha Unmanned Systems said: "We would like to clarify that Dhaksha Unmanned Systems does not use any Chinese components in its defence drones, and any such claims are untrue and unsubstantiated.

Dhaksha Unmanned Systems has also reiterated this fact to the Defence Ministry officials. As part of the process, the company had submitted all the information and documents related to sourcing of its components to the Defence Ministry and has successfully submitted documents towards completion of the quality and process audit. Dhaksha Unmanned Systems remains steadfast on its commitment to manufacture 'Make in India' drones."

Dr Vijayakumar Rajarathinam, Chief Operating Officer of Garuda Aerospace said, "There have been no formal or specific accusations made by the Ministry of Defence (MoD) against Garuda Aerospace Pvt Ltd. regarding the assembly or integration of Chinese components into our drones. As a DGCA-approved drone manufacturing company, Garuda Aerospace strictly adheres to all government regulations, ensuring that our products meet the highest standards of quality and security."

"Moreover, we have received invitations from the Army to participate in significant events organized by the Eastern and Western Commands on August 5th and August 12th, respectively...We believe that the cautionary notice if it exists, is a routine measure and not a reflection of any wrongdoing on our part," he added.

Sources in the industry bodies confirmed receiving the MoD's correspondence to check the use of Chinese parts in manufacturing drones in India. A representative for one of the industry associations said on condition of anonymity the letter from MoD has been "circulated" to members for their consideration.

However, companies associated with the industry associations do not provide any compliance report on issues flagged by the industry bodies as such cautionary directions are not binding on member firms. The Defence Ministry, on its part, has prohibited the use of hardware and software of systems and sub-systems of drones made in China and other countries sharing land borders with India.

Earlier in 2017, the CBI had filed a case against Delhi-based Sidh Sales Syndicate and defence PSU Guns Carriage Factory on charges of selling China-made spares as "Made in Germany" for Dhanush artillery guns.

https://www.thehindubusinessline.com/news/national/defence-ministry-cautions-firms-using-chinese-parts-for-drones/article68573070.ece

THE TIMES OF INDIA

Wed, 28 Aug 2024

A peep into the proposed US-India Defence Cooperation Act of the United States

US Senator Marco Rubio on July 25, 2024 introduced a bill in the U.S. Senate proposing to treat India on par with its allies like Japan, Israel, Korea, and Nato allies as regards the technology transfers and support India in its response to growing threats to its territorial integrity.

The bill also proposes to bar Pakistan from receiving security assistance if it is found to have sponsored terrorism against India. With India's growing influence & return of Narendra Modi's as PM & recognising India as a strategic ally of the US, Congressman Marco Rubio has proposed elevation of India's status to that of America's close allies, Japan, Israel, South Korea, and Nato members reflecting a shift in the US policy, prompted by acknowledgment of India's pivotal role in Regional stability and Countering terrorism, opine observers.

Strengthening military and diplomatic ties

The bill calls for enhancement of United States' military cooperation with India:

1. By treating India on par with its allies Japan, Israel, and South Korea & Nato members, and;

2. Increasing military aid and sharing critical defence technology with it.

Rubio has highlighted the necessity of the partnership with India to counter China's growing influence in the Indo-Pacific region drawing attention to China's efforts at increasing its dominance in the Region & continuing to violate the sovereignty of the regional allies of the US.

Addressing Pakistan's proxy war

Referring to Pakistan, the bill demands that, if Pakistan continues proxy war against India, the US should halt its economic aid and take action against it, underscoring the US's commitment to supporting India's security, and curbing terrorism in the region.

Advocating Exemption from sanctions under the Countering America's Adversaries Through Sanctions Act A notable provision proposed in the bill has been the call for exempting India from sanctions under the Countering America's Adversaries Through Sanctions Act (CAATSA), arguing that, India should be allowed some freedom in continuing its heavy reliance on Russian defence equipment purchases to enable it to maintain its defence capabilities without facing US sanctions.

India's historical stance on becoming a part of Nato Plus In 2023, the US Parliament's Select Committee had recommended India's inclusion in Nato Plus, a security system that brings together NATO and five alliance nations, Australia, New Zealand, Japan, Israel, and South Korea to enhance Global Defence Cooperation.

However, Indian Foreign Minister, S Jaishankar had made it clear that India was not keen on joining Nato Plus & that India's strategy has always been to maintain its Strategic Autonomy, and not be a part of any power bloc compromising its independent decision-making.

Enhancing US-India partnership

Rubio's bill aims to strengthen the USIndia partnership across multiple dimensions, including defence, civil space, technology, medicine, and economic investments. It proposes that the US should support India in its efforts to secure its land and maritime borders, particularly against Chinese aggression.

The bill also calls for a comprehensive review of US aid to Pakistan, ensuring that it does not support terrorism against India.

India's growing defence imports from the US

In the past decade, India has significantly bolstered its defence capabilities through substantial imports from the US totalling nearly $ 25 billion. This growing defence trade between the two countries underscores the deepening of strategic ties between the two, and India's increasing reliance on advanced American military technology.

Epilogue

India and the United States enjoy a comprehensive global strategic partnership covering almost all areas of human endeavour, driven by shared democratic values, convergence of interests on a range of issues, and vibrant people-to-people contacts. There is also a regular high-level interaction between Prime Minister Shri Narendra Modi and the US President Joe Biden.

They had several bilateral meetings. PM Narendra Modi has also participated in virtual Summits convened by President Biden including Quad, I2U2, the Intergovernmental Group of India, Israel, the USA, and the UAE, and various other events. PM Modi made his first State Visit to the US from 21st to 23rd of June 2023 at the invitation of President Biden.

In addition to a bilateral meeting with President Biden, he addressed a Joint Meeting of US Congress and interacted with business and thought leaders. President Biden had also visited India from 8th to 10th of September 2023 to attend the G-20 Leaders' Summit.

Both had a bilateral meeting and co-hosted a group of G-20 leaders to accelerate investments in high-quality infrastructure projects and development of Economic Corridors through the India Middle East Europe Economic Connectivity Corridor and the Partnership for Global Infrastructure and Investment (PGI).

Various events mentioned underscore the importance the United States attaches to India under PM Narendra Modi. India during the past decade has achieved noticeable progress in different sectors including the defence sector, prompting the US to long for closer ties, particularly taking into consideration, India's utility in countering China in the Indo-Pacific.

The proposed US-India Defence Cooperation Act marks a significant development in the US-India relations. By proposing to treat India as a strategic ally on par with Japan, Israel, South Korea and NATO members, the bill underscores the importance of India in the Global Geopolitical Landscape. The bill also highlights the need for a robust partnership between the two countries to counter common threats, particularly from China and Pakistan by India.

The bill as it progresses through the US Congress, could therefore herald a new era of defence and strategic cooperation between the two largest democracies in the world.

The bill assumes importance as this is for the first time such an Indiacentric bill has been introduced in the US Congress that proposes to put India at the same level of that of its treaty ally, exempt it from CAATSA sanctions, and imposes sanctions on Pakistan for promoting terrorism in India, it has been opined.

https://timesofindia.indiatimes.com/blogs/truth-lies-and-politics/a-peep-into-the-proposed-us-india-defence-cooperation-act-of-the-united-states/

THE ECONOMIC TIMES

Wed, 28 Aug 2024

From Cold War to Hot Nukes: Could the US or China win a full-scale nuclear war?

A recent tabletop exercise conducted by the Centre for a New American Security (CNAS) in Washington examined the distressing possibility of a SinoAmerican nuclear war erupting in 2032.

Experts in the wargame emphasized the potential risks of a nuclear conflict stemming from a conventional war over Taiwan, with severe consequences for both nations. The scenario proposed that after 45 days of fierce combat over Taiwan, China might deploy "theatre" nuclear weapons, which are shorter-range and loweryield compared to strategic nuclear missiles aimed at cities.

These weapons could be used to coerce the United States by targeting crucial military assets, including Guam, Kwajalein Atoll, and an American aircraft carrier strike group. Authors Andrew Metrick, Philip Sheers, and Stacie Pettyjohn utilized two tabletop exercises (TTXs) named "Spike the Ball" and "Cold Stop" to explore nuclear coercion dynamics in this hypothetical 2032 conflict.

The scenarios tested China's potential use of nuclear weapons to either consolidate a marginal advantage or overcome a disadvantage. The findings underscored the complexity of managing nuclear escalation and the difficulties US decisionmakers could face.

From a capabilities standpoint, the US maintains a more extensive and advanced nuclear arsenal than China. The United States possesses a diversified triad of nuclear forces, comprising land-based intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and strategic bombers, providing significant second-strike capabilities to ensure effective retaliation after a nuclear attack.

China, traditionally maintaining a smaller nuclear force, has significantly expanded and modernized its arsenal in recent years. This development includes new mobile missile systems, enhanced submarine-launched ballistic missiles, and the construction of numerous hardened ICBM silos. By 2030, China is expected to have around 1,000 operational nuclear warheads.

"China is expanding its nuclear arsenal faster than any other country. But in nearly all of the nuclear-armed states there are either plans or a significant push to increase nuclear forces," said Hans M Kristensen, an associate senior fellow with SIPRI.

Although China's historical nuclear doctrine emphasized a no-first-use policy and assured deterrence strategy, recent expansion efforts suggest a shift towards a more flexible and potentially aggressive nuclear posture. This transition could involve adopting a launch-on-warning posture and integrating nonstrategic nuclear weapons into its conventional warfighting strategies.

The pathways to nuclear escalation between the US and China are complex and risky. A key finding of the study is that a protracted conflict, especially over Taiwan, could make nonstrategic nuclear weapon use more appealing to China. As conventional capabilities strain, China might

consider limited nuclear strikes to achieve favorable terms or coerce the US into de-escalating the conflict.

If China initiated limited nuclear strikes against US military targets or allied territories in the Indo-Pacific, the US would face a critical decision point. The study's TTXs indicate that US decision-makers might struggle to respond uniformly to such provocations. Some might advocate for a proportional nuclear response, while others could argue that US interests in Taiwan do not justify the risks of further nuclear escalation.

The military exercises suggested that China had advantages, with numerous American military targets in Asia, including naval assets and facilities. The American team faced difficulties, as many suitable targets for retaliation were on the Chinese mainland, raising the risk of escalating to full-scale nuclear war.

America lacked the necessary weapons to strike lower-risk targets, such as warships and Chinese bases in the South China Sea. America’s most advanced non-nuclear missiles would be depleted by day 45 of the conflict. Unlike Russia, the US no longer has nuclear-tipped anti-ship missiles, limiting its options. A new submarine-launched nuclear cruise missile is planned for the 2030s, but its use for deterrence would reveal submarine locations and strain naval resources. Another critical aspect is the role of US allies in the region.

The study points out that China could use nuclear coercion against US allies, such as Japan or Australia, to weaken the US alliance network. Such actions would challenge US resolve and potentially fragment the alliance, complicating unified resistance against Chinese aggression. The global impact of a nuclear war between the US and China would be catastrophic, with wide-reaching economic, political, and environmental consequences.

The very concept of "winning" such a conflict becomes meaningless due to the extensive destruction nuclear weapons cause. "The political ramifications of nonstrategic nuclear use are highly variable and unpredictable. While there is a clear operational utility to nuclear arms, their political impacts are far less certain, resulting in a wide range of different beliefs within the expert community," the report notes.

The report concludes with several key findings and recommendations for US policymakers: Educate senior US decision-makers: The report stresses the need for US leaders to understand the logic behind theater nuclear use and the limitations of current US responses. It recommends a high-level study group to explore these issues and develop strategies for addressing them.

Pursue dialogue with China: Despite the challenges, the report advocates for continued dialogue and confidence-building measures with China to manage the risks of nuclear escalation. Strengthen alliances: The report highlights the importance of US alliances in the Indo-Pacific and the need for detailed planning with key allies like Japan and Australia to prepare for potential nuclear coercion by China.

Improve US nuclear and conventional capabilities: The report calls for the United States to fully integrate nuclear considerations into its planning and exercises and to develop new capabilities that can effectively respond to nuclear coercion in a protracted conflict. Consider expanding theater nuclear capabilities: The report suggests that the United States may need to develop new theater

nuclear weapons, such as nuclear-tipped anti-ship missiles, to enhance its ability to manage nuclear escalation in the Indo-Pacific.

https://economictimes.indiatimes.com/news/defence/from-cold-war-to-hot-nukes-could-the-us-or-china-win-a-full-scale-nuclear-war/articleshow/112866296.cms

ThePrint

Wed, 28 Aug 2024

What are sonobuoys India is buying from US amid Chinese forays in Indian Ocean

Amid continued forays by Chinese submarines into the Indian Ocean, the Indian Navy will soon get a new set of American-made sonobuoys, a deal cleared during Defence Minister Rajnath Singh's four-day visit to the US last week.

The US announced that the State Department approved the sale of sonobuoys–a critical expendable system for anti-submarine warfare–for an estimated cost of $52.8 million to the Indian Navy which will be deployable from MH-60R helicopters.

While India already operates the American sonobuoys from the P-8I maritime surveillance and anti-submarine warfare aircraft, the fresh deal is for the MH-60 Romeo helicopters, also procured from the US.

The sonobuoys are a mix of active and passive capabilities, and are expendable, meaning they are meant for use only once.

Use of sonobuoys would make these aircraft more potent in carrying out anti-submarine warfare as they raise the probability of detection of enemy submarines.

There are three types of sonobuoys the Indian Navy is procuring: AN/SSQ-53G high-altitude anti-submarine warfare (HAASW) sonobuoys, the AN/SSQ-62F HAASW and the AN/SSQ-36.

What are sonobuoys

Sonobuoys are expendable, electro-mechanical acoustic sensors that relay underwater sounds emitted from ships and submarines.

They remain active for about 24 hours and help in detection, classification and prosecution of adversarial ships and submarines. A naval helicopter or fixed-wing aircraft generally drops sonobuoys in a pattern.

They are dropped in canisters and are deployed automatically upon impact with water.

An inflatable system with a radio transmitter remains on the surface for communication with the ship or aircraft tracking it while sensors descend below the surface to predetermined depth.

It then relays acoustic information back to those monitoring them. A group of sonobuoys deployed in a pattern can find out the exact location of the submarine which then can be tracked by other systems.

Some sonobuoys are designed to be deployed in passive mode and some in active mode. Active sonobuoys emit sound energy and receive the echo, based on which it transmits information back to the aircraft. Passive sonobuoys, on the other hand, only listen for sounds coming from ships or submarines. They then transmit the sound back to the aircraft.

https://theprint.in/defence/what-are-sonobuoys-india-is-buying-from-us-in-wake-of-chinese-forays-in-indian-ocean/2241929/

FINANCIAL EXPRESS
Read to Lead

Wed, 28 Aug 2024

Vivek Krishnan's Challenge to Indian Defence: A Call for Indigenous Firearms Excellence

India's decision to procure an additional 73,000 Sig-716 rifles from US manufacturer Sig Sauer Inc. has ignited a fierce debate over the country's defence procurement practices. At the forefront of this discussion is Vivek Krishnan, CEO of Bengaluru-based SSS Defence, who has voiced strong criticisms of the government's continued reliance on foreign-made weapons, particularly in light of the much-touted "Make-in-India" initiative. His challenge to the Indian military is not merely a critique but a call to action—a demand for fairness and a level playing field for indigenous manufacturers.

Krishnan's frustration was made clear in a detailed post on X (formerly Twitter), where he did not hold back in expressing his dissatisfaction. "We've heard from the buyer for a long time that 'we're not there on metallurgy' or 'our designs are behind time.' I say put an indigenous weapon of ours against a global benchmark in each caliber and test out. Make the results open like real serious armies do," Krishnan declared. His words underscore a growing sentiment within India's private defence sector—one of disappointment and determination.

The controversy surrounding the Indian Army's procurement practices is not new. The decision to order additional Sig-716 rifles follows a 2019 purchase of 72,400 rifles, which were distributed across the Indian armed forces. This latest order has only deepened concerns that the Indian government is sidelining domestic manufacturers in favour of foreign suppliers, thereby undermining the very essence of the "Make-in-India" campaign.

Krishnan's critique extends beyond just the latest procurement decision. He highlights a broader issue—the Indian government's apparent reluctance to trust and invest in its homegrown talent. "I wish the govt had not acquired more of these. A private solicitation and insistence on Indian design and content would've easily thrown up a contender or many in fact. Testing the same against the in-

service system would've been rather easy," he remarked. Krishnan's comments reflect the frustration of many Indian defence firms that feel stifled by the lack of opportunities to prove their capabilities.

Despite the setbacks, Krishnan's resolve remains unshaken. He emphasized that SSS Defence is committed to staying in the game and continuing its efforts to develop world-class weapons. "Now that it's done, what can we do right? Most others would disband. Not us @sssdefence. We made a decision a long while ago to be the most fearless dog in this business. We shall still have a weapon for each caliber and the user to us is still the man in uniform. We will be global," Krishnan asserted. His words resonate with the determination and grit that have come to define India's private defence sector.

Krishnan's statements also touch upon a critical issue—national pride. He questions the erosion of pride in Indian-made products, particularly in the defence sector. "We lost that pride a long while ago by building substandard weapons in the govt controlled space. If anything, the private sector is regaining some of the pride. But making good weapons & getting them accepted is a difficult task," he noted. Krishnan's observations highlight the challenges faced by Indian manufacturers in gaining acceptance, both domestically and globally.

However, Krishnan's message is not solely one of criticism. It is also a challenge to the Indian military and government to reconsider their approach to defence procurement. He advocates for a system where indigenous weapons are given a fair chance to prove their worth on the global stage. "Here's the challenge – we've heard from the buyer for a long time that 'we're not there on metallurgy' or 'our designs are behind time.' I say put an indigenous weapon of ours against a global benchmark in each caliber and test out. Make the results open like real serious armies do. Test protocols are clearly defined. It would be the best for both sides. How difficult is that?" Krishnan's challenge is a call for transparency and fairness, one that seeks to elevate the standards of India's defence procurement practices.

Bottomline

Vivek Krishnan's outspoken critique of the Indian government's defence procurement policies is more than just a complaint—it is a rallying cry for change. His challenge to the Indian military is a bold statement that calls for the recognition and support of India's indigenous defence capabilities. As India continues to navigate its path towards self-reliance in defence, voices like Krishnan's will be crucial in shaping a future where Indian-made weapons stand on equal footing with their global counterparts. The question now is whether the Indian government and military will rise to the challenge and embrace the potential within their own borders.

https://www.financialexpress.com/business/defence-vivek-krishnans-challenge-to-indian-defence-a-call-for-indigenous-firearms-excellence-3594830/

Press Information Bureau
Government of India

Ministry of Science & Technology

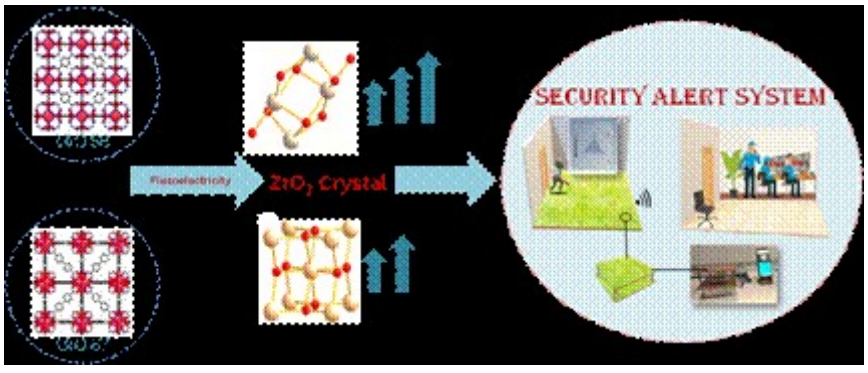
Wed, 28 Aug 2024

Piezoelectric polymer nanocomposite developed can be used for energy harvesting

A new piezoelectric polymer nanocomposite material developed can be useful for pressure sensing and energy harvesting applications.

Researchers from Centre for Nano and Soft Matter Sciences (CeNS), an autonomous institute of Department of Science and Technology, in collaboration with scientists from National Chemical Laboratory (CSIR-NCL), Pune have developed a security alert system based on piezoelectric polymer nanocomposite. This development was based on the finding that metal oxide nanomaterials with appropriate crystal structure and surface properties when used as fillers in a polymer composite lead to a significant enhancement in the piezoelectric response.

In today's world, energy creation and harvesting from readily available sources is crucial. Mechanical energy is a plentiful and easily accessible source that can be transformed to electrical energy through a variety of techniques, including contact electrification/triboelectric effect and piezoelectric effect. Flexible, portable, sustainable, and wearable sensors and energy harvesting devices are critical nowadays. Polymers and nanoparticles are playing a major role in present flexible electronic systems.



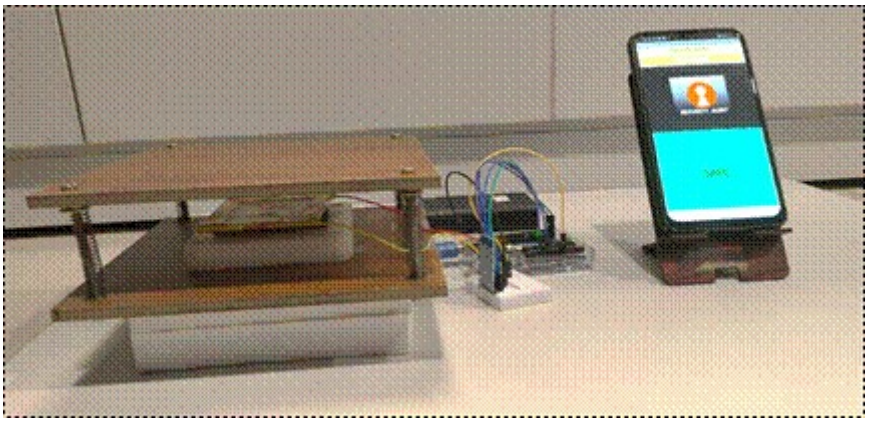
A team of scientists from Centre for Nano and Soft Matter Sciences (CeNS), Bangalore, and the National Chemical Laboratory (CSIR-NCL), Pune have successfully prepared a polymer nanocomposite material for pressure sensing and energy harvesting applications. The researchers synthesized two zirconia-based metal−organic frameworks (UiO-66 and UiO-67) which were converted to zirconia nanoparticles with exquisite control over their crystallographic phases namely monoclinic and tetragonal phases.

Polymer nanocomposite films were then fabricated by incorporating these nanoparticles with different crystal structures in to a well-known piezoelectric polymer, poly (vinylidene difluoride) (PVDF). The team of researchers evaluated the influence of varying crystal structures of zirconia nanoparticles on a piezoelectric energy-generating zirconia- PVDF composite and observed that the surface characteristics and crystal structure of the nanofillers have a significant impact in piezoelectric properties of polymer material.

Polymer nanocomposite with monoclinic zirconia nanoparticles produced from UiO-66 outperformed other derivatives and had greater piezoelectric output performance than pure polymer.

Furthermore, a laboratory-scale demonstration of a wireless, Bluetooth-based security alert system supported by an Android application was carried out, using the fabricated prototype as an energy-generating and security alert pavement unit.

The security pavement prototype was installed in a chamber. The piezoelectric pavement generated voltage due to footsteps (mechanical to electrical energy conversion), whenever an unwanted entry took place. This activated the security system, and the Bluetooth module sent the wireless communication to the concerned screen. In the system an android phone-based app was used to demonstrate this. Apart from a touch sensor the prototype can be also used for generating electrical energy from mechanical energy input.



Prototype of piezoelectric pavement used for security alert system

This study validates the PVDF-monoclinic ZrO2 nanoparticle nanocomposites will be an excellent value addition for flexible, durable energy generation and pressure-sensing applications. This work was recently published in American Chemical Society journal ACS-Applied Nano Material. This

study is part of an ongoing project “Materials for self powered energy generating and pressure sensing devices” funded by Department of Science and Technology under Inspire –faculty fellowship programme.

The methodical investigation and crystal structure modifications will undoubtedly open the door to a better understanding of the mechanism underlying the piezoelectric capabilities of polymer nanocomposites based on PVDF.

Publication details: DOI: https://doi.org/10.1021/acsanm.3c04730

For further details: Prof. B L V Prasad (Email: pl.bhagavatula[at]cens[dot]res[dot]in) or Dr. Subash C K (Email: cksubash[at]cens[dot]res[dot]in) can be contacted.

https://pib.gov.in/PressReleasePage.aspx?PRID=2049436

ANI
South Asia's Leading Multimedia News Agency

Thu, 29 Aug 2024

IIT Guwahati, ISRO Studies challenges existing theories by uncovering low polarisation in Galactic Ultraluminous X-ray pulsar

In a collective effort, the Indian Institute of Technology Guwahati and Indian Space Research Organisation researchers have made a groundbreaking discovery that challenges the existing theories of emitted radiation from astronomical bodies.

The team of researchers was studying the first known Galactic Ultraluminous X-ray emitting pulsar, Swift J0243.6+6124, which shows that the polarisation of X-rays emitted by this pulsar is significantly lower than expected, challenging existing theories.

Ultraluminous X-ray sources (ULXs) are bright X-ray emitters from nearby galaxies that were once thought to be intermediate-mass black holes. However, some of them are believed to be pulsars because they emit regular pulses. Swift J0243.6+6124 is such a pulsar emitter, detected by NASA's Swift spacecraft during a strong X-ray outburst in 2017-2018 and identified as the first Galactic ULX pulsar due to its exceptional X-ray brightness.

The ISRO and IITG scientists focused on this source during its active period in 2023, using NASA's Imaging X-ray Polarimetry Explorer (IXPE) to detect the polarised X-ray emission for the first time.

They also combined data from the Neutron Star Interior Composition ExploreR (NICER) and the Nuclear Spectroscopic Telescope Array (NuSTAR) missions. Through their research, the scientists found that the polarisation of X-rays from Swift J0243.6+6124 was much lower than expected, around 3 per cent.

Speaking on the impact of these research findings, one of the coauthors of the paper, Dr Anuj Nandi, said, "The IXPE mission's unique capabilities made it possible to detect low polarisation in X-rays from the first known Galactic ULXPs. Notably, this low polarisation appears to vary with the emitted pulses."

Speaking about the research, Prof. Santabrata Das, Department of Physics, IIT Guwahati, said, "The discovery of lower polarisation in the X-rays from Swift J0243.6+6124 is important because it makes us rethink how these stars work. Neutron stars in binary systems have very strong magnetic fields that direct matter from a nearby star to its poles. This process affects the X-rays we see because the magnetic field influences how the X-rays behave. The polarisation of X-rays plays a big role in this. The unexpected low polarisation means our current understanding of these magnetic fields and X-rays needs to be updated."

This surprising result challenges current theories and raises new questions for further exploration. It also opens new opportunities for studying similar X-ray sources within our galaxy and beyond.

The details of this research have been published in The Astrophysical Journal Letters, co-authored by Dr Santabrata Das, Dr Anuj Nandi, and researchers Seshadri Majumder, Rwitika Chatterjee, and Kiran M Jayasurya.

https://www.aninews.in/news/national/general-news/iit-guwahati-isro-studies-challenges-existing-theories-by-uncovering-low-polarisation-in-galactic-ultraluminous-x-ray-pulsar20240829011425/

ThePrint

Wed, 28 Aug 2024

UK scientists taught a ‘brain’ made of jelly to play Pong. It aced the video game in 20 mins

Biomedical engineers from the United Kingdom have created a polymer hydrogel—a jelly-like substance—which can be infused with electrical currents in order to make it function as memory and an “artificial brain”. With feedback from this artificial brain’s emergent memory that arises from the currents, the gel is able to accurately play Pong, a table tennis-themed video game wherein a brick hits a ball that bounces around.

The study, demonstrating how the jelly functions as an artificial brain, was published last week in the journal Cell.

Led by Vincent Strong of the University of Reading, the study said the blob is not biological and is stimulated by ions in its polymer chain structure which move when electrical current is applied. This causes the gel to swell up, and then slowly shrink. The deswelling process influences the subsequent motions, and continually rearranges ions inside the gel’s material, making the currents function as “artificial memory”.

For the gel to make motor movements based on previous movements or memory, the researchers connected the gel to a single-paddle ‘Pong’ simulation, and electrically stimulated the gel so that it could position the ball. The gel’s ions flowed to position the pong and paddle, leading to rallies.

The gel peaked in its ability in 20 minutes.

The study is a demonstration of how neural networks can potentially become artificial intelligence that is capable of complex processing.

What smart materials can do

As technology improves rapidly around the world, material science is making advances. Intelligent, responsive or “smart” materials are those that are designed to respond to external stimuli like electricity, moisture, temperature and light, among others. These materials are often used to make sensors, and are applied widely in biotechnology, medical and biomedical sciences, especially within the human body.

Hydrogels are a mix of solids and are often jelly-like polymers. They are mainly synthetic but can also be natural. Because electro-active polymer (EAP) hydrogels are responsive to electricity, they are often used in biological neural network research.

The authors wanted to go beyond a previous 2022 research, as part of which a team demonstrated that a blob of human brain cells in a Petri dish could be taught to play Pong. Known as DishBrain, it was used as a metric for artificial memory material study.

Previously, the authors of the new study had been able to demonstrate how EAP hydrogel could beat in sync with a human pacemaker, expanding and contracting, resembling an artificial heart. During the process, they noticed that the material retained its previous shape, and a “memory” of beating, even after the pacemaker was stopped.

How the artificial brain played ‘Pong’

Pong consists of one paddle and a ball that is bounced towards bricks against a wall using the paddle. Thus, electrical processes require two signals: one for the ball to make it move and another for the paddle.

The engineers developed a special interface and built an electrical adaptation of the game. They stimulated the gel with electrical pulses that indicated random positions the ball moved to.

The structure of the “smart material” gel then responded to the electrical stimuli by rearranging ions. As the ions moved around, they also dragged with them water molecules, which caused changes in water distribution in the gel, leading to localised deformation and structural change, causing the gel to physically move.

By recording ion concentrations before and after a response event, the amount of “memory” the material has can be understood.

With two pairs of electrodes, stimulation was applied to the gel while the conductivity of ions inside was simultaneously studied.

As the gel responded to the electrical signal, it “played” rallies with its virtual paddle.

Since the material deformed every time it performed the paddle function, the retained shape functioned as a memory of sorts, improving performance.

The authors stated that this form of memory is an "emergent" ability, something the material was not explicitly designed for. But the findings open up newer and interesting avenues of materials research for wider applications.

https://theprint.in/science/uk-scientists-taught-a-brain-made-of-jelly-to-play-pong-it-aced-the-video-game-in-20-mins/2242276/

ThePrint

Wed, 28 Aug 2024

Lab-grown food to fabrics, what's bio-manufacturing & how India's BioE3 policy could give it a boost

The government's new BioE3 (Biotechnology for Economy, Environment and Employment) policy, aimed at fostering high-performance biomanufacturing in the country, will enable India to lead the global bio-revolution, officials from the Department of Biotechnology (DBT) said.

The Cabinet approved the BioE3 policy Saturday.

Biomanufacturing is a process that uses biological systems of living organisms to produce commercially viable products. Biodegradable plastic, textiles, food etc, can be bio-manufactured to supplement the growing population demands.

For instance, to supplement the demand for animal products like milk and eggs, factory-produced milk and eggs can be an alternative. These products will carry the same nutritional value and will be able to feed large populations in the coming years. Similarly, bio-manufactured alternatives to silk, cotton etc will become the need of the hour as the demand for textile grows.

"Our present era is an opportune time to invest in the industrialisation of biology to promote sustainable and circular practices to address some of the critical societal issues such as climate change mitigation, food security and human health," a statement issued by the government read.

It added, "Building a resilient biomanufacturing ecosystem in our nation is important to accelerate cutting-edge innovations for developing bio-based products."

ThePrint breaks down the BioE3 policy—what it is, how it will be implemented, and why the industry is skeptical.

What is the policy?

Senior officials from the Department of Biotechnology—which falls under the Ministry of Science and Technology and will lead the implementation of the policy in various sectors with over 21 government ministries—explained that the policy has been proposed to drive innovative solutions for high-performance biomanufacturing; facilitate, scale-up and commercialise bio-based products; and intensify the country's entrepreneurial momentum.

The policy also promises to expand India's workforce, provide a surge in job creation and build a circular bio-economy by reducing, reusing and recycling waste materials, officials added.

"This is a bio-vision of 'Viksit Bharat'. We will be setting the stage for the future," a top DBT official told ThePrint.

The BioE3 policy will be implemented under six identified thematic verticals and augmented by bio-enablers called the 'Mulankars'.

These bio-enablers will be bio-based chemicals and enzymes; functional foods and smart proteins; precision biotherapeutics; climate resilient agriculture; carbon capture and its utilisation; and futuristic marine and space research. The work on these enablers will essentially involve the development of bio-artificial intelligence and biomanufacturing hubs and bio-foundries to augment discovery and translational research.

The bio-AI hubs will act as pre-commercial scale manufacturing facilities for researchers, start-ups, small and medium enterprises (SMEs) and industries, which will translate innovative R&D leads into viable commercial bio-based products.

On the other hand, biomanufacturing hubs will serve as centralised facilities that focus on producing, developing, and commercialising bio-based products through advanced manufacturing technologies and collaborative efforts, focusing on innovation and sustainability.

"The Mulankar bio-enablers will be used to bridge the gap between 'lab-to-pilot' and 'pre-commercial' scale manufacturing of commercially viable bio-based products," the policy document read.

Implementation

The DBT has already started working on various aspects of the policy.

Different labs under the aegis of DBT are experimenting with foods with specific nutritional value, biodegradable plastics, reusable textiles, and agricultural byproducts, which can be scaled commercially in the coming years.

With a probable increase in population size and the extreme impacts of climate change, countries will likely face an acute resource shortage in the coming years. In such a scenario, bio-manufactured, industry-made products will act as alternatives to bridge the gap between natural availability of resources and public demands.

Government estimates show that India's bio-economy will reach Rs 24,000 billion by 2030 and will account for around 5-6 percent share of India's GDP. The policy hopes that high-performance biomanufacturing will act as a strong catalyst towards this.

A scientist at one of the DBT-funded labs said that the implementation of the BioE3 policy will be done through a "public-private co-creation model", which will combine the expertise of the academia, start-ups, universities and the industry. It will not only strengthen inter-ministerial collaborations, but will also promote international cooperation.

Private players will be closely involved in the research and innovation stage. They will also be assisting the government in bringing the developed products to the market.

“It will focus on both discovery and innovation as well as bridging the gap for scale-up bio-based products identified based on their domestic demand and those holding a promise for import substitute,” the scientist said on the condition of anonymity.

The industry, while welcoming the policy, is sceptical about the implementation.

Dr Aldon Fernandes, head of operations at the Genei Laboratories, said that a robust ecosystem needs to be developed to encourage and empower start-ups to innovate and scale up operations so that products can be used commercially.

“If you look at the current situation of biomanufacturing and biotechnology in India, we are at least 10-15 years behind our counterparts in the US and UK. The government policies have a very top-down view. It has the interests of big companies. But innovations happen in start-ups and they are not provided with ample assistance and resources to go from start-ups to MSMEs (micro, small and medium enterprises). The state governments also need to be roped in for the better implementation of the policy,” said Fernandes.

https://theprint.in/science/lab-grown-food-to-fabrics-whats-bio-manufacturing-how-indias-bioe3-policy-could-give-it-a-boost/2241779/

Thu, 29 Aug 2024

NASA rocket discovers Earth’s global ambipolar electric field

The Earth has well-studied and well-known gravitational and geomagnetic fields. Now, a NASA suborbital rocket has measured a planet-wide ambipolar electric field, which has confirmed to be the driver of polar wind, a steady stream of charged particles from the Earth into space, that occurs from the poles of the Earth. This electric field propels particles into higher altitudes in the polar regions. How this electric field has influenced the evolution of the planet remains to be examined.

Scientists have suspected the existence of a global electric field surrounding the Earth since the 1960s, when spacecraft started detecting energetic particles streaming out into space from the polar regions. Scientists escaped some energetic particles from the Earth to leak into space, similar to steam evaporating from a pot of water. However, the particles were cold, and not hot, and were traveling at supersonic speeds, suggesting the presence of some kind of driving field.

New instrument detected the global electric field

The global ambipolar electric field is so weak, that technologies were just not sensitive enough to detect it. Scientists built an instrument capable of detecting this electric field, generated at a subatomic scale in 2016. The instrument was launched on board a suborbital rocket named Endurance, in honour of the ship that carried Ernest Shackleton on his 1914 voyage to Antarctica. The rocket was launched from the Svalbard range.

The observed changed in electrical potential was only half a volt, which is about as strong as a watch battery.

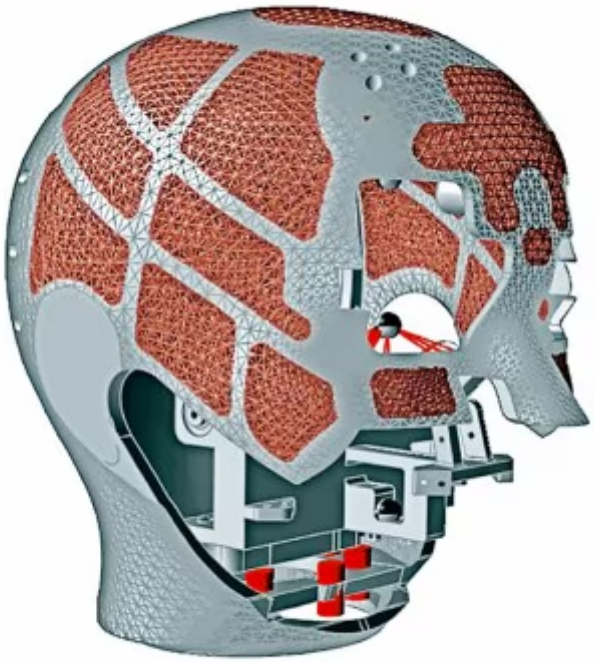
A paper describing the findings has been published in Nature. The electric field is called ambipolar because it has both polarities, driving particles both upwards and downwards through the atmosphere. Lead author of the paper, Glyn Collinson explains, “It’s like this conveyor belt, lifting the atmosphere up into space. Any planet with an atmosphere should have an ambipolar field. Now that we’ve finally measured it, we can begin learning how it’s shaped our planet as well as others over time.”

https://www.news9live.com/science/nasa-rocket-discovers-earths-global-ambipolar-electric-field-2674584

The Indian EXPRESS

Thu, 29 Aug 2024

How ISRO designed humanoid skull which will be used in Gaganyaan



Final skull design with lattice structures. Journal of Institution of Engineers, India

The Indian Space Research Organisation’s (ISRO’s) uncrewed Gaganyaan mission in 2025 will carry the female half humanoid Vyomitra (literally “space friend”). The design for Vyomitra’s skull, fashioned by ISRO’s Inertial Systems Unit in the Vikram Sarabhai Space Center in Thiruvananthapuram, Kerala, was finalised recently.

What are humanoids?

Humanoids (or half-humanoids) are robotic systems designed to resemble humans — Vyomitra comes with movable arms, a torso, a face, and a neck — and function autonomously in space.

In general, robotic systems are used to assist astronauts in performing repetitive and/or dangerous tasks in space, like cleaning of solar panels or fixing faulty equipment located outside the spacecraft. This protects astronauts, and allows them to work on the scientific mission at hand.

Why will ISRO send a humanoid to space next year?

Next year's mission is primarily designed to be a technology demonstration of the Vyomitra. It will see the half humanoid use its robotic arms to perform operations at the crew console, visually monitor various systems inside the crew module, and communicate with the Earth-based mission control team.

ISRO will evaluate the performance of the robot's technology to measure the likely impacts of space travel on human beings, ahead of India's first crewed mission planned for later in 2025.

How did ISRO design the humanoid skull for Vyomitra?

The recently-designed Vyomitra skull will house the key components of the robot.It has been made using an aluminium alloy (AlSi10Mg) known for its high flexibility, light weight, heat resistance, and mechanical properties. This alloy is commonly used for making automotive engines and aerospace components.

Crucially, the skull has been designed to be incredibly sturdy, capable of withstanding some extreme vibrational loads that are experienced during a rocket launch. The high strength of the aluminium alloy offers a yield strength of more than 220 MegaPascals (1 MPa = 1 million pascals). Yield strength refers to the maximum stress that can be applied to a material before it begins to deform permanently.

The humanoid skull model has dimensions of 200mm x 200mm, and weighs only 800 grams.

AlSi10Mg is also amenable to the Additive Manufacturing (or AM) technique. This is how the humanoid skull was created. AM enables easy induction of lattice structures, as incorporated in the humanoid skull design.

Importantly, it helps in significant reduction of the overall weight of the final product. Unlike conventional manufacturing techniques, AM follows a process in which a desired part or product is created in a layered manner, a commonly deployed mechanism in 3D printing.

Sturdy yet flexible, lightweight materials are often used to build payloads for space missions. This is because heavier the payload, more the fuel required to reach space, and larger the rocket needed.

https://indianexpress.com/article/explained/explained-sci-tech/how-isro-designed-humanoid-skull-which-will-be-used-in-gaganyaan-9538728/

Business Standard

Wed, 28 Aug 2024

EU, India announce joint funding initiative to foster research cooperation

The European Union and India's Council of Scientific and Industrial Research (CSIR) have launched a joint funding initiative for the Marie Sklodowska-Curie Actions (MSCA) Staff Exchanges, part of the EU's research and innovation programme, the Delegation of the European Union to India and Bhutan said on Wednesday.

This new partnership will promote a balanced researcher mobility and long-term collaborations.

"Through this scheme, CSIR will top up selected MSCA Staff Exchanges projects, enabling its institutes to engage in joint research projects with European and international partners and second their scientific and technical staff to European research organisations for knowledge sharing and research activities," the statement added.

This new partnership will strengthen research and innovation ties between Europe and India and drive forward scientific and technological progress by enhancing bilateral institutional cooperation, collaborative research and researcher exchanges in a plurilateral setting under Horizon Europe.

According to the official statement, through its Staff Exchanges scheme, the MSCA promote collaborative research, knowledge transfer and innovation by supporting the secondment of research and innovation staff within international consortia of organisations based in the EU, countries associated with Horizon Europe and third countries.

Following this, Ambassador of the European Union to India, Herve Delphin stated, "The Marie Sklodowska-Curie Actions Staff Exchanges co-funding initiative marks a watershed moment in EU-India research cooperation. This initiative comes in support of our political commitment to enhancing scientific excellence and people-to-people connectivity, as outlined in the EU-India Joint Roadmap 2025."

"Facilitating exchanges between our most brilliant researchers, will turbocharge joint innovation in all domains and pool our expertise to better address global challenges that impact our economies and societies," he added.

Director General, CSIR, N Kalaiselvi and Secretary DSIR, Government of India expressed their excitement for this collaboration with EU. He stressed that this "programme will not only boost the exchanges of our researchers but also forge stronger institutional ties."

"We are excited to join forces with the EU on this transformative initiative. The Marie Sklodowska-Curie Actions Staff Exchanges co-funding programme will not only boost the exchanges of our researchers but also forge stronger institutional ties and foster ground breaking research collaborations. We look forward to the profound impact this will have on science and technology in both regions," he said.

CSIR is India's premier research and development organisation, comprising 37 national laboratories and a dedicated team of over 8,000 scientific and technical staff.

The Marie Sklodowska-Curie Actions under Horizon Europe is the reference programme for doctoral education and postdoctoral training. They support researchers across any career stage, as well as doctoral training and postdoctoral fellowship programmes and collaborative research in all domains.

https://www.business-standard.com/external-affairs-defence-security/news/eu-india-announce-joint-funding-initiative-to-foster-research-cooperation-124082801144_1.html

DECCAN HERALD

Wed, 28 Aug 2024

CSIR-NIO holds workshop on harnessing potential of marine venom in Mumbai

The Goa-based CSIR-National Institute of Oceanography (CSIR-NIO) in collaboration with Hindi Vidya Prachar Samiti's Ramniranjan Jhunjhunwala College at Ghatkopar in Mumbai held a comprehensive workshop exploring the possible therapeutic applications of marine venom.

The workshop focused on identifying venomous marine organisms and developing strategies to manage their venom risks while promoting conservation. This effort helps safeguard marine biodiversity and coastal communities, underscoring the growing importance of marine venom research.

With its potential for breakthroughs in drug discovery, biotechnology, and environmental conservation, marine venom, which is found in creatures like jellyfish, sea anemones, and cone snails, offers a rich source of bioactive compounds for therapeutic applications.

Coordinated by Dr. Narsinh L. Thakur, Senior Principal Scientist & Head of Chemical Oceanography Division at CSIR-NIO, the event was part of the outreach activities of the CSIR-funded Niche Creating Project on Biodiversity & Chemodiversity of venomous marine organisms.

Dr. Usha Mukundan, the Director of Ramniranjan Jhunjhunwala College, talked about the significance of collaborative research in addressing societal challenges. Dr. Himanshu Dawda, Principal of RJ College, extended a warm welcome to all participants and dignitaries.

The opening address was given by Dr. Mandar Nanajkar, Principal Scientist & Head PME at CSIR-NIO, while Dr Thakur provided an overview of the workshop. The event was also graced by Sanika Gupte, Convener of the workshop & Head of Zoology Department and Dr. Geeta Joshi, Organizing Secretary.

The workshop attracted a diverse group of 150 academicians, scientists, research scholars, and postgraduate students from across Mumbai. Participants engaged in a series of insightful sessions led by experts.

Dr Thakur presented a comprehensive lecture on the biodiversity and chemodiversity of venomous marine organisms. An interactive session on the "Identification of Marine Venomous Organisms" was led by Dr. Mandar Nanajkar and Dr. Kalyan De, scientists from CSIR-NIO, Goa.

Additional notable sessions included talks on the venomous marine organisms of the Mumbai coast by Pradip Patade, Co-founder of Marine Life of Mumbai, and on the functional characterization of ion channel toxins from marine ribbon worms by Prof. Jan Tytgat, Head of the Laboratory for Toxicology and Pharmacology at KU Leuven, Belgium, who joined remotely.

An interactive session with the CSIR-NIO team, led by Mr. Venkat Krishnamurthy, Principal Technical Officer, and anchored by Dr. Geeta Joshi, provided participants with the opportunity to explore educational and research opportunities at CSIR-NIO.

https://www.deccanherald.com/science/csir-nio-holds-workshop-on-harnessing-potential-of-marine-venom-in-mumbai-3167278#google_vignette