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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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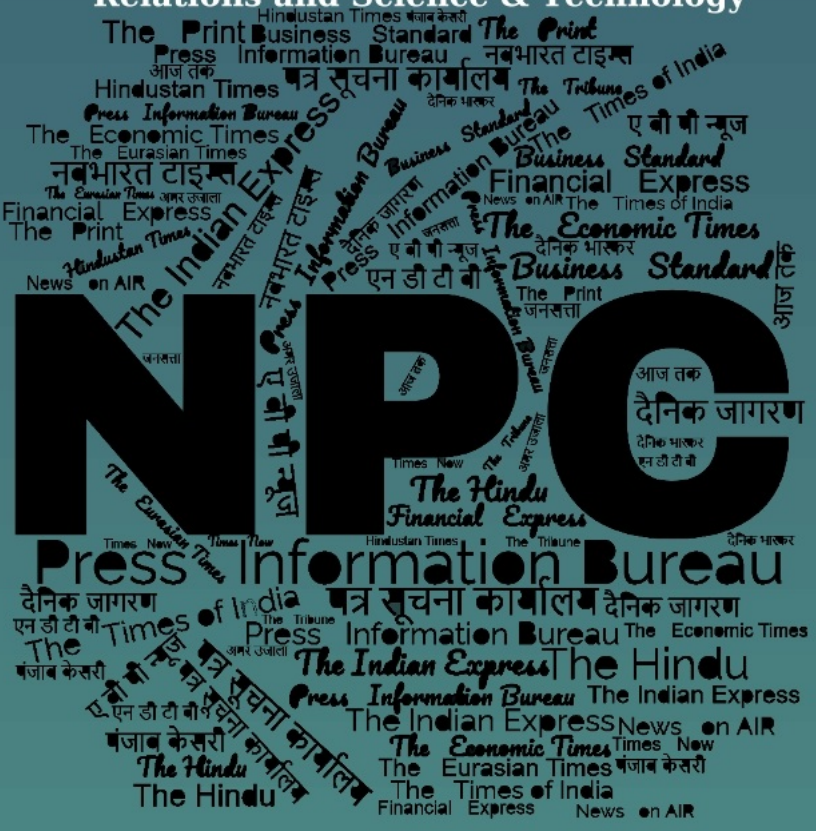

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DRDO News

Sun, 15 Dec 2024

जिस मिसाइल को बनाने में फेल हुआ अमेरिका, वैसी भारत ने बना ली 3-3 Missile, टेंशन में पाक-चीन

DRDO's Project Dhvani : सपने अक्सर उन्हीं के सच होते हैं, जो उन्हें पूरा करने के लिए निरंतर प्रयासरत रहते हैं. दुनियाभर में ताकत का प्रतीक माना जाने वाला अमेरिका भी आज हाइपरसॉनिक मिसाइल बनाने के लिए संघर्ष कर रहा है. लेकिन भारत जो कभी तकनीकी क्षमता में दुनिया की दौड़ में पीछे समझा जाता था, वही आज 3–3 महामिसाइल बनाकर पूरी दुनिया को चुनौती दे रहा है.

प्रोजेक्ट ध्वनि के तहत हाइपरसॉनिक मिसाइल

तकनीकी क्षमता में पीछे रहने वाले देश को आज दुनिया की अग्रणी सूची में गिना जाता है. इसका श्रेय भारत के वैज्ञानिकों का जुनून और रक्षा अनुसंधान और विकास संगठन (DRDO) की मेहनत को जाता है. DRDO के वैज्ञानिकों ने प्रोजेक्ट ध्वनि के तहत ऐसे हाइपरसॉनिक हथियार बनाए है, जिन्हें रोक पाना अब नामुमकिन है.

ध्वनि की गति से भी तेज होते हैं हाइपरसॉनिक मिसाइल

दरअसल, हाइपरसॉनिक मिसाइल उन हथियारों को कहा जाता है जो कि ध्वनि की गति से पांच गुणा तेज यानी 6,200 प्रति घंटे की रफ्तार से उड़कर अपने लक्ष्य पर हमला करते हैं. इनकी तेज रफ्तार और कम ऊंचाई पर उड़ने वाले खासियत के बदौलत ये हाइपरसॉनिक मिसाइल बेहद खतरनाक हो जाते हैं, जिसे कोई भी रडार पकड़ नहीं सकता है.

DRDO की यह हाइपरसॉनिक तकनीक पूरी तरह से स्वदेशी है. हाइपरसॉनिक मिसाइल रॉकेट इंजन के जरिए लॉन्च होता है और वातावरण में 6 से 7 Mach की गति से उड़ता है. वहीं, 1,500 किलोमीटर से अधिक की रेंज में पेलोड ले जाने में सक्षम है.

भारत के तीनों सेनाओं के लिए अत्यंत उपयोगी है हाइपरसॉनिक मिसाइल

ध्वनि की गति से 5 गुना तेज उड़ने, किसी भी रडार के पकड़ में न आने वाली खासियत से यह हाइपरसॉनिक मिसाइल भारत की तीनों सेना (थल सेना, नौसेना और वायु सेना) के लिए अत्यंत उपयोगी है. इसमें मिसाइल में स्क्रैमजेट इंजन का इस्तेमाल होता है, जो उड़ान के दौरान मिसाइल की गति को बनाए रखता है. भारत का ब्रह्मोस–2 इस हाइपरसॉनिक तकनीक का सटीक उदाहरण है. बता दें कि DRDO अभी तीन अलग–अलग डिजाइनों पर काम कर रहा है.

पाकिस्तान और चीन की अब खैर नहीं

उल्लेखनीय है कि भारत ने एक बार गलती से पाकिस्तान की ओर एक ब्रह्मोस मिसाइल दाग दी थी, जिसे पाकिस्तान ट्रैक नहीं कर पाया था. वहीं, अब ब्रह्मोस–2 और प्रोजेक्ट ध्वनि की हाइपरसॉनिक मिसाइलों के सामने पाकिस्तान तो क्या चीन और अमेरिका के डिफेंस सिस्टम भी पूरी तरह से बेबस नजर आ रहे हैं. जहां अमेरिका

अब तक अपने हाइपरसॉनिक प्रोग्राम को सफलता नहीं दिला पाया, वहीं भारत रूस के साथ मिलकर इस तकनीक में महारथ हासिल कर ली है.

https://www.abplive.com/news/world/india-drdo-project-dhvani-left-america-behind-in-hypersonic-missile-system-china-and-pakistan-in-danger-2842709

india.com

Sun, 15 Dec 2024

Big worry for Pakistan, China, Bangladesh, as India's DRDO develops hypersonic missile system that has ability to…

In a major boost for India's defence capabilities, Defense Research and Development Organization (DRDO) has developed not just one, but three state-of-the-art hypersonic missiles, which spell trouble for rival nations like China, Bangladesh, and Pakistan.

Notably, hypersonic missiles are considered the most advanced variants of missiles in the world today, and even military superpower like the United States struggles to manufacture them in bulk as they very expensive to make and require expertise.

DRDO's Project Dhvani

DRDO, the country's premier defense research and development establishment, has developed these advanced hypersonic missiles under its Project Dhvani program.

According to various reports, India's new Dhvani hypersonic missiles boast a range of over 1,500 kilometers, and can carry both conventional or nuclear warhead payloads. DRDO's hypersonic technology is completely indigenous, which is a remarkable achievement as it makes India one of handful nations in the world which have indigenous technological ability and resources to build these advanced missiles.

The DRDO is reportedly working on three different variants of the hypersonic missiles under Project Dhvani, and has used a scramjet engine — the same engine which powers the BrahMos-II supersonic cruise missile system.

DRDO's new hypersonic missiles will be inducted in all three of India's armed forces — Army, Navy, and Air Force– providing a major boost to their offensive and defensive capabilities.

Trouble for India's rivals

India's growing capabilities in developing its homegrown hypersonic missiles are a major challenge for its nations like Pakistan, China, and more recently, Bangladesh, as these missiles are almost impossible to track or intercept even with the most advanced air defense systems. Notably, India had once mistakenly fired a BrahMos supersonic missile towards Pakistan and Islamabad had not been able to track it at the time.

What are hypersonic missiles?

Hypersonic missiles, as the name suggests, can travel at hypersonic speeds of faster than Mach 5, and can reach speeds of up to Mach 25 or 25 times the speed of sound, which is 1,235 km/h. India's new hypersonic missiles can travel at speeds of around 6,200 km/h or Mach 6 speeds and

have the ability to strike enemy targets without being detected by radar. Hypersonic missiles have several advantages over their less advanced cousins, mainly due to their express speed, which makes them almost impossible to detect and intercept with even the most advanced missile defense systems that are used today.

Additionally, hypersonic missiles have the ability to maneuver during flight, making it impossible to predict their flight path. The only drawback is the high development cost and technological complexity required to build these advanced missiles.

https://www.india.com/news/india/india-hypersonic-missile-big-worry-for-pakistan-china-bangladesh-as-india-drdo-develops-hypersonic-missile-system-that-has-ability-to-strike-faster-than-sound-7467154/

NEWS NATION

Sun, 15 Dec 2024

DRDO ने उड़ाई दुनिया की नींद, बना रहा ऐसा हथियार–दुश्मनों पर बरसाएगा मौत, चीन ही नहीं रूस–अमेरिका भी हैरान!

डिफेंस रिसर्च एंड डेवलपमेंट ऑर्गेनाइजेशन (DRDO) देश की सैन्य ताकत को बढ़ाने में लगा हुआ है. DRDO एक से बढ़कर हथियार बना रहा है, जो किसी भी युद्ध की तस्वीर बदलने की क्षमता रखते हैं. अब डीआरडीओ ने एक ऐसे खतरनाक हथियार बनाने का ऐलान किया है, जो दुश्मनों पर सीधे मौत बरसाएगा. डीआरडीओ के इस हथियार से चीन तो छोड़िए भारत के मित्र देश रूस और अमेरिका भी हैरान हैं. तो चलिए जानते हैं कि DRDO आखिर किस तरह का हथियार बनाने जा रहा है.

डीआरडीओ ने मोबाइल मिसाइल डिफेंस सिस्टम बनाने का ऐलान किया है, वो इसे रूस के बुक मिसाइल सिस्टम (BUK Missile System) से प्रेरित होकर बना रहा है. DRDO के इस कदम को मिसाइल डिफेंस के क्षेत्र में ऐतिहासिक कदम बताया जा रहा है, जिससे चीन ही नहीं बल्कि रूस और अमेरिका जैसे शक्तिशाली देश भी हैरान हैं. DRDO का ये चलता फिरता मिसाइल सिस्टम दुश्मनों के हौसलों को तो पस्त करेगा ही बल्कि दुनिया में शक्ति संतुलन पर भी असर डालेगा.

मोबाइल मिसाइल डिफेंस सिस्टम की खूबियां

- मोबाइल मिसाइल डिफेंस सिस्टम वो रक्षा तकनीक होती है, जो दुश्मन की मिसाइलों को हवा में ही तबाह कर देती है.
- ये हाई क्वालिटी के रडार और डिटेक्शन सिस्टम की मदद से काम करता है, जिससे दुश्मन पर बड़ी ही सटिकता के साथ टारगेट किया जा सकता है.
- इसे बख्तरबंद वहानों के ऊपर लगाया जा सकेगा, जिस वजह से युद्ध के समय इसे बेहद कम समय में तैनात किया जा सकता है.
- इतना ही नहीं इस मिसाइल डिफेंस सिस्टम को एक जगह से दूसरी जगह शिफ्ट करना भी आसान होगा. यह सिस्टम कुछ घंटे में ही अपनी जगह बदल सकता है.
- ये सिस्टम 70 किलोमीटर से अधिक दूरी से दुश्मनों की मिसाइल को डिटेक्ट कर उन्हें नेस्तनाबूद कर देगा. इसमें स्वदेशी रडार प्रणाली का इस्तेमाल होगा.

https://www.newsnationtv.com/specials/explainer/drdo-new-weapon-drdo-is-making-indigenous-buk-missile-system-like-russia-china-america-shocked-8442578

THE NEW INDIAN EXPRESS

Fri, 13 Dec 2024

India rides high as missile with cutting-edge SFDR technology tested successfully

In yet another technological accomplishment, the Defence Research and Development Organisation (DRDO) successfully conducted the final round test of the solid fuel ducted ramjet (SFDR) propulsion based missile system from a defence facility off the Odisha coast on Friday.

The indigenously developed missile system was test-fired from a static launcher at the launching complex-III of the integrated test range (ITR). This was the third successful mission involving three different classes of missiles with indigenous technologies in a month.

Defence sources said the missile powered by SFDR met all mission objectives validating the advanced propulsion system and several other critical components. The missile flew in its intended trajectory at a speed exceeding Mach 3 (thrice the speed of sound) and neutralised the aerial target at precision.

"The data captured by a number of range instruments including telemetry, radar and electro optical tracking systems has confirmed its performance. This could be the last developmental trial of the system as the flawless mission indicates that the system is ready for induction," said a defence official.

India is said to be the first country to develop this cutting-edge SFDR technology which will help develop long range air-to-air missiles capable of neutralising fast moving aerial targets at a distance of over 300 km at supersonic speed.

The SFDR has been developed by the Defence Research and Development Laboratory (DRDL), Hyderabad, in collaboration with other DRDO laboratories like Research Centre Imarat (RCI), Hyderabad, and High Energy Materials Research Laboratory (HEMRL), Pune.

Equipped with an advanced propulsion system, nozzle-less booster and thrust modulation system, the missile has been uniquely designed to deliver specific impulse in ramjet mode.

"The SFDR-based missile is usually boosted into a high-altitude trajectory to simulate aircraft-launch conditions and then the nozzle-less booster guides the weapon towards its target. The system utilises a solid fuelled air-breathing ramjet engine, which takes up oxygen from the atmosphere during flight," said the official.

Last month, former DRDO chairman G Satheesh Reddy had told TNIE that SFDR will propel the country develop long range air-to-air missiles. Once fully developed, India will be the first country to possess such capability, he had said.

On November 16, India had successfully test-fired its first long-range hypersonic missile capable of destroying targets 1,500 km away. The 3,500 km range K-4 missile was successfully flight tested from the INS Arighaat submarine on November 27.

https://www.newindianexpress.com/nation/2024/Dec/13/india-rides-high-as-missile-with-cutting-edge-sfdr-technology-tested-successfully

THE ECONOMIC TIMES

Fri, 13 Dec 2024

DRDO, IAF discuss key aerospace projects in high level meeting

A high-level joint apex board meeting chaired by Defence Research and Development Organisation (DRDO) chairman Dr Samir V Kamat and co-chaired by Indian Air Force Vice Chief Air Marshal SP Dharkar today discussed key aerospace projects undertaken by the premiere research agency for the force. The meeting was held to review the status of the design and development of various projects of the Indian Air Force, DRDO officials said.

The meeting was attended by senior officials from the two organisations and important discussions were held on the status of key aerospace projects, the officials said. In a post on X, DRDO said that the meeting was attended by senior officials from the Indian Air Force, Ministry of Defence, DGAQA, CEMILAC and DRDO.

"A high level Joint Apex Board meeting chaired by SecyDDR&D and Chairman DRDO and co-chaired by VCAS was held at DRDO HQ to review the status of D&D of various projects of IAF," DRDO said.

https://economictimes.indiatimes.com/news/defence/drdo-iaf-discuss-key-aerospace-projects-in-high-level-meeting/articleshow/116292988.cms?from=mdr

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Sat, 14 Dec 2024

Strengthening Maritime Ties - Adm Dinesh K Tripathi, Chief Of The Naval Staff Embarks On An Official Visit To Indonesia

Adm Dinesh K Tripathi, Chief of the Naval Staff (CNS), is on a four day official visit to Indonesia from 15 to 18 Dec 24. This visit is part of ongoing efforts to further consolidate bilateral defence

relations between India and Indonesia, in line with the deepening Comprehensive Strategic Partnership, with a focus on enhancing Naval Cooperation.

During the visit, the CNS is scheduled to engage in bilateral discussions with top level Indonesian Government and defence officials including Lt Gen Sjafrie Sjamsoeddin (retd), Defence Minister of Indonesia, General Agus Subiyanto, Commander of Indonesian Armed Forces and Admiral Muhammad Ali, Chief of Staff of Indonesian Navy. The discussions are expected to cover a broad spectrum of defence cooperation areas, particularly maritime security, joint training initiatives, and exploring avenues for further strengthening the operational collaboration between the two navies.

The visit underscores the strong maritime relations between the two countries conforming to the shared vision of India-Indonesia Maritime Cooperation in the Indo Pacific.

The existing maritime cooperation between the two Navies encompasses a range of activities, including joint exercises, port visits, and training initiatives aimed at building capacity. Currently, the 43rd India-Indonesia Coordinated Patrol is underway (10-18 Dec) along the International Maritime Boundary Line (IMBL).

Admiral Dinesh K Tripathi's engagements in Indonesia are expected to further strengthen the bonds of friendship and cooperation between the two navies, ensuring enhanced collaboration in areas of mutual interest.

https://pib.gov.in/PressReleasePage.aspx?PRID=2084438

Press Information Bureau
Government of India

Ministry of Defence

Sun, 15 Dec 2024

Successful Conclusion Of Suprabal Janasewashree General Ashok Raj Sigdel's Visit To India: Strengthening Bilateral Ties And Achieving Key Milestones

The visit of Suprabal Janasewashree General Ashok Raj Sigdel, Chief of the Army Staff (COAS) of the Nepali Army, to India from 11th to 14th December 2024 has marked a significant milestone in strengthening the longstanding ties between the Nepali Army and the Indian Army. The visit, which saw key engagements between senior leaders and officials from both sides, has further strengthened the foundation for enhanced bilateral military cooperation, exchange, and collaboration in areas of strategic and defence interests.

During his visit, General Ashok Raj Sigdel engaged in a series of productive discussions with his Indian counterpart, General Upendra Dwivedi, Chief of the Army Staff of the Indian Army. The talks focused on ways to expand and deepen the cooperation between the two armies, with several key outcomes from the visit, that will further strengthen the bond between both nations.

Key Outcomes of the Visit:

- **High-Level Engagements.** The COAS, Nepali Army had important discussions with key Indian leaders, focused on enhancing bilateral defence cooperation and strategic alignment between India and Nepal:

- Shri Rajnath Singh, Hon'ble Defence Minister.
- Shri Ajit Doval, NSA.
- General Anil Chauhan, Chief of Defence Staff (CDS).
- Mr Rajesh Kumar Singh, Defence Secretary.
- Mr Vikram Misri, Foreign Secretary.
- **Honorary Generalship of the Indian Army.** The COAS of the Nepali Army was conferred with the Honorary Generalship of the Indian Army, symbolising the deep and enduring friendship between the two military forces.
- **Reviewing Officer for the Passing Out Parade at IMA Dehradun**. The COAS of the Nepali Army served as the Reviewing Officer at the Passing Out Parade at the Indian Military Academy, Dehradun. The event included the commissioning of two Nepali cadets, Officer Cadet Binod Bhatta and Officer Cadet Prabin Pandey.
- **Capacity Building and Capability Enhancement of Nepali Army.** The visit resulted in agreements aimed at strengthening the operational and technological capabilities of the Nepali Army, including enhancing the scope of joint exercises. As part of the defence cooperation, General Upendra Dwivedi, COAS announced the handing over of a target practice drone and medical equipment related to Field Hospital to the Nepali Army.
- **Visit to Indian Defence Industries (TASL & Bharat Forge)**. The COAS, Nepali Army visited key Indian defence industries, including Tata Aerospace & Defence Ltd (TASL) and Bharat Forge in Pune.
- **Scaling up of Bilateral Joint Exercise Surya Kiran:** The scope of bilateral joint military exercise **Surya Kiran**, which has been the flagship event between the two armies would be considered for enhancement after further mutual deliberations. This will further enhance the preparedness of both armies to undertake peacekeeping operations as both countries are one of the largest contributors to the UN PKO.
- **Medical Cooperation:** Assistance to the Nepali Army in the field of organ transplant, supply of life-saving drugs and sharing of experiences related to mental health of personnel and tele-medicine also came up for discussion.
- **Cultural Exchange between Young Officers and Cadets** was also discussed**.**
- **Guest Lectures by Senior Officers:** As part of the broader initiative to promote mutual learning, senior officers from both armies will undertake guest lectures at each other's military training establishments.
- **Visits by High-Ranking Officers:** The aspect of visits by high-ranking officers, including Principal Staff Officers (PSOs), to each other's military establishments, also came up for discussion.
- **Reciprocal participation of Nepali Army Band in Indian Army Day parade** was also discussed**.**
- **Cultural Visit to Ram Mandir, Ayodhya:** The COAS Nepali Army visited the Ram Mandir in Ayodhya, reflecting the cultural and spiritual bonds that complement the growing defence and strategic ties between India and Nepal.

General Ashok Raj Sigdel's visit has proven to be a resounding success in furthering the longstanding friendship between the Indian and Nepali Armies. The various initiatives outlined above reflect a shared commitment to strengthen deep rooted bond between the two Armies.

https://pib.gov.in/PressReleasePage.aspx?PRID=2084543

Press Information Bureau
Government of India

Ministry of Defence

Fri, 13 Dec 2024

General Ashok Raj Sigdel's Day Three In India Focuses On Strengthening Defence Collaboration

On the third day of his official visit to India, Suprabal Janasewashree General Ashok Raj Sigdel, Chief of the Army Staff (COAS) of the Nepali Army, continued his engagement to further solidify the defence cooperation between Nepal and India. General Sigdel's engagements today focused on visit to Indian Defence Industries in Pune followed by departure for Dehradun where he will Review the prestigious Passing Out Parade at the Indian Military Academy (IMA) on 14th December 2024. After arrival at Dehradun, General Sigdel attended Reviewing Officers' Dinner at the IMA.

The day began with General Sigdel visiting several key Defence Industry establishments including Tata Advanced Systems Ltd (TASL) and Bharat Forge. During the visit, he interacted with senior representatives from India's defence sector and exchanged ideas. The focus of these talks was on adaptation of technology by armies of both nations. The COAS, Nepali Army appreciated the "Atmanirbhar" initiatives of the Indian Army and contribution of Indian Defence Industries in this direction. He also observed a Static Equipment Display, where he was introduced to the latest, state-of-the-art equipment recently inducted into the Indian Army.

Following his engagements in Pune, General Sigdel departed for Dehradun, where he will Review the Passing Out Parade at IMA scheduled for 14th December 2024. On arrival at IMA, he attended Reviewing Officers' Dinner and interacted with the faculty and dignitaries.

As Reviewing Officer, General Sigdel will inspect the cadets who are about to begin their careers in the Indian Army. As part of this enduring partnership, two cadets from Nepal, Officer Cadet Binod Bhatta and Officer Cadet Prabin Pandey, will be commissioned during the parade, marking a moment of pride and shared tradition. Their commissioning underscores the deep-rooted military ties between India and Nepal, reflecting a commitment to mutual development and collaboration in defence and training.

Day three of General Ashok Raj Sigdel's visit to India has been marked by productive engagements aimed at enhancing defence cooperation, particularly in strengthening the bonds between the Nepali and Indian Armed Forces.

https://pib.gov.in/PressReleasePage.aspx?PRID=2084210

Press Information Bureau
Government of India

Ministry of Defence

Fri, 13 Dec 2024

Launch Of Seventh Missile Cum Ammunition (MCA) Barge, LSAM 14 (Yard 82)

Launch ceremony of seventh MCA Barge, LSAM 14 (Yard 82) was held on 12 Dec 24 at Mira Bhayandar, Maharashtra, west coast launch site of M/s SECON Engineering Projects Pvt Ltd Visakhapatnam. The launch ceremony was presided over by Cmde AKK Reddy, AGM (PR), ND (Mbi).

The contract for construction of eight Missile Cum Ammunition Barges was concluded with M/s SECON Engineering Projects Pvt Ltd, Visakhapatnam on 19 Feb 21, a MSME Shipyard. The Shipyard has indigenously designed these Barges in collaboration with an Indian Ship Design firm and subsequently successfully model tested at Naval Science and Technological Laboratory, Visakhapatnam to ensure seaworthiness. These barges have been built in accordance with relevant Naval Rules and Regulation of Indian Register of Shipping (IRS). The Shipyard has successfully delivered six of these Barges till date and are being utilized by IN for its operational evolutions by facilitating Transportation, Embarkation and Disembarkation of articles/ ammunition to IN platforms both alongside jetties and at outer harbours.

These Barges are proud flag bearers of “Make in India” and “Aatmanirbhar Bharat” initiatives of Government of India.

https://pib.gov.in/PressReleasePage.aspx?PRID=2084393

Press Information Bureau
Government of India

Ministry of Defence

Fri, 13 Dec 2024

Curtain Raiser - Commissioning Of Nirdeshak The Second Ship Of Survey Vessel (Large) Project

Raksha Rajya Mantri, Shri Sanjay Seth to Preside over the Commissioning Ceremony in Visakhapatnam

The Indian Navy is all set to commission its latest survey ship, Nirdeshak, at Naval Dockyard, Visakhapatnam, on 18 Dec 24. The ceremony will be presided over by the Hon’ble Raksha Rajya Mantri, Shri Sanjay Seth, as the Chief Guest. The ceremony will be hosted by the Flag Officer Commanding-in-Chief, Eastern Naval Command and attended by distinguished guests, including senior naval officials and GRSE representatives.

The ship, built at GRSE Kolkata, boasts over 80% indigenous content, reaffirming India's expertise in ship design and construction & Indian Navy's focus towards Aatmanirbharta. The 110-meter-long vessel, with a displacement of approximately 3800 tons, is powered by two diesel engines and is equipped with state-of-the-art Hydrographic and Oceanographic Survey Equipment.

Nirdeshak, the second ship of the Survey Vessel (Large) Project, is designed to conduct hydrographic surveys, aid in navigation, and support maritime operations. It represents the reincarnation of the erstwhile Nirdeshak, which served the Indian Navy with distinction for 32 years until its decommissioning on 19 Dec 2014.

With an endurance of over 25 days at sea and a top speed exceeding 18 knots, INS Nirdeshak is set to enhance India's Maritime capabilities. It will play a pivotal role in mapping the nation's waters and strengthening India's strategic presence in the Indian Ocean Region through its foreign cooperation surveys.

https://pib.gov.in/PressReleasePage.aspx?PRID=2084209

Press Information Bureau
Government of India

Ministry of Defence

Fri, 13 Dec 2024

HQIDS organises Workshop on Making India Self-Reliant in IC Chip Manufacturing

Considering the immense importance of IC manufacturing technology, Headquarters Integrated Defence Staff (IDS) organised a one-day Workshop on the theme "Energizing Semiconductor Ecosystem to Make India Self-Reliant in IC Chip Manufacturing" on 13th Dec 2024 at Manekshaw Centre, Delhi. The event was chaired by Vice Admiral Sanjay Vatsayan, Deputy Chief of IDS (Perspective Planning and Force Development). He propounded the need to develop an 'Indian Defence Semiconductor Policy', stating that 'India was on the cusp of a trans-formative change driven by demand and the Government's policy'.

The Workshop provided a platform for brainstorming critical issues pertaining to the theme, by bringing together experts form various Departments of the Ministry of Defence including HQ IDS, Services HQs, DRDO, the Ministry of Electronics and Information Technology (MEITY) along with Academia and Private Industries. Deliberations were held on India's journey from Material to Device Fabrication and towards arriving at a road map for making India Self-Reliant in design, development and manufacturing of IC Chips for military applications.

Integrated circuits are the backbone of modern technology, used in smartphones, computers, medical device, automotive systems, military systems, communication networks and critical infrastructure. In today's interconnected global economy, having a semiconductor manufacturing capability reduces dependency on foreign suppliers and minimizes the risk of supply chain disruptions. Eminent dignitaries including Dr Meena Mishra, OS & Director Solid State Physics Laboratory of DRDO and Mr Utpal Shah, Senior Vice President on behalf of Dr Randhir Thakur, MD & CEO Tata Electronics delivered special addresses.

https://pib.gov.in/PressReleasePage.aspx?PRID=2084318

THE ECONOMIC TIMES

Sat, 14 Dec 2024

India committed to free and inclusive Indo-Pacific: Army Chief Upendra Dwivedi

Army Chief Gen Upendra Dwivedi on Saturday reaffirmed India's commitment to regional stability and its pursuit for a free, open and inclusive Indo-Pacific. The Army Chief made the remarks while speaking virtually at a land forces summit that was held in Japan.

The summit brought together army chiefs and senior generals from several nations, including Japan, the United States, Australia, Indonesia, the Philippines and South Korea.

In his address, Gen Dwivedi delved into India's security and strategic perspective in the Indian Ocean Region and emphasised the importance of enhancing multinational defence cooperation.

He also underscored India's commitment to regional stability and its pursuit for a free, open and inclusive Indo-Pacific.The comments came amid growing global concerns over China's increasing military muscle-flexing in the Indo-Pacific region.

The summit provided a platform for exchanging ideas and perspectives on fostering greater multinational defence cooperation, aimed at ensuring peaceful coexistence in the Indo-Pacific region, Indian military officials said.

It was a significant opportunity for the participating nations to discuss and collaborate on shared security challenges and opportunities, they said.

https://economictimes.indiatimes.com/news/defence/india-committed-to-free-and-inclusive-indo-pacific-army-chief-upendra-dwivedi/articleshow/116321614.cms

THE ECONOMIC TIMES

Fri, 13 Dec 2024

India’s ambitious $6 billion submarine building plan stalls after sea tests

India’s $6 billion plan to build submarines has stalled because of contractor complaints over whether proper procedures were followed during tests at sea, delaying the navy’s efforts to bolster its capabilities as China expands its presence in the Indian Ocean.

The South Asian nation’s bid to build six conventional diesel-electric subs is now delayed by a year and further delays are expected, according to two senior officials direct aware of the situation who asked not be identified because the information isn’t public.

The development is more than a setback to India’s efforts to upgrade its military: The project also represents a test of Prime Minister Narendra Modi’s new defense acquisition policy. That policy requires foreign manufacturers to partner and provide local firms with technology to build military hardware in India, the world’s largest weapons importer.

German defense manufacturer ThyssenKrupp Marine Systems, in partnership with India's state shipyard Mazagon Dock Shipbuilders Ltd., and private shipbuilder Larsen & Toubro Ltd. with Spain's Navantia SA, are competing for the project.

About a half-dozen objections were raised by local contractors as the navy came close to picking a winner following crucial field trials in June of some of the key technologies needed for the subs, the people said, without naming the companies involved. Each objection will need to be investigated before the process can proceed.

Complaints ranged from alleged violations of proper procedures to unclear guidance about how to conduct the sea trials, the people said. The nature and timing of the complaints raise questions about whether contractors are trying to stall the project because they fear losing out, the people added.

The Indian Navy and Mazagon didn't respond to emails seeking comments.

"The field trial evaluation process is ongoing at the Ministry of Defense, it would be inappropriate for us to comment on it in any manner at this stage," L&T said in response to an email seeking details about the objections raised.

India's Ministry of Defense has formed a committee to evaluate both proposals and advise the government on a final decision, the people said.

Leading a country long dependent on Russian weapon systems, Modi not only wants to wean India's reliance on imported hardware but also build up the nation's ability to export weapons.

Nuclear-Powered Subs

There's little doubt that India's fleet is showing its age. Half of its conventional submarines — comprising about 16 Russian and German-made vessels — have undergone multiple upgrades and retrofits over the last three decades, but are now nearing the end of their productive lives.

The first of the six new submarines were scheduled to join the fleet by early next decade as the decommissioning of older Indian vessels gathered pace. India also plans to build two nuclear-powered submarines carrying conventional weapons.

A successful submarine construction program would also boost India's appeal as an alternate low-cost manufacturing hub for weapon platforms just as demand for military hardware soars in Europe on the back of Russia's war in Ukraine.

In addition, India has strengthened ties with several Western allies, including through the Quad bloc with the US, Australia and Japan, and is expected to play a key role in countering China's presence in the Indo-PacificGerman Chancellor Olaf Scholz and Spanish Prime Minister Pedro Sanchez visited India in quick succession in October, meetings in which defense issues — including Modi's efforts to build up domestic capacity — featured prominently, according to readouts of the separate talks.

"Both sides committed to supporting strategic exports to India and encouraged co-development, co-production and joint research between the respective defence industries," India and Germany said in a joint statement Oct. 25.

https://economictimes.indiatimes.com/news/defence/indias-ambitious-6-billion-submarine-building-plan-stalls-after-sea-tests/articleshow/116282285.cms

THE ECONOMIC TIMES

Fri, 13 Dec 2024

India’s Indo-Pacific Strategy: A vision for peace, prosperity, and partnership

India aims to anchor its Indo-Pacific strategy around the 3 Ps—peace, prosperity, and partnership, prioritising cooperation over rivalry.

This was the key focus as the CUTS International, a prominent forty-year old global public policy research and advocacy group, hosted a webinar titled "India’s Indo-Pacific Strategy". The event brought together a distinguished pool of experts who discussed the approach and strategic importance for India to have an Indo-Pacific strategy laid out.

“From the Pacific Ocean, our shores in the Indian Ocean to the East Coast of Africa, India aims to anchor its strategy around the 3 Ps—peace, prosperity, and partnership,” noted Purushendra Singh, Assistant Director at CUTS International, setting the tone for the discussion by acknowledging that this century belongs to Asia and highlighting the essence of India's Indo-Pacific strategy, which should reflect the vision of Viksit Bharat—a developed India contributing to regional and global growth. Admiral Sunil Lanba, former Chief of Indian Naval Staff, elaborated that there has been reduction in west’s influence in this region which has created a vacuum.

“India's strategic location and influence in this vital region act as a key player for the Sea Lines of Communication (SLOCs) linking the East and West”, India as a potential player should fill this gap.

Lanba also acknowledged the undeniable shift of global focus toward the Indo-Pacific, making its most important region noting its importance economically, strategically, diplomatically and technologically. Capt. Sarabjeet S. Parmar (Retd.), Distinguished Fellow at the United Service Institution of India, emphasised the increasing criticality of India’s role in the Indian Ocean region as the U.S. shifts its focus toward West Asia.

He further noted that India’s involvement is crucial for the stability of global supply chains, security and partnership. With President Trump returning to the White House, “India’s role in the Indo-Pacific is poised to expand, particularly in defence, technology, and regional stability”.

He highlighted underwater domain awareness as a newly emerging and significant area of focus. This view was further supported by the next speaker from Japan who mentioned that both Japan and India are expected to play a larger role together during the Trump 2.0 administration. R. Admiral (Retd.) Katsuya Yamamoto, Program Director and Senior Research Fellow at the Sasakawa Peace Foundation, Japan, shed light on the security challenges in the region, particularly in the South China Sea. He called out China’s use of fishermen as a militia to harass neighbouring countries, calling it an unacceptable practice in a world that values human dignity and international law.

Dr. Pooja Bhatt, Associate Professor at the Jindal School of International Affairs, discussed India’s need for an evolving Indo-Pacific strategy, which is likely to be less influenced by the west and more driven by India’s own interest and vision of this region. She further mentioned the shift from a defence-centric to a broader approach, encompassing issues like clean energy, sustainable development, and regional cooperation as the need of the hour.

Dr. Monish Tourangbam, Director at the Kalinga Institute of Indo-Pacific Studies, spoke on India's broader approach to Southeast Asia, emphasising the importance of deeper connections and new opportunities for business, people, and growth. He also highlighted the strategic significance of India's Northeast, and connectivity in Bangladesh and Myanmar as key links between regional and global aspirations in the larger Indo-Pacific security landscape.

Among the discussions, the increasing importance of the southern Indian Ocean and Oceania in particular, and role of vulnerable yet important island nations in the confluence of two seas were also discussed. The webinar suggested a strategic framework prioritising cooperation over rivalry. The guiding principles of peace, prosperity, and partnership were proposed for India's engagement in the Indo-Pacific.

https://economictimes.indiatimes.com/news/defence/indias-indo-pacific-strategy-a-vision-for-peace-prosperity-and-partnership/articleshow/116274642.cms

THE ECONOMIC TIMES

Fri, 13 Dec 2024

Companies from UK, Italy and Japan to form joint venture for new fighter jet

The three companies building a next generation fighter jet for the UK, Italy and Japan revealed Friday that they are forming a joint venture to deliver the aircraft. The triangular-shaped jets will have supersonic capability and cutting-edge technology. Pilots will be able to use virtual reality in the aircraft's digital cockpit, with vital information displayed directly in front of them.

The aim is that they will take to the skies by 2035.Under the agreement, Britain's BAE Systems, Italy's Leonardo and Japan Aircraft Industrial Enhancement will each own a third of the new joint venture, which will be subject to regulatory approvals.

"This agreement is the result of an intensive journey made possible by pooling our mutual and shared experiences," said Roberto Cingolani, Leonardo's chief executive.

The headquarters for the Global Combat Air Programme, or GCAP, will be the UK, but operations will take place in each of the partner nations. Under the terms of the agreement, the first chief executive will come from Italy.

"The new business will bring together the significant strengths and expertise of the companies involved to create an innovative organisation that will lead the way in developing a next generation combat air system, creating long-term, high value and skilled jobs across the partner nations for decades to come," said Charles Woodburn, BAE Systems' chief executive.

Kimito Nakae, president of JAIEC, acknowledged that the way ahead "might not always be simple and straightforward," but that "through continuing the strong spirit of trilateral cooperation and collaboration that we have fostered up to this point, we will not only deliver the GCAP on time but also at a level that exceeds all of our expectations."

https://economictimes.indiatimes.com/news/defence/companies-from-uk-italy-and-japan-to-form-joint-venture-for-new-fighter-jet/articleshow/116294774.cms

THE ECONOMIC TIMES

Fri, 13 Dec 2024

Indian forces will be going to all patrolling points in Depsang, Eastward Limit

External affairs minister S Jaishankar on Friday said that Indian security forces would be going to all patrolling points in Depsang in Ladakh and the eastward limit, which have historically been India's patrolling limit.

He informed the Lok Sabha during question hour that the last of the disengagement agreement with China was related to Depsang and Demchok.On Bangladesh, Jaishankar hoped that "both India and Bangladesh will settle down to a mutually beneficial and stable relationship".

"With regard to the treatment of minorities in Bangladesh, it has been a source of concern... It is our expectation that, in its own interest, Bangladesh would take measures so that its minorities are safe," he added.

On Pak, he said like any other neighbour, India would like to have good ties. "The ball is in Pakistan's court. Regarding trade, I think some of the disruptions...happened because of decisions by...Pakistan in 2019... We have an agnostic position on this."

https://economictimes.indiatimes.com/news/defence/indian-forces-will-be-going-to-all-patrolling-points-in-depsang-eastward-limit/articleshow/116298435.cms

THE ECONOMIC TIMES

Fri, 13 Dec 2024

Russia has invented a missile that may change the way wars are fought

Russian President Vladimir Putin has touted the Oreshnik hypersonic missile as a breakthrough that could significantly alter global defence strategies.

Speaking from a Kremlin-released transcript, he said, “What we need now is not to improve the nuclear doctrine, but the Oreshnik, because enough of these modern weapons systems puts us on the verge of virtually eliminating the need to employ nuclear weapons.”

This missile, reportedly capable of carrying both conventional and nuclear warheads, was deployed for the first time during an attack in Dnipro, Ukraine, on 21 November.

The Oreshnik’s Capabilities: Speed and Precision

The Oreshnik missile is described as a cutting-edge intermediate-range ballistic missile (IRBM), travelling at speeds up to Mach 11—more than ten times the speed of sound. According to General Sergei Karakayev, head of Russia’s Strategic Missile Forces, it has a range sufficient to hit any target in Europe.

The missile’s multiple independently targetable reentry vehicle (MIRV) configuration allows it to carry six warheads, each releasing six submunitions. This setup gives it the capacity to target multiple sites simultaneously with devastating precision.

Its destructive potential lies not just in its explosive payloads but also in its kinetic energy. Video footage of the Dnipro attack showed fiery descents of warheads creating significant shockwaves, despite reports that the warheads carried no explosives. Ukrainian authorities said the missile was launched from Russia's Kapustin Yar test range near the Caspian Sea.

First Use in Ukraine: A Warning to the West

The Kremlin described the Dnipro attack as a "warning" to the West after the United States and the United Kingdom permitted Ukraine to fire missiles into Russian territory. While the missile hit a defence factory in Dnipro, Ukrainian officials noted limited damage and casualties. Ukrainian Defence Ministry sources said the missile's submunitions appeared unarmed, likely intended as a show of force.

Putin has often linked such strikes to broader geopolitical tensions, stating, “We are behaving quite carefully in all directions, I would even say, with restraint,” during a press briefing.

Marina Akhmedova, a Russian state journalist, reiterated the Kremlin’s stance, warning, “If NATO ballistic missiles fly from Ukraine to Russia, Ukraine will be the first to be wiped out.”

What are Russia's other Hypersonic Missiles

The Oreshnik is reportedly a derivative of the RS-26 Rubezh and incorporates components of the Bulava missile, developed in the 1990s. Its hypersonic speed, mid-flight manoeuvrability, and multiple warheads make it particularly hard to intercept, even with advanced missile defence systems.

Russia’s use of advanced missile technology isn’t new. Over the course of the Ukraine conflict, it has deployed subsonic cruise missiles, Iskander short-range ballistic missiles, and Kinzhal hypersonic missiles, each with varying degrees of success. However, none have combined the range, speed, and payload capabilities of the Oreshnik.

Hypersonic missiles have raised global concerns due to their precision and ability to evade traditional missile defence systems. The United States and Russia withdrew from the Intermediate-Range Nuclear Forces (INF) Treaty in 2019, further accelerating the development of these weapons.

Russia’s updated nuclear doctrine, signed into law by Putin in November, lowers the threshold for nuclear retaliation. It now permits nuclear responses to significant conventional attacks on Russia or its allies.

“This ensures an understanding by a potential adversary of the inevitability of retaliation in the event of aggression against the Russian Federation and its allies,” the doctrine states.

The doctrine aligns with Putin’s claim that conventional missiles like the Oreshnik could be as impactful as nuclear strikes. The Kremlin argues this provides a credible deterrent against NATO’s growing involvement in Ukraine. Military Watch Magazine speculated that Russia could produce up to 300 Oreshnik missiles annually, though Ukrainian analysts dispute this as "deliberate disinformation" intended to spread fear in Western societies.

International Reactions: A Mixed Response

Western officials remain sceptical about the missile’s battlefield impact. As told to Newsweek, Sabrina Singh, Deputy Pentagon Press Secretary, stated, “Should Russia choose to launch this type

of missile, it’s not going to be a game changer on the battlefield. It’s just yet another attempt to inflict harm and casualties in Ukraine.”

Experts like John Erath of the Centre for Arms Control and Proliferation view Russia’s hypersonic developments as “intimidation tactics,” aimed at undermining Western support for Ukraine. A Royal United Services Institute commentary noted that while the Oreshnik enhances Russia’s tactical options, it doesn’t fundamentally alter the strategic balance. “Critical red lines have not been crossed by either side,” the commentary added, highlighting that NATO and Russia have refrained from direct confrontations.

The Oreshnik missile showcases Russia’s technological advancements and its evolving military strategy. While its deployment in Ukraine serves as a potent demonstration of its capabilities, the broader implications remain uncertain. As tensions escalate between Russia and NATO, the international community must navigate the challenges posed by hypersonic weapons and their potential to reshape modern warfare.

https://economictimes.indiatimes.com/news/defence/russia-has-invented-a-missile-that-may-change-the-way-wars-are-fought/articleshow/116284228.cms

THE WEEK

Fri, 13 Dec 2024

Navy Commander-in-Chief declares Russian naval superiority amid Arctic power struggle

Navy Commander-in-Chief Admiral Alexander Moiseyev claimed that Russia's naval nuclear forces have been completely upgraded, and added that nuclear forces have been, and will continue to serve as a security guarantee for the country at the international level.

He further said modernisation remains a key priority for Russia. He reiterated that the condition and combat readiness of Russia's modernised naval strategic nuclear forces are at an exceptional level.

Moiseyev noted that the presence of such a powerful force in the region should "enhance the sense of responsibility among all countries in the Arctic, primarily those who seek to escalate tensions in the region."

He observed that the NATO countries have changed their approach to drills in the Arctic—conducting offensive rather than defensive exercises. Driven by several factors, including shipping routes and access to untapped natural resources, there is an intense power struggle happening in the Arctic region among major global powers, primarily the US, Russia, and China. With an estimated 64 vessels, Russia has one of the largest submarine fleets in the world. According to the US Congressional Research Service, Russia remains the US rival with the most capable and diverse nuclear forces.

"Today it is unique in the combination of strategic and non-strategic nuclear forces it fields that enables nuclear employment ranging from large-scale attacks on the (US) homeland to limited strikes in support of a regional military campaign."

https://www.theweek.in/news/defence/2024/12/13/navy-commander-in-chief-declares-russian-naval-superiority-amid-arctic-power-struggle.html

The Indian EXPRESS

Fri, 13 Dec 2024

In race for Indian Navy submarine contract, Germany's TKMS pitches for naval manufacturing and export hub in India

German naval shipbuilder ThyssenKrupp Marine Systems (TKMS) sees significant potential for India to emerge as a naval vessel manufacturing hub due to its substantial cost advantage vis-à-vis Europe and a resurgence in demand for naval defence equipment in the wake of the Russia-Ukraine war and other recent geopolitical conflicts. The company is also pitching the proposition as a strategic collaboration between Germany and India to limit China's influence in naval equipment supplies, particularly in the Indo-Pacific.

According to TKMS CEO Oliver Burkhard, the German company would want to build submarines and other naval vessels in India for exports jointly with its partner — the state-owned Mazagon Dock Shipbuilders (MDL) — if the combine bags the contract for manufacturing six new diesel-electric submarines from the Indian Navy. TKMS and MDL are competing with the combine of Larsen & Toubro (L&T) and Spain's Navantia for the P75 (I) (Project 75 India) submarines.

The much-delayed submarine acquisition project is understood to be in an advanced stage with some key decisions likely over the next few months. TKMS's pitch for developing a joint manufacturing and export hub in India may be seen as part of its effort to win the contract jointly with MDL. The company has communicated its manufacturing hub offer to the relevant authorities in the Indian government.

Burkhard said that TKMS estimates that manufacturing submarines in India would cost less than half of what it costs in Germany — where wages are much higher — which is a big advantage when it comes to catering to more price-sensitive defence equipment buyers in Southeast Asia and even South America. The other reason that TKMS is interested in manufacturing in India is that there is no additional capacity available in its home country and much of Europe as demand for defence equipment jumped in that region following Russia's invasion of Ukraine.

Not just in Europe, but a number of countries in the other parts of the world are also looking to augment or modernise their defence equipment — including naval assets — which is a significant business as well as strategic opportunity for TKMS and MDL, and also for Germany and India, TKMS India CEO Khalil Rahman said. According to him, China can jump on this opportunity and offer naval equipment to other countries at "friendship prices", and such sales would be undesirable for India as well as Germany from a geostrategic perspective.

While initially such a collaboration could be limited to building submarines in India, TKMS is keen to expand its footprint in the country and would consider jointly building other naval assets like surface boats and autonomous marine vehicles. On being asked if MDL is the only Indian partner that TKMS is looking to work with to expand its India footprint, Burkhard said that while the Indian PSU would "ideally be the first choice", the German company is not averse to the idea of partnering with other players in India.

https://indianexpress.com/article/business/in-race-for-indian-navy-submarine-contract-germanys-tkms-pitches-for-naval-manufacturing-and-export-hub-in-india-9722746/lite/

THE HINDU

Sun, 15 Dec 2024

Morocco welcomes Indian defence companies to set up shop

Morocco is emerging as a springboard for India's ambitions to expand its footprint in Africa for defence exports. Pitching Morocco as a gateway to Africa and Europe for Indian companies, Abdeltif Loudyi, Morocco's Minister Delegate to the Head of the Government, and In-Charge of Administration of National Defence, said they would like "to offer state-of-the-art environment, zero bureaucracy, and profitability for Indian defence companies".

"Morocco and India enjoy excellent bilateral relations based on mutual respect, and have every potential to pursue their positive momentum in various fields, including defence," Mr. Loudyi said, addressing the India-Morocco defence industry seminar held in Rabat on December 9-10, and jointly organised by the Defence Ministries of the two countries, the Indian Embassy in Morocco, and the Society of Indian Defence Manufacturers. "We want you in Morocco; we will support you," he said.

This seminar can only strengthen the historic ties between Morocco and India, two emerging economies with growing strategic cooperation in the defense sector, the Minister observed. "It capitalises on the Indian government's 'Make in India' initiative, which aims to strengthen national production capacities while promoting international collaborations," he said.

Recently, the Tata Group announced plans to set up its first defence manufacturing facility in that country, also India's first. Referring to this, Mr. Loudyi said the launch of the strategic defence industry project placed Morocco at the centre of attention as a defence development hub, and opened up promising prospects for investors interested in the defence and high-tech sectors, as demonstrated by the new strategic partnership signed between the National Defense Administration and the Tata Group, aimed at local production of the WhAP 8x8 ground combat vehicle.

"The partnership between ADN and TASM is part of a broader drive to develop Morocco's defense industry, with the aim of gradually building strategic autonomy," he observed.

Morocco has adopted a new legal framework governing defense industry activity, opting for a gradual approach based on promoting an attractive investment climate, incentives for international investors, and the creation of an industrial ecosystem around the defense industry sector, the Minister said.

"In addition, Morocco's influence in Africa and the Middle East, its maritime and air connectivity, and its modern infrastructure are proven assets that make it a regional and even global export platform for investors," he added.Morocco has Free Trade Agreements (FTAs) with 90 countries across Africa and Europe, which officials said would facilitate access.

In this context, the Moroccan Minister said the instructions of His Majesty the King, the Supreme Commander and the Chief of the General Staff of the Royal Armed Forces of Morocco included the defence industry in the drive to accelerate their country's industrialisation.

The seminar offered opportunities for joint ventures, technology sharing, and procurement potential for Indian defence companies in Morocco, officials said. One of the objectives was also to understand Morocco's specific defence requirements, particularly in armoured personnel carriers and other critical assets, and provide tailored solutions through Indian defence manufacturing expertise to support their vision for defence modernisation, one official said.

“Presentations by Moroccan officials emphasised the country’s investor-friendly climate; free zones, including the Atlantic Free Zone; and incentives for foreign investments. The Indian delegation also visited the Atlantic Free Zone, gaining a comprehensive understanding of Morocco’s industrial landscape,” the Society of Indian Defence Manufacturers said on social media platform X.

Day 2 of the India- Morocco Defence Industry Seminar was marked by meaningful discussions and engagements.

The Mr. Loudyi’s 2018 visit to India saw focus on hydrography, peacekeeping, telemedicine, information technology, counterterrorism, and counterinsurgency. Key agreements included Memorandums of Understanding on cyber security and peaceful uses of outer space, strengthening cooperation in advanced technologies, and defence.

Morocco’s defence budget is 5% of its GDP.Bilateral trade between India and Morocco was approximately $4.1 billion in 2023, with major exports from India including refined petroleum, vehicles, and various chemicals. India is the largest buyer of phosphate from Morocco.

https://www.thehindu.com/news/national/morocco-welcomes-indian-defence-companies-to-set-up-shop/article68989242.ece

Business Standard

Sat, 14 Dec 2024

BRO steps up India-Myanmar border fencing work near Manipur's Moreh

Border Roads Organisation (BRO) has stepped up India-Myanmar border fencing work near Moreh town in Manipur's Tengnoupal district, an official said on Saturday.

India shares a 1,643 km border with Myanmar of which 398 km is in Manipur.

"BRO has commenced work of erecting the border fencing along the India-Myanmar border in general area of Moreh in Tengnoupal district," PRO Defence Kohima told PTI over the phone.

"Work has just commenced... Things are being done in a phase-wise. Only when the project reach a substantial length, we will be able to give more details on the project" the PRO said.

The work is undertaken by Project Sewak which is looking after road construction in Nagaland and Manipur. Its headquarters is based in Dimapur, the officer said.

Only 10 km of the international border with Myanmar is fenced near Moreh in Manipur.

The entire 1,643 km porous India-Myanmar border, known for the smuggling of arms, ammunition and narcotics, will be fenced at a cost of Rs 31,000 crore.

https://www.business-standard.com/external-affairs-defence-security/news/bro-steps-up-india-myanmar-border-fencing-work-near-manipur-s-moreh-124121400333_1.html

The Tribune

Sun, 15 Dec 2024

First batch of Air Force's weapon systems branch commissioned

The first batch of officers for the newly created Weapon Systems Branch of the Indian Air Force (IAF) passed out from the Air Force Academy (AFA) in Dundigal near Hyderabad on Saturday.

They were among the 204 cadets, including 26 women from flying and ground duty streams, who were commissioned as flying officers at the Combined Graduation Parade, which was reviewed by Chief of the Air Staff, Air Chief Marshal AP Singh.

A two-stage training curriculum has been developed for the weapon system operators, with initial training at the AFA and subsequent training at the newly established Weapon Systems School at Begumpet near Hyderabad to focus on specialised skills.

During the Air Force Day celebrations held at Chandigarh in 2022, the then Chief of Air Staff, Air Chief Marshal Vivek Ram Chaudhari, had announced the creation of the Weapon Systems Branch for its officers, aimed at unification of all weapon system operators in specialist ground-based systems and airborne platforms under a single stream. This is the first time since Independence that a new operational branch was created in the IAF.

"This will essentially be for manning of four specialised streams of surface-to-surface missiles, surface-to-air missiles, remotely piloted aircraft and weapon system operators in twin- and multi-crew aircraft," Choudhari had said during his address. "Creation of this branch would result in savings of over Rs 3,400 crore due to reduced expenditure on flying training," he had further said.

The branch is divided into four sub-streams, each with its own specialisation to carry out launch of weapons, collate information and even operate space assets. These are surface-to-surface missiles, surface-to-air guided missiles, unmanned aerial vehicles (UAVs) and all weapon system operators in twin-seat and multi-crew aircraft.

The first sub-stream is 'Flying'Officers in this category will be weapon systems operators in aircraft like the Su-30MKI, attack helicopters like the AH-64E Apache, Soviet-origin Mi-25/35 and indigenous Prachand and special operations aircraft C-130J Super Hercules.

The second sub-stream is 'Remote', involving operations by UAVs or drones. There are several types of UAVs operated by the IAF for various missions such as attack, surveillance and logistics. Some are sourced from foreign suppliers like the US and Israel while others are designed and manufactured indigenously.

The third sub-stream is 'Intelligence', comprising interpretation of imagery obtained through surveillance assets in space, aircraft or UAVs. It will also include intelligence analysts, information warfare specialists, observers, signal intelligence collators as well as operators of space systems.

https://www.tribuneindia.com/news/india/first-batch-of-air-forces-weapon-systems-branch-commissioned-2/

india.com

Sat, 14 Dec 2024

Big worry for India as after Pakistan now Bangladesh gets ready to buy J-10C fighter jet from China, it is capable of…

Bangladesh is working on enhancing and modernizing its air force capabilities, and for this, it has collaborated with China. Air Chief Marshal Hasan Mahmud Khan of the Bangladesh Air Force has emphasized the need to upgrade its fleet. While addressing the media, Khan said, "We are making every effort to acquire fighter jets and attack helicopters." If successful, Bangladesh will become the second neighbouring country, after Pakistan, to procure fighter jets from China, an IDRW report said.

Bangladesh to Procure J-10C Fighter Jets

As per several media reports, Bangladesh is likely to purchase China's Chengdu J-10C multirole fighter jets to strengthen its air fleet. Sources indicate that in the first round, Bangladesh plans to acquire 16 J-10C fighter jets for its air force.

J-10C: Features

China-made J-10C fourth-generation fighter jet. It is known for its air-to-air and air-to-ground missions and is loaded with advanced avionics, AESA radar systems, and the ability to deploy modern weaponry.

Bangladesh's Aspiration for Air Superiority

By acquiring J-10C jets, Bangladesh's air force will significantly upgrade its fleet and bolster its combat readiness. This showcases Bangladesh's intention to become a crucial player in regional air defence. Beyond these fighter jets, acquiring attack helicopters also takes priority for Bangladesh, highlighting their focus on offering close-knit air support and managing anti-armour operations effectively.

India Set To Acquire These Lethal Weapons

India has inked a Rs 34,500 deal with America to purchase MQ-9B drones. As per the government-to-government agreement, the US will provide 31 long-range drones to the Indian Army, Air Force, and Navy. However, this acquisition still falls short of the military's requirements. The delivery date of these drones has yet to be finalised.

India is also planning to purchase attack-capable drones from Israel and France to address its need, aiming to strengthen its military capabilities in the face of modern warfare challenges.

https://www.india.com/news/world/big-worry-for-india-as-after-pakistan-now-bangladesh-gets-ready-to-buy-j-10c-fighter-jet-from-china-it-is-capable-of-7464356/

The EurAsian Times

Sun, 15 Dec 2024

India "Beats" France & U.K In Eight Great Powers Of 2025 List But Two Asian Nations Continue To Lead India

Usually, at the beginning or end of a year, various organizations and experts indulge in the exercise of "global ranking" of the countries. These rankings differ from one another as the metrics of their respective rankings vary. One such ranking has been just released on who will be "The Eight Great Powers of 2025." Here, the criteria for determining power have been economic heft and dynamism, social and political influence, political stability, and raw military capability.

Eight Great powers so chosen are: The United States of America, the People's Republic of China, the Russian Federation, Japan, India, France, the United Kingdom, and South Korea. In other words, as per this ranking, the U.S. continues to be the foremost power in the world, followed by China. India is recognized now as a major global power. And so is South Korea.

Thus, of the eight Great Powers of 2025, four are Asian countries – India, China, Japan, and South Korea. If anything, this only proves that the global power is shifting from the Euro-Atlantic to the Indo-Pacific. For nearly 500 years, the West determined the central balance of global power. In the last century, if the U.S. played a decisive role, it was as an Atlantic power. But, in this century, if the U.S. continues playing that role, it will be so as an Indo-Pacific power.

This ranking has been done for the American outlet "19FortyFive" by Dr. Robert Farley, who has taught security and diplomacy courses at the Patterson School and authored books such as "Grounded: The Case for Abolishing the United States Air Force," "Patents for Power: Intellectual Property Law and the Diffusion of Military Technology" and most recently "Waging War with Gold: National Security and the Finance Domain Across the Ages."

The ranking points out the strengths and weaknesses of each of the listed "great powers." Apart from its undoubted economic and technological heft, the United States is said to have the world's most sophisticated and expensive defense establishment. It is "the only country that can conduct expeditionary operations at a moment's notice on every continent."

While attaching importance to China's "first-rate military power," the ranking does point out its mixed to negative demographic trajectories over the past few years and "the often brutal infighting between China's political elites, a tendency that the rise of Xi Jinping has obscured but hardly eliminated." It also says China's technological gap with the U.S. is shrinking by bringing "its robust tech economy into harmony with its defense industrial base."

While the ranking notes that since 1949, China's greatest weakness has always been its lack of firm alliances, Beijing has taken advantage of the Russia-Ukraine War to bind Russia more tightly into its economic embrace. Besides, China's slow, careful commercial expansion into Central Asia and Africa has been noted with regard to the increase of its strategic reach.

Despite its debilitating economy (because of the Western sanctions) and the falling demography (made worse by the loss of many young men in the war with Ukraine), Russia, according to the ranking, has many advantages.

"Russia is immensely large with a profound natural resource endowment. Its population is old and sick but large and relatively well-educated. And Russia retains vast numbers of nuclear weapons,

which have allowed it to carry on its war with Ukraine without much interference from the much wealthier Atlantic powers," it says.

Japan is fourth in the ranking because of what is said to be its undoubted economic and technological strength. The ranking takes note of Tokyo "breaking out of its post-war geostrategic slumber" by spending more on security and expanding its defense industrial base. Fifth-ranked India, described as "a newcomer" in the list, is noted for its "healthy demographic foundation," economic growth at "a higher rate than any country on this list," and open political system that "has allowed it to give a home to innovative technology firms, tightly linked with the global economy and increasingly able to throw their weight around," and strong "military relations with Britain, France, the United States, and Russia that give it access to the most modern technology."

Of course, there are problems, the ranking says. "India remains too closely linked with Russia in defense issues, a relationship that even Indians are beginning to realize represents more of a burden than an asset. Parts of India's economy remain sclerotic and impoverished, generating political and social unrest. Pakistan continues to exert an inordinate influence on India, distracting New Delhi from broader international influence. Finally, the soundness of India's democratic institutions has frayed at the edges, although the country remains more democratic than Russia or China."

France, at number six, may have many drawbacks (charged politics, weakening demography, immigrant issues), but the ranking points out that "With Brexit, France is now the driving force in the European Union… And France still has its nuclear arsenal. It still has expeditionary military capabilities. It still has intelligence gathering and synthesis capabilities apart from the United States… It still has a robust defense industrial base, with strong export relationships across the world."

The United Kingdom has been ranked seventh on the list. The ranking says that Brexit has done great damage to British power. Its economy is said to be "disappointing." Yet, if it is still a "great power," that is because "the British defense industry remains robust and continues to wield more financial power through the City of London than a handful of competitors."

"The UK retains the friendship of the United States even during times of partisan political strife and also has strong political ties with Paris. Even at this late date, the Commonwealth is an asset for London, giving the UK influence in North America and across the Indo-Pacific. Finally, the British nuclear arsenal, like France's, puts some distance between London and its closest competitors."

The last that is eighth in the ranking happens to be another "newcomer," South Korea, which overtook the likes of "Saudi Arabia, Turkey, Brazil, and Germany" because of it being "a pivotal player in several areas critical to global security," the ranking points out. "South Korea has built an innovative, successful economy around the integration of its industries with its larger neighbors and with the United States.

"It is building a large military capable of expeditionary operations and still has a defense industrial base capable of manufacturing the basic logistical requirements (artillery shells) for conducting a major war. Unlike Japan, South Korea has positioned itself as a pivotal arms exporter, competing for markets with the United States and the Europeans."

"Finally, South Korea is perhaps the most likely state to join the nuclear club in the not-too-distant future, although taking that step would be fraught with danger. In short, the Republic of Korea is a rising power, increasingly prominent in global security and economic affairs". However, Dr. Farley, the author of the ranking, notes that some countries in his list are vulnerable, and their rankings can change in the future. In this regard, he mentions, in particular, Russia, France, and the

United Kingdom, which have “enjoyed great power status for as long as people have thought about great powers.”

But, he adds, “We now find ourselves in a situation where we can at least imagine the passing of some of these countries from the center stage. Policymakers in Paris, Moscow, and London will struggle to maintain relevance over the next half-century, their precious nuclear arsenals notwithstanding.”

https://www.eurasiantimes.com/rise-of-india-and-south-korea-but-the-last-few/

The EurAsian Times

Mon, 16 Dec 2024

Artillery Shell Boom For India Amid Ukraine-Russia War; Indian Firms To Set Up Manufacturing Lines In Estonia

Europe has been looking at alternate options to procure artillery shells for its forces and to help Kyiv. This has forced the European countries to explore India as an alternative source of artillery rounds. After Poland and Slovenia, now another Russian neighbor, Estonia, is exploring if Indian companies can set up manufacturing lines in the country. Estonia’s Defence minister Hanno Pevkur has said Indian companies are keen to invest in his country to produce ammunition. India has been positioning itself as a manufacturer of defense equipment.

The Indian companies that manufacture 155 mm ammunition are interested in investing in Estonia’s defense industry park. Estonia is one of the few countries in NATO that has consistently met the 2 percent defense spending requirement. Along with the artillery shells, the possibility of setting up an artillery manufacturing line is also considered.

In an interview with WION, Minister Pevkur said, “It’s not only ammunition. It’s also the production of Armed Vehicles and Howitzers. So, the cooperation is very intense. So, I do hope that I can find the time also to come to India.”

The importance of artillery can hardly be overstated. While modern technologies like drones are playing a crucial role in the war, the outcome of the Ukraine war will likely depend on which side can sustain its use of artillery fire for a longer period. Artillery has some distinct advantages. It can fire day and night and in any weather condition and is immune to modern electronic warfare systems.

For years, Europe neglected artillery ammunition production in favor of air power and precision-guided weapons. Now, the EU is ramping up its production capability. An effort to increase the 155mm production in Europe is finally showing results. According to NATO estimates, Europe can produce nearly two million shells yearly. EU states also need to stockpile ammunition for themselves. They need to replenish their stocks after supplying Ukraine, and they aim to meet the NATO requirement of having enough shells in their warehouses for 30 days of high-intensity warfare.

Ukraine’s Insatiable Hunger For Artillery Shells

As the war enters its third year, Ukraine is facing a critical ammunition shortage. Despite reducing Russia’s ammunition advantage from 8:1 to 3:1, the gap is big, considering Russia plans to bump

its defense spending by 25 percent in 2025. Kyiv requires about 2.4 million artillery shells annually. In February 2024, European countries responded to Ukraine's needs with a plan to acquire artillery shells from non-EU sources. The initiative aimed to procure 500,000 rounds of 155mm and 300,000 rounds of 122mm artillery, worth US$3.2 billion. These shells are vital as Russia currently produces around 250,000 artillery rounds per month, vastly outpacing the US goal of 100,000 rounds monthly by 2025.

On February 19, the European Union's top diplomat, Josep Borrell, urged member states to opt for countries outside the Union if it was "better, cheaper, and quicker." Apart from India, the EU was looking at Arab countries for alternate sources of supply for Ukraine. During the Ukrainian conflict, the 155 mm howitzer was one of the most sought-after artillery rounds. Although the United States has already sent over 1.5 million rounds to Ukraine, Kyiv still needs more.

With conflict starting between Israel and Palestine, the US has been sending the munition to Israel as well. And the problem is that Russia alone can produce more ammunition than the whole Western block. Moscow is churning more than double the combined output of the EU and the US.

However, European countries are now trying to catch up. Germany gave the nod to purchase 155 mm artillery ammunition worth more than US $ 400 million from Rheinmetall and an unnamed French company. The ammunition is intended to be sent to Ukraine. According to a statement released by Rheinmetall on December 18, the German army ordered several tens of thousands of shells worth at least €100 million, or US$110 million, for the Ukrainian armed forces under an existing framework arrangement.

So far, 18 countries have pledged their support, including the Netherlands, Denmark, Belgium, Canada, Norway, and Germany as the top donors, which provided financing for the first batch of ammunition delivered to Ukraine in June. However, three countries have yet to provide funds. In September, the Polish newspaper Gazeta Wyborcza revealed that Poland is one of those countries that has failed to deliver on what they promised.

However, after recurring delays, the European Union (EU) is finally close to fulfilling its commitment to supply Ukraine with one million artillery shells. EU diplomat Josep Borrell in November confirmed that the target of one million shells is nearing completion, with over 980,000 rounds already delivered. Ukraine can now also produce 155mm artillery shells designed to meet NATO standards. These shells can be fired from Western-provided howitzers, including the American M109, Polish AHS Krab, and British AS90.

European Demand Fuelling India's Artillery Boom

India has been reluctant to supply ammunition to Ukraine or any Western countries to maintain neutrality in the war. However, the war's increasing demand for ammunition among the European countries has fuelled the artillery manufacturing boom in India. India aims to become the prime manufacturing hub for advanced 155mm artillery ammunition for all types of artillery guns operated by over 75 armies worldwide.

The Indian Ministry of Defence (MoD) selected five domestic ammunition manufacturers in 2024 to supply around 2,000 155mm terminally guided munitions (TGMs) for the Indian Army's in-service 155mm guns of 39/45/52 caliber artillery guns. The 155mm TGM is the most advanced artillery ammunition, and its technology was not available in India in the past. The Indian-made artillery ammunition is cheaper than other global options.

Each indigenously made-in-India 155mm TGM projectile costs around Rs. 80 Lakhs ($100,000), one of the cheapest globally. Typically, a Western and Russian TGM projectile costs more than double, while US-made artillery ammunition costs three times more. The Indian defense ministry

has opened ammunition manufacturing to private companies. The private sector is now invited to fill critical ammunition shortages in some areas, and companies will be given long-term demand contracts to supply a variety of ammunition.

Five domestic companies – state-run Munitions India Ltd and private sector companies Adani Defence Systems and Technologies Ltd (ADSTL), Bharat Forge Ltd, Economic Explosive Ltd, Premier Explosives, and SMPP Ltd have been issued Project Sanction Orders (PSOs) by Army under the industry funder Make-II procurement scheme to develop 25 rounds of 155 mm TGMs along with four fire control systems in one year and participate in the trials on a no-cost-no-commitment basis. The prototypes must have 50 percent indigenous technology.

Several overseas original equipment manufacturers (OEMs) have shown interest in partnering with Indian companies to bulk-produce 155mm TGM projectiles. Amongst the OEMs that have shown interest are Nexter of France, Rosoboronexport of Russia, Nammo AS of Norway, Saab Bofors Dynamics of Sweden, Elbit Systems of Israel, Diehl Defence of Germany, Denel of South Africa, Yugoimport SDPR of Serbia, Arsenal of Bulgaria, and Raytheon/ BAE Systems Inc of the US.

https://www.eurasiantimes.com/ukraine-russia-war-fuels-artillery-shell-boom/

Science & Technology News

Press Information Bureau
Government of India

Ministry of Science & Technology

Fri, 13 Dec 2024

Dr. Prem Kaushal and Dr. Rajender Motiani from The Regional Centre of Department of Biotechnology Join The European Molecular Biology Organization Global Investigator Network

The European Molecular Biology Organization (EMBO) has announced the selection of eleven life scientists as the newest members of the EMBO Global Investigator Network on 12th December 2024. Five of the eleven new EMBO Global Investigators are based in India and two of them are from the Regional Centre for Biotechnology (RCB), Faridabad.

Dr. Prem Kaushal and Dr. Rajender Motiani, who both are Associate Professors at RCB, have been selected for the EMBO Global Investigator Network. Dr. Prem Kaushal's research focuses on protein synthesis in pathogenic microbes, *Mycobacterium tuberculosis* and *Entamoeba histolytica*. Dr. Rajender Motiani's research program focuses on understanding the role of calcium driven inter-organelle crosstalk in skin pigmentation.

The EMBO Global Investigator Network supports young group leaders in Chile, India, Singapore and Taiwan. The new global investigators will become part of an international network of nearly

800 current and former EMBO Global Investigators, Young Investigators and Installation Grantees, and will start in January 2025.

“EMBO is excited to welcome the new EMBO Global Investigators. Their research highlights the universal language of discovery and provides diverse perspectives to tackle foundational research questions as well as global challenges. We are delighted to support these outstanding group leaders in forming connections with scientists in Europe and around the world,” said EMBO Director Prof. Fiona Watt.

The new EMBO Global Investigators receive financial support for four years for networking activities and collaborations with local scientists and those in Europe. The global investigators are funded, for example, to attend or organize scientific meetings, visit other research institutions or deliver seminar series. They also benefit from training opportunities, including EMBO lab leadership training courses, for themselves and their lab members.

"I am really excited to receive this prestigious fellowship from EMBO. I look forward to engaging and networking with some of the brightest life science researchers across the globe," said Dr. Motiani on receiving the news of the award. Dr. Kaushal remarked, “I am grateful to EMBO for recognizing our research work. It will help establish international collaborations and bring new technologies to the Regional Centre for Biotechnology.

About Regional Center for Biotechnology

Regional Centre for Biotechnology (RCB) is an academic institution established by the Department of Biotechnology, Govt. of India with regional and global partnerships synergizing with the programmes of UNESCO as a Category II Centre. The primary focus of RCB is to provide world class education, training and conduct innovative research at the interface of multiple disciplines to create high quality human resources in disciplinary and interdisciplinary areas of biotechnology in a globally competitive research milieu. In 2016, RCB was recognised as an Institution of National Importance by the Parliament of India.

https://pib.gov.in/PressReleasePage.aspx?PRID=2084044

THE HINDU

Sun, 15 Dec 2024

What is ‘mirror life’ and why have scientists opposed it?

In a mirror, left and right become swapped. While you unscrew a bottle cap anti-clockwise in the real world, in the mirror you’ll be rotating it clockwise. Anything that has a handedness -- left or right -- is said to be chiral. Chiral molecules that are mirror images of each other are called enantiomers. A good example is the compound thalidomide. It was sold as a sedative for four years in the late 1950s before being withdrawn. Scientists found that the right-handed enantiomer worked as a sedative but the left-handed one caused severe birth defects.

In the human body itself, the amino acids used to make proteins are all left-handed. Their right-handed enantiomers are absent. Similarly, the DNA in all our bodies is right-handed (the double-helix twists to the right). The reasons are a mystery. Scientists have been making and studying enantiomers in the lab for a long time, but recently a few of them have started on the road to creating ‘mirror microbes’ -- synthetic bacteria whose building blocks are enantiomers of their natural counterparts.

Earlier this month, an international group of scientists, including Deepa Agashe of the National Centre for Biological Sciences, Bengaluru, published a 300-page technical report and a commentary in the journal Science warning against efforts to build mirror life.

“Life isn’t even-handed: many cellular components are all either left or right handed. But we are now (uncomfortably) close to being able to make flipped “mirror” cells,” Dr. Agashe wrote on X (Twitter) on December 13. “Our analysis suggests that mirror bacteria would likely evade many immune mechanisms mediated by chiral molecules, potentially causing lethal infection in humans, animals, and plants,” the commentary read. “They are likely to evade predation from natural ... and many other predators, facilitating spread in the environment.”

They acknowledged that mirror microbes may have valuable applications. For example, industrial facilities that use bacteria for decomposition or fermentation or to speed up chemical reactions could substitute them with mirror bacteria, which are likely to be more resilient. But the researchers also say the cons outweigh the pros in their analysis, and that there are other ways to solve the problems mirror bacteria can while incurring less risk.

“Countermeasures such as mirror antibiotics, crops engineered to be resistant to mirror bacteria, and mirror phages appear very unlikely to be sufficient to stop or reverse the spread of mirror bacteria throughout global ecosystems or to prevent unacceptable loss of life and irreversible ecological changes that could result,” they added.

“The primary challenge with these countermeasures is our inability to deploy them throughout the ecosphere at sufficient scale to prevent or counter dissemination and evolutionary diversification of mirror bacteria in the wild. They could therefore only protect against a fraction of the potentially immense harm.” The team has invited other researchers to examine their evidence and arguments and conduct more studies to better quantify the risks mirror life may pose.

https://www.thehindu.com/sci-tech/science/what-is-mirror-life-and-why-have-scientists-opposed-it/article68987990.ece

THE HINDU

Sat, 14 Dec 2024

Solid phase alloying can turn metal scrap into high-value alloys

Metal scrap can be directly transformed and upgraded into high-performance, high-value alloys without the need for conventional melting processes, according to a new study published this week in the journal Nature Communications. The study demonstrates that scrap aluminum from industrial waste streams can produce high-performance metal alloys.

The upcycled aluminum performs on par with identical materials produced from primary aluminum, indicating that this approach can provide a low-cost pathway to bringing more high-quality recycled metal products to the marketplace. By converting waste into high-performance aluminum products, the new method, called solid phase alloying, not only enhances material properties but also contributes to environmental sustainability.

The innovative solid phase alloying process converts aluminum scrap blended with copper, zinc and magnesium into a precisely designed high-strength aluminum alloy product in a matter of

minutes, compared to the days required to produce the same product utilizing conventional melting, casting and extrusion.

The research team used a PNNL-patented technique called Shear Assisted Processing and Extrusion, or ShAPE, to achieve their results. However, the researchers noted that the findings should be reproducible with other solid phase manufacturing processes. Within the ShAPE process, high-speed rotating die create friction and heat that disperses the chunky starting ingredients into a uniform alloy with the same characteristics as a newly manufactured aluminum wrought product.

The solid phase approach eliminates the need for energy-intensive bulk melting, which combined with the low-cost feedstocks originating from scrap, has the potential to sharply reduce the cost of manufacturing these materials. For consumers, this means recycled aluminum products will have a longer lifespan and better performance at a lower cost, whether they are part of a vehicle, a construction material, or a household appliance.According to the researchers, the solid phase alloying process could be used to create custom metal wire alloys for various 3D printing technologies.

“Solid phase alloying is theoretically applicable to any metal combination that you can imagine, and the fact that manufacturing occurs wholly in the solid state means you can begin to consider totally new alloys that we’ve not been able to make before,” Cindy Powell, a researcher at the Pacific Northwest National Laboratory, U.S. and a coauthor of the study said in a release.

https://www.thehindu.com/sci-tech/solid-phase-alloying-can-turn-metal-scrap-into-high-value-alloys/article68982000.ece

THE HINDU

Mon, 16 Dec 2024

Can we make black holes reveal themselves in echoes of light?

When it comes to making sense of our universe, the importance of black holes is hard to understate. Scientists know that a black hole exerts a strong gravitational pull, so much so that any object that gets closer to its centre beyond a point can never get back out. The effects of black holes on their surroundings include the release of a tremendous amount of energy. These effects are crucial to determine the structures of the galaxies they occupy and how the stars around them evolved over time.

A study published in the Astrophysical Journal Letters on November 7 is notable in this wider context. It was carried out by astrophysicists from the Institute for Advanced Study in Princeton, New Jersey, led by George Wong of the School of Natural Sciences at Princeton University. In their study, the researchers presented a new method to measure the properties of black holes by using the effects they have on light flowing around them.

Signatures in the light

When light passes around a very heavy object, like a black hole, its path bends. As a result some parts of the light may take a direct route to the viewer while others may pass around the black hole a few times before getting back on its original path. In this way, light emitted by a distant source in the cosmos may reach the earth at different instances, depending on its interactions with black holes on the way. When two beams of light emitted by the same source reach the earth at different

points, the beam to arrive second will be an echo of the beam that arrived first. This phenomenon is thus called a light echo.

The manner and extent to which light circles around a black hole depends on the black hole's mass and radius. If the black hole is spinning (a.k.a. a Kerr black hole), it will also depend on the object's angular momentum. Thus, according to the study, scientists can use light echoes as a new and independent way to the masses and spins of black holes. In general, the task of measuring a black hole's mass and spin is quite tedious because all the matter, hot gases, and the radiation swirling around the object complicate observations and make signals harder to extract from the noise. Light, fortunately, is affected differently and light echoes could offer a better signal-to-noise ratio.

Lenses and ringsAn object that bends light is called a lens. Black holes do this by the sheer strength of their gravity, thus the phenomenon is called gravitational lensing. Scientists theorised long ago that gravitational lensing could create light echoes but they have not been directly measured so far. To get around this issue, the new study proposes the use of a technique called long-baseline interferometry. The principle here is that the non-simultaneous arrival of two signals — like two light beams — could interfere with each other to create a new, unique signal. To spot light echoes created by a black hole, one telescope could be placed on the earth and the other in space. While the number of instruments may seem modest, they will have to operate with supreme technical rigour.

The main motivation for the new study was the fact that some of the supermassive black holes in the centre of the Milky Way and the nearby M87 galaxies have been found to have bright rings of light at a frequency of 230 GHz around them. The structure of these rings is influenced by astrophysical forces and the spacetime geometry of black holes, and scientists have been keen to study them in detail using very long baseline interferometry techniques. One particular aspiration is to trace the black hole's shadow on these rings to understand spacetime around the black holes.

Independent of colourThe analysis in the new study essentially focused on a black hole at the centre of the M87 galaxy — an appealing object of study for light echoes since it's quite large in the sky. But the results are also applicable to other black holes. The baseline in 'long baseline interferometry' refers to the distance between the two telescopes that receive the light. According to the study, it should be at least 40 Gλ, where Gλ is a unit of measurement that refers to the telescopes' ability to collect signals at a specific frequency. Ferocious black holes reveal 'time dilation' in early universeThe Princeton team also carried out preliminary high-resolution simulations to test the credibility of their technique. For this, team members collected several thousand instantaneous images of light travelling around the M87 black hole, located nearly 55 million lightyears away, using the Event Horizon Telescope. Then they estimated the time beams of light took to travel from the near end of the black hole to its far end, which, according to their idea, would depend on the black hole's mass and angular momentum, after adjusting for the angle at which the telescope was viewing it. From this simulated data, the team inferred the echo delay.

Albert Einstein's general theory of relativity also anticipated the phenomenon of light echoes. In particular the theory predicts the echoes will be achromatic, meaning light of all frequencies should be able to form echoes. (Since Gλ is inversely proportional to the frequency, building a telescope to detect the echoes is a separate headache.) Thus any approach to detect light echoes at multiple frequencies at the same time could provide a good test of the new technique. A positive result will also be yet another confirmation that the general theory of relativity provides an accurate description of black holes.

https://www.thehindu.com/sci-tech/science/can-we-make-black-holes-reveal-themselves-in-echoes-of-light/article68981587.ece

THE WEEK

Sun, 15 Dec 2024

Mission Mausam: India aims to improve forecast accuracy by adding 87 new Doppler weather radars

India will add 87 more Doppler Weather Radars (DWRs) by 2026 under Mission Mausam. The Union government informed Parliament that currently, there are only 39 DWRs to cover the entire country. The government stated that Mission Mausam aims to expand the DWR network across India to ensure complete radar coverage and improve the accuracy of weather forecasting.

Speaking to THE WEEK, S. Abhilash, Director of the Advanced Centre for Atmospheric Radar Research at CUSAT, said that once these additional DWRs are established, almost every region in the country will fall under the radar network.

Abhilash added that most of the new radars would be S-band and C-band. S-band radars have a radial coverage of 400km, while C-band and X-band radars cover 250km and 100km, respectively. “X-band radars are typically used for studying cloud development and light precipitation, which is why their range is limited,” he said. “C-band and S-band radars, on the other hand, will be used more extensively for weather prediction.”

Currently, of the 39 operational DWRs, 12 are X-band, five are C-band, and 22 are S-band. The data collected from these radars is already being integrated into Numerical Weather Prediction (NWP) models through advanced data assimilation techniques to enhance weather forecasts.

Dr Jitendra Singh, Minister of State (Independent charge) for the Ministry of Science and Technology and Earth Sciences, explained in a reply to an unstarred question in Parliament that recent advances in computing have enabled NWP modelling systems to utilize multiple radar observations with higher spatial and temporal resolution. This capability has improved the accuracy of localized forecasts. “Advanced decision support systems and techniques now generate location-specific forecasts for all types of weather by integrating various inputs, including radar observations,” he stated.

https://www.theweek.in/news/sci-tech/2024/12/15/mission-mausam-india-aims-to-improve-accuracy-of-weather-forecasting-by-adding-87-new-doppler-weather-radars.html

news nine

Fri, 13 Dec 2024

New atom interferometer will unveil the hidden Universe, dark matter on the horizon

A team of physicists at Northwestern University has produced a device that can boost weak signals a thousandfold and could thus help in the hunt for dark matter and gravitational waves. Called an atom interferometer, this state-of-the-art device enables the control of atoms with light and the detection of forces that are otherwise almost impossible to measure. In contrast to previous

models, the new device corrects for flaws in light, which is 50 times more improved than the previous device.

The largest part of all the matter in the universe, 85 percent, is called dark matter and is still one of the most well-guarded secrets in the field of physics. Although its existence is almost unconditional, it is incredibly elusive in its relationships with ordinary matter, which is why contemporary devices cannot pick up on them. “Dark matter is an embarrassing problem,” said Timothy L. Kovachy, the physicist who led the work. “This is ordinary matter, and we know a lot about it; however, the majority of the universe remains unknown.” In doing so, this breakthrough not only allows researchers to develop high-sensitivity detectors to investigate previously unmeasurable signals of ultra-weak forces from dark matter and dark energy and other unknown phenomena.

How Atom Interferometers Work

Atom interferometers work in the basis of quantum mechanics, where particles are put in two or more states at the same time. In these devices, lasers divide a wave-like atom into two separate waves that travel different paths. When these waves merge, they form an interference pattern—a signature of sorts of forces influencing the atoms.This new interferometer addresses the difficulties associated with light-induced defects. For instance, even a single photon can turn an atom slightly off course, and compounded errors make measurements unreliable after ten laser pulses. The use of a machine learning approach by the Northwestern team allowed them to correct errors of waveform and synchronise the laser pulses for optimal outcomes.

High Sensitivity: signal amplification up to 1000 times

Having mimicked the environment, the researchers subjected their innovations to laboratory tests after that. The results verified that their device was capable of boosting the signals by 1,000 times, a giant leap in terms of sensitivity. It is possible that such capabilities could open up entirely new ways of trying to find dark matter and other mysterious phenomena in the universe, in frequencies that have not been accessible before.

“We know that atom interferometers are quite sensitive to small oscillations,” Kovachy added. “With our improvements, we are now expanding the boundaries of detection to further explore the unknown universe.” This advancement not only improves the search for dark matter but also lays down a platform for other improvements of quantum measurement devices.

https://www.news9live.com/science/new-atom-interferometer-will-unveil-the-hidden-universe-dark-matter-on-the-horizon-2772828

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