

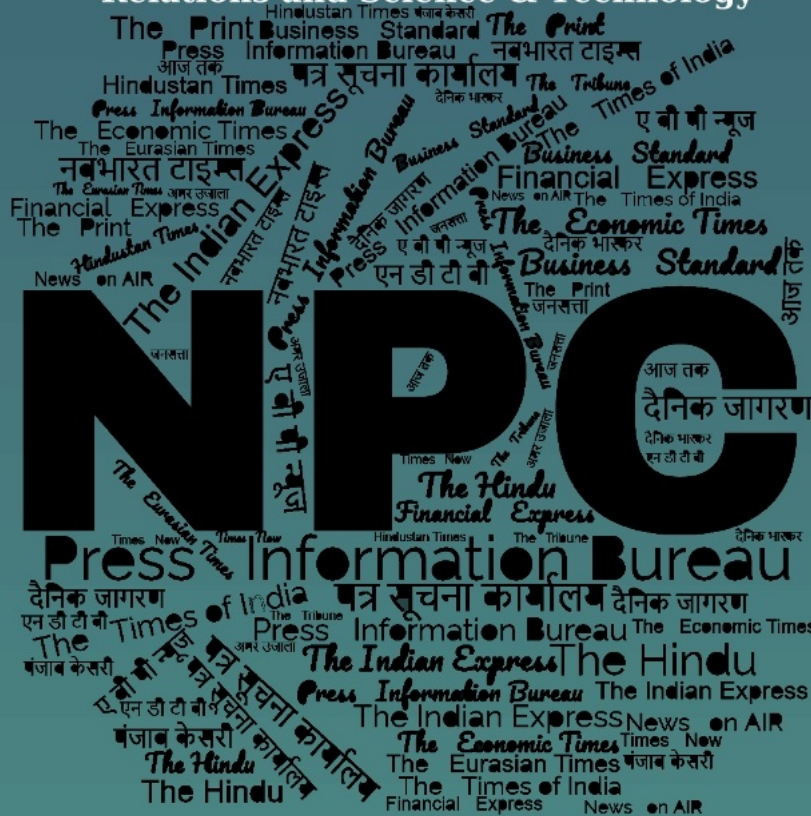
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समाचार पत्रों से चयनित अंश Newspapers Clippings

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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Wed, 11 Dec 2024

Manastu Space Delivers Groundbreaking Green Propulsion System to DRDO, Empowered by TDF Support

Manastu Space Technologies, a Mumbai-based deep-tech startup, has successfully delivered its revolutionary iBooster Green Propulsion System to the Defence Research and Development Organisation (DRDO). This achievement follows four years of rigorous research and development, backed by DRDO's Technology Development Fund (TDF). The successful delivery underscores the increasing role of Indian startups in advancing the nation's capabilities in space and defence technology.

About iBooster system

The iBooster system, designed for small satellites ranging from 100 to 500 kg, plays a vital role in critical satellite operations like orbit raising, station-keeping, and deorbiting. What sets the iBooster apart from traditional propulsion systems is its use of hydrogen peroxide-based fuel—a safer, more efficient, and environmentally friendly alternative to the toxic fuels that have long dominated the industry. This innovative fuel choice enhances the system's overall performance, ensuring both sustainability and cost-effectiveness.

Key innovations include:

- Hydrogen peroxide-based fuel, offering a greener and safer propulsion solution.
- An optimized thruster design, ensuring efficiency and precision.
- A high-temperature catalyst, which guarantees reliable ignition and endurance in space conditions.

Tushar Jadhav, Co-founder of Manastu Space, expressed his pride in the milestone, stating, "Delivering this technology to DRDO is a proud moment for us. It highlights our commitment to creating greener, safer, and more efficient solutions for space exploration. This collaboration exemplifies how innovation and collaboration can drive India's aerospace ambitions forward."

The DRDO echoed similar views, noting, "Manastu Space's achievement demonstrates the transformative potential of Indian startups in deep-tech. Their innovation significantly contributes to DRDO's mission to strengthen India's defence and satellite capabilities."

Future Projects

Manastu Space is now preparing for its next major milestone: a space test of the iBooster system aboard an upcoming PSLV mission by ISRO. This test will further showcase the system's capabilities and reinforce India's leadership in sustainable space technologies.

Background

Founded in 2017, Manastu Space Technologies continues to push boundaries in propulsion systems and satellite technologies, solidifying India's position as a global leader in aerospace innovation.

<https://www.financialexpress.com/business/defence-manastu-space-delivers-groundbreaking-green-propulsion-system-to-drdo-empowered-by-tdf-support-3689559/>

Defence News

Defence Strategic: National/International



**Press Information Bureau
Government of India**

Ministry of Defence

Wed, 11 Dec 2024

Nepali Army Chief General Ashok Raj Sigdel Marks Day Two Of His Official Visit To India With Key Engagements And Discussions

Suprabal Janasewashree General Ashok Raj Sigdel, Chief of the Army Staff (COAS) of the Nepali Army, on his official visit to India, marked the day filled with high-level engagements and interactions. The visit, which spans from 11th to 14th December 2024, underscores the ongoing efforts to further strengthen and deepen the defence cooperation between Nepal and India.

Wreath Laying Ceremony and Guard of Honour

The day began with a solemn and respectful wreath-laying ceremony at the National War Memorial in New Delhi. General Sigdel paid tribute to the brave soldiers who made the ultimate sacrifice in service to the country. This moment of remembrance was a poignant start to the day's engagements, reflecting Nepal's commitment to honouring the shared values of courage and sacrifice.

Following the wreath-laying, General Sigdel was given a formal Guard of Honour. The ceremonial event, attended by senior officials of the Indian Army, marked a significant gesture of respect and a symbol of the enduring friendship between the two nations. The Guard of Honour was followed by General Upendra Dwivedi, COAS of the Indian Army welcoming General Sigdel to the South Block.

Strategic Discussions and Briefings

General Sigdel's day continued with a series of high-level meetings designed to enhance strategic collaboration between the two armies. He engaged in an in-depth interaction with General Upendra Dwivedi, Chief of the Army Staff of the Indian Army, where they discussed various aspects of bilateral defence cooperation and regional security concerns.

During the Call-on, General Upendra Dwivedi announced the handing over of a Target Practice Drone and Medical equipment relating to Field Hospitals.

Later, General Sigdel was briefed on India's security perspective and on matters of mutual interest with the Army Design Bureau by senior Army officials. These sessions provided valuable insights into India's current and future security strategies, highlighting areas of potential collaboration between the two nations.

Engagements with Senior Defence Officials and Bureaucrats

General Sigdel called on several senior Indian defence and foreign officials, further strengthening the ties between the two countries. He met with Shri Ajit Doval, NSA, General Anil Chauhan, Chief of the Defence Staff, Mr Rajesh Kumar Singh, Defence Secretary and Mr Vikram Misri, Indian Foreign Secretary. These meetings provided an opportunity for the exchange of views on broader defence and security issues, focussing on matters of mutual interests and further strengthening of friendship. The COAS, Nepali Army also interacted with representatives of Indian Defence Industry and appreciated "Atmanirbharta" efforts being undertaken.

Evening Banquet

The day's activities will culminate with a Banquet hosted in General Sigdel's honour by General Upendra Dwivedi, COAS of the Indian Army. The Banquet will provide a platform for informal discussions and further cemented the strong personal rapport between the two senior military leaders, fostering mutual trust and understanding.

General Ashok Raj Sigdel's visit to India is marked by a series of productive engagements, aimed at furthering the defence relationship between Nepal and India. The visit not only highlights the commitment of both nations to strengthening their military ties but also underscores their shared focus on regional security and peace. General Sigdel's interactions with senior military and government officials are expected to pave the way for enhanced defence cooperation and strategic partnership in the future.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2083324>



**Press Information Bureau
Government of India**

Ministry of Defence

Wed, 11 Dec 2024

Centre for Joint Warfare Studies inks MoU with National Disaster Management Authority to strengthen research and innovation in disaster management

In a significant step towards bolstering India's disaster management capabilities, the Centre for Joint Warfare Studies (CENJOWS), the only tri-services think tank under HQ Integrated Defence Staff, Ministry of Defence signed a Memorandum of Understanding with the National Disaster Management Authority (NDMA). The MoU was signed by Lt Gen Syed Ata Hasnain (Retd), Member, NDMA and Major General (Dr) Ashok Kumar (Retd), Director General of CENJOWS. The signing ceremony marked the beginning of a strategic partnership to address critical challenges in disaster mitigation, preparedness, and response to develop the 'whole of the nation' approach.

Key Areas of Collaboration

The MoU outlines a framework for joint initiatives, including:

- **Collaborative Research:** Undertaking studies on disaster management, HADR operations, and disaster diplomacy to provide policy inputs to the Government of India.
- **Capacity Building:** Organizing seminars, workshops, and training programs for stakeholders, including armed forces personnel, NDMA officials, and other key agencies.
- **Awareness Campaigns:** Promoting disaster preparedness and risk mitigation through nationwide awareness initiatives.
- **International Engagements:** Facilitating global collaboration on disaster management, aligning with India's foreign policy objectives.

Speaking on the occasion, Major General (Dr) Ashok Kumar emphasized the importance of leveraging joint research to infuse development of actionable policy recommendations that enhance disaster resilience at both national and international levels. Lt Gen Syed Ata Hasnain, member NDMA highlighted the shared vision of both institutions to create a safer and more disaster-resilient India. The MoU underscores CENJOWS' role as a pivotal think tank fostering synergy between the armed forces and civilian agencies. It also reaffirms NDMA's commitment to a holistic, technology-driven approach to disaster management. Together, the institutions aim to contribute significantly to building a disaster-resilient India while strengthening India's global standing in HADR operations.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2083200>

India plans to buy this massive \$4 billion wall-like radar to neutralise Chinese threats from 6,000 km away

India and China agreed to take measures to further ease the situation at the borders while continuing to implement the October agreement to resolve the standoff in eastern Ladakh comprehensively, the Chinese Foreign Ministry said a day after talks in New Delhi.

India and Russia are in advanced discussions on a \$4 billion defence deal to strengthen India's air defence infrastructure. The deal focuses on the acquisition of the state-of-the-art Voronezh radar system, which is expected to significantly enhance India's ability to detect and respond to aerial threats across an extensive region, as reported by Russia Today.

The agreement reflects the enduring defence cooperation between New Delhi and Moscow, a partnership that Defence Minister Rajnath Singh reinforced during his visit to Russia this week.

Advanced Voronezh Radar to Boost Threat Detection

The centrepiece of the proposed deal is the Voronezh radar system, developed by Russia's Almaz-Antey Corporation, known for its expertise in missile systems and radar technology. With a vertical range exceeding 8,000 kilometres and a horizontal reach of over 6,000 kilometres, the radar can detect and track multiple threats, including ballistic missiles, stealth aircraft, fighter jets, and intercontinental ballistic missiles (ICBMs).



Voronezh radar system

According to Russian claims, the system can monitor more than 500 objects simultaneously and even track near-Earth objects in space. The advanced radar is expected to provide a strategic advantage to India by enhancing its situational awareness over critical regions, including China,

South Asia, and the Indian Ocean. This capability will address India's evolving security needs amid regional and global challenges.

Push for Local Manufacturing Under 'Make in India'

As reported by The Sunday Guardian, in line with India's 'Make in India' initiative, the deal includes a provision for at least 60% of the radar system to be manufactured domestically. A team from Almaz-Antey recently visited India to meet with potential offset partners, as reported by Russia Today. The system, once acquired, will likely be stationed in Karnataka's Chitradurga district, which is already home to several advanced defence and aerospace facilities. The location has reportedly been surveyed, ensuring readiness for installation.

Strengthening India-Russia Defence Ties

India and Russia share a "special, privileged, and strategic defence partnership," a sentiment reiterated during Singh's visit. In a meeting with his Russian counterpart Andrey Belousov, Singh co-chaired discussions on military-technical cooperation and took stock of the delivery status of two remaining S-400 Triumph missile systems, part of a \$5.43 billion deal signed in 2018.

The longstanding India-Russia defence relationship has been built on historical trust and cooperation, dating back to the Cold War era. Russia remains India's largest defence supplier, providing approximately 60–70% of its military equipment. Key acquisitions include Su-30MKI and MiG-29 fighters, T-90 tanks, and the INS Vikramaditya aircraft carrier, as well as the BrahMos missile system, a successful Indo-Russian collaboration.

India's Balanced Defence Strategy: Russia and the US

India's defence strategy reflects a balancing act between its historical ties with Russia and its growing partnership with the United States. While Russia supplies cost-effective systems with significant technology transfer opportunities, the US provides cutting-edge technology through agreements like LEMOA, COMCASA, and BECA. Recent US deals include Apache and Chinook helicopters and MQ-9B drones to enhance surveillance capabilities.

In contrast, Russia offers flexibility in payment terms and customisation, with notable projects such as licensed production of T-90 tanks and Su-30MKIs in India. This flexibility aligns with India's goal of enhancing indigenous manufacturing and reducing reliance on imports. India's defence procurements are shaped by its strategic needs in the Indo-Pacific and evolving geopolitical realities.

While the US focuses on high-tech systems to counter China, Russia's historical support and cost-effective platforms remain crucial for India. Notably, US sanctions under CAATSA (Countering America's Adversaries Through Sanctions Act) have complicated India's acquisition of Russian systems like the S-400. Nevertheless, India has navigated these challenges through mechanisms such as Rupee-Ruble trade agreements.

Despite Moscow's growing ties with China and Pakistan, India continues to view Russia as a reliable defence partner. The current radar deal exemplifies this partnership, aimed at bolstering India's air defence and situational awareness across Asia and the Indian Ocean.

India's focus on self-reliance in defence, underpinned by initiatives like 'Make in India,' is shaping its procurement strategies. By leveraging Russia for cost-effective systems and the US for high-tech solutions, India ensures a diversified defence portfolio. The potential Voronezh radar deal with Russia highlights India's commitment to enhancing its security infrastructure while fostering local manufacturing capabilities.

As Defence Minister Rajnath Singh continues his visit to Russia, the evolving partnership underscores the strategic depth of India-Russia ties amid an increasingly complex global security environment.

<https://economictimes.indiatimes.com/news/defence/india-plans-to-buy-this-massive-4-billion-wall-like-radar-to-neutralise-chinese-threats-from-6000-km-away/articleshow/116198461.cms>

THE ECONOMIC TIMES

Wed, 11 Dec 2024

BEML bags Rs 136-cr Defence Ministry contract for high mobility vehicles

State-owned BEML Ltd on Wednesday said it has secured a Rs 136-crore contract for the supply of indigenously designed High Mobility Vehicles (HMV) 8x8. These vehicles will play a pivotal role in the Battle Field Surveillance System (BFSS) project, reinforcing India's defence capabilities and advancing the government's vision of Atmanirbhar Bharat, the PSU under the Ministry of Defence said.

Manufactured at BEML's facilities, the HMV 8x8 is designed to deliver exceptional reliability and versatility, even in the most challenging environments.

Key features of these vehicles include an independent suspension system, a high-power air-cooled engine, a central tyre inflation system, an anti-lock braking system and a backbone tube chassis design.

BEML said these features ensure superior mobility, stability and operational safety. The vehicles are capable of operating in extreme climates, from -20 degrees Celsius to +55 degrees Celsius, and at altitudes of up to 5,000 metres above sea level.

"The indigenously developed HMV 8x8 vehicles showcase our engineering excellence and dedication to equipping India's armed forces with cutting-edge mobility solutions," Shantanu Roy, Chairman and Managing Director of BEML, said.

The PSU has been at the forefront of India's defence manufacturing sector, delivering advanced solutions such as rocket and missile launchers, Armoured Recovery and Repair Vehicles (ARRV), High Mobility All-Terrain Vehicles for radar and communication systems and tactical Unmanned Aerial Vehicles (UAVs).

BEML operates in three verticals -- defence and aerospace, mining and construction, and rail and metro. It has manufacturing facilities located in Bengaluru, Kolar Gold Fields (KGF), Mysore, and Palakkad, with R&D infrastructure and a nationwide network of sales and services.

Shares of BEML were trading at Rs 4,471.40 apiece, up 2.48 per cent on the BSE at around 2.40 pm.

<https://economictimes.indiatimes.com/news/defence/beml-bags-rs-136-cr-defence-ministry-contract-for-high-mobility-vehicles/articleshow/116209719.cms>

ThePrint

Wed, 11 Dec 2024

Indian Navy to commission last Scorpene-class submarine & first Nilgiri-class frigate in January 2025

The Indian Navy is set to begin 2025 with two new commissionings. The last of the Kalvari-class or Scorpene-class submarines and the first of the Nilgiri-class frigates are likely to be commissioned in January, ThePrint has learnt.

Both were scheduled for commissioning in December, but the timelines have changed, according to sources in the defence and security establishment.

Vagsheer is the sixth and last Scorpene-class submarine, ordered by the Indian Navy in 2005. It was launched in April 2022. These submarines have been completely built by Mazagon Dock Shipbuilders through a transfer of technology from France-based Naval Group. While the French name for this class of submarines is Scorpene, the Indian Navy has classified these as the Kalvari-class submarines.

Scorpenes are 2000-ton conventional attack submarines designed for all types of missions, including anti-surface warfare, anti-submarine warfare, long-range strikes, special operations or intelligence gathering. These submarines have six weapon-launching tubes and 18 weapons (torpedoes, missiles). The first of the Kalvari-class submarines, INS Kalvari, was inducted into the Indian Navy in 2017.

Mazagon Dock will also build three more of these submarines for the Indian Navy under Project 75 (P75). As reported by ThePrint earlier, the Navy will sign the contract by next month.

The guided missile Nilgiri-class frigates are also being built by Mazagon Dock. The one likely to be commissioned next month will be the first of the Navy's seven new stealth frigates.

These Project 17A frigates are based on the P17 Shivalik-class frigates with advanced stealth features, and indigenous weapons and sensors, and are being built using integrated construction methodology. The P17A frigates will offer "improved survivability, sea keeping, stealth and ship manoeuvrability", according to the Ministry of Defence.

On 9 December, India commissioned INS Tushil into India's Western Fleet, known as the Sword Arm. The second ship, Tamal, is expected to be delivered by early next year. These ships are part of a \$2.5 billion deal inked between India and Russia in 2016 for four frigates. According to the agreement, two ships were to be built in Russia and the other two will be built at the Goa Shipyard in India with technical collaboration from Russia.

Furthermore, on 18 December, Nirdeshak, the second Survey Vessel Large (SVL) ship is set to be commissioned by Union Minister of State for Defence Sanjay Seth in Visakhapatnam. The first such vessel, INS Sandhyak, was inducted by Defence Minister Rajnath Singh in February 2024.

The ship's role is to carry out full-scale hydrographic surveys of ports, harbours, navigational channels, coastal areas and deep seas. These activities are mainly undertaken to ensure safe marine navigation. The ship will also be capable of undertaking several naval operations.

<https://theprint.in/defence/indian-navy-to-commission-last-scorpene-class-submarine-first-nilgiri-class-frigate-in-january-2025/2397554/>

#SWARAJYA

Wed, 11 Dec 2024

Zorawar Light Tank Trials Underway In Ladakh, Putting China's Nerves To The Test

Trials of India's indigenously developed Zorawar light tank are currently underway in the high-altitude region of Ladakh, with successful firing tests reported.

The trials, taking place at Nyoma, are focused on evaluating the tank's firepower, mobility, and protection in rugged terrain. These tests are expected to be completed by the end of the month, after which the tank will undergo user trials with the Indian Army next year.

Developed in response to China's deployment of light tanks along the Line of Actual Control (LAC) during the stand-off that began in April 2020, the Zorawar light tank is a joint project between DRDO and L&T under the Make in India initiative.

Weighing 25 tonnes, the tank is designed for swift movement in high-altitude regions and is equipped with an active protection system to counter anti-tank guided missiles.

One of the key features being tested is the tank's amphibious capability, allowing it to operate in riverine areas such as the Pangong Tso Lake, where Indian forces have faced Chinese light tanks in the past.

The timing of the Zorawar's trials coincides with a fragile India-China disengagement agreement along the LAC. Its presence in Ladakh sends a clear message that India is preparing for any future escalation, particularly after the 2020 border clash. The Zorawar is named after Zorawar Singh Kahluria, the 19th-century warrior known for his conquests in Ladakh.

Its trials are taking place in the same region where, in 1962, the Indian Army rushed AMX-13 tanks from Chandigarh, flying them in on the newly inducted An-12 transport aircraft. The tanks landed in Chushul, not far from Nyoma, as part of India's response to the Chinese invasion, highlighting the historical significance of the area.

Unlike the hastily deployed AMX-13s, the Zorawar is a locally developed, purpose-built tank designed for Ladakh's unique terrain, symbolizing India's growing capability to develop and deploy platforms tailored for its forces.

<https://swarajyamag.com/defence/zorawar-light-tank-trials-underway-in-ladakh-putting-chinas-nerve-to-the-test>



Wed, 11 Dec 2024

वायुसेना के लिए तेजी से बनेंगे LCA-Mk1A फाइटर जेट्स... साढ़े 3 महीने में तैयार हो जाएगा HAL का नासिक प्लांट

लाइट कॉम्बैट एयरक्राफ्ट यानी हल्के लड़ाकू विमान (LCA) तेजस एमके1 ए वैरिएंट की प्रोडक्शन लाइन नासिक में बनकर तैयार होने वाली है. यह फैसिलिटी काफी तेजी से तैयार की जा रही है. संभावना है कि अगले साल मार्च तक पहला MK1A वैरिएंट इस प्लांट से बनकर बाहर निकलेगा.

इंडियन एयरफोर्स को इस समय इस फाइटर जेट की तत्काल जरूरत है. क्योंकि उसे अपने फ्लीट्स और स्क्वॉड्रन को पूरा करना है. साथ ही पुराने फाइटर जेट्स को भी हटाना है. यह फाइटर जेट अत्याधुनिक सुविधाओं से लैस है. अगर मार्च 2024 तक नासिक प्लांट शुरू हो गया तो अगले महीने यानी अप्रैल से प्रोडक्शन शुरू हो जाएगा.

इससे HAL के बंगलुरु में मौजूद दो अन्य प्लांट्स को सपोर्ट मिलेगा. बंगलुरु से अभी हर साल 8 फाइटर जेट बन पाते हैं. लेकिन MK1A की सप्लाय चैन में दिक्कत होने की वजह से इसका प्रोडक्शन भी देरी से हो रहा है. इसे अमेरिका से इंजन हासिल करना है. इन सबके बावजूद HAL बाकी काम तैयार करके रखना चाहता है, ताकि जैसे ही इंजन मिले फाइटर जेट कम से कम समय में सेना में शामिल हो सकें.

नासिक प्लांट में ही बनता Su-30MKI

नासिक के HAL प्लांट में ही सुखोई Su-30MKI फाइटर जेट की अपग्रेडिंग और प्रोडक्शन भी होता है. यह भारतीय वायुसेना का मुख्य फाइटर जेट है. तेजस एमके1 ए को लेकर भारतीय वायुसेना ने HAL के साथ 2021 में 48 हजार करोड़ का सौदा किया था. जिसमें 73 सिंगल सीटर जेट्स और 10 ट्विन सीटर ट्रेनर्स शामिल थे.

जानिए तेजस-MK1A की खासियत...

तेजस एमके-1 ए में उन्नत मिशन कंप्यूटर, उच्च प्रदर्शन क्षमता वाला डिजिटल फ्लाइट कंट्रोल कंप्यूटर (DFCC Mk-1A), स्मार्ट मल्टी-फंक्शन डिस्प्ले (SMFD), एडवांस्ड इलेक्ट्रॉनिकली स्कैन्ड ऐरे (AESA) रडार, एडवांस्ड सेल्फ-प्रोटेक्शन जैमर, इलेक्ट्रॉनिक वारफेयर सूट आदि सुविधाएं हैं. यह फाइटर जेट वैसे तो तेजस एमके-1 की तरह ही है, इसमें कुछ चीजें बदली गई हैं. जैसे इसमें अत्याधुनिक इलेक्ट्रॉनिक वारफेयर सूईट, उत्तम एईएसए

राडार, सेल्फ प्रोटेक्शन जैमर, राडार वॉर्निंग रिसीवर लगा है. इसके अलावा इसमें बाहर से ECM पॉड भी लगा सकते हैं.

इसके आने से क्या बदलाव होगा?

तेजस के आने से वायुसेना के पुराने मिग सीरीज के विमान को हटा दिया जाएगा. तेजस एमके1 ए की तैनाती से दुश्मन देशों की हालत खराब रहेगी. नए तेजस के साथ राजस्थान के जोधपुर में तीसरा स्कवॉड्रन बनाया जाएगा. यानी पाकिस्तान किसी भी तरह की हिमाकत नहीं कर सकता. यह फाइटर जेट दुनिया का सर्वश्रेष्ठ हल्का लड़ाकू विमान है.

क्या मतलब है DFCC का...

तेजस एमके-1 ए फाइटर जेट में डिजिटल फ्लाई बाय वायर फ्लाइट कंट्रोल कंप्यूटर (DFCC) को लगाया गया है. DFCC का साधारण भाषा में मतलब होता है कि फाइटर जेट से मैनुअल फ्लाइट कंट्रोल हटाकर इलेक्ट्रॉनिक इंटरफेस लगाना. यानी कंप्यूटर विमान को उड़ाने समय पायलट के मुताबिक संतुलित रखता है. इस सिस्टम से राडार, एलिवेटर, एलिरॉन, फ्लैप्स और इंजन का नियंत्रण इलेक्ट्रॉनिक तरीके से होता है. फ्लाई बाय वायर फाइटर जेट को स्टेबलाइज करता है. यह विमान को सुरक्षित बनाता है.

2200 km/hr की स्पीड, 739 km की कॉम्बैट रेंज

मार्क-1 ए पिछले वैरिएंट से थोड़ा हल्का है. लेकिन यह आकार में उतना ही बड़ा है. यानी 43.4 फीट की लंबाई. 14.5 फीट की ऊंचाई. अधिकतम 2200 km/hr की स्पीड से उड़ान भर सकता है. कॉम्बैट रेंज 739 किलोमीटर है. वैसे इसका फेरी रेंज 3000 किलोमीटर है.

यह विमान अधिकतम 50 हजार फीट की ऊंचाई तक जा सकता है. इसमें कुल मिलाकर 9 हार्ड प्वाइंट्स हैं. इसके अलावा 23 मिलिमीटर की ड्विन-बैरल कैनन लगी है. हार्डप्वाइंट्स में 9 अलग-अलग रॉकेट्स, मिसाइलें, बम लगा सकते हैं. या फिर इनका मिश्रण कर सकते हैं.

<https://www.aajtak.in/defence-news/story/hal-nasik-plant-nears-completion-for-lca-mk1a-production-amid-iaf-fighter-fleet-challenges-rptc-2118725-2024-12-11>



Wed, 11 Dec 2024

LAC पर सेना की नई तैयारी... ATV से करेंगे पेट्रोलिंग, चीन के नापाक इरादों पर रहेगी नजर

Indian Army लद्दाख के साथ लगी लाइन ऑफ एक्चुअल कंट्रोल (LAC) पर सर्दियों की तैयारी कर चुका है. बर्फीले और दुरूह इलाकों में पेट्रोलिंग और निगरानी के लिए सेना ऑल-टरेन व्हीकल्स (ATV) का इस्तेमाल करने जा रही है. जिसका एक वीडियो सेना के फायर एंड फ्यूरी कॉर्प्स ने अपने X हैंडल पर जारी किया है.

ये ATV दुनिया के किसी भी तरह की भौगोलिक परिस्थितियों में चलने के हिसाब से बनाई गई हैं। इसमें से एक तो गुजरात के कच्छ में भी तैनात है। इन एटीवी में शामिल हैं— Polaris Sportsman, Polaris RZR और JSW—Gecko ATOR. ये किसी भी तरह की दुरुह चढ़ाई, ढलान, पथरीले रास्तों पर चढ़, चल और दौड़ सकती हैं।

लद्दाख के पास LAC का इलाका बर्फ से ढका जंगी क्षेत्र है। यहां पर निगरानी रखने के लिए जरूरी है कि भारतीय सैनिकों के पास आधुनिक हथियार, यूनिफॉर्म, गाड़ियां और अन्य सुविधाएं हों। ये गाड़ियां कम वजन की और हाई—मोबिलिटी के अनुसार बनाई गई हैं। इनकी मैन्यूवरिंग बेहद आसान है। ये किसी भी तरह के रास्ते पर चल सकती हैं।

लंबे समय बाद शुरू हुई पेट्रोलिंग

देपसांग के मैदानों और देमचोक इलाके में भारत—चीन की सेनाओं के पीछे हटने के बाद इन गाड़ियों को शामिल किया गया ताकि पेट्रोलिंग तेजी से ज्यादा दूरी तक की जा सके। ये पेट्रोलिंग लंबे समय के विवाद के बाद शुरू हुई है। इसलिए ऐसी गाड़ियों की जरूरत बढ़ जाती है, जो ऐसे खतरनाक मार्गों पर सैनिकों को ले जा सकें।

सेना ने कहा- बेहद जरूरी हैं एटीवी

इनके जरिए भारतीय सेना जरूरत पड़ने पर अपने सैनिकों को सही स्थान पर तैनात कर पाएंगे। तेजी से सर्वांगीण हो सकेगा। निगरानी हो सकेगी। किसी भी तरह के मौसम में सैनिक स्ट्रैटेजिक प्वाइंट्स और अपने बेस तक पहुंच सकेंगे। सेना भी इस बात को मानती है कि इन गाड़ियों की वजह से लाइन ऑफ एक्जुअल कंट्रोल के पास पेट्रोलिंग आसान हुई है। अगर किसी तरह की दिक्कत आती है तो इनकी मदद से तत्काल कहीं भी पहुंचा जा सकता है।

<https://www.aajtak.in/defence-news/story/indian-armys-winter-operations-in-ladakh-by-atv-dskc-2118655-2024-12-11>



Wed, 11 Dec 2024

“Catch Needle In The Sea,” Track Stealth Jets In Sky: China Claims Big Advancement In Cutting Edge Radars

The Chinese research community is making huge strides in developing devices that can detect tiny objects deep inside the sea and track stealth fighters. In the latest development, a team of Chinese researchers won the best paper prize in October from the international journal ‘Applied Optics’ for conducting a deep-dive study to detect objects deep inside the sea.

The study, which stood out among 1,278 submissions to the journal, focused on a radar device that can identify objects at tremendous depths—a process that has been compared to “fishing for a needle in the sea,” as claimed by the South China Morning Post. Under the direction of associate professor Shangguan Mingjia of Xiamen University, the researchers unveiled the world’s first single-photon Raman lidar system in their 2023 paper. The team claimed that this system can operate at a depth of 1,000 meters, or roughly 3,280 feet, below sea level.

Lidar sensors, short for “light detection and ranging,” is a remote sensing technique that uses lasers to measure the distance to objects. The paper states that the extremely sensitive, low-noise single-photon detector overcomes the major limitations of oceanic lidar systems regarding size and power consumption. The team claims that this new Raman lidar system is particularly appropriate for low-light circumstances.

The report also states that Raman scattering, which is the phenomenon of laser light interacting with materials to cause vibrational changes, can be used to identify compounds like dissolved CO₂ and oil. This would likely help in the early detection of oil spill accidents. Additionally, with uses in ocean surveys and deep-sea resource development, the system exhibits enormous promise for recognizing and detecting materials in complicated aquatic ecosystems.

According to the study, the team’s practical demonstrations were based on a cylindrical radar that was 40 cm (15.7 inches) long, 20 cm in diameter, and used less than 100 watts of electricity. The radar only needed a 1-microjoule laser pulse and a 22.4mm telescope to detect undersea oil spills at a distance of 12 meters, or roughly 39.4 feet. The US professional association Optica published a special study on the radar system, observing that it could be deployed at depths of up to 1,000 meters and was characterized by miniaturization and high integration. The Optica paper stated that the technology has great promise for use in coral detection, manganese nodule exploration, and underwater material identification.

An official report from Xiamen University said, “Such radar systems have already been integrated into Xiamen University’s Jia Geng research vessel, AUVs and drones, playing a key role in marine surveys, deep-sea resource exploration, environmental monitoring, and underwater target imaging and recognition.”

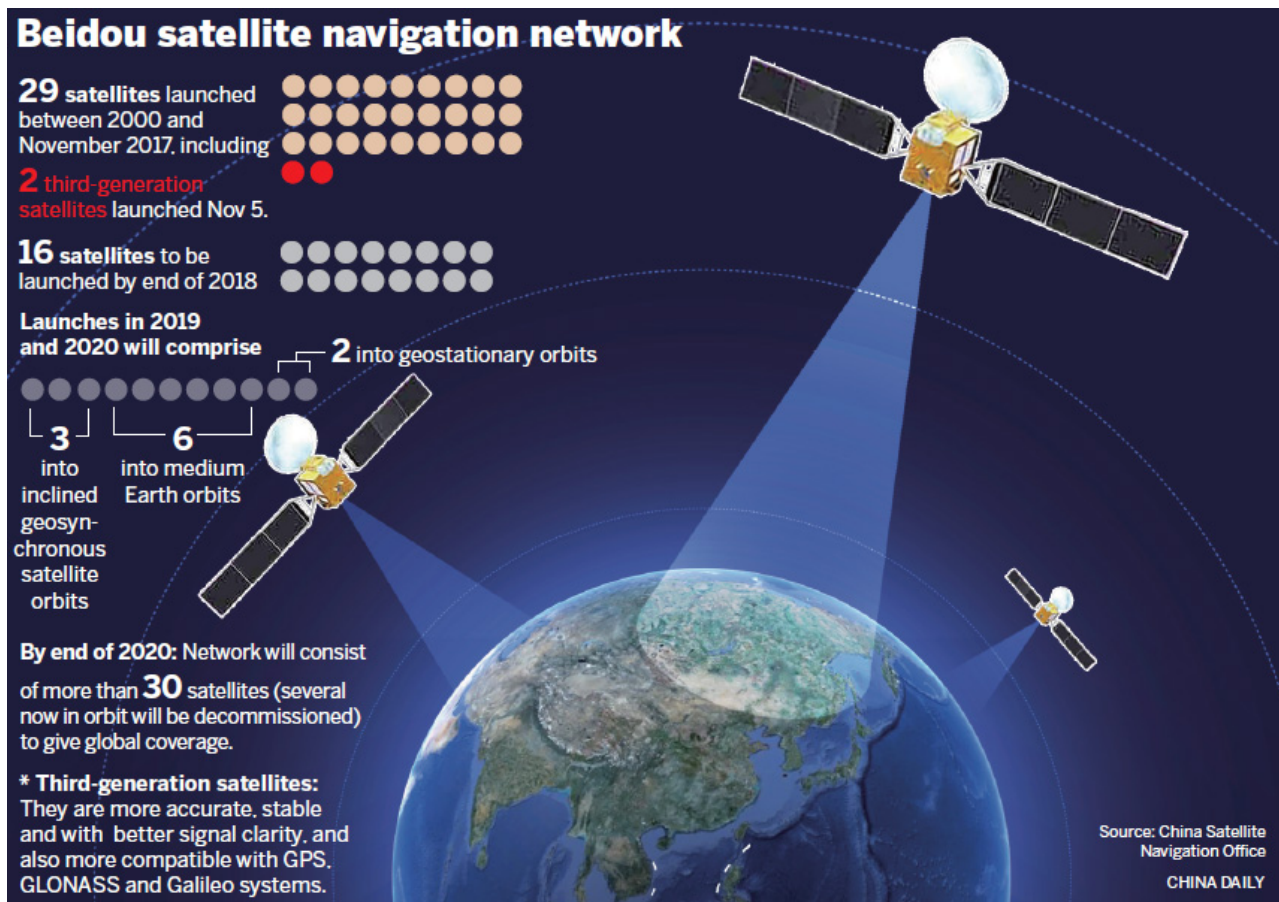
More importantly, though, the technology may find application in military domains like submarine detection and reconnaissance since it offers the possibility of high-resolution laser imaging of small underwater targets. This could prove to be crucial for China, especially amid increasing US submarine activity in the Asia-Pacific.

Chinese scientists have increased their efforts to develop sophisticated devices that could easily detect the latest submarines underwater. For instance, a team of Chinese scientists earlier developed a terahertz-based submarine detection device that detects tiny vibrations or ripples on the water surface caused by a submarine under the ocean. In addition to detecting objects at great sea depths, Chinese researchers have also developed radars allowing the country’s military to detect the US stealth fighter jet F-22 Raptor.

Chinese Radar That Can “Detect” The Raptor?

According to reports published in October, Chinese researchers have created a new radar technology to track and identify the F-22 Raptor, one of the world’s most sophisticated stealth fighter jets flown by the US Air Force. Chinese media reported that this innovation reportedly leverages signals from China’s BeiDou navigation satellite system. The novel radar technique, which just requires a basic receiving antenna, is characterized as an affordable solution that could facilitate its deployment at several places. Moreover, this technology does not transmit signals as conventional radars do, which greatly lowers the possibility of revealing its location—a crucial

advantage during military operations. This breakthrough was detailed in a peer-reviewed paper published in the Journal of the National University of Defense Technology. To illustrate the radar's capabilities, the research team employed a hypothetical F-22 Raptor as a target.



China's BeiDou navigation system

The radar uses BeiDou signals to identify refraction patterns that stealth planes create. Scientists can determine the type and position of the aircraft by analyzing the distinctive echoes produced by these patterns. China's global navigation satellite system, BeiDou, has robust worldwide coverage with almost twice as many satellites as the United States' GPS. According to the researchers, this system's signals are stable, continuous, and precise, which makes it appropriate for illuminating small or challenging-to-detect objects. The ability to identify stealth aircraft designed to minimize radar signatures is particularly helpful.

However, the scientists also acknowledged the challenges in using these signals for detection. The signals refracted by stealth aircraft are frequently feeble by the time they hit the ground, and reflections from trees, buildings, and other surrounding objects can cause interference. Earlier passive radar systems needed sophisticated dual-channel reception arrangements with a reference antenna aimed directly at a satellite to handle these issues. Due to this, the radar systems became more complicated and expensive. On the other hand, the Chinese team's new radar design uses a single receiving antenna and incorporates a revolutionary "blind detection" technique.

This greatly lowers hardware costs and computing demands by eliminating the necessity for a reference signal. The system's streamlined structure increases its dependability in a wartime

situation, making it simpler to deploy and more resilient to hostile jamming. If these claims are anything to go by, the emergence of this new radar technology could significantly impact the effectiveness of stealth fighters. The F-22, well-known for its ability to avoid enemy radar, mostly depends on its stealth characteristics to engage targets in the air and on the ground. According to performance parameters projected by Chinese researchers, the new radar system may potentially be used to detect other stealth aircraft, such as the F-35. If these innovations are adopted for military use, the Chinese might soon wield devices that can detect objects anywhere, from the depths of the sea to skies dominated by hostile fighter jets.

<https://www.eurasiantimes.com/china-can-detect-objects-at-great/>



Thu, 12 Dec 2024

South Korea Installs Indigenous TACAN System At 13 Air Bases To Ensure “Safer” Navigation For Pilots

South Korea has successfully completed the installation of a new, domestically developed Tactical Air Navigation (TACAN) system at 13 air bases across the country. The completion of the project, valued at 30.7 billion won (approximately US\$21.5 million), was announced on December 11 by the Defense Acquisition Program Administration (DAPA). The new TACAN system replaces outdated navigation technology at these key air bases to bolster the country’s air operations support infrastructure.

The system provides crucial bearing and distance information for military aircraft and is vital for air operations to ensure safer and more efficient navigation for pilots. Described by DAPA as a “lighthouse in the sky,” the system allows military aircraft to determine their position relative to a fixed base accurately.

Unlike the previous foreign-supplied systems, the new setup is fully developed using homegrown technology to offer greater flexibility and control over its operation and maintenance. This shift to domestic production is expected to streamline the logistics and reduce reliance on foreign suppliers for critical air navigation components. DAPA did not disclose the specific details and name of the new system. However, it is known that Korea Airports Corporation (KAC) is one of the few global manufacturers of TACAN.

According to the KAC’s website, its TACAN 400G, based on modern digital technology and a modular design, meets international standards, including compliance with the International Civil Aviation Organization (ICAO) and various military standards. KAC’s TACAN system has undergone rigorous testing, including a successful German flight inspection in 2016, to certify that it meets global quality benchmarks.

Additionally, KAC collaborates with Rantec Corporation of the U.S. for TACAN antenna production, combining advanced technology and user-friendly features for easy operation and maintenance. This latest development highlights South Korea's continuously growing self-reliance in defense technology and reinforces its ability to support and maintain critical air navigation infrastructure independently.

Tactical Air Navigation (TACAN) System

The Tactical Air Navigation (TACAN) system is a vital radio navigation aid primarily used by military aircraft. It was developed in the 1950s by the United States military to provide accurate navigation and positioning information for aircrews. The system is crafted to help pilots determine their position and navigate both en route and during approach phases.

The system operates in the Ultra High Frequency (UHF) range to offer pilots two key pieces of information: the aircraft's bearing to the TACAN station and the distance to that station. This information is important for precise navigation in complex and challenging environments where traditional navigation aids, such as VOR (VHF Omnidirectional Range) or NDB (Non-Directional Beacon), might be less effective.

The system consists of two main components: the ground station, which transmits the navigation signals, and the aircraft receiver, which processes these signals to provide distance and bearing data. The range of the system typically extends to hundreds of miles, depending on the power and location of the ground station. At its core, TACAN works by emitting a signal from a ground station that the aircraft can detect and use to calculate both bearing and distance. The ground station broadcasts a directional signal, which the aircraft's TACAN receiver processes.

The receiver then determines the bearing, which is the angle between the aircraft and the station, and the distance, which is calculated based on the time it takes for the signal to travel from the station to the aircraft. Unlike other navigation systems that provide either azimuth (direction) or distance data, TACAN simultaneously provides both, making it a more precise and reliable system for military aircraft.

Additionally, the system operates in the UHF frequency range (between 962 and 1213 MHz), which allows for better penetration in environments with obstacles like mountains or dense urban areas. While originally developed for military use, TACAN is also used in shared civil and military environments, especially at airports where both civilian and military aircraft operate.

The system is particularly beneficial in low-level flight operations, where visual references might be limited, and during missions such as air-to-air refueling, search and rescue, and long-range navigation. Compared to VOR/DME, TACAN offers several advantages, such as the ability to provide both distance and direction simultaneously. This makes it more accurate for military operations. VOR systems, by contrast, usually require an additional Distance Measuring Equipment (DME) system to determine distance. Furthermore, TACAN operates in a higher frequency range (UHF), making it more suitable for military operations, which often require greater signal clarity and range.

<https://www.eurasiantimes.com/south-korea-installs-indigenous-tacan-system/>

Fujian Aircraft Carrier: China Mastering Catapult Launch From Its 80,000-Ton Warship? New Images Spark Speculations

The buzz surrounding China's newest aircraft carrier, the Fujian, has gained fresh momentum with the circulation of new images that seem to show the first-ever coordination between aircraft and the vessel during a recent sea trial. These images, which surfaced online, reveal tire marks on the carrier's deck, which sparked speculation that the Fujian is now engaged in aircraft landing and take-off testing.

The Fujian, China's most advanced aircraft carrier to date, has been the subject of global attention ever since its launch. The ship represents an important advancement in China's naval capabilities. It is designed with a cutting-edge electromagnetic catapult system, also known as the Electromagnetic Aircraft Launch System (EMALS).

When fully operational, this feature will enable Fujian to launch a wider variety of aircraft more efficiently, allowing China to project naval power more effectively. The Fujian aircraft carrier began its sea trials earlier this year and completed its fifth trial on December 3. This trial lasted approximately 15 days and took place in the Yellow Sea. These trials are critical to the vessel's development, as they focus on testing and refining the ship's systems.

The fifth trial began in November 2024 and even saw the launch of test vehicles—often referred to as “dead load”—into the sea to simulate aircraft launches from the carrier. These tests help assess the functionality and strength of the catapult system. Images that emerged on the Chinese social media platform Weibo also show scale models of China's latest J-35 stealth fighter and the KJ-600 early warning and control aircraft displayed on the flight deck.

However, it was only upon Fujian's return from this trial on December 3 that an image showing tire marks on the carrier's deck surfaced. Military aviation researcher Rupprecht Deino shared the image on the social media platform X (formerly known as Twitter), which gained traction online and sparked discussion and speculation.

Experts Cautious About Catapult Launch Claims

Many viewed the image as confirmation of the “first take-off” from the Fujian, seeing the event as a crucial milestone in the vessel's progress. Despite the visible tire tracks, experts have cautioned that these marks do not necessarily indicate a successful aircraft launch. Deino himself pointed out that while the image may appear promising, it does not definitively confirm the execution of full-scale catapult trials with actual aircraft.

He suggested the marks could be from a “touch-and-go” maneuver, where a plane lands on the carrier's deck and takes off again without stopping. He said, “I don't really want to jump the gun

here but that sure looks like a jackpot to me. Doesn't necessarily mean that it has conducted catapult trials with real aircraft though. Could just be a touch-and-go." Similarly, Timothy Heath, a senior international defense researcher at the US-based think tank Rand Corporation, told SCMP that the marks might also result from "touch-and-go passes by aircraft."

He expressed doubt that the PLA Navy had successfully conducted catapult launches, noting that if they had, Chinese media would likely have featured footage and extensive coverage of the accomplishment. Heath acknowledged that while it would take time, the PLA Navy would eventually master the technique for such launches.

Heath's argument that a milestone such as a successful catapult launch from the Fujian aircraft carrier would have drawn major attention in Chinese media is understandable. Launching an aircraft from the Fujian's deck will be a pivotal moment in bringing the ship closer to full operational status. Given the strategic importance of such a potential achievement, Beijing would use it as a powerful symbol to showcase its growing military and technological prowess to the world.

So far, the only carrier to successfully launch aircraft using the electromagnetic aircraft launch system (EMALS) is the USS Gerald R. Ford. Other countries, including France, India, and possibly the United Kingdom, are also planning to work on deploying EMALS-equipped carriers in the future. What sets Fujian apart is China's decision to bypass steam-powered catapults entirely, opting directly for electromagnetic catapults without having operated a carrier with the older technology.

This leap underscores China's intent to fast-track its naval modernization and take the lead in advanced naval technology. Meanwhile, Yue Gang, a retired colonel from the People's Liberation Army (PLA), suggested that the tire marks on the flight deck are likely a result of landing tests, in which aircraft land and slide for about 80 meters (263 feet) before being caught by the arrestor wires.

Yue speculated that the first landings on the carrier would likely involve the J-15T and the KJ-600. Yue further indicated that upcoming trials would focus on testing landings of the J-35B, the naval variant of the J-35, followed by aircraft launches. He added that the tests will be conducted incrementally, assessing performance with various fuel and munitions loads.

According to Yue, the coming months will be critical as the carrier progresses to tests involving aircraft launches and landings. Once these are completed, the next phase will involve evaluating multi-carrier coordination and communication systems.

<https://www.eurasiantimes.com/photos-suggest-chinas-fujian-aircraft-carrie/>

Science & Technology News



**Press Information Bureau
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Ministry of Science & Technology

Wed, 11 Dec 2024

"Exploring unexplored or under-explored sectors is vital for achieving the India 2047 goal"

**India to launch its Deep-Sea mission by end of next year: Union Minister
Dr Jitendra Singh**

"Exploring unexplored or under-explored sectors is vital for achieving the India 2047 goal". This was stated here today by Union Minister Dr Jitendra Singh while addressing the "States' Policy Conclave 2024" organised by PHD Chamber of Commerce & Industry.

The Minister underscored the need to explore sectors like the deep sea and Himalayas. He said that by the end of the next year India will be in a position to commission its deep-sea mission. He said that marine resources are one such area which is yet to be fully explored. As many as twelve States in India scaling above 75 hundred kilometer located around the sea right from Orissa to Maharashtra.

The deep-sea, said Dr Jitendra Singh, has a huge concentration of natural resources which needs to be explored in such a way that it could contribute to the growth trajectory of the nation. He said that our ancestors had smelt the smell of deep-sea.

Dr. Jitendra Singh informed that India has had a favourable political dispensation since last one decade; this could also help in achieving the goal of 2047. Due to lack of political milieu the deep-sea exploration remained unexplored since the last 7 decades.

He said that Himalayan resources are also equally important for the States which are located in its lap like Himachal Pradesh, Uttarakhand and other States. Before any others, this government has woken up as far as marine resources are concerned and gearing up for the purple mission.

In consecutive last two Independence Day 2022-2023 the Prime Minister in his address mentioned this which is usually not supposed to be figured in the Independence Day speech of Prime Minister Modi. However, by the end of next year India will habit all deep-sea missions.

He said startup is such a mission it need not require a person to be well versed in English, it is easy for anyone to start a startup but it is so difficult to sustain. Highlighting the success of startups in Lavender, the Union Minister said J&K has now around 3000 lavender startups.

Dr. Jitendra Singh said that right from the beginning, optimum industry linkage is essential. As close as possible we have to build a linkage between academia research and industry. In India in 2014 there were only 350 startups whereas now it is spiked into 1.7 lakh claiming third position in the world. He said that his government is contemplating to float national resource foundation design on global strategy to achieve the target 2047.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2083329>



Press Information Bureau
Government of India

Ministry of Science & Technology

Wed, 11 Dec 2024

Parliament Question: Establishment Of Advance Research Laboratories

Four national-level Sophisticated Analytical & Technical Help Institute (SATHI) centres and fifteen regional Sophisticated Analytical Instrument Facilities (SAIF) centers equipped with major analytical instruments have been established.

The four SATHI centers are at Indian Institute of Technology, Delhi (Delhi), Indian Institute of Technology Kharagpur (West Bengal), Banaras Hindu University, Varanasi (Uttar Pradesh) and Indian Institute of Technology, Hyderabad (Telangana), while over the years 15 SAIF centers were also established at various States (Annexure).

In terms of physical progress, both SAIF and SATHI centers annually analyse approximately 1,00,000 samples, serving around 32,000 users, and contributing to approximately 2,200 research publications.

Schemes	Financial allocations/Utilisation		
	Amount in ((₹) Crore)		
	2021-2022	2022-2023	2023-2024
SATHI & SAIF	46.7	37.62	34.09

No such facility is established so far, in the state of Andhra Pradesh.

Under SATHI scheme, institutions are selected on cluster mode based on metrics such as academic and research profile, Institute of Eminence status, rank according to National Institutional Ranking

Framework (NIRF), quality of research publications, the breadth of Science, Technology, Engineering, Maths (STEM) disciplines, willingness of lead organisation and its co-opted partners (minimum 5 partners) from nearby organizations to collaborate, technical expertise, readiness to form Section-8 company, availability of dedicated space under one roof, the presence of supportive infrastructure, prior experience in managing shared equipment, well-structured plans for skill development and capacity building, and a minimum 25% funding contribution towards DST's recommended cost slab.

Only ongoing support is provided for strengthening research facilities at SAIF centres and no new calls has been announced to establish new SAIF centres. DST has supported numerous R&D projects under bilateral S&T cooperation with many countries including Australia, Belarus, Canada, Czech Republic, Denmark, Germany, Finland, France, Israel, Italy, Japan, South Korea, Netherlands, Romania, Russia, Serbia, Slovenia, Sri Lanka, Sweden, Taiwan, UK, USA and African countries.

Under multilateral international cooperation DST is involved with The Association of Southeast Asian Nations (ASEAN), Brazil, Russia, India, China and South Africa (BRICS), European Union (EU) etc in the area of sustainable energy, water etc. Some of the salient highlights of these collaborations are focused on adoption of clean technologies, water management, real-time water quality monitoring and water treatment technologies etc. The scheme in building institutional and human capacity, has made significant paces in advancing scientific research, technological innovation, and human capacity building, by strengthening research facilities of various academic institutions and nurtured young talent.

During last financial year, Innovation in Science Pursuit for Inspired Research -Million Minds Augmenting National Aspiration and Knowledge (INSPIRE-MANAK) program empowered young minds by recognizing over 46,000 innovative ideas submitted by them, with a significant female participation. Additionally, through programs like INSPIRE Faculty and INSPIRE-Scholarship for Higher Education (INSPIRE-SHE), DST has supported more than 11500 fellowship to encouraged research excellence on annual basis.

DST provides assistance to the educational institutions to promote innovation in science and technology under National Initiative for Developing and Harnessing Innovations (NIDHI). Support is provided for establishment of startup incubation centers in academic institutions across the country. These centers help in augmenting the institutional capacity of the educational institutes for supporting innovation and translation of research to startup.

Over the years, DST has established around 180 incubators across the country in various educational and research institutes supporting startups in different technology domains. In order to strengthen Human Capacity in entrepreneurship and innovation, DST provides fellowship to students through NIDHI Entrepreneur in residence program. Over the last 3 years, a total 931 students have been supported through the NIDHI Entrepreneur in residence fellowship. Climate Energy and Sustainable Technology program has supported over 290 projects on water technology and clean energy.

By nurturing young talent, supporting startups, and promoting technological advancements, DST is contributing to India's growth and development as a global leader in science and technology.

Annexure

S.No	Institution Name	State
1.	Indian Institute of Technology -Madras, Chennai	Tamil Nadu
2.	Central Drug Research Institute, Lucknow	Uttar Pradesh
3.	Indian Institute of Technology -Bombay, Mumbai	Maharashtra
4.	Shivaji University, Kolhapur	Maharashtra
5.	Indian Institute of Science, Bangalore	Karnataka
6.	Karnatak University, Dharwad	Karnataka
7.	Panjab University, Chandigarh	Chandigarh
8.	All India Institute of Medical Sciences, New Delhi	Delhi
9.	North Eastern Hill University, Shillong	Meghalaya
10.	Gauhati University, Guwahati	Assam
11.	Sophisticated Instrumentation Centre for Applied Research & Testing, Charutar Vidya Mandal, Vallabh Vidyanagar, Anand	Gujarat
12.	Sophisticated Test and Instrumentation Centre, Cochin University of Science and Technology (CUSAT), Kochi	Kerala
13.	Mahatma Gandhi University, Kottayam	Kerala
14.	Indian Institute of Technology-Patna	Bihar
15.	Indian Institute of Engineering Science and Technology, Shibpur	West Bengal

Name of the institutes and State where Sophisticated Analytical Instrument Facilities (SAIF) have been established: -

This information was given by Union Minister of State (Independent Charge) for Science & Technology, Dr. Jitendra Singh in a written reply in the Lok Sabha today.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2083208>



Press Information Bureau
Government of India

Ministry of Science & Technology

Wed, 11 Dec 2024

Parliament Question: PMECRG

The Prime Minister Early Career Research Grant (PMECRG) Scheme of the Anusandhan National Research Foundation (ANRF) aims to empower and support the early career researchers in their pursuit of research excellence, providing them with an enabling environment to effectively conduct research with ease and flexibility. It supports researchers to initiate their research with a support of up to Rs. 60 lakh along with overhead charges for a period of three years. Selection of researchers is based on recommendation of the subject specific expert committees. The Committees select the applicants primarily based on the quality of the research proposal, and the research accomplishment and track record of the applicant in relevant fields.

The Mission for Advancement in High-Impact Areas - Electric Vehicle (MAHA-EV) of ANRF addresses priority-driven, solution-focused research that would catalyse multi-institutional, multi-disciplinary and multi-investigator collaboration to address scientific challenges and advance the frontiers of technology in Electric Vehicle (EV) mobility. The Mission enables research & development (R&D) in some of the key EV components such as batteries, motors and controllers, power electronics, and related subsystems, chargers, grid interface to meet the current technological requirements on one side as well as doing cutting edge research to attain future global leadership, enhance domestic R&D capabilities, and position India as a hub for development of EV components thereby promoting Atmanirbhar Bharat. The EV Mission is one of the significant steps in achieving India's commitment towards net-zero emission target by 2070 and positively impact on India's sustainability goals. These targets necessitate India to develop indigenous, innovative, technically advanced, and economically viable components/systems for EVs that are also going to perform at optimal levels in the context of the Indian weather and traffic conditions.

The MAHA-EV Mission envisages creation of Electric Mobility Nodes (e-Nodes) in consortia mode for effective and impactful implementation. Each e-Node in a specific technology vertical consists of about 3-4 academic institutions/R&D laboratories with provision for inclusion of startups/PSU/industry partners working in the respective domain. Selection of e-Nodes is based on recommendation of specific expert committees. ANRF will monitor the progress of e-Nodes periodically in terms of their target achievements and impact. These measures ensure effective implementation and monitoring of the MAHA-EV Mission.

By supporting early-career scientists, the PMECRG will play a pivotal role in advancing scientific research, enabling recipients to undertake independent and impactful research. It also promotes knowledge creation and strengthens the research ecosystem by fostering fresh perspectives and innovative outcomes. The MAHA-EV Mission initiative focuses on developing indigenous capabilities in the Indian eco-system to meet the current technological requirements and doing cutting edge advanced research. These schemes help researchers establish and advance their research careers, and their contributions are likely to impact India's position in global science and technology. These initiatives are also aligned with the broader vision of Azadi Ka Amrit Mahotsav and contribute to India's scientific and technological advancements.

This information was given by Union Minister of State (Independent Charge) for Science & Technology, Dr. Jitendra Singh in a written reply in the Lok Sabha today.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2083203>



Press Information Bureau
Government of India

Ministry of Science & Technology

Wed, 11 Dec 2024

Parliament Question: National Quantum Mission

The National Quantum Mission (NQM) is for a period of eight years. However, the implementation broadly has three timelines, i.e. 3 years, 5 years and 8 years. Following are the specific aims and objectives of the mission:

1. Develop intermediate scale quantum computers with 20-50 physical qubits (3 years), 50-100 physical qubits (5 years) and 50-1000 physical qubits (8 years) in various platforms like superconducting and photonic technology.
2. Develop satellite based secure quantum communications between two ground stations over a range of 2000 kilometres within India as well as long distance secure quantum communications with other countries.
3. Develop inter-city quantum key distribution over 2000 km with trusted nodes using wavelength division multiplexing on existing optical fibre.
4. Develop multi-node Quantum network with quantum memories, entanglement swapping and synchronised quantum repeaters at each node (2-3 nodes).
5. Develop magnetometers with 1 femto-Tesla/sqrt(Hz) sensitivity in atomic systems and better than 1 pico-Tesla/sqrt(Hz) sensitivity in Nitrogen Vacancy-centers; Gravity measurements having sensitivity better than 100 nano-meter/second² using atoms and Atomic Clocks with 10⁻¹⁹ fractional instability for precision timing, communications and navigation.

6. Design and synthesis of quantum materials such as superconductors, novel Semiconductor structures and topological materials for fabrication of quantum devices for development of qubits for quantum computing and quantum communication applications, single photon sources/detectors, entangled photon sources for quantum communications, sensing and metrological applications.

The major fields of research and development being focused upon under the mission are Quantum Computing, Quantum Communication, Quantum Sensing & Metrology and Quantum Materials & Devices.

The National Quantum Mission was approved by the Union Cabinet at an outlay of Rs.6003.65 Crores for a period of eight years.

National Quantum Mission is a pan India initiative under which four Thematic Hubs (T-Hubs) have been established, comprising of 14 Technical Groups across 17 states and 2 Union Territories, including Bihar. The activities undertaken by these hubs - technology development, human resource development, entrepreneurship development, industry collaborations, and international collaborations-are national in scope. Female scientists from all states and districts, including Bihar, are encouraged to participate in and benefit from the Mission's programs.

This information was given by Union Minister of State (Independent Charge) for Science & Technology Dr. Jitendra Singh in a written reply in the Lok Sabha today.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2083199>



Press Information Bureau
Government of India

Ministry of Science & Technology

Wed, 11 Dec 2024

Parliament Question: National Research Foundation Act

The Anusandhan National Research Foundation (ANRF), established through an Act of Parliament, namely Anusandhan National Research Foundation Act, 2023 (25 of 2023), aims to seed, grow and promote research and development (R&D) and foster a culture of research and innovation throughout India's universities, colleges, research institutions, and R&D laboratories. ANRF acts as an apex body to provide high-level strategic direction of scientific research in the country. The provisions of the said Act have been brought into force on February 5, 2024 and many programmes have been launched in line with the commitment of the Government to operationalize ANRF.

ANRF has provisions to receive monies from the Central Government through grants and loans; donations from public sector enterprises, the private sector, philanthropist organisations, foundations or international bodies for R&D; recoveries made of the amounts granted to ANRF; any income from investment of the amounts received by ANRF and all amounts with the Fund for

Science and Engineering Research under the repealed Science and Engineering Research Board Act, 2008. ANRF and its funding systems are operated through a Governing Board (GB) and an Executive Council (EC). The GB provides high-level strategic direction and monitors the implementation of the objectives of the ANRF and EC is entrusted to implement the provisions of this Act. ANRF has been operationalized recently and a budgetary allocation of Rs. 2000 crore was made for BE 2024-25.

This information was given by Union Minister of State (Independent Charge) for Science & Technology, Dr. Jitendra Singh in a written reply in the Lok Sabha today.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2083198>

THE ECONOMIC TIMES

Wed, 11 Dec 2024

By 2035, India will set up its own space station and set foot on moon by 2040: Union Minister Jitendra Singh

India is set to achieve groundbreaking milestones in space exploration, biotechnology, and marine resource development, with key projects slated for the coming years. Union Minister of State for Science & Technology and Space, Jitendra Singh, revealed plans to establish Bharat Antariksha Station, India's own space station, by 2035, along with an ambitious goal to land an Indian astronaut on the Moon by 2040. These developments underscore India's growing leadership in global science and technology.

Bharat Antariksha Station and Lunar Ambitions

One of India's most ambitious space projects is the establishment of the Bharat Antariksha Station by 2035. The station will mark India's significant leap in space exploration, placing it among the first countries, alongside the U.S. and a few others, to have its own space station.

"We are going to have our own space station, we will be among the first to have that, after the U.S. and one or two other countries. It will be known as Bharat Antariksha Station by 2035. And by 2040, we might be landing an Indian on the surface as well," Minister Jitendra Singh stated during a press conference in Delhi, as reported by TOI.

The proposed space station and lunar landing ambitions are part of India's long-term vision to advance its space capabilities and play a larger role in global space exploration.

Gaganyaan Mission: India's First Human Spaceflight

India is also gearing up for its first human spaceflight mission, Gaganyaan, which will send an Indian astronaut into space. According to Minister Singh, the first astronaut is expected to travel to space either by the end of 2024 or early 2026.

“And while next year ends, or maybe by 2026, we will have the first Indian human being in space, called Gaganyaan,” he remarked. This mission marks a significant step in India's space programme, positioning the country to join the ranks of nations with a human spaceflight capability.

Deep Sea Mission: Exploring the Depths of the Ocean

Alongside its space exploration efforts, India is also focused on exploring the depths of the ocean. The government's Deep Sea Mission aims to send a human to explore the seabed at depths of up to 6,000 meters, a feat that has never been undertaken by India.

“Simultaneously also sending one human being down into the seabed, 6,000 meters deep, which is possibly the maximum depth of the sea,” Singh explained. This mission will provide critical insights into India's marine resources, further strengthening its capabilities in scientific research and exploration.

Satellite Launches: India's Growing Role in Space

India's space programme has made significant strides, with the country becoming a global leader in satellite launches. Since its first foreign satellite launch from Sriharikota, India has launched a total of 432 foreign satellites, nearly 90% of which have been launched in the past decade.

These launches underscore India's growing prominence as a hub for space activities and its ability to support international space exploration efforts.

Biotechnology: India's Vision for Economic and Environmental Growth

Minister Jitendra Singh also highlighted India's focus on biotechnology, particularly through the Biotechnology E3 policy, which integrates biotechnology into economic growth, job creation, and environmental sustainability. Singh emphasized the importance of bio-economy in driving the next industrial revolution, following the IT revolution that has shaped India's economic success.

“Prime Minister Modi is very supportive in all these measures, which is, again, evident from the fact that we are among the first countries in the world to have come out with a bio-economy-related policy called Biotechnology E3,” Singh added.

This policy is part of India's strategy to expand its biotechnology sector, contributing to both economic development and environmental sustainability. The biotechnology field is expected to play a key role in India's future growth, aligning with the country's vision of becoming a global leader in the bio-economy.

Marine Resources: Unlocking India's Ocean Wealth

India's marine exploration efforts have received significant attention, with the government prioritising the development of the Deep Sea Mission. Prime Minister Narendra Modi has underscored the importance of exploring India's marine resources, particularly in his Independence Day addresses in 2022 and 2023. These initiatives are aimed at tapping into the potential of India's vast marine wealth, supporting both economic growth and environmental sustainability.

India's investments in space exploration, biotechnology, and marine research highlight its commitment to becoming a global leader in science and technology by 2047. The Bharat

Antariksha Station, Gaganyaan mission, and Deep Sea Mission are just a few of the key projects that demonstrate India's ambition to lead in the fields of space and scientific exploration. With strong backing from Prime Minister Modi and a focus on sustainable development, India is positioning itself as a key player in the future of global science and technology.

<https://economictimes.indiatimes.com/news/science/by-2035-india-will-set-up-its-own-space-station-and-set-foot-on-moon-by-2040-union-minister-jitendra-singh/articleshow/116203833.cms>



Thu, 12 Dec 2024

Govt. reveals more info about ‘One Nation, One Subscription’ | Explained

On November 25, the Indian government announced the launch of its ‘One Nation, One Subscription’ (ONOS) plan to improve access to expensive research journals to the country’s public education and research institutes. The announcement was accompanied with scant details and broached widespread criticism from the research community, especially over what was perceived to be its disproportionate expense and lack of support for open-access publishing. On December 11, government officials conducted a press conference in New Delhi that addressed many of these concerns.

What is ONOS’s purpose?

When, say, scientists have concluded an experiment, they write up their methods and findings and publish it as a paper in a journal. The journal collects, reviews, edits, publishes, and archives these papers as a service to other scholars and the people at large.

In exchange, journals levy a fee. Subscription-based journals charge readers a fee to read papers. Some forms of open-access (OA) journals, called ‘gold’ OA, charge researchers to publish their paper. So institutes had subscribed to subscription journals through 10 or so consortia within the country.

What is the ‘One Nation One Subscription’ initiative? Why did ONOS provoke criticism?

At the time of announcement, a Ministry of Education press release didn’t specify which journals would be part of ONOS, how ONOS would be implemented, how its allocation of Rs 6,000 crore (for three calendar years) would be spent, and how ONOS would support efforts to make research OA. Experts on the topic also asked whether the allocation for foreign journals could have been used to support domestic publishing efforts instead.

Also it wasn’t clear whether ONOS would help scientists pay to publish in gold OA journals or whether these payments — called article processing charges (APCs) — could be discounted.

What was revealed on December 11?

The press conference was attended by officials from the office of the Principal Scientific Advisor (PSA), the Department of Science & Technology, and the Department of Higher Education.

The package: Currently students and staff at all public institutes will be able to access all papers in the journals participating in ONOS irrespective of their discipline. These include titles owned by major publishers like Springer-Nature, Wiley, and Taylor & Francis.

The officials said centres of science, social science, humanities, and medical education will all be eligible and won't have to pay any other fees. Negotiations are underway to bring more journals into the fold. Those journals that aren't part of ONOS can still sell access separately within the country.

Phases: In her presentation Remya Haridasan, a scientist at the PSA's office, said the government would implement ONOS in three phases. In phase I, it would merge all the consortia and work to facilitate journal access in all public institutes. The scheme will expand to include private institutions in phase II, and in phase III the government would create "universal access" to all citizens "through designated access points at public libraries".

Open access: In a pilot, ONOS would set aside Rs 150 crore a year, out of its Rs 2,000 crore per year budget, to pay for APCs. The government has also negotiated APC discounts for researchers to publish in certain OA journals. The officials said they are aware of transformative OA models around the world and that ONOS would encompass them as it progressed.

As of now, they said, 60-70% of journals in ONOS are subscription-based. They added that around half a decade ago, 75% of papers published by Indian scientists were in subscription-based journals, and that this figure has dropped to 65% today.

Dr. Haridasan said ONOS "is not a value judgment of the subscription-based model of knowledge dissemination but an adoption of the most practical India-specific solution until a sustainable OA model is achieved globally."

Domestic efforts: Officials at the press conference acknowledged the need to support domestic publishers and journals. They said there were five repositories in the country — servers where researchers could deposit digital copies of their papers and where others could freely access them — but that scientists were using them to a less-than-ideal degree.

They said other efforts need to take place, such as "enhancement, promotion, and support of Indian journals" and changes in how institutes evaluate the work of researchers, especially to reduce dependence on journal titles and increase the focus on merit of each person's work. A new research evaluation framework would be needed that also accounts for entrepreneurial pursuits and innovation, they added.

"In a democracy, you can't have a dictum that all research done in India should be published in Indian journals," PSA Ajay Sood said. "Science is global."

<https://www.thehindu.com/sci-tech/science/govt-reveals-more-info-about-one-nation-one-subscription-explained/article68974647.ece>

Google introduces state-of-the-art Willow chip capable of outpacing a supercomputer

Google has unveiled 'Willow,' its latest quantum chip, with 'state-of-the-art performances' across various metrics.

Sundar Pichai, CEO of Google and its parent firm Alphabet, wrote on X, "We see Willow as an important step in our journey to build a useful quantum computer with practical application in areas like drug discovery, fusion energy, battery design + more."

Here's all about Google's Willow chip:

(1.) According to Pichai, Willow can reduce quantum computing's errors exponentially, even as Google scales up its use of qubits (units of computation in quantum computers).

(2.) He also said the chip took less than five minutes to perform a standard benchmark computation, while Frontier, one of the fastest supercomputers today, would complete the same task in 10 'septillion years.'

(3.) The chip was built in the tech giant's new, state-of-the-art fabrication facility in Santa Barbara, one of only a few facilities in the world built from the ground up for this purpose.

(4.) Willow's 105 qubits help it give 'best-in-class performance' across quantum error correction and random circuit sampling (RCS). Its performance is ~5x improvement over Google's previous generation of chips.

(5.) Willow, Pichai stated, is a 'major step' on a journey that he started 12 years ago by founding Google AI. "The vision was to build a useful, large-scale quantum computer that could harness quantum mechanics," the Indian-origin chief executive of Google and Alphabet said.

<https://www.hindustantimes.com/business/google-introduces-state-of-the-art-willow-chip-capable-of-outpacing-a-supercomputer-101733809427336.html>



Researchers develop electronic tattoo for reading brainwaves

About ten years ago, researchers developed electronic tattoos that have since been used for a number of biomedical applications including measuring heart activity, tracking the progress of

pneumonia and evaluating stress levels. However, one of the logistical challenges facing electronic tattoos is applying them on hairy skin, withing compromising on the performance.

Researchers have now developed a new method where a camera maps the shape of the patient's head, then an algorithm informs a robotic printer about where to apply the ink and position the custom designed electroencephalography (EEG) sensors. The printer does not even touch the patient, but propels the ink at great speeds through the hair.

So far the scientists have found success only for short-haired patients. Once the printed sensors are in place, cables are used to link the e-tattoo to a commercial EEG recorder. Brain-computer interfaces use the same equipment as EEG, and the electronic ink tattoos can be easily deployed and are less intrusive for users.

The sensor network is mechanically imperceptible to the user, and requires less setup and maintenance. The researchers intend to improve the application so that it works on patients with longer hair and are exploring using robotic fingers and combs to separate the hair and allow for printing.

Mobile EEG Sensing

A paper describing the new method has been published in Cell Biomaterials. The goal of the project is to develop small, portable, easy-to-use EEG devices that can monitor brain tumours, sleep disorders and other problems with the brain. One of the scientists on the project, Nanshu Lu says, "The holy grail for EEG is a sensor that patients can wear for long periods of time, outside the clinical setting and without the need for constant maintenance. What we've developed opens the door for more mobile EEG sensing."

<https://www.news9live.com/science/researchers-develop-electronic-tattoo-for-reading-brainwaves-2771309>

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