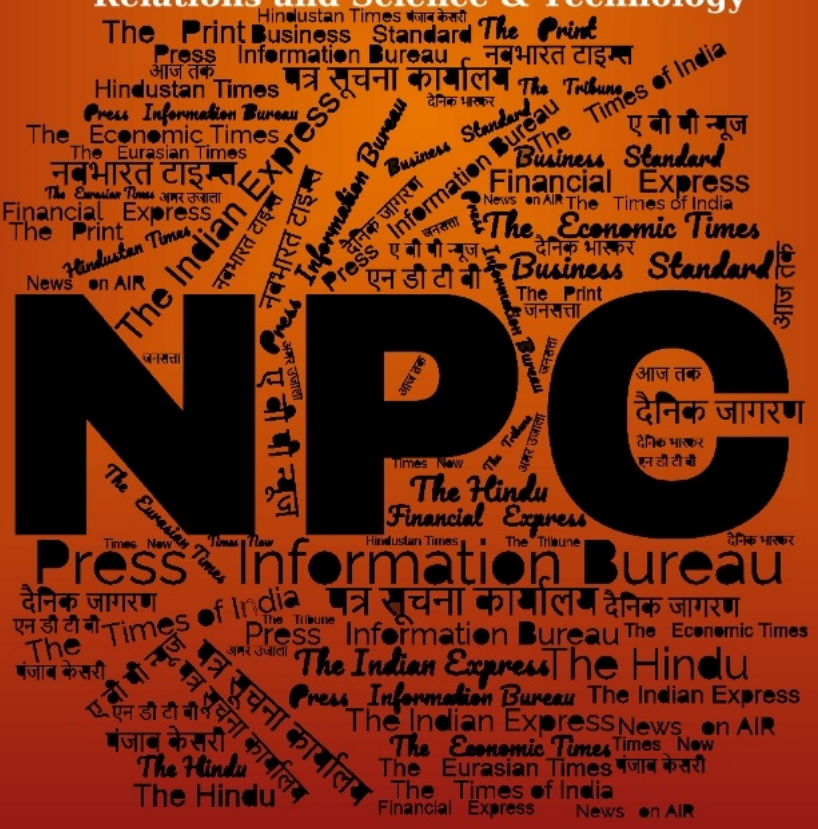
जनवरी
Jan
2025

खंड/Vol. : 50 अंक/Issue :09
11-13/01/2025

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

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology



रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
Defence Scientific Information & Documentation Centre
मेटकॉफ हाउस, दिल्ली - 110 054
Metcalfe House, Delhi - 110 054

CONTENTS

DRDO News

Sat, 11 Jan 2025

अब सेना का कुछ नहीं बिगाड़ पाएगी ठंड! माइनस 60 डिग्री में भी गर्म रखेगा 'हिमकवच'

रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने हिमकवच मल्टी–लेयर क्लोदिंग सिस्टम पेश किया है, जिसे विशेष रूप से अत्यधिक ठंड के मौसम में सुरक्षा के लिए डिज़ाइन किया गया है. इसने 20°C से –60°C तक के तापमान में काम करने के लिए डिजाइन की गई सिस्टम ने ऑपरेशन्स सेटिंग्स में सभी यूजर टेस्ट को पास कर लिया है.

हिमकवच कई परतों से बनी है, इसको इन्सुलेशन, सांस लेने की क्षमता और आराम के लिए तैयार किया गया है. मॉड्यूलर डिजाइन सैनिकों को मौसम के आधार पर परतें जोड़ने या हटाने की अनुमति देता है. इस सुविधा को हिमालय में सक्रिय सैनिकों के लिए महत्वपूर्ण माना जाता है, जहां तापमान तेजी से गिर सकता है.

एक्सट्रीम कोल्ड वेदर क्लोथिंग सिस्टम

हिमकवच से पहले, भारतीय सेना एक्सट्रीम कोल्ड वेदर क्लोथिंग सिस्टम (ECWCS) का उपयोग करती थी, जो DRDO के डिफेंस इंस्टीट्यूट ऑफ फिजियोलॉजी एंड अलाइड साइंसेज द्वारा विकसित एक तीन–स्तरीय संगठन है. हिमकवच से पहले की प्रणाली की तुलना में ज्यादा सुरक्षा देने की उम्मीद है. इसकी क्षमता का उद्देश्य तापमान रेंज में काम करने की उच्च ऊंचाई वाले क्षेत्रों में तैनात सैनिकों की सुरक्षा में सुधार करना है.

सेना की तैयारी को मजबूत करने में मदद

हिमकवच की शुरूआत तब हुई है जब भारत हिमालय की सीमाओं पर चल रही सुरक्षा चिंताओं का सामना कर रहा है. यह गियर सैनिकों को कठिन से कठिन परिस्थितियों में प्रभावी ढंग से काम करने और सेना की तैयारी को मजबूत करने में मदद करने के लिए डिज़ाइन किया गया है. नया क्लोदिंग सिस्टम की तैनाती जल्द ही शुरू होने की संभावना है. इससे कठोर वातावरण में तैनात सैनिकों के लिए गतिशीलता, स्थायित्व और समग्र दक्षता में सुधार होने की उम्मीद है.

https://www.tv9hindi.com/india/drdo-prepared-himkavach-now-soldiers-will-be-able-to-protect-country-even-in-minus-60-degrees-3052945.html

ANI
South Asia's Leading Multimedia News Agency

Fri, 10 Jan 2025

DRDO's multi-layer clothing system 'HIMKAVACH' clears user trials, set to aid military operations

The Defence Research and Development Organisation (DRDO) has introduced the HIMKAVACH multi-layer clothing system, specially designed to provide optimal protection in extreme cold weather conditions.

The innovative clothing system has passed all user trials under actual operational conditions, proving its effectiveness for military operations in cold weather, particularly in the Himalayan region.

Taking to its official handle on X, DRDO posted, "DRDO developed HIMKAVACH multi-layer clothing system designed for temperature range of +20°C to -60°C has successfully cleared all user trials in actual operation. The clothing system will be very useful in military operations in cold weather conditions along the Himalayan region."

https://www.aninews.in/news/national/general-news/drdos-multi-layer-clothing-system-himkavach-clears-user-trials-set-to-aid-military-operations20250110213911/

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Fri, 10 Jan 2025

Raksha Mantri Shri Rajnath Singh calls for enhanced cohesiveness of the global community in view of the current security environment

"India is emerging as a leading voice for the Global South & advocates for a multi-aligned policy approach"

"Aero India is an event where nations come together & form bonds beyond boundaries"

"Asia's largest aeroshow presents an opportunity for nations to jointly explore strengths & capabilities and address strategic & tactical needs"

"Aero Space Power is the new frontier of military dominance which acts as strategic deterrence"

Raksha Mantri Shri Rajnath Singh has called for enhanced cohesiveness of the global community in view of the current security environment which, he said, is in a state of flux with multiple conflicts and challenges. Addressing Ambassadors' Round-Table, organised as a prelude to Aero India 2025, in New Delhi on January 10, 2025, Raksha Mantri stressed on the need to overcome the present geopolitical tensions for ensuring mutual prosperity and global peace.

"It is of paramount importance that the like-minded countries should strive together for collective actions for peace and prosperity. Without these, our future generations will not be able to take advantage of economic growth or technological innovations that we are experiencing in today's era," Shri Rajnath Singh told the Ambassadors and High Commissioners of various countries attending the event.

Raksha Mantri pointed out that India is emerging as a leading voice for the Global South, and it advocates for a multi-aligned policy approach, which ensures that diverse views are considered in the collective pursuit of prosperity. “Prime Minister Shri Narendra Modi has articulated India’s commitment to addressing global challenges through five guiding principles: Respect, Dialogue, Cooperation, Peace & Prosperity. In today’s geopolitical landscape, fostering unity among like-minded nations is essential for ensuring mutual prosperity and peace, while addressing contemporary challenges. India has always championed shared prosperity and shared responsibility based on the fundamental principle of Vasudhaiva Kutumbakam, ‘One Earth, One Family’, which was also the theme for G-20 Summit in 2023,” he added.

Shri Rajnath Singh described Aero India, Asia’s largest aeroshow, as one such event, where nations come together and form bonds beyond boundaries. Elaborating on the vision behind the biennial event, he stated that it has proven itself to be the meeting ground for the aerospace and defence sectors to showcase their products/technologies. He defined it as a forum to forge strategic partnerships towards increasing opportunities for business, Transfer of Technology, joint development and co-production between various industries.

Raksha Mantri emphasised that, today, India possesses one of the largest defence industrial ecosystems in Asia and the Government is committed to further enhancing the capabilities. He added that the Indian aerospace and defence sector represents an attractive opportunity for foreign companies seeking to establish new ventures & partnerships. He cited the significant milestone of setting-up of the manufacturing facility of C-295 transport aircraft for the Indian Air Force through collaboration between Tata Advanced Systems Limited and Airbus Defence & Space.

Shri Rajnath Singh asserted that India has emerged as an attractive destination for investment, and Aero India 2025 presents an opportunity for friendly nations to jointly explore strengths and capabilities in the defence sector, addressing both strategic needs as well as tactical requirements. He added that the event will facilitate industry captains, technology leaders, intellectuals and entrepreneurs with new avenues for collaboration in defence industrial enterprises. “Aero India 2025 will serve as a vital forum for exploring partnerships that will from the base for future challenges. Together, we can create pathways for growth that are inclusive and sustainable,” he said.

Raksha Mantri emphasised that air and space power have become pivotal elements in shaping strategies as such assets, incorporated with Artificial Intelligence and Machine Learning systems, provide an unprecedented advantage in battle-field scenarios. He described Aero Space Power as the new frontier of military dominance which acts as strategic deterrence.

Highlighting India’s focus on self-reliance through strategic partnership and technological collaborations in defence & aerospace sectors, Shri Rajnath Singh said: “In recent years, the government has brought about several transformative policy reforms aimed at bolstering a robust defence industry ecosystem. This includes initiatives that promote domestic design, development, manufacturing and exports. Recognising its strategic importance and vast potential, the Government has designated aerospace as one of the core sectors of ‘Aatmanirbhar Bharat’. As a result of this, aerospace and defence in India is taking significant strides in developing cutting-edge technologies, both through public as well as private industry participation.

Raksha Mantri looked forward to welcoming the Ministers, Officials and Business Delegations from various countries at Aero India 2025 and utilising the platform to explore newer areas for enhancing collaboration.

During the Round-Table, Ambassadors and High Commissioners of various countries were briefed on the major events of Aero India 2025, and extended a personal invite from Raksha Mantri for their senior most leadership. Chief of Defence Staff General Anil Chauhan, Chief of the Army Staff General Upendra Dwivedi, Chief of the Naval Staff Admiral Dinesh K Tripathi, Chief of the Air Staff Air Chief Marshal AP Singh, Defence Secretary Shri Rajesh Kumar Singh, Secretary (Defence Production) Shri Sanjeev Kumar and other senior officials of the Ministry of Defence as well as the Government of Karnataka attended the Round-Table.

About Aero India 2025

This 15th edition of Aero India is scheduled to be held at the Air Force Station, Yelahanka in Bengaluru, Karnataka from February 10 to 14, 2025. The five-day event comprises a curtain raiser event, inaugural event, Defence Ministers' Conclave, CEOs' Round-Table, iDEX start-up event, breath-taking air shows, a large exhibition area comprising India Pavilion and a trade fair of aerospace companies. The broad theme is 'The Runway to a Billion Opportunities'.

The first three days of the event (February 10th, 11th & 12th) will be business days, while 13th & 14th have been set as public days to allow people to witness the show. The event will provide a platform for forging partnerships between foreign & Indian firms and the discovery of newer avenues in the global value chain to accelerate the indigenisation process.

Aero India attracts a large number of exhibitors from the world's leading industries in the field of aerospace and defence. It provides a unique opportunity for the industry to showcase their capabilities, products and services to the targeted audience. The biennial event serves as a platform for industry leaders to connect and shape the future of aerospace & defence industries.

https://pib.gov.in/PressReleasePage.aspx?PRID=2091817

THE ECONOMIC TIMES

Fri, 10 Jan 2025

Surya Kiran: Indo-Nepal joint military ex focuses on urban warfare, jungle survival

The 18th edition of the Indo-Nepal Joint Military Exercise Surya Kiran, currently underway in Nepal, highlights the robust partnership between the Indian and Nepalese armies.

Focused on counterterrorism and operations in challenging terrains, the exercise features rigorous training in jungle survival, urban warfare, heliborne operations, and ambush tactics, fostering military cooperation and mutual preparedness.

In a statement, the Indian Army said, "The 18th edition of the Indo-Nepal Joint Exercise Surya Kiran, currently underway in Nepal, underscores the strong and enduring partnership between the Indian and Nepalese armies. This joint military exercise focuses on counterterrorism and operations in challenging terrains, with troops engaging in rigorous drills such as jungle survival, combat first aid, ambush tactics, and heliborne operations."

"Urban warfare training, including close-quarter combat and room-clearing techniques, prepares participants for modern battlefield scenarios. Additionally, lane training simulates real-world tactical challenges, while team sports and yoga sessions foster resilience, mental focus, and camaraderie. Surya Kiran 18 exemplifies the shared commitment of both nations to military excellence, peace, and mutual cooperation," the statement added.

Notably, the 18th Indo-Nepal Joint Military Exercise is underway at Saljhandi in Nepal and is running from December 31 to January 13.

As part of the opening ceremony, both contingents participated in a traditional march, harmonising the tunes of Indian and Nepali military music.Major General Prem Bahadur Gurung, General Officer Commanding the Mid-West Division of the Nepal Army, addressed the troops during the ceremony. He emphasised the importance of learning from each other's experiences and enhancing interoperability, while also strengthening the brotherhood between India and Nepal.

"Gain from each other's rich experience, enmesh interoperability while simultaneously strengthening the brotherhood existing among the two nations," he said in his address.

The Indian Army contingent arrived at Saljhandi on December 29, receiving a traditional military reception. Around 700 defense personnel from both armies are participating in the exercise, further solidifying the military ties between the two countries.

https://economictimes.indiatimes.com/news/defence/surya-kiran-indo-nepal-joint-military-ex-focuses-on-urban-warfare-jungle-survival/articleshow/117107136.cms

THE ECONOMIC TIMES

Fri, 10 Jan 2025

Kochi: Indian Navy, Indian Air Force, French Navy participate in Maritime Partnership Exercise

INS Mormugao, along with aircraft from the Indian Air Force, recently participated in a Maritime Partnership Exercise with the French Carrier Strike Group (CSG) off India's Western Seaboard, an official statement reported.

The exercise involved complex maritime drills, including joint air operations, showcasing the high degree of interoperability and professionalism between the Indian and French naval forces.

These professional interactions are a hallmark of strategic bilateral relationships and symbolise a high degree of professionalism and interoperability between the navies.

Earlier this month, French naval ships FS Forbin and FS Alsace, part of the CSG, arrived in Kochi, Kerala, as part of their ongoing mission.

The visit serves to enhance interoperability, and mutual understanding, and foster closer collaboration between the Indian and French navies. During their visit, the Commanding Officers of the French ships engaged in discussions with senior officials at the Southern Naval Command, focusing on strengthening defence cooperation.

In addition to the maritime exercises, the visit includes several professional exchanges involving cross-deck visits and Subject Matter Expert Exchanges (SMEE), which offer valuable opportunities for learning and enhancing military operations. The visit of the French ships aims to further strengthen ties and reaffirm India's commitment to constructive collaboration and mutual growth.

Earlier, the French carrier strike group (CSG), led by the aircraft carrier FNS Charles de Gaulle, made stopovers in Goa, Kochi on Friday as part of Mission CLEMENCEAU 25India and France have maintained a robust defence partnership since 1998, marked by numerous joint exercises such as Shakti (land), Varuna (sea), and Garuda (air). This partnership continues to thrive through operational stopovers, with 16 port calls by French Navy vessels since 2022.

Both nations, as resident states of the Indian Ocean, work closely to ensure maritime safety in the region, further solidifying their role as key players in maintaining regional security.

https://economictimes.indiatimes.com/news/defence/kochi-indian-navy-indian-air-force-french-navy-participate-in-maritime-partnership-exercise/articleshow/117125177.cms

THE ECONOMIC TIMES

Sat, 11 Jan 2025

Irrespective of domain of war, victory or defeat will be decided on land: Army commander

Irrespective of the domain in which a war takes place, victory or defeat will be decided on land only, and the Russia-Ukraine war has again proved it, an army commander said on Saturday. General Officer Commanding-in-Chief, Western Command, Lt Gen M K Katiyar, in his address at an investiture ceremony here, without naming any country, also said, "Because our disputes, along northern and western borders, are related to land, therefore for us it becomes even more necessary to win on land".

"This is a challenging time for our army. Two major wars are currently underway in the world and going on for a long time. Many countries are directly or indirectly linked to these wars," he said.

Despite efforts by world bodies such as the UN, these wars are neither ending nor getting limited. Today's situation encourages those countries who want to settle disputes through the use of force or fighting, the top army officer said.

"We have to stay fully vigilant at both our northern and western borders. Besides, it is necessary that there are no shortcomings in our preparations for any war. Good training, good weapons, and technology infusion are very necessary," he said.

During the investiture ceremony of the Western Command held at the Cariappa Parade Ground at Delhi Cantonment, an impressive parade of marching contingents and weapon platforms was also held.

"This (parade) clearly shows that our army is fully ready for a battle. When you will march on the Kartavya Path on January 26, the faith of our countrymen in our army and in the ability of the armed forces to defend the country will also get augmented," the GOC-in-C of the Western Command said.

He also emphasised that technology is changing the nature of warfare, and today this change is happening at a "very fast rate", and it is imperative that "we also change our mindset".

"We should learn from previous wars and prepare for future wars. We should be prepared for future wars. The change in the nature of warfare has also changed the scope of warfare. The area of operation is expanding. Future wars will not be limited to battlefields. Its impact will be beyond the battlefield," he said.

Domains of war have also grown, and besides, sea, land, air, and space, wars will take place in cyber, electronic and network domains too, the army commander said.

"But, wherever the war takes place, in air or on seas, victory or defeat will be decided on land only. This thing the Russia-Ukraine war has again proved. Through victory earned on land, we will be able to reach our goal. And, because our disputes, along northern and western borders, are related to land, therefore for us it becomes even more necessary to win on land," he said.

The army commander exhorted the men and women in uniform and said to win on land, "The role of the army, your role will always be decisive".

The responsibility of winning is in your hands. And, besides a win, a decisive win there is no other option. Because there are no runners-up in a war, he underlined.Before the parade, the top officer also reviewed the lineup of contingents and weapon platforms.During the ceremony, he awarded several army personnel or their next of kin for the selfless service rendered to the nation while displaying extraordinary bravery.

In his address, he also said new-generation equipment is getting inducted in all wings of the army, and many of these are also seen here in the parade. "And, it gives us assurance that our army is moving fast in the direction of modernisation."

"We have to achieve expertise in their usage, these equipment and modern technology are a force multiplier which will enhance manifold our combat capabilities and we can fight in a better manner," he added.

"We also have to see how we can change the method of fighting a war, and bring a change in our TTPs (tactics, techniques, and procedures), and revise them," the top officer said.

He emphasised that whether it is external or internal, "Our army has always played an important role in ensuring the security of the country".

The officer stressed that the Indian Army's strength also lies in its unity and secular ethos as people from different backgrounds, cultures and religions together serve the country as one force with a spirit of 'nation first'.

https://economictimes.indiatimes.com/news/defence/irrespective-of-domain-of-war-victory-or-defeat-will-be-decided-on-land-army-commander/articleshow/117153586.cms

THE ECONOMIC TIMES

Sat, 11 Jan 2025

330 Indigenous Choppers Remain Grounded For Transmission Checks

A possible transmission fault is being probed after a fatal crash of an Advanced Light Helicopter that led to the deaths of three coast guard personnel this week. The indigenous fleet of Helicopters - about 330 of them are currently in service - has been grounded for comprehensive checks while the crash is being probed.

Sources said that the crash occurred after the crew reported a sudden loss of control second before the chopper hurtled to the ground. It is learnt that flight data being studied did not show any obvious reason for the loss of control and the probe team is now examining the transmission system for a possible failure.

Earlier, the indigenous helicopter had undergone comprehensive design review by Netherlands based NLR and had been given a green signal. Recently some changes were made in the transmission system and control rods were changed after instances of material failure came to light. Sources pointed out that the accident rate of the ALH is 6.5 incidents per lakh hours of flying, saying that for helicopters of this class, the global average is 7.5 incidents per lakh hours. The ALH fleet has flown over 4.5 lakh hours by now and serves in areas ranging from the high seas to high altitude mountain bases.

They added that from 2004 to 2024, there have been nine major accidents involving the fleet, three of which were attributed to human error and three to a technical fault. The reason behind the remaining could not be conclusively determined.

While the air force has the best safety record with the fleet, the coast guard has had the most number of incidents, including a ditching at sea late last year during a complicated Night time rescue attempt. A call on resuming flight operations will be taken jointly by the services and manufacturer HAL.

https://economictimes.indiatimes.com/news/defence/330-indigenous-choppers-remain-grounded-for-transmission-checks/articleshow/117155028.cms

THE ECONOMIC TIMES

Sat, 11 Jan 2025

Indonesia’s Prez Cancels Pak Detour As India Readies BrahMos Loan Offer

Indonesian President Prabowo Subianto has decided to visit Malaysia from India instead of travelling to Pakistan, following India's formal displeasure over his decision to club Pakistan with his visit to New Delhi, even as India is working to arrange a $450 million loan to Indonesia for purchasing BrahMos missiles.

India had formally expressed displeasure with the Indonesian government on Subianto's decision to travel to Pakistan from New Delhi, where he will be the chief guest for the Republic Day celebrations.

Pakistan was not part of his plan until he met Pakistan Prime Minister Shehbaz Sharif. However, Malaysia was part of his original plan. Indonesia has been among Organisation of Islamic Cooperation member countries that have not backed Pakistan's position on Kashmir at the forum.

Meanwhile, Indonesia's defence ministry has sent a letter to India seeking a $450 million loan for purchasing BrahMos missiles jointly developed by India and Russia, according to people familiar with the matter.

India is considering offering a loan to Indonesia from either State Bank of India or another state-run bank for the deal and the specifics are being worked out, they said.

ET had first reported earlier this month that purchase of BrahMos missiles would figure prominently on President Subianto's wish list during the trip despite budget constraints at home.

Amid a lack of availability of funds for purchasing BrahMos missiles due to the Subianto government's sharp focus on social sector projects in the first year in office, Indonesia decided to seek a loan from India for purchasing the state-of-the-art missiles, according to the people.

When Subianto visited India as defence minister in 2020, BrahMos missiles were among the key talking points on the agenda of his meeting with his counterpart Rajnath Singh. But the deal could not be finalised owing to the financial constraints of the previous Indonesian government due to Covid-19.

After the Philippines purchased BrahMos missiles from India, Vietnam has finalised purchase of BrahMos missiles and Indonesia could be the third customer in Southeast Asia.

Indonesia has long been seen as a potential importer of the missiles as it is keen to modernise its military. Under its current President the country has a former general who could boost defence industry requirements given Indonesia's long coastline.

Subianto could also seek India's support to maintain Sukhoi 30 fighter jets of the Indonesian Air Force. Following the Russia-Ukraine war and Russia's preoccupation, the Indonesian Air Force has

faced some difficulties in maintenance of Su-30s and may approach India, it has been learnt. The Indonesian Air Force has Su-27, Su-30MKK/MK2 and Su-30MKI in its fleet.

https://economictimes.indiatimes.com/news/defence/indonesias-president-cancels-pakistan-detour-as-india-readies-brahmos-loan-offer/articleshow/117155953.cms?from=mdr

THE HINDU

Sun, 12 Jan 2025

HAL's latest Combat Air Teaming System completes crucial test ahead of upcoming Aero India

The flagship program of HAL, Combat Air Teaming System achieved a significant milestone by successfully conducting the Engine Ground Run of a Full-Scale Demonstrator, CATS – Warrior.

The flagship program of HAL, Combat Air Teaming System achieved a significant milestone by successfully conducting the Engine Ground Run of a Full-Scale Demonstrator, CATS – Warrior.

Ahead of the Aero India 2025 which is scheduled to be held next month, Hindustan Aeronautics Limited (HAL) has achieved a significant milestone by conducting the engine ground run of a full-scale demonstrator, Combat Air Teaming System (CATS) - Warrior on January 11, 2025.

The Bengaluru headquartered defence PSU over the last few years has developed the Combat Air Teaming System (CATS) which it had earlier said involves the Light Combat Aircraft (LCA) Tejas as the mother-ship platform.

"The flagship program of HAL, Combat Air Teaming System achieved a significant milestone by successfully conducting the Engine Ground Run of a Full-Scale Demonstrator, CATS - Warrior," HAL announced.

It added that this demonstrates synergy between various R&D centres of HAL with Aircraft design and integration by Aircraft Research & Design Centre (ARDC), indigenous Mission Computer from SLRDC and indigenous power plant from AERDC.

The prototype aircraft is slated to be unveiled at Aero India 25. In the 2021 edition of the Aero India CATS, simulator was showcased.The simulator had the TEJAS–MAX cockpit as the mother-ship platform with the embedded air teaming intelligence concepts to demonstrate the fully integrated as well as autonomous wingman platforms and swarming of drones to engage in the mission. Immersive mission visualization was also projected over a wider screen apart from the command and display at the TEJAS-MAX cockpit.

It can be recalled that the defence PSU has been developing CATS which involves the Light Combat Aircraft (LCA) Tejas as the mother-ship platform along with components such as the Hunter, Alpha and Warrior.A senior HAL official involved in HAL's R&D, HAL has said the CATS is a combined air teaming system with the mothership flying on top along with Hunter

which can inflict strikes deep inside the enemy territory. The Alpha will be equipped with swarm drones and the Warrior can strike after entering nearly 700 km inside the enemy territory.

“We dont want our pilots to enter enemy territory. The CATS Hunter, Alpha and the Warrior would instead enter the enemy territory and carry out the attack if need be,” Arup Chaterjee, who was former director engineering, R&D, HAL had said.

https://www.thehindu.com/news/national/hals-latest-combat-air-teaming-system-completes-crucial-test-ahead-of-upcoming-aero-india/article69090082.ece

The Tribune

Mon, 13 Jan 2025

Z-Morh: A game-changer for all-weather access to Ladakh

Situated at an altitude of 8,652 feet above sea level, the 6.5-km, two-lane tunnel links Gagangir, located 68 km from Srinagar, with the scenic town of Sonamarg. Named after the Z-shaped stretch of road it bypasses, the tunnel eliminates the avalanche-prone section of the route that was often blocked for months due to heavy snowfall. Travel time through this segment will now be reduced from over two hours to just 15 minutes.

Construction of the Z-Morh tunnel began in May 2015 under the National Highways Authority of India (NHAI). This is part of the broader Zoji La Tunnel project aimed at establishing uninterrupted road access between Ladakh and Srinagar.

Strategic importance

The Zoji La Tunnel, a 14-km U-shaped structure currently under construction further east, will bypass the 11,575-foot-high Zoji La Pass, one of the world’s most treacherous. Once completed in about two years, the Zoji La Tunnel will significantly bolster India’s defense posture in the Ladakh and Kargil sectors, where Indian troops are stationed along the Line of Control with Pakistan and the Line of Actual Control with China.

The commissioning of the Z-Morh Tunnel will benefit the civilian population of Sonamarg by providing them with reliable access to Srinagar and Jammu for daily needs. Additionally, it is expected to boost tourism in the area, a major contributor to the region’s economy.

Future tunnel projects

The Z-Morh tunnel is part of a larger effort to improve connectivity to Ladakh and other northern border areas. On the Manali-Leh axis, the Atal Tunnel under the Rohtang Pass was inaugurated in 2020, and work is underway on the Baralacha La Tunnel at the Himachal-Ladakh border. Additional tunnels are planned under the Tangang La and Lachung La passes in Ladakh, all located at elevations exceeding 15,000 feet.

A third route from Manali to Leh, via the Zanskar Valley and the 16,800-foot Shinku La Pass, has recently opened. Construction of a tunnel under Shinku La has already received environmental clearance, further enhancing connectivity.

These projects fall under the Centre's India-China Border Roads initiative, a comprehensive programme to build critical infrastructure along the northern and northeastern borders. The initiative involves constructing thousands of kilometers of roads, bridges, and tunnels, with contributions from organisations like the Border Roads Organisation (BRO), NHAI, and private entities.

Significance for defence

In winter, when roads are blocked, the sustenance of troops in the region relies heavily on Indian Air Force transport aircraft and helicopters. Year-round road access will significantly reduce reaction times, facilitate the movement of heavy equipment, and enable cost-effective logistics. For civilians, it promises better access to healthcare, education, and economic opportunities.

Once the network of tunnels is complete, Ladakh and Kargil will enjoy all-weather connectivity via three routes — one from Srinagar and two from Manali. This will provide not only strategic advantages but also a massive boost to the socio-economic development of the region.

https://www.tribuneindia.com/news/j-k/z-morh-a-game-changer-for-all-weather-access-to-ladakh/

The Tribune

Sat, 11 Jan 2025

Bangladesh widens arc of military ties, looks at US, EU for modern tech, arms

In an important military-strategic development impacting India, Bangladesh is widening its arc of military cooperation in its quest for modern technology, besides seeking additional lethal arms, land attack weapons, helicopters, fighter jets, drones and warships.

Other than China and Pakistan, Dhaka is in talks with the US for equipment. The European Union, for the first time, posted a defence attache to Dhaka in December. Bangladesh is also steadfast in operationalising a security agreement with Japan inked in November 2023.

Italy, Türkiye, France and Sweden are other countries with which Dhaka is in touch for its military needs. Indian security agencies monitoring Bangladesh have informed the government about the military-related changes being done by the Mohd Yunus-headed interim government in Dhaka.

Adding more force, muscle

- Bangladesh is looking at US 'black hawk' helicopters and targeting acquisition of counter-UAV systems from 'western suppliers'

- Dhaka also plans to join the ‘EU security framework’ for its air force; for its immediate needs, it plans to buy Chinese J-10C jets
- Italy, Türkiye, France and Sweden are other countries with which Dhaka is in touch to fulfil its ambitious military requirements

All these developments have happened after the exit of Prime Minister Shiekh Hasina who left the country on August 5 last year amid street protests. In February, Bangladesh Navy is set to join a multi-nation exercise ‘Aman’ hosted by Pakistan. The same month, the Pakistan army will be part of a training module at Mymensingh in north-eastern Bangladesh – a first since 1971.

India’s eastern neighbour hiked the defence budget by 11 per cent for the present fiscal ending June 30, 2025. The budget is now Taka 42,315 crore (approximately $3.6 billion). This is 5 per cent of the country’s overall budget.

Additional allocations target new corps formation and cantonment establishment. The Bangladesh navy is targeting to get 12 new warships and is seeking a foreign partner to make these ships in Bangladesh. China, which is building ships in Pakistan, is expected to step in.

https://www.tribuneindia.com/news/india/bangladesh-widens-arc-of-military-ties-looks-at-us-eu-for-modern-tech-arms-2/

THE TIMES OF INDIA

Mon, 13 Jan 2025

India eyes mega defence deals worth Rs 1.5 lakh crore before March 31

India plans to ink at least four mega defence deals for fighters, submarines, helicopters and artillery guns, collectively worth over Rs 1.5 lakh crore, before this fiscal ends on March 31, as part of the long-term plan to boost the firepower and combat capabilities of the armed forces.

The first off the block will be the around Rs 63,000 crore contract with France for the direct acquisition of 26 Rafale-Marine fighter jets, which will operate from the deck of indigenous aircraft carrier INS Vikrant, defence sources told TOI.

The deal for the 22 single-seat maritime jets and four twin-seat trainers for the Navy, along with weapons, simulators, crew training and five-year performance-based logistics support as well as spares for the 36 Rafales already inducted by the IAF, is now headed for the final nod from the PM-led cabinet committee on security (CCS), the sources added.

Another major deal with France will be the Rs 38,000 crore one for three additional Scorpene diesel-electric submarines, with air-independent propulsion (AIP) for longer underwater endurance, to be built at the Mumbai-based Mazagon Docks (MDL).

The three new boats — with the first slated to roll out by 2031, followed by the other two at intervals of a year each — will add to the six Scorpene or Kalvari-class submarines already built at MDL under the over Rs 23,000 crore 'Project-75'. The sixth submarine 'Vagsheer' is slated to be commissioned, along with guided-missile destroyer Surat and stealth frigate Nilgiri, by PM Narendra Modi on Jan 15.

"The Rafale deal is likely to be cleared by the CCS before this month ends, and will be followed by the Scorpene deal soon after," a source said. Modi, incidentally, is slated to visit France for the Artificial Intelligence Summit on Feb 11 and 12.

The other two mega deals are for 156 indigenous Prachand light combat helicopters for around Rs 53,000 crore and 307 indigenous advanced towed artillery gun systems (ATAGS) for Rs 8,500 crore.

The 156 new Prachand helicopters (90 for Army, 66 IAF), which are capable of offensive operations in high-altitude areas like Siachen Glacier and eastern Ladakh, will be manufactured by Hindustan Aeronautics Limited. They will add to the 15 such choppers (10 IAF and five Army) already inducted under a Rs 3,887 crore contract inked in 2022.

The ATAGS designed and developed by DRDO, which is touted to have a strike range up to 48 km, in turn, will be produced by Bharat Forge and Tata Advanced Systems.

With Bharat Forge emerging as the L-1 (lowest bidder), it will manufacture 60% of the guns, while Tata will produce the rest 40%. The order for 307 ATAGS is likely to go up in the future because the Army plans to induct "more advanced versions" for a total requirement of 1,580 such guns.

"The aim is to sign all the four deals within this fiscal. Work is also underway to revise the Defence Acquisition Procedure-2020 to further cut down procurement timelines, streamline processes and provide a level playing field to all," another source said.

https://timesofindia.indiatimes.com/india/india-eyes-mega-defence-deals-worth-rs-1-5-lakh-crore-before-march-31/articleshow/117182178.cms

INDIA TODAY

Sat, 11 Jan 2025

Army uses AI-powered drones and satellite systems for operations

The Indian Army is incorporating artificial intelligence (AI) to enhance its operations in surveillance, reconnaissance, and logistics. Army officials said that AI-powered drones and satellite systems are now being used to gather intelligence and provide real-time data to assist in strategic decision-making.

"AI-powered drones and satellite systems are being used for intelligence gathering, providing real-time data for strategic decision-making. In logistics and supply chain management, AI algorithms can optimise supply chain operations, ensuring timely delivery of essential resources to the frontline," Army officials told India Today.

AI is also being deployed to strengthen cybersecurity, with its capability to detect and respond to cyber threats. "AI can prove to be very effective for cybersecurity as it is employed to detect and respond to cyber threats, enhancing the resilience of military networks," the officials added.

Training simulations for personnel are another area benefiting from AI. "AI-driven simulations provide realistic training environments for personnel, improving readiness and response times," the officials explained.

The integration of AI has broader implications for the Indian Armed Forces. It supports decision-making by processing large volumes of data and delivering actionable insights. It also boosts combat capabilities by enabling autonomous systems and precision strikes.

In logistics, AI streamlines resource management, ensuring timely and efficient delivery of essential supplies. Additionally, its role in cyber warfare is growing as AI strengthens both offensive capabilities and defensive measures against digital threats.

However, the use of AI in warfare is not without challenges. Ethical and legal questions arise, particularly regarding accountability, autonomous weapons systems, and adherence to international humanitarian law.

https://www.indiatoday.in/india/story/indian-army-uses-artificial-intelligence-powered-drones-and-satellite-systems-for-operations-cybersecurity-2663169-2025-01-11

#SWARAJYA

Fri, 10 Jan 2025

BSF Holds High-Level Talks With Bangladesh Border Guards Amid Fencing Dispute, Focuses On Controlling Crime And Illegal Crossings

Amid mounting tensions and objections from the Border Guard Bangladesh (BGB) over fencing activities, the Border Security Force (BSF) and BGB held a high-level meeting on Thursday (9 January) at the Integrated Check Post (ICP) in Petrapole, North 24 Parganas district.

The meeting, cloaked in the shadow of recent confrontations, sought to address the ongoing disputes surrounding the BSF's attempts to erect fences in contentious areas along the India-Bangladesh border.

Representing the BSF South Bengal Frontier, Inspector-General Maninder PS Pawar and BGB Brigadier-General Mohammad Humayun Kabir led the discussions.

The agenda encompassed key issues such as effective border management, the prevention of illegal crossings, combating cross-border crimes, and fostering stability in the region.

In a carefully worded statement, the BSF emphasised the importance of mutual cooperation. IG, South Bengal Frontier said that the commitment to a secure border environment is pivotal for regional stability and prosperity.

The origins of the dispute lie in the BSF's recent push to erect a barbed wire fence in Sukdevpur, Baishnabnagar, Malda district.

Tensions reached a boiling point on Monday when the BGB halted fencing activities, claiming the work encroached upon Bangladeshi territory. A brief pause followed, but discussions temporarily resolved the issue, allowing construction to resume on Tuesday.

However, peace was short-lived. On Wednesday, the fencing work was disrupted once more by the BGB, leading to a dramatic escalation.

Local villagers swept up in the fervor, and clashed verbally across the border, with slogans reverberating on the Indian side.

Swapan Mondal, a local resident, voiced grave concerns, accusing the BGB of endangering national security. “The BGB continues to obstruct the fencing work. This is a serious concern as it leaves the border vulnerable to infiltration by militants and smugglers,” he said.

Janardan Mandal echoed this sentiment, citing the potential threat of Rohingya refugees and underscoring the urgent need for robust border fencing.

https://swarajyamag.com/news-brief/bsf-holds-high-level-talks-with-bangladesh-border-guards-amid-fencing-dispute-focuses-on-controlling-crime-and-illegal-crossings

FINANCIAL EXPRESS
Read to Lead

Mon, 13 Jan 2025

Indian Army’s Technological Transformation: Crafting a Future-Ready Force

As the Indian Army marks its 77th Army Day on January 15, 2025, the force stands at the forefront of an unprecedented transformation. The years 2023 and 2025 have been designated pivotal milestones in the Army’s drive toward technological absorption, with the overarching goal of making India’s defense ecosystem more self-reliant and cutting-edge. The declaration of 2023 as the “Year of Technology Absorption,” followed by 2025 as the “Year of Reforms” by the Ministry of Defence (MoD), signals a period of deep innovation within the Indian Army, setting the stage for what is being called the “Decade of Transformation” (2023-2032).

This ambitious transformation is not just about the adoption of new technology, but the creation and cultivation of a culture of innovation within the military ranks. In a rapidly evolving

geopolitical landscape, it is crucial for India's military to be prepared for a diverse range of threats, and technological advancements are key to addressing these emerging challenges.

The Need for Indigenous Innovation in Defense

The Indian Army's operational conditions are as diverse as the country itself. From the icy terrains of Ladakh to the desert landscapes of Rajasthan and the dense jungles of the Northeast, the Army faces an array of unique operational demands. These diverse challenges require tailored solutions that only an innovative and self-reliant defense ecosystem can provide.

As noted by sources in the defence and security establishment, "The changing nature of warfare—driven by technology, hybrid threats, and the need for rapid adaptability—demands that the Army not only absorb cutting-edge solutions but also develop them indigenously. Our dependence on foreign technology is gradually diminishing, ensuring we maintain strategic autonomy." With this philosophy, the Army has sought to foster a culture of continuous innovation.

Inno-Yoddha: Empowering Soldiers to Innovate

Central to the Indian Army's strategy of fostering homegrown solutions is the Inno-Yoddha competition. Originally launched in 2014 and rebranded in 2023, the competition allows soldiers to contribute their ideas and innovations to address operational gaps. By shifting the focus to grassroots involvement, the Army ensures that practical, battlefield-tested solutions are at the heart of its technological push.

As articulated by a senior officer in the Army's innovation wing, "Inno-Yoddha is designed to tap into the ingenuity of soldiers, who, through their unique experiences in the field, are best placed to identify problems and offer solutions. It's a bottom-up approach that ensures innovations are both relevant and immediately applicable." Winning solutions are not only recognized but are often scaled and incorporated into operational protocols or future procurement cycles, ensuring their longevity and impact.

Key Innovations: From Concept to Deployment

ASMI 9mm Machine Pistol: Designed for close-quarters combat, this new weapon system is a breakthrough in firepower, offering enhanced accuracy and rapid response in urban warfare scenarios.

Multi-Purpose Octacopter: This advanced drone system is capable of multiple functions—surveillance, reconnaissance, and even combat—demonstrating the Army's increasing reliance on unmanned aerial technologies.

Wireless Electronic Detonation Circuit (WEDC): A game-changer in the field of explosives, this technology enhances the safety, precision, and effectiveness of detonating devices, reducing risks during operations.

Vidyut Rakshak: An Internet of Things (IoT)-based generator monitoring system, designed to optimize power usage, improve efficiency, and prevent operational downtime.

Agni Astra: A cutting-edge precision munitions system designed to significantly improve strike accuracy, providing the Indian Army with advanced capabilities in precision warfare.

These innovations have undergone extensive trials, with several already being deployed. As sources explain, “Each technology undergoes rigorous testing to ensure it meets the Army’s operational standards before being cleared for deployment. The collaboration with academia, startups, and defense technology incubators has allowed us to rapidly move from prototype to field-ready solutions.”

Incentivizing Innovation: A New Era of Recognition

The Indian Army’s innovation drive extends beyond technology development to include comprehensive recognition and support for those who contribute. Innovators are awarded commendations from the Chief of Army Staff (COAS) and General Officer Commanding-in-Chief (GOC-in-C). The Army has also implemented policy reforms that allow officers and personnel to innovate without jeopardizing their career progression. Innovations are now rewarded with continued professional development opportunities, even allowing personnel to remain in technical roles long after promotions.

Strategic Collaborations for Mass Production and Commercialization

One of the key aspects of the Indian Army’s technological transformation is the shift towards more collaborative approaches with academic institutions and the private sector. A notable example is the Memorandum of Understanding (MoU) with the Foundation for Innovation and Technology Transfer (FITT) at IIT Delhi. This partnership enables faster technology transfer, ensuring the rapid commercialization of innovations developed by the Army’s in-house teams.

By opening doors to private sector production, the Army ensures that innovations like the Vidyut Rakshak and ASMI Pistol are manufactured in large quantities, integrated into the Army’s supply chain, and, importantly, contribute to the wider defense ecosystem. “The collaboration with IIT Delhi is a key example of how we are accelerating the process from research to production, and it benefits not just the Army, but the entire defense sector,” said a senior defense official.

Vision for the Future: A Self-Reliant Defense Ecosystem

Looking ahead, the Indian Army is committed to expanding its technological partnerships, integrating reforms with the Innovations like the Vidyut Rakshak are already being considered for adoption by the Indian Air Force (IAF) and Central Reserve Police Force (CRPF).

This push for innovation, coupled with strategic collaborations and a focus on indigenization, aligns with India’s broader vision of Atmanirbhar Bharat (Self-Reliant India). As the Ministry of Defence has noted, “The Indian Army’s focus on indigenization and technological advancement is key to ensuring national security and promoting India as a global leader in defense technology.”

As the “Decade of Transformation” progresses, the Indian Army is setting new benchmarks in defense modernization—creating a future where innovation, resilience, and self-reliance form the cornerstone of India’s military might. Through technology and innovation, the Army is not only strengthening India’s security but also contributing to its economic growth and strategic autonomy.

https://www.financialexpress.com/business/defence/indian-armys-technological-transformation-crafting-a-future-ready-force/3713136/

THE WEEK

Sat, 11 Jan 2025

Anti-personnel mines, mock firings, reigniting local militancy: Pakistan's new LoC strategy against India exposed

Pakistan has been enhancing its defence capabilities along certain sections of the Line of Control that divides India and Pakistan-occupied Kashmir by laying anti-personnel mines and increasing the presence of Special Service Group commandos, latest intelligence reports have revealed.

The strengthening of positions comes at a time when terror training camps are being reactivated, and it is learnt that outfits like the Hizbul Mujahideen are back in operation, this time with volunteers from ex-TTP (Tehrik-e Taliban Pakistan) factions. The strategy is being tweaked, security sources said, by not trying too hard to engineer fresh incursions, instead asking Pakistan-origin militants who have been lying low in the valley to reactivate themselves.

In recent months, terrorists who infiltrated from across the border took advantage of the tough terrain and dense forests to target security forces in the Jammu region. "The planting of landmines to damage army troops patrolling along the fence is not new. But with improved technology and quicker access to border areas, fresh attempts are being made to plant anti-personnel mines in certain stretches," said a security official in the state.

Senior security officials said there is an attempt to reignite local militancy but keep it on a low flame to avoid a repeat of an overreaction by Indian forces, but at the same time, be prepared by strengthening their positions.

The changing global dynamics, a senior official said, have also changed the cross-border strategy of the Pakistan Army, which is not only focused on provoking Indian forces with mock firings but also trying to attract international attention to alleged violations from the Indian side.

The inputs suggest that the ISI has more or less regained a certain degree of control over the jihadi forces, which they had lost over the last decade. There is a section within the ISI, an official said, which has been allowed some autonomy to try out a new counter to what they see as a TTP-Baloch offensive in their region.

However, aware of their limitations, the mining along the LoC is also to ward off the possibility of preemptive action by Indian security forces.

https://www.theweek.in/news/defence/2025/01/11/anti-personnel-mines-mock-firings-reigniting-local-militancy-pakistans-new-loc-strategy-against-india-exposed.html

THE WEEK

Fri, 10 Jan 2025

A new challenge for Indian Air Force? Pakistan eyes Turkey's TAI Kaan fifth-generation stealth fighter jets

Pakistan's aerial power is likely to have a major boost as the country is in the advanced stage of discussions with Turkey on setting up a production facility for a fifth-generation stealth aircraft, TAI Kaan, in the country.

The facility is expected to focus on producing the local variant of the cutting-edge, next-generation stealth jet.

The report comes even as there have been talks of Pakistan procuring 40 fifth-generation stealth Shenyang J-35 fighter jets from China. These fighter jets are expected to replace the ageing fourth-generation F-16s and French Mirage fighters of Pakistan.

Developed by Turkish Aerospace Industries (TAI), and featuring automatic target recognition, multi-target tracking, ground mapping, AI-assisted target limiting, electronic warfare capacities, and enhanced missile guidance, Kaan—officially known as the TAI Kaan or TF-X—boasts of superior situational awareness and formidable deterrent capabilities.

"Discussions on the export of the Kaan fighter jet and plans for joint development of helicopters highlight shared ambitions to advance defense technology collaboration and industrial partnerships," according to a Turkish media report.

According to media reports, the discussions may be focused on the technical and logistical aspects of setting up the unit in Pakistan.

"Pakistan might have officially joined the Kaan stealth aircraft project. Multiple subsystems would be manufactured in Pakistan. A joint production line is likely being established. This will reduce the financial burden considerably and provide jobs for Pakistanis," EurAsian Times quoted a source as saying.

Nonetheless, according to Indian Air Force veteran Air Marshal Anil Chopra (retd), Kaan is not going to be ready for induction before 2030.

He noted that a cash-strapped Pakistan may not be able to purchase two different stealth fighters, and the talks with Turkey are on because Pakistan realizes its military cannot depend on Chinese equipment alone and needs to diversify. "Through Kaan, they strengthen their defense cooperation with a trusted and reliable partner, Turkey," EurAsian Times quoted him as saying.

The reports of Pakistan's fifth-generation fighter jets ambitions come even as Indian Air Force Chief Air Chief Marshal A. P. Singh recently expressed concerns over the northern as well as the western adversaries increasing their air forces at a "very rapid pace" while IAF is awaiting the delivery of Tejas aircraft.

Meanwhile, India's fifth-generation fighter program, primarily focused on the Advanced Medium Combat Aircraft (AMCA), is expected to be ready only by 2028.

https://www.theweek.in/news/defence/2025/01/10/a-new-challenge-for-indian-air-force-pakistan-eyes-turkeys-tai-kaan-fifth-generation-stealth-fighter-jets.html

THE WEEK

Fri, 10 Jan 2025

Russia's 203mm 2S7M Malka artillery gun: The mighty beast that can bring down bridges and shatter armour

The 203mm 2S7M Malka heavy self-propelled artillery gun of Russia is an extremely powerful weapon capable of destroying bridges, leaving craters of up to seven meters on the ground and piercing enemy armour with just one shot.

According to Russian state-owned defense conglomerate Rostec, the tremendous impact of the gun and the detonation of nearly 20 kg of explosives create a powerful destruction effect on the battlefield.

An enhanced version of the earlier 2S7 Pion, the gun's firepower and advanced capabilities make it one of the most formidable pieces of artillery in the world. The Malka is designed to strike major enemy targets and installations in the tactical defense depth beyond the frontline. The gun has a rate of fire of up to 2.5 rounds per minute and can engage targets at a range of about 50 km.

“It is capable of wiping out even concrete-made fortifications, structures, bridges, river crossings and other installations. Heavy munitions leave craters of up to seven meters in the ground and tear armor to pieces,” the company said.

Each projectile scatters a mass of fragments over a considerable radius, Rostec added.

The heavy artillery gun is a priority target for the enemy in the area of the special military operation in Ukraine, and Russian artillery crews accomplish their combat objectives as quickly as possible, minimising the time of their deployment to the position to avoid an adversary counterattack, the company further stated, according to news agency TASS.

The commander of a Malka artillery gun engaged in the fighting in the Avdeyevka frontline area in the Donbass region had earlier claimed that the gun is capable of making "buildings fold down" and destroying armor even if hitting close to it.

https://www.theweek.in/news/defence/2025/01/10/russias-203mm-2s7m-malka-artillery-gun-the-powerful-beast-that-can-bring-down-bridges-and-shatter-armour.html

THE WEEK

Sat, 11 Jan 2025

Modernised, lethal, agile: How the US is outpacing China in military might

The US, over the past quarter of a century, has been closely following China's attempts to build a modern military, and during the ongoing strategic competition with Beijing, there has been several major enhancements in the military capabilities of the US.

According to Deputy Defense Secretary Kathleen Hicks, this strategic competition between the US and China does not mean conflict. During a keynote address at the Johns Hopkins School of Advanced International Studies in Washington, titled 'Outpacing the PRC: Lessons Learned for Strategic Competition' Hicks pointed out that staying focused on top priorities and appreciating that execution or delivery is paramount for the US defences.

She said the US has focused relentlessly on driving changes needed to outpace the People's Republic of China and ensure the Pentagon's military advantage. This resulted in a more more modernised, lethal, agile force across capabilities, operational concepts, and posture.

She noted that the US has strong competitive advantages it must leverage in the competition against China and said decision makers must rigorously align ends, ways and means to ensure the strategy itself remains right and the department of defence can deliver on it.

"We want the (the PRC) leadership to wake up each day, consider the risks of aggression and think to themselves, 'Today is not the day'; and for them to think that — today and every day — between now and 2027, in 2035, 2049 and beyond," she said.

The US isn't however, interested in needlessly provoking China into starting a war, she said, adding, “We don't believe conflict is inevitable, but it's our job to prevent war by always being ready for war if it comes. So, where Beijing might see department of defence anticipating a potential conflict, that's because we're concerned Beijing will instigate one."

https://www.theweek.in/news/defence/2025/01/11/modernised-lethal-agile-how-the-us-is-outpacing-china-in-military-might.html

Press Information Bureau
Government of India

Ministry of Science & Technology

Fri, 10 Jan 2025

Technology developed to shape light for future technologies

A new cutting-edge platform for controlling light at the nanoscale, paves the way for advancements in quantum communication, data encryption, and next-generation photonic devices.

Highly efficient and spectrally pure single photon sources are desirable in fundamental studies of quantum physics and in many varied applications like in quantum metrology and quantum cryptography where the ability to generate and manipulate individual photons with high purity and brightness is a game changer.

2D semiconductor colloidal quantum wells (CQWs) are quite appropriate as nanoscale photon sources because of their giant oscillator strengths and large absorption cross sections. The integration of such sources with dielectric metasurfaces exhibiting narrow resonances provides an excellent platform for highly efficient light-matter interactions and the development of on-chip light sources with high spectral purity.

Researchers at the Indian Institute of Science (IISc), Bangalore, have have integrated two-dimensional (2D) semiconductor colloidal quantum wells (CQWs) with dielectric metasurface resonators (MSRs) to achieve unprecedented emission line narrowing and long- range photon transport at room temperature for on-chip photonic quantum information processing.

Led by Prof. Jaydeep K. Basu from IISc's Department of Physics, in collaboration with Prof. Shankar Kumar Selvaraja from the Centre for Nano Science and Engineering (CeNSE), and theoretical support from Prof. Girish S. Agarwal at Texas A&M University, the study showcases the integration of Cadmium Selenide (CdSe)-based CQWs with a guided mode MSR. The MSR, fabricated on a silicon nitride (SiN) slab-waveguide platform, features a precise arrangement of holes in a square-lattice geometry. This design enables narrow resonances in both out-of-plane and in-plane directions, effectively tuning the light emission properties of CQWs.

The integration achieved remarkable results, including a 12-fold increase in brightness and a 97% reduction in the width of the emitted light's spectral line, ensuring unparalleled spectral purity. The enhancement was enabled by the spectral overlap between the MSR's narrow-band response and the broader emission from CQWs. The platform also demonstrated long-range photon transport across the chip, up to 1 mm, showcasing its potential for creating compact and efficient quantum devices.

“Our work shows how nanoscale materials like CQWs can be seamlessly integrated with photonic structures to achieve exceptional control over light emission and transport, which is critical for the next generation of quantum devices,” said Prof. Basu.

The researchers employed a state-of-the-art confocal setup for photoluminescence (PL) measurements, funded by the DST-FIST program, to study enhanced light properties with high precision. The findings have been published in the prestigious journal Advanced Optical Materials.

Looking ahead, the researchers aim to extend this platform to integrate single quantum emitters (SPEs) with MSRs to create highly efficient single-photon sources which are essential for quantum cryptography and quantum information processing.

Combining the spectral filtering capabilities of MSRs with the precise light emission of SPEs could unlock new possibilities in on-chip quantum photonics, enabling secure communications and advanced sensing technologies.

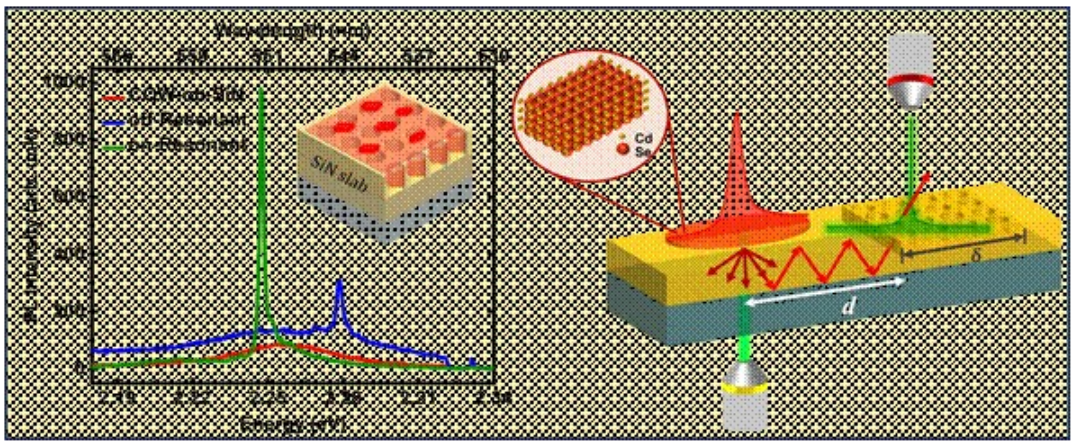


Fig1: Emission spectrum collected from confocal PL microscope funded by DST FIST.

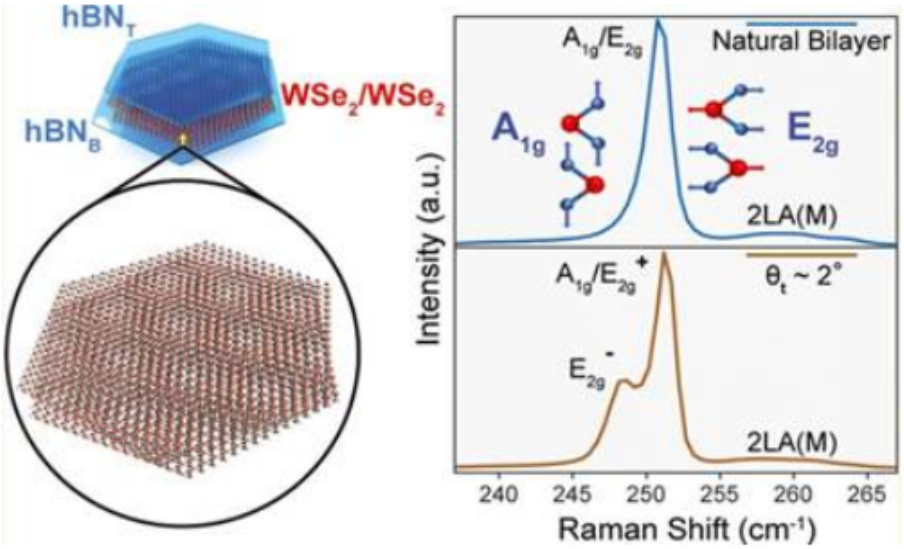


Figure caption: Left panel – schematic of twisted WSe2. Right panel – Raman spectra from natural and twisted bilayer of WSe2.

https://pib.gov.in/PressReleasePage.aspx?PRID=2091775

Press Information Bureau
Government of India

Ministry of Science & Technology

Fri, 10 Jan 2025

Iron lines in the X-ray detected from a binary black hole system that can help infer their properties

Iron Lines in X-ray have been detected from a well-known binary black hole system in the radio galaxy 4C+37.11 750 million light years away from the Earth, making way for study of the properties of the system. This is the first time that X-Ray has been detected in a binary system -- a system of two astronomical bodies that orbit a common center of mass and are gravitationally bound. The lines can help understand properties of the black hole.

The centers of all galaxies are known to host supermassive black holes (SMBHs), which have masses between a million to a billion times that of the sun. It is not easy to understand how the gas surrounding these black holes moves in its gravitational field, but X-ray observations offer a way to study the inner parts of these objects. However, radiation coming from the central SMBHs plays a critical role in illuminating the circumnuclear environment, which gives rise to various emission and absorption spectral lines. One of the most important is the Fe K emission line in the X-ray spectra from Iron atoms. These lines serve as important diagnostic tools for probing the physical conditions of the gas surrounding black holes, such as the temperature, density, and ionization state.

A study led by astronomers at the Indian Institute of Astrophysics (IIA) an autonomous institute of Department of Science and Technology, have detected the Fe K spectral lines of ionized Iron atoms from the well-known binary Active Galactic Nucleus system 4C+37.11 using data from the Chandra Space Telescope. They concluded that this emission arises from both the accretion disk and the collisionally ionized plasma surrounding the pair of supermassive black holes in this object.

“We decided to look at 4C+37.11, which is one such fascinating and unique astrophysical object. It is one of the few confirmed binary active galactic nuclei (bAGN) located about 750 million light years away from the Earth, and is a very well-studied system of its kind”, said Santanu Mondal, a Ramanujam Fellow at the Indian Institute of Astrophysics, and lead author of the paper published about this work. Discovered in 2004, this system consists of two SMBH nuclei separated by a distance of only about 23 light years. “The proximity of these two SMBHs makes 4C+37.11 a rare and valuable case for studying the dynamics and interactions in such extreme environments.

“Although Fe K emission lines have been detected from many nearby SMBHs, it has never been detected in this SMBH binary system. Such a spectral line can reveal facts about the merging of SMBHs, which is even known to produce gravitational waves at their final moments at merger”, said Mousumi Das of IIA and a co-author of the study.

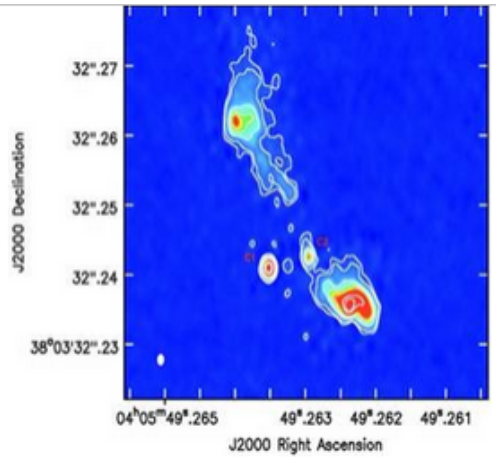


Figure caption: The VLBA image of the bAGN system 4C+37.11, where C1 and C2 denote the well-resolved two cores hosting SMBHs and one of them, C2 is showing a prominent jet

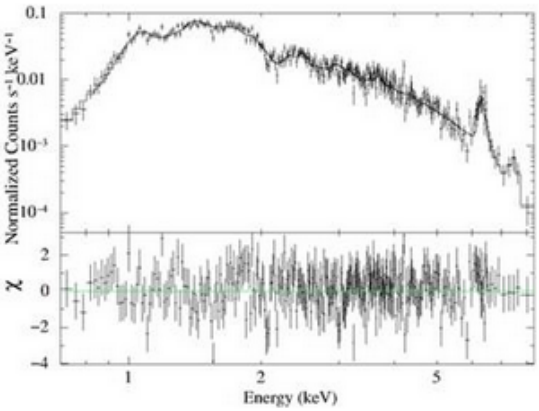


Figure caption: The X-ray spectrum of the system in the 0.7-8.5 keV band extracted from the Chandra observations, fitted with combined models of accretion disk and collisionally ionized plasma. The lower panel is showing the residual of the fit. Two Fe K lines are clearly visible at ~6.62 keV and ~7.87 keV energies.

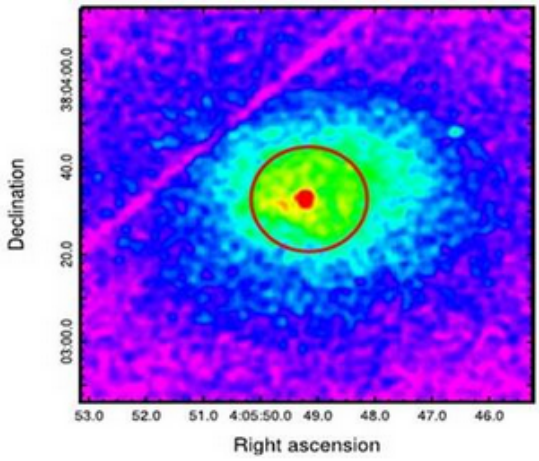


Figure Caption: The Chandra X-ray image of the core of 4C+37.11. The red circle is the region considered for spectral analysis.

"We studied 4C+37.11 using archival data from Chandra, and discovered two Fe K lines for the first time. Through modelling, we could infer that this line emission originates from the combined

effects of the accretion disk around the supermassive black holes and the collisionally ionized plasma surrounding them", said Mondal. The team also determined the total mass of the binary SMBHs to be 15 billion times that of the Sun, rotating with a moderate or low spin of less than 0.8.

"Our study shows that detecting the Fe K line emissions from binary supermassive black holes is important for estimating the individual black hole masses and their spins, as well as exploring the emission regions and the behavior of matter around them and radiation in extreme conditions", said Mousumi Das.

The results of the study by Santanu Mondal and Mousumi Das from IIA, Aniket Nath from NISER, Rubinur Khatun from Norway, Karishma Bansal from USA and Greg B. Taylor from the University of New Mexico, USA have been published in the Astronomy & Astrophysics (A&A) journal.

https://pib.gov.in/PressReleasePage.aspx?PRID=2091776

THE ECONOMIC TIMES

Sun, 12 Jan 2025

SpaDeX: ISRO brings satellites within three metres in trial attempt

ISRO on Sunday said the two satellites launched to perform space docking experiments were brought within three metres and then moved safely back in a trial attempt. The space agency also said the docking process would be done after analysing the data further."

A trial attempt to reach up to 15 metres and further to three metres is done. Moving back spacecraft to safe distance. The docking process will be done after analysing data further," ISRO said in a post on X.

The Space Docking Experiment (SpaDeX) project has missed two announced schedules for docking experiments on January 7 and January 9.

ISRO launched the mission on December 30.

The PSLV C60 rocket, carrying two small satellites -- SDX01 (Chaser) and SDX02 (Target) -- along with 24 payloads, lifted off from the Satish Dhawan Space Centre in Sriharikota. About 15 minutes later, the two small spacecraft weighing about 220 kilogrammes each were launched into a 475-kilometre circular orbit, as intended.

The SpaDeX project is a cost-effective technology demonstrator mission for the demonstration of in-space docking using small spacecraft, according to ISRO.

A successful demonstration of SpaDeX will make India the fourth nation to master the complex technologies that are crucial for its future missions, such as the Bharatiya Antariksh Station and landing an astronaut on the moon.

In-space docking technology is essential when multiple rocket launches are required to achieve common mission objectives.

https://economictimes.indiatimes.com/news/science/spadex-isro-brings-satellites-within-three-metres-in-trial-attempt/articleshow/117163836.cms

THE TIMES OF INDIA

Mon, 13 Jan 2025

Blue Origin set for first launch of giant New Glenn Rocket

A quarter century after its founding, Jeff Bezos's Blue Origin is finally ready for its maiden orbital voyage with a brand new rocket the company hopes will shake up the commercial space race.

Named New Glenn after legendary astronaut John Glenn, it stands 320 feet (98 meters) tall, roughly equivalent to a 32-story building, and is set to blast off from Cape Canaveral Space Force Station in a launch window that opens at 1:00 am (0600 GMT) Monday.

"Pointy end up!" the company's CEO, Dave Limp posted on X alongside photos of the gleaming white behemoth.

With the mission, dubbed NG-1, billionaire Amazon founder Bezos is taking aim at the only man in the world wealthier than him: Elon Musk, whose company SpaceX dominates the orbital launch market through its prolific Falcon 9 rockets, vital for the commercial sector, the Pentagon and Nasa.

"SpaceX has for the past several years been pretty much the only game in town, and so having a competitor... this is great," G. Scott Hubbard, a retired senior Nasa official, told AFP.SpaceX, meanwhile, is planning the next orbital test of Starship -- its gargantuan new-generation rocket -- this week, upping the high-stakes rivalry.

Landing attempt

Soon after launch, Blue Origin will attempt to land the first-stage booster on a drone ship named Jacklyn, in honour of Bezos's mother, stationed about 620 miles (1,000 kilometers) downrange in the Atlantic Ocean.

Though SpaceX has long made such landings a near-routine spectacle, this will be Blue Origin's first shot at a touchdown on the high seas.Meanwhile, the rocket's upper stage will fire its engines toward Earth orbit, reaching a maximum altitude of roughly 12,000 miles above the surface.

A Defense Department-funded prototype spaceship called Blue Ring will remain aboard for the roughly six-hour test flight.

Blue Origin has experience landing its New Shepard rockets, used for suborbital tourism but they are much smaller and land on terra firma rather than a ship at sea.

Physically, New Glenn dwarfs the 230-foot Falcon 9 and is designed for heavier payloads.It slots between Falcon 9 and its big sibling, Falcon Heavy, in terms of mass capacity but holds an edge with its wider payload fairing, capable of carrying the equivalent of 20 moving trucks.

Slow v fast development

Blue Origin has already secured a Nasa contract to launch two Mars probes aboard New Glenn. The rocket will also support the deployment of Project Kuiper, a satellite internet constellation designed to compete with Starlink.For now, however, SpaceX maintains a commanding lead, while other rivals, United Launch Alliance, Arianespace, and Rocket Lab, trail far behind.

Like Musk, Bezos has a lifelong passion for space. But whereas Musk dreams of colonizing Mars, Bezos envisions shifting heavy industry off-planet onto floating space platforms in order to preserve Earth, "humanity's blue origin."

He founded Blue Origin in 2000, two years before Musk created SpaceX, but has adopted a more cautious pace, in contrast to his rival's "fail fast, learn fast" philosophy.

If New Glenn succeeds, it will give the US government "dissimilar redundancy", valuable backup if one system fails, said Scott Pace, a space policy analyst at George Washington University.

Musk's closeness to President-elect Donald Trump has raised concerns about potential conflicts of interest, especially with private astronaut Jared Isaacman, a business associate of Musk, slated to become the next Nasa chief.

Bezos, however, has been making his own overtures, paying respect to his former foe during a visit to Trump's Mar-a-Lago residence, while Amazon has said it would donate $1 million to the inauguration committee.

https://timesofindia.indiatimes.com/science/blue-origin-set-for-first-launch-of-giant-new-glenn-rocket/articleshow/117187124.cms

THE TIMES OF INDIA

Sat, 11 Jan 2025

IMD looks to use data from CubeSats, IoT devices for better forecasts

The India Meteorological Department (IMD) is looking to access data from CubeSats, crowdsourcing, and Internet of Things devices besides conventional weather satellites to improve it forecast accuracy, a former official said. The IMD has also sent a dedicated meteorological satellite in orbit and installed a new high power computing system (HPCS) last year that would allow it to issue more accurate forecasts.

"IMD will soon move to an ensemble prediction system with a horizontal resolution of 6 km, which is an improvement over the current resolution of 12 km," Madhavan Rajeevan, Ministry of

Earth Sciences' former secretary, said in article penned on the occasion of the 150th Foundation Day of IMD.

"The improvement of observation networks incorporating state-of-the-art technologies such as crowdsourcing, CubeSats, IoT devices and unmanned platforms will significantly improve data quality and forecast efficiency," he said.

Rajeevan said the IMD was also setting up separate research testbeds in Bhopal and Mumbai to deepen the understanding of monsoon dynamics and cloud physics.

"As user expectations continue to grow, the IMD must continuously innovate and proactively address these demands," he said.

The IMD has access to weather observations from over 6,000 surface observatories in addition to data from weather balloons, satellites, a network of radars which feed information to prediction models.

"By embracing cutting-edge technologies and continually improving forecasting systems, IMD can sustain its legacy as a global leader in weather and climate services and helping India navigate the challenges of climate Change," Rajeevan said.

In a separate article, leading meteorologist U C Mohanty said under the aegis of Ministry of Earth Sciences, significant scientific and technological advancements have been achieved across various domains of Earth system sciences, encompassing the atmosphere, hydrosphere, lithosphere, cryosphere, biosphere, and their intricate interactions.

The advances in computational resources allowed the use of advanced deterministic chemical transport models, leading to more accurate air quality forecast, replacing the previous empirical and statistical approach which has some limitations and misses to adequately represent the physical and chemical processes of pollutants.

The scientists at IMD and Indian Institute of Tropical Meteorology (IITM), Pune, Ministry of Earth Science jointly developed the advanced Air Quality Early Warning System (AQEWS), Rajesh Verma, Chairman of the Commission for Air Quality Management said.

In the Power sector, timely weather forecasts helps in better management of electricity grids.

"There is trading in power sector in every 15 minutes. Thus, the 15-minute forecasts and hourly forecasts of basic weather parameters upto a few hours help in ensuring better management of power generation and distribution," a power ministry official said.

https://timesofindia.indiatimes.com/science/imd-looks-to-use-data-from-cubesats-iot-devices-for-better-forecasts/articleshow/117148303.cms

THE HINDU

Mon, 13 Jan 2025

An unlikely mystery: studies shed new light on how genes are made

The alikeness of identical twins can be startling. They are alike because all their genes are alike. Genes are those segments of the genome where, if changes occur, the characteristics of an organism change. Non-identical twins vary in 50% of their genes and are much less alike. Thus, genes define our individuality in many ways.

In December 2024, two research groups addressed how new genes are created. The University of Nevada, Reno, group reported its findings in Molecular Biology and Evolution and the other, from the Max Planck Institute for Evolutionary Biology Plön, Germany, reported in Genome Biology and Evolution.

How jumping genes and RNA bridges promise to shake up biomedicine

The 24 moleculesA group of 24 molecules of DNA gives identity to our 24 chromosomes. These are the chromosomes numbered 1 to 22 and the sex chromosomes X and Y. Our cells contain two sets of the genome: one derived from the mother's egg and the other from the father's sperm. Eggs and sperm receive only one chromosome of each pair. When they fuse and form the zygote, the latter has two sets again. The zygote then multiplies to form a baby.

The cells in human bodies possess two copies of chromosomes 1-22. Biological females have two X chromosomes whereas biological males have an X chromosome and a Y chromosome.

Identical twins arise from a single zygote while non-identical twins from two zygotes produced simultaneously.

Each DNA molecule has two strands held together by bonds between compounds on the strands, called base pairs. Our genome contains 3.2 billion base-pairs. A gene is typically a few-thousand base-pair-long segment of a DNA.

When a gene is 'expressed', it means a cell will transcribe the underlying base pair sequence to a molecule called a messenger RNA (mRNA), and read the mRNA like a recipe to make a protein.In the human genome, there are 20,000 protein-coding genes and 20,000 genes that cells use to create RNA that influences the expression of other genes. There are also some genes, called promoters and enhancers, which tell the cell when and where other genes are copied into mRNA.

Two compounds involved in forming the base pairs are cytosine and thymine. Sometimes the cytosine molecules bind to a methyl ion and are said to be methylated. A methylated cytosine molecule is likelier than an unmethylated one to mutate and become a thymine molecule.

Duplications create new genesIn 1970, Japanese-American biologist Susumu Ohno proposed that the main source of new genes is gene duplication. When the body's genome has two copies of the

same gene, one copy can continue to provide the original function while the other is free to mutate and acquire new functions.

Ohno's proposal was simple but had one flaw: it didn't explain how the organism's cells would deal with producing twice the quantity of the same proteins as a result. Protein over-expression can lead to debilitating conditions. The University of Nevada, Reno, researchers addressed this problem.Humans and mice last shared a common ancestor 75 million years ago. The researchers compared genes duplicated in human or mouse genomes, those duplicated in both, and those not duplicated in either.

They found the promoters of duplicated genes had more methylated DNA than the promoters of genes that hadn't been duplicated. Increased methylation would have prevented the cells from manufacturing twice as many proteins, minimising the ill effects of duplication, and allowing the duplicate gene to survive long enough to acquire new functions.

The researchers reported that the higher rate of methylation also elevated the rate of mutation.

Random sequences to incipient genes

The Max Planck Institute group inserted exogenous DNA into a population of cells derived from a human. (Exogenous means the DNA came from sources separate from the cells.) The researchers were careful to insert the DNA at a specific site in the genome, and allowed the cells to make proteins with them.

The exogenous DNA had a chunk that consisted of a random sequence of base-pairs — which means the proteins the cells made with it would be random as well.

The researchers put together a collection of cells of 3,708 types and nurtured them for 20 days. At regular intervals they checked the relative abundance of different cell types.

After 20 days, the team found that 53% of cell types had become less abundant, 8% more abundant, and 40% didn't swing either way. That is, more often than not, random DNA sequences affected cell growth and thus became relevant for evolution to act upon.

In yet other words: the random DNA inserts behaved like incipient genes.

Keeping v. chucking a gene

For a genome to retain a gene, it must have some use or the genome allows it to mutate. But establishing a gene's usefulness is challenging.Consider blood groups. Individuals can have one of four groups — A, B, AB or O — depending on which variants of the ABO gene they've inherited. If a person receives A and A or A and O, they have the A blood type. If they have B and B or B and O, they have the B blood type. If they have A and B or O and O, then they have the AB or the O blood types, respectively.

In sum, every individual lacks either one or two of the variants, which means no variant is really essential. The O variant also encodes a protein with no known function and whose amino-acid sequence is markedly different from those encoded by A and B.

Primates and humans took different branches on the tree of evolution millions of years ago but share blood types — which is to say evolution both found a way and saw fit to retain all three variants in so many species for a very long amount of time.

Scientists don't yet have a simple answer to why evolution has done this, but they aren't complaining.

https://www.thehindu.com/sci-tech/science/an-unlikely-mystery-studies-shed-new-light-on-how-genes-are-made/article69091741.ece

THE HINDU

Sat, 11 Jan 2025

IIT Roorkee uses bacterial enzymes to degrade plasticizers

Plasticizers, which are added to plastics and personal care products, can be absorbed through the skinPlasticizers, which are added to plastics and personal care products, can be absorbed through the skin.

Besides plastics, the amount of carcinogenic plasticizers in the environment is increasing at an alarming rate. Plasticizers are chemicals added to plastics and personal care products to enhance flexibility and shine, and are commonly found in items such as baby toys, shampoos, soaps, and food containers. Plasticizers can be absorbed through the skin, making them a direct threat to human health.

A team of researchers headed by Dr. Pravindra Kumar, Professor at the Department of Biosciences and Bioengineering, IIT Roorkee has successfully used an enzyme — esterase enzyme — produced by soil bacteria Sulfobacillus acidophilus to break down diethyl hexyl phthalate (DEHP) plasticizer. While a Chinese team had characterised this enzyme to degrade low molecular weight phthalate diester plasticizers, which can be degraded by several reported esterase enzymes, the IIT Roorkee team has identified its actual potential and used it for degrading difficult to degrade high molecular weight phthalate plasticizers. The research was funded by THDC India Limited, Rishikesh, and the results were published recently in the journal Structure. The group has also discovered that the esterase enzyme can bind to molecules similar to polypropylene used in plastics, making it a potential tool for extracting polypropylene from contaminated water sources.

The esterase enzyme was structurally characterised using X-ray crystallography. "This helped in identifying the active sites of the enzymes and in understanding the detailed mechanism by which this enzyme degrades the DEHP plasticizer," says Shalja Verma from IIT Roorkee and the first author of the paper. Other sophisticated biochemical and biophysical approaches were also used to understand the efficiency of the enzyme to degrade the plasticizer.

The esterase enzyme remains active for about a month and catalyzes the degradation of DEHP plasticizer with significant efficiency. For large-scale production of this enzyme, the researchers

cloned the genes of the EstS1 esterase enzyme into E. coli bacteria and the enzyme was produced in large-scale through aerobic culture.

The enzyme breaks down the DEHP plasticizer into two products — mono-(2-ethylhexyl) phthalate (MEHP) and 2-ethyl hexanol. According to Prof. Kumar, this esterase enzyme, along with other enzymes identified by their group previously can convert high molecular weight phthalate plasticizers into water and carbon-dioxide. And this is where the IIT Roorkee team appears to have an edge.

“The results of our research mark a significant advancement in addressing one of the most pressing environmental challenges — providing a promising path toward a plastic and plasticizer-free future,” says Dr. Kumar. Other researchers involved in the work include Shweta Choudhary, Kamble Amith Kumar, Jai Krishna Mahto, Ishani Mishra, Dr. Ashwani Kumar Sharma, Dr. Shailly Tomar, Dr. Debabrata Sircar and Dr. Jitin Singla.

In 2017, the team isolated another soil bacteria Comamonas testosteroni that breaks down the phthalates produced by DEHP degradation into carbon-dioxide and water. In the lab, the researchers used the enzymes in sequence to first break down DEHP to MEHP and 2-ethyl hexanol using esterase enzyme, which then was degraded to phthalate using another enzyme. The phthalate is then converted to intermediate compounds using a third enzyme (phthalate dioxygenase). The intermediate compound produced after this step is converted into protocatechuate by the enzyme phthalate decarboxylase. Once protocatechuate is produced, the tricarboxylic acid cycle of the bacteria, which is common in all bacteria, converts it to carbon-dioxide and water.

While the esterase enzyme used for breaking down DEHP into MEHP and 2-ethyl hexanol is from Sulfobacillus acidophilus bacteria, the three other enzymes used in sequence are from Comamonas testosteroni bacteria. “In the lab, we have tried using the enzymes in sequence to break down DEHP into water and carbon-dioxide,” says Ms. Verma. “We are now trying to insert the genes of all the five enzymes into bacteria to directly convert the DEHP plasticizer into water and carbon-dioxide.”

Putting all the five enzymes into bacteria will speed up the degradation process not only because the enzymes will act sequentially but also because degradation of the enzymes itself becomes a non-issue once they are integrated into bacteria. The enzymes, whether used for degradation or not, will remain active only for a short time. But once integrated into bacteria, the enzymes remain active for a longer time and the bacteria can be used continuously for degrading the plasticizers. But when the enzymes are used without integrating into bacteria, a fresh batch of enzymes needs to be produced to continue the degradation process.

“We are also undertaking enzyme engineering to speed up the degradation process inside the bacteria,” says Ms. Verma.

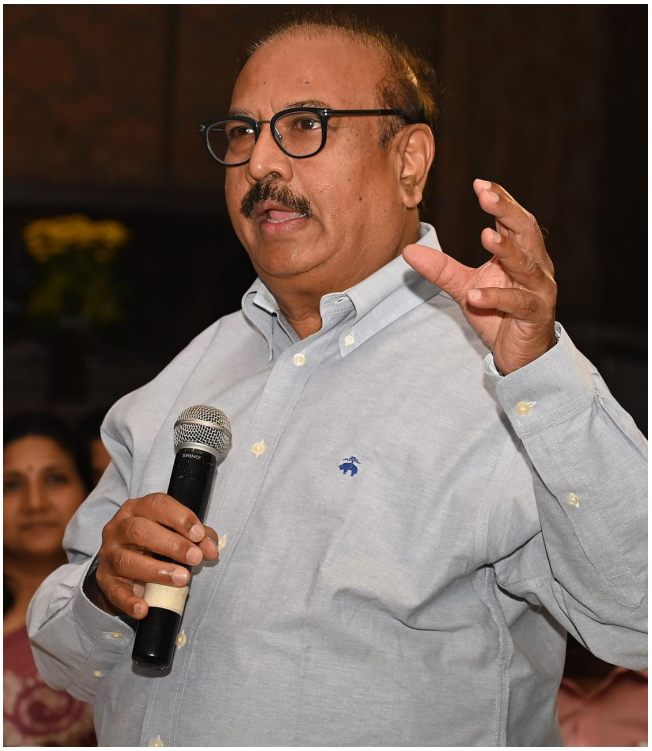
https://www.thehindu.com/sci-tech/iit-roorkee-uses-bacterial-enzymes-to-degrade-plasticizers/article69085296.ece

THE HINDU

Sat, 11 Jan 2025

Krishna Ella, of Bharat Biotech, conferred INSA Fellowship

Krishna Ella, co-founder and Executive Chairman of Bharat Biotech International, one of India's leading vaccine makers, was earlier this week conferred with the India Fellowship of the Indian National Science Academy (INSA) – among the country's science academies – for the year 2025. This is the first year that the INSA has awarded fellowships to representatives from the industry.



"Dr. Krishna Ella, a prominent Indian scientist and entrepreneur, leads Bharat Biotech in ground-breaking vaccine development. His achievements include India's Covaxin, the world's first clinically proven conjugated Typhoid Vaccine, ROTAVAC, and the first preservative-free vaccine, Revac-B mcf Hepatitis B Vaccine. Bharat Biotech also introduced India's first cell-cultured Swine Flu vaccine and manufactures the world's most affordable Hepatitis vaccines. Additionally, they were the first globally to develop a vaccine for the Zika virus," said the citation on the website of INSA.

Indian National Science Academy general meeting held at SRMISTOther notable scientists and technologists who were conferred an INSA fellowship this year included Anil Kakodkar, former Chairman of the Atomic Energy Commission of India; V.K. Saraswat, former Director General, DRDO; S. Somanath, Chairman ISRO; S. Kris Gopalakrishnan, Co-founder, Infosys; Samir V. Kamat, Secretary DDR&D and Chairman, DRDO.

This year a total of 61 fellowships were awarded. Elected INSA fellows may attend and vote at INSA general meetings and can propose other individuals for fellowships or INSA awards.

“I deeply appreciate and am thankful to be recognized for my contribution in the field of vaccines and biotechnology by INSA. I look forward to continuing to support its initiatives, to improve public health, and make India self-reliant and a dominant force in discovering novel vaccines as an Indian fellow,” Dr. Ella said in a statement. “I share this honour with all of my highly motivated team at Bharat Biotech, research fellows, and other collaborators who have contributed enormously to improve public health,” he added.

https://www.thehindu.com/sci-tech/science/krishna-ella-of-bharat-biotech-conferred-insa-fellowship/article69085949.ece

THE HINDU

Sat, 11 Jan 2025

Putting the gene editing tool to use

When you edit a letter or a document, you make specific changes in the words and phrases to make the meaning clearer. Gene editing involves changing the sequence of DNA using specific enzymes which can cut DNA at a precise location, thus permitting the removal, addition, or replacement of genetic information within a gene. The process is akin to correcting a misspelt word in a sentence or replacing it with a more appropriate word. In organisms, this modification directly alters the genetic instructions encoded in the DNA.

In earlier days, if we wanted to modify the message in the DNA to a desired function, it involved two enzymes — one to cut the DNA at a specific site, and another to help insert the desired genetic change. While such twin-enzyme methods worked, they were laborious.

The discoveryThis was when Drs Jennifer Doudna of University of California, Berkeley, U.S. and Emmanuelle Charpentier of Humboldt University, Germany came out with a double action gene modification method, called CRISRP-Cas9. This is a mechanism that can edit the genomes of humans, pathogens, and plants. CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats, and Cas9 (which stands for CRISPR- associated Protein 9) cuts DNA strands at a specific location, creating a gap that can be filled with new DNA. Doudna and Charpentier shared the Nobel Prize in 2012.

However, Prof. Feng Zang who was then at a Southern California University, published a paper wherein he showed genome engineering using the CRISPR-Cas9 system. But he was not included as the third scientist by the Nobel Committee. He then went ahead, obtained a patent and moved to Boston, where he works and this patent is owned today by the MIT-Harvard University combine, called Broad Institute, which uses the CRISPR-Cas9 system for a variety of applications such as the mouse model for cancer, identifying genes that make cancer drugs ineffective, and modification of immune cells, plus training people in the technology.

Gene editing in plants

While CRISPR-Cas9 patented technology has been used for the above-mentioned diagnostic and genetic uses, agricultural scientists and botanical researchers have been using this method to genome engineer plants. The group of Dr Holger Puchta of the Karlsruhe Botanical Institute, Germany has published several papers, notably how to use Cas9, Cas 12 and Cas13, for targeting plant genomes. Most recently, CRISPR-Cas9 based 'knock-out' of two genes in tomato plants increased their sweetness with no loss in weight. Similar studies on other plants and fruits will surely follow.

However, a recent report by Dr Anurag Chaurasia, titled "How CRISPR patent issues block Indian farmers from accessing biotech benefits", points out that the IPO has granted a local patent to ERS Genomics of Dublin, which allows Indian researchers to use CRISPR-Cas9 only for academic purposes but not commercialise any scientific breakthroughs. Our rural farmers are thus still left 'classical'.

Visually handicappedFor people afflicted with eye disorders, scientists and clinicians at LV Prasad Eye Institute, Hyderabad, in collaboration with a group in IGIB, have used one of these high precision methods to correct inherited mutations in patient-specific stem cells (Nature Communications, June 2024). These mutation-corrected stem cells could then make retinal cells, which showed restored expression of the missing protein. This has opened the possibility of developing autologous cell therapies for certain inherited eye disorders. A similar approach can be adapted for other diseases affecting other tissues and cell types of the body.

https://www.thehindu.com/sci-tech/putting-the-gene-editing-tool-to-use/article69085286.ece

The Indian EXPRESS

Sun, 12 Jan 2025

India Genome Project: After mapping 10,000 healthy genomes, India targets cancer DNA next

AFTER COMPLETING India's baseline map by sequencing 10,000 genomes, the Genome India project is set to move into its second phase during which samples of individuals with specific diseases would also be sequenced.

"Now that we have released the data of healthy individuals, the second phase of the project would involve sequencing the genomes of diseased persons. There are ongoing discussions with experts to finalise what diseases should be included and how many samples for them need to be sequenced to give meaningful insights," Dr Suchita Ninawe, senior scientist at the Department of Biotechnology, told The Indian Express.

Genome India is a government-backed project to collect and catalogue the genetic variations specific to Indian populations. India-specific genetic information is not very well reflected in global human genome databases. Such information is valuable for a number of reasons, including diagnosis and treatment of several gene-related diseases.

Launched in 2020, 10,000 sequences from healthy individuals were collected in the first phase of the project. The second phase seeks to expand the database to one million sequences, including genetic information of people with specific diseases.

A comparison of the healthy and diseased genome can help researchers identify targets for developing treatments and diagnostic tests. It is the first step towards personalised treatment and medicine, which is supposed to be the future of healthcare.

The diseases that would most likely be included in the list would be different types of cancers, chronic conditions such as diabetes, and various neurological or neurodegenerative diseases. Rare diseases that are found in Indian populations are also likely to be included in the list of diseases to be studied for the next phase of Genome India project.

“This data will also help us understand why certain diseases happen, especially when it comes to rare diseases that are not yet extensively studied,” said Dr Ninawe.

The second phase would also cover many more linguistic and ethnic groups. In the first phase, individuals from 99 population groups were included. But as many as 4,635 different population groups have been identified in India.

The next phase would have representation of all the states and UTs, most linguistic and ethnic groups, and rural populations, said Prof Y Narahari from the Indian Institute of Science, one of the lead scientists on this project. More than 20 major research institutions are participating in this project.

“This is just the beginning,” Rajesh Gokhale, Secretary of Department of Biotechnology, said. “The data from the first phase has set the standards, and it makes us feel very confident to expand the dataset to one million genomes of various kinds.”

One million genomes would put India among a small group of countries that have managed to sequence a large number of genomes to understand genetic variation within their populations.

The first Human Genome Project, which was an international consortium funded by the US National Institutes of Health among others, published the world’s first complete human genome in 2003. Since then, the ‘1,000 Genomes’ project, again an international collaboration, published 1,092 sequences in 2012. A UK government project sequenced 100,000 genomes by 2018.

https://indianexpress.com/article/india/in-2nd-phase-genome-india-project-to-focus-on-diseases-9773862/