

दिसंबर
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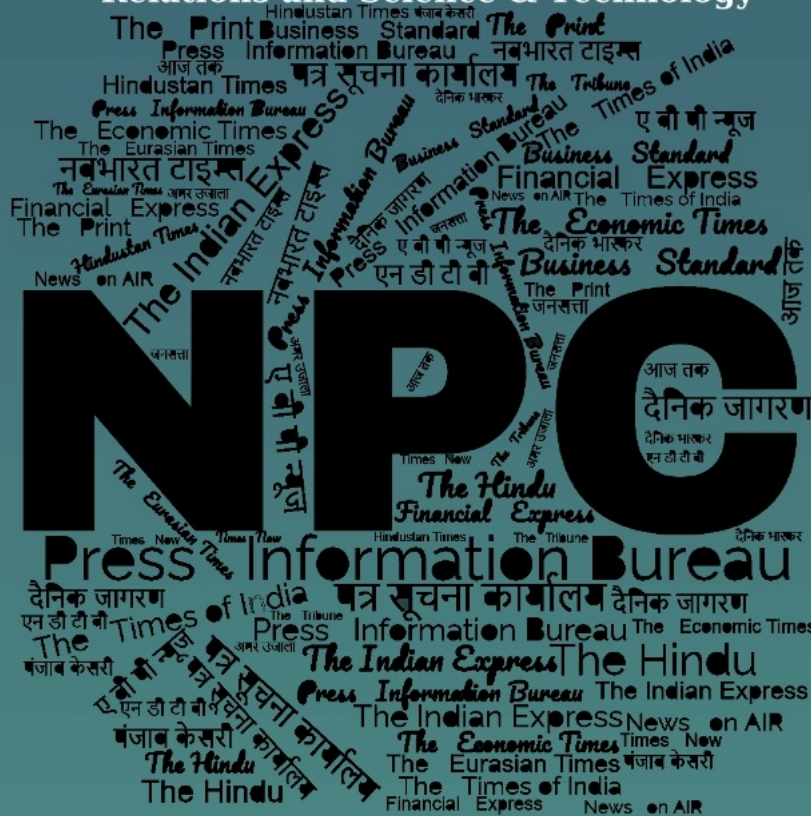
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समाचार पत्रों से चयनित अंश Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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‘मेक इन इंडिया’ से मजबूत हो रही देश की सुरक्षा, TDF योजना के तहत 79 योजनाओं को मिली मंजूरी

रक्षा प्रौद्योगिकियों के विकास के लिए प्रौद्योगिकी विकास निधि (टीडीएफ) योजना के तहत अब तक 79 परियोजनाएं मंजूर की गई हैं, जिनकी लागत 334.02 करोड़ रुपये है। इसके अलावा, रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने देश भर में 15 उद्योग अकादमिक उत्कृष्टता केंद्र (डीआईए-सीओई) स्थापित किए हैं। रक्षा राज्य मंत्री संजय सेठ ने लोकसभा में एक लिखित जवाब में यह जानकारी दी। रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) द्वारा मेक इन इंडिया पहल के तहत प्रौद्योगिकी विकास निधि योजना रक्षा मंत्रालय का एक प्रमुख कार्यक्रम है। केंद्र सरकार ने उद्योगों, विशेष रूप से एमएसएमई और स्टार्टअप को विभिन्न रक्षा प्रौद्योगिकियों को विकसित करने के लिए प्रोत्साहित करते हुए इस योजना को मंजूरी दी है।

मिलेगा 50 करोड़ तक का फंड

केंद्रीय मंत्री ने कहा कि उद्योगों को अनुदान सहायता के रूप में प्रति परियोजना 50 करोड़ रुपये तक का फंड दिया जाएगा। डीआरडीओ ने रक्षा और सुरक्षा के लिए नई टेक्नोलॉजी के विकास में रिसर्च को बढ़ावा देने के लिए आईआईएससी बंगलोर, विभिन्न आईआईटी और केंद्रीय/राज्य विश्वविद्यालयों जैसे संस्थानों में डीआईए-सीओई की स्थापना की है। ये उत्कृष्टता केंद्र शोधकर्ताओं और विद्वानों को आकर्षित करने के लिए अत्याधुनिक प्रयोगशालाओं, अनुसंधान सुविधाओं और बुनियादी ढांचे से सुसज्जित हैं।

DRDO का उद्देश्य

इन केंद्रों के माध्यम से, डीआरडीओ का लक्ष्य उत्पाद विकास को आगे बढ़ाने के लिए स्टार्टअप और उद्योगों के साथ प्रभावी सहयोग स्थापित करना है। सरकार ने रक्षा और एयरोस्पेस क्षेत्रों में इनोवेशन और टेक्नोलॉजी के विकास को बढ़ावा देने के लिए इनोवेशन फॉर डिफेंस एक्सीलेंस फ्रेमवर्क को लॉन्च किया है। यह आत्मनिर्भरता को बढ़ावा देने के लिए एमएसएमई, स्टार्टअप, व्यक्तिगत इनोवेटर्स, आरएंडडी संस्थानों और शिक्षाविदों सहित उद्योगों को शामिल करता है। मई 2021 में, सरकार ने पांच साल (2021-22 से 2025-26) के लिए 498.80 करोड़ रुपये के बजटीय आवंटन के साथ इनोवेशन फॉर डिफेंस एक्सीलेंस को बढ़ाने के लिए एक योजना शुरू की। इस योजना का उद्देश्य रक्षा नवाचार संगठन (डीआईओ) ढांचे के तहत लगभग 300 स्टार्टअप, एमएसएमई और व्यक्तिगत इनोवेटर्स के साथ-साथ 20 पार्टनर इनक्यूबेटर्स को वित्तीय सहायता प्रदान करना है। केंद्रीय मंत्री ने बताया कि अब तक डीआरडीओ की अनुदान सहायता योजना के तहत लगभग 930 करोड़ रुपये की 264 परियोजनाओं को मंजूरी दी गई है।

<https://www.timesnowhindi.com/business/79-projects-approved-under-tdf-scheme-to-develop-defense-technology-in-india-article-116079548>

9 projects worth Rs 334 cr sanctioned under TDF scheme: Defence MoS Sanjay Seth tells Lok Sabha

A total of 79 projects, costing Rs 334.02 crore, have so far been sanctioned to various industries under the Technology Development Fund (TDF) scheme for the development of defence technologies. Additionally, the **Defence Research and Development Organisation (DRDO)** has established 15 Industry Academia **Centres of Excellence (DIA-CoEs)** across the country, Minister of State for Defence Sanjay Seth informed in a written reply to Ananta Nayak in the Lok Sabha on Friday.

The Technology Development Fund Scheme is a flagship programme of the Ministry of Defence (MoD) executed by DRDO under the 'Make in India' initiative. The Union Government has approved the scheme to encourage industries, especially MSMEs and startups, to develop various defence technologies. The scheme aligns with the vision of 'Aatmanirbhar Bharat' by integrating new industries into the design and manufacturing of defence technology. Funding of up to Rs 50 crore per project is provided to the industry as a grant-in-aid, the minister stated.

DRDO has set up **DIA-CoEs** at institutions such as IISc Bangalore, various IITs, and Central/State Universities to promote focused research in developing new technologies for defence and security. These Centres of Excellence are equipped with state-of-the-art laboratories, research facilities, and infrastructure to attract researchers and scholars. Through these centres, DRDO aims to establish effective collaborations with startups and industries to further product development.

The Government has also launched the Innovations for Defence Excellence (iDEX) framework to foster innovation and technology development in the Defence and Aerospace sectors. It engages industries, including MSMEs, startups, individual innovators, R&D institutes, and academia, to promote self-reliance.

In May 2021, the government introduced a scheme to scale up iDEX with a budgetary allocation of Rs 498.80 crore for five years (2021-22 to 2025-26). This scheme aims to provide financial support to nearly 300 startups, MSMEs, and individual innovators, as well as 20 partner incubators under the Defence Innovation Organisation (DIO) framework.

So far, 264 projects, worth approximately Rs 930 crore, have been sanctioned under the DRDO's grants-in-aid scheme, Sanjay Seth noted.

Since 2019, DRDO has been organising the Pan India Dare to Dream Innovation Contest annually to encourage innovators, entrepreneurs, individuals above 18 years, and startups (recognised by DPIIT and founded by Indians) to contribute innovative ideas in the Defence and Aerospace sectors. Through this contest, DRDO identifies and awards the best ideas, supporting their development into prototypes under the TDF scheme.

Four editions of the Dare to Dream contest have already been successfully conducted. The fifth edition, Dare to Dream 5.0, was launched by Raksha Mantri on October 18, 2024, and is currently underway. Winners in each category receive a fixed cash prize, with Rs 543 lakh already disbursed across the four previous editions. Selected individuals or companies also benefit from DRDO's support in realising their awarded ideas into prototypes.

<https://economictimes.indiatimes.com/news/defence/79-projects-worth-rs-334-cr-sanctioned-under-tdf-scheme-defence-mos-sanjay-seth-tells-lok-sabha/articleshow/116046488.cms>

Defence News

Defence Strategic: National/International



**Press Information Bureau
Government of India**

Ministry of Defence

Fri, 06 Dec 2024

Research And Technology Hub In Defence Sector

Government has taken various initiatives to develop India into a research and technology hub. Some of them are as follows:

(i) **Technology Development Fund (TDF) Scheme:** Technology Development Fund Scheme is a flagship program of MoD (Ministry of Defence) executed by DRDO under Make in India initiative. The Government has approved TDF Scheme to encourage industries especially MSMEs and Startups to develop various Defence technologies. The scheme aligns with the vision of 'Aatmanirbhar Bharat' by bringing new industries in the fold of design and manufacturing of defense technology. Funding of up to Rs. 50 Cr. per project is provided to the industry as Grant-in-Aid.

(ii) **DRDO Industry Academia Centre of Excellence (DIA-CoE):** DRDO has established DRDO Industry Academia Centre of Excellence (DIA-CoE) across the country at IISc Bangalore, various IITs and Central/State Universities to encourage directed research for developing new technologies for Defence and Security in identified areas. State-of-the-Art lab/research facilities and infrastructure for attracting researchers and scholars are established at these Centres of excellence. Through these DIA-CoEs, DRDO will have effective collaboration with start-ups/industry which will further help in product development.

(iii) **Innovations for Defence Excellence (iDEX)** framework was launched by the Government with the aim to foster innovation and technology development in Defence and Aerospace Sector by engaging Industries including MSMEs, startups, individual innovators, R&D institutes and academia to promote self-reliance. Further, a scheme for scaling up iDEX has been launched in May 2021 with a budgetary support of Rs. 498.80 crore for the next five years i.e. from 2021-22 to 2025-26. The Scheme aims at providing financial support to nearly 300 Start-ups/ MSMEs/ individual innovators and 20 partner incubators under the Defence Innovation Organisation (DIO) framework.

So far, a total of 79 projects of costing Rs 334.02 crore have been sanctioned to various industries under the TDF scheme for development of Defence technologies, and DRDO has established 15 DIA-CoEs across the country. 264 projects of cost approximately Rs 930 crore are sanctioned so far, under the Grants-in-Aid scheme of DRDO.

DRDO has been launching Pan India Dare to Dream Innovation Contest every year since 2019 to bring together innovators, entrepreneurs, individuals above 18 years and start-ups (recognised by DPIIT and with Indian founders) for innovative ideas in the field of Defence and Aerospace. Through this contest, DRDO invites innovative ideas and best ideas are selected and awarded.

Four versions of Dare to Dream Contest have already been successfully conducted. Dare to Dream (D2D) 5.0 was launched by Raksha Mantri on October 18, 2024 and is presently going on. A fixed amount in each category is provided as cash prize to the winners of this contest. A total of Rs 543 lakh has been released to the winners of four editions of Dare to Dream Contest as cash prize money. The selected individual/company are getting benefitted as DRDO supports them to realise awarded ideas into Prototype through TDF scheme.

This information was given by Raksha Rajya Mantri Shri Sanjay Seth in a written reply to Shri Ananta Nayak in the Lok Sabha today.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2081451>



Press Information Bureau
Government of India

Ministry of Defence

Sat, 07 Dec 2024

Raksha Mantri to visit Russia to attend 21st meeting of India-Russia Inter-Governmental Commission on Military & Military Technical Cooperation

Indian Navy's latest multi-role stealth guided missile frigate 'INS Tushil' to be commissioned during his 3-day visit

Raksha Mantri Shri Rajnath Singh will pay an official visit to the Russian Federation from December 08-10, 2024. During the visit, Raksha Mantri and the Defence Minister of Russia Mr Andrey Belousov will co-chair the 21st meeting of India-Russia Inter-Governmental Commission on Military and Military Technical Cooperation (IRIGC-M&MTC) in Moscow on December 10, 2024.

The two leaders will review the entire range of multi-faceted relations between the two countries in the field of defence, including military-to-military and industrial cooperation. They will also exchange views on contemporary regional and global issues of mutual interest.

As part of the visit, Raksha Mantri will also commission the Indian Navy's latest multi-role stealth guided missile frigate 'INS Tushil' at Yantra Shipyard, Kaliningrad on December 09, 2024. Chief of the Naval Staff Admiral Dinesh K Tripathi will accompany Shri Rajnath Singh for the commissioning ceremony.

In addition, Raksha Mantri will pay tributes at 'The Tomb of the Unknown Soldier' in Moscow to honour the Soviet soldiers killed during the Second World War. He will also interact with the members of the Indian community.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2081806>



Press Information Bureau
Government of India

Ministry of Defence

Fri, 06 Dec 2024

Commissioning Of INS Tushil

The Indian Navy is all set to commission its latest multi-role stealth guided missile frigate, INS Tushil, at **Kaliningrad, Russia, on 09 Dec 24**. The ceremony will be presided over by the **Hon'ble Raksha Mantri, Shri Rajnath Singh**, as the Chief Guest, with many high ranking Russian and Indian government and defence officials present.

INS Tushil is an **upgraded Krivak III class frigates of the Project 1135.6** of which, six are already in service – three Talwar class ships, built at Baltiysky shipyard, St. Petersburg, and three follow-on Teg class ships, built at Yantar shipyard, Kaliningrad. INS Tushil, the seventh in the series, is the **first of the two upgraded additional follow-on ships** the contract for which was signed in Oct 2016 between JSC Rosoboronexport, Indian Navy and the Govt. of India. The ship's construction was closely monitored by an Indian team of specialists from the Warship Overseeing Team stationed at Kaliningrad, under the aegis of the Embassy of India, Moscow.

The warship is the result of the continuous toil of hundreds of shipyard workers along with multiple Russian and Indian OEMs. The ship post construction and readiness underwent a series of extensive trials, beginning January this year, including Factory Sea Trials, State Committee Trials and lastly Delivery Acceptance Trials by a team of Indian specialists. These trials included the

proving of all Russian equipment fitted onboard, including weapon firings. During the trials, the ship clocked an impressive speed of more than 30 knots. With these trials being successfully completed, the ship would reach India in a near combat-ready condition ready to deliver its effects from the word go.

The ship's name, *Tushil*, means '**the protector shield**' and its crest represents the '*Abhedya Kavacham*' (impenetrable shield). Along with its motto, '*Nirbhay, Abhedya aur Balsheel*' (Fearless, Indomitable, Resolute), the ship stands as a symbol of the Indian Navy's undying commitment to protect and safeguard the nation's maritime frontiers.

This **125 metre, 3900 ton ship**, packs a lethal punch and is an impressive blend of Russian and Indian cutting edge technologies and best practices in warship construction. The ship's new design provides it with enhanced stealth features and better stability characteristics. With the collaboration of Indian naval specialists and Severnoye Design Bureau, **the indigenous content of the ship has been enhanced to an impressive 26% and the number of made-in-India systems have more than doubled to 33**. The major Indian OEMs involved were BrahMos Aerospace Private Limited, Bharat Electronics Limited, Keltron, Nova Integrated Systems from Tata, Elcome Marine, Johnson Controls India and many more.

Upon commissioning, INS Tushil will join the '*Sword Arm*' of the Indian Navy, the Western Fleet, under the Western Naval Command and will rank amongst the most technologically advanced frigates in the world. It will not only be a symbol of Indian Navy's growing capabilities, but also the resilient collaborative strength of the India-Russia partnership.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2081448>



**Press Information Bureau
Government of India**

Ministry of Defence

Sun, 08 Dec 2024

Commanders' Conference-2024 Western Air Command

A two day Commanders' Conference of Western Air Command (WAC) of the Indian Air Force was held on 06 & 07 December 2024 at New Delhi, with Air Chief Marshal AP Singh, Chief of the Air Staff (CAS) as the chief guest.

He was received by Air Marshal PM Sinha, Air Officer Commanding-in-Chief, WAC, and was presented with a ceremonial Guard of Honour on his arrival.

During the conference, the CAS interacted with the Commanders of the WAC AoR, and discussed the need to pursue training for ensuring the capability to fight and win multi-domain warfare. He emphasised on the theme for this year "Bharatiya Vayu Sena - Sashakt, Saksham, Atmanirbhar", and sought the collective capability, capacity and commitment of all commanders to take the IAF to even greater achievements.

He emphasised on the need to achieve focused progress in various areas, which include increasing operational capability through better training and planning; early operationalisation of newly inducted equipment; safety and security, and nurturing leaders by empowering individuals at all levels to turn into a future ready and cohesive force.

The CAS in his address, complimented WAC for being the first responders to calls for HADR, both within India and abroad; maintaining high operational excellence to ensure an always ready' formidable fighting force, and always keeping IAF core values of 'Mission, Integrity and Excellence' foremost.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2082054>

THE ECONOMIC TIMES

Fri, 06 Dec 2024

China, India agree to take measures to further ease border situation at Delhi WMCC meeting: Beijing

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

China and India held the 32nd meeting of the Working Mechanism for Consultation & Coordination on China-India Border Affairs (WMCC) on Thursday in New Delhi, and the two sides agreed to maintain communication through diplomatic and military channels, and safeguard sustainable peace and stability in the border areas. Both sides positively assessed the solutions reached on border-related issues and agreed to continue implementing them comprehensively and effectively, while taking measures to further ease the border situation, a press release issued by the Ministry here on Friday.

This is the first meeting of WMCC after the October 21 agreement between the two countries to resolve the over four yearlong military standoff in eastern Ladakh that had brought the relations between the two countries to a standstill. Following the important consensus reached by the leaders of both countries, the meeting focused on preparations for the next round of Special Representatives' talks on the China-India border issue, it said.

The two sides also agreed to continue leveraging the role of the border negotiation mechanism, maintaining communication through diplomatic and military channels, and safeguarding sustainable peace and stability in the border areas, the release said. The Ministry of External Affairs (MEA), in its press release on the talks on Thursday, said both sides reflected on the lessons learnt from the eastern Ladakh border row in order to prevent such face-offs in future.

Also at Thursday's WMCC the two sides agreed to maintain peace and tranquillity in border areas in line with bilateral pacts and protocols. The two sides also prepared for the next meeting of the

Special Representatives on the boundary question. "The two sides positively affirmed the implementation of the most recent disengagement agreement which completed the resolution of the issues that emerged in 2020," the MEA release said.

The eastern Ladakh military standoff between India and China began in May 2020 and a deadly clash at the Galwan Valley in June that year resulted in a severe strain in ties between the two neighbours. The face-off effectively ended following completion of the disengagement process from the last two friction points of Demchok and Depsang under an agreement finalised on October 21. Two days after the pact was firmed up, Prime Minister Narendra Modi and Chinese President Xi Jinping held talks on the sidelines of the Brics Summit in the Russian city of Kazan.

In the meeting, the two sides agreed to revive several dialogue mechanisms including the Special Representatives dialogue on boundary questions. India's Special Representative for the dialogue is NSA Ajit Doval while the Chinese side is headed at the talks by Foreign Minister Wang Yi. "They also prepared for the next meeting of the Special Representatives, which is to be held in accordance with the decision of the two leaders in their meeting in Kazan on October 23," the MEA said on the WMCC talks.

It said "both sides reviewed the situation in border areas, and reflected on the lessons learnt from the events of 2020 in order to prevent their recurrence." "In this context, they highlighted the importance of regular exchanges and contacts at diplomatic and military level through established mechanisms."

"They agreed on the need for effective border management and maintenance of peace and tranquillity in accordance with relevant bilateral agreements, protocols and understandings reached between the two governments," the MEA added.

The Indian delegation at the talks was led by Gourangalal Das, Joint Secretary (East Asia) in the MEA. The Chinese team was headed by Hong Liang, Director General of the Boundary and Oceanic Affairs Department at the Chinese Foreign Ministry. Hong also called on Foreign Secretary Vikram Misri.

<https://economictimes.indiatimes.com/news/defence/china-india-agree-to-take-measures-to-further-ease-border-situation-at-delhi-wmcc-meeting-beijing/articleshow/116044507.cms>

THE ECONOMIC TIMES

Fri, 06 Dec 2024

BSF launches special surveillance project to plug over 600 gaps on Pak, Bangla borders

The Border Security Force (BSF) has initiated a special electronic surveillance project to secure over 600 "vulnerable patches" along the India-Pakistan and India-Bangladesh borders, covering areas where physical fencing is not feasible, the force chief said on Friday.

Speaking at a press conference on the occasion of the 60th Raising Day of the force, BSF director general (DG) Daljit Singh Chawdhary said approximately 800 km of the 4,069 km India-Bangladesh border remains unfenced due to rivers and other geographical challenges.

Last year in December during the BSF Raising Day at Hazaribag in Jharkhand, Union Home Minister Amit Shah had said that India's two most important borders with Pakistan and Bangladesh will be completely secured in the next two years.

Chawdhary said that a "stern direction" has been given to BSF troops that "no infiltration should take place" along the 2,289 km long India-Pakistan international border (IB) guarded by it on the country's western flank running along the states of Gujarat, Rajasthan, Punjab and Jammu.

In Kashmir, the BSF works under the command of the Army to secure the Line of Control (LoC). About 2.65 lakh strength force was raised on December 1, 1965. It is primarily tasked to guard more than 6,300 kms of Indian fronts with Pakistan and Bangladesh apart from rendering a variety of duties in the internal security domain of the country. Union Home Minister Amit Shah is scheduled to officiate as the chief guest of the Raising Day parade at a BSF camp here, about 340 kms from state capital Jaipur, on December 8.

Answering a question about the current situation of fencing along the two borders, the DG said, "Hardly about 800 kms of the India-Bangladesh border remains unfenced...this is that area where it is not feasible to erect a fence, like the riverine areas.

"However, efforts are underway to set up an electronic surveillance and vulnerability project consisting of infra red sensors and alarms to dominate vulnerable patches on this IB, the DG said.

The force, along the Bangladesh front, is also undertaking a "detailed vulnerability mapping to strengthen surveillance by deploying additional manpower, special surveillance equipments and vehicles, Chawdhary said. For the western front with Pakistan, the DG said the force was planning to erect a "new design fence" and CCTV, PTZ (pan tilt zoom) and bullet cameras have been installed in vulnerable areas for better surveillance of this front.

An electronic surveillance of vulnerable patches is being undertaken along the Pakistan and Bangladesh borders where a total of 635 vulnerable patches, covering 484 kms of the two IBs are being covered, as per the BSF, he said. Chawdhary said there was "very little" area on the India-Pakistan front that was not fenced.

"We are using drone penetrating radars in Jammu and Punjab border areas to find and dismantle under-ground tunnels that are used by terrorists to infiltrate into India from Pakistan," he added.

The DG said there was not an "exact estimate" about the number of infiltration attempts getting successful from the Pakistan border but the force undertakes "all necessary" measures to stop such crossings of terrorists. He said illegal entry of drones from Pakistan into the border areas of India was a "big challenge" but while these unmanned aerial vehicle (UAV) flights have gone up, the volume of drugs smuggled from this border had gone down. As per data recorded by the BSF, more than 257 drones have been seized by the force this year as compared to more than 110 recovered last year.

Similarly, this year the force has seized over 432 kg of drugs at this front as compared to 895 kgs recovered last year. Chawdhary said BSF was on "continuous alert" along the Bangladesh border post the fall of the Sheikh Hasina government in that country in August. The force was "in touch" with its Bangladeshi counterpart BGB and they "always responded" to them post these latest developments in the neighbouring country, he said. Issues are immediately sorted out, he said pointing out to the good working relations between the forces of the two countries.

"There has been no unnecessary movement or encroachment on this border. Only people with valid visa are being allowed to cross over to India. We have been able to stop illegal infiltration from this area (Bangladesh border) ," he said. BSF data said over 172 gold and 178 kg silver was seized along the India-Bangladesh border this year.

<https://economictimes.indiatimes.com/news/defence/bsf-launches-special-surveillance-project-to-plug-over-600-gaps-on-pak-bangla-borders/articleshow/116053291.cms>

THE ECONOMIC TIMES

Sat, 07 Dec 2024

Defence Minister Rajnath Singh exhorts people to contribute to Armed Forces Flag Day Fund

Defence Minister Rajnath Singh on Saturday urged people to contribute generously to the Armed Forces Flag Day Fund, describing it as a collective responsibility to ensure the welfare of the soldiers.

The Armed Forces Flag Day is celebrated every year on this day to honour the martyrs and the men in uniform who fought valiantly on the borders. In a video message on X, Singh said it is an opportunity for the citizens to recognise the indomitable courage, sacrifice and dedication of the soldiers and reaffirm the resolve to fulfil the responsibilities towards the "bravehearts".

"Our armed forces act as an impregnable security shield, which is ever-ready to protect us in every situation -- not just external threats, but also during natural disasters," he said.

"Their sacrifice and discipline of our soldiers is a source of inspiration for every Indian," he added.

Reiterating the government's commitment towards the welfare of the ex-servicemen, Singh said all efforts are being made to cater to the needs of the veterans and their families.

He called upon people to play their part, emphasising that their contribution can prove to be crucial for the soldiers and their kin. For the welfare of society, it is the duty of every citizen to earn with a hundred hands and donate with a thousand hands, he said.

<https://economictimes.indiatimes.com/news/defence/defence-minister-rajnath-singh-exhorts-people-to-contribute-to-armed-forces-flag-day-fund/articleshow/116072145.cms>

India to create comprehensive anti-drone unit for border security: Amit Shah

Union Home Minister Amit Shah on Sunday (December 8, 2024) said India will soon create a comprehensive anti-drone unit to secure its borders as the "menace" of unmanned aerial vehicles is going to get serious in the coming days. Addressing BSF troops at the 60th Raising Day event of the force here at its training camp, about 300 km from the India-Pakistan border, Mr. Shah said the initial results of a "laser-equipped anti-drone gun-mounted" mechanism have been encouraging.

This has led to an increase in drone neutralisation and detection cases, up from 3% to 55%, along the India-Pakistan border in Punjab, he said.

"The drone menace is going to get more serious in the coming days... We are tackling this issue with a 'whole of government' approach with the defence and research organisations and the DRDO joining hands.

"We are going to create a comprehensive anti-drone unit for the country in the coming time," Mr. Shah said.

According to official data, more than 260 drones have been downed or recovered from India's border with Pakistan this year as compared to about 110 in 2023. The maximum number of such interdictions of drones carrying arms and drugs have taken place in Punjab and very few in Rajasthan and Jammu.

The Minister reviewed the ceremonial parade, took a salute and awarded medals to gallantry award winners and some other decorations. The Border Security Force (BSF), which has a strength of about 2.65 lakh personnel, was raised on December 1, 1965. It is primarily tasked with guarding more than 6,300 kms of Indian fronts with Pakistan and Bangladesh apart from rendering a variety of duties in the internal security domain of the country.

Mr. Shah said the ongoing Comprehensive Integrated Border Management System (CIBMS) for securing India's borders with Pakistan (2,289 km) and Bangladesh (4,096 km) is a work in progress.

"We have had an encouraging response from the CIBMS deployed along the riverine border in Assam's Dhubri (India-Bangladesh international border) but some improvements are required," he said. The Minister also said that the Modi government's Vibrant Village Programme (VVP) for developing and bringing into the mainstream the population of northern borders will be implemented for all the frontier villages of the country.

This is the Modi government's "biggest achievement" vis-a-vis enhancing border security and working for the population living in these remote areas with a fund allocation of ₹48,000 crore. It is being run on an "experimental basis" in around 3,000 villages, he said.

Mr. Shah said the Union government has sanctioned a "big" budget for strengthening India's borders — fencing, frontier infrastructure, roads and other logistics.

"Securing global recognition and the number one place for India by 2047 is not possible without our security personnel... the jawans who guard our borders with dedication," he said. Mr. Shah said about 573 new border posts have been created by the Modi government apart from 1,812 km of roads. BSF Director General (DG) Daljit Singh Chawdhary said 13,226 newly trained personnel have been posted in various battalions and this will add to the "operational strength" of the force.

An additional 4,000 freshly recruited personnel are under training while about 12,000 will join the force next month to learn security and combat skills before being posted at the borders, he said. Mr. Chawdhary also spoke about the "increasing number" of drones carrying arms and drugs being sent by the enemy from across the Pakistan border.

More than 250 drones have been intercepted this year on the western border, he said. "We have deployed a DRDO-made anti-drone system to check this menace," he said.

<https://www.thehindu.com/news/national/india-to-create-comprehensive-anti-drone-unit-for-border-security-amit-shah/article68961523.ece>

THEWEEK

Fri, 06 Dec 2024

Russia's new nuclear beast, 'Arkhangelsk', ready to dominate the oceans

Russian Navy is all set for a major power upgrade in its strategic and tactical maritime capabilities as the latest Project 885M (Yasen-M) multi-purpose nuclear-powered submarine, Arkhangelsk, will be delivered to the force by next summer. With an estimated 64 vessels, including 16 nuclear-powered ballistic missile submarines, the Russian Navy has one of the largest submarine fleets in the world.

According to media reports, the head of the All-Russian Navy Support Movement Vladimir Maltsev, confirmed that the Russian Navy will soon be equipped with the submarine, built at the Sevmash Shipyard, which is part of the United Shipbuilding Corporation.

"The Arkhangelsk is currently undergoing state trials. The submarine is planned to be delivered to the Russian Navy in the summer of 2025," news agency Tass quoted Maltsev as saying.

Arkhangelsk was deployed to the sea for the first time in June for sea trials. Project 885M nuclear-powered submarines carry Oniks and/or Kalibr-PL cruise missiles as their basic strike weapons.

The shipyard is constructing five Project 885M submarines. Designed for multiple roles, including anti-ship, anti-submarine, and land-attack missions, the Yasen-M submarines are extremely versatile.

The Project 885/885M nuclear-powered subs Severodvinsk, Kazan, Novosibirsk and Krasnoyarsk have been delivered to the Russian Navy. Arkhangelsk is the fifth submarine in this class.

<https://www.theweek.in/news/defence/2024/12/06/russia-new-nuclear-beast-arkhangelsk-ready-to-dominate-the-oceans.html>



Fri, 06 Dec 2024

India's LCA Tejas Mk1 challenges Pakistan's JF-17 Thunder in Nigeria's fighter jet upgrade

India has extended \$200 million line of credit to Nigeria in a bid to help facilitate the procurement of light combat aircraft (LCA) Tejas Mk1, the single-engine multi-role combat aircraft manufactured by Hindustan Aeronautics Limited (HAL).

According to media reports, Nigeria is looking to replace its fleet of Chengdu F-7NI, a variant of Chinese fighter aircraft Chengdu J-7 specifically tailored for Nigeria and is part of the broader family of J-7 aircraft, known for their short-range air-to-air combat capabilities. India is putting forward Tejas Mk1 as an advanced and cost-effective alternative for the aging Chengdu F-7NI fleet.

Prime Minister Narendra Modi had recently visited Nigeria. During his visit, a series of agreements were signed between the two countries. "In recent years, India-Nigeria ties have evolved into a "Strategic Partnership" with sound political understanding, diversified economic engagement, intensifying technical cooperation, close people to people contact as well as deepening relations in the fields of Science and Technology, Education, Trade, Agriculture, Defence, Space, Cyber Security, Energy, FinTech, Healthcare, Capacity Building, Training, and concessional Lines of Credit. Both sides agreed to continue strengthening their historical and strategic bilateral relations," a statement from the ministry of external affairs had read.

According to a IDRW report, Nigeria will be able to procure four to five Tejas Mk1A fighter jets with the line of credit offered, and in the long term, this number could go up to 15.

Nigeria, in 2021, inducted into its Air Force, a few JF-17 Thunder fighter jets, a lightweight, single-engine multirole combat aircraft developed through a collaboration between the Pakistan Aeronautical Complex and Chengdu Aircraft Corporation of China. However, reports suggest that the country is not planning to expand the JF-17 Thunder fleet and is looking for alternatives.

India's offer of Tejas Mk1, which is considered to be more maneuverable and reliable than JF-17, with a line of credit for procurement may make it easy for Nigeria to make a decision.

<https://www.theweek.in/news/defence/2024/12/06/india-lca-tejas-mk1-challenges-pakistans-jf-17-thunder-in-nigeria-fighter-jet-upgrade.html>

Why US finds increased military collaboration between Russia and China 'disturbing'

The growing defence collaboration between Russia and China, including joint military exercises and military technology exchange, is causing concern to the US.

Deputy Assistant Secretary of Defense for Arctic and Global Resilience Iris A. Ferguson recently observed that China is working closely with Russia in an attempt to be seen as an Arctic power, although China is not an Arctic nation.

Canada, Denmark, Finland, Iceland, Norway, Russia, the US, and Sweden are the Arctic nations. According to the US, Chinese leaders, however, see the Arctic region as a new source of raw materials and new avenues for manifesting its growing power.

Ferguson further observed that despite the war in Ukraine, President Vladimir Putin is investing heavily on military and economic strategies in the Arctic.

"(China) is one of the newer entrants on the scene. Over time, the strategic interests that they have in the region are ... giving us pause. How their long-term vision for the region could affect our interests, is (also) giving us pause," she said.

She called the increasing level of military collaboration between Moscow and Beijing "disturbing" and said, "Just this past summer, right after we released our department (Arctic) strategy, we saw a joint bomber patrol off of the coast of Alaska."

She noted that this kind of increased level of military cooperation is new.

Ferguson said the new Arctic strategy of the US Department of Defence (DOD) is aimed at preserving the region as a place that is both stable and secure and added that the US is also focused on engaging with its allies and partners.

According to the DOD, these nations are a unique US strategic advantage that stretches from the border of European Russia to the Bering Strait.

While the US is working on using military exercises in the region, this may not be enough to counter China as Beijing is also involved in scientific and research projects in the region and is looking to establish economic ties within the Arctic region.

"We (the US) really just need to be clear-eyed about some of their intentions and, how we can be like thinking about their long-term interests and, how we can best protect ours," Ferguson said.

<https://www.theweek.in/news/defence/2024/12/07/why-us-finds-increased-military-collaboration-between-russia-and-china-disturbing.html>

Drone that fires rockets to anti-fratricide AI system—Army's in-house innovations shine at Inno Yoddha

Amid a push for indigenisation and in-house problem-solving, the Indian Army showcased 22 innovations that were designed by its personnel to plug gaps in its battlefield capabilities as part of the Inno Yoddha competition. The innovations showcased in the competition conducted by the Army in New Delhi were spread across different domains such as unmanned systems, capability enhancement, and operational logistics.

According to the Army, once these solutions are shortlisted by the Army based on their competence, they will be finetuned. They will be taken through several developmental stages such as Research and Development (R&D), Design and Development (D&D), Army Technology Board (ATB) Projects, and Base Workshops. If selected, these projects may be used on the battlefield one day. ThePrint visited Manekshaw Centre and looked at several newly-developed systems displayed at the venue.

Baaz Unmanned Aerial System

Colonel Vikas Chaturvedi developed the Baaz Unmanned Aerial System (UAS), a multi-weapon attack drone with the ability to fire rocket launchers—a capability that the Indian Army does not possess as of now. The drone can drop small arms, automatic grenade launchers, and mortar bombs or explosives on designated targets. This can make it effective in anti-tank roles, the destruction of enemy bunkers, administrative areas, ammunition dumps, command and control centres, counter-insurgency and counter-terrorism operations as well as in replenishment roles in forward areas. Col. Chaturvedi told ThePrint, “This drone is first-of-its-kind wherein a rocket launcher can be fired from an aerial platform.”

The Baaz UAS has a range of up to 5km in piloted mode with the help of a hand-held transmitter, which can be extended up to 10km. “It has an endurance of up to 45 minutes. With the top speed of 12 metres per second, which is roughly around one km in one minute,” he said. The drone, which weighs around 82kg, can lift up to 80kg of weight. It produces 400 kg of thrust. The drone was tested at high-altitude areas in Sikkim. What stands out about the drone, according to Col. Chaturvedi, is its stability. He said that it does not move even an inch when it is firing.

Col. Chaturvedi also said that no foreign components were used in its making and its entire programming was done in-house. Drones play a major role in modern-day warfare and have been a critical procurement for militaries around the world due to their cost-effective nature. Unlike traditional military assets, especially manned aircraft, drones operate from a distance and at a much lower cost and without putting human life in harm's way. Drones, integrated with sophisticated software, also come with increased precision and can be equipped with a range of weapons to strike designated targets.

Ten AI-Enabled Weapon System

The Ten AI-Enabled Weapon System, developed by Lt. Col. Prashant Agrawal, Col. Ashish Dogra, and Agniveer Pratik Gare, that could come as an aid for the Light Machine Guns operated by the Army was also on display. Since traditional weapon systems do not effectively detect and engage hidden threats, the system, built using artificial intelligence (AI) detection, tracking and decision-making algorithms, could enhance operational capability and tactical superiority on the battlefield.

The system integrated “advanced” electronic sensor fusion with a deep learning algorithm for real-time detection, classification and tracking of targets, according to the developers. They said that the system combines data from multiple sensors, including an Optical Camera, Thermal Imager, GPS, Magnetometer, Inclinometer Laser Range Finder, and encoders to deliver comprehensive situational awareness. The system is a secondary platform with an alternate field of view, detecting targets which are hidden from the main platform’s view.

Remotely Operated NSVT

Developed on the T72 tanks, the Remotely Operated NSVT, a technology to shield the gunner, was also on display. On battlefields, currently, the gunner is required to operate the anti-aircraft gun from outside the cupola and is susceptible to enemy fire. The T72 is equipped with an anti-aircraft 12.7 mm NSVT gun.

The Remotely Operated NSVT developed by Lt. Col. C. Sarath Chandran, Major Mohammad Navaid, Naib Subedar Rajeev Kumar and Havildar Major Technical (HMT) Romeo Singh, enables the gunner to fire from inside the tank. Essentially, the developers have modified the firing system by motorising the elevation and traverse mechanism allowing the tank commander to remotely operate and fire from inside the cupola. The modification has come with an integrated screen display for rapid and precise target engagement and acquisition.

“This system ensures the safety of the crew. It is simple in design and can be fitted onto every variant of T72 tank and recovery vehicles which are based on the T72 chassis,” Major Navaid told ThePrint.

Nabh AI

One of the innovations addressed the problem of fratricide due to the incorrect identification of aircraft. This issue has emerged in the Russia-Ukraine war. In 2019, the Indian Air Force shot down its own Mi-17V5 helicopter in a friendly fire near Srinagar.

The NABH AI system, developed by Col. Prashant Thakur, captures the photo of the aircraft and feeds it to an AI programme that searches the database and identifies the model within 6-8 seconds. Meant to be used by Army Air Defence (AAD), the project will be extended to develop a chip model for Zi-23mm, Zu-23 mm and upgraded L-70-gun systems.

“The system detects the aircraft, helicopter and unarmed aerial vehicles. It took us one year to develop the system. We take the image of the aircraft in burst mode when it is nearly 10-11 km away and the computer automatically selects. Once the photo is fed to the system, it processes and tells the name of the aircraft,” Col. Thakur told ThePrint.

Fast Erection Rubik PD

Major Sudheesh's Fast Erection Rubik PD offers a solution to quickly construct bunkers in forward areas and do away with the hassle of carrying heavy construction material in high-altitude areas. The Indian Army is required to construct solid block permanent defence such as bunkers. Presently, the army requires 1,000 blocks which weigh around 28-32 kgs. This requires nearly 25 days plus the transportation time for the material to reach. With the use of Rubik, only 120 blocks will be required.

The Fast Erection Rubik PD, which is constructed with prefabricated interlocking RUBIK blocks, are manufactured using polymer concrete and can sustain sub-zero temperatures. Each block weighs 17kg.

"Rubik helps in the construction of bunkers in two days. The stores can be transported only in two vehicles," the Major told ThePrint. "It also saves on the manpower required to build the bunkers. We have infused metal fibres, glass fibres and carbon fibres. It makes the construction process easy as these blocks have an interlocking system. Once the levelling of ground is done, it is easy to build the structure."

<https://theprint.in/defence/drone-that-fires-rockets-to-anti-fratricide-ai-system-armys-in-house-innovations-shine-at-inno-yoddha/2391438/>

#SWARAJYA

Fri, 06 Dec 2024

India Steps Up Surveillance After Bangladesh Deploys Turkish-Made Bayraktar TB2 Drones Near Border

India has ramped up surveillance along its border with Bangladesh following reports that Turkish-made drones have been deployed near West Bengal, according to sources cited by India Today. This comes as intelligence suggests a rise in terrorist activities along the border after the fall of Sheikh Hasina's Awami League government.

The Army is currently verifying reports regarding the deployment of Bayraktar TB2 unmanned aerial vehicles (UAVs) near the Indian border, the report said citing sources. Operated by Bangladesh's 67th Army, these drones are used for intelligence, surveillance, and reconnaissance missions.

Although Bangladesh has claimed that the drones are for defensive purposes, India remains cautious about their strategic implications in this sensitive area. Intelligence inputs indicate that extremist groups, suppressed during Sheikh Hasina's tenure, are regaining ground in areas near the Indian border. Reports also suggest that terror organisations and smuggling networks are exploiting Bangladesh's political instability to attempt infiltration into India.

"After Hasina's ouster, the border areas have seen a surge in anti-India elements. The combination of political instability and advanced UAV deployments near Indian borders requires heightened

vigilance," a senior intelligence officer was quoted as saying by India Today. Bangladesh acquired Bayraktar TB2 drones earlier this year, significantly boosting its capacity for surveillance and light strike missions.

Defence Technology of Bangladesh (DTB) reported that six out of the 12 drones ordered are now operational. With unrest continuing in Bangladesh, Indian armed forces are on high alert and are closely monitoring the recent drone deployments. The forces may consider deploying Heron TP drones and stepping up counter-drone operations in sensitive areas.

"We are monitoring the situation closely and will take countermeasures as necessary to ensure the safety and security of our borders," a senior defence official was quoted as saying in the India Today report. India is also leveraging intelligence-sharing mechanisms and cooperation with international partners to track the situation in Bangladesh.

<https://swarajyamag.com/news-brief/india-steps-up-surveillance-after-bangladesh-deploys-turkish-made-bayraktar-tb2-drones-near-border>



Sat, 07 Dec 2024

Nepalese Army chief's India visit from December 11, focus on Gorkha recruitment

Nepali Army Chief General Ashokraaj Sigdel is set to embark on an official visit to India from December 11 to 14, weeks after Indian Army Chief General Upendra Dwivedi's official visit to the Himalayan country.

During his visit to India, General Sigdel will hold meetings with senior military and government officials to explore avenues for deepening defence cooperation. He will also serve as the Reviewing Officer at the passing-out parade of Officer Cadets at the Indian Military Academy (IMA) in Dehradun.

The Indian Army Chief General Upendra Dwivedi visited Nepal in November 2024 and his visit had opened discussions on several critical defence issues, including training programs, joint exercises, and the possibility of resuming Gorkha recruitment into the Indian Army under the Agniveer scheme.

The recruitment of Gorkhas, historically a vital component of the Indian Army, has been a sensitive issue. Nepal temporarily halted the process following the introduction of the Agniveer scheme, citing concerns over its terms. General Sigdel's visit provides an opportunity to continue these discussions and address Nepal's reservations, potentially paving the way for a resumption of recruitment.

The Nepali Army Chief's visit comes at a time when both countries are seeking to strengthen their strategic and defence ties. If the resumption of Gorkha recruitment takes place, it will further deepen the relationship, providing Nepal with economic benefits and ensuring the continued contribution of the valiant Gorkhas to the Indian Army.

Observers see these high-level visits as a reflection of the shared commitment to regional stability and a stepping stone toward resolving pending issues in the defence relationship between India and Nepal.

During the visit, General Sigdel will also be conferred the honorary rank of General of the Indian Army by President Droupadi Murmu, an official statement said, adding that it will be continuing a long-standing tradition of mutual respect between the two armed forces.

<https://www.indiatoday.in/india/story/nepalese-army-chief-general-ashokraj-sigdel-india-visit-focus-gorkha-recruitment-into-indian-army-2646292-2024-12-07>

The Tribune

Sun, 08 Dec 2024

IAF gets virtual reality based system to train crew on aircraft refuelling operations

The Indian Air Force (IAF), in collaboration with Chitkara University, near Chandigarh, has developed an advanced Virtual Reality (VR) system to train newly inducted Agniveers on the process of refuelling aircraft.

The VR-based system allows trainees to don a head-mounted device and experience a realistic virtual environment featuring aircraft and its subsystems. It eliminates the need for physical aircraft, enabling trainees to practice the complex process.

The system provides training in a compressed timeframe, which is advantageous as the initial term of Agniveers is just four years, thereby reducing the overall time utilised for training.

The first such system has been developed for training aircrew to refuel the helicopters. It can also be modified to impart training on other aircraft in the IAF's inventory.

"Aircraft refuelling is a complex activity that includes movement and parking vehicles in an aircraft's vicinity, operating pumping equipment, blending anti-freeze additives, ensuring proper earthing and filling the correct volume of fuel. There are several technical, environmental and safety factors involved," Dr PK Khosla, a former DRDO-TBRL scientist and now pro-vice chancellor of the university, who along with Dr Amanpreet Kaur headed the project team, said. It took about six months for team to complete the project. "The system has been handed over to the IAF," added pro chancellor Dr Madhu Chitkara.

VR solutions are highly engaging, error-tolerant and foster faster learning without risking damage to actual equipment or aircraft. Such systems aids can be developed for imparting training on a vast array of subjects.

The development process involved close collaboration with defence experts to map the intricate details of helicopter refuelling operations. Every component, from fuel couplings to control panels, was meticulously modelled in 3D.

Advanced haptic feedback systems, that is devices which create the illusion of substance and force within the virtual world, and motion-tracking algorithms were incorporated to enhance realism to provide trainees with a near-physical experience that significantly improves skill acquisition and retention.

<https://www.tribuneindia.com/news/india/iaf-gets-virtual-reality-based-system-to-train-crew-on-aircraft-refuelling-operations/>



Mon, 09 Dec 2024

What Is 'Kharga' Kamikaze, Indian Army's High-Speed Drone

The Indian Army has developed 'Kharga' Kamikaze drone, an aero system capable of being deployed in intelligence and surveillance roles. The drone is a high-speed and low-weight aerial vehicle with a speed of 40 meters per second, officials said.

'Kharga' can carry up to 700 grams of explosives and is equipped with GPS, a navigation system, and a high-definition camera. It also reportedly has countermeasures for enemy electromagnetic spectrum jamming.

The drone has a range of about one and a half kilometres. Known as a kind of 'suicide' drone, it can easily destroy enemy targets. According to officials, 'Kharga' does not come under the radar range. The drone has been built at a cost of ₹ 30,000. Such drones were used in the Russia-Ukraine war, officials said.

In August, the National Aerospace Laboratories (NAL) launched potent 'Swadeshi' (indigenous) Kamikaze drones - do-and-die unmanned aerial vehicles with home-built engines that can power them to fly up to 1,000 kilometres. The aerial vehicles have been used extensively by the Ukrainians to target Russian infantry and armoured vehicles.

The Kamikaze suicide missions were first seen towards the end of World War II when the pilots of a depleted Japanese air force would ram their fighter planes on Allied aircraft and ships.

'Dronaam' neutralised 55% drones

Union Home Minister Amit Shah on Sunday said that the Border Security Force (BSF) has been able to neutralise 55 percent of drones along the India-Pakistan border in Punjab using 'Dronaam', India's indigenous counter-unmanned aerial system (C-UAS).

"I sleep fearlessly at night as I know you people are guarding borders. The new system installed is a great success," Mr Shah said while addressing the 60th raising day of the Border Security Force.

Developed by Gurutvaa Systems, 'Dronaam' is a cutting-edge modular C-UAS designed to offer foolproof protection against illegal unmanned aerial systems (UAS). It is a versatile system that can provide directional or omnidirectional coverage, making it suitable for various security scenarios.

<https://www.ndtv.com/india-news/what-is-kharga-kamikaze-indian-armys-high-speed-drone-7204971>



Sat, 07 Dec 2024

India to Strengthen Defence with Autonomous Counter-Drone Solution, Says Anand Mahindra

In a bold statement on Twitter, Anand Mahindra, Chairman of the Mahindra Group, emphasized the growing importance of drones in both defence and civilian sectors.

"Drones are going to be the most critical pieces of hardware in both Defence and Civil Protection in the future. We must be second to none in this area," Mahindra wrote, highlighting the evolving role of unmanned aerial systems (UAS) in shaping security landscapes globally.

As drone technology continues to advance, Mahindra's focus is on countering the threat posed by hostile drones, an issue that has gained significant attention in recent years. Recent events in the Middle East have underscored the urgency of developing effective counter-drone systems, which are crucial for safeguarding infrastructure and personnel from drone attacks.

The Mahindra Group is stepping up to the challenge with a cutting-edge, autonomous counter-drone solution designed for both civilian and defence applications.

A Multi-Layered Approach to Countering Drone Threats

The counter-drone system being developed by Mahindra promises to be a comprehensive, all-in-one solution. It integrates detection, tracking, identification, and mitigation capabilities into a single system, ensuring a seamless and efficient approach to countering unmanned aerial threats.

At the heart of the solution is a sophisticated Command and Control (C2) module that allows operators to monitor and respond to potential threats in real time.

According to Mahindra, the system is versatile and can be deployed for various purposes. In urban environments, it can be used to protect critical infrastructure, such as power plants, airports, and

government buildings. In defence applications, it can serve as an integral part of a broader multi-layered Counter-Unmanned Aircraft System (C-UAS), providing essential protection in military operations and combat zones.

Transfer of Technology to Strengthen National Security

Mahindra also highlighted the importance of Transfer of Technology (TOT) in the development of state-of-the-art counter-drone solutions.

“We are focused on the Transfer of Technology (TOT) of best-in-class solutions and manufacturing of Radio Frequency (RF) based counter-drone solutions,” Mahindra stated, underlining the need for advanced technological expertise to protect critical national assets.

In line with these objectives, Mahindra’s team recently conducted a demonstration of the counter-drone system for the Uttar Pradesh Prayagraj Police, with a focus on its potential use during the Kumbh Mela, one of India’s largest religious gatherings.

The system's ability to neutralize hostile drones is expected to play a pivotal role in ensuring the safety of millions of attendees at such mass events, where the risk of drone-related threats could otherwise go unchecked.

The Mahindra Marksman: A Leap in Armored Mobility

In addition to the counter-drone solution, Anand Mahindra also spoke about another important project — the Mahindra Marksman, India’s first armoured capsule-based Infantry mobility vehicle.

The Mahindra Marksman offers critical protection to defence, paramilitary, and police personnel by safeguarding them against small arms fire and grenade attacks. It has been designed to serve in both counterterrorism and conventional military roles.

The Marksman is indicative of Mahindra’s commitment to enhancing India’s defence capabilities, offering advanced solutions for personnel protection in high-risk situations.

By equipping India’s armed forces and law enforcement agencies with such robust vehicles, Mahindra aims to strengthen security and increase operational efficiency across the country.

The integrated approach to counter-drone capabilities, coupled with the cutting-edge Mahindra Marksman, aligns with the government's growing focus on self-reliance in defence technology under the 'Atmanirbhar Bharat' initiative.

By combining advanced engineering with a clear focus on national security, Mahindra’s solutions are set to play a pivotal role in safeguarding India’s interests in an increasingly complex security environment.

<https://www.republicworld.com/defence/defence-technology/india-to-strengthen-defence-with-autonomous-counter-drone-solution-says-anand-mahindra>

More delays for Project 75I: AIP Dilemma – Stuck Between Germany and Spain

India's ambitious Project 75I, aimed at enhancing its submarine fleet, continues to face significant delays. The primary hurdle is the selection of the right Air Independent Propulsion (AIP) system, with the Indian Navy yet to decide between two key contenders: Germany's ThyssenKrupp Marine Systems (TKMS) and Spain's Navantia. This decision has become complicated by technical evaluations, cost considerations, and the growing urgency to modernize India's underwater capabilities.

According to sources in the defence and security establishment, the outcomes of the trials carried out earlier this year are being reviewed again. "This means that the Project-75I will get delayed further," they added.

The Role of AIP in Submarine Warfare

Submarine warfare is a crucial element of modern naval defence, providing nations with the ability to conduct covert operations and deliver precise strikes both on land and underwater. AIP technology is central to modernizing conventional submarines, as it allows them to stay submerged for extended periods without the need to surface or use a snorkel. For India, the integration of AIP into six new submarines under Project 75I is crucial not just for operational range but also for improving stealth and survivability.

However, selecting the right AIP system is not just about performance specifications. Milind Kulshreshtha, an Indian Navy veteran and expert in defence technologies, explains that choosing an AIP system involves more than just theoretical comparisons. "Submarine warfare is the most potent arm any country can field today, with lethal land and undersea attack capabilities. An AIP system must be evaluated based on its at-sea performance and engineering reliability—key factors like MTBF (Mean Time Between Failures) and other operational parameters that emerge only through real-world testing," he notes.

He further clarifies, "An AIP system that has undergone real-world testing offers valuable data for comparison. The Spanish system, for instance, uses bioethanol technology, while the German system has been tested in smaller boats but has not yet been applied to the larger, more complex submarines that India requires." Kulshreshtha, with an expertise in technologies related to C4I solutions highlights that the decision ultimately comes down to engineering and real-world performance, rather than just theoretical specifications.

Germany's TKMS Offering: Proven, But Not Ideal

Germany's TKMS offers the Type 214 submarine, which features an AIP system already proven in smaller vessels like the Type 212 submarines in the German Navy. While the German AIP is

reliable, it is designed for smaller submarines, and adapting it to the larger submarines required by the Indian Navy presents significant challenges. The system has not been tested on the scale of the submarines India plans to build under Project 75I.

The Indian Navy veteran explains, “The German system has a solid track record in smaller submarines, but India’s requirements for larger submarines with greater endurance and stealth capabilities demand a more powerful AIP system.” This discrepancy raises concerns within the Indian Navy about whether the German technology, despite its proven success, can be scaled appropriately for larger vessels.

Spain’s Navantia Offering: Advanced, But Delayed

Spain’s Navantia, on the other hand, offers the S-80-class submarine, which integrates an advanced bioethanol-based AIP system. The bioethanol-based technology has been tested extensively and selected for the Spanish Navy. The key advantage of this technology is its environmental benefits and the availability of bioethanol as a refueling option worldwide.

However, the timeline for operational readiness is a significant issue. The S-80-class submarines, equipped with this AIP technology, are not expected to enter service until 2026. For the Indian Navy, which is keen to expand its submarine fleet quickly in light of growing security challenges, this delay could be a critical factor.

As Kulshreshtha observes, “The Spanish AIP is technologically advanced, but the delay in its availability means India will have to wait several years to deploy this system, which might not meet the urgent needs of the Navy.” While the Spanish AIP offers great potential, its readiness timeline creates a gap that could undermine the Indian Navy’s strategy for immediate fleet expansion.

Cost Considerations and Strategic Implications

The cost of the two options also plays a major role in the decision. Germany’s TKMS would require designing a completely new submarine to meet India’s specifications, which would come with a higher price tag. This includes adapting its smaller AIP system to meet the demands of larger vessels, which would increase the overall cost of the project.

In contrast, Navantia’s offering involves the already developed S-80-class submarine, which could potentially reduce costs and shorten the integration timeline. However, the delay in the operational readiness of the Spanish AIP system could offset some of these savings.

Kulshreshtha notes, “The Indian Navy must weigh both short-term and long-term factors when deciding between these two options. While the cost of the German solution may be higher due to the need for new designs and integration, the Spanish solution might save costs initially but comes with the risk of delays.”

The Strategic Decision: More Than Just a Procurement Choice

The decision between TKMS and Navantia is not just a matter of selecting the best AIP technology; it carries broader strategic implications. A choice in favor of TKMS could create closer defence ties between India and Germany, fostering deeper technological collaboration. On

the other hand, selecting Navantia would expand India's defence relationships within Europe, particularly with Spain.

Kulshreshtha argues that, while diversifying partnerships is important, the primary concern should be the operational readiness of the submarine fleet. "India's decision will reflect its strategic priorities, and the Navy's main focus should remain on selecting a system that best meets its immediate operational needs," he explains.

A Well-Informed Decision Ahead

India's decision on which AIP system to adopt for Project 75I remains crucial not just for the future of its submarine fleet but for its broader defence strategy. The German and Spanish options both offer distinct advantages, but each comes with its own set of challenges. While the German AIP system is proven in smaller submarines, it may not scale well for India's needs. The Spanish bioethanol-based system offers promising technology but will not be ready for service until 2026, potentially delaying India's fleet modernization.

Ultimately, the Indian Navy will need to consider both the immediate operational requirements and the long-term sustainability of its submarine fleet. With the technical expertise within the Navy the final decision will likely be well considered, factoring in both the short-term and long-term needs of India's naval defence.

<https://www.financialexpress.com/business/defence-more-delays-for-project-75i-aip-dilemma-stuck-between-germany-and-spain-3686521/>



Mon, 09 Dec 2024

45 Years Of Jaguar: Bluffed F-16s, Supported Kargil & Siachen Ops, IAF Continues To Bet Big On 1960-Developed Jets

The Indian Air Force (IAF) is the only operator of this low-flying, sea-skimming fighter bomber. The joke about the twin-engine fighter aircraft is that it can fly only because of the earth's curvature. But the war bird that forms an important part of India's nuclear triad has completed 45 years in service, with adversaries continuously underestimating the edge of its sword.

SEPECAT Jaguar is an Anglo-French supersonic attack aircraft designed for close air support and nuclear strike roles. Christened 'Shamsher,' meaning Sword of Justice in Persian, Jaguars seemed irrelevant in the age of short-range surface-to-air Missiles as the fighter jets had to go higher to deliver stand-off weapons.

However, the advent of long-range surface-to-air Missiles has made high-flying aircraft more vulnerable, making low-flying tactics relevant to evading radars. Despite their low thrust and the IAF's lack of investment in new engines, Jaguars will be relevant for at least the next decade.

The Russia-Ukraine conflict has further underscored the relevance of low-level penetration in contested airspace. Ukrainian MiG-29s, Su-24, Su-25, and Su-27 fighters invariably fly to their standoff weapon launch points at very low altitudes, below the adversary's radar horizon, to escape detection. Nearing the launch point, they zoom up, launch their weapons, and once again "hit the deck."

Jaguar's "lo-lo-lo combat radius of action" is 350 nautical miles (650 kilometers), which means it can travel this distance while flying low. This is one of the highest for low-flying strike aircraft. The SEPECAT Jaguar is a single-seater, swept-wing, twin-engine, transonic attack aircraft developed in the 1960s. Its trainer has a twin-seater configuration.

Before 1971, the IAF had formulated requirements for what came to be known as Deep Penetration Strike Aircraft. The requirement was to "effectively locate and hit a well-defended target deep inside hostile territory and recover with safety; the strike aircraft necessarily had to possess good weapons load, supersonic performance, long-range at low level all the way, a sophisticated nav/attack system and an ability to defend itself when required."

The Jaguars were inducted into the IAF in 1979, and their precise navigation, weapon aiming, and attack systems were a quantum leap in the technology existing in the IAF at that time. What impressed the IAF most about the aircraft was its ability to operate from short, semi-prepared airstrips and the twin-engine, which increased its survivability.

At USD 1 billion, it was one of the most expensive defense deals of that time. Many people still question how Jaguar fits in the IAF's strategy, considering they have never seen action. However, as recently as 2019, when the IAF undertook the Balakot strike inside Pakistan, the Jaguars used a decoy to bait the Pakistan Air Force's F-16 and take them away from the target area. The Jaguar contingent took off from Ambala air base and joined the 2 Su-30MKI, making a high-speed flight towards Bahawalpur, Pakistan, as decoys.

It was intended to show that Bhawalpur was about to be attacked by Indian fighter jets. The F-16s took the bait and moved to stop the Jaguars. The Jaguars never crossed the Line of Actual Control, but it cleared the path for the Mirage fighter jets to breach Pakistani airspace.

The IAF operates around 120 Jaguars across six squadrons. Its No. 5 squadron, known as "Tuskers," and No. 14 squadron, known as "Bulls," are based in Ambala. The No. 6 squadron, known as "Dragons," based in Jamnagar, operates a maritime variant of the Jaguar. The No. 224 squadron, known as "Warlords," is also based in Jamnagar. Gorakhpur houses the No. 16 squadron, known as "Black Cobras," and the No. 27 squadron, known as "Flaming Arrows."

Jaguars used their altitude-adapted navigation and strike systems during Operation Meghdoot in 1984, which secured the Siachen Glacier for India. During the Kargil war in 1999, the Jaguars played a significant role in reconnaissance and high-altitude precision targeting support. Air Marshal Anil Khosla (retired), former Vice Chief of the IAF and himself a Jaguar pilot, told the EurAsian Times: "The IAF has extended the operational life of the Jaguars with mid-life upgrades,

including modern EW suites, radar warning receivers (RWRs), smart weapons, and avionics and survivability systems. Despite aging, modernization has ensured that Jaguars remain a cost-effective strike option, complementing newer fighter jets in India's inventory." Khosla commends Jaguar's "adaptation, resilience, and strategic significance."

Jaguar – A Truly Indian Aircraft?

Jaguar was manufactured by Hindustan Aeronautics Limited (HAL), an Indian aircraft maker. It is a truly Indian aircraft in the sense that its airframe, mission computer, and source code are all made in India. In 1979, alongside the direct supply of Jaguars from Britain, a comprehensive transfer-of-technology agreement was signed to manufacture Jaguars by HAL. A workforce of 40,000 was spread over seven major plants in different parts of India, and HAL was to manufacture the Jaguar, its Adour engine, and much of the avionics and subsystems at the Aircraft and Engine Divisions at Bangalore, with Avionics and Accessories at the Hyderabad and Lucknow divisions, respectively.

The HAL's Accessories Complex at Hyderabad and Lucknow was responsible for producing other Jaguar avionics, including the Radar Warning Receiver, stabilization and suppression system, and notch aerial system, plus various connectors, engine controls, and amplifier system. The HAL Lucknow also produced the Jaguar's ejection seats, hydraulics, and fuel systems.

While the majority of HAL-built Jaguars would have the standard Ferranti laser ranger and marked target seeker fitted in the nose, eight aircraft were fitted with the Thomson-CSF Agave multi-mode 1/J band radar for maritime role. The first HAL-assembled Jaguar made its first flight in March 1982, and the Indian Jaguar came to be known as the DARIN (Display Attack and Ranging Inertial Navigation) version. The indigenously developed DARIN incorporated second-generation gyros and computers in conjunction with sensor, electronic, and navigation-attack processors. Jaguars have now been equipped with DARIN-III.

The DARIN III includes an open-system architecture mission computer, multi-functional displays, an engine and flight instrument system, a new fire control radar, a geodetic height correction system, and an inertial navigation system with satellite navigation.

The DARIN III Jaguars have also been equipped with the Israeli EL/M-2052, which improves its defensibility against electronic warfare jamming. By having multiple transceiver modules (TRM), each transmitting on a different radio frequency, the EL/M-2052 also reduces the probability of enemy radar warning receivers. In other words, the Jaguar DARIN III would be more difficult to detect and jam.

EL/M-2052 is an advanced multi-mode radar capable of air-to-air, air-to-ground, and air-to-sea tracking, targeting, and engagement. Elta has not disclosed the radar's range or the number of targets it can track and simultaneously engage. In fact, the IAF Chief Air Chief Marshal AP Singh opined that the IAF ought to draw from its experience of Jaguars during the acquisition of 114 Medium Role Fighter Aircraft (MRFA).

"The technology will then (if the Jaguar model is followed) be available to us to upgrade. Like Jaguar, we purchased from abroad and started manufacturing with HAL. We have done so many modifications and weapons integration with that. So MRFA, whichever aircraft will be something like Rafale plus. Because the requirements are the same. But we will have indigenous content in it

and can integrate indigenous weapons in it,” the IAF chief said in October 2024. The Jaguar’s Indian avionics make it the most eligible platform for all sorts of Indigenous weapons. The IAF tested the smart anti-airfield weapon (SAAW), which can target enemy airfield assets such as radars, bunkers, taxiways, and runways.

Jaguars To Get Same Missiles As F-35s

The IAF is equipping Jaguars with MBDA’s Advance Short Range Air-To-Air Missile (ASRAAM). The NGCCM (next-gen close combat missile) will replace the aging Matra R550 Magic on the Jaguar strike aircraft’s over-the-wing pylon. ASRAAM has an infrared homing system that can track and hone in on a target range inside the line of sight. The missile weighs 88 kg and has a range of more than 25 km.

“IIR (Imaging Infrared) is the most advanced IR missile. There is no information on the target when IR missiles are launched since they are passive. With a Helmet-mounted Sighting Display, pilots can cue the missile head to look toward the target without turning the aircraft on that side. This makes off-boresight launch possible,” an official told the EurAsian Times.

“The missiles also make it possible without input from onboard radar making ‘over the shoulder’ shots possible as no radar looks behind,” the official added.

ASRAAM is in service with the Royal Air Force as its Within Visual Range (WVR) Dominance weapon. The missile has been fully integrated with Eurofighter Typhoon, Tornado, and F/A-18. Now, ASRAAM is also being integrated into the F-35 Lightning II. The IR missiles, also known as fire-and-forget, will enable Jaguars to successfully engage various types of combat aircraft, transport platforms, cruise missiles, and unmanned aerial vehicles.

<https://www.eurasiantimes.com/45-years-of-jaguar-bluffed-f-16s-supported/>

Science & Technology News



**Press Information Bureau
Government of India**

Ministry of Science & Technology

Fri, 06 Dec 2024

Himalayan heights potentially perfect for India's ‘Quantum Leap’ to space: Study

In a pioneering study for the Indian subcontinent, scientists have mapped out optimal locations for beaming quantum signals into space.

Satellite-based quantum communications including quantum key distribution (QKD) represent one of the most promising approaches toward global-scale quantum communications. To determine the viability of transmitting quantum signals through the atmosphere, it is essential to conduct atmospheric simulations for both uplink and downlink quantum communications and practicality of potential locations for the same need to be determined.

In meticulous research, Raman Research Institute (RRI) scientists analysed existing open-source data available on three of India's most sophisticated observatory sites, and found that the Indian Astronomical Observatory (IAO) in Hanle, nestled in the pristine heights of Ladakh, as the prime candidate for this revolutionary technology.

While similar studies have been conducted in regions like Canada, Europe, and China, India's remarkable geographical diversity – from the Himalayas to coastal plains, from deserts to tropical regions – could make this analysis particularly valuable. The analysis takes into account the deeply interdisciplinary nature of satellite-based quantum communications, where success depends on understanding everything from high-precision telescope operations to complex atmospheric turbulence patterns that can distort quantum signals.

This site in Hanle is a dry and a cold desert, with temperatures in winter plummeting to minus 25 to 30 degrees Celsius; suffers from low atmospheric water vapour levels and oxygen concentrations.

“Hanle offers all required natural settings suitable for setting up a ground-station and undertaking quantum communication over long distances,” said Professor Urbasi Sinha, head, Quantum Information and Computing (QuIC) lab at the RRI, an autonomous institute funded by the Department of Science and Technology, Government of India.

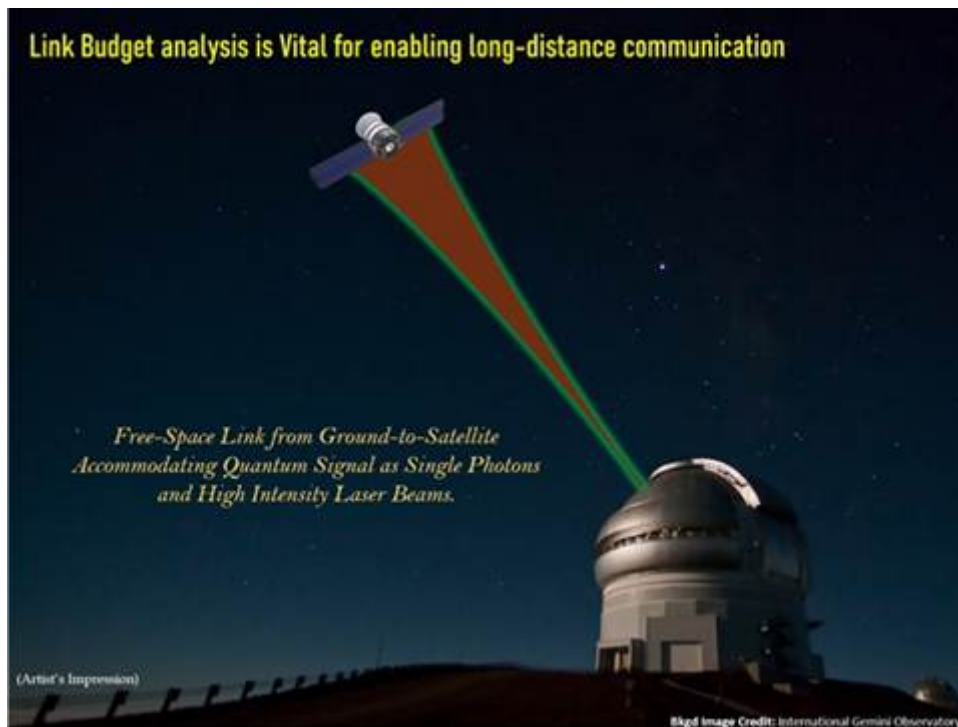
Other than the quantum nature of the signal, what sets quantum communication apart from the well-established satellite-based communication is the signal band that each of them use. While satellite-communication works in frequencies ranging in Mega Hertz (MHz) or Giga Hertz (GHz), quantum communication operates in Tera Hertz (THz), with 100 THz being the most commonly represented in wavelength, often represented in nanometre.

In the paper titled ‘Estimating the link budget of satellite-based Quantum Key Distribution (QKD) for uplink transmission through the atmosphere’, published in *EPJ Quantum Technology, Springer Nature*, the researchers have mentioned working in the signal band of 370 THz (810 nm). Authors Urbasi Sinha and Satya Ranjan Behera at QuIC lab, have used existing open-source data on temperature, humidity, atmospheric pressure and other vital meteorological parameters from three sites namely -- IAO Hanle, Mt Abu in Rajasthan and Aryabhata Institute of Observational Sciences (ARIES), Nainital in Uttarakhand.

“India offers such vast and a variety of geographical terrains and this diversity could potentially make this work as a universal template that could be applied anywhere in India or across the globe. This versatility could make the research invaluable for future quantum satellite projects worldwide,” said Sinha.

Proposed satellites for establishing secure satellite-based quantum communications orbiting in the Low Earth Orbit(LEO), where the maximum altitude from earth is 500 kms, are considered in this

work. For establishing quantum communication, one has to initially send a beacon signal from the ground station of a particular site every time the designated satellite hovers close to the location. Once the beacon signal is detected by the satellite, another beacon signal is sent by the satellite to the ground station to lock it. It is then ready to facilitate quantum signal transmission.



“Beacon signals are used to track the moving satellite and point it towards the corresponding telescope. Our main signal would be at 810 nm while the uplink and downlink would use 532 nm and 1550 nm of wavelength, respectively,” said Satya Ranjan Behera, the paper’s lead author.

The main challenge is to identify a site that will allow them to send quantum signals through the multi-layered and complex Earth’s atmosphere and, yet, continue to travel to the receiver satellite.

“In order to transmit the beam to a distance across 500 km, the beam width has to be magnified and its divergence has to be minimal. Hence, a telescope is used for this purpose and ideally, small telescopes are best suitable. In the same manner, the receiver side of the telescope is used to collect and de-magnify the beam for detection purposes,” explained Behera.

Based on their analysis, the RRI researchers concluded that IAO Hanle (signal loss - 44dB) was ideal among the sites in India considered in this study for establishing a potential-ground station. The two next best sites were Mt Abu (signal loss - 47dB) and Nainital (signal loss - 48dB), where some unavoidable signal losses were likely, they said. This study can form the basis of estimating link-budgets ahead of finalizing the Indian ground-stations for quantum communication purposes.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2081468>



UVIT on board AstroSat captures cosmic arsenal in Andromeda galaxy

Astronomers have spotted far ultra violet emissions from novae, a special class of transient astronomical event that causes the sudden appearance of a bright, apparently new star that slowly fades over weeks or months, during their outburst, for the first time in the neighbouring Andromeda galaxy.

All observed novae involve white dwarfs in close binary systems, but causes of the dramatic appearance of a nova vary, depending on the circumstances of the two progenitor stars.

A binary pair of stars comprising a White Dwarf, an earth-sized but very hot star, and a Sun-like (or its puffed-up evolved version) star are sometimes found orbiting each other in close proximity. In such systems, the White Dwarf's intense gravitational force can deform the companion star and pull its matter onto the surface of the White Dwarf. The piling up of matter creates such intense densities that the fusion reaction is enhanced, giving off enormous amounts of light, which is seen as a nova eruption. Novae eruptions contribute towards galactic chemical enrichment, and hence they are important for study. These also provide laboratories to study extreme conditions of shock mechanisms, thermonuclear processes, and the binary evolution of stars.

This accretion process is streamlined through the presence of a disc-like structure around the White Dwarf, known as the accretion disk. These disks are very hot and emit electromagnetic waves in the UV and blue regions of the spectrum.

Scientists from Indian Institute of Astrophysics, Bengaluru, an autonomous institute of Department of Science and Technology, used Ultraviolet Imaging Telescope (UVIT/AstroSat) data of the Andromeda Galaxy from the public archives, to look for Far Ultra Violet (FUV) emission from novae during their dormancy. On the way, they stumbled upon novae around their eruption phase in a study published in the *Astrophysical Journal*.

The team consisting of Judhajeet Basu (IIA and Pondicherry University), Krishnendu S. (IIA and Amrita University), Sudhanshu Barway (IIA), Shatakshi Chamoli (IIA and Pondicherry University), and G. C. Anupama (IIA) discovered ultraviolet emission from 42 novae, a special class of stellar explosions, and even caught 4 of them in the act of outburst itself.

This could help the scientists study these interacting binary star systems in our nearest neighbor galaxy at different phases of their life, some piling up matter from their companion, while others spewing it into space.

“UVIT's fine spatial resolution and unique capability to observe simultaneously in far UV and near UV helped us investigate the fluxes in different UV bands, which led to the detection of accretion

disks in some of these systems, 2.5 million light years away. The brighter the disk, the more rapidly it is consuming its companion's matter. We also studied how the flux from these discs changes with time, and as per our expectations, the accretion process was found to be stable in these systems." said Basu, a PhD student at IIA who led the project.

Continuous accumulation of matter onto the White Dwarf leads to extreme temperature, pressure, and density conditions. "This layer of material acts like a translucent shell, blocking off some of the radiation from the white dwarf and the accretion disc. Under these circumstances, the brightness of these systems diminishes, and it is a tell-tale signature of what's going to come.

It's like the calm before the storm, and this is exactly what we found in two of these systems in Andromeda Galaxy by using data from UVIT, a telescope built at our CREST campus and launched into space by ISRO," Basu added.

Once the threshold temperature and densities are reached, all the accumulated hydrogen-rich matter undergoes a thermonuclear runaway reaction. "It is much like what happens in a fusion bomb, but on an "astronomical" scale. This explosion naturally leads to the brightening of the system by several orders of magnitude, hurling large quantities of material into the interstellar medium. We serendipitously found four systems caught in this act," said Barway, a faculty at IIA.

However, it was not easy to detect all of these systems. "The central region of Andromeda is quite bright, encouraging us to use sophisticated image subtraction techniques to uncover more novae. We used two different techniques. Both yielded the same results, confirming what we are seeing are real sources and not bogus," said Barway.

"Tracing these novae was possible only because of the Andromeda survey proposals taken up by AstroSat UVIT operated by ISRO. More such future missions, especially in UV and X-ray, can discover and follow up these systems, and could answer some of the missing puzzles of novae," Basu pointed out.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2081522>



Press Information Bureau
Government of India

Ministry of Science & Technology

Fri, 06 Dec 2024

2-Day Smf 2024 Conference Kicked Off At IIT Ropar

Department of Mechanical Engineering, IIT Ropar, kicked off the SMF2024 (Sheet Metal Forming) Conference on Sheet Metal Forming with emphasis on FormingFuture "Shaping the Future with Advanced Sheet Metal Technologies" during 5-6th Dec 2024.

The conference was inaugurated by Chief Guest, Dr. Santosh Kumar, (Corporate Head and Vice President of R&D at Jindal Stainless Ltd.) and Prof. K Narasimhan, (Metallurgical Engineering

and Material Science Department, IIT Bombay and Secretary of SMFRA). Prof. Rajeev Ahuja, our Director and Patron of this conference conveyed his best wishes to all participants and expressed his unwavering support for the success of this event. More than 100+ delegates from Academia and various industries were present across the length and breadth of the country in the specialized fields of Sheet Metal Forming and emerging areas.

Organizing Secretary Prof. Anupam Agrawal and co-organizing secretaries Prof Navin Kumar and Prof Ekta Singla of Mechanical Engineering Department, IIT Ropar welcomed the guests and the participants while giving the overview of SMF2024, followed by the address of Dr. Prabhat K. Agnihotri, HOD of Mechanical Engineering Department and Organizing Chairman of the conference. Prof. K Narasimhan, Metallurgical Engineering and Material Science Department, IIT Bombay and Secretary of SMFRA gave the details about SMF2024. He highlighted the history of SMFRA and its activities in promoting research in Metal Forming a specialization of mechanical engineering in India. He also urged the researchers and faculty to become the member of the SMFRA. He discussed forming the mechanical components, including sheet metal forming, superplasticity, modeling and simulation.

While giving the presentation, Dr. Santosh Kumar, focused on the use of Materials as he has extensive expertise in steel characterization, alloy design, product development, and process technology. He focused on the development of numerous steel products for various segments, including automotive, construction, defense, and shipbuilding. Kumar's contributions have significantly advanced the field of metallurgical engineering and continue to impact the industry positively.

Prof. Navin Kumar, Department of Mechanical Engineering, IIT Ropar and Co-Organizing Secretary of this conference presented a vote of thanks. Faculty members from the Mechanical Engineering Department and other departments attended the event. The conference was sponsored by prestigious private organizations - Autoform Engineering India Ltd., Electropneumatic & Hydraulic (I) Pvt. Ltd. and Altair Inspire Form.

<https://pib.gov.in/PressReleasePage.aspx?PRID=2081601>



Sun, 08 Dec 2024

What is mathematical realism?

Is mathematics a discovery or an invention?

The answers to this question are an important part of the philosophy of mathematics. To answer it, philosophers would like to know whether mathematics is a natural part of this world that existed before humans discovered and comprehended it or if mathematics was invented by humans.

In this discussion, experts have developed many different ideas. A particularly popular one is mathematical realism: according to this view, mathematics is real irrespective of whether there is a

human mind to comprehend it. In other words, it stipulates that human minds discovered mathematics rather than creating it.

There has been some support from evolution for this view. Insects called cicadas live underground but emerge every few years to eat food, reproduce, and then die. This year, three broods of cicadas emerged at the same time: one with a 13-year cycle, one with a 17-year cycle, and one with a seven-year cycle. It's the first such event in 1,547 years.

Seven, 13, and 17 are all prime numbers, and some scientists believe evolution opted for them to avoid predators that emerge from underground to hunt cicadas at periodic intervals. By keeping their emergence cycle to a prime number of years, cicadas have a better chance of avoiding the predators' more predictable cycles.

There are many types of realism as well, including Platonic, mathematicism, and logicism. Other, alternative positions on the nature of mathematics include structuralism, fictionalism, and social constructivism.

<https://www.thehindu.com/sci-tech/science/what-is-mathematical-realism/article68961268.ece>

THE ECONOMIC TIMES

Fri, 06 Dec 2024

ISRO signs Technical Implementing Plan with European Space Agency for network operation support for Gaganyaan missions

Indian Space Research Organisation (ISRO) and the European Space Agency (ESA) signed a Technical Implementing Plan (TIP) on Wednesday. This will enable ESA to provide critical ground tracking support for India's Gaganyaan missions.

The TIP was signed by Dr Anilkumar A K, Director, ISTRAC, from ISRO and Dietmar Pilz, Director of Technology, Engineering and Quality and Director of ESTEC, Netherlands, from ESA, said a release from ISRO. s, from ESA.

"Strengthening global collaboration! On Dec 4, 2024, ISRO and ESA signed a Technical Implementing Plan to provide ground tracking support for the Gaganyaan Mission. A major step for seamless orbital operations and data continuity!" ISRO posted on X on Friday.

The TIP was signed by Satish Dhawan Space Centre (SDSC) in the presence of Dr Somanath S, Chairman, ISRO and Didier van der Hasselt, Ambassador from Belgium to India.

The plan will enable ESA to provide ground station support for Gaganyaan Missions which will ensure continuity in data flow and communication with the Orbital Module for monitoring and orbital operations.

ISRO and ESA have long-standing cooperation and have been collaboratively supporting each other in the successful accomplishment of several space missions in the past and further committed to future collaboration activities. Gaganyaan project aims at demonstrating human spaceflight capability by launching a crew of 3 members to an orbit of 400 km for a three-day mission and bringing them back safely to earth, by landing in Indian sea waters.

Earlier on Thursday, ISRO successfully launched the PSLV-C59/PROBA-3 Mission, deploying ESA's satellites into their designated orbit with precision. ISRO said that the mission reflected the dedication of NewSpace India Limited (NSIL), ISRO and European Space Agency (ESA) teams.

The PSLV-C59 vehicle is carrying the Proba-3 spacecraft into a highly elliptical orbit as part of a dedicated commercial mission by NewSpace India Limited (NSIL). The PSLV-C59 mission is a joint initiative between ISRO and NewSpace India Limited (NSIL).

Proba-3 is a technology demonstration mission of the European Space Agency (ESA) and marks ESA's first precision formation-flying mission. It involves a pair of satellites flying together in a fixed configuration, as if forming a single large rigid structure in space, to showcase innovative formation-flying and rendezvous technologies.

<https://economictimes.indiatimes.com/news/science/isro-signs-technical-implementing-plan-with-european-space-agency-for-network-operation-support-for-gaganyaan-missions/articleshow/116039994.cms>

THE ECONOMIC TIMES

Sun, 08 Dec 2024

Proba-3 mission would significantly advance understanding of Sun's Corona: Ex-ISRO scientist

ISRO's successful launch of European Space Agency's (ESA) Proba-3 satellites onboard PSLV-C59 rocket is a 'groundbreaking mission' and would significantly advance the understanding of Sun's corona and solar wind, a former ISRO scientist said. According to P V Venkitakrishnan, former director of Capacity Building Programme Office, ISRO headquarters, the 'innovative design and advanced technologies' used in the mission would pave the way for future space weather forecasting and solar physics research.

"This mission is a collaborative effort between the European Space Agency (ESA) and the Indian Space Research Organisation. Proba-3 is a pioneering mission designed to explore the Sun's corona, the outer atmosphere of the Sun", he told PTI.

It aims to study the Corona, which is hotter than the Sun's surface, and explore the solar wind which is a stream of charged particles emanating from the Sun, Venkitakrishnan said.

"The data from Proba-3 satellites would help scientists better understand and predict space weather events, which can impact the Earth's magnetic field and satellite operations."

He noted that the two satellites -- Coronagraph and Occulter-- would form a 'precise formation 150 meters apart after several orbital manoeuvres in the coming days.

The instrument in the Coronagraph spacecraft would capture high-resolution images of the Sun's corona. This setup will mimic a total solar eclipse which traditionally lasts only for a few minutes and does not occur frequently. Proba 3 will provide 6 continuous hours of observation during each orbit, equivalent to about 50 natural solar eclipses annually.

"The Proba-3 features an advanced propulsion system, enabling precise control and maneuvering of the spacecraft and is made by ESA. With the Bengaluru-headquartered space agency providing the launch vehicle for the latest mission, Venkitakrishnan said the ESA collaborated with ISRO as it currently lacks an active launch vehicle to carry its payloads to orbit.

"This shows the success of our space diplomacy and our capacity to provide reliable and cost effective launches to our customers," he said. ISRO had on Thursday successfully launched the Proba-3 mission onboard a PSLV-C59 rocket, a solar experiment undertaken by the European Space Agency.

<https://economictimes.indiatimes.com/news/science/proba-3-mission-would-significantly-advance-understanding-of-suns-corona-ex-isro-scientist/articleshow/116097752.cms>



Sun, 08 Dec 2024

Challenges with developing AI applications in Indic languages

Large Language Models (LLMs) can be understood as autocomplete on steroids, at scale. These generative chatbots are finding widespread applications, and streamlining as well as simplifying how humans process and disseminate information.

LLMs are trained on text corpora, vast quantities of text on a variety of topics. In English, there are plenty of resources available for training the LLMs, including news sites, blogs, forum posts and crowdsourced resources such as Wikipedia articles.

When it comes to Indic languages however, the resources available are far more limited, with companies having to resort to creative methods to derive the vast quantities of text required for training.

Director of the Centre for Interdisciplinary Artificial Intelligence at Flame University, Kaushik Gopalan explains, "Some of the challenges in developing AI applications for Indian languages lie in the relative paucity of training data available in these languages. The digital ecosystem for these languages—despite their richness and diversity—is unfortunately quite limited. Further, the large variety of dialects and regional variations in major Indian languages further complicate the process of training AI models for these languages. As a result, the major commercially available Large

Language Models (LLMs) are not as adept in their performance in Indian languages as they are in English and some European languages.”

The complexity of the script poses challenges as well

English uses an alphabet, where each of the letters are distinct. Indic languages use a form of script where the letters are mashed together, known as abugida. The algorithms, and indeed the Unicode system for writing, are both oriented towards the alphabet and not abugida. This also makes developing AI applications for Indic languages challenging.

Gopalan explains, “The scarcity of training data constitutes only part of the issues facing AI models in Indian languages. Imitating human language—as LLMs attempt to do—is a complex and resource-intensive venture. It requires first breaking down texts into smaller units, called tokens, where shorter words form a token of their own, whereas words like ‘Honorificabilitudinitatibus’ might be broken down into several tokens. In the context of Indic languages, my colleague, Shagun Dwivedi, has been investigating tokenizers that follow English-centric algorithms and how they impact the performance of a language model in answering fact-based questions in Hindi.”

One possible approach to improve the efficiency, reduce the environmental impact, and develop AI technologies for Indic languages is to use different algorithms and tokenising approaches.

Gopalan says, “Commercial LLMs have advanced their linguistic skills significantly in languages such as English, French, or German, which are written in the alphabetic Roman script. However, for Indic languages such as Hindi, which use a more complex system of writing (called abugida) with inherent vowels, conjunct characters, and diacritic forms of vowels, LLMs have a long way to go before they achieve a similar level of proficiency. Shagun’s work suggests that tokenizers using an English-centric algorithm led to poor downstream performance in Hindi; they also prove to be less computationally efficient and lead to erroneous language generation when compared to models with more representative tokenizers. We are now exploring tokenizers tailored specifically to Indic scripts based on these insights.”

<https://www.news9live.com/science/earth-sized-magnetic-tornados-discovered-on-poles-of-jupiter-2769032>

THE TIMES OF INDIA

Sun, 08 Dec 2024

Study finds connection between quantum theory, information theory

"Our results have no clear or direct application right now. It's basic research that lays the foundation for future technologies in quantum information and quantum computers. There's enormous potential for complete discoveries in many different research fields," said Guilherme B Xavier, a researcher in quantum communication at Linkoping University, Sweden.

However, we must begin at the beginning in order to comprehend what the researchers have demonstrated. One of the most irrational--yet essential--features of quantum mechanics is that light may be both particles and waves. We refer to this as wave-particle duality.

The theory dates back to the 17th century when Isaac Newton suggested that light is composed of particles. Other contemporary scholars believed that light consists of waves. Newton finally suggested that it might be both, without being able to prove it. In the 19th century, several physicists in various experiments showed that light actually consists of waves.

But around the early 1900s, both Max Planck and Albert Einstein challenged the theory that light is just waves. However, it was not until the 1920s that physicist Arthur Compton could show that light also had kinetic energy, a classical particle property. The particles were named photons. Thus, it was concluded that light can be both particles and waves, exactly as Newton suggested. Electrons and other elementary particles also exhibit this wave-particle duality.

But it is not possible to measure the same photon in the form of a wave and a particle. Depending on how the measurement of the photon is carried out, either waves or particles are visible. This is known as the complementarity principle and was developed by Niels Bohr in the mid 1920s. It states that no matter what one decides to measure, the combination of wave and particle characteristics must be constant.

In 2014, a research team from Singapore demonstrated mathematically a direct connection between the complementarity principle and the degree of unknown information in a quantum system, the so-called entropic uncertainty. This connection means that no matter what combination of wave or particle characteristic of a quantum system is looked at, the amount of unknown information is at least one bit of information, i.e. the unmeasurable wave or particle. Researchers from Linköping University together with colleagues from Poland and Chile have now succeeded in confirming the Singapore researchers' theory in reality with the help of a new type of experiment.

"From our perspective, it's a very direct way to show basic quantum mechanical behaviour. It's a typical example of quantum physics where we can see the results, but we cannot visualise what is going on inside the experiment. And yet it can be used for practical applications. It's very fascinating and almost borders on philosophy," added Guilherme B Xavier.

In their new experiment set-up, the Linköping researchers used photons moving forward in a circular motion, called orbital angular momentum, unlike the more common oscillating motion, which is up and down. The choice of orbital angular momentum allows for future practical applications of the experiment, because it can contain more information. The measurements are made in an instrument commonly used in research, called an interferometer, where the photons are shot at a crystal (beam splitter) that splits the path of the photons into two new paths, which are then reflected so as to cross each other onto a second beam splitter and then measured as either particles or waves depending on the state of this second device.

One of the things that makes this experiment set-up special is that the second beam splitter can be partially inserted by the researchers into the path of the light. This makes it possible to measure light as waves, or particles, or a combination of them in the same set-up. According to the

researchers, the findings could have many future applications in quantum communication, metrology, and cryptography. But there is also much more to explore at a basic level."

In our next experiment, we want to observe the behaviour of the photon if we change the setting of the second crystal right before the photon reaches it. It would show that we can use this experimental set-up in communication to securely distribute encryption keys, which is very exciting" shared Daniel Spegel-Lexne, PhD student in the Department of Electrical Engineering.

<https://timesofindia.indiatimes.com/science/study-finds-connection-between-quantum-theory-information-theory/articleshow/116109025.cms>



Fri, 06 Dec 2024

Kerala's Unique World Robotics creates history at World Robot Olympiad

Unique World Robotics (UWR), a pioneer in AI, Robotics and STEM education, has made history at the World Robot Olympiad (WRO) 2024 held in Turkey. For the first time in the competition's two-decade-long history, a team from Kerala has reached the podium, winning third position in the Future Innovators Elementary Category. Out of 85 countries and over 450+ teams, Team Rescue Tech Allies by UWR is the only team from India to achieve a podium finish at the Internationals in 2024. This groundbreaking achievement underscores the impact of UWR's expert training and mentorship.

Team Rescue Tech Allies, comprising the dynamic sister duo, Cathlin Marie Jeesan (12) and Clare Rose Jeesan (9) from Holy Grace Academy, Mala, represented India on the global stage. They were not only the national champions of India, earning their ticket to the international competition, but also the only Indian team to reach the podium this year. Their outstanding achievement has brought immense pride to Kerala and the nation.

The Aqua Rescue Raft 1.0 is a versatile innovation that serves as a life-saving raft during floods, capable of swift evacuations and delivering essential supplies. Beyond disaster relief, it autonomously navigates rivers and lakes to collect debris and pollutants while monitoring water quality. The data collected is seamlessly shared through the Aqua Watch App, empowering communities with real-time information to make informed decisions and take proactive measures for environmental preservation.

This remarkable success is a reflection of the collective effort of Cathlin and Clare, the guidance of UWR mentors Bansan Thomas George, Akhila R Gomez, Dixon MD, Jithin Anu Jose and Monish Mohan.

Unique World Robotics, Kerala based start-up operating across India and GCC countries, has consistently set a benchmark in international robotics competitions, achieving numerous prizes

over the years. With over 100,000 students trained globally, UWR has been at the forefront of revolutionizing robotics education, nurturing young innovators, and empowering them to tackle real-world challenges through technology and teamwork.

UWR's accomplishments go beyond competition success. For the second consecutive year, UWR has organized the world's largest NASA Space Apps Challenge event, and became the largest NASA Space Apps Event organiser with 17 locations across India, UAE & Europe, further cementing its position as a global leader in fostering creativity and innovation among students.

This victory is not just a milestone for Kerala but a proud moment for India, demonstrating how teamwork, innovation, and determination can break new ground on the global stage.

Mr Bansan Thomas George, CEO and Founder of Unique World Robotics, has articulated a bold vision for transforming Kerala into a global hub of innovation. Reflecting on the company's recent success at the World Robot Olympiad (WRO), he stated, "As a startup rooted in Kerala, our recent success at WRO is not a one-off achievement—we intend to make it a tradition. Our vision is to ignite a passion for future technologies among K-12 and university students across India, starting with Kerala. By encouraging participation in international competitions and cultivating an innovation-driven ecosystem, we aim to equip students with advanced knowledge, global exposure, and hands-on experience."

"Our focus spans robotics, AI, coding, metaverse, space technology, and rapid prototyping. Through our training programs and competitive platforms, we strive to inspire and empower students to develop groundbreaking projects and products. Kerala's representation in the global innovation and competition space has been minimal, and as a startup from the region, we are determined to bridge this gap. Our goal is to position Kerala as a hub of ingenuity and innovation, and from there, elevate India to the global stage."

<https://www.theweek.in/news/sci-tech/2024/12/06/keralas-unique-world-robotics-creates-history-at-world-robot-olympiad.html>

