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समाचार पत्रों से चयनित अंश
Newspapers Clippings

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

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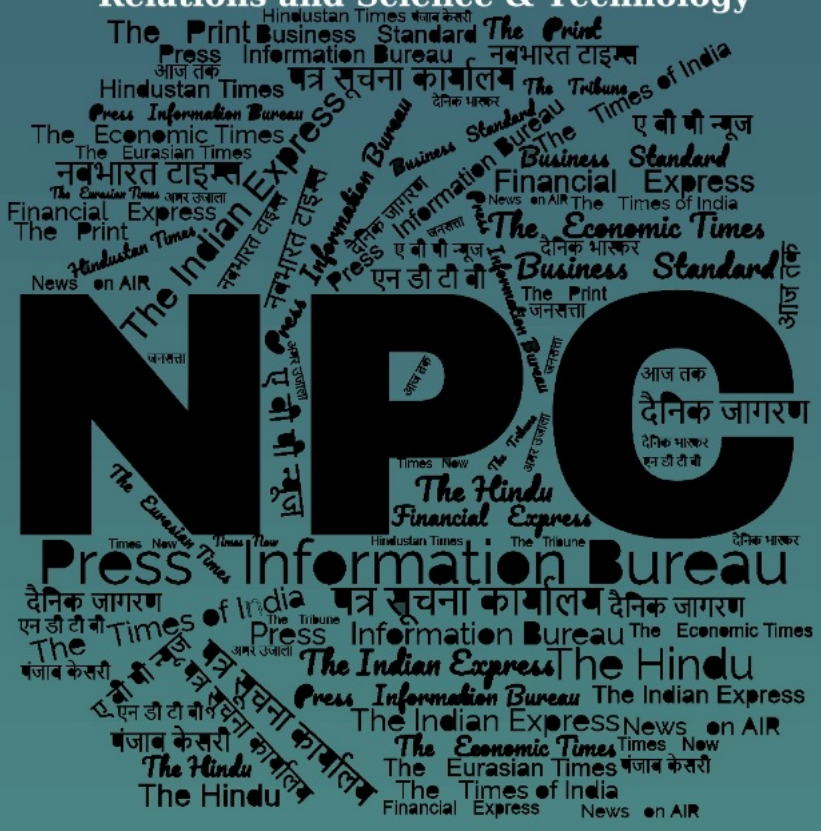

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दिल्ली के डीआरडीओ (DRDO) भवन में 30 दिसंबर को एक भव्य कार्यक्रम का आयोजन होने वाला है। यह कार्यक्रम नेवी के उन कर्मचारियों के लिए रखा गया है, जिन्होंने मेक इन इंडिया से नौसेना के लिए बने सभी हथियार और वॉरशिप में अपना अमूल्य योगदान दिया है। इस कार्यक्रम में रक्षा मंत्री राजनाथ सिंह इन सभी कर्मचारियों को सम्मानित करेंगे।

भारतीय नौसेना की ताकत

बता दें कि असैन्य कार्मिक भारतीय नौसेना के कुछ कर्मचारियों का लगभग एक तिहाई हिस्सा हैं, ये सभी कर्मचारी नौसेना के सभी सेक्टरों में महत्वपूर्ण योगदान देते हैं। यह असैन्य कर्मी नौसेना के कमान मुख्यालय, डॉकयार्ड, सामग्री संगठन, नौसेना आयुध डिपो, नौसेना आयुध निरीक्षणालय, प्रशिक्षण प्रतिष्ठान और कई दूसरे तरह की हेल्पिंग यूनिट्स के लिए काम करते हैं। यही वजह है कि नौसेना मुख्यालय की तरफ से भारतीय नौसेना की ताकत को बढ़ाने के लिए इन कर्मचारियों की ताकत को भी एकजुट करने की कवायद की जा रही है। इससे ये कर्मचारी भारतीय नौसेना को युद्ध के लिए हमेशा तैयार, विश्वसनीय, एकजुट और बेहतर भविष्य के लिए प्रभावी ढंग से योगदान दे सकेंगे।

बढ़ाया गया रक्षा वेतन पैकेज

भारतीय नौसेना ने पिछले साल फरवरी में अपने नागरिक कर्मियों की प्रशासन और कल्याण में दक्षता बढ़ाने के लिए 2024 को नौसेना नागरिकों का वर्ष घोषित किया था। इस लिए मौजूदा साल में मानव संसाधन प्रबंधन में सुधार लाने और टाइम टेबल के अनुसार नागरिक कर्मियों के पेशेवर और व्यक्तिगत विकास के उद्देश्य से कई उपाय किए गए थे। इसमें बंदरगाह, समुद्र में जहाजों पर काम करने वाले नागरिक कर्मियों के लिए बीमा कवर का प्रावधान और मुंबई में 21 औद्योगिक इकाइयों तक सीजीएचएस सुविधा शामिल है। जिसमें सभी नौसेना नागरिकों के लिए रक्षा वेतन पैकेज बढ़ाया गया है।

https://hindi.news24online.com/india/defence-minister-rajnath-singh-will-honour-the-employees-who-made-weapons-and-warships-for-the-indian-navy-in-drdo-bhawan/1007002/

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Sat, 28 Dec 2024

Ndian Navy To Showcase Operational Demonstration At RK Beach, Visakhapatnam

The Indian Navy is set to dazzle the citizens of Andhra Pradesh with a grand Operational Demonstration on 04 Jan 25, at the picturesque RK Beach, Visakhapatnam. The Hon'ble Chief Minister of Andhra Pradesh, Shri. N Chandrababu Naidu, has kindly consented to be the Chief Guest for this signature naval event, which would be hosted by Vice Admiral Rajesh Pendharkar, Flag Officer Commanding-in-Chief, Eastern Naval Command. Towards preparations, Joint Site Survey and Coordination Meetings are being undertaken by officials from the Eastern Naval Command (ENC), State Government and City Administration.

This annual Flag Ship outreach programme reflects the Eastern Naval Command's commitment to fostering a strong bond with the people of Andhra Pradesh and demonstrating the Indian Navy's unwavering readiness to safeguard the nation's maritime interests. The Operational Demonstration will showcase the Indian Navy's cutting edge capabilities through an exciting and neatly choreographed array of activities, including demonstrations by Warships, Submarines, Aircraft, Naval Band and the Marine Commandos (MARCOS).

Highlights of the event this time includes high speed manoeuvers by warships of various types, flying operations by fighters and fixed wing maritime aircraft as well as various types of helicopters, demonstration of amphibious assault, live slithering operations and Combat Free Fall by Marine Commandos. The event would also feature a unique *Horn Pipe Dance* by the Sea Cadets Corps from Visakhapatnam and the Beating Retreat Ceremony by the *ENC* band. Rehearsals Schedule: Preliminary rehearsals are scheduled for 28 and 29 Dec 24 with the Final rehearsals scheduled on 02 Jan 25 to ensure the event's flawless execution on 04 January 25. The public is cordially invited to witness the rehearsals on these dates at RK Beach.

https://pib.gov.in/PressReleasePage.aspx?PRID=2088638

Press Information Bureau
Government of India

Ministry of Defence

Sat, 28 Dec 2024

Indian Naval Ship Tushil At Casablanca, Morocco

As part of strengthening the bilateral relations and naval cooperation between India and Morocco, INS Tushil arrived at Casablanca, Morocco on 27 Dec 24. Morocco is a maritime nation and like India holds a unique geographical position with coastlines along both the Mediterranean and the Atlantic Ocean. The visit by the Indian warship seeks to further explore avenues for collaboration between both the navies. It may be noted that in the past 12 months, three Indian Navy ships - Tabar, Tarkash and Sumedha visited Casablanca, significantly elevating mutual trust and interoperability.

During this two day visit, crew of Tushil would engage with the Royal Moroccan Navy personnel at the functional level, host distinguished senior officials and other guests towards furthering naval cooperation, diplomatic ties and fostering goodwill. Thereafter, both the navies will engage in a Passage Exercise (PASSEX) at sea to improve interoperability and share the best practices.

INS Tushil was commissioned on 09 Dec 24 in Russia and is commanded by Captain Peter Varghese, supported by a dedicated team of 250 personnel. As the frigate continues its journey towards its home port in Karwar, it will participate in collaborative exercises with friendly foreign navies, further promoting India's maritime diplomacy with nations in the region.

https://pib.gov.in/PressReleasePage.aspx?PRID=2088564

Press Information Bureau
Government of India

Ministry of Defence

Sat, 28 Dec 2024

Indian Army Contingent Departs For India- Nepal Joint Military Exercise Surya Kiran

The Indian Army contingent comprising 334 personnel departed for Nepal today to participate in 18th edition of Battalion Level Joint Military Exercise SURYA KIRAN. The exercise will be conducted in Saljhandi, Nepal from 31st December 2024 to 13th January 2025. It is an annual training event conducted alternatively in the two countries.

The Indian Army contingent is being led by a Battalion from the 11th Gorkha Rifles. The Nepal Army contingent will be represented by Srijung Battalion.

The aim of Exercise SURYA KIRAN is to enhance interoperability in jungle warfare, counter terrorism operations in mountains, and Humanitarian Assistance and Disaster Relief under United Nations Charter. The exercise will focus on enhancing operational preparedness, aviation aspects, medical training, and environment conservation. Through these activities, the troops will enhance their operational capabilities, refine their combat skills and strengthen their coordination to operate together in challenging situations.

This edition of Exercise SURYA KIRAN follows successful visits by General Upendra Dwivedi, Chief of the Army Staff to Nepal, and the visit by General Ashok Raj Sigdel**,** Chief of the Army Staff of Nepali Army to India. The exercise will provide a platform for soldiers from India and Nepal to exchange ideas and experiences; share best practices and foster a deeper understanding of each other's operational procedures.

Exercise SURYA KIRAN signifies the strong bonds of friendship, trust, common cultural linkages that exist between India and Nepal. It sets the stage for a productive and professional engagement,

showcasing the unwavering commitment of both nations towards a broader defence cooperation. The exercise will also achieve shared security objectives and foster bilateral relations between two friendly neighbours.

https://pib.gov.in/PressReleasePage.aspx?PRID=2088529

Press Information Bureau
Government of India

Ministry of Defence

Sun, 29 Dec 2024

Raksha Mantri lauds the efforts of Indian Army training institutes for making the personnel proficient in military strategies & skills of warfare

Raksha Mantri Shri Rajnath Singh has lauded the valuable contribution of the training institutions of the Indian Army in making the personnel proficient in military strategies and skills of warfare. He was on a visit to the three Premier Training Institutes of the Indian Army - Army War College (AWC), Infantry School and Military College of Telecommunication & Engineering (MCTE) - in Mhow, Madhya Pradesh on December 29, 2024, accompanied by Chief of the Army Staff General Upendra Dwivedi and other senior officers of the Indian Army.

Shri Rajnath Singh was briefed by the Officiating Commandant on the establishment of Advanced Incubation & Research Centre and the various MoUs towards enabling absorption & transformation of technologies. He visited the Army Marksmanship Unit to witness their contribution towards national sports. Raksha Mantri also visited the Infantry Museum, where he was briefed on the history of Infantry as well as the induction of modernised equipment into the Infantry.

Raksha Mantri also interacted with all ranks of the three institutes at AWC. Addressing the troops, he commended the courage & vigilance of the Indian Army personnel in safeguarding the borders and ensuring national security. “Your dedication and devotion to duty are an inspiration to all of us. It is due to your hard work & commitment that our country and its borders are becoming increasingly secure & strong,” he said.

Shri Rajnath Singh called upon the Armed Forces to continue keeping a vigilant eye on the current geopolitical scenario, and always remain alert & ready to deal with any kind of threats. He emphasised that there are times when India faces challenges on the borders as well as on the internal front, which makes it imperative for the soldiers to keep a close eye on the activities of the adversaries & take timely and effective steps against them.

Raksha Mantri asserted that Prime Minister Shri Narendra Modi-led Government’s aim is to make India a developed & self-reliant nation by 2047, and the Armed Forces will play a crucial role in

achieving this goal. “You are the protectors of our borders, and the forerunners in nation building. I am sure that you will continue securing our borders with courage & dedication, and contribute in realising the vision of Viksit Bharat by 2047,” he said.

Earlier, Shri Rajnath Singh visited the Bhim Janm Bhoomi, a memorial dedicated to Dr BR Ambedkar in Mhow, and paid homage to the Bharat Ratna & the architect of the Indian constitution at his birthplace. He described Dr BR Ambedkar as an epitome of selfless service, who dedicated his life for social equality and empowerment.

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Press Information Bureau
Government of India

Ministry of Defence

Fri, 27 Dec 2024

INS Sarvekshak Arrives At Port Louis

INS Sarvekshak arrived at Port Louis, Mauritius on 26 Dec 24 to undertake Joint Hydrographic Survey. On arrival, the ship. was received by Shri Anurag Srivastava, High Commissioner of India to Mauritius, Capt CG Binoop, Commandant, Mauritius National Coastguard and other military and civil dignitaries. A preliminary survey coordination meeting was held with the Hydrographic Survey Unit of Mauritius.

INS Sarvekshak will engage with Mauritian authorities through technical knowledge exchange, professional interactions and training sessions on hydrography. This crucial survey will enable Mauritius to develop maritime infrastructure, resource management and coastal development planning. The extant visit highlights strong maritime partnership between India and Mauritius, reflecting shared commitment to regional development and deeper bilateral cooperation in line with the GoI’s vision of SAGAR (Security And Growth for All in the Region).

https://pib.gov.in/PressReleasePage.aspx?PRID=2088480

THE ECONOMIC TIMES

Sat, 28 Dec 2024

China unveils next-generation amphibious assault ship in naval expansion effort

China has unveiled its first next-generation amphibious assault ship, marking a significant step in the country's ongoing efforts to expand its military capabilities, CNN reported.

The ship, named Sichuan, was launched on Friday at a shipyard in Shanghai, according to the People's Liberation Army Navy (PLAN). This launch is part of China's drive to bolster its naval power and rival the military strength of the United States.

The Sichuan, a Type 076 amphibious assault ship, represents a major upgrade in China's naval fleet. The vessel is designed to enhance the country's long-range operational capabilities and is considered a "key asset" for advancing the Navy's transformation.

With a full-load displacement of over 40,000 tons, the Type 076 ranks among the world's largest amphibious assault ships. It features a twin-island superstructure and a full-length flight deck, allowing it to carry both fixed-wing aircraft and helicopters, as per reports by CNN.

One of the standout features of the Sichuan is its electromagnetic catapult system, which sets it apart from other amphibious assault ships. The system allows the ship to launch larger and heavier aircraft, providing enhanced range and firepower.

This improvement allows aircraft to carry more fuel, increasing the ship's overall combat range, and more bombs or missiles, enhancing the strike capability of the aircraft themselves.With this development, China continues to build carriers and large warships at an accelerated pace, positioning itself as a formidable naval power.

The Sichuan is just one example of China's strategic push to project power far beyond its shores and close the gap with the United States' military supremacy, CNN reported.

The electromagnetic catapult system used in the Sichuan is also found on the US Navy's newest aircraft carrier, the USS Gerald R. Ford, underscoring the advanced technology employed by both nations.

https://economictimes.indiatimes.com/news/defence/china-unveils-next-generation-amphibious-assault-ship-in-naval-expansion-effort/articleshow/116733574.cms

THE ECONOMIC TIMES

Sun, 29 Dec 2024

Pakistan Army plans to return to Bangladesh for the first time since 1971

In what may send alarm bells ringing in the Indian establishment Pakistan Army for the first time since 1971 has reached an agreement with Bangladesh to train its Army beginning February 2025.

The training will be conducted in four cantonments of Bangladesh Army beginning with Mymensingh cantonment in February, ET has reliably learnt. Mymensingh houses training and doctrine command headquarters of the Bangladesh Army. Sources alleged that Maj Gen rank officers from Pakistan may train Bangladesh Army officers.

The agreement for cooperation between Armies of Pakistan and Bangladesh was reached in the backdrop of the Yunus regime's effort to improve ties with Islamabad. The first training module guided by the Pakistan Army could last for a year. The proposal to Bangladesh was offered by Pakistan Army's Joint Chief of Staff Committee chairman Gen S Samshad Mirza.

This has raised apprehensions of indoctrination of Bangladesh Army with anti-India ideology that was diluted over the years following the induction of officers born in Bangladesh and under the Awami League rule.

Pakistan trained officers continued to hold leadership positions in the Bangladesh Army for the first two decades after the country's independence. The list included Gen Ziaur Rahman and Lt Gen HM Ershad both of whom went on to become Presidents. That exercise ensured anti-India doctrine being advocated by the Bangladesh Army till it got diluted.

Ershad, however, was also an alumni of India's National Defence College and maintained cordial links with the political leadership here.

The leadership of the Bangladesh Army “perceived” to be close to Awami League and Sheikh Hasina are being targeted by the current regime with cases being filed against them.

Presence of the Pakistan Army in Bangladesh also creates a challenge for Northeastern states which are landlocked and are vulnerable.Meanwhile, explosives have reportedly reached Bangladesh from Pakistan through that second ship that entered Chittagong Port last Friday. The containers containing explosives were unearthed when local authorities launched a search - operation on the cargo of the ship. Port authorities are now ascertaining the motive of the cargo containing explosives.

https://economictimes.indiatimes.com/news/defence/pakistan-army-plans-to-return-to-bangladesh-for-the-first-time-since-1971/articleshow/116751122.cms

THE ECONOMIC TIMES

Sun, 29 Dec 2024

India not 'lucky' on security front, stay vigilant against enemies: Rajnath Singh to Armymen

Defence Minister Rajnath Singh on Sunday termed India a "not very lucky" nation on the security front and urged soldiers to keep a sharp eye on internal and external foes who he said are always active. He was addressing Army personnel at the more-than-two-century-old Mhow cantonment in the Indore district of Madhya Pradesh.

"Taking the security scenario into account, Bharat is not a very lucky country because our northern border and western border continuously face challenges," said Singh, who is on a two-day tour of the state.

Mhow cantonment, 25 km from Indore, is home to three premier training institutes - Army War College, Military College of Telecommunication Engineering and Infantry School - other than the Infantry Museum and Army Marksmanship Unit.

"We also face challenges on the internal front. In the backdrop of this, we can't sit quiet, unconcerned. Our enemies, whether internal or external, remain active always. In these circumstances, we must keep a close eye on their activities and take appropriate and timely effective steps against them," he told the Armymen.

To make Bharat a developed and self-reliant country by 2017, the role of the Army is very crucial, said the defence minister.

".. as the country's defence minister, I would like to tell you that we should be alert always. This patch of time, though often referred to as peacetime, struck me deeply when I arrived and witnessed the discipline and dedication with which you are undergoing training. Your regimen is no less than that of a war," he told the gathering.

"To maintain such a level of discipline, dedication and firm conviction are needed," he added.Singh said he was impressed by the cleanliness at the Army establishments and cantonments across the country."

Your dedication to work inspires me. I can say that the most appealing thing is your devotion towards work and sense of responsibility. It is inspiring to all of us," Singh said.

Earlier, Singh along with the Chief of Army Staff General Upendra Dwivedi paid floral tributes at the memorial of Dr B R Ambedkar at Mhow.

The memorial of Ambedkar, the chief architect of India's Constitution, has been built at his birthplace in the Kali Paltan area of Mhow cantonment.

https://economictimes.indiatimes.com/news/defence/india-not-lucky-on-security-front-stay-vigilant-against-enemies-rajnath-singh-to-armymen/articleshow/116768990.cms

THE ECONOMIC TIMES

Fri, 27 Dec 2024

Focus on capacity enhancement of IAF as China unveils two'6th Gen' fighter jets

As China has unveiled two new under development 'Sixth Generation' fighter jets that can give it a global aerial combat edge, the focus is firmly on capacity enhancement of the Indian Air Force which has been struggling to even reach its target for adequate 'Fourth Generation' combat jets.

Even as the number of combat jets has hit an all-time low since 1965, the larger worry is that India has been facing significant delays from its major defence suppliers, the US and Russia, which has resulted in degraded combat capability.

With the US, the inordinate delay in supply of GE 404 jet engines has led to major setback for the Light Combat Aircraft (LCA Mk1a) programme that was meant to replace retiring MiG 21 fighter jets. Deliveries for these jets - 83 were ordered in 2021 - was to start this year but is being pushed well into 2025 as GE has been unable to supply the jet engines due to disruptions in its supply chains, particularly in South Korea.

With Russia, the problem is on the other spectrum of aerial warfare - anti air defence systems. India had ordered five regiments of S400 long-range air defence systems. While all were to be delivered by 2023, till now only three have arrived. There is no clarity on when the last two will be delivered, with a possibility that the waiting period could extend to 2026. Both delays are being attributed to disruptions in supply chains - a recurring theme for defence suppliers in recent years with the twin hits of the Covid-19 crises and a spate of regional conflicts like the Russia-Ukraine war and trouble in West Asia.

Creating indigenous options and establishing a robust aero-defence ecosystem is the way forward but things have moved at a slow pace in recent years. While Hindustan Aeronautics Limited has commenced manufacturing the LCA Mk1a, new programmes like a Mk2 version of the aircraft and a future 'Advanced Multirole Combat Aircraft' are years away from even a prototype flying, much less serialised production to meet air force requirements.

Adding to this is the inability to develop a cutting edge fighter jet engine in India that would power next generation jets. An engine is at the very core of a combat aircraft right from the design stage and India has been unable to select a foreign partner for the ambitious plan to develop an engine with at least 110 kN of power. A lucrative offer from France to co-develop the engine has been in cold storage for the past eight years, while another from the UK has been languishing as well with no forward movement.

These, and other issues like how to proceed with procuring new Multi Role Fighter Aircraft and aerial refuellers, are to be addressed by a new committee set up in the defence ministry that has its task cut out as Indian aerial capacity is degrading while China has been on overdrive.

https://economictimes.indiatimes.com/news/defence/focus-on-capacity-enhancement-of-iaf-as-china-unveils-two6th-gen-fighter-jets/articleshow/116722960.cms

THE ECONOMIC TIMES

Fri, 27 Dec 2024

Take That: The gamechanger weapons India acquired in 2024

2024 proved to be a landmark year for India’s defence sector, epitomising the nation’s unwavering commitment to its ‘Atmanirbhar Bharat’ initiative and its vision to modernise its armed forces.

From monumental acquisitions to cutting-edge technological advancements, India’s defence strides this year laid the groundwork for enhanced strategic capabilities and indigenous self-reliance. Among the standout achievements were the success of “Mission Divyastra”, the historic Predator

drone deal with the United States, and the inauguration of Tata-Airbus' military aircraft manufacturing facility in Vadodara.

The Union Budget for 2024-25 highlighted the government's focus on defence modernisation, with a record allocation of ₹6.21 lakh crore to the Ministry of Defence. This included ₹1.72 lakh crore for capital outlay—a 20.33% increase compared to FY 2022-23's actual expenditure—to bolster the armed forces' operational capabilities. As the year draws to a close, here is a detailed look at India's remarkable defence milestones in 2024.

Predator Drone Deal with the United States

India's strategic partnership with the US reached unprecedented heights with the finalisation of a ₹32,000-crore deal for 31 MQ-9B Predator drones. These 'hunter-killer' drones, capable of operating at altitudes of 40,000 feet for up to 40 hours, will significantly augment India's surveillance and offensive capabilities. The Navy will receive 15 Sea Guardian drones, while the Army and Air Force will each acquire eight Sky Guardian variants.

Each drone will feature advanced weaponry, including Hellfire missiles and precision-guided bombs. The agreement also encompasses the establishment of a maintenance, repair, and overhaul (MRO) facility in India, furthering domestic expertise in unmanned aerial systems.

Tata-Airbus C-295 Facility Inauguration

October saw the inauguration of India's first private military aircraft manufacturing facility in Vadodara. Prime Minister Narendra Modi and Spanish Prime Minister Pedro Sanchez jointly launched the Tata-Airbus project, which will locally produce 40 C-295 tactical transport aircraft, complementing the 16 units imported from Spain under a ₹21,935-crore contract signed in 2021.The C-295, celebrated for its versatility, is designed for medical evacuations, disaster response, and maritime patrol missions. This facility symbolises India's ascent as a global hub for aerospace manufacturing.

Defence Acquisition Council Approvals

In December, the Defence Acquisition Council (DAC) approved projects worth over ₹21,772 crore. Key proposals included:

- 31 New Water Jet Fast Attack Crafts (NWJFACs): Enhancing the Navy's coastal operations and anti-piracy capabilities.
- 120 Fast Interceptor Craft (FIC-1): Strengthening escort and coastal defence operations. Electronic Warfare Suites for Su-30 MKI Aircraft: Incorporating next-generation radar warning receivers and jammer pods.
- Six Advanced Light Helicopters (ALH-MR): Bolstering the Indian Coast Guard's maritime security initiatives.

Army's Signals Technology Evaluation and Adaptation Group (STEAG)

The Indian Army established the STEAG to explore advanced technologies such as artificial intelligence, 5G/6G communications, and quantum computing for military applications. Officials

described STEAG as a “premier organisation” focused on identifying, adapting, and developing tailored solutions in partnership with academia and industry.

Indigenous Milestone: Asmi Machine Pistols

As part of its push for self-reliance, the Indian Army inducted 550 indigenously developed Asmi machine pistols into its Northern Command. Designed by the DRDO in collaboration with Lokesh Machines Limited, the Asmi features a semi-bullpup configuration, enabling efficient single-handed operation during close-quarters combat.

$4 billion defence deal for Russia’s Voronezh radar system

India and Russia are also in the final stages of discussions for a significant $4 billion defence agreement aimed at bolstering India’s air defence capabilities. Central to this deal is the acquisition of the cutting-edge Voronezh radar system, a development that promises to dramatically enhance India’s capacity to detect and respond to aerial threats. According to Russia Today, this strategic collaboration underscores the enduring defence ties between New Delhi and Moscow—a relationship reaffirmed during Indian Defence Minister Rajnath Singh’s recent visit to Russia.

Voronezh Radar: A Game-Changer for India’s Air Defence

The crown jewel of the proposed deal is the Voronezh radar system, designed by Russia’s Almaz-Antey Corporation, renowned for its advancements in radar and missile systems. Boasting an impressive vertical range of over 8,000 kilometres and a horizontal reach exceeding 6,000 kilometres, the radar can monitor an extensive area, detecting threats such as ballistic missiles, stealth aircraft, fighter jets, and intercontinental ballistic missiles (ICBMs).

As reported, the Voronezh system is capable of simultaneously tracking more than 500 objects and can even monitor near-Earth objects in space. This unparalleled situational awareness is set to provide India with a strategic edge, enhancing surveillance over critical regions, including China, South Asia, and the Indian Ocean.

Boosting Domestic Manufacturing under ‘Make in India’

In alignment with India’s ‘Make in India’ initiative, the deal includes a stipulation that at least 60% of the radar system’s components will be manufactured domestically. A delegation from Almaz-Antey recently visited India to explore partnerships with local offset firms, according to Russia Today.Reports suggest that the radar system will be stationed in Karnataka’s Chitradurga district, already a hub for advanced defence and aerospace infrastructure. This location has been surveyed, ensuring its readiness for the installation of this transformative technology.

Future Naval and Aerial Assets

Looking ahead, India plans to acquire 26 Rafale-M naval jets and three Scorpene submarines in 2025. Navy Chief Admiral Dinesh K. Tripathi highlighted the ongoing indigenous construction of 62 ships and a submarine, reflecting efforts to reinforce maritime capabilities.

The Cabinet Committee on Security also approved the construction of two nuclear-powered attack submarines as part of the ‘Project Advanced Technology Vessel’ initiative. These submarines,

costing ₹45,000 crore, will be constructed in Visakhapatnam with significant private-sector involvement.

Major Defence Contracts and Indigenous Emphasis

In September, India sanctioned capital acquisition proposals worth ₹1.44 lakh crore, with 99% allocated to indigenous categories. Notable projects included Future-Ready Combat Vehicles (FRCVs) and Project 17B stealth frigates for the Navy. Additional contracts were signed for AL-31FP jet engines for Sukhoi Su-30MKI fighters and advanced unmanned underwater vehicles.

Defence Manufacturing and Export Growth

India's defence exports surged to ₹6,915 crore in the first quarter of FY 2024-25. Collaborations with global firms, such as Dassault Aviation's proposed MRO facility near Noida and PTC Industries' supply agreement with Israel Aerospace Industries, underscore India's burgeoning role in the international defence supply chain.

https://economictimes.indiatimes.com/news/defence/take-that-the-gamechanger-weapons-india-acquired-in-2024/articleshow/116698829.cms

The Tribune

Sun, 29 Dec 2024

Why Bhutan King has visited India thrice in 20 months

ON December 20, Home Minister Amit Shah said in Kolkata that the Siliguri corridor is the key link to the Northeast. Given the unfriendly regime change in Bangladesh, Bhutan plays a crucial role towards its security. On December 6, King Jigme Khesar Namgyel Wangchuck of Bhutan was on an unprecedented third official visit to India in the last 20 months.

No King of Bhutan has come to India that frequently, but there was a reason. This year, Bhutan has been relatively silent about border resolution with China, especially after the previous government had signed a three-step roadmap in January 2023, held three expert group (on the 11th, 12th and 13th) and two joint technical group meetings, all packed in 2023, even as the 10th expert group meeting was held in 2021.

The cat was set among the pigeons after the previous PM, Lotay Tshering, in an interview to a Belgian newspaper in March 2023, said: "Soon we will be able to resolve the border issue, including Doklam, as there are no real differences between China and Bhutan."

The Tshering interview triggered alarm bells in New Delhi and a chain of events, including a virtual air-dash by the King for talks with PM Narendra Modi. Following the joint statement which steered clear of the border issues, the then Foreign Secretary Vinay Kwatra said: "India will take all necessary measures to safeguard its national interest."

High-ranking officials believe that Modi did some plain-speaking with the King, emphasising that their border disputes with China were intertwined. In the past, Bhutanese officials consulted their Indian counterparts prior to holding border talks with China. Especially regarding Doklam, where, in 2017, New Delhi invoked the India-Bhutan Treaty of Perpetual Friendship 2007 to intervene on Bhutanese territory (which China claims) to prevent the PLA from constructing a road to Gipmochi — its version of the tri-junction between India, Bhutan and China.

In an interview in October 2023 to an Indian newspaper, Tshering said his government had a month left in office, but "it was inching towards an agreement of the border."

Also, last October, previous Foreign Minister Tandi Dorji had visited Beijing, a first for any Bhutanese minister, and met his counterpart Wang Yi, signed the Cooperation Agreement on Joint Technical Team for Delimitation and Demarcation of Border and endorsed the One-China policy.

Wang urged Dorji to establish diplomatic relations with China as Thimphu has none with any P5 country. In 2023, the Tshering government was actually racing (not inching) towards a border resolution. Dorji, after his 25th round of talks in Kunming, told journalists in Thimphu that talks with China had been accelerated.

His visit to Beijing and the agreements clinched with China, like the Tshering interviews earlier, shocked India’s security establishment. It forced the King days later to make an unprecedented second visit to India. Being asked to come to New Delhi twice within six months over border issues was plainly discomfiting for the King, though the second visit was disguised as Bhutan’s curtain-raiser for the Gelephu Smart City project. Tshering said: “The first leader the King wanted to discuss Gelephu with was PM Modi.”

In the elections held in November last year, Lotay Tshering’s party was eliminated in the first round and Tshering Tobgay became PM in January 2024. Not a word has been heard about the three-step roadmap since then from the new PM or the Foreign Minister. In 2013, PM Jigme Thinley was defeated by Tobgay in elections after he was seen getting closer to China.

Clearly, the King was in the loop of the policy shift for an early resolution of the border with China, including the Doklam package deal, delinked from its adverse impact on India's strategic concerns in the Chumbi valley.

‘Kuensel’, a weekly broadsheet from Thimphu, has reported that young and educated Bhutanese have been urging the government to establish diplomatic relations with China and resolve the border issue. During my visit to Thimphu and Paro after Doklam, I felt that people were unhappy over the way Doklam was handled as also the economy and presence of Indian soldiers on Bhutanese soil.

Thimphu's $3-billion economy supports a population of seven lakh Bhutanese, with hydropower as its main source of revenue, and with India financing all its five-year development plans. In fact, this year, the government doubled the Rs 5,000-crore outlay for the 12th plan to Rs 10,000 crore for the 13th plan.

Half the population is below 30 years and with 30 per cent unemployment, nearly 15,000 persons left Bhutan in 2023 for Australia, Canada and the US. Gelephu, the King believes, will be the open-sesame to get the young and educated Bhutanese to return.

Some believe Gelephu is the King's idea of a diversion from the vexed border issues and economic hardship. The Gelephu SEZ will have energy and communication connectivity, an international airport, a university, a healthcare facility, etc.

A new dream city on the India-Bhutan border will soon come up with international aid and assistance to address Bhutan's declining Gross National Happiness. India is a key player in the project.

India's worry will remain the Doklam package deal, which the Tshering government was on the verge of signing. It would have plunged the Chumbi dagger deeper into the Siliguri corridor, popularly called Chicken's Neck. While the Tobgay government will go slow on the three-step roadmap, the 26th round of Bhutan-China talks was held quietly at Thimphu in August.

Bhutan and India are the only two countries which have a disputed border with China and Thimphu is in a hurry to settle it. King Wangchuck’s word holds for now.

https://www.tribuneindia.com/news/comment/why-bhutan-king-has-visited-india-thrice-in-20-months/

india.com

Sun, 29 Dec 2024

Big THREAT for India as Bangladesh seeks short-range ballistic missiles from Pakistan for…, these weapons are capable of…

In another setback to the rapidly degrading India-Bangladesh relations, Bangladesh is reportedly seeking to acquire Short Range Ballistic Missiles (SRBM) from Pakistan to bolster its defense capabilities and deterrence against a possible Indian attack, an intelligence report has revealed. According to a report quoted by defense website Indian Defence Research Wing (IDRW), Bangladesh has approached Pakistan to procure the Abdali SRBM, which has a range of 400 km, apparently to act as a deterrent against an attack by India.

The intelligence report stated that Pakistan is likely to agree to the request for two main reasons, first to expand its regional influence by supporting Dhaka, currently at odds with New Delhi, and second, because selling the Abdali SRBMs would not significantly change the strategic balance against Pakistan because these missiles have a short range and can only be realistically and potentially used against India, with whom Bangladesh shares a long border.

However, the IDRW report noted that in order to fulfill Dhaka’s request, Islamabad would have to carefully navigate global arms control regimes, such as the Missile Technology Control Regime (MTCR), which could eventually influence the final decision, even though neither country is a part of the MTCR.

Major threat for India?

According to experts, the Abdali SRBM, also called the Hatf-II within the Pakistan army, could pose a significant threat to India's northeastern states, because even though the tactical ballistic missile, which is designed for battlefield use, has a limited range, it can cover enough distance to reach major cities in Northeastern India. The Abdali missile system, developed by the Pakistan's Space Research Commission (SUPARCO), is designed for quick reaction battlefield scenarios and has provides a tactical edge to the Pakistan Army in such situations.

New arms race in South Asia

Defence experts believe that Abdal SRBMs would drastically change regional security dynamics and alter strategic balance in South Asia, if Bangladesh manages to procure them from Pakistan. Bangladesh deployment of these missiles could serve more as a psychological deterrent, notwithstanding the missile's limited range, they say. Some assert that Bangladesh's acquisition of ballistic missiles could trigger an arms race, forcing India to further enhance its missile defence and deploying more offensive capabilities. Dhaka's move is also being seen as a response to India expanding its military infrastructure near the Bangladesh border, and New Delhi's ever-increasing military prowess, including its ballistic missile defense systems.

India-Bangladesh relations

India-Bangladesh relations are at an all-time low after the ouster of former Prime Minister Sheikh Hasina, and an interim government led by Nobel laureate Muhammad Yunus, coming to the helm in Dhaka.

Bangladesh has witnessed widespread communal violence against minorities, especially Hindus, which has soured Dhaka's ties with New Delhi, with the latter accusing the Yunus-led interim government of not doing enough, and turning a blind eye to the atrocities perpetrated by radical Islamist elements against the minority Hindu community in the country.

https://www.india.com/news/world/india-bangladesh-relations-big-threat-for-india-as-bangladesh-seeks-short-range-ballistic-missiles-from-pakistan-for-boosting-defence-abilities-abdali-srbm-narendra-modi-muhmmad-yunus-7501298/

THE WEEK

Sat, 28 Dec 2024

Russia's Oreshnik missile leaves Indian Air Force veteran impressed; says Western defence systems helpless against it

The newly developed intermediate-range ballistic missile (IRBM) of Russia, Oreshnik, continues to gain admirers, with an Indian Air Force veteran now echoing claims of a few military experts and Russian President Vladimir Putin that there is no system in the world that can intercept Oreshnik.

Oreshnik, meaning hazel tree, which reportedly can reach speeds exceeding Mach 10 (approximately 12,300 km/h or 7,610 mph), was first used in a November 21 strike on the Ukrainian city of Dnipro.

A few days ago, Putin had said Russia has just a few Oreshnik missiles but wouldn't hesitate to use them on Ukraine. "We have them and more than one system, but we are not in a hurry to use them, because this weapon is powerful, it is designed to solve certain tasks," he added.

The Russian president had earlier said there are currently no ways of counteracting Oreshnik, a claim that a few global military analysts have promptly backed despite the West raising doubts over its operational effectiveness.

According to a report in the defence website IDRW, retired IAF Group Captain Uttam Kumar Devnath claimed that Western defence systems like Patriot or THAAD (Terminal High Altitude Area Defense) cannot intercept Oreshnik missiles.

He observed that the missile travels too fast for radar targetting. Its speed, coupled with manoeuvrability, makes it almost impossible to be intercepted by current Western missile defence systems.

The ability of the missile to alter its trajectory and its velocity are some of the reasons that make Oreshnik hard to intercept. According to Devnath, the missile also leverages stealth technologies and hypersonic principles to evade detection and interception.

https://www.theweek.in/news/defence/2024/12/28/russia-oreshnik-missile-leaves-indian-air-force-veteran-impressed-says-western-defence-systems-helpless-against-it.html

THE WEEK

Sat, 28 Dec 2024

Regulated movement on Indo-Myanmar border: A step in the right direction

The 1,643-km Indo-Myanmar border (IMB) runs from the trijunction with Tibet in the north to the trijunction with Bangladesh in the south. It is perhaps one of the most remote and challenging boundaries running along the Great Himalayan range in the North and its offshoot, the Patkai to the South. The entire border is a dense forest with thick secondary vegetation, making it extremely difficult to negotiate. Road, rail, air, telecommunications, and logistics infrastructure are almost non-existent.

It is inhabited by the various sub-tribes of Mishmi, Naga, and Zomi who are spread in Arunachal Pradesh, Nagaland, Manipur and Mizoram which share this border with Myanmar. All these states have been afflicted with insurgency and inter-tribal conflicts at some or other time, making this region insecure for meaningful development activity. The IMB is guarded by nearly 20 battalions

of Assam Rifles, many of which also perform dual roles as they are deployed on the counter-insurgency grid under the operational control of the Indian Army.

The IMB, in its present form, was created in 1937 when India and Myanmar were partitioned by the British. This partition created a boundary along the Patkai and divided the closely knit tribal populations with deep ethnic and family connections between the two countries. After the formal delineation of the IMB In 1968, the government of India, to facilitate the movement of populations on the two sides, declared a 40-kilometre free movement regime (FMR) for the people of the bordering areas. Subsequently, in 2010, it was reduced to 16-kilometer on both sides. This provision has been extensively used by people from both countries to move to and from and maintain relations and contact. In 2018, the FMR arrangement was formalised by both countries as the Land Border Crossing Agreement (LBXA).

The critics of the FMR consider this provision as the major factor for trans-border smuggling of drugs and weapons, and the movement of refugees and armed insurgents. While it is true that the IMB is exploited by the insurgents and other criminal elements to move people, weapons, drugs and other contraband, it is also a fact that a significant quantity of heroin and methamphetamine produced in the “golden triangle” is moved into India through the rebel-controlled areas of Myanmar.

Although the FMR is not responsible for this because the IMB is extremely porous and Assam Rifles is so thin on ground that anti-national and criminal elements do not require the provisions of FMR to move across the border. They can easily circumvent the border guarding outposts, taking cover of thick vegetation and inclement weather.

In February 2024, the Indian government took a long-awaited decision to fence the IMB and improve its surveillance. This decision came after the violence in Manipur, during which it was believed that the porous border had facilitated the influx of a large number of Myanmar nationals. While the decision to fence the IMB was a welcome step, the news of the ending of the FMR came as a surprise. Most security experts know that the FMR provisions do not contribute significantly to this illegal influx. The ending of the FMR also annoyed the tribal populations of the Northeast who felt that the government was not displaying sensitivity towards them by taking this decision.

The ministry of home affairs has now introduced a fresh protocol to regulate the movement of people living within 10 kilometres on either side of the international border. According to the new guidelines, a citizen crossing the border from India to Myanmar will be given a 'border pass' by the Assam Rifles for a stay up to seven days in Myanmar. For entry into India from Myanmar, individuals will have to report at the designated border crossing points where the Assam Rifles will carry out the requisite documentation at the time of entry and exit. The period of stay under the FMR for Myanmar nationals is also kept at seven days.

The continuation of the FMR with stricter protocols is a positive development which should assuage the feelings of the people of the Northeast and at the same time address the security concerns of the country. The government, however, will have to empower the Assam Rifles with more resources to ensure that the improved provisions of the FMR are implemented properly.

he government should also expeditiously take steps to strengthen the border guarding mechanism on the IMB. The fencing of the IMB must commence immediately. However, being capital-intensive, it will take a long time to be completed. In the meantime, the government should consider increasing the satellite coverage in the region combined with the induction of unarmed aerial vehicles for effective surveillance. The number of border guarding units of Assam Rifles should also be increased because the current number is just not enough to carry out effective patrolling and management of the border.

https://www.theweek.in/news/defence/2024/12/28/regulated-movement-on-indo-myanmar-border-a-step-in-the-right-direction.html

The Indian EXPRESS

Sun, 29 Dec 2024

Amid reports of sixth-gen Chinese aircraft, what does 'generation' mean in the context of fighter jets?

Unverified images of what is being termed as a Chinese sixth-generation fighter aircraft have gone viral on social media. This comes a month after China's Aviation Industry Corporation (AVIC) unveiled its Baidi White Emperor 'B Type' sixth generation fighter jet at the Zhuhai Airshow in November. But what does the concept of a "generation" mean in the context of fighter jets?

A relatively recent heuristic

Before getting into the weeds of what each generation entails, two points to be noted.

First, the notion of aircraft generations came up only in the 1990s. It has thus been retrospectively applied to fighter aircraft that came before this period. Notably, these generations only refer to jets and not the propeller-driven fighters that predated them.

Second, there is no standard definition of what constitutes a "generation". Some have even used terms such as "generation 3.5" or "generation 4.5". At the end of the day, the idea of generations is meant to act as a heuristic device and not the be-all, end-all determinant of an aircraft's capabilities. Not all aircraft in the same generation are equal, and the measure of a country's air capabilities does not rest solely on what generation of fighter jets it possesses.

So, how exactly are aircraft generations defined? Loosely put, a generational shift in fighter jets is said to occur when a certain technological innovation cannot be incorporated into an existing aircraft through upgrades and retrospective fit-outs — each new generation comes with a certain significant leap in technology.

The five generations (so far)

There are currently five generations of fighter jets which are (or were in the past) in active service, with sixth generation jets currently in development. Here is what each generation entails,

according to the classification presented by aviation expert David Baker in Fifth Generation Fighters (2018).

1. First generation (1943 to 1955)

The earliest fighter jets appeared on the scene in the final years of World War II. They were faster than their piston-engined contemporaries, but otherwise not very different from existing fighter aircraft.

Notably, these jets still flew mostly at subsonic speeds. This was not only because of the capabilities of their engines — these were without afterburners, which provide a sudden boost of thrust — but also the design of their wings, which were more or less straight, and thus aerodynamically inefficient. Although later first generation aircraft did introduce swept wings which were angled backwards to the fuselage, which allowed for transonic flight during dives, pilots had minimal control at such speeds, which made them impractical.

First generation jets also had very basic avionic systems and no self-protection measures. Only the very final jets in this generation had rudimentary radar systems. They were armed with machine guns or cannons, and unguided bombs and rockets. These aircraft were deployed as interceptors, and could engage in combat within close visual range. Most such aircraft could also be operated only during the day. During this time, ground-attack aircraft continued to be powered by piston-engines and propellers.

EXAMPLES: Messerschmitt Me 262, North American 5-86 Sabre, Mikoyan-Gurevich MiG-15, Hawker Hunter

2. Second generation (1955 to 1970)

Second generation fighters saw massive improvements in terms of speed, weaponry, and avionics. With the introduction of afterburners, and swept wings becoming the norm, these aircraft for the first time were capable of transonic and supersonic dashes during level flight. This new-found speed had a major influence on how dogfights would unfold, and air forces had to bring in major changes to their fighting doctrines.

Second generation fighters also boasted the very first fire control radars and semi-active guided missiles. Also came along radar warning receivers, which would eventually develop into aircraft being able to deploy active countermeasures. While the range of air-to-air engagement greatly increased, most combat was still within visual range albeit with pilots having much more accurate fire control systems.

Aircraft in this generation were classified as either interceptors or fighter-bombers for air superiority and ground attack roles respectively.

EXAMPLES: Mikoyan MiG-21F, Sukhoi SU-9, Lockheed F-104 Starfighter (interceptors), and Republic F-105 Thunderchief and Sukhoi SU-7B (fighter-bombers)

3. Third generation (1960-1970)

There are four main points of demarcation between the second and third generations of fighter jets.

First, the design process of this generation of aircraft saw a major overhaul. Instead of designing an airframe upon which to hang an increasingly complex suite of systems and subsystems, there was a shift towards more integrated designs. The most important change in this regard came with the shift to an integrated engine and airframe assembly.

Second, this was the first generation of fighter jets designed to have multi-role capabilities. The traditional demarcation between fighter-bombers and interceptors started to become blurred — aircraft could now carry a far wider range of weapons, from air-to-ground missiles and laser-guided bombs, to air-to-air missiles and cannons.

Third, this generation of aircraft were the first with capabilities of beyond visual range air-to-air combat, aided by significantly improved fire control radars, guided missiles, and the first generation of tactical electronic warfare systems. Improved avionics included pulse-doppler radar, off-sight targeting and terrain-warning systems.

Fourth, the engines saw some major improvement as well, with better turbofans. Third generation fighters were thus capable of more sustained supersonic flight, far superior range and performance, and more maneuverability, with some aircraft also coming with vectored thrust.

EXAMPLES: McDonnell Douglas F-4 Phantom, Mikoyan Gurevich MiG-23, Hawker Siddeley (later British Aerospace) Harrier

4. Fourth generation (1970 to 2000s)

The fourth generation is the longest according to any classification, meaning that even within the generation one can find a rather extensive progression of technology. The earliest fourth gen fighters, like the Grumman F-14 Tomcat, made famous in the movie Top Gun (1986), are pretty much incomparable to the latest fighters of the generation (sometimes referred to as gen 4.5 as a result) such as the Dassault Rafale.

A few characteristic developments are nonetheless notable.

First, true multi-role aircraft emerged only with this generation. While the lines between interceptors and fighter-bombers had started to blur with the previous generation, it was now that fighters such as the F-14, and later the McDonnel Douglas F/A-18 ‘Superhornet’ and Sukhoi Su-30 that one had fighters which were equally adept at either role.

Second, this was the first generation of aircraft to use fly-by-wire (FBW) control systems, which use computers to mediate between pilot’s inputs and the eventual output on an aircraft’s control surfaces (such as the rudder or the elevons). This provided pilots with improved control at high speeds, improved the performance and fuel efficiency of aircraft by replacing heavier control systems with ‘wires’, and allowed for more intentionally aerodynamically unstable aircraft designs to increase maneuverability.

Third, with advancements in computers and electronics seen elsewhere, fighter aircraft too became far more “high-tech”, as per modern standards. This generation saw a wide-range of developments in avionics, including the introduction of “heads-up displays”, and “improved electronic warfare systems”.

Fourth, this was the first generation of fighter aircraft designed using some stealth principles. (Stealth here refers to the ability to be invisible to radar systems). Composite construction materials, radar absorbent paints, and stealth-designs make a debut with this generation.

EXAMPLES: Grumman F-14 'Tomcat', General Dynamics F-16 Fighting Falcon, McDonnel Douglas (later Boeing) F/A-18 'Superhornet', Sukhoi Su-30, Mikoyan Gurevich MiG-29, Chengdu J-10, Sukhoi Su-35, Eurofighter Typhoon, Saab Gripen, HAL Tejas LCA, Dassault Rafale

5. Fifth generation (2000 onwards)

The most advanced fighter aircraft currently in operation, fifth generation aircraft have fully embraced stealth, advanced integrated avionics systems that provide the pilot with a complete picture of the battle space (literally allowing them to look through the airframe), and network capabilities (which allow aircraft to be in constant touch, and act in coordination — like a hive mind).

The Lockheed Martin F-22 Raptor was the first fifth generation aircraft to enter service (in 2005). Till date, its stealth and long-range combat capabilities remain unmatched — its radar cross-section is comparable to a small bird or insect, while its own suite of advanced avionics allows it to identify and locate enemy aircraft at great distances. This means that the Raptor can effectively shoot down an adversary before they even know of its presence.

A crucial aspect of a fifth generation fighter jets capabilities are its computers and onboard software, which help automate or semi-automate many functions, and process battlefield information at a very advanced level. However, these aircraft are also extremely expensive to develop and maintain, meaning that even among countries which operate them, they do not form the bulk of the fleet.

The Lockheed Martin F-35 Lightning was meant to address the cost issue by developing a single, all-purpose, universal aircraft which could be operated out of land or sea, for interceptor, ground attack or electronic warfare roles, in all conditions. The F-35B even boasts short takeoff/vertical landing capability. But the aircraft has seen multiple cost overruns, and its performance has been debatable.

Currently, only the US (F-22 and F-35), Russia (Sukhoi Su-57), and China (Chengdu J-20) have developed operational fifth generation aircraft. India is currently developing its own fifth generation aircraft, although this is not even in the prototype stage.

6. Sixth generation: What the future looks like

Several countries such as the US, China, Russia, the UK-Japan-Italy, and France-Germany-Spain have announced the development of sixth-generation fighters even before fifth-generation ones become ubiquitous. So far, there is no clarity on what features these fighters might boast, apart from further improving on beyond-visual-range capabilities, stealth, computational power, and weaponry.

Some possible features may include the following.

- Sixth-generation aircraft may be optionally-manned, meaning that they may not require a human to sit in a cockpit to carry out their missions. So far, unmanned drones have been

limited by various factors, including the tiny lag in the time it takes for aircraft to respond to commands sent from the control centre. The integration of Artificial Intelligence, and improvements in computation and networking can change this, which would fundamentally revolutionise aerial warfare.

- This generation might even boast advanced dual cycle engines, allowing aircraft to potentially touch hypersonic speeds when required while still being able to cruise economically. Such high speeds may especially become viable if pilots do not need to sit in cockpits and endure the tremendous G-forces that such speeds would generate.
- These aircraft may see the potential use of directed-energy weapons such as a laser.
- Some speculate that sixth-generation fighters might also come with the ability for suborbital flight, meaning they could operate in low space for brief periods, allowing them to escape anti-aircraft systems, and significantly improve survivability.

https://indianexpress.com/article/explained/explained-sci-tech/fighter-jets-generation-9749116/

ANI
South Asia's Leading Multimedia News Agency

Sun, 29 Dec 2024

Rajnath Singh becomes 1st Defence Minister to visit Mhow in 24 Years, lauds Indian Army's Training Institutes

Defence Minister Rajnath Singh on Sunday made history by becoming the first Defence Minister to visit Mhow in 24 years, where he lauded the Indian Army's training institutes for their outstanding contributions. Singh's visit was a significant milestone, as he acknowledged the crucial role these institutes play in shaping the military strategies and warfare skills of Indian Army personnel.

He was on a visit to the three Premier Training Institutes of the Indian Army - Army War College (AWC), Infantry School and Military College of Telecommunication and Engineering (MCTE) - in Mhow, Madhya Pradesh, accompanied by the Chief of the Army Staff General Upendra Dwivedi and other senior officers of the Indian Army.

Singh was briefed by the Officiating Commandant on the establishment of the Advanced Incubation and Research Centre and the various MoUs towards enabling the absorption and transformation of technologies. He visited the Army Marksmanship Unit to witness their contribution towards national sports. Singh also visited the Infantry Museum, where he was briefed on the history of the Infantry as well as the induction of modernised equipment into the Infantry.

Addressing the troops, he commended the courage and vigilance of the Indian Army personnel in safeguarding the borders and ensuring national security. "Your dedication and devotion to duty are an inspiration to all of us. It is due to your hard work and commitment that our country and its borders are becoming increasingly secure and strong," he said. Singh called upon the Armed

Forces to continue keeping a vigilant eye on the current geopolitical scenario, and always remain alert and ready to deal with any kind of threats.

During his address at Mhow Military Station, Defence Minister Rajnath Singh said, "Our jawans are not ordinary but very special. Whenever you want to do something you don't calculate but instead you think that no matter what we need to do it. This dedication of yours inspires the entire citizens of this country...as the Defence Minister, I want to say that we will have to keep ourselves alert always..."

He emphasised that there are times when India faces challenges on the borders as well as on the internal front, which makes it imperative for the soldiers to keep a close eye on the activities of the adversaries and take timely and effective steps against them. Singh asserted that Prime Minister Narendra Modi-led Government's aim is to make India a developed and self-reliant nation by 2047, and the Armed Forces will play a crucial role in achieving this goal.

"You are the protectors of our borders and the forerunners in nation-building. I am sure that you will continue securing our borders with courage and dedication, and contribute to realising the vision of Viksit Bharat by 2047," he said. Earlier, the Defence Minister visited the Bhim Janm Bhoomi, a memorial dedicated to Dr BR Ambedkar in Mhow, and paid homage to the Bharat Ratna and the architect of the Indian constitution at his birthplace. He described Dr BR Ambedkar as an epitome of selfless service, who dedicated his life to social equality and empowerment.

https://www.aninews.in/news/national/general-news/rajnath-singh-becomes-1st-defence-minister-to-visit-mhow-in-24-years-lauds-indian-armys-training-institutes20241229194145/

THE TIMES OF INDIA

Mon, 30 Dec 2024

India to commission 2 frontline warships & a sub in new year in big boost to blue water capabilities

In a major boost to India’s blue-water combat capabilities to counter China’s ever-expanding footprint in the Indian Ocean Region and beyond, the Navy is all set to commission two indigenous frontline warships and a diesel-electric submarine next month, even as the new Russian-built frigate INS Tushil also heads home. The biggest of the new warships will be the guided-missile destroyer Surat, with a displacement of 7,400-tonne, followed by stealth frigate Nilgiri (6,670-tonne) and submarine Vagsheer (1,600-tonne), all of which are packed with heavy-duty sensors and weapons for a deadly punch.

Surat and Nilgiri were delivered to the Navy by the Mumbai-based Mazagon Docks (MDL) last week. On commissioning, the 164-metre-long Surat will join the first three such warships, INS Visakhapatnam, INS Mormugao and INS Imphal, constructed under the Rs 35,000 crore Project-15B at MDL. “Surat is also the Navy’s first AI-enabled warship to enhance its operational efficiency manifold times,” an officer said. With an indigenous content of 72% and endurance of

4,000 nautical miles, these destroyers are armed with BrahMos supersonic cruise missiles, Barak-8 medium-range surface-to-air missiles, 76mm super rapid guns and anti-submarine weapons like rockets and torpedoes.

Nilgiri, in turn, is the first of the seven multi-role frigates being constructed under Project-17A, four at the MDL and three at GRSE in Kolkata, at an overall cost of around Rs 45,000 crore. All these seven frigates, with the requisite hull-shaping, radar-transparent deck fittings and other measures to make their detection by enemies difficult, are slated for delivery by late-2026.

Vagsheer is the sixth and last of the French-origin Scorpene or Kalvari-class submarines built at MDL under the over Rs 23,000 crore `Project-75'. India and France are now also in final negotiations for three more Scorpenes to be built at MDL for around Rs 36,000 crore, with the first slated to roll out in six years, followed by the other two at intervals of a year each. Overall, the Navy now has 60 warships and vessels under construction in Indian shipyards. The 3,900-tonne INS Tushil, which will traverse the Baltic Sea, the North Sea, the Atlantic Ocean and the IOR to reach India, is to be followed by the delivery of another frigate Tamal by Russia in March-April next year.

The over 130-warship Navy, with 251 aircraft and helicopters, also has the initial approval or `acceptance of necessity' (AoN) for another 31 warships, including seven new-generation frigates, eight corvettes and six stealth diesel-electric submarines. The Navy, however, will reach a force-level of just about 155-160 warships by 2030, given the slow pace of construction in Indian shipyards as well as the progressive decommissioning of older warships, as earlier reported by TOI. In contrast, China is constructing warships and submarines at an astonishing rate, while it has stepped-up naval forays into the IOR and the hunt for overseas bases. Numerically, it already has the world's largest Navy, with over 370 ships and submarines, including 140 major surface combatants.

https://timesofindia.indiatimes.com/india/india-to-commission-2-frontline-warships-a-sub-in-new-year-in-big-boost-to-blue-water-capabilities/articleshow/116650145.cms

FINANCIAL EXPRESS
Read to Lead

Mon, 30 Dec 2024

Is India's Warship-Building Industry having a Renaissance?

Mumbai based Mazagon Dock Shipyard Ltd's dual delivery of frontline warships signals the evolution of India's defense shipbuilding capabilities, setting the stage for global competitiveness.

Laying the Keel: A History of Indian Shipbuilding

India's shipbuilding odyssey began in 1961 with INS Ajay, a modest anti-submarine warfare vessel, and gained momentum with the Nilgiri-class frigates of the 1970s. These early efforts,

while foundational, relied heavily on foreign designs and components. It wasn't until the Delhi-class destroyers of the 1990s that India began flexing its indigenous shipbuilding muscles.

Accelerating Production: The Modern Turnaround

The past decade has witnessed a dramatic transformation. State-run shipyards have significantly enhanced their efficiency, delivering advanced platforms like the Kolkata/Visakhapatnam-class destroyers and Kalvari-class submarines. These ships, combat-ready upon delivery, showcase India's ability to meet complex demands on tight schedules.

Building Together: Collaboration Fuels Success

India's progress stems from a collaborative ecosystem involving state-owned shipyards like MDL and GRSE and private players like L&T. This partnership has enabled ambitious projects, from stealth frigates to fleet support ships, while bolstering technical expertise across the defense sector.

Strategic Growth: Beyond National Security

Warship construction reflects more than military capability—it highlights industrial and technological advancements. With investments like the ₹25,000 crore Maritime Development Fund, India aims to bridge the gap with global leaders like China, whose shipbuilding dominance underscores the importance of a robust commercial sector.

Commanding the Indo-Pacific: A Geopolitical Edge

India's shipbuilding prowess enhances its autonomy and positions it as a key maritime power in the Indo-Pacific. In a contested geopolitical environment, domestically built warships strengthen India's ability to safeguard its interests and project influence.

The Horizon Ahead

India's warship-building industry stands at a critical juncture. With sustained investments, policy support, and innovation, it has the potential to not just meet domestic needs but also compete globally. The dual deliveries of INS Surat and INS Nilgiri signal the beginning of a new era, where India's shipyards can serve as a cornerstone of its maritime ambitions.

https://www.financialexpress.com/business/defence-is-indias-warship-building-industry-having-a-renaissance-3703075/

FINANCIAL EXPRESS
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Mon, 30 Dec 2024

AI's Role in National Security: Enhancing Defence and Intelligence Capabilities

Artificial intelligence (AI) is increasingly recognized as a critical force in enhancing national security. It equips defence forces, intelligence agencies, and law enforcement with advanced tools

to address evolving and complex threats. By harnessing technologies such as Generative AI, Open-Source Intelligence (OSINT), and Big Data, AI provides real-time insights and predictive capabilities that significantly improve decision-making, threat detection, and response times.

“Artificial Intelligence is revolutionizing national security by empowering defence forces, intelligence agencies, and law enforcement with cutting-edge tools and systems. By harnessing Generative AI, OSINT, and Big Data, these agencies can address complex threats with precision, agility, and efficiency. AI delivers 360° situational awareness, predicts threats, automates surveillance, and defends against evolving cyberattacks. It accelerates decision-making, enhances counter-terrorism efforts, and strengthens border security while reducing human error and response times. For India, AI is not just a technological advancement but a strategic pathway to global leadership, ensuring resilience and dominance in an era of dynamic global challenges,” explains Tarun Wig, Co-founder & CEO of Innefu Labs, to FinancialExpress.com in an exclusive interaction.

By enabling precise intelligence gathering, improving cyber defence, and automating surveillance, AI ensures that national security efforts are more agile and effective, allowing agencies to stay ahead of emerging threats.

Leveraging AI for Integrated Theatre Commands: Revolutionizing Military Strategy

AI is transforming India’s Integrated Theatre Commands (ITCs) into powerful, data-driven hubs that bridge operational silos across land, air, and maritime domains. This integration enhances the coordination, decision-making, and real-time responsiveness of military commanders, equipping them with advanced predictive analytics and situational awareness tools.

“Artificial Intelligence is transforming India’s Integrated Theatre Commands (ITCs) into agile, data-driven hubs of military strategy. By bridging operational silos across land, air and maritime domains, AI enables seamless coordination and real-time decision-making. With advanced predictive analytics, threat forecasting, and situational awareness, commanders can anticipate risks, optimize resources, and respond proactively to evolving threats. AI automates the analysis of diverse data formats, from drone feeds to text and videos, delivering actionable intelligence and reducing response times. This integration of AI not only enhances operational efficiency but also establishes India’s strategic superiority, ensuring resilience and dominance in the complex landscape of modern multi-domain warfare,” according to Wig. Explains. “AI is not just a tool but a force multiplier, enabling Integrated Theatre Commands to operate as a cohesive, agile unit. The future of defence lies in leveraging AI to redefine strategy and ensure precision in action,” he adds.

AI as a Force Multiplier: Maximizing Military Efficiency and Effectiveness

In his view AI serves as a “force multiplier” for military operations, optimizing resource use, enhancing decision-making, and boosting efficiency. “Artificial Intelligence is the ultimate force multiplier, enabling our armed forces to achieve more with fewer resources while enhancing operational efficiency and soldier safety. By automating routine tasks and offloading low-value work, AI allows military personnel to concentrate on critical priorities, reducing workload and increasing effectiveness. Its ability to analyze vast data sets and deliver actionable insights in real-time empowers commanders to make faster, more accurate decisions. From improving combat

lethality to optimizing resource allocation, AI is revolutionizing military efficiency, ensuring our forces are always a step ahead in safeguarding national security."

By facilitating more informed, real-time decisions and improving combat readiness, AI strengthens the military's capacity to act swiftly and with greater accuracy.

Harnessing AI to Resolve India's Judicial Challenges: A Technological Solution

"Artificial Intelligence is poised to transform India's judicial system by addressing inefficiencies and accelerating justice delivery. With secure, on-premise AI solutions, courts can process and analyze vast volumes of data with precision, enabling streamlined workflows and faster case resolutions. Advanced tools like speech-to-text, multilingual OCR, and sophisticated text and image processing simplify legal research, summarize case files, and accurately translate complex legal documents. By automating routine tasks and delivering actionable insights, AI allows legal professionals to dedicate more time to critical judgments and decisions. This technological leap not only enhances efficiency and transparency but also moves India closer to achieving a more accessible, inclusive, and equitable justice system," he adds.

India's Leadership in AI Adoption: A Vision for the Future

"India's remarkable leadership in AI adoption, as highlighted by the recent BCG report, reflects the nation's strong commitment to leveraging technology for transformation. With 30% adoption, surpassing the global average of 26%, India is uniquely positioned thanks to its skilled workforce, robust government initiatives like 'National Strategy for AI' and 'AI for All,' and a dynamic startup ecosystem. The widespread integration of generative AI—used weekly by 83% of Indian employees—underscores how innovation is becoming deeply rooted in our professional culture. This confluence of support, talent, and vision not only enhances India's AI capabilities but also reinforces its role as a global hub for technological advancement," Wig observes.

India's commitment to AI adoption, along with its strategic focus on creating an innovation-driven ecosystem, ensures that the nation remains at the forefront of technological development and global AI leadership.

https://www.financialexpress.com/business/defence-ais-role-in-national-security-enhancing-defence-and-intelligence-capabilities-3703077/

The EurAsian Times

Sat, 28 Dec 2024

After 6th-Gen Fighters, China's 'Cutting Edge' KJ-3000 Aircraft Breaks Cover As PLA Expands AEW&C Fleet

After conducting the maiden flight of two of its cutting-edge sixth-generation fighter jets, China has sprung another surprise with its new KJ-3000 Airborne Early Warning and Control (AEW&C) aircraft taking to the skies for the first time. The maiden flight of the aircraft was reportedly

conducted by the X'ian Aircraft Company. Though details are scant and the exact flight date is unknown, it is believed to have been conducted very recently.

A few pixelated photos of the KJ-3000 in flight were published on social media and shared widely on December 27, with military watchers calling it "another surprise" by China. China has not officially confirmed the first flight of the KJ-3000 aircraft, which will significantly enhance its early warning capabilities. However, the development has thrilled the PLA commentators and military experts, with one X user quipping, "It has been quite a week for China watchers." A day ago, on December 26, social media platform X was flooded with images and videos featuring Chengdu Aerospace Corporation's (CAC) sixth-generation fighter jet in flight, which was seen soaring alongside China's fifth-generation J-20S (a twin-seat variant of its Chengdu J-20 Mighty Dragon stealth fighter).

Even as the netizens and analysts were still discussing the surprising maiden flight of CAC's sixth-generation aircraft, the internet was shortly flooded with images of another sixth-generation fighter jet developed by Shenyang Aircraft Corporation (SAC). A detailed EurAsian Times coverage of the first flight of both next-generation fighter prototypes can be read here. Since the first flight of KJ-3000 came right after 6th-gen fighters, some analysts humorously suggested that China should conduct the first flight of its next-generation H-20 stealth bomber before the end of this year to complete the pack.

What Do We Know About The KJ-3000?

The KJ-3000 is based on the People's Liberation Army Air Force (PLAAF) Y-20 transport aircraft and is the latest addition to China's "eye in the sky" arsenal of early warning aircraft. Chinese military aviation specialist Andreas Rupprecht said: "Ok, it goes on and on and on: second surprise this morning, the new KJ-3000 (?) AEW performed its maiden flight at XAC, and from what can be seen on the first few small & blurry images, it is, as expected, a Y-20B-based design featuring a large rotodome but also a bulge on the tail."

The rotodome is a discus-shaped rotating radome that allows the detection and tracking of targets by providing 360-degree coverage. Some experts speculate that the bulge on the tail may be related to the integration of some advanced communication systems. The aircraft is powered by the domestically-produced WS-20 high-bypass turbofan engine, like the Y-20B transport aircraft that it is based on. It is anticipated to generate approximately 31,000 pounds of thrust. As per some unconfirmed claims, the aircraft would have a detection range exceeding 360 kilometers to 500 kilometers. Notably, the KJ-3000's first flight comes amid speculations that the Y-20B transport aircraft may have been inducted into service. As reported by EurAsian Times recently, Y-20B was spotted at the Kaifeng Air Base in the east-central Henan region of China. Though the specifics of the KJ-3000 aircraft are not known due to the paucity of information, EurAsian Times understands that in addition to developing a whole-new next-generation AEW&C aircraft from scratch known as the KJ-700, China has also been working on developing an AEW&C aircraft based on an existing platform.

For instance, Macau-based military aviation expert Antony Wong Tong hinted at the existence of the aircraft in 2022 when he said, "China is developing its new generation KJ-3000 strategic early-warning aircraft, which needs a bigger platform, but the country doesn't have big aircraft like its

American counterpart, so the Y-20 would be the only option." The KJ-3000 is expected to be comparable to the existing KJ-2000, the largest dedicated AEW&C aircraft in the People's Liberation Army Air Force (PLAAF) inventory. Some reports suggest that the KJ-3000 will eventually replace the KJ-2000. The KJ-3000 can carry more payload—up to 66 tons— 16 tons more than the KJ-2000. Moreover, the WS-20 engines provide more thrust and fuel efficiency, enabling longer flight operations.

The aircraft could operate as a complete command center since it integrates C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance) technologies, allowing for better coordination between the land, sea, and air domains. This would enhance the PLAAF's ability to execute missions and improve combat effectiveness on the battlefield. The KJ-3000 is expected to strengthen China's air defense by flying alongside cutting-edge fighter jets in combat. With an AEW&C fleet that already dwarfs the United States, China has been making concerted efforts to develop newer early warning aircraft on existing designs. The primary objective of an AEW&C aircraft is to use its powerful radars to monitor large swathes of the airspace and scan and detect hostile aerial targets.

Due to their "look-down capability," they can detect low-flying aircraft and missiles that surface and land-based radars would otherwise miss due to the horizon or topography. They can classify and examine such targets by using their own radar and fighter interceptors that passively detect radio frequency signals across long distances. This makes an AEW&C aircraft indispensable in combat. That said, while China's fighter jet designs continue to hog the limelight, its expanding AEW&C fleet does not get the same attention.

China's Existing Early Warning Aircraft Fleet

China has reliable early warning capability, with the KJ-2000 based on the Il-76 platform and the KJ-500 on the Shaanxi Y-9 aircraft. The PLAAF also operates the KJ-200 based on the Y-8 aircraft. While the KJ-2000 is a large platform, the KJ-200 and KJ-500 are relatively smaller. They are considered to be ideal for regional operations, including in volatile areas like the Taiwan Strait and the South China Sea. China is also developing the KJ-600 for carrier-based operations that would give the PLA Navy a massive reach and detect incoming threats from even further away, allowing it to project power over regions far away from its coast. Earlier this year, reports indicated that the aircraft was undergoing flight testing. Chinese state media posits that China's strategic position in the seas will be buttressed with the anticipated integration of the KJ-600 into People's Liberation Army Navy (PLAN) operations, allowing it to improve its aerial command and maritime surveillance capabilities.

With tensions raging in the Indo-Pacific, a carrier-based AEW&C aircraft could be the key to conducting operations against the adversary. Experts pointed out that coordination between carrier-based fighter jets and early warning aircraft will speed up upgrading China's combat capabilities. Adding a large, land-based early warning aircraft with sophisticated radomes providing extended coverage to this mix is expected to bolster China's "eyes in the sky" significantly.

https://www.eurasiantimes.com/china-springs-another-surprise-as-all-new-kj-3000/

Press Information Bureau
Government of India

Ministry of Science & Technology

Sat, 28 Dec 2024

ISRO's year end mission to seek the rare feat of docking or merging or joining together two satellites in Space

SpaDeX, India's final Space Mission for 2024: How ISRO will dock 2 satellites in space with PSLV rocket's round design

"SpaDEX" will mark a milestone, showcasing India's expertise in spacecraft docking technology

ISRO's SpaDeX mission aims to achieve a historic Space Docking Feat on December 30, 2024, demonstrating India's capabilities in Space Technology and advancing its Space program : Dr Jitendra Singh

Docking technology is key for long-term missions like "Chandrayaan-4" and the planned Indian space station. It is also crucial for the eventual manned "Gaganyaan" mission

Union Minister of State (Independent Charge) for Science and Technology, Minister of State (Independent Charge) for Earth Sciences, MoS, PMO, Department of Atomic Energy, Department of Space, Personnel, Public Grievances and Pensions, Dr Jitendra Singh informed here today that (Indian Space Research Organisation) ISRO's year-end mission scheduled for 30th December is going to be a historic one as it will seek the rare feat of docking or merging or joining together two satellites in Space. The project has been named "Space Docking Experiment" (SpaDeX), he said.

The whole nation looks forward with bated breath as ISRO is set to achieve a significant milestone in Space technology, said the Minister in the Department of Space.

In an exclusive media interview, Dr Jitendra Singh elaborated that the upcoming SpaDeX mission aims to dock two satellites in Space, a challenge only mastered by a few countries. This ambitious project will take place on December 30, 2024, under the Space Docking Experiment (SpaDeX) and the indigenous technology used for this mission is called the "Bharatiya Docking System".

"SpaDEX" will mark a milestone, showcasing India's expertise in spacecraft docking technology.

This mission, said Dr Jitendra Singh, will mark India’s entry into the exclusive league of nations capable of mastering space docking. A unique approach, the PSLV rocket, will launch two satellites equipped with the 'Bhartiya Docking System' to demonstrate this complex feat, he added.

The success of this mission is vital for India’s future space ambitions, said the Minister. Docking technology is key for long-term missions like "Chandrayaan-4" and the planned Indian space station. It is also crucial for the eventual manned "Gaganyaan" mission.

In the near vacuum of Space, the handout said, ISRO will attempt to dock two satellites orbiting at speeds of 28,800 km/h. This is a challenging task, as both satellites must be carefully manoeuvred to reduce their relative velocities to a mere 0.036 km/h. The two satellites, designated 'Chaser' and 'Target', will merge to form a single unit in Space.

ISRO’s achievement will place India among the world’s space leaders, marking a step towards greater space exploration and innovation. SpaDeX is a significant milestone that paves the way for more complex space missions in the coming years. ISRO's SpaDEX mission is set to launch on Dec 30, 2024, will demonstrate India's Spacecraft Docking technology, marking a crucial step in space exploration and satellite servicing capabilities.

India is preparing for a key step in space exploration. ISRO will launch the Space Docking Experiment (SpaDEX) on December 30, 2024. The mission will use PSLV-C60, lifting off at 21:58 IST from Sriharikota. SpaDEX marks a milestone, showcasing India's expertise in spacecraft docking technology.

SpaDEX will deploy two identical satellites, SDX01 and SDX02. Each satellite weighs around 220 kilograms and will orbit 470 km above Earth. Key objectives include Performing precision rendezvous and docking manoeuvres, Validating power transfer between docked spacecraft and Operating payloads post-undocking, with a two-year lifespan.

This mission is essential for future endeavours, including satellite servicing and building India's space station, Bharatiya Antriksh Station.

SpaDEX will also use PSLV's fourth stage, POEM-4, for experiments. The stage will carry 24 payloads from academic institutions and startups. These experiments will utilise the microgravity environment in orbit.

SpaDEX will demonstrate docking and undocking capabilities between satellites. This includes transferring power and operating scientific payloads. The mission will simulate a sequence of manoeuvres, starting with a far rendezvous phase at 20 km and ending with docking at 3 metres.

This capability is vital for India's lunar and interplanetary missions. Docking technology enables multi-launch missions and supports future human spaceflight. Only the US, Russia, and China have mastered such advancements so far.

https://pib.gov.in/PressReleasePage.aspx?PRID=2088569

Press Information Bureau
Government of India

Ministry of Science & Technology

Fri, 27 Dec 2024

Department of Biotechnology Hosts the Fourth Webinar in its Webinar Series on Biomanufacturing and Biofoundry Initiative on the Theme “Biomanufacturing of Enzymes”

The Department of Biotechnology (DBT), Government of India, conducted the fourth webinar in its Biofoundry and Biomanufacturing Initiative series today. The session focused on “Biomanufacturing of Enzymes,” a critical domain under the BioE3 (Biotechnology for Economy, Environment & Employment) Policy. Approved by the Union Cabinet in August 2024, the BioE3 Policy aims to position India as a global leader in bio-based innovations. It focuses on promoting sustainable biomanufacturing in thematic areas such as enzymes, smart proteins, and bio-based chemicals, supporting economic growth while ensuring environmental sustainability.

The webinar provided a platform for academia, industry leaders, start-ups, and researchers to discuss advancements and opportunities in enzyme biomanufacturing—a sustainable and efficient process that replaces chemical catalysts with environmentally friendly alternatives. The discussions underscored the growing importance of enzymes in supporting innovation and reducing environmental impact across various industries.

Dr. Alka Sharma, Scientist ‘H’, DBT, highlighted the BioE3 Policy’s vision to foster high-performance biomanufacturing by supporting sustainable green growth. She mentioned that BioE3 Policy will set Bharat at the forefront of a future that is more sustainable and responsiveto global challenges by accelerating and harnessing biomanufacturing solutions that encompass diverse bioeconomc activities while safeguarding environmental and climate impacts. She informed that the fourth webinar in this series focuses on enzymes, a transformative vertical under the policy, stating, “Enzymes are not just pivotal to advancing sustainable industrial practices but are also integral to fostering innovation, reducing environmental impact, and driving India’s bioeconomy.”

Dr. Amit Kumar Yadav, Scientist ‘D’, DBT, provided an overview of the thematic sector, discussing the applications and potential of enzyme biomanufacturing in transforming industrial practices in the country. He highlighted its ability to drive sustainable practices through cost-effective and environmentally sound solutions.

Dr. Syed Shams Yazdani, Group Leader, Synthetic Biology and Biofuel Group, ICGEB, New Delhi, delved into how India can position itself as a hub for industrial enzyme production. He outlined strategies to catalyze indigenous enzyme discovery, scale up manufacturing capacities, and leverage advanced technologies like synthetic biology and AI/ML to enhance microbial chassis for high-titer enzyme production.

Mr. G.S. Krishnan, President of the Association of Biotechnology Led Enterprises (ABLE), presented an industry viewpoint on the enzyme ecosystem. He discussed sourcing, production, and supply chain management and emphasized the role of local innovation. Mr. Krishnan also highlighted how the BioE3 Policy is fostering a conducive environment for long-term growth and global competitiveness in enzyme biomanufacturing.

The session concluded with a vibrant Q&A segment moderated by DBT and BIRAC officials. Participants actively engaged with the experts, discussing challenges and opportunities in scaling up enzyme production and addressing regulatory considerations.

https://pib.gov.in/PressReleasePage.aspx?PRID=2088439

THE ECONOMIC TIMES

Sun, 29 Dec 2024

ISRO to demonstrate docking of satellites in space in January, launch on Monday

ISRO is set to launch two satellites on Monday night from the Sriharikota spaceport to demonstrate docking and undocking of spacecraft in orbit, which will make India the fourth country in the world to achieve the feat. The Indian Space Research Organisation's (ISRO) warhorse rocket Polar Satellite Launch Vehicle (PSLV) will place the two satellites -- SDX01 and SDX02 -- in a 476-km circular orbit and attempt the Space Docking Experiment (SpaDEx) in the first week of January, the space agency officials said.

"This mission will mark India's entry into the exclusive league of nations capable of mastering space docking," Union Science and Technology Minister Jitendra Singh said.

The SpaDEx mission is expected to be a stepping stone for India's future endeavours in space exploration which include getting rocks and soil from the moon on Earth, the proposed Bharatiya Antariksha Station and landing an astronaut on the lunar surface.

Only the US, Russia and China have mastered space docking technologies.

"The primary objective of the SpaDeX mission is to develop and demonstrate the technology needed for rendezvous, docking, and undocking of two small spacecraft (SDX01, which is the Chaser, and SDX02, the Target) in a low-Earth circular orbit," an ISRO official said.

The secondary objective of the mission includes demonstration of the transfer of electric power between the docked spacecraft, which is essential for future applications such as in-space robotics; composite spacecraft control and payload operations after undocking.

"This capability is vital for India's lunar and interplanetary missions. Docking technology enables multi-launch missions and supports future human spaceflight," Singh said.

After the demonstration of docking and undocking experiments, the two satellites will continue to orbit the Earth for standalone missions for two years.The SDX01 satellite is equipped with a High Resolution Camera (HRC) and SDX02 has two payloads -- Miniature Multispectral (MMX) payload and Radiation Monitor (RadMon).

These payloads will provide high-resolution images, natural resource monitoring, vegetation studies and on-orbit radiation environment measurements which have numerous applications, ISRO said.

The PSLV-C60 mission also carries 24 payloads from various ISRO labs, private start-ups and educational institutions for carrying out experiments in space.

These 24 payloads are mounted on the fourth stage of the PSLV rocket which remains in orbit for a few weeks before falling back on the Earth.

PS4-Orbital Experiment Module (POEM) provides an opportunity for the scientific community to carry out certain in-orbit microgravity experiments for an extended duration of up to three months using the platform, which otherwise would end up as space debris immediately after the mission objective of injecting the primary payloads of the mission.

https://economictimes.indiatimes.com/news/science/isro-to-demonstrate-docking-of-satellites-in-space-in-january-launch-on-monday/articleshow/116771061.cms

THE ECONOMIC TIMES

Sun, 29 Dec 2024

ISRO to launch its SpaDeX mission tomorrow

The Indian Space Research Organisation (ISRO) is set to launch its year-end mission, "Space Docking Experiment" (SpaDeX), on Monday at 9:58 pm from the Satish Dhawan Space Centre (SDSC) SHAR in Sriharikota. The mission will use PSLV-C60.

As per the ISRO, the primary objective of the SpaDeX mission is to develop and demonstrate the technology needed for rendezvous, docking, and undocking of two small spacecraft (SDX01, which is the Chaser, and SDX02, the Target, nominally) in a low-Earth circular orbit.

"In addition, SpaDeX, because of its small size and mass, is even more challenging due to the finer precision required for the rendezvous and docking maneuvers compared to docking two large spacecraft. This mission will be a forerunner for autonomous docking needed for future lunar missions like Chandrayaan-4 without the support of GNSS from Earth," ISRO said in a statement.

Like all ISRO satellites in low-Earth orbit, both the SpaDeX spacecraft carry a differential GNSS-based Satellite Positioning System (SPS), which provides PNT (Position, Navigation, and Timing) solutions for the satellites.

"In SpaDeX, a novel RODP processor is included in the SPS receiver, which allows accurate determination of the relative position and velocity of the Chaser and the Target. By subtracting the

carrier phase measurements from the same GNSS satellites in both Chaser and Target SPS receivers, highly accurate relative states of the two satellites are determined. The VHF/UHF transceivers in both satellites aid this process by transferring the GNSS satellite measurements from one satellite to the other. Hardware and software test beds, including closed-loop verifications, were carried out to characterise the RODP performance," the statement said.

The SpaDeX spacecraft were designed and realized by the UR Rao Satellite Centre (URSC) with the support of other ISRO centers (VSSC, LPSC, SAC, IISU, and LEOS). The spacecraft, in its orbital phase, will be controlled from ISTRAC using ISRO ground stations and other externally hired ground stations.

"The full integration and testing of the satellite were carried out at M/s Ananth Technologies, Bangalore, under the supervision of URSC. Presently, after completing all tests and clearances, the spacecraft has moved from URSC to SDSC and is undergoing preparations for launch," the statement said.

https://economictimes.indiatimes.com/news/science/isro-to-launch-its-spadex-mission-tomorrow/articleshow/116764479.cms

ThePrint

Fri, 27 Dec 2024

New study reveals game-changer method to detect H. pylori and its mutations

Researchers have developed a new method for detecting H. pylori and its mutations in dyspeptic patients, which could be a game-changer for those in rural areas with limited access to diagnostic laboratories, a PIB press release stated.

The study, published in the Microchemical Journal, focuses on a method called CRISPR-based diagnostics (CRISPRDx). This technique utilizes the CRISPR-Cas9 system, known for its ability to recognize and cleave specific DNA sequences, to detect the presence of H. pylori and identify mutations associated with antibiotic resistance.

H. pylori is a bacterium that affects over 43% of the world’s population and is linked to various gastrointestinal disorders, including peptic ulcers, gastritis, and gastric cancer. Resistance to clarithromycin, a major concern in treating H. pylori infections, is often caused by point mutations in the 23S ribosomal RNA coding gene of the bacterium. This resistance necessitates repeated diagnostic tests and multiple courses of different antibiotic combinations for eradication, posing a global public health threat.

The researchers, led by Dr. Shraddha Chakraborty from CSIR-IGIB, used an engineered Cas9 protein, en31-FnCas9, to detect H. pylori and its mutations in gastric biopsy samples. This approach, combined with lateral flow-based test strip assays (FELUDA), offers a rapid visual

readout of the infection status and antibiotic resistance profile of H. pylori. This method is particularly beneficial in remote settings with limited access to diagnostic laboratories, providing accurate and timely information on the antibiotic resistance pattern of H. pylori strains isolated from patients.

https://theprint.in/science/new-study-reveals-game-changer-method-to-detect-h-pylori-and-its-mutations/2422443/

The Indian EXPRESS

Sat, 28 Dec 2024

Speed of human thought lags far behind internet connection: What does a new study say?

Human brain processes thought at a much slower rate than the rate of information transmitted over the Internet, according to a new study. While the speed of information flow in the human brain is just 10 bits per second (bps), a typical wi-fi connection processes 50 bps. One bit is the smallest unit of data that a computer can process and store. The study, 'The unbearable slowness of being: Why do we live at 10 bits/s?', was published by the journal Neuron earlier this month. To carry out the analysis, the researchers examined data on human behaviours such as reading, writing, etc.

What are the findings of the study?

Markus Meister, a neuroscientist at the California Institute of Technology and an author of the study, told The New York Times that "It is a bit of a counterweight to the endless hyperbole about how incredibly complex and powerful the human brain is… If you actually try to put numbers to it, we are incredibly slow." The researchers noted that the human brain processes sensory information from sight, smell and sound much more rapidly — about 100,000,000 times the rate that cognition does. In other words, while humans can process one thought at a time, their sensory systems — and computers — process thousands of bits of information at once. "Psychological science has not acknowledged this big conflict," Meister told The NYT.

The slow pace of conscious thought could be a result of how human brains have evolved. "Our ancestors have chosen an ecological niche where the world is slow enough to make survival possible," according to the study. "In fact, the 10 bits per second are needed only in worst case situations, and most of the time our environment changes at a much more leisurely pace."

Some researchers are not entirely convinced by the findings of the new study. Britton Sauerbrei, a neuroscientist at Case Western Reserve University told The NYT that the study may not have fully captured the flow of information in the human nervous system. If those were included, "you're going to end up with a vastly higher bit rate," he said.

https://indianexpress.com/article/explained/explained-sci-tech/speed-human-thought-lags-internet-9748730/

THE TIMES OF INDIA

Mon, 30 Dec 2024

The 10 most intriguing science breakthroughs of 2024

It was a bad year for good news, but only because the tumult and drama surrounding the 2024 US election and ongoing wars overshadowed some of the discoveries made in the world's observatories, field studies and laboratories. Some of those findings could make us healthier, while others expand the outer limits of our knowledge of the universe.

Moon rocks from Terra Incognita

There's something mysterious about the side of the moon that always faces away from us. Flyby missions show a very different, lighter surface with fewer craters and a thicker crust than the familiar face. China landed the first craft on the moon's far side in 2019, and then in 2024, a Chinese craft, Chang'e-6, drilled beneath the surface and sent back two kilograms of rock and dirt.Those samples could help scientists reconstruct how our own planet formed. And China's enterprising program is fueling a new space race with the US.

NASA's long-planned US crewed landing was recently pushed back to 2027. China plans to land a crewed mission in 2030.

A drug that prevents HIV

After nearly 40 years of failed attempts to develop a vaccine against HIV/AIDS, scientists found a drug that blocks infection if injected just twice a year. A clinical trial in South Africa and Uganda that wrapped up in 2024 showed 100% efficacy among 2,134 women and girls.

In the control group, girls and young women were given existing prevention drugs, also known as PrEP, which need to be taken as a daily pill. While PrEP has nearly eliminated new cases of HIV in San Francisco, stigma in Africa makes it hard for women to take the drug regularly. Science named the new twice-yearly drug, lenacapavir, the 2024Breakthrough of the Year.The new drug, made by Gilead, doesn't work the way a vaccine would. But scientists aren't giving up on a vaccine, which likely would cost less and might protect people permanently. The Gilead drug is likely to be approved in mid-2025, though it's unclear whether it will be affordable and accessible to those who need it.

AI delves into the human psyche

AI is shaking up every field of science, but social scientists have used it to gain particularly distinct new insights. They use large language models to study the way humans think and explore ways we might think smarter.

In a study published in September, psychologists surprised themselves when they trained an AI chatbot to persuade conspiracy theorists to consider that they might be wrong. It worked. People let go of their beliefs in nefarious plots to cover up alien landings or curb population growth with biological weapons.

Conspiracy theorists often gather mountains of dubious evidence to support their beliefs, wearing out humans who don't have the time or energy to keep up. Chatbots can more than match them for the quantity of evidence.

Another study published this year found doctors often stuck with wrong diagnoses even after an AI suggested the correct answer. When pitted in a diagnosis contest against ChatGpt-4, the AI correctly diagnosed 90% of conditions taken from case reports, while the doctors got 74% correct.

When doctors were allowed to confer with the AI, they were accurate only 76% of the time. They were too sure of their first intuitions.The doctors' failure to fully benefit from AI shows that there is room for improvement in how they are trained to use it and how AI can be trained to help them.

According to another study, AI was not very good at helping people fact-check the news. ChatGPT-4 sometimes increased people's belief in fake headlines when they were unsure and made them disbelieve actual headlines when it made an error. AI seems to do best when it stimulates us to think differently, not when we rely on it to think for us.

Craft sets off for distant ocean world

On Oct. 14, the $5 billion spaceship Europa Clipper lofted far above budget cutters' reach and embarked on a journey to the most promising abode of extraterrestrial life in our solar system.

Europa, a moon orbiting Jupiter, doesn't look like a nice place on the surface, with a thick crust of ice and temperatures that never get above -120C. But previous flyby missions revealed signs of a vast ocean sloshing beneath the surface and occasionally bursting through.Scientists estimate that Europa carries about twice as much water as all Earth's oceans combined, warmed by friction generated by Jupiter's monster tidal force. Astrobiologists consider liquid water the key ingredient for life — at least life of the kind earthlings could recognize.

When it arrives in 2030, the craft will make dozens of flybys over the surface, using its instruments to sniff for molecules that could serve as nutrients and map out the ice and ocean beneath. If the results are promising, a lander could follow.

The James Webb telescope recalculates universal expansion

New aspects of our distant universe came into view this year thanks to the James Webb Telescope, also known as JWST. Trained on distant galaxies, it showed stars "popping out" where the Hubble showed faint smudges, said astronomer Wendy Freedman of the University of Chicago. That's allowed her to recalculate the rate at which the universe is expanding.

This is all part of a bigger quest to figure out why the universe is expanding and where we're all headed — a dramatic collapse or dissipation into oblivion. Scientists are also looking back to the period known as "cosmic dawn" when the universe was 1% of its current age and all the galaxies and stars within them first took shape from primordial gases. So when they announced they'd captured the most distant galaxy ever seen — it was also the deepest in time, appearing as it was more than 13 billion years ago.

Scientists thought they had nailed the expansion rate in 2001 using observations from the Hubble Space Telescope. However, it didn't match the measurements made using leftover radiation from the Big Bang, known as the cosmic microwave background. Freedman says the new measurements

her group did with JWST square with this radiation's behavior. She was recognized for this work as one of Nature’s top 10 scientists of the year.

Others, also using JWST, measure a faster expansion and argue that the incompatibility with other measurements is the universe trying to show us there’s some new physical phenomenon at play. As for our fate, we may yet end in a crunch or expand forever — it’s still unknown.

Aging spurts at 44 and 60

In an ambitious project aimed at fighting the ravages of aging, geneticist Michael Snyder and colleagues took blood and other biological samples from 108 volunteers. They monitored invisible age-related changes in a combination of microbes and molecules totaling 135,239.

That revealed a surprising pattern — sudden molecular-scale shifts when people turn 44 and again at 60. The changes indicated a loss of muscle mass, worse heart health, and a lessening ability to metabolize fats, alcohol and caffeine. At around 60, more changes indicated degeneration of the immune system.

At first, researchers thought that the shifts at 44 were associated with perimenopause in the women. However, the data showed the same thing happening in men, meaning either that this aging spurt happens independently from menopause or that male menopause is real.

Snyder said these changes could be the targets of interventions designed to help people stay healthy longer and eventually lead to ways to extend the human lifespan.

Reconstructing climate in deep time

A new reconstruction of Earth’s climate shows it fluctuated wildly over the eons. Scientists shocked the world in the 1990s with a graph of the last thousand years, using natural records to reveal temperatures shooting upward in the 20th century. This one goes back 485 million years — before dinosaurs, before forests, before fish started dragging themselves up primitive banks.

It shows that over the last 485 million years, the climate fluctuated between “hothouse” periods when the global temperature can be 30F hotter than it is now, and unstable “icehouse” periods when the temperature seesaws between ice ages and more temperate phases like recent history.

Sometimes, living things adapted to the hottest spells, with hippos and tropical palms slowly migrating to the Arctic. When change was sudden, the fossil record shows 80% to 90% of species went extinct, though life has never been extinguished completely. The researchers who made the plot say it has been a useful test of our climate models — they match these measurements-based approximations going back in time. So more steep warming is coming. The good news is that Earth will likely be a living planet for millions of years.

The health scare of the year: plastic in your brain

I've already made some effort to cut back on plastic, but the turn of a new year could give me more motivation. I don’t like plastic, but I like the convenience of food and drinks in plastic packaging. It’s also not something most of us can give up entirely — the stuff is everywhere, seeping into tap water, meat, poultry and seafood.

This year, several unnerving studies showed that plastic particles are building up in our organs. In mice, microplastic impairs male fertility, learning and memory. We don't know exactly what these particles do in us, but it can't be good.

One study found plastic in plaque that builds up in arteries, and more plastic was associated with a higher risk of stroke or heart attack. A review article associated plastic with oxidative stress, which is tied to aging.

But what really put the fear in me was a preprint released last summer of a study showing that microplastic is probably accumulating in our brains. Researchers looked for plastic during autopsies from 91 people and found their brains had stored up to 20 times as much microplastic as other organs. Those who had died from Alzheimer's were carrying more plastic in their brains than those who were healthy but died from accidents or violence.

A study published in January showed that a typical bottle of water carries about 240,000 invisible particles of plastic, so cutting back on drinks in plastic bottles could be a starting point for a resolution.

Best occupations for fighting death and dementia

Two studies released this year provided some tantalizing hints about who is most likely to postpone mental decline and fend off the Grim Reaper. One, released in the British Medical Journal's Christmas issue, used CDC statistics to show that ambulance and taxi drivers were less likely than those in other professions to die from Alzheimer's disease. In another study released last summer, researchers compared male professional athletes and found pole vaulters and gymnasts lived longest, and volleyball players were surprisingly short-lived.

The lead author of the sports study told me that there might be something beneficial in the training regimens of pole vaulters and gymnasts and that many of the athletes with lower life expectancies did sports that put them at risk of injuries, especially blows to the head.

The taxi study excited scientists because it called to mind a fascinating finding from 2000. Compared to the general public, London taxi drivers had a more developed hippocampus — the part of the brain associated with memory and navigational skills. That was, of course, back when they didn't use GPS.

Before considering taking up taxi driving or pole vaulting as part of a New Year's resolution, scientists warn that both studies are preliminary. But studies like these can help set scientists in new directions.

A big step toward quantum computing

Until this year, quantum computing was one of those dream technologies that remained forever a decade away from doing anything useful. Now, things are happening faster than expected. Several groups have solved one of the major hurdles — an error problem. The units of information storage — called qubits — were error-prone in a way that stringing them together only multiplied the error rate.

If the latest round of optimistic predictions pans out, quantum computers could digest the real world's complexity to make otherwise impossible predictions — how experimental drugs would

work in the human body, for example, or how some new type of material would handle stress. While ordinary computers store information in bits, which can take the values 0 or 1, a qubit can take any value in between. Qubits can consist of supercooled matter or atoms that are confined with lasers.

Last summer, Microsoft and the California-based startup Quantinuum and Google announced they were making progress. They were able to string together qubits that decreased rather than increased the error rate.

Google extended the error correction yet further, connecting 105 qubits in a chip called Willow, which was announced in the journal Nature this month. The big sales line was that Willow could take five minutes to do a test problem that supercomputers couldn’t do in 10 septillion years, or the universe's age squared. The test problem wasn’t anything useful, and the experts say real-world problems are more complex. But it should start to happen in less than a septillion years, maybe by 2030, if some new issue doesn’t keep it perpetually five years away.

https://timesofindia.indiatimes.com/science/the-10-most-intriguing-science-breakthroughs-of-2024/articleshow/116784996.cms