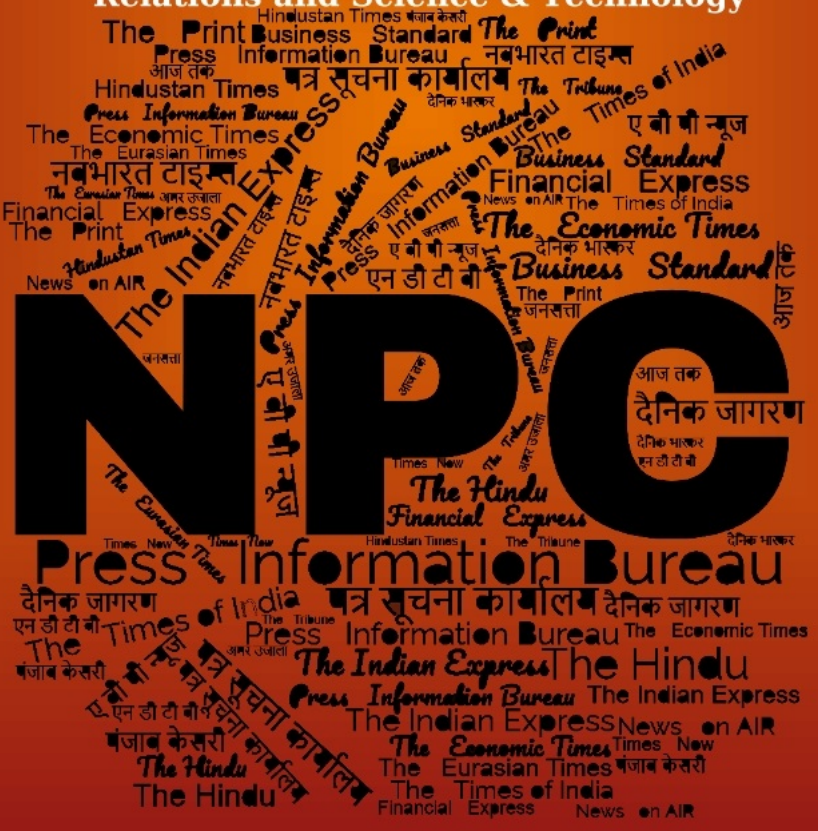
जनवरी
Jan
2025

खंड/Vol. : 50 अंक/Issue :23
31/01/2025

समाचार पत्रों से चयनित अंश
Newspapers Clippings

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

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



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DeepSeek जैसा सस्ता AI मॉडल बनाएगा भारत, अमेरिका से लेगा अपमान का बदला, DRDO का बड़ा बयान

Source: NavBharat Times, Dt. 30 Jan 2025,
URL: https://navbharattimes.indiatimes.com/tech/gadgets-news/india-may-launch-cheap-ai-model-like-deepseek-says-drdo-to-compete-openai-chatgpt/articleshow/117736485.cms

भारत ने खुद के एआई मॉडल का ऐलान कर दिया है। सरकार ने साफ कर दिया है कि अगल 10 माह में भारत खुद का लॉर्ज लैंग्वेज मॉडल तैयार कर लेगा, जो भारत के अपमान का बड़ा बदला होगा। दरअसल ओपनएआई के सैम ऑल्टमैन ने भारत के दौर के वक्त दावा किया था कि भारत जैसे देश के लिए चैटजीपीटी जैसा टूल बनाना मुश्किल होगा। अगर भारत ऐसा करने की सोचता है, तो उसे नाकामयाबी हाथ लगेगी।

अमेरिकी टेक वर्चस्व को मिली चीन से टक्कर

इस बयान के पीछे की दो वजह थी। पहली कि भारत जैसे देश के लिए बिलियन डॉलर खर्च करके चैटजीपीटी जैसा टूल बनाना संभव नहीं है, क्योंकि इसके लिए बड़े निवेश की जरूरत होगी। साथ ही दूसरा चैटजीपीटी जैसे टूल के लिए एक्सपर्टीज और एडवांस्ड कंप्यूटर की जरूरत होगी। लेकिन अमेरिकी टेक कंपनी गुरुर को चीनी एआई मॉडल डीपसीक ने तोड़ कर रख दिया। एडवांस्ड अमेरिकी कंप्यूटिंग चिप के एक्सपोर्ट पर लगे प्रतिबंध के बावजूद चीन ने डीपसीक बनाकर अमेरिकी वर्चस्व को चुनौती है।

DRDO का बयान - बिलियन डॉलर की जरूरत नहीं

चीन के डीपसीक के बाद भारत में हलचल तेज हो चुकी है। केंद्रीय मंत्री ने डीपसीक जैसा एआई टूल बनाने का ऐलान कर दिया है। साथ ही DRDO प्रमुख ने डीपसीक मामले में बयान दिया है कि चीन ने दिखाया है कि एआई मॉडल बनाने के लिए बिलियन डॉलर की जरूरत नहीं है। बता दें कि चीन ने डीपसीक को मात्र 5 मिलियन डॉलर में बना दिया है। साथ ही चीन ने डीपसीक बनाने के लिए अमेरिकी कंपनी की पुरानी चिप का इस्तेमाल किया है। चीन के बाद भारत को उम्मीद है कि वो सस्ता एआई मॉडल लॉन्च करके अमेरिकी अपमान का बदला ले सकता है।

5 मिलियन डॉलर में बना डीपसीक

ओपनएआई बेस्ड चैटजीपीटी को बनाने में माइक्रोसॉफ्ट की तरफ से 13 बिलियन डॉलर की फंडिंग की गई है। लेकिन डीपसीक को एक छोटे से स्टार्टअप में 5 मिलियन डॉलर की फंड में मात्र 2 साल में बना डाला है। ऐसे में भारत ने दावा किया है कि उसकी तरह से मात्र 10 माह में एआई मॉडल बनाया जाएगा, जिसमें देश की ज्यादातर लैंग्वेज का सपोर्ट मिलेगा। बता दें कि डीपसीक जैसे एआई मॉडल में हिंदी और अन्य भाषाओं का सपोर्ट सही से नहीं मिलता है।

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Development in composite materials key for 5th generation fighters, hypersonic missiles: DRDO chief

Source: The Indian Express, Dt. 30 Jan 2025,
URL: - https://indianexpress.com/article/cities/pune/development-materials-5th-generation-fighters-hypersonic-missiles-drdo-chief-9808426/

DRDO Chief Samir Kamat visits the exhibition organised as part of the conference.

Defence Research and Development Organisation (DRDO) Chairman Dr Samir V Kamat said on Thursday that developments in composite materials will play a key role in indigenous development of the strategically significant fifth-generation aircraft, hypersonic missiles and bulletproof jackets, among other things.

The DRDO chief was delivering the inaugural address at the two-day national conference on composites, which began in Pune on Thursday. The conference has been jointly organised by the Research and Development Establishment (Engineers), a premier Pune-based facility of the DRDO, and the Indian Society for Advancement of Materials and Process Engineering (ISAMPE), Pune chapter. This is the 19th edition of the ISAMPE National Conference on Composites (INCCOM).

“Materials play a key role in advancements of defence technologies. The DRDO has been an early adopter of composite technology in the country. A good example is our Tejas aircraft. It has 45 per cent composites by weight in its airframe. If we look at the surface area which is visible, 90 per cent of it consists of composites. It has helped make the aircraft stealthier — even though it was not designed for stealth — as compared to contemporary fighters of the same class. We are now moving on to AMCA (Advanced Medium Combat Aircraft), which is going to be a fifth-generation stealth aircraft. Here, the composites, in addition to the shaping as well as RAM and RAP (Radar

Absorbent Material and Radar Absorbent Paint) which we are developing, are going to play a key role in ensuring that the stealth requirements for this fighter are met," he said.

"Our missile cluster also adapted to the composite technology very early. Earlier most of our rocket motor casings were made of maraging steel. We adapted to composite moto casings and this has helped us especially in our strategic programme for achieving longer ranges. R&DE (Engineers), which is organising this conference, has been one of the key drivers of composite technology in DRDO. They have used composites for bridges, for SONAR domes for ships and submarines, which are really huge structures. There are other labs in the DRDO like the Advanced Systems Laboratory, Defence Materials and Stores Research and Development Establishment, Defence Lab Jodhpur, which are looking at different composite materials," he added.

Pune-based R&DE (Engineers) has worked on several strategically crucial technologies including stealth radomes for enhanced radar capabilities in fighter aircraft, sonar domes for naval ships ensuring acoustic precision and durability, composite military bridges that are lightweight, portable, and robust for deployment in combat zones and composites hull for infantry combat vehicles among others.

Kamat said, "The ceramic matrix composites and carbon fibre silicon carbide are going to play a key role in our hypersonic missile programme and our aero engine programmes. We are still at a nascent stage. We also have to address the issue of metal matrix composites especially for our turbine disks. If we have to reduce weight we will have to look at titanium matrix composites. Our bulletproof jackets, armour protection is again a very important area for DRDO. There we use ultra high molecular weight polyethylene or kevlar type of fibres. And we are dependent on imports for that. So there is scope for fibre development. There is a national textile mission which is trying to address this issue. I am sure that in the next four to five years we will have an indigenous fibre for this," he said.

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Defence News

Defence Strategic: National/International

CSL lays keel of seventh Anti-Submarine craft for Indian Navy

Source: The Economic Times, Dt. 30 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/csl-lays-keel-of-seventh-anti-submarine-craft-for-indian-navy/articleshow/117742834.cms

The Cochin Shipyard Ltd (CSL) on Thursday said that it has laid the keel for the seventh Anti-Submarine Warfare Shallow Water Craft (ASW SWC) as part of a contract to build eight such vessels for the Indian Navy. The keel-laying ceremony took place on Wednesday at CSL in the presence of Rear Admiral Upal Kundu, VSM, Chief of Staff, Southern Naval Command.

Senior naval officers, CSL officials, and representatives from the DNV Classification Society were also present, according to a release.The agreement to construct eight ASW SWC ships was signed between the Ministry of Defence (MoD) and CSL in April 2019.

"The Mahe-class ships will replace the in-service Abhay-class ASW Corvettes and are designed to perform anti-submarine operations in coastal waters, Low-Intensity Maritime Operations (LIMO), mine-laying tasks, and subsurface surveillance," the release stated.

Equipped with state-of-the-art, indigenously developed SONARS, these vessels have a maximum speed of 25 knots and an endurance of 1800 nautical miles, it said.

The construction of these high-tech warships with significant indigenous content exemplifies India's capability and commitment to 'Aatmanirbhar Bharat', the release added.

Five of the eight vessels have already been launched and are in various stages of machinery and system outfitting.

The keel of the sixth vessel was laid in December last year.The first ship in the series is scheduled to be delivered by March 2025.

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India to seal Rafale-M, Scorpene deals with France soon

Source: The Economic Times, Dt. 30 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/india-to-seal-rafale-m-scorpene-deals-with-france-soon/articleshow/117745031.cms

India is expected to seal in the next few weeks procurement of 26 naval variant of Rafale jets and three Scorpene submarines from France to further crank up its naval prowess, people familiar with the matter said on Thursday. It is not immediately clear if the procurement will be announced

during Prime Minister Narendra Modi's visit to Paris next month to attend a summit on artificial intelligence.

Modi and French President Emmanuel Macron are expected to hold bilateral talks on the sideline of the summit, being held on February 10 and 11.The people cited above said all the two deals are in the final stage of finalisation and that the Cabinet Committee on Security (CCS) will have to look at them.

In July 2023, the defence ministry approved the purchase of 22 Rafale (marine) jets from France, primarily for deployment on board the indigenously built aircraft carrier INS Vikrant.The ministry had also cleared procurement of three Scorpene submarines from France.

Under the Indian Navy's Project 75, six Scorpene submarines have already been constructed in India by Mazagon Dock Limited (MDL) in cooperation with the Naval Group of France.

The procurement of the Rafale (M) jets along with associated ancillary equipment including weapon systems and spares would be based on an inter-governmental agreement (IGA).

The Indian Air Force bought 36 Rafale fighter aircraft in fly-away condition. There is a thinking in the IAF that it should go for at least two more squadrons of the Rafale jets.

The defence and strategic ties between India and France have been on an upswing in the last few years.

In July 2023, India and France announced a raft of ground-breaking defence cooperation projects including the joint development of jet and helicopter engines.

The two strategic partners also had expressed commitment to cooperate in the co-development and co-production of advanced defence technologies, including for the benefit of third countries.

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US-India Defence deals: How the Trump administration plans to strengthen ties

Source: The Economic Times, Dt. 30 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/increased-us-india-defence-deals-how-the-trump-administration-plans-to-strengthen-ties/articleshow/117731323.cms

The Trump administration is putting increasing pressure on India to bolster its military procurement from the United States. Defence sales between the two countries have already surpassed $25 billion since 2007, with recent discussions intensifying over future purchases. In a phone call on Monday, President Donald Trump directly called on Prime Minister Narendra Modi to expand India’s acquisition of US military technology, including fighter jets, drones, and armoured vehicles.

India is facing a delicate balancing act. While the US is pushing for increased sales, India is keen to ensure that any procurement fits within its broader defence strategy, which focuses on the

domestic production of military hardware. A senior Indian official said, “India will have to negotiate carefully with the new Trump administration. US military technology is certainly top-notch, but it will have to dovetail into our policy of 'Make in India' with foreign collaboration at a reasonable cost."

Ongoing Deals and Strategic Developments

India's relationship with the US in defence has evolved significantly in recent years, and the current negotiations reflect deeper collaboration. Just months ago, India signed a mega $3.3 billion deal with the US government to purchase 31 weaponised MQ-9B Predator drones.

Additionally, another $520 million contract was signed with drone manufacturer General Atomics to set up a maintenance, repair, and overhaul (MRO) facility in India, marking a significant step in strengthening defence ties between the two nations.

However, the Trump administration seeks even more ambitious deals. As part of the growing partnership, the US is pushing for joint defence manufacturing. One such example is the ongoing negotiations for the co-production of General Electric F414-INS6 aero-engines with Hindustan Aeronautics.

These engines are intended for India’s Tejas Mark-II fighter jets and are valued at around $1.5 billion. As part of the agreement, 80% of the technology for engine parts will be transferred to India, highlighting the push for co-development rather than simply purchasing finished products.

In addition to the aero-engine deal, the US has been heavily marketing the Stryker armoured infantry combat vehicle, which it hopes to manufacture jointly with India. The Indian Army is planning to acquire 527 wheeled infantry combat vehicles as part of a broader expansion of mechanised infantry units. In September 2023, the US showcased the Stryker’s capabilities in Ladakh, demonstrating its firepower and mobility, despite some criticism from local industry experts who favour indigenous alternatives.

A Focus on Fighter Aircraft and Maritime Defence

Another major area of focus is India’s ongoing quest for 114 new multi-role fighter aircraft (MRFA). The deal, estimated at a staggering Rs 1.25 lakh crore, is expected to involve foreign collaboration, and the US is hoping to secure a significant share of the contract. To further strengthen its position, the US will display its F-16 and fifth-generation F-35 fighter jets at Aero-India, which will be held in Bengaluru from February 10 to 14, 2025.

Meanwhile, India’s navy is looking to enhance its maritime capabilities. As part of an agreement reached in February 2020, India has already inducted 24 MH-60R Seahawk helicopters, which are designed for submarine hunting. These helicopters are part of a larger $2.13 billion contract, and India is now in the process of purchasing additional high-end technical equipment worth $1.1 billion to support these aircraft.

Additionally, there are discussions about purchasing six more P-8I long-range maritime patrol aircraft, which would supplement the 12 already in service as part of a $3.2 billion deal.

India’s Defence Priorities and the ‘Make in India’ Policy

India’s defence strategy is evolving as the country looks to modernise and strengthen its military. While partnerships with foreign nations like the US are central to this effort, India remains focused on its domestic production capabilities. The “Make in India” initiative, launched by Prime Minister Modi, is a cornerstone of this strategy, with a goal to reduce dependency on foreign imports while boosting domestic manufacturing and technological innovation.

In this context, the Indian government is keen on entering co-production and co-development agreements rather than relying solely on foreign-made equipment. This approach not only reduces costs but also ensures that India’s military capabilities are built in partnership with global leaders in defence technology.

The growing defence collaboration between India and the US is undeniable, with several high-profile deals already in place and more in the pipeline. However, India must carefully navigate its defence procurement strategy to ensure that it can continue to develop its own military technologies while maintaining strong international partnerships. As the US continues to push for greater sales, India’s emphasis on self-reliance and indigenous production will remain central to the country’s long-term defence strategy.

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ISI looking for pre-1971 presence in Bangladesh

Source: The Economic Times, Dt. 15 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/isi-looking-for-pre-1971-presence-in-bangladesh/articleshow/117752954.cms

Pakistan's Inter-Services Intelligence (ISI) is seeking to establish its presence in some strategic areas of Bangladesh, a move that could be detrimental to India's security interests.

ET has learnt that the two sides discussed the possibility of ISI's presence in Cox's Bazar, Ukhia, Teknaf, Moulvibazar, Habiganj and Sherpur during ISI chief Lt Gen Asim Malik's visit to Dhaka last week.

Before the formation of Bangladesh in 1971, the Pakistan army had presence in these strategic areas, which were then part of East Pakistan. This created challenges for India as the Pakistan army gave support to insurgent groups active in northeastern states like Nagaland and Mizoram.

The recent Bangladesh visit of ISI's top brass witnessed exploratory talks with the amenable section of Bangladesh army on expanding ISI's network along India's northeast and eastern borders.

Experts on Bangladesh affairs are alarmed over the rapid inroads by the Pakistan army in Dhaka.

ISI is allegedly coordinating its moves with the pro-Islamist and pro-Jamaat faction of Bangladesh army. Besides Lt Gen Faizur Rahman, quarter master general of Bangladesh Army, the general officer commanding of 24 Division of Bangladesh army, Maj Gen Mir Mushfique Rahman, is known to harbour close connections with the homegrown radicals and ISI.

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Understanding the ‘hellscape’ strategy of US to counter China in Taiwan Strait

Source: The Week, Dt. 30 Jan 2025,
URL: https://www.theweek.in/news/defence/2025/01/30/understanding-the-hellscape-strategy-of-us-to-counter-china-in-taiwan-strait.html

Amid growing aggression by China in the Taiwan Strait, which it claims is part of its exclusive economic zone, the US is set to meet the August 2025 deadline for the “unmanned hellscape” strategy.

The 'hellscape' strategy, part of the Replicator initiative of the US, envisions a battlefield in which thousands of unmanned ships, submarines, and aircraft work in tandem to engage numerous targets in the West Pacific. It is aimed at preventing any aggression by the People’s Liberation Army (PLA) across the Taiwan Strait.

The replicator initiative was announced in 2023 to apply lessons from the Ukraine war to the Indo-Pacific region. The first iteration of Replicator (Replicator 1) is expected to deliver all-domain attritable autonomous systems to warfighters at a scale of multiple thousands, across multiple warfighting domains by August 2025.

The first tranche of the Replicator initiative was set up to link surface, subsurface drones and loitering munitions to create a “hellscape” that would thwart the Chinese invasion while the second tranche would include systems in the air and maritime domains, as well as integrated software enablers that will enhance the autonomy and resilience of other Replicator systems

Acting as a first line of defence, as soon as China’s invasion fleet starts moving across the waterway that separates China and Taiwan, the US forces would deploy thousands of unmanned submarines, ships and drones to flood the area and give Taiwanese, US and partner forces time to mount a full response, Admiral Samuel Paparo, Commander, Indo-Pacific Command (INDOPACOM) told Washington Post in an interview some time ago, speaking about the 'hellscape' strategy.

“I want to turn the Taiwan Strait into an unmanned hellscape using a number of classified capabilities so I can make their lives utterly miserable for a month, which buys me the time for the rest of everything," Admiral Paparo said.

"The geography of the Indo-Pacific and the distances American forces would need to operate from would put the United States at a disadvantage in a Taiwan scenario. The United States must rapidly acquire longer-range drones with more endurance to close this gap, while developing a layered system of defenses to counter Chinese drones," a report titled 'Swarms over the Strait' in Centre for a New American Security read.

The 'hellscape's strategy represents a major shift in military planning, as it focuses on the integration of unmanned systems to create a formidable defense against potential aggression.

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Two Indian Navy lady officers cross 'graveyard of satellites' on sails

Source: The Week, Dt. 30 Jan 2025,
URL: https://economictimes.indiatimes.com/news/defence/armenia-to-tow-indo-french-artillery-gun-system/articleshow/117275292.cms

Latitude 48°53′ South, Longitude 123°24′ West, are no ordinary coordinates. They refer to Point Nemo, named after Captain Nemo, a character from 'Twenty Thousand Leagues Under the Seas' and 'The Mysterious Island' written by French writer Jules Verne.

Considered to be the most remote place on earth, two Indian Navy lady officers, Lieutenant Commander Dilna K. and Lieutenant Commander Roopa A., did the country and the Indian Navy proud when they crossed Point Nemo at 0030h (IST) on Thursday, on board the INSV Tarini. And very interestingly, the crossing was done purely on sails.

The INSV Tarini was sailing from Lyttelton, New Zealand, to Port Stanley, Falkland Islands, during the third leg of Navika Sagar Parikrama II, a circumnavigation of the globe by the two lady Indian Navy officers.

Navika Sagar Parikrama II was flagged off on October 2, 2024, on the birth anniversary of Mahatma Gandhi, from Goa and will sail for about 23,400 nautical miles over eight months before returning by May 2025.

It was only 26 years ago that a ship—a Spanish research vessel Hespérides—had sailed to Point Nemo, a place so isolated that "the closest human presence often being aboard the International Space Station orbiting above".

Also called the 'Oceanic Pole of Inaccessibility', the nearest landmass is situated about 2,688 kilometers away. Point Nemo also is a graveyard of spacecrafts, where defunct and decommissioned satellites and space stations are made to re-enter Earth's atmosphere and fall into the ocean with the aim of minimizing risks to human populations.

A release said, "The officers have also collected vital water samples from the point, which will be analysed by the National Institute of Oceanography. These samples will provide valuable insights into oceanic conditions, including the presence of marine biodiversity and chemical composition, contributing to global oceanographic research."

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Increase defence spending

Source: The Financial Express, Dt. 31 Jan 2025,
URL: https://www.financialexpress.com/opinion/increase-defence-spending/3731609/

Over the past few years, India's external security threats have escalated, even as our defence capabilities have stagnated or, in some cases, declined. This must be reversed as it would be difficult to further the country's socio-economic development objectives in the absence of an assured level of stability in the neighbourhood.

The irony is that while everyone in the government acknowledges this, the allocations in the annual budgets on defence have been falling as a share of the total expenditure. In 2024-25, the allocation was Rs 6.22 lakh crore or about 13% of the Centre's total expenditure. This was smaller than the 17% share in 2014-15 and 17.8% in 2016-17 or even the 13.9% shares in the revised estimates for 2023-24. The Standing Committee on Defence had, in 2018, recommended that the allocation to defence be fixed at about 3% of GDP. However, as a share of GDP, the allocation has consistently fallen from 2.4% in 2020-21 to 1.92% in 2024-25.

The 15th Finance Commission had recommended that the ministry should take steps to reduce salaries and pension liabilities which accounted for about half the estimated spending in 2024-25. Experts have pointed out that between 2013-14 and 2024-25, the amount paid out towards pension went up at an annual rate of 11%, which is higher than the annual 8% increase in the total defence expenditure.

As a result, the capital outlay has fallen to 29% in the 2024-25 Budget from 32% in 2014-15. This is dangerously low. Budget 2025-26 must increase defence and security spending, especially when several nations are dramatically increasing their defence capabilities.

Admittedly, the local arms manufacturing ecosystem has grown with the private sector supporting the efforts of many state-owned enterprises. The value of defence production crossed Rs 1 lakh crore in FY23. Moreover, exports of defence equipment are expected to hit Rs 40,000 crore by 2026. Besides, the draft Defence Production and Export Promotion Policy is targeting a turnover of Rs 1.75 lakh crore and exports of Rs 35,000 crore in aerospace and defence goods and services by 2025.

Production-linked incentive schemes for equipment such as drones and components have been announced to boost local manufacturing. For that to happen on a larger scale, the government needs to offer sops and tax breaks, apart from giving some visibility on procurement schedules to encourage local manufacturers to set up capacity. The economic activity as a result should be able to provide jobs for both skilled and semi-skilled workers.

To fortify its defence arsenal, India has been importing arms including fighter aircraft and guns. According to one study by the Stockholm International Peace Research Institute, India is the world's biggest importer of arms. The government's approach over the last few years has been to liberalise foreign direct investment (FDI) rules.

To attract investments from overseas, the government in 2020 eased the FDI limit, enhancing it to 74% through the automatic route for companies seeking new defence industrial licences. In cases where the investment could result in access to modern technology, the limit was raised to 100% via the government route.

Despite this, there has been little interest from global arms manufacturers to set up shop in India as is evident from the negligible FDI flows into the space. It would be worthwhile to review the policy to understand what exactly is holding back global corporations from investing here.

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India's long-term growth is in securing its seas. When will the Navy budget reflect this?

Source: The Print, Dt. 30 Jan 2025,
URL: https://theprint.in/opinion/india-long-term-growth-securing-seas-navy-budget-reflect-this/2470056/

India never lost her independence till she lost the command of the sea in the first decade of the sixteenth century," wrote Sardar Kavalam Madhava Panikkar, a multifaceted personality if ever there was one.

Much like US Captain Alfred Thayer Mahan's The Influence of Sea Power upon History (1890) is a global benchmark for naval perspectives, Panikkar's essay, India and the Indian Ocean (1945) remains the holy grail for the domestic naval fraternity.

It is perspectives that now influence budgetary allocations. So, it is pertinent to point out the vast discrepancies in the perceptions that shape national security projections, and as a result, preparations. It boils down to how the map of India is understood—how it is looked at in terms of its size, shape, and situation on the world oceanic map. It is, really, a toss-up between India as a subcontinent and a peninsular nation.

Importance of sea

Sardar Panikkar explained that India's land-based invaders ultimately became natives. Its colonisers were the ones who came by sea, a process that began with the arrival of the Portuguese.

"The importance of the sea came to be recognised by the Indian Rulers only when it was too late," Panikkar wrote. "The commercial interests of India, though they have changed character have also increased…Her vast markets and her great natural resources can be reached through the Indian Ocean and her recent industrial growth, with consequent expansion of trade, emphasises the necessity of safe sea communications."

As the budgetary preparations reach the last-minute lobbying stage, it is worth pondering over what India needs, in the long run, to sustain its economic growth while maintaining its national security space. The land boundaries on the eastern and western fronts remain tense but stable, contested by both neighbours. But for China's 2020 perfidy, the borders have largely been managed with care and statesmanship. That is unlikely to change in the near future, so it is time for India to broaden its horizon.

The horizon should be obvious from the attached map, which, albeit with gross errors on the northern part, reflects where India can stretch its legs. The ocean's importance was also underlined recently by Prime Minister Narendra Modi in a 2015 Mauritius ship launch ceremony.

"Today, 90% of our trade by volume and 90% of our oil imports take place through sea. We have coastline of 7500 km, 1200 islands and 2.4 million square kilometres of Exclusive Economic Zone. India is becoming more integrated globally. We will be more dependent than before on the ocean and the surrounding regions," he said.

Budgetary allocations

Midnight oil is now being burned across the three service headquarters as budgetary allocations reach the final stage. It is well nigh certain that as the largest service, a major share of monies will end up in the Army's kitty, followed by the Air Force and then the Navy. This has been the practice all along. The final figures have only ever fluctuated by degrees and percentages, while the ratio has remained roughly the same over decades. Until India resolves its boundary alignments on both its eastern and western flanks, this is likely to remain so.

This is a pity since India's long-term security interests and growth clearly lie in securing the seas around it. All wars currently being fought, whether conventional as in Ukraine or against non-state combatants as in Gaza, have nullified almost any précis on battle craft and tactics. Modern technologies, despite looking spectacular on sanitised television sets or smartphones, have proved severely wanting in terms of actually delivering results. Gaza is a better example of this than the much-publicised Russian failures in Ukraine. What both fronts can't deny is the centrality of the sea for trade.

Further, trade is the most basic ingredient for economic growth, making it the first brick in the wall of national security and defence. While the budget planners ply their trade at midnight hours, the immediate and long-term interests of India's security structure must be considered.

As PM Modi's statement made clear, there is no substitute for trade on the oceanic highway and the need to secure sea lines of communication (SLOCS). The budget must recognise that reality.

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Science & Technology News

Non-conventional approach to measure the radial dimension of CMEs can help predict adverse effects on Earth

Source: Press Information Bureau, Dt. 30 Jan 2025,
URL: https://pib.gov.in/PressReleasePage.aspx?PRID=2097599

A novel method has been found to determine the instantaneous expansion speed and radial size of Coronal Mass Ejections (CMEs) from the Sun when it passes over a spacecraft at a single-point in the interplanetary medium.

The radial dimension of CMEs governs the longevity of the CMEs and their associated geomagnetic storms on the Earth and hence it is important to determine it, to predict the influence of the CMEs on the Earth's communication system.

CMEs are magnetized plasma bubbles ejected from the Sun and evolve in the interplanetary medium. They are the major drivers of perturbations in the Earth's magnetic field, known as geomagnetic storms. Such storms can cause severe impacts on ground and space-based

technological systems, such as communication disruptions, deorbiting satellites, and power grid failures.

The duration over which the Earth experiences such a magnetic perturbation is influenced by the radial dimension of a CME, along with other parameters, during its passage over the Earth. The changes in the radial dimension of CME depend on its expansion in the interplanetary medium, which has yet to be adequately understood. CMEs expand during their journey due to the pressure difference between CME and ambient solar wind. Limited efforts have been made to investigate the evolution of radial sizes of CMEs so far.

The measurements of expansion speeds of CMEs have been done mostly utilizing single-point in situ measurements, which are known to be insufficient to estimate the instantaneous expansion speed of CMEs.

In order to overcome this challenge, Astronomers at the Indian Institute of Astrophysics, an autonomous institute of the Department of Science and Technology (DST), devised a novel method to estimate a CME's instantaneous expansion speed even using a single-point in situ spacecraft and will be helpful for sub-L1 monitors.

They found a method to first infer the accelerations of CME substructures (leading edge, center, and trailing edge) even from single-point in situ observations that are used to estimate their propagation speeds at an instant. This can be used for estimating the instantaneous expansion speed.

“Our non-conventional approach utilizes the propagation speed of any two CME substructures at the same instance to determine the instantaneous expansion speed,” said Wageesh Mishra, a faculty at IIA and a co-author of the study.

This approach also computes the radial size and the distance traveled by the CME substructures at various instances as well.

“This study has implications for understanding the longevity of perturbations on the Earth’s magnetosphere caused by CMEs,” said Anjali Agarwal, a Ph.D. student at IIA and the first author of the paper published on this work.

The novel method is demonstrated in a case study of a CME that erupted from the Sun on 2010 April 3, using remote and in situ observations from the NASA and ESA SOHO (SOlar and Heliospheric Observatory), STEREO (Solar TErrestrial RElation Observatory), and Wind spacecraft. The researchers noted that the accurate estimation of CME’s expansion speed is essential for predicting its arrival time at Earth, especially its substructures such as center and TE, which are crucial for space weather.

“The instantaneous expansion speed of a CME derived from our proposed non-conventional approach using a single-point in situ spacecraft provides a substantial outcome — CME substructures evolve differently in the ambient medium, possibly because of different forces acting on them,” said Wageesh Mishra IIA.

Unlike earlier studies, the authors suggest, a CME, during its journey, experiences a change in the aspect ratio — a measure of the radial dimension of CME with respect to its increasing distance

from the Sun. They found that the aspect ratio of CME first increases and then remains constant up to a certain height, followed by a systematic decrease in the IP medium.

Wageesh Mishra said, “We are looking forward to utilizing single-point in situ observations from the Aditya Solar wind Particle EXperiment (ASPEX) onboard the Aditya-L1 spacecraft, India's first space-based solar observatory, with implementing our non-conventional approach, to understand CMEs expansion.”

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India will host DeepSeek's AI models on its servers for security checks: Vaishnaw

Source: The Times of India, Dt. 31 Jan 2025,
URL: https://timesofindia.indiatimes.com/india/india-will-host-deepseeks-ai-models-on-its-servers-for-security-checks-vaishnaw/articleshow/117756609.cms

India will host Chinese startup DeepSeek's AI models on its servers to check for security and other safety parameters, govt said on Thursday, as it intensified efforts to provide compute to startups and researchers to hasten work on developing localised AI 'foundational models' or tech solutions as the country looks to counter advances made in the US, and now China, in AI.

IT and electronics minister Ashwini Vaishnaw said govt is procuring as many 18,693 graphics processing units (GPU) that will be used to provide the much-needed "affordable compute" facility to large as well as emerging tech companies and researchers working in the area of AI.

Foundation models are a type of AI solution trained on vast datasets to perform a wide range of tasks. The models are designed to adapt and can be further fine-tuned for specific applications making them versatile.Vaishnaw said the number of high-tech GPUs being procured - as part of the Rs 10,372 crore IndiaAI mission - are sufficient for now to power India's AI quest, pointing out that DeepSeek was built with around 2,000 GPUs.

Dismissing apprehensions over India being late in its AI quest, he said, being a trusted partner, it enjoys the support of countries such as the US. "We are well in time. The most important thing is getting the compute facility. And this is now being made available. We are in very good shape. Getting the compute facility was very, very, very critical to the mission."

He said India is confident of a regular supply of GPUs by companies such as Nvidia, despite restrictions by the US govt against certain countries. "I'm reiterating that we are seen as a trusted country, we're seen as a country which respects IP rights, (and) we're seen as a country which understands the technological development prospects and all the points related to that."

The recent surge in interest in DeepSeek has not got the govt worried. "The good thing is that DeepSeek is an open source model and we are very soon going to actually host it on Indian servers - the way we have hosted (Meta's) Llama. Everything which is open source can be taken and hosted on our servers so that the data privacy parameters can be addressed. That we are going to do very soon," he said.

Vaishnaw said preparatory work has been initiated for this. "The team has worked out the details on how many servers are required, how much capacity is required."

Ministry officials told TOI that the testing around security aspects will be done by multiple agencies, which will include cyber security watchdog CERT-In and those in the security establishments such as National Cyber Security Secretariat.

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My journey to space will be the journey of 1.4 billion fellow Indians: Axiom Mission 4 pilot Group Captain Shubhanshu Shukla

Source: The Hindu, Dt. 31 Jan 2025,
URL: https://www.thehindu.com/sci-tech/science/my-journey-to-space-will-be-the-journey-of-14-billion-fellow-indians-group-captain-shubhanshu-shukla/article69160820.ece

Axiom Mission 4 crew clockwise: Commander Peggy Whitson, Mission Pilot Shubhanshu Shukla, Mission Specialist Sławosz Uznański-Wiśniewsk, and Mission Specialist Tibor Kapu.

Indian astronaut Group Captain Shubhanshu Shukla will be the pilot of the upcoming Axiom-4 mission to the International Space Station (ISS). NASA and its international partners announced on Thursday (January 30, 2025) that they had approved the crew for the mission.

Group Captain Shukla, who is also one of the four astronaut-designates selected for India's Gaganyaan mission, will become the first Indian astronaut to go to the ISS and the first Indian to go to space in the last 40 years.

The mission to the ISS will be launched from the agency's Kennedy Space Center in Florida in 2025, and the mission crew will spend 14 days on board the space station and will conduct various experiments during the stay.

While former NASA astronaut Peggy Whitson will command the commercial mission, Group Captain Shukla will be the pilot.European Space Agency project astronauts Sławosz Uznański-Wiśniewski from Poland and Tibor Kapu from Hungary are also part of the crew.

"Axiom-4 mission is very important for India, and it comes at a very opportune time. I am confident that the lessons learnt during the Axiom-4 mission are going to prove invaluable for our journey back home," said Group Captain Shukla on Thursday.

Group Captain Shukla, whose mission call sign is 'Shucks,' said that witnessing the end-to-end execution of a human space flight mission will provide the crew with key knowledge that will help them fill any gaps they may encounter.

"I also hope to ignite the curiosity of an entire generation in my country through my mission and drive the innovation that will make many such projects possible for us in the future. I also have a personal agenda of capturing my experience on the station through pictures and videos so that I can share this with all the Bharatwasi (Indians) back home; I truly believe that even though, as an individual, I am travelling to space, this is the journey of 1.4 billion people," he said.

He added that he would demonstrate a few poses of yoga in the ISS and that he would be practising it while they are on the ground. He also said a lot of stuff that represents the regions, particularly India in general, would be taken to the ISS to honour India.

Group Captain Shukla is an alumnus of NDA and was commissioned on June 17, 2006, in the fighter stream of IAF. He is a Fighter Combat Leader and a Test Pilot with approx 2,000 hrs of flying experience. He has flown a variety of aircraft, including Su-30 MKI, MiG-21, MiG-29, Jaguar, Hawk, Dornier, An-32 etc.

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Unmasking Guillain-Barré Syndrome: revelations from studies at NIMHANS

Source: The Hindu, Dt. 30 Jan 2025,
URL: https://www.thehindu.com/sci-tech/health/unmasking-guillain-barr%C3%A9-syndrome-revelations-from-studies-at-nimhans/article69155226.ece

The recent outbreak of Guillain–Barré syndrome (GBS), a rare neurological condition in Pune, Maharashtra, has led to panic among the public in Maharashtra and other parts of India. While GBS-like disorders have been known in scientific literature for centuries, this eponymous term was first coined in 1916. Outbreaks of GBS of the magnitude reported from Pune, have been rather uncommon. A few examples however, have been higher incidences of GBS reported in French Polynesia in 2013-2014 and Latin America as well as the Caribbean in 2015-2016 due to outbreaks of Zika virus infection. An unusually large outbreak of GBS was reported in Peru between May 20

and July 27, 2019, where over a period of two months and seven days, 683 cases of GBS were reported.

The first case of GBS in Pune was reported on January 9, 2025 and as on January 28, 111 cases and one death have been reported. The incidence of GBS in Pune is quite alarming given the fact that the outbreaks of GBS have not crossed a three-digit number in the past except during the above two instances.

What is GBS?

GBS is a neurological disorder that causes abnormal tingling, numbness, pain and muscle weakness. Some patients may experience difficulty in talking, closing eyes tightly, chewing, swallowing, and sometimes even breathing, as well as abnormal heart rate and fluctuating blood pressure. The annual global incidence of GBS is approximately 1-2 per 100,000 person-years. The lifetime risk of developing GBS is less than 1%. The diagnosis of GBS is established through a series of neurological, electrophysiological and biochemical (blood and cerebrospinal fluid) analyses. GBS progresses rapidly and most of the patients attain the maximum disability within two weeks. The current literature suggests that about 20% of GBS patients develop weakness of respiratory muscles and require mechanical ventilation, while about 3-7% patients succumb even with the best available medical care. Thus, GBS is a medical emergency and can be potentially fatal, albeit in a small proportion of the affected patients. While GBS is a one-time illness, recurrences do occur very rarely in about 2-5% of patients.

What is Guillain-Barré Syndrome?

Risk factors of GBSGBS has been categorised as a post-infectious immune-mediated disorder where the immune cells and molecules attack and damage the protective covering of the peripheral nerves. Several studies across the world suggest an association between an antecedent infection and the risk of developing GBS in upto 70% of the cases. The symptoms of GBS usually begin to appear after a few days or weeks of a gastrointestinal or respiratory infection. It has been reported that various factors other than infections, such as recent surgery, certain vaccinations, immunocompromised states, etc. could also serve as triggering factors.

Among the several micro-organisms, Campylobacter jejuni has been reported to be the most predominant infectious trigger of GBS. Other bacterial and viral pathogens that are associated with GBS include Cytomegalovirus, Dengue virus, Influenza virus, Japanese encephalitis virus, Chikungunya virus, Mycoplasma pneumoniae, Epstein-Barr virus, and Zika virus. Though a majority of the studies suggest that 30-50% of the patients with GBS have antecedent Campylobacter jejuni infection, lower percentages of Campylobacter jejuni infection have also been reported. For instance, during the large GBS outbreak in Peru, only 5.2% of the cases had Campylobacter jejuni infection. It is noteworthy that approximately only one in 1,000 people infected with Campylobacter jejuni go on todevelop GBS. This suggests that infection alone is not adequate to induce the development of GBS. Not all patients with infection develop GBS, and similarly not all patients with GBS have a preceding infection.

We carried out a study on the impact of antecedent infections such as Campylobacter jejuni, Influenza virus, Dengue virus, Japanese encephalitis virus and Zika virus in 150 patients with GBS

between July 2014 and June 2019 at NIMHANS, Bengaluru. In our cohort, 79.3% showed evidence of prior infections, of which 32% tested positive for Campylobacter jejuni. Interestingly, in our study, co-infection by multiple pathogens was more common, seen in about 65%. This suggests a complex interplay among various bacteria and viruses that confer the risk of developing GBS.

Guillain-Barré Syndrome suspected behind three deaths in West Bengal

Etiopathology of GBSGBS develops as a result of aberrant immune functions, either due to an autoimmune reaction or an exaggerated inflammatory response. Infectious risk organisms can mount an autoimmune reaction through ‘molecular mimicry’ where the protective antibodies generated against the cell surface antigens of the bacteria bind to the functionally relevant molecules on the surface of nerve cells, due to the similarity between the molecules of bacteria and nerve cells. The infectious risk organisms can also lead to inflammatory responses by activating the immune cells. Our research over the past 10 years on the immunobiology of GBS at NIMHANS, Bengaluru, suggests the involvement of multiple types of immune cells such as T lymphocytes, especially the Th1 and Th17 lineages and a unique mucosal associated invariant T (MAIT) cell in GBS.

Further, inflammatory cytokines of Th1 and Th17 pathway are also involved in GBS. The most notable finding in GBS was the alteration of an alarmin, a molecule that alerts immune system to the presence of an infection or injury. Further, our on-going research suggests a pivotal role of gut microbiota in perturbing the immune homeostasis and elevating the risk of GBS. Though a precise mechanistic basis of GBS is yet to be established, we suggest a combined, concerted and additive effects of multiple cells and molecules within the immune system.

Who is affected?

GBS affects people of all age groups, however, the incidence increases with age. GBS is more common in men as compared to women, the precise reason for the male preponderance is not known. There is a clear lack of data on the epidemiology and burden of GBS at a global level, and it is suggested that probably, people living in low-income and middle-income countries are more vulnerable owing to poor hygiene and high exposure to infections. Arboviral infections such as Dengue, Chikungunya, Zika, etc. are more common in tropical and sub-tropical areas. Therefore, people living in these areas are likely more prone to developing GBS.

Treatment

There are only two established treatment options for GBS - plasma exchange and intravenous immunoglobulin (IVIg). Plasma exchange involves filtering out the harmful antibodies from the body. On the other hand, IVIg acts by neutralising the deleterious effects of the immune system on the peripheral nerves. Both treatment options are considered to be equally effective. Patients with severe GBS require additional ICU care for mechanical ventilation and managing other inter-current complications, on a case-to-case basis. Though a majority of the patients recover fully from GBS with treatment and rehabilitation, a small number are left with disability for months to years.

Preventive measures

GBS is not a contagious disease. Nevertheless, people should avoid consuming undercooked poultry, meat and milk. It is advisable to drink treated/ purified and/or boiled water. Foods that are susceptible to bacterial growth due to high moisture content should be cooked thoroughly before consumption. One needs to maintain proper and adequate personal as well as food hygiene. These measures will reduce respiratory and gastrointestinal infections and may mitigate the risk associated with infection-induced GBS.

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Why China's recent nuclear fusion breakthrough is significant

Source: The Indian Express, Dt. 30 Jan 2025,
URL: https://indianexpress.com/article/explained/explained-sci-tech/promise-of-nuclear-fusion-9806630/

Experimental Advanced Superconducting Tokamak (EAST), a nuclear fusion reactor, in Hefei, Anhui province, China

An experimental nuclear fusion reactor in China last week triggered a lot of excitement by keeping its operational state maintained for more than 1,000 seconds, or over 17 minutes, which is a new record. Nuclear fusion is what produces the energy in the Sun, or any other star.

Scientists across the world have been trying to recreate this process to produce electricity. The technology can eliminate the world's energy crisis, and the problem of climate change, but it has not been mastered yet.

The Chinese reactor did not produce electricity. It did not even carry out a fusion reaction. The technology has not yet reached that stage. However, the reactor managed to maintain plasma in a steady state of confinement for a long time, longer than it had previously been possible. This itself was a major step forward towards the dream of realising a fusion-based nuclear reactor in the near future.

Extreme conditions

Fusion reactions require very high temperatures, hundreds of millions of degrees Celsius — higher than the temperatures in the Sun's core.

At such high temperatures, matter exists only in the plasma state, in which atoms get split into positively and negatively charged particles. But such hot plasma cannot be handled by or contained in any material.

Within the reactor, this plasma needs to be kept suspended in a confined space, surrounded by very strong magnetic fields acting as walls.

Charged particles respond to magnetic fields, and this property is used to guide the flow of plasma within an enclosed space, separated from any matter. This condition, necessary for facilitating fusion reactions, is extremely delicate and unstable, with the tiniest of changes in the magnetic field disturbing the whole set-up. Scientists have not been able to maintain these conditions for longer than a few seconds.

That is why the achievement of the Experimental Advanced Superconducting Tokamak (EAST) reactor, located at the Institute of Plasma Physics in Anhui province in eastern China, is being seen as so important. It is a significant improvement on this reactor's previous record of a little over 400 seconds achieved in 2023.

Real-life electricity-generating reactors would require this state to be maintained for hours, even days, at a stretch. Only then would continuous operations be possible, like current nuclear reactors which are based on fission technology.

Energy source of futureFusion technology has been under development for more than 70 years but progress has been slow. Even the optimistic forecasts, at least till a few years ago, suggested a functional fusion reactor, producing electricity at a commercial scale, would not be realised before 2050.

For this reason, none of the global energy transition pathways for a net-zero world in 2050, or 2070, factor in the potential of fusion electricity. Each one of those pathways, incidentally, is heavily dependent on the success of several other uncertain technologies such as carbon sequestration and carbon removal, whose technical and economic viability remain under doubt.

However, the promise of fusion energy is alluring. If, and when, it comes through, other sources of alternative clean energy being explored, like solar or wind, to tackle the climate crisis are likely to become peripheral or even redundant.

The fusion process produces far greater amounts of energy than any other source — one gram of fuel can yield as much energy as burning about eight tonnes of coal. It uses cheap input materials,

available in almost limitless supply (deuterium and tritium, two heavier isotopes of hydrogen that are used as fuel, are easily available in nature), has a zero emission footprint, and can be set up and operated almost anywhere. Unlike the fission process, it does not leave dangerous nuclear waste.

Recent breakthroughs

In the last few years, fusion research has produced a string of breakthroughs. In December 2021, the United Kingdom-based JET laboratory set a new record in the amount of energy produced through fusion. It produced about 12 MW of electricity for five seconds, enough to cater to the demands of about 10,000 homes for that period of time.

A year later, a reactor in the United States achieved a net gain in energy for the first time. The extreme conditions needed in a fusion reactor require a very large amount of input energy. Fusion would be viable only if the output energy is significantly larger. The performance of this US reactor has improved since then. Last year, researchers at MIT said they had developed a new material that could better withstand the extreme conditions within the reactor.

The feats of the Chinese EAST reactor, in 2023 and now, are the latest additions to these successes. This week, fresh evidence emerged to show that China was building a large laser-ignited fusion research centre that could also be used to develop thermonuclear weapons, commonly known as hydrogen bombs.

The US facility at the Lawrence Livermore National Laboratory in California, which was the first to produce a net gain in energy in 2022, is based on a similar technology.

Greater optimism

The recent breakthroughs have triggered a big surge in interest, and ambition, for fusion energy, particularly among private companies which have entered the field in a major way. A total of 163 fusion reactors, in about 30 countries, are currently in operation, under construction, or being planned, according to the Fusion Device Information System (FusDIS) database maintained by International Atomic Energy Agency (IAEA).

The Fusion Outlook 2023 report, published by IAEA, said private companies operating in this space had attracted $6.2 billion in investment that year. There were at least 43 such companies operating in more than 10 countries.

Helion, a US-based company backed by tech billionaires Sam Altman and Peter Thiel, has promised to generate 50 MW of electricity by 2028, which will be provided to Microsoft. The company aims to become the first firm to start producing commercial electricity from fusion reactions.

Another US company, Commonwealth Fusion Systems, is collaborating with MIT to generate 400 MW grid-scale electricity by the early 2030s from a plant it is building in Virginia.

ITERThe largest fusion reactor, an international collaborative project called ITER, is coming up in southern France. More than 30 countries are participating with India being one of the seven member countries contributing to the reactor’s construction and research. This project, which has been under development since 2005, is slated to become one of the biggest international science

facilities in the world. According to its current timeline, it would begin deuterium-tritium fusion reactions by 2039, producing 500 MW of fusion power.

ITER would not be converting the output heat energy into electricity. But its success is expected to pave the way for other machines to start using fusion energy as a regular source of electricity generation.

Dr Indranil Bandyopadhyay, group leader, Council Support and Knowledge Management, at ITER India, said, "A 15-year timeline for nuclear fusion energy to reach commercial scale is very aggressive but not implausible."

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Did DeepSeek copy OpenAI's AI technology?

Source: The Indian Express, Dt. 30 Jan 2025,
URL: https://indianexpress.com/article/explained/explained-sci-tech/deepseek-openai-technology-9807132/

Even as ChatGPT creator OpenAI faces a barrage of copyright infringement cases in some countries, the company believes that its upstart Chinese rival DeepSeek may have copied from its artificial intelligence (AI) technology. Not just OpenAI, but one of US President Donald Trump's top advisors has also levelled this claim, without yet presenting much evidence.

DeepSeek's entry into the AI space – touted for being open source, its accuracy and claims that its built at fraction of the cost as its US competitors – have caused an upheaval in the technology industry. It has sent Nvidia's stock on a downward spiral, since their model was trained on inferior graphics processing unites (GPUs) compared to what the likes of OpenAI have access to. And its entry has reignited the conversation around stricter export controls.

It is in this context that OpenAI has said that DeepSeek may have used a technique called "distillation," which allows its model to learn from a pretrained model, in this case ChatGPT. While DeepSeek has been accused of intellectual property theft ever since it gained mainstream attention, some industry experts have dismissed these claims saying they stem from an inadequate understanding of how models such as DeepSeek are trained.

OpenAI's suspicion about DeepSeek

OpenAI prohibits the practice of training a new AI model by repeatedly querying a larger, pre-trained model, a technique commonly referred to as distillation, according to their terms of use. And the company suspects DeepSeek may have tried something similar, which could be a breach of its terms.

"We know that groups in the P.R.C. (China) are actively working to use methods, including what's known as distillation, to replicate advanced US AI models," a spokesperson for OpenAI said in a statement. "We are aware of and reviewing indications that DeepSeek may have inappropriately distilled our models, and will share information as we know more."

David Sacks, Trump's AI adviser, told Fox News, "There's substantial evidence that what DeepSeek did here is they distilled the knowledge out of OpenAI's models… And I don't think OpenAI is very happy about this."Industry players counter OpenAI's assertionsStory continues below this adSome, however, disagree with assertions that DeepSeek copied technology from OpenAI and the likes.

"There's a lot of misconception that China 'just cloned' the outputs of OpenAI. This is far from true and reflects incomplete understanding of how these models are trained in the first place…" Aravind Srinivas, CEO of Perplexity said in a post on X.

"DeepSeek R1 has figured out RL (reinforcement learning) finetuning. They wrote a whole paper on this topic called DeepSeek R1 Zero, where no SFT (supervised fine tuning) was used. And then combined it with some SFT to add domain knowledge with good rejection sampling (aka filtering). The main reason it's so good is it learned reasoning from scratch rather than imitating other humans or models," he added.

The idea of using reinforcement learning (RL) became a focus point for AI companies in 2024.

"This new paradigm involves starting with the ordinary type of pretrained models, and then as a second stage using RL to add the reasoning skills," explained Dario Amodei, CEO of Anthropic, in a blog post.

Supervised Fine-Tuning (SFT), is a process in machine learning where a pre-trained model is further trained (fine-tuned) on a labeled dataset specific to a particular task. This approach leverages the general knowledge the model has already acquired during its initial pre-training phase and adapts it to perform well on a more specialized task.

As per an attached summary with DeepSeek's model on its Github page, the company said it applied reinforcement learning to the base model without relying on supervised fine-tuning as a preliminary step.

"This approach allows the model to explore chain-of-thought (CoT) for solving complex problems, resulting in the development of DeepSeek-R1-Zero. DeepSeek-R1-Zero demonstrates capabilities such as self-verification, reflection, and generating long CoTs, marking a significant milestone for the research community. Notably, it is the first open research to validate that reasoning capabilities of LLMs can be incentivized purely through RL, without the need for SFT. This breakthrough paves the way for future advancements in this area.," the summary said.

OpenAI's own copyright troublesStory continues below this adAround the world, and specifically in countries like the USA and India, there is growing scepticism of news publishers over concerns of copyrighted material, such as news reports, being used by companies like OpenAI for training their foundational models, without permission or payment.

Last November, news agency ANI had sued OpenAI in the Delhi High Court, accusing the company of unlawfully using Indian copyrighted material to train its AI models. Earlier this week, a number of digital news publishers, including The Indian Express, have filed an intervention in the case.

The contention is that companies like OpenAI have developed large language models (LLMs) by "training" on vast quantities of text, including, without a licence or permission, copyright-protected works. This "unlawful utilisation of copyrighted materials exclusively benefits OpenAI and its investors, to the detriment of the creative works across the entire industry in India," said the Digital News Publishers Association (DNPA) said in a statement.

OpenAI is facing a number of similar lawsuits in other jurisdictions as well. In December 2023, The New York Times sued the company and Microsoft, citing "unlawful" use of copyrighted content. The publication has alleged that OpenAI and Microsoft's large language models, which power ChatGPT and Copilot, "can generate output that recites Times content verbatim, closely summarises it, and mimics its expressive style." This "undermine[s] and damage[s]" the Times' relationship with readers, while also depriving it of "subscription, licensing, advertising, and affiliate revenue."

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