

March  
मार्च  
2025

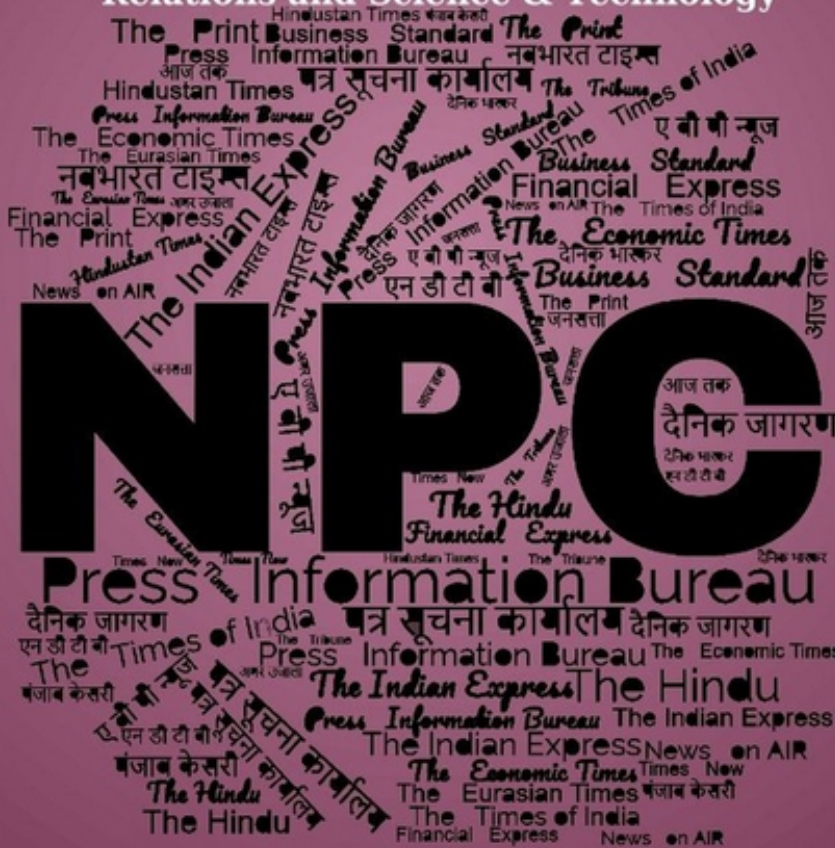
खंड/Vol. : 50 अंक/Issue : 49

12/03/2025

# 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

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## CONTENTS

S. No.	Title	Source	Page No.
<b>DRDO News</b>			<b>1-2</b>
1	DRDO Aims to Equip Indian Army with Self-Propelled Air Defence Gun Missile System (ADGM-SP), Leveraging Zorawar Tank and VSHORADS Tech	<i>Defence.in</i>	1
<b>Defence News</b>			<b>3-18</b>
<b>Defence Strategic: National/International</b>			
2	Chief of the Air Staff Air Chief Marshal AP Singh underscores need for rapid capability enhancements to counter emerging security challenges	<i>Press Information Bureau</i>	3
3	Ukraine top arms importer in 2020-24, India second: Global think-tank SIPRI	<i>Hindustan Times</i>	4
4	Mega fighter jet deal back on track, Air Force to fast track tenders: Sources	<i>India Today</i>	6
5	Why it is vital to document a national security policy	<i>The Tribune</i>	7
6	Centre bans 2 Hurriyat groups for five years	<i>The Indian Express</i>	9
7	Urgent action needed to bolster depleting IAF squadron strength, says Defence Secretary Rajesh Singh	<i>CNBC News</i>	10
8	U.S. Vice-President Vance likely to travel to India later this month: Report	<i>The Hindu</i>	11
9	Framework To Restrict Chinese Components In Military Drones Submitted To MoD	<i>The Print</i>	12
10	India-Brazil defence partnership: MoU on 'Scorpene' class submarine maintenance to be inked soon	<i>The Financial Express</i>	14
<b>Science &amp; Technology News</b>			<b>19-22</b>
11	Blood Moon and Christopher Columbus: How the navigator tricked Jamaicans with a total lunar eclipse	<i>The Indian Express</i>	15
12	Astronomers Just Traced Mysterious Radio Pulses to an Unusual Star Duo	<i>Sci Tech Daily</i>	17
13	Water's Hidden Side Revealed – It Can Exist in Two Liquid Forms at Once	<i>Sci Tech Daily</i>	18
14	A new protocol to image wave functions in continuous space	<i>Phys.org</i>	21
15	New AI Tool Predicting Brain Decline In Advance May Revolutionise Dementia Treatment	<i>NDTV News</i>	22

## DRDO News

# DRDO Aims to Equip Indian Army with Self-Propelled Air Defence Gun Missile System (ADGM-SP), Leveraging Zorawar Tank and VSHORADS Tech

Source: Defence.in, Dt. 11 March 2025,

URL: <https://defence.in/threads/drdo-aims-to-equip-indian-army-with-self-propelled-air-defence-gun-missile-system-adgm-sp-leveraging-zorawar-tank-and-vshorads-tech.13253/>

The Defence Research and Development Organisation (DRDO) is preparing a proposal for a new, domestically-produced Self-Propelled Air Defence Gun Missile System (ADGM-SP) to enhance the Indian Army's air defence capabilities. This system will be based on the chassis of the Light Tank Zorawar, and is designed to protect the Army's mechanized units, such as tanks and Armoured Personnel Carriers (APCs), from a range of aerial threats.

The proposed ADGN-SP represents a significant upgrade in protecting mobile ground forces. It combines a twin 30mm gun system with the Very Short-Range Air Defence System (VSHORADS), a portable missile system. This combination allows the ADGN-SP to effectively engage various aerial threats, including drones, helicopters, and low-flying aircraft.

The system will be mounted on the 25-ton Zorawar light tank chassis, a platform jointly developed by DRDO and Larsen & Toubro (L&T) specifically for high-altitude operations. This provides the ADGM-SP with exceptional mobility and adaptability across India's varied terrains.

The choice of the Zorawar platform is strategic. The tank underwent successful trials in Ladakh during 2024, demonstrating its superior performance in challenging, high-altitude environments. Utilizing this existing, proven chassis allows DRDO to offer a cost-effective and indigenous solution, addressing the Army's pressing need for enhanced protection of its mechanized units, particularly along the borders with China and Pakistan.

The planned ADGN-SP is envisioned with several key features:

- \* **Twin 30mm Guns:** These rapid-firing cannons provide close-range defence against low-flying targets, offering a reliable gun-based defence.
- \* **VSHORADS Integration:** The inclusion of missiles, likely based on DRDO's laser-guided VSHORADS (successfully tested in 2022 according to DRDO reports), provides extended range and accuracy against fast-moving threats like drones and helicopters. VSHORADS are designed to neutralize low-altitude aerial threats at short ranges.
- \* **Low Radar Cross Section (RCS) 3-D Acquisition and Fire Control Radar:** This compact radar uses advanced Active Electronically Scanned Array (AESA) technology and digital beam-forming. It allows for Track While Scan (TWS) capability and is designed to function effectively even in environments with heavy electronic jamming.

\* Electro-Optical Fire Control System (EOFCS): This system includes a Thermal Imaging (TI) sight and an optical sight for precise tracking. It ensures the system can acquire and engage targets in all weather conditions, day or night.

\* Fire Control Computer (FCC): The FCC integrates data from the radar and EOFCS, enabling smooth transitions between gun and missile modes to provide the most effective response.

\* Dual Mode Engagement: For the adaptability, system will be able to engage targets by using either the Fire Control Radar or EOFCS.

This integrated system of guns, missiles, and sophisticated sensors makes the ADGN-SP a versatile protective shield for mechanized formations, capable of countering both large-scale drone attacks and precision strikes from manned aircraft.

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The indigenous ADGN-SP is expected to compete with international systems like South Korea's K30 Biho Hybrid and Russia's Pantsir-S1, which the Indian Army has previously considered. DRDO's design, however, offers advantages in terms of cost-effectiveness, customization to Indian requirements, and strategic independence, aligning with the "Atmanirbhar Bharat" initiative.

The Zorawar's lighter weight (25 tons, compared to the 40+ tons of many existing Self-Propelled Anti-Aircraft Gun (SPAAG) systems) makes it particularly suitable for deployment in high-altitude areas like Ladakh and Sikkim, where heavier systems may face operational limitations.

An official familiar with the project stated that, if the Indian Army approves the proposal, DRDO could potentially deliver a prototype within 18 months, possibly by mid-2026. This accelerated timeline is possible because the project leverages existing, proven technologies: the Zorawar platform, VSHORADS missiles (which are already in limited production), and established radar/EOFCS systems derived from projects like the Akash missile program.

While the twin 30mm guns may require integration testing, potentially using components from Ordnance Factory Board upgrades or new designs, DRDO is confident in its ability to expedite the process. However, the official also noted that obtaining full production clearance could take more than four years, potentially delaying the system's induction until 2029 or later.



This longer timeframe is necessary to accommodate comprehensive and rigorous trials by the Indian Army. These trials will evaluate the system's mobility, firepower, and survivability across diverse terrains, including deserts, plains, and mountains. The Army's demanding requirements for day and night operation, resistance to electronic jamming, and seamless integration of radar and EOFCS systems will necessitate thorough validation, a process that has historically extended timelines for other DRDO projects, such as the Arjun main battle tank.

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## Defence News

### Defence Strategic: National/International

#### **Chief of the Air Staff Air Chief Marshal AP Singh underscores need for rapid capability enhancements to counter emerging security challenges**

**Source: Press Information Bureau, Dt. 12 March 2025,**

**URL: <https://pib.gov.in/PressReleasePage.aspx?PRID=2110603>**

Chief of the Air Staff (CAS) Air Chief Marshal AP Singh underscored the need for rapid capability enhancements to counter emerging security challenges in the evolving geo-strategic landscape. He was addressing student officers from the Indian Armed Forces undergoing the 80th Staff Course, along with the permanent faculty at the Defence Services Staff College (DSSC), Wellington. The CAS visited the DSSC on 11-12 March 2025.

Air Chief Marshal AP Singh urged course officers to embrace change, critically assess evolving threats, and design adaptive strategies for future conflicts. Stressing the importance of jointmanship, he emphasized the need for integrated training and operational synergy among the three Services to enhance combat effectiveness. In his address, the CAS provided a strategic perspective on the Indian Air Force (IAF), its ongoing capability development initiatives, and the importance of unified operations in modern warfare. He highlighted the accomplishments, resilience, and unwavering commitment of IAF personnel in safeguarding India's national interests.

During his visit, the CAS was also briefed on the DSSC's training activities and its emphasis on fostering jointmanship among the Armed Forces, a key aspect of modern military preparedness. He commended the institution's role in shaping future military leaders through rigorous academic and professional training. The visit reaffirmed the IAF's commitment to enhancing joint operational

capabilities and strengthening inter-service cooperation, ensuring a well-prepared leadership for the challenges of tomorrow.



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## Ukraine top arms importer in 2020-24, India second: Global think-tank SIPRI

Source: Hindustan Times, Dt. 11 March 2025,

URL: <https://www.hindustantimes.com/world-news/ukraine-top-arms-importer-in-2020-24-india-second-global-think-tank-sipri-101741687038646.html>

Ukraine, which is embroiled in a prolonged conflict with Russia, was the world's largest importer of major arms during 2020-24, when its imports increased nearly 100 times as compared to the figures for 2015-19, a new global report said. India was the world's second largest arms importer during the period under review, with its imports reflecting "perceived threats from both China and Pakistan". However, India's imports decreased by 9.3 per cent between 2015-19 and 2020-24, according to a statement by independent global think-tank Stockholm International Peace Research Institute , which published the report.

"European arms imports overall grew by 155 per cent between the same periods, as states responded to Russia's invasion of Ukraine and the uncertainty over the future of US foreign policy," it said. The US further increased its share of global arms exports to 43 per cent, while Russia's exports fell by 64 per cent, as per the new data on international arms transfers published by SIPRI on Monday.

The Ukraine-Russia conflict began in February 2022 and efforts are currently being made by certain quarters to resolve it and bring lasting peace in the region. "Ukraine became the world's largest importer of major arms in the period 2020-24, with its imports increasing nearly 100 times as compared to 2015-19," SIPRI said in the statement.

The overall volume of arms transfers globally remained at roughly the same level as in 2015-19 and 2010-14, as increasing imports in Europe and the Americas were offset by decreases in other regions. "The top 10 arms exporters in 2020-24 were the same as those in 2015-19, but Russia fell to third place behind France, while Italy jumped from 10th to sixth place," the statement said.

"At least 35 states sent weapons to Ukraine after Russia's full-scale invasion in 2022, and substantial further deliveries are in the pipeline. Ukraine received 8.8 per cent of global arms imports in 2020-24.

"Most of the major arms supplied to Ukraine came from the US, followed by Germany and Poland. Ukraine was the only European state among the top 10 importers in 2020-24, although many other European states significantly increased their arms imports during the period," SIPRI said.

Russia delivered major arms to 33 states in 2020-24. Two thirds of Russian arms exports went to three nations India, China and Kazakhstan, as per SIPRI data.

"France became the world's second largest arms supplier in 2020-24, delivering arms to 65 states. France's exports of major arms to other European states almost trebled between 2015-19 and 2020-24. This was mainly due to deliveries of combat aircraft to Greece and Croatia, and arms supplies to Ukraine after Russia's full-scale invasion in 2022," it said.

India received by far the "largest share" of French arms exports almost twice the share that went to all European recipients combined. The second largest recipient of major arms from France was Qatar, the think-tank said. China was the fourth largest exporter of arms in 2020-24, with 5.9 per cent of global arms exports.

Despite China's efforts to increase its arms exports, many large importers do not buy Chinese arms for "political reasons", the statement noted. The largest share of Indian arms imports came from Russia, a significantly smaller share than in 2015-19 and 2010-14, it said.

"Arms imports by Pakistan grew by 61 per cent between 2015-19 and 2020-24. China became even more dominant as its supplier, accounting for 81 per cent of Pakistan's arms imports in 2020-24, compared to 74 per cent in 2015-19," SIPRI said.

With the sharp drop in China's arms imports, and marked decreases in imports by Taiwan and South Korea, arms imports by East Asian states shrank by 22 per cent between 2015-19 and 2020-24. Japan was the only East Asian state that saw an increase in its arms imports, the think-tank added.

SIPRI is an independent international institute dedicated to research into conflict, armaments, arms control and disarmament. "The new arms transfers figures clearly reflect the rearmament taking place among states in Europe in response to the threat from Russia," Mathew George, programme director with the SIPRI Arms Transfers Programme, was quoted as saying in the statement. Arms imports by the European NATO members more than doubled between 2015-19 and 2020-24. The US supplied 64 per cent of these arms, a substantially larger share than in 2015-19.

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## Mega fighter jet deal back on track, Air Force to fast track tenders: Sources

**The planned induction of these 114 multirole fighter jets is going to help the Air Force maintain its squadron strength over the next 10 years along with the indigenous fighter jets.**

Source: India Today, Dt. 12 March 2025,

URL: <https://www.indiatoday.in/india/story/indian-air-force-new-jet-deal-government-to-fast-track-global-tenders-say-sources-2692368-2025-03-12>

At a time when a high-level defence ministry committee has agreed with its demand for new multirole fighter jets, the Air Force is planning to begin induction of these planes in the next four to five years through a fast-tracked global tender, sources said on Tuesday. The planned induction of these 114 multirole fighter jets is going to help the Air Force maintain its squadron strength over the next 10 years along with the indigenous fighter jets, including the different variants of the Light Combat Aircraft such as the Mark 1A and the Mark-2, they added.

According to sources, the Air Force will be retiring 10 fighter aircraft squadrons by the year 2037. It is looking to achieve the number of 60 fighter aircraft squadrons by the year 2047 and feels that the induction of the MRFA jets in the next five to 10 years would be critical to achieve the numbers required to be able to be battle-ready in case of a two-front war.

The fleets which would be looking at exiting from the Air Force in the next 10 to 12 years completely would be the Jaguar, Mirage-2000 and the MiG-29s, they added.

On the fighter aircraft competition, the sources said the aircraft likely to be part of the global tender include the Rafale, Gripen, Eurofighter Typhoon, MiG-31 and the F-16 aircraft have already taken part in the previous tender for 126 multirole combat aircraft and have already been evaluated. The only new entrant likely to be in the race this time is the F-15 Strike Eagle fighter aircraft from the American firm Boeing. The Air Force is also looking to conduct limited trials to ascertain the capabilities of the participating aircraft to fast track the tender process.

The Indian Air Force has been seeing a downfall in fighter jet numbers due to the phasing out of older aircraft of the MiG series and delays in the induction of new indigenous aircraft like the LCA Mark1 and Mark1A. The projects are likely to get delayed further due to supply chain issues faced by American firms due to Covid and commitments to provide supplies to its allies engaged in wars in Europe and the Middle East.





The Air Force has been able to induct only 36 Rafale aircraft which are in the 4.5 plus generation category, which provides it with some kind of edge over its adversaries in the neighbourhood, the sources said.

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## Why it is vital to document a national security policy

**Former J&K Governor NN Vohra is repeatedly warning the establishment to reform and build deterrence**

**Source: The Tribune, Dt. 12 March 2025,**

**URL: <https://www.tribuneindia.com/news/comment/why-it-is-vital-to-document-a-national-security-policy/>**

N N Vohra, a passionate advocate of defence and national security, has held important positions such as Defence Secretary and Principal Secretary to the PM. *India's National Security Challenges* is the Vohra-edited seminal collection of essays which he has discussed at the India International Centre with both Chiefs of Defence Staff, the late Gen Bipin Rawat and Gen Anil Chauhan, and held several public debates.

In the latest discussion on February 28, he emphasised two issues: the absence of a national security policy; and lack of transparency in the national security discourse. He listed the litany of woes: single service approach, inadequate higher defence management, lack of cross-domain connects and failure to integrate internal security with external security challenges. He has advocated a separate ministry for internal security. Along with former Foreign Secretary Shyam Saran, he recalled that three national security policy drafts were prepared, one endorsed by NSA Shiv Shankar Menon, but none saw the light of day due to fear of accountability by the political leadership. A fourth draft is likely lying with NSA Ajit Doval, collecting dust.

During his one-on-one with General Chauhan last year, Vohra got him to admit that a national security doctrine was indeed required and "something was being written." However, earlier, on May 29, 2024, during the release of Lt Col Gautam Das'(retd) book *Indian Art of War for Future Challenges*, when asked about the national security policy, General Chauhan had replied: "A written policy is not needed....We have fought wars for the last 70 years and have managed well...." Elsewhere, later that year, one of General Chauhan's acolytes, a cerebral General, concurred with him on not codifying the doctrine, saying: "It is in our head."

Modern statecraft is managing and safeguarding national interest predicated on written plans and contingencies for execution by different instruments of state. The security strategy should emanate from a holistic strategic defence and security review, that would lead to defence and security planning, resource allocation as a percentage of GDP, higher defence organisation and capability creation with inherent flexibility in an era of uncertainties and massive disruptions. Deterrence, diplomacy and development have to adapt to changes.

US President Trump has set the cat among the pigeons over his plan to end the Ukraine conflict. Suddenly, Europe and NATO, likely to be decoupled from the US, are scrambling to enhance defence budgets not just to 2 per cent, but 5 per cent. Russia is the enemy, but apparently not for

the US. In 1991, after the dissolution of the USSR, CDS Field Marshal Lord Bramall told me that the UK no longer had an enemy. "We're looking for one," he said. They have found one.

Lack of long-term defence planning has led to frightening operational situations. Among many, the one staring India in the face for two decades has now exploded: IAF fighter squadrons depleting to less than 31 squadrons, when 42 squadrons are authorised. In an unprecedented admonition of the Hindustan Aeronautics Limited (HAL), Air Chief Marshal AP Singh recently said that HAL had failed to provide LCA at the promised rate of supply, adding: "I am not confident of HAL. It is not in mission mode." While the IAF requires 35-40 jets every year, HAL has promised 24 LCA MK1A in 2025. The rest, Singh says, can be provided by the private sector. With the AON for 114 MRCA out of sight and no mention of GE414 engine in the Trump-Modi joint statement last month, the IAF will face a daunting situation that, one former IAF C-in-C told me last week, would render the IAF unable to support a two-front situation. He recalled that during his time (1986-2002), the IAF held 39 and a half squadrons, with defence spending being 3-4 per cent of the GDP.

Christopher Clary, international affairs and security expert, currently with the University of Albany, has reported that between 2014 and 2024, while China and Pakistan added 435 and 31 jets, respectively, India's inventory depleted by 151 jets (International Institute for Strategic Studies figures).

Prime Minister Narendra Modi believes this is not an era of war and describes India as a land of Buddha, not *yuddha*. That is why his reliance on Agniveer. Deterrence and capacity-building cannot be developed on the assumption that there would be no war and with just 1.9 per cent of GDP for defence.

Vohra's focus on opacity is illustrated by the wide disparity between the Chinese and Indian readouts after the October 2024 disengagement agreement in east Ladakh. The Working Mechanism for Consultation and Coordination on India–China Border Affairs (WMCC) statement of December 5, 2024, saying that all issues that emerged from 2020 had been resolved contradicted Foreign Minister Jaishankar's statement in Parliament on December 3: "We will be discussing de-escalation (de-induction) as well as effective management of our activities in the border areas." There is no transparency on patrolling rights, grazing and future of buffer zones. Both former Army Chiefs — General Naravane and General Pande — and COAS General Dwivedi have called for the restoration of status quo ante (May 2020), a pipedream.

In January this year, Defence Minister Rajnath Singh declared 2025 as the year of reforms, though the political elite has failed to appreciate the strength of military power.

Marc Faber, military historian, has said: "India continues to be ambivalent about power; has failed to coin a strategic roadmap (national security policy) commensurate with its growing economic wealth and use military instruments in support of national interests."

India's complacency stems from the illusion that it is in a sweet spot. It is lack of political will that fails the government in documenting a security policy and implementing reforms that ensure there is no deterrence failure, as in Kargil, attacks on Parliament, Mumbai and Galwan. Vohra is repeatedly warning the establishment to reform and build deterrence.

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## Centre bans 2 Hurriyat groups for five years

Source: The Indian Express, Dt. 12 March 2025,

URL: <https://indianexpress.com/article/india/centre-bans-awami-action-committee-jammu-and-kashmir-ittihadul-muslimeen-9881174/>

The Centre has banned two Jammu and Kashmir groups – Awami Action Committee (AAC) headed by Kashmir’s chief cleric Mirwaiz Umar Farooq and Jammu and Kashmir Ittihadul Muslimeen (JKIM) led by Mohammad Abbas Ansari — for five years for their alleged anti-national activities, “supporting terrorism and fuelling secessionist activities”.

Both the organisations are constituents of the All Parties Hurriyat Conference chaired by Farooq. In separate notifications, the MHA said the AAC and the JKIM are indulging in unlawful activities that are prejudicial to the integrity, sovereignty and security of the country. JKIM members have remained involved in supporting terrorist activities and anti-India propaganda for fuelling secessionism in J&K, the MHA said.

Considering all the facts available, the MHA declared both groups outlawed for five years under the Unlawful Activities (Prevention) Act, 1967, according to the notifications.

Reacting to the ban, Mirwaiz Farooq said the move seems to be a part of the continuation of the policy of “intimidation and disempowerment” that has been followed in J&K since August 2019 (when the Centre abrogated Article 370).

Farooq said that the AAC, founded by his father, Mirwaiz Molvi Farooq, at the peak of holy relic (moi muqadas) agitation in 1964, “has unwaveringly stood by the people of J&K advocating for their aspirations and rights through completely non-violent and democratic methods and calling for peaceful resolution of the Kashmir conflict through dialogue and deliberation, for which it’s members suffered jails and incarceration and even martyrdom.” “The voice of truth may be suppressed through force but will not be silenced,” Mirwaiz said.

PDP chief Mehbooba Mufti said that banning the two organisations “is another blow to Kashmir’s social and political landscape.” “Suppressing dissent will only deepen tensions rather than resolve them,” the former J&K Chief Minister said and urged the Omar Abdullah led J&K government to intervene and stop such actions of the Centre.

“While silencing Kashmir’s voices may serve BJP’s political agenda, it undermines the very Constitution that safeguards these rights. The central government must reassess its approach and move away from heavy-handed tactics,” Mufti said.

The Jamaat-e-Islami, also a part of the APHC, was banned in 2019 and the ban was extended in 2024. In 2023, the Muslim League Jammu Kashmir (Masarat Alam) was banned by the Centre under the UAPA for its alleged involvement in anti-national and secessionist activities in J&K. The Tehreek-e-Hurriyat (TeH), founded by the late Syed Ali Shah Geelani, was also banned in December 2023.

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## Urgent action needed to bolster depleting IAF squadron strength, says Defence Secretary Rajesh Singh

Source: CNBC News, Dt. 11 March 2025,

URL: <https://www.cnbctv18.com/india/indian-air-force-tejas-aircraft-squadron-strength-defence-secretary-19572274.htm>

The Indian Air Force (IAF) faces an "immediate need" to address its dwindling squadron strength, Defence Secretary Rajesh Kumar Singh has asserted, underscoring the urgency to modernise and expand the nation's aerial defence capabilities. Singh's comments come following the submission of a confidential report by an empowered committee, which he heads, outlining strategies to plug critical gaps in the IAF's preparedness.

"I think it's not a secret that their squadron strengths have been depleting and we need to do something about that," Singh stated, acknowledging the pressing challenge. Speaking to CNBC-TV18, he emphasised that efforts are underway to stabilise the production of the indigenous Tejas Light Combat Aircraft (LCA) to bolster the fleet.

Singh revealed that the government expects Hindustan Aeronautics Limited (HAL) to deliver 12 Tejas aircraft in the calendar year 2025, with a projected increase to 20 aircraft annually thereafter. The Defence Secretary attributed past delays in Tejas delivery schedules partly to engine supply issues, which he indicated are now being resolved. "Hopefully, we are seeing the end of that hiatus and now we have a relatively stable Tejas production line going forward," he stated, referencing the resolution of engine delivery issues.

Recognising the need for a multifaceted approach, Singh also indicated that the government is exploring "other options" to meet the IAF's operational requirements in the "shortest timeframe possible." While he refrained from detailing specific proposals, he assured that the government is committed to "optimising among the constrained choices that they have to ensure that IAF strength is rapidly scaled up."

The empowered committee's report, while confidential, is understood to provide "specific time-bound recommendations, short, medium and long term" to address identified capability gaps. It emphasises the need to boost the "Make in India" initiative in the aerospace sector, including increased private sector participation.



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## U.S. Vice-President Vance likely to travel to India later this month: Report

Source: The Hindu, Dt. 12 March 2025,

URL: <https://www.thehindu.com/news/national/us-vice-president-vance-likely-to-travel-to-india-later-this-month-report/article69320128.ece>

United States (US) Vice President JD Vance and Indian-origin Second Lady Usha Vance will visit India this month, American news portal POLITICO reported citing three sources familiar with the matter. It will be JD Vance's second foreign trip as vice president and Usha Vance's first visit to India as second lady. Usha Vance's mother, a molecular biologist, and mechanical engineer father moved to the US from Andhra Pradesh.

In February, JD Vance visited France and Germany, where he criticised European governments over illegal migration, religious freedoms, and overturning elections in a speech at the Munich Security Conference. The POLITICO report on JD Vance's visit to India comes against the backdrop of trade negotiations between India and the US. US President Donald Trump this month cited high tariffs from countries such as Brazil, India, and China, and said his plan for reciprocal tariffs would come into effect on April 2. Indian officials hoped for a resolution through trade negotiations. Trump's comments about reciprocal tariffs in his address to a joint session of the US Congress intensified fears about trade wars and their impact on global economic growth. Union minister Jitin Prasada on Tuesday told Parliament that India and the US will focus on increasing market access for each other, reducing tariff and non-tariff barriers, and enhancing supply chain integration.

The comments came days after a Union commerce minister Piyush Goyal-led delegation concluded its US visit as the two sides have been working on a Bilateral Trade Agreement (BTA) hoped to be concluded by the fall of 2025. HT reported India is holding inter-ministerial discussions to lower exceptionally high tariffs on items such as automobiles (motorbikes and cars) for mutual gains. Prime Minister Narendra Modi and Trump on February 13 agreed to negotiate the first part of a "mutually beneficial and multi-sector" BTA by the fall of 2025. The two decided to set a "bold new goal" for bilateral trade – "Mission 500" – to more than double the bilateral trade to \$500 billion by 2030.



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## Framework To Restrict Chinese Components In Military Drones Submitted To MoD

Source: THE PRINT, Dt. 12 March 2025,

URL: <https://theprint.in/defence/framework-to-restrict-chinese-components-in-military-drones-submitted-to-defence-ministry/2543584/>

Given the widespread use of drones, a framework is being finalised to check Chinese imprint on these platforms as well as to boost indigenisation for the purpose of national security. Chinese components in drones—even those supplied to the Indian Army with many meant for deployment in border areas in northern and eastern sectors—have been a cause of concern for the defence establishment.

Last year, intelligence agencies had flagged the presence of Chinese components, including electrical, in drones purchased by the armed forces from domestic private players. What made the situation delicate was the Army relying on self-certification by drone makers claiming their products were free of Chinese components.

Director General, Army Design Bureau, Major General C.S.Mann said that there were 840 drone companies in the country, but they were mainly integrators. There were very few companies, which could be counted on fingers, that were actually drone manufacturers, he added.

“What we need is indigenisation,” he said at ‘Bharat Drone Manthan 2.0’ in Delhi.

The need for self-reliance, Major General Mann asserted, was felt in the past more than three years. Elaborating the threat dimension posed by the Chinese components, the major general said that it was now a security challenge.

“But now the dimension is different. It is no more just for the purpose of supply chain resilience or no more a logistical challenge. It is a national security challenge today. Because if we have the components coming from China, they are being used in these drones and then the entire data, the control of these drones is very much in the hands of the adversary sitting over there,” he said.

“Can you imagine the amount of vulnerability we have with all these drones operating in the country? So that is what we are targeting now and I am sure the drone industry is aware of it.”

The Indian Army has had multiple iterations with the drone industry as well as other government agencies including Quality Council of India (QCI), Standard Testing and Quality Certification (STQC), and various other ministries, he said. “We (Army and the Union govt) have come up with a framework.”

Major General Mann said that such a framework could mitigate the security vulnerabilities in drones for defence, and added that it is likely to get approved very soon.

“It has already been presented to the defence secretary. It’s going to get implemented in a few months. I can say, it is just one of our steps so that we ensure that at least we don’t have vulnerabilities,” he said.

The Army, he said, was restricted to just this for now because the levels of indigenisation in the country were still maturing, or not at par with others.

“Semi-conductors and the fabrication alongside other capabilities are not there. So while the efforts and initiatives have been taken by the government, it will take some time for it to actually get established and develop that kind of capability,” he said.

The concept of manned-unmanned teams because of drones has now even graduated to the unmanned-unmanned teams, he said. A recent example of this was seen in Ukraine wherein drones and unmanned ground vehicles were being used in conjunction with each other for an operation, he added.

Explaining the Indian Army's approach in this regard, Major General Mann said that the Army's approach is "eagle on every soldier's shoulder".

"The Indian Army is looking at the idea of one drone with every soldier for the purpose of Intelligence, Surveillance and Reconnaissance (ISR) and even for the purpose of targeting," he said. "And towards that, we're looking at establishing drone labs even at the formation levels and also having drone incubation hubs in some of the military stations."



It was important for India to have both drone and counter-drone measures, he said. "So it's a great opportunity for the industry. The global market says that the Compound Annual Growth Rate for the drone industry is nearly about 8 percent. And for the Indian market, the expectation is about \$11.8 billion by 2026." "So, in the interim is this that at least if we can mitigate these security vulnerabilities, that will be good enough for us. But ultimately, the aim is indigenisation," Major General Mann said.

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## **India-Brazil defence partnership: MoU on 'Scorpene' class submarine maintenance to be inked soon**

**Source: The Financial Express, Dt. 11 March 2025,**

**URL: <https://theprint.in/defence/framework-to-restrict-chinese-components-in-military-drones-submitted-to-defence-ministry/2543584/>**

In an important visit to India recently, General Heraldo Luiz Rodrigues, Secretary of Defence Products (SEPROD) of Brazil, set the stage for a deeper defence partnership between the two nations. The discussions in New Delhi with top officials in the Ministry of Defence and three

services covered everything from submarine maintenance to cutting-edge missile systems, with a focus on cooperation that goes beyond just buying and selling equipment.

Brazil is set to sign an MoU for submarine MRO next month, a move that could change the game for India's naval defence. The deal will allow India to maintain its 'Scorpene' submarines locally, boosting self-reliance in an area that has long depended on foreign expertise. The partnership will open the door for Brazil to share its wealth of knowledge in submarine maintenance, something that could help India modernize and strengthen its naval capabilities.

In 2022, Brazilian Navy delegation, led by Vice Admiral Liberal Enio Zanelatto had visited the Western Naval Command and Mazagon Dock Shipbuilder Limited (MDL) in Mumbai, where the 'Scorpene' class submarines were being constructed. The delegation had inspected an Indian Navy Kalvari (Scorpene) class submarine. This visit had resulted in discussion related to submarine technology, defence and security cooperation, and also the shared maritime interests of both nations. Following this visit then, the Brazilian side had expressed interest in collaborating with India for the maintenance of their Scorpene-class submarines. And the two countries discussed building of frigates jointly for the Brazilian Navy, with India being shortlisted as a candidate for this project.



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## Science & Technology News

**Blood Moon and Christopher Columbus: How the navigator tricked Jamaicans with a total lunar eclipse**



Source: The Indian Express, Dt. 12 March 2025,

URL: <https://indianexpress.com/article/technology/science/christopher-columbus-tricked-jamaicans-total-lunar-eclipse-blood-moon-9880612/>

Knowledge is power, and at times, it can be used to gain an upper hand in difficult situations. As skywatchers gear up for a [total lunar eclipse this week](#), a well-documented episode highlights how Christopher Columbus, the famed explorer and navigator, leveraged his astronomical knowledge to his advantage. According to an article published in *The Guardian* in 1999, Columbus predicted a Blood Moon in 1504, and consequently manipulated and frightened the people of Jamaica into fulfilling his demands.

*The Guardian* article says that when Columbus was stranded on the shores of Jamaica in 1504, he learned about an upcoming total lunar eclipse on February 29, also known as the Blood Moon. He used this knowledge to intimidate the leaders of Jamaica that his powerful Christian god was displeased with how they had treated him. As a sign of this anger, he claimed, the moon would turn dark with a blood-red sky, the report mentions.

While many initially dismissed his warning, they became terrified when the total lunar eclipse occurred. Columbus then rushed to his cabin, pretending to pray for divine intervention. When the eclipse ended, the people believed his story and not only provided all the supplies he needed but some even begged for forgiveness, the report notes. It is said that Columbus used a sandglass to measure the timing of the lunar eclipse, to make everything look believable.



A total lunar eclipse similar to the Blood Moon in 1504 will occur on March 13 and 14 this year, and it will be visible in select parts of the world but not in India, according to *Space.com*. This eclipse occurs 521 years after the one Columbus used to his advantage and follows an identical path with the same background stars, *Space.com* mentions. An identical eclipse happens once every 223 “lunations,” or 18 years, 11 days, and 8 hours — a cycle known as the Saros.

The upcoming total lunar eclipse is part of the Saros 123 cycle. If you have the opportunity to witness it, take a moment to reflect on how Columbus, nearly 500 years ago, used a similar event to his benefit.

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## Astronomers Just Traced Mysterious Radio Pulses to an Unusual Star Duo

Source: Sci Tech Daily, Dt. 12 March 2025,

URL: <https://scitechdaily.com/astronomers-just-traced-mysterious-radio-pulses-to-an-unusual-star-duo/>

Astronomers have finally traced mysterious radio pulses in the Milky Way to a unique cosmic duo—a red dwarf and a white dwarf orbiting each other every two hours. This discovery challenges previous assumptions that only neutron stars produce such signals.

### Mysterious Radio Pulses in Space

An international team of astronomers, led by Dr. Iris de Ruiter from the University of Sydney, has discovered that a white dwarf and a red dwarf orbiting each other every two hours are emitting radio pulses. By using optical and x-ray telescopes for follow-up observations, the researchers were able to pinpoint the exact source of these pulses. This marks the first time astronomers have confirmed the origin of such radio emissions, which have been detected throughout the Milky Way.

Their findings have been published today (March 12) in *Nature Astronomy*.

### *Unraveling the Cosmic Mystery*

In recent years, advances in data analysis have allowed scientists to detect radio pulses lasting from seconds to minutes, seemingly originating from stars within our galaxy. While there have been many theories about what causes these bursts, no definitive proof existed until now. This study, conducted by Dr. de Ruiter during her time at the University of Amsterdam, provides the long-awaited answer.

Dr. de Ruiter, who received her doctorate from the University of Amsterdam in October 2024, is now a postdoctoral researcher at the University of Sydney. During the last year of her PhD, she developed a method to search for radio pulses of seconds to minutes in the historical archive of LOFAR, the Low-Frequency Array telescope in the Netherlands.

While improving the method, Dr. de Ruiter discovered a single pulse in the 2015 observations. When she subsequently sifted through more archive data from the same patch of sky, she discovered six more pulses. All the pulses came from a source called ILTJ1101.

### *The Red and White Dwarf Duo*

Follow-up observations with the 6.5m Multiple Mirror Telescope in Arizona and the Hobby-Eberly Telescope in Texas (USA) showed that it is not one flashing star, but two stars that together cause the pulse. The two stars, a red dwarf and a white dwarf, orbit a common center of gravity every 125 minutes. They are located about 1600 light-years from us in the direction of the Big Dipper, also known as the Plough, within the Ursa Major constellation.

Astronomers believe that the radio emission is caused by the interaction of the red dwarf with the white dwarf's magnetic field. Astronomers plan to study the ultraviolet emission of these entwined

stars in detail. This will help to determine the temperature of the white dwarf and learn more about the history of white and red dwarfs.

“It was especially cool to add new pieces to the puzzle,” Dr. de Ruiter said. “We worked with experts from all kinds of astronomical disciplines. With different techniques and observations, we got a little closer to the solution step by step.”

### *Neutron Stars No Longer Alone*

Because of this discovery, astronomers now know that neutron stars do not have the monopoly on bright radio pulses. In recent years, other research groups have discovered about 10 such radio-emitting systems. However, these groups have not yet been able to prove whether these pulses come from a white dwarf or a neutron star.

Researchers are now searching through the LOFAR data to find more such long-period pulses. Co-author Dr. Kaustubh Rajwade (University of Oxford, UK) said: “There are probably many more of these types of radio pulses hidden in the LOFAR archive, and each discovery teaches us something new.”



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## **Water’s Hidden Side Revealed – It Can Exist in Two Liquid Forms at Once**

Source: Sci Tech Daily, Dt. 12 March 2025,

URL: <https://scitechdaily.com/waters-hidden-side-revealed-it-can-exist-in-two-liquid-forms-at-once/>

Scientists have found that water, under extreme pressure and cold temperatures, can split into two different liquid phases. This was theorized decades ago but never proven—until now. Advanced molecular simulations, leveraging AI and quantum mechanics, have made it

possible to model this elusive behavior, hinting at potential future applications in materials science and environmental technology.



### **The Unique Nature of Water**

Water is a truly unique substance. It is one of the few materials that can naturally exist as a solid, liquid, and gas at the same time under normal conditions—for example, think of ice floating on a pond, liquid water beneath it, and water vapor forming clouds above. It is also unusual because its solid form, ice, is less dense than its liquid form, which is why it floats.

Now, researchers at the University of California San Diego have uncovered another remarkable property of water. Under extreme pressure and low temperatures, liquid water can separate into two distinct liquid phases—one denser than the other. This discovery, published in *Nature Physics*, provides new insight into water’s complex behavior.

### **Molecular Modeling: A New Approach**

Francesco Paesani, a professor of chemistry and biochemistry at UC San Diego, leads a team that combines chemistry, physics, and computer science to develop advanced models of molecular behavior. Using machine learning and computational algorithms, his group creates highly realistic simulations that closely match experimental observations.

“Our water model is so realistic you can almost drink it,” Paesani said.

## **Water's Critical Point Revealed**

Most liquids are homogenous — it all flows together and you can't distinguish one liquid molecule from the next. Indeed, this is mostly true of water. However, in 1992 researchers theorized that at a certain temperature and pressure, liquid water would reach a critical point at which it would no longer be homogenous.

Paesani's team conducted simulations that revealed the critical point at which the temperature is low enough (198 Kelvin or -103 Fahrenheit) and the pressure is high enough (1,250 atmospheres) for water to spontaneously separate into high-density and low-density liquids.

At this critical point, water exhibits wild oscillations between high- and low-density phases. Below this pressure, water returns to its low-density phase; above it, it shifts entirely to the high-density phase. This is an unexpected phenomenon unfolding at the molecular level.

## **Advancing Computational Models**

The 1992 simulation was crude. Since then, researchers have tried to create this spontaneous separation experimentally, but without success. Over the past three decades, advancements in computational modelling have made more detailed, accurate simulations possible — particularly the advent of data-driven many-body potentials, in which Paesani's group specializes.

The data-driven many-body model of water (MB-pol) developed by the Paesani group is trained on high-level quantum mechanical calculations (data-driven) and rather than calculating the energy of an entire system at once, they deconstruct energy in terms of individual contributions (many-body). These reference energies are fed into a machine learning model that is then able to provide realistic simulations of water across the entire phase diagram.

## **Understanding Water at the Quantum Level**

Paesani explains the MB-pol model in this way: a person alone in a room behaves a certain way. If someone else enters the room, the first person's behavior changes to accommodate the second person. If a third person enters, the dynamic of the first two changes. On and on until there are so many people in the room that the addition of one more does not significantly impact the behavior of any single person.

This is how MB-pol works. In the short range, there are quantum mechanical effects that directly modify the behavior of the water molecules, just as one person influences the behavior of another. However, at a certain point, the effects are averaged out over the entire system, just as adding one more person to an already crowded room doesn't impact the behavior of another individual.

## **Supercomputers and the Future of Research**

“Quantum mechanical simulations can be extremely expensive. You might be able to calculate the energies of five or six water molecules. Our method, using MB-pol and machine learning, allows us to run simulations for up to several microseconds,” stated Paesani. “This is something computational molecular scientists have dreamed about for a long time.”

However, the discovery didn't come easy. Running simulations for this research took nearly two years of non-stop calculations using some of the world's most powerful supercomputers, including

Expanse at the San Diego Supercomputer Center, which is a pillar of UC San Diego's new School of Computing, Information and Data Sciences.

### **Synthetic Liquids and Future Possibilities**

In the future, as technology develops, Paesani hopes this research might be used to devise synthetic liquids that undergo a similar liquid-liquid transition as water, but can do so in everyday conditions. Porous liquids that can move from low to high density would behave similarly to sponges, and could be used to capture pollutants or aid in water desalinization.

"The simulation took almost two years, so this is a really exciting accomplishment," stated Paesani. "I think our estimate is very realistic. Now it's up to the experimental researchers to see whether our predictions are correct." Currently, recreating these conditions in a laboratory remains a challenge. However, nanodroplet technology could offer a way forward by creating tiny water droplets that generate high internal pressure through surface tension, potentially leading to experimental confirmation of this phenomenon.

For now, this discovery offers the most accurate prediction yet of a phenomenon scientists have long suspected, but never directly observed. And when that day comes, it may change the way we think about water forever.

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## **A new protocol to image wave functions in continuous space**

**Source: Phys.org, Dt. 11 March 2025,**

**URL: <https://phys.org/news/2025-03-protocol-image-functions-space.htm>**

In recent years, physicists have been trying to better understand the behavior of individual quantum particles as they move in space. Yet directly imaging these particles with high precision has so far proved challenging, due to the limitations of existing microscopy methods. Researchers at CNRS and École Normale Supérieure in Paris, France, have now developed a new protocol to directly image the evolution of a single-atom wave packet, a delocalized quantum state that determines the probability that an associated atom will be found in a specific location.

This imaging technique, introduced in *Physical Review Letters*, could open exciting possibilities for the precise study of complex quantum systems in continuous space.

"Our group is interested in the study of ultracold atoms, the coldest systems in the universe, just a few billionths of degrees above absolute zero, where matter displays fascinating behaviors," Tarik Yefsah, senior author of the paper, told Phys.org. "One of these behaviors is the so-called superfluidity, a remarkable state of matter, where particles flow without friction.

"This is a purely quantum phenomenon where the system, although composed of particles, behaves as a giant wave. When the interaction between particles is large, the precise behavior of such a state is extremely difficult to predict theoretically, especially at the microscopic, atomic, scale."

The primary objective of the recent study by Yefsah and his colleagues was to probe these quantum systems by resolving each individual atom involved in them. They were aware that by turning on

an optical lattice (i.e., a laser-made egg carton–like box), using it to pin atoms and then shining a carefully selected light onto them, they would be able to individually image them becoming fluorescent while being trapped.

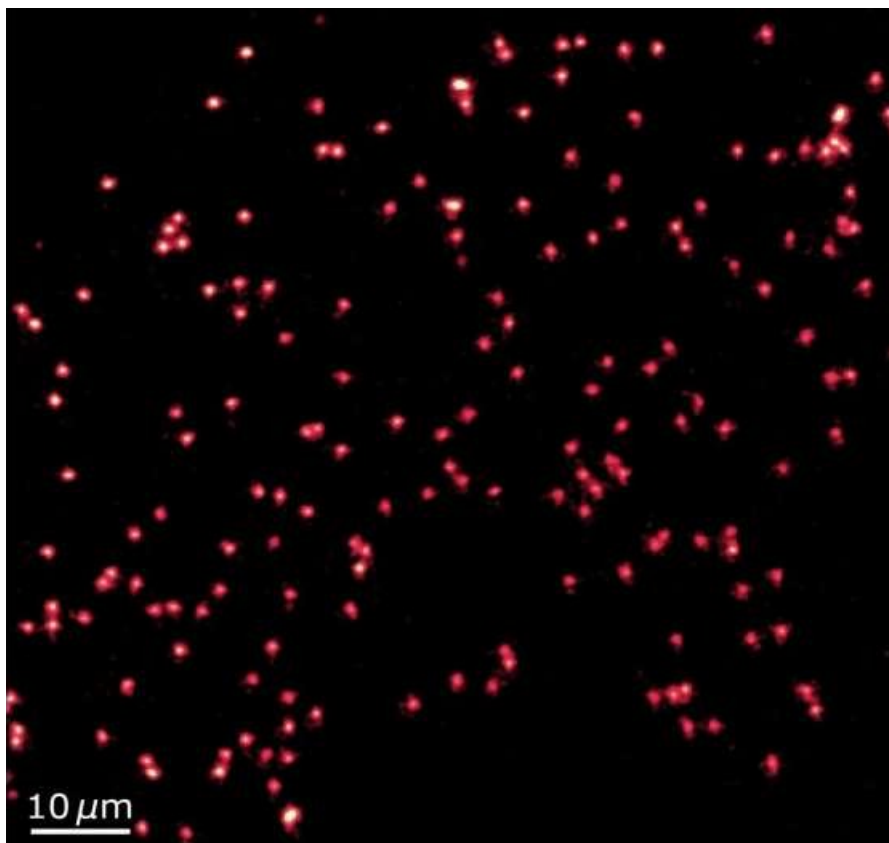
"Atoms are initially in free space, and without an optical lattice for the detection phase they would move around too much and we would lose information on their initial position," said Yefsah.

"With the use of an optical lattice, the question is then, how do we ensure that the atoms are pinned in the closest lattice well (egg slot) to their initial position rather than moving to a distant one?"

"The latter scenario would yield incorrect information. We realized that the answer to this question is not obvious even for a single-atom wave function living in free space—before even considering the complicated many-body wave function of an interacting ensemble."

Based on these initial predictions and considerations, the researchers realized that it would make sense to first perform their experiment with single-atom wave functions. If this succeeded, they could then employ the same methods to study more complex quantum systems.

"This experiment is crucial: if pinning fails there, there is not much hope for it to work with more complicated systems," said Yefsah. "Luckily, we found a regime where it worked beyond expectations, with a near 100% fidelity."



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## **New AI Tool Predicting Brain Decline In Advance May Revolutionise Dementia Treatment**

**Source:** NDTV News, Dt. 11 March 2025,

**URL:** <https://www.ndtv.com/science/new-ai-tool-predicting-brain-decline-in-advance-may-revolutionise-dementia-treatment-7897974>

### **New AI Tool Predicting Brain Decline In Advance May Revolutionise Dementia Treatment**

Researchers at Mass General Brigham have developed a new AI tool that has the potential to revolutionise dementia treatment.

The researchers used AI to detect the subtle changes in brain wave activity.

A new, game-changing artificial intelligence (AI) tool capable of predicting brain decline in patients, years in advance, allowing for earlier treatment options has been developed.

Researchers at Mass General Brigham have come up with the AI tool that analyses subtle changes in brain activity during sleep using electroencephalography (EEG) to make the prediction.

The study, published in the Journal of Alzheimer's Disease, highlights that the AI tool was trained using sleep study data from a group of women over 65, who were tracked for five years. Of the 281 participants who had normal cognitive function at the time of the initial sleep study, 96 developed cognitive impairment by the time they arrived for the second round of assessments, five years later.

After extracting brainwave patterns from the EEG data, the researchers used AI to detect the subtle changes in brain wave activity, especially in the gamma band frequencies during deep sleep.

"This could completely change how we approach dementia prevention," said Dr Shahab Haghayegh, lead author of the study.

"Using novel sophisticated analyses, advanced information theory tools and AI, we can detect subtle changes in brain wave patterns during sleep that signal future cognitive impairment, offering a window of opportunity for intervention years before symptoms appear," Mr Haghayegh added.

#### **Early detection system**

According to the World Health Organization (WHO), about 55 million people worldwide live with dementia. Multiple studies have suggested that prior to the onset of cognitive impairment, alterations in behaviour and physiological functions may occur. Identifying these signals at the prodromal stages may potentially provide a better window for effective interventions.

With the AI tool's early detection system, those at risk could be given valuable time to usher in radical lifestyle changes such as exercising, staying mentally active and eating a balanced diet. These changes may help preserve cognitive health before the effects of impairment set in.

The researchers, however, added that larger studies with more diverse populations were required to validate and expand on these findings in diverse populations.





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