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# समाचार पत्रों से चयित अंश Newspapers Clippings

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

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# DRDO News

## DRDO On Twitter

**DRDO**    
 @DRDO\_India

[#DRDOUpdates](#) | DRDO conducted TDF-**मंथन** on 2nd August 2022 at Vigyan Bhawan with Indian industries, tri-services and DRDO officials to brainstorm upon the future challenges and opportunities for cutting-edge defence developments.

[@DefenceMinIndia](#)  
[@SpokespersonMoD](#)



12:47 PM · Aug 3, 2022 · Twitter for iPhone



गुरुवार, 04 अगस्त 2022

### 19 महीनों से बिना एयरक्राफ्ट कैरियर के है इंडियन नेवी, रीफिटिंग के लिए गया है INS विक्रमादित्य

इंडियन नेवी करीब 19 महीने से बिना ऑपरेशनल एयरक्राफ्ट कैरियर के काम कर रही है। नेवी (Indian Navy) के पास एक ही एयरक्राफ्ट कैरियर है आईएनएस विक्रमादित्य (INS Vikramaditya), यह भी पिछले 19 महीनों से ऑपरेशनल नहीं है। सूत्रों के मुताबिक दिसंबर 2020 में एयरक्राफ्ट कैरियर को री-फिट के लिए भेजा गया। यह काम कारवार में हो रहा है और अभी इसमें 2-3 महीने का और वक्त लग सकता है। जिसके बाद ही आईएनएस विक्रमादित्य का किसी भी ऑपरेशन में इस्तेमाल किया जा सकेगा। एलएसी की स्थिति को देखते हुए आगे खिसकाई तारीख सूत्रों के मुताबिक आईएनएस विक्रमादित्य की रीफिटिंग यानी मेंटेनेंस का काम वैसे तो 2018 से ही होना था लेकिन नेवी की कई एक्सरसाइज को देखते हुए इसे टाला गया। फिर 2020 की शुरुआत में ईस्टर्न लद्दाख में एलएसी पर तनाव शुरू हो गया और चीन के साथ तनाव को देखते हुए फिर इसके मेंटेनेंस की तारीख आगे खिसकाई गई। नेवी के पास एक ही एयरक्राफ्ट कैरियर है और चीन के साथ तनाव की स्थिति में इसे मेंटेनेंस के लिए नहीं भेजा जा सकता था।

इसलिए है तीसरे एयरक्राफ्ट की जरूरत ऐसे वक्त में जब एलएसी पर सबकुछ शांत नहीं है और चीन अलग अलग फ्रंट पर अग्रेसिव रवैया दिखा रहा है, इंडियन नेवी के पास ऑपरेट करने के लिए एयरक्राफ्ट कैरियर ही नहीं है। हालांकि जल्द ही नेवी को दूसरा एयरक्राफ्ट कैरियर विक्रांत मिल जाएगा। जिसके बाद नेवी के पास दो एयरक्राफ्ट कैरियर हो जाएंगे। लेकिन नेवी काफी वक्त से तीसरे एयरक्राफ्ट कैरियर की जरूरत बता रही है। ताकि जब कभी एक एयरक्राफ्ट कैरियर रीफिट के लिए जाएगा तो उस वक्त भी नेवी के पास दो एयरक्राफ्ट कैरियर ऑपरेशनल होंगे। चीन के पास दो एयरक्राफ्ट कैरियर पहले से हैं और तीसरा एयरक्राफ्ट कैरियर बन रहा है। ऐसी आशंका जताई जाती रही है कि फिर चीन अपने एयरक्राफ्ट कैरियर को हिंद महासागर रीजन में ऑपरेट करने लग सकता है। अभी चीन के शिप आते हैं और चले जाते हैं। जब उसके पास एयरक्राफ्ट कैरियर का सपोर्ट होगा तो वह ज्यादा अग्रेसिव दिख सकता है। हर जहाज-सबमरीन के लिए तय है मेंटेनेंस का वक्त

आईएनएस विक्रमादित्य के मेंटेनेंस में 19 महीने से भी ज्यादा वक्त लगने के सवाल पर एक अधिकारी ने कहा कि जब एक सामान्य गाड़ी के मेंटेनेंस में ही 5-6 घंटे लग जाते हैं, तो आईएनएस विक्रमादित्य तो चालीस हजार टन से भी ज्यादा का है। मेंटेनेंस में किसी भी वॉरशिप के मैकेनिकल, इलैक्ट्रिक सभी पार्ट्स का मूल्यांकन होता है और उसे फुल परफॉर्मंस में लाने के लिए जो भी जरूरी होता है वह किया जाता है। उन्होंने बताया, कोई भी वॉरशिप या सबमरीन का दो साल के ऑपरेशन के बाद मेंटेनेंस किया जाता है। जिसमें उसके साइज के हिसाब से एक हफ्ते से दो महीने तक का वक्त लग सकता है। इस तरह तीन बार यह चक्र पूरा होने के बाद फिर नॉर्मल रीफिट (एनआर) के लिए भेजा जाता है। इसमें चार महीने से लेकर डेढ़ साल तक का वक्त लग सकता है। किसी भी वॉरशिप या सबमरीन का जब दो बार एनआर हो जाता है उसके बाद फिर उसे मेजर रीफिट के लिए भेजा जाता है। इसमें लंबा वक्त लगता है।

<https://navbharattimes.indiatimes.com/india/indian-navy-is-without-aircraft-carrier-since-19-months-ins-vikramaditya-gone-for-refit-latest-news/articleshow/93332153.cms>



*Thu, 04 Aug 2022*

## **Aircraft Carrier INS Vikramaditya to Sail Out of Refit in Couple of Months**

Aircraft carrier INS Vikramaditya is undergoing its first major refit since December 2020 and is expected to sail out in the next couple of months. “This is the first major refit of INS Vikramaditya and it should come out in couple of months,” a defence source said. Once that happens and with Indigenous Aircraft Carrier (IAC) Vikrant set to be commissioned this month, the Navy will have two fully operational carriers for sometime, the official noted. Explaining the maintenance and refit process, the official said a ship or submarine, after two years of operation, goes for refit — called the assisted maintenance period. The duration ranges from two weeks to two months depending on the size of the vessel.

Then there is the normal refit after six years, ranging anywhere from four months to one and half year, the official elaborated. Being very large and complex platforms, aircraft carriers are out of action for long periods of time for maintenance and upgrades, another officer noted, adding this is why the Navy has been pressing for a third aircraft carrier. The Navy envisages IAC-II to have a displacement of 65,000 crore and use a Catapult Assisted Take Off But Arrested Recovery (CARTOBAR) for launching aircraft. The 44,500-tonne INS Vikramaditya procured from Russia is the lone carrier currently in service. Like INS Vikramaditya, Vikrant too would employ the STOBAR (Short Take-Off But Arrested Recovery) mechanism with a ski-jump and arrestor cables to launch and recover aircraft.

### **Fire during trials**

The schedule was delayed by couple of months due to the recent fire onboard during the trials at sea off Karwar on July 20. The fire was brought under control by the ship’s crew using onboard firefighting systems and no casualties were reported. In June, China, which operates two carriers

Liaoning and Shandong, launched its third aircraft carrier, Fujian, into waters, also its largest. The Parliamentary Standing Committee on Defence, in its report last December, said in its recommendation to the government that having three aircraft carriers will considerably enhance combat capabilities of the Navy.



*INS Vikramaditya anchored in Mumbai harbour*

Taking into account the long coastline and hostile adversities on both sides of Indian peninsula, an aircraft carrier on both sides of coast is “quintessential” to uphold operational requirements, the committee said, and noted that given the long time for repairs and to bridge operational deficiencies thus arising, three aircraft carriers are an “unavoidable requirement” to meet any eventualities. In its reply to the committee, the government had stated, “The requirement of third aircraft carrier will be worked out on the Indian Navy committed liabilities and future acquisition projects.”

<https://www.thehindu.com/news/national/aircraft-carrier-ins-vikramaditya-to-sail-out-of-refit-in-couple-of-months/article65722118.ece>

THE HINDU  
**BusinessLine**

*Tue, 02 Aug 2022*

## **Indian Navy Ships on Sail to Celebrate 75th Independence Day in six Continents**

In a first of its kind effort, the Indian Navy warships are on sail to six different continents to celebrate 75th Independence Day as part of “Azadi Ka Amrit Mahotsav” and in the process demonstrate sailors operational potential and diplomatic outreach. The warships, that are doing exercises and other engagements with different navies on their ways, will hoist Tri-colour and perform other ceremonial activities after berthing at San Diego in United States, in Brazil, Muscat, London and Perth, said Indian Navy sources. A coordinated effort of this magnitude is happening for the first time to celebrate the freedom milestone along with friendly nations and maritime allies, said a Navy official.

Among the platforms set on sail are INS Tarkash which would be at Brazil on August 15, while INS Tharangini will dock at London and INS Sumedha at Perth, revealed Navy officials. The guided missile frigate, INS Tarkash, completed her Mediterranean deployment and entered the Atlantic to continue with her long-range voyage to visit Rio Di Janeiro for hoisting the national



flag. Prior to that, on July 26 the ship participated in a Maritime Partnership Exercise in the Atlantic with Royal Morocco Naval Ship Hassan 2, a Floreal Class Corvette, said Navy officials.

Similarly, INS Tharangini – the first sail training ship -- embarked on a 14-nation voyage, flagged as 'Lokayan 2022', from Kochi in April. She will reach London on August 13. The ship will wind up seven-month-long journey by calling on 17 ports spread across 17,485 nautical miles, added the Navy. Diplomacy is one of the primary role of Indian Navy and the effort demonstrates its Blue water capabilities, said officials.

<https://www.thehindubusinessline.com/news/national/indian-navy-ships-on-sail-to-celebrate-75th-independence-day-in-6-continents/article65712146.ece>



*Wed, 03 Aug 2022*

## **India's Indigenous Multi-Role Helicopters to be Another Ambitious Push towards 'Aatmanirbhar' Defence**

The design, development, and manufacture of multi-role helicopters for the armed forces, with Hindustan Aeronautics Limited (HAL), four or five private firms, could well be one of the most ambitious defence projects in India in the 75 years of its Independence. It will be using the Special Purpose Vehicle or SPV, with the government paying for some of the research and development costs involving HAL and other private firms. Discussions for this multi-role helicopter project are ongoing in the defence ministry. There is a talk of over 400 such helicopters being manufactured. What is important to note is that such a project, looking at it from the long-term perspective, has rarely been considered where everyone is involved including the defence ministry, a public sector firm in HAL, private sector firms and of course, the armed forces.

The development cost being talked about is about Rs 15,000 crores and the development time is estimated to be eight years. The current plan is for limited series production of the chopper in the ninth year. And if everything goes according to plan, full production after that. While the project, with the Indian Air Force as the lead organisation among the services, is still in the discussion stage, the fact that the 'aatmanirbharata' or self-reliance model is being followed could ensure that it could get the go-ahead. So far, it hasn't reached the Defence Procurement Board. And only after clearance by the Defence Procurement Board will it reach the all-important Defence Acquisition Council headed by defence minister Rajnath Singh. In a decade, many helicopters being used by the armed forces could well be outdated. This could be an opportunity for Indian designers to produce a helicopter for use over three or four decades. If successful, this could be a model to follow in the future.

<https://www.timesnownews.com/india/indias-indigenous-multi-role-helicopters-to-be-another-ambitious-push-towards-aatmanirbhar-defence-article-93312243>

Wed, 03 Aug 2022

## Myanmar may be Interested to Acquire Brahmos Cruise Missile

According to information published by TASS on August 2, 2022, Myanmar might purchase Russian-Indian BrahMos supersonic anti-ship cruise missiles, which are being manufactured by the two countries' joint venture BrahMos Aerospace, by borrowing money from the Indian government. BrahMos is a supersonic cruise missile manufactured by BrahMos Aerospace — a joint Russian-Indian venture. It was designed by the Russian NPO Mashinostroyeniya in partnership with the Indian Defence Research and Development Organization (DRDO). The missile's first test launch took place in 2001, and today its various versions are operated by the Indian Air Force, Navy, and Army. The company is based in New Delhi. The nametag "BrahMos" is formed by combining the names of two rivers — the Brahmaputra in India and the Moskva in Russia. According to open source intelligence, the Myanmar Navy already has five types of anti-ship cruise missiles: the Chinese-made C-801, C-802, C-802A, HY-2, and the Russian-made Kh-35U.

### About The Kh-35 Missile

The Zvezda Kh-35 is a Soviet turbojet subsonic cruise anti-ship missile. The missile can be launched from helicopters, surface ships, and coastal defence batteries with the help of a rocket booster, in which case it is known as Uran or Bal. It is designed to attack vessels up to 5,000 tons. The Kh-35 missile features a normal aerodynamic configuration with cruciform wings and fins and a semi-submerged air duct intake. The propulsion unit is a turbofan engine. The missile is guided to its target at the final leg of the trajectory by commands fed from the active radar homing head and the radio altimeter. The Kh-35 can be employed in fair and adverse weather conditions at sea states up to 5–6, by day and night, under enemy fire and electronic countermeasures.

<http://www.indiandefensenews.in/2022/08/myanmar-may-be-interested-to-acquire.html>

## The Tribune

Thu, 04 Aug 2022

### No Compromise on Security

*Lt Gen Pradeep Bali*

As independent India turns 75, the most important aspect of its nationhood is its territorial integrity and the safety and security of its citizens from any external threat or externally sponsored threat. At the forefront in safeguarding our country are the armed forces, supported by various other elements of state power, the prime one being the economy. We went through four major wars within the first 24 years as an independent country and the last of these conflicts saw



India liberating and facilitating the birth of a nation. A limited war was again fought successfully against Pakistani intrusions in Kargil. Virulent insurgencies, which are actually proxy wars, have been effectively combated and kept under check. However, disputed borders and large areas with constant friction continue to impinge on our developmental goals and territorial integrity. India's ongoing security problems are land-centric. We have unsettled and disputed borders with our two major adversaries.

Going from the east to west, there is a 3,488-km-long Line of Actual Control (LAC) with China, which is contested all along by the manufactured claims of our northern neighbour. It has well-identified disputed and sensitive areas. Almost in continuation is the disputed boundary with Pakistan on the world's highest battlefield at the Siachen glacier. Thereafter, is the Line of Control (LoC), stretching over 740 km through J&K. As the international border with our western neighbour nears the Persian Gulf, we have the boundary dispute at Sir Creek in the Rann of Kutch. Moving inwards from the borders, the Indian Army, paramilitary forces and Central police organisations have been embroiled in combating militant insurgency in J&K and the North-East, which is aided and abetted by our inimical neighbours.

Then there is a Maoist insurgency waxing and waning in the heartland states, where the Army deployment has been rightly avoided so far. As we look ahead, there are some pressing issues which need increased focus, relative to our national security. The first one is the economy and the optimum use of the defence budget. The major economic thrust of the government and the pointer to future economic prosperity is 'Make in India'. The Indian armed forces are a prominent stakeholder in its success. The matrix of numbers related to equipment and wherewithal of the services is of a very large dimension. The manufacture of military equipment not only gives a boost to the defence industry, but also builds up a dual-use ecosystem of many smaller items and sub-items, which in turn, encourages entrepreneurship, generates employment and multiple other benefits. The success of 'Make in India' for defence equipment will lead to an enhancement of defence exports, accrue forex earnings and contribute significantly to the GDP.

The big-ticket missile export to the Philippines was a clear pointer in the direction of becoming a net exporter of defence equipment. The recently tabled report by the Ministry of Defence in Parliament has highlighted a notable decrease in India's military equipment imports. This is primarily due to the new acquisition policies, thrust on indigenous manufacture and successive increase in items on the negative import list, giving a boost to the start-ups to work increasingly in the defence manufacturing eco-system. In this vein, very useful work is now being done in robotics and AI technologies by new small-scale entrants. Organising the armed forces into integrated theatre commands is another subject which needs urgent attention. It directly impacts how the forces should be structured and evolved into a robust organisation that optimally harnesses the national military power.

At the outset, there is no gainsaying that to be a great power, India needs a large and modern navy with a trans-oceanic reach. The Indian Navy is a formidable force but given our emerging challenges, it definitely needs to be on a growth trajectory, adequately equipped with surface, sub-surface and aerial platforms for varying roles. The Air Force has to possess the capability to not only guard our vast air space but also provide operational reach that can also act as an effective deterrent. The IAF is a highly professional service but its capacity needs to be enhanced, upgraded and modernised on an ongoing basis. However, the issue of integrated force structures has to be viewed in terms of our current challenges and not as one that a superpower with expeditionary forces would see it. Our deployments beyond the Indian shores are only

under the UN aegis with two brief exceptions in the past and that too in the immediate neighbourhood.

The US girdles the globe with its theatre commands and aircraft carriers and the wannabe superpower, China, has carved out its own version of such an organisation in keeping with its aspirations and perceived threats. India is neither an expansionist nation nor does it covet foreign territory or aspire to act as a global security provider on its own through the deployment of forces overseas. The primary role of our armed forces is to deter war against the country and prosecute operations to safeguard our territorial integrity in case deterrence fails. Given the adversarial relationships with our two major neighbouring countries, it is imperative to maintain and equip the three services with state-of-the-art and platform-centric systems.

However, given the force parities and stakes involved, as long as the disputes along the LAC and LoC are managed with resolve and sagacity, the actual occurrence of a large-dimension conventional conflict can well be deterred. At worst, face-offs and intrusions could lead to local clashes, which would lie in the domain of the Army with support from the Air Force. Within these parameters, the creation of an integrated theatre command system would be well served if it leads to greater synergy and optimisation while fulfilling this role. A concurrent aspect has to be economisation of effort and resources, which will help in balancing the revenue and capital expenditures in the defence budget. This can be achieved by working in a time-bound manner towards commonality in procurement, logistics and administrative issues, which are not service-specific, for the Army, Navy and Air Force. There are many such areas that require a merger and a patient examination for all three services, ensuring that there is no repetition and wastage of effort. These need to be pursued vigorously, overcoming procedural and service-centric hurdles.

<https://www.tribuneindia.com/news/comment/no-compromise-on-security-418525>



*Mon, 01 Aug 2022*

## **Government to Encourage Private Players in Defence Manufacturing**

Defence Industry sector, which was hitherto reserved for the public sector, was opened up to 100% for Indian private sector participation in May, 2001. According to the government officials, since the opening up of Defence sector, a total of 584 Industrial Licenses have been issued to 358 companies for manufacturing of various defence items. The initial validity of the Industrial License granted under the Industries (Development & Regulation) Act has also been increased from 03 years to 15 years. Increase in validity of Industrial Licenses has provided sufficient time and space for companies to start operations and manufacture without hindrance.

In order to give a push to the domestic defence industry, the Government has taken several policy initiatives in the past few years and brought in reforms to encourage indigenous design, development, and manufacture of defence equipment in the country, thereby expanding the production of indigenous defence equipment to strengthen our armed forces. These initiatives, inter-alia, include according to priority to the procurement of capital items from domestic sources under Defence Acquisition Procedure (DAP)-2020; Announcement of 18 major defence

platforms for industry-led design & development in March 2022; Notification of three 'Positive Indigenization Lists' of total 310 items of Services and two 'Positive Indigenization Lists' of total 2958 items of Defence Public Sector Undertakings(DPSUs), for which there would be an embargo on the import beyond the timelines indicated against them.

Defence Ministry has reformed the Simplification of the Industrial licensing process with a longer validity period. Liberalization of Foreign Direct Investment(FDI) policy allowing 74% FDI under automatic route.

In terms of streamlining the defence policies and procurement, the Government has also simplified the Make Procedure. In the area of defence research and development, defence Ministry has launched of Innovations for Defence Excellence (iDEX) scheme involving start-ups & Micro, Small, and Medium Enterprises (MSMEs). Under the iDEX, several projects are initiated to encourage start-ups in defence. On the path towards indigenization, ministry reformed the Implementation of Public Procurement (Preference to Make in India) Order 2017 and launched of an indigenization portal namely SRIJAN to facilitate indigenisation by Indian Industry including MSMEs. Government also reformulated the offset policy and gave new direction in Offset policy with thrust on attracting investment and Transfer of Technology for Defence manufacturing by assigning higher multipliers.

To attract investment and innovation in defence, ministry also establishment two Defence Industrial Corridors, one each in Uttar Pradesh and Tamil Nadu. Opening up of Defence Research & Development (R&D) for industry, start-ups and academia with 25 per cent of defence R&D budget earmarked to promote the development of defence technology in the country. Government has also increased the allocation of Defence Budget of military modernisation for procurement from domestic sources.

<https://www.financialexpress.com/defence/government-to-encourage-private-players-in-defence-manufacturing/2613358/>

## रक्षा परत से दुश्मन के रडार खाएंगे गच्चा

चंद्रप्रकाश गुप्ता, कानपुर

आइआइटी कानपुर की स्टार्टअप कंपनी के विशेषज्ञों ने एक ऐसा पदार्थ विकसित किया है, जिसकी परत चढ़ाने के बाद सैन्य उपकरण रडार की पकड़ में नहीं आ सकेंगे। इसको रडार अब्जार्वर कोटिंग नाम दिया गया है। यह तकनीक भारतीय सेना की तीनों शाखाओं के लिए उपयोगी होगी, उसकी मदद से दुश्मन की धरती पर किसी भी गोपनीय आपरेशन को अंजाम देना आसान होगा। रक्षा मंत्रालय के आइडेक्स (इनोवेशन फ़र डिफेंस एक्सीलेंस) कार्यक्रम के तहत इस तकनीक को शामिल कराने के लिए आवेदन किया गया है।

आइआइटी से मैटीरियल साइंस एंड इंजीनियरिंग में एमटेक और पीएचडी कर चुके डा. विशाल कुमार चक्रधारी ने पिछले वर्ष आरएफ नैनो कंपोजिट नाम से कंपनी बनाई थी, जिसे इसी वर्ष अप्रैल में संस्थान के

### आत्मनिर्भर भारत

- ▶ आइआइटी की स्टार्टअप कंपनी ने बनाया कार्बन और फेराइट आधारित नैनो मैटीरियल
- ▶ रडार से निकली विद्युत चुंबकीय तरंगों को अवशोषित कर लेगी सैन्य उपकरणों पर लगी परत



रडार अब्जार्वर कोटिंग का नमूना।

सौ. डा. विशाल कुमार

Contd.

स्टार्टअप इन्क्यूबेशन एंड इनोवेशन सेंटर (एसआइआइसी) से समर्थित कराया। उन्होंने बताया कि रडार अब्जार्वर कोटिंग, कार्बन और फेराइट आधारित नैनो मैटीरियल को पालीमर के साथ मिलाकर बनाया गया है। इसकी विशेषता है कि किसी उपकरण या वस्तु पर इसको परत के रूप में लगाने पर यह रडार, सोनार, इंफ्रारेड आदि से निकलने वाली विद्युत चुंबकीय तरंगों को अवशोषित कर लेता है। इससे उपकरण रडार की पकड़ में नहीं आता। यानी कि इस कोटिंग का इस्तेमाल लड़ाकू विमान, हेलीकॉप्टर, मिसाइल, ड्रोन, जलीय यान, युद्धपोत, पनडुब्बी, टैंक आदि पर किया जाए तो दुश्मन के रडार उसे पकड़ नहीं आएंगे।

**चीन, अमेरिका के पास ही है यह तकनीक :** डा. विशाल ने बताया कि रडार की दृष्टि से किसी उपकरण को छिपाने की तकनीक अभी तक चीन, अमेरिका और रूस के ही पास है। अब भारत भी इस तकनीक को बनाने वाले देशों की सूची में शामिल हो गया है।

उन्होंने बताया कि यह तकनीक विभिन्न युद्ध के दौरान बेहद कारगर साबित होती है। यही नहीं, सर्जिकल स्ट्राइक और अन्य गोपनीय आपरेशन

## ईएमआइ परिरक्षण सामग्री भी बना रही कंपनी

कंपनी उन्नत ईएमआइ परिरक्षण (शील्डिंग) सामग्री भी विकसित



रडार अब्जार्वर कोटिंग बनाने वाले डा. विशाल कुमार चक्रवर्ती। स्वयं

करने की कोशिश कर रही है, जिसका उपयोग रक्षा व एयरोस्पेस क्षेत्र में किया जाता है। ईएमआइ परिरक्षण

सामग्री की परत सभी तरह के इलेक्ट्रॉनिक्स उपकरणों को बाहरी विद्युत चुंबकीय हस्तक्षेप से होने वाले नुकसान से बचाती है। यह पदार्थ सभी तरह की माइक्रोवेव ऊर्जा को अवशोषित करने में सक्षम होगा। डा. विशाल ने बताया कि वर्तमान में इस सामग्री को विदेश से आयात करना पड़ता है।

में भी इसकी अहम भूमिका होती है। यह तकनीक भारत के रक्षा क्षेत्र को ताकत देगी और विश्व में दबदबा बढ़ाएगी।

# THE TIMES OF INDIA

Thu, 04 Aug 2022

## Army, Experts to Meet on China Threat Today

*By Prabin Kalita*

Top Army officers (both serving and retired) and experts on China will be coming together at the 4th Corps headquarters at Tezpur on Thursday and Friday to stay upto-date with the "evolving threat on the northern borders." Defence PRO Lt-Col A S Walia, in a statement titled, "Eyes on the Dragon- Indian Army to conduct seminar on China", stated that the two-day seminar "is aimed to further refine the understanding of the diverse contours of the evolution of Sino-India boundary dispute over the decades, Chinese strategic thought process and military transformation, implications and way ahead for India." The seminar has been organised by Army's Eastern Command, which is responsible for safeguarding the country's long frontiers in the northeast region across some of the most difficult and inhospitable high-altitude and jungle terrains found anywhere on earth. Eastern Command GOC-in-C Lt Gen RP Kalita, who will take part in the seminar, is currently on a tour to the forward areas in this theatre.

The Army commander will also take part in the seminar-cum-panel discussion. "The continued push for operational preparedness along the northern borders has received a shot in the arm with high priority fast paced infrastructure development in the border areas, infusion of latest technology in Army and a vigorous discourse on doctrine and strategy. Towards this, a seminar is being organised at Tezpur on 4th and 5th August to keep abreast with the evolving threat on the northern borders," the PRO stated.

The seminar will include talks and panel discussions by eminent subject matter experts, including senior level diplomats, academicians and senior military dignitaries such as former Indian Ambassador to the China Ashok Kantha, professor Srikanth Kondapalli, who is a professor in Chinese studies at Jawaharlal Nehru University, former bureaucrat and president of Centre for China Analysis and Strategy Jayadev Ranade, Dr Amrita Jash, who is an assistant professor at the department of geopolitics and international relations, Manipal Academy of Higher Education and French-born author, journalist, historian Claude Arpi. The panel also includes former Army commander Northern Command Lt-Gen Ranbir Singh (retd), former army commander Army Training Command Lt Gen Raj Shukla (Retd) and member of National Security Advisory Board LtGen SL Narasimhan (retd) apart from other serving military officials. The seminar will be attended by over 200 officers of the Indian Armed Forces, including senior military leadership and ground commanders, the PRO added.

<https://timesofindia.indiatimes.com/city/guwahati/army-experts-to-meet-on-china-threat-today/articleshow/93333694.cms>



## **India-US to Hold High-Altitude Military Exercise Near LAC Amid Rising Tensions With China**

Amid rising tensions with China, India and US will come together for two weeks of high-altitude military exercise in Uttarakhand's Auli, less than 100 km from the Line of Actual Control (LAC) in the Central Sector, ThePrint has learnt. The Indo-US joint exercise is known as 'Yudh Abhyas' and it will be the 15th edition this year. Sources in the defence and security establishment said the joint exercise is being planned from 14 to 31 October where the two forces will carry out "maneuvers to exploit the full scope" of high-altitude warfare. Sources also said the location (at 10,000 feet) where the exercise will take place falls in Stage 1 of acclimatization for high altitude.

"This time it is a very important exercise because the Indian side will be showcasing their high-altitude warfare strategies, while the Americans will be showcasing a number of technologies that can be used in such scenarios. This exercise has been planned in such a way that both sides come together for any scenario," a source said. Another source said that various activities have been planned for both sides to fully exploit the two weeks of focused high altitude military exercise and to see how the troops can operate together. Sources further said this edition of the exercise will see a greater integration of air and ground assets, meaning the Indian Air Force will also play a key role.

### **India-US tensions with China**

India and China have witnessed rising tensions at the LAC over the last two years following the stand-off in Ladakh. Meanwhile, tensions have also risen between the US and China over House Speaker Nancy Pelosi's Taiwan stop Tuesday. Noting that the Chinese military's infrastructure build-up under its Western Theatre Command — that looks after India — was "eye-opening and alarming", US Army Pacific Commanding General Charles Flynn had in June said that the Indian and American Army will train together this year at 9,000-10,000 feet to increase interoperability for high-altitude warfare. Interacting with a select group of journalists, Flynn also said Chinese build up along the LAC and construction of villages in Bhutan was "eye-opening".

<https://theprint.in/defence/india-us-to-hold-high-altitude-military-exercise-near-lac-amid-rising-tensions-with-china/1067250/>

*Tue, 02 Aug 2022*

## **Asia's 2 Biggest Militaries are Both Getting New Aircraft Carriers. Here's How China's and India's Latest Flattops Stack Up.**

China officially launched its newest and most advanced aircraft carrier, Fujian. Fujian is China's third aircraft carrier and the first to be totally designed and built domestically. It symbolizes the Chinese military's rapid expansion and is seen as a potential rival to the US Navy's nuclear-powered supercarriers. But China isn't the only Asian country getting a new carrier this year. In the final days of July, India's navy took delivery of its new carrier, Vikrant. Vikrant is also domestically designed and built, and its arrival is a major milestone for India, which is Asia's second largest military power and shares a long and contentious border with China.

In addition to their many improvements over their predecessors, both carriers are important firsts for their countries. It will be years before either is fully operational, but here's how the two flattops stack up. A Type 003-class carrier, Fujian is about 1,035 feet long and displaces about 80,000 tons fully loaded. This makes it slightly larger than its predecessors, the Type 001 Liaoning and Type 002 Shandong, which were about 1,000 feet long and displaced 60,000 to 70,000 tons. Liaoning is a Soviet-designed Kuznetsov-class carrier that China bought in 1998 and modified extensively before commissioning it into service in 2012. Shandong was based on Liaoning and entered service in 2019. All three of China's carriers use conventional engines rather than nuclear reactors, limiting the power they can generate and the time they can spend at sea.

Among Fujian's upgrades is a command island that is slimmer and more refined than those of its predecessors, freeing up space on the flight deck. The most striking change, however, is the replacement of the short takeoff but arrested recovery (STOBAR) system, and the ski-jump ramp it requires, used on both Liaoning and Shandong. Fujian has a completely flat deck and three catapults, reflecting China's effort to adopt the catapult-assisted takeoff but arrested recovery (CATOBAR) system used on US aircraft carriers. STOBAR allows jets to take off on shorter decks but limits how much fuel and weaponry they can carry when taking off. This is especially problematic for China, as the only fixed-wing carrier-based aircraft it has in service, the J-15, is already the heaviest carrier-based fighter in service.

A CATOBAR system can launch jets with bigger payloads and more fuel. It can also launch larger aircraft, like those suited for airborne early warning and control. Parts of Fujian's flight deck were covered during the launch ceremony, obscuring its catapults, but they are believed to use an electromagnetic aircraft launch system (EMALS) that can launch aircraft more efficiently and more frequently than steam-powered catapults. Until Fujian, the only carriers with EMALS were those of the US Navy's nuclear-powered Ford-class. Chinese sailors' unfamiliarity with the CATOBAR system and the challenges the US Navy has had with EMALS suggest it will be some time before Fujian reaches its full potential. The exact size and makeup of the Fujian's air wing is still not known, but it is expected to be larger than the roughly 36 aircraft carried by both Liaoning and Shandong and to include J-15 fighters and Z-18 helicopters. In the future, Fujian's

air wing may comprise J-35 stealth fighters (a naval version of the FC-31), Z-20F helicopters, and, thanks to EMALS, KJ-600 airborne early-warning aircraft and even carrier-based drones.

## **Vikrant**

Vikrant was officially launched in 2013 and is expected to be commissioned on August 15, but it won't be India's first or only carrier. India had former British carriers in service from 1961 to 1997 and from 1987 to 2016, and INS Vikramaditya, a modified Kiev-class carrier purchased from Russia and commissioned in 2013, is the Indian navy's current flagship. At 860 feet long and with a full displacement of about 45,000 tons, Vikrant is the biggest warship India has ever constructed. It was designed and built by India's largest shipbuilder, Cochin Shipyard Limited, and 76% of its components were developed domestically, according to India's Defense Ministry.

Vikrant is crewed by about 160 officers and 1,400 sailors and is powered by four gas turbines capable of generating 88 megawatts of power and of pushing it to a top speed of 28 knots. It can carry about 30 jets and helicopters, and like INS Vikramaditya, it uses a STOVAR system with a ski-jump ramp. Vikrant's initial air wing is expected to be made up of MiG-29Ks, the carrier version of the Russian-made MiG-29. The jet has served on INS Vikramaditya but its poor track record has led India to seek 26 new carrier-based fighters — the finalists are Boeing's F/A-18 Super Hornet and Dassault Aviation's Rafale-M. The F/A-18 has been the backbone of US Navy carrier aviation for decades, and Boeing has demonstrated its ability to operate on STOVAR decks in India. The Rafale-M has operated on the French aircraft carrier Charles de Gaulle, which uses catapults, and has been demonstrated on an Indian STOVAR system. (India's air force already operates the Rafale.)

India's HAL twin-engine fighter has also been proposed as an indigenous aircraft for Vikrant. The new carrier's air wing is likely to be rounded out by a mix of KA-31, MH-60R, and HAL Dhruv helicopters. INS Vikrant is expected to play a major part in boosting the Indian Navy's capabilities in the face of a rising Chinese threat in the waters around India.

<https://www.businessinsider.in/international/news/asias-2-biggest-militaries-are-both-getting-new-aircraft-carriers-heres-how-chinas-and-indias-latest-flattops-stack-up/articleshow/93284385.cms>



**बुधवार, 03 अगस्त 2022**

## **अमेरिका से अलकायदा चीफ जवाहिरी का खात्मा करने वाली MQ-9**

### **Reaper Drone खरीदेगा भारत, जानिए इसकी खासियत**

भारत अमेरिका का खतरनाक स्टील्थ ड्रोन खासकर भारतीय नौसेना के लिए खरीदेगा. इसके लिए बाइडेन प्रशासन से बातचीत भी शुरू कर दी गई है. अमेरिका (America) ने ड्रोन हमले (Drone Attack) में अलकायदा चीफ अयमान अल जवाहिरी (Al Qaeda Chief Ayman Al Zawahiri) को ढेर कर दिया.

अमेरिका ने जवाहिरी के खात्मे के लिए अपने सबसे अडवांस स्टील्थ ड्रोन (Stealth Drone) और खतरनाक मिसाइल R9X और खतरनाक MQ-9 Reaper Drone का इस्तेमाल किया.

भारत (India) इस समय सीमा पर दोहरी चुनौतियों से जूझ रहा है. एक तरफ पाकिस्तानी घुसपैठिए (Pakistani Infiltrators) तो दूसरी ओर वास्तविक नियंत्रण रेखा (LAC) पर चीन (China) की लगातार बढ़ती दखलंदाजी की घटनाओं से निपटने के लिए भारतीय सेना (Indian Army) को अत्याधुनिक हथियारों से लैस किया जा रहा है. भारत ने अपनी रक्षा प्रणाली को मजबूत करने और भविष्य में किसी भी संकट से निपटने के लिए अमेरिका से उसके इस खतरनाक ड्रोन सिस्टम को खरीदने की इच्छा जाहिर की है. भारतीय रक्षा अधिकारियों ने इस सिलसिले में बाइडेन प्रशासन से बातचीत भी शुरू कर दी है.

### **क्यों इतना खतरनाक है अमेरिका का रीपर ड्रोन?**

रक्षा विशेषज्ञों की मानें तो अमेरिकी वायुसेना का रीपर ड्रोन की सबसे खास विशेषता है कि ये पलक झपकते ही सटीक निशाना लगाकर दुश्मन का खात्म कर सकता है. इसे इसकी स्पीड और फायरपावर के लिए भी जाना जाता है. वहीं इस एक ड्रोन का वजन किसी अफ्रीकी हाथी के बराबर है. रक्षा विशेषज्ञों के अनुसार, इसे स्टील्थ श्रेणी में इसलिए रखा जाता है आधुनिक से आधुनिक रडार भी इसे पकड़ नहीं पाता. इसके अलावा रीपर ड्रोन तेज हवा के बीच भी 1700 किलो वजन उठा सकते हैं. इसलिए इन ड्रोन को खतरनाक से खतरनाक हथियारों से भी लैस किया जा सकता है. वहीं, इस ड्रोन से दुश्मन को हवा से जमीन और हवा से हवा में भी टारगेट किया जा सकता है.

### **भारतीय नौसेना को मिलेगी मजबूती**

भारत के लिए इस समय वास्तविक नियंत्रण रेखा पर चीन के साथ चल रही तनावनी से निपटना एक बड़ी चुनौती बनी हुई है. चीन के साथ बॉर्डर पर चल रहे तनाव के बीच भारत अमेरिका से इस खतरनाक स्टील्थ ड्रोन को खरीदने की तैयारी में है. जानकारी के मुताबिक, इन स्टील्थ ड्रोन को खासकर भारतीय नौसेना के लिए खरीदा जाएगा. भारत से अत्याधुनिक ड्रोन सिस्टम मिलते ही सेना की ताकत को अवश्य बल मिलेगा.

<https://www.abplive.com/news/india/defense-news-india-to-buy-mq-9-reaper-drone-from-america-which-eliminate-al-qaeda-chief-zawahiri-2183153>

# A new age of military tech

Al-Zawahiri's killing, with a new missile, shows how much war and weaponry have evolved

**T**he killing of Al Qaeda chief Ayman al-Zawahiri in central Kabul, reportedly with a new type of missile that did not even have an explosive warhead, shows how far military technology has evolved since the United States (US) mounted a high-risk operation within Pakistan against al-Zawahiri's predecessor more than a decade ago. The operation that killed Osama bin Laden involved months of training, boots on the ground and nearly came undone when one of the helicopters used by the assault team crashed into the terror mastermind's compound in Abbottabad, Pakistan. While the planning for the latest operation was just as meticulous, the US reportedly deployed a drone armed with the Hellfire R-9X missile, which has no explosives and instead destroys a target with sheer kinetic energy and six metal blades that emerge from the projectile's body just before impact.

The missile has reportedly been used in precision strikes in Syria and the Gaza Strip, in situations where it was necessary to avoid collateral damage. Such new-age weapons reflect the new dynamics of war and counterterror operations, with greater reliance on technology and intelligence, and with weapon systems manned by personnel who could be thousands of miles away. The importance of technology-driven weaponry has also been seen in the Ukraine conflict, where Ukrainian forces have used Turkish drones and western missiles to stymie and hold off numerically superior Russian troops.

Clearly, technology, especially the capacities for surveillance, intelligence-gathering and target acquisition, will be a key deciding factor of military superiority in future conflicts, more than just the number of ground forces that a country possesses. This is a change that has been predicted, but the theories appear to have come of age if one were to go by recent developments. In the case of India, some experts contend it is still necessary to maintain a large Army to have an edge against traditional adversaries such as Pakistan and China, but military planners in Beijing have already made the switch to a more technology-driven force, as reflected in China's capacity to mount cyberattacks and its greater use of hi-tech platforms. India's shift to the Agnipath programme, which aims to give the forces a younger and tech-savvy profile, creates the grounds for the potential use of such technology-driven platforms though the country will have to move much faster to boost both the acquisition and adoption of the latest military technologies.



## **U.S., Indonesia Hold Joint Military Drills Amid China Concerns**

The United States and Indonesian militaries began annual joint combat exercises Wednesday on Indonesia's Sumatra Island, joined for the first time by participants from other partner nations, signalling stronger ties amid growing maritime activity by China in the Indo-Pacific region. More than 5,000 soldiers from the U.S., Indonesia, Australia, Japan and Singapore were participating in this year's exercises, making them the largest since the drills were established in 2009. The exercises are designed to strengthen interoperability, capability, trust and cooperation in support of a free and open Indo-Pacific, the U.S. Embassy in Jakarta said in a statement. "It's a symbol of the U.S.-Indonesia bond and the growing relationship between land forces in this consequential region," Gen. Charles Flynn, Commanding General of U.S. Army Pacific, said in the statement. "Because land forces are the glue that binds the region's security architecture together."

Flynn and Indonesia's Military Chief Gen. Andika Perkasa opened the joint drills with a ceremony on Wednesday morning in Baturaja, a coastal town in South Sumatra province. The exercises will last until Aug. 14, encompassing army, navy, air force and marine drills. The planned two-week drills opened after China's Defense Ministry said Tuesday night it would conduct a series of targeted military operations to "safeguard national sovereignty" in response to U.S. House Speaker Nancy Pelosi's visit to self-governed Taiwan, which China claims as part of its territory to be annexed by force if necessary. China has also been increasingly assertive over its claim to virtually the entire South China Sea.

U.S. Gen. Mark Milley, chairman of the Joint Chiefs of Staff, said the number of intercepts by Chinese aircraft and ships in the Pacific region with the U.S. and other partner forces has increased significantly over the past five years, and the number of unsafe interactions has risen by similar proportions. "The message is the Chinese military, in the air and at sea, have become significantly more and noticeably more aggressive in this particular region," Mr. Milley said last month during a trip to the Indo-Pacific that included a stop in Indonesia. Mr. Milley said Indonesia is strategically critical to the region and has long been a key U.S. partner. Earlier this year, the U.S. approved a \$13.9 billion sale of advanced fighter jets to Indonesia. And in Jakarta, last December, Secretary of State Antony Blinken signed agreements for enhanced joint naval exercises between the U.S. and Indonesia.

While Indonesia and China enjoy generally positive ties, Jakarta has expressed concern about Chinese encroachment on its exclusive economic zone in the South China Sea, which China claims virtually in its entirety. The U.S.-Indonesia military exercises coincided with Ms. Pelosi's arrival in Taiwan late Tuesday, as the highest-ranking American official in 25 years to visit the self-ruled island. Beijing views visit by foreign government officials as recognition of the island's sovereignty. Japan's Ground Self-Defense Force is participating for the first time in the exercises, saying it promotes a "free and open" Indo-Pacific vision of security and trade with the U.S. and other democracies in the region.



The expanded drills are seen by China as a threat. Chinese state media have accused the U.S. of building an Indo-Pacific alliance, similar to NATO, as a means to intentionally provoke conflict. China has also been increasingly assertive over its claim to virtually the entire South China Sea. U.S. Gen. Mark Milley, chairman of the Joint Chiefs of Staff, said the number of intercepts by Chinese aircraft and ships in the Pacific region with the U.S. and other partner forces has increased significantly over the past five years, and the number of unsafe interactions has risen by similar proportions. “The message is the Chinese military, in the air and at sea, have become significantly more and noticeably more aggressive in this particular region,” Mr. Milley said last month during a trip to the Indo-Pacific that included a stop in Indonesia. Mr. Milley said Indonesia is strategically critical to the region and has long been a key U.S. partner. Earlier this year, the U.S. approved a \$13.9 billion sale of advanced fighter jets to Indonesia. And in Jakarta, last December, Secretary of State Antony Blinken signed agreements for enhanced joint naval exercises between the U.S. and Indonesia. While Indonesia and China enjoy generally positive ties, Jakarta has expressed concern about Chinese encroachment on its exclusive economic zone in the South China Sea, which China claims virtually in its entirety.

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<https://www.thehindu.com/news/international/us-indonesia-hold-joint-military-drills-amid-china-concerns/article65721827.ece>



*Tue, 02 Aug 2022*

## **USS Frank Cable is in Visakhapatnam on a Week-Long Visit**

USS Frank Cable, an Emory S-Land class submarine tender, is here on a week-long visit to the port city of Visakhapatnam. The visit of the ship gains significance with India expanding its submarine fleet. As of now India's operational submarine fleet includes around four Shishumar-class submarines, about eight Sindhughosh-class submarines, five newly-built Scorpene-class submarines (one undergoing sea trials) and one Arihant-class nuclear submarine. This apart, about six conventional submarines under Project 75 (India) are in the pipeline and two Arihant-class nuclear submarines S3 and S4 are coming close to the completion stage.

But as of now, India does not have a submarine tender ship. India had only one such ship INS Amba and it was decommissioned in 2006. Submarine tender ships such as the 9,000-tonne USS Frank Cable is basically a naval ship that specialises in replenishing submarines in the mid-sea. Hailing from the Pacific Fleet of the US Navy, Frank Cable is unique in its class, as it carries a mix of US navy personnel and civilian seafarers who are trained in specific skillsets. In total, the

ship carries about 500 crew members and officers. As per B. Trejo, public affairs officer of the ship, the vessel berths alongside the submarines in the mid-sea and does a lot of things such as clearing the trash, supplying food and potable water, medicine and other requirements. “Though search, rescue and repair of submarines is our main job onboard, we also specialise in replenishing the subs with stocks, which includes torpedoes and missiles,” he said.

A minimum distance of about 15-foot is maintained between the ship and the submarine and the deck cranes of the ship are used to transfer the supplies. The ship has three deck cranes, of two 5-tonne on each side and a 30-tonne crane in the middle deck. While the 5 tonners move on rails, the 30 tonne one is a fixed one. The crew from the submarines who sail underwater under difficult conditions can also come onboard, use the dive chamber for decompression and can also use the ship’s galley for some fresh food and refreshments. Even medical check-ups are done, said Mr. Trejo. The ship has its own weapon systems for its protection and has a state-of-the-art machine shop department. “Our primary role is to take up repairs of submarines mid-sea. We have a good number of technicians onboard and the machine shop is equipped to fabricate the parts that are needed,” he said. The machine shop primarily deals with hull repairs, mechanical and electrical repairs. There are also trained divers to undertake specific repairs underwater and there is a remote-controlled robot to assist the divers. Apart from a courtesy visit, there will also be interaction with Indian Navy officials, who will be exposed to the functioning of the ship, the US naval personnel onboard said.

<https://www.thehindu.com/news/cities/Visakhapatnam/uss-frank-cable-is-in-visakhapatnam-on-a-week-long-visit/article65716181.ece>



*Thu, 04 Aug 2022*

## **UN Nuclear Chief: Ukraine Nuclear Plant is ‘Out of Control’**

The UN nuclear chief warned that Europe's largest nuclear power plant in Ukraine “is completely out of control” and issued an urgent plea to Russia and Ukraine to quickly allow experts to visit the sprawling complex to stabilise the situation and avoid a nuclear accident. Rafael Grossi, director general of the International Atomic Energy Agency, said in an interview Tuesday with The Associated Press that the situation is getting more perilous every day at the Zaporizhzhya plant in the southeastern city of Enerhodar, which Russian troops seized in early March, soon after their Feb 24 invasion of Ukraine.

“Every principle of nuclear safety has been violated” at the plant, he said. “What is at stake is extremely serious and extremely grave and dangerous.” Grossi cited many violations of the plant's safety, adding that it is “in a place where active war is ongoing,” near Russian-controlled territory. The physical integrity of the plant hasn't been respected, he said, citing shelling at the beginning of the war when it was taken over and continuing information from Ukraine and Russia accusing each other of attacks at Zaporizhzhya.

<https://www.dailypioneer.com/2022/world/un-nuclear-chief--ukraine-nuclear-plant-is----out-of-control-.html>



*Wed, 03 Aug 2022*

## **Evidence of a New Type of Disordered Quantum Wigner Solid**

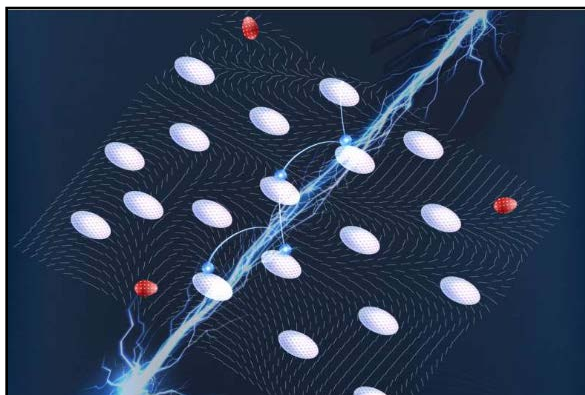
Physicists have been trying to determine the ground states of 2D electron systems at extremely low densities and temperatures for many decades now. The first theoretical predictions for these ground states were put forward by physicists Felix Bloch in 1929 and Eugene Wigner in 1934, both of whom suggested that interactions between electrons could lead to ground states that had never been observed before. Researchers at Princeton University have been conducting studies in this area of physics for several years now. Their most recent work, featured in *Physical Review Letters*, gathered evidence of a new state that had been predicted by Wigner, known as a disordered Wigner solid (WS).

"The phase predicted by Wigner, an ordered array of electrons (the so-called Wigner crystal or WS), has fascinated scientists for decades," Mansour Shayegan, principal investigator for the study, told Phys.org. "Its experimental realization is extremely challenging, as it requires samples with very low densities and with appropriate parameters (large effective mass and small dielectric constant) to enhance the role of interaction." To successfully produce a WS or quantum WS in a laboratory setting, researchers need extremely pure and high-quality samples. This means that the substances they use in their experiments must have a minimal number of impurities, as these impurities can attract electrons and prompt them to re-arrange themselves randomly.

As satisfying the requirements for producing these states is very challenging, previous studies probing quantum WS systems, in which electron-electron interactions dominate over the so-called Fermi energy, have been incredibly scarce. The first quantum WS was observed in 1999 by Jongsoo Yoon at Princeton University and some of the researchers involved in the recent study, using a GaAs/AlGaAs 2D heterostructure. In their new study, the team used a clean and highly pure 2D AlAs (aluminum arsenide) sample with an anisotropic (i.e., different when measured along different directions) effective mass and Fermi Sea. Notably, their sample satisfied the requirements for the realization of an anisotropic 2D WS very well.

"Our sample is a nearly ideal platform for observing a quantum WS at zero magnetic field," Shavegan said. "Now, it turns out the 2D electrons in AlAs provide an extra bonus, namely an anisotropic energy band dispersion which leads to an anisotropic effective mass. What we found is that this anisotropy can manifest itself in the properties of the WS such as its resistance and depinning threshold along different in-plane directions. The material used by Shavegan and his colleagues in their experiments consists of a high-quality AlAs quantum well, with very few impurities and thus low disorder. In this quantum well, electrons are confined within 2 dimensions. "We can use gate voltage to tune the density of the electrons in our sample," Md Shafayat Hossain, lead author of the paper, told Phys.org. "We used a combination of electrical

transport (i.e., measurements of resistivity) and DC bias spectroscopy (i.e., measurement of differential resistance as a function of source-drain DC bias) to study the anisotropic 2D disordered Wigner solid."



*Artistic rendition of disordered anisotropic Wigner solid composed of frozen electrons (pinned by the disorder) arranged in an anisotropic lattice.*

Measurements of the team's sample's resistivity and differential resistance showed that they had in fact observed a new quantum WS at a zero magnetic field, using an anisotropic material system. Ultimately, this allowed them to uncover the effects of anisotropy on the elusive but fascinating WS state. "The observed Wigner solid shows different effective sliding capabilities along different directions," Hossain said. "This is manifested via different de-pinning threshold voltages along different directions observed in our experiments." The anisotropic WS state observed by this team of researchers is likely to be an entirely new quantum state. This means that so far very little is known about its properties and characteristics. In the future, these recent findings could thus inspire new theoretical and experimental studies aimed at better understanding this newly identified quantum state with an intrinsic anisotropy (i.e., with different values when measured in different directions). These studies could, for instance, try to determine the state's characteristic lattice shape.

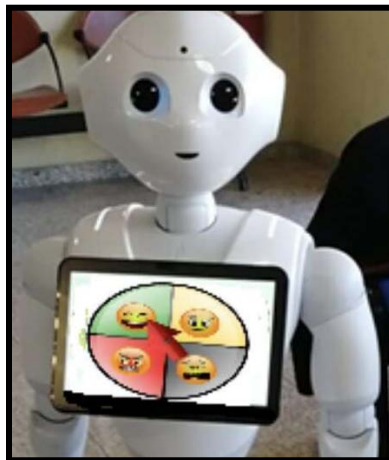
"Based on our experimental findings, the different electronic behavior along different directions of anisotropic WSs can also be of use in electronic devices," Hossain said. "Such devices could respond differently depending on the direction of the applied voltage." Ultimately, the anisotropic WS uncovered by this team of researchers could pave the way for the development of new types of anisotropic quantum devices. In their next works, Shavegan, Hossain and their colleagues will probe the microwave resonances of the state they uncovered, as these could provide more details about the state and its anisotropy. "For example, we will ask: does the WS show resonances, similar to what has been seen in the case of magnetic-field-induced WSs, at very small fillings (high magnetic fields)?" Shavegan added. "Observing resonances would be very helpful as they would provide strong evidence for the WS phase. Also, observing resonances whose frequencies depend on the orientation of the applied electric field with respect to the orientation of the WS crystal would be fascinating, and would shed light on the role of anisotropy."

More information: Md. S. Hossain et al, Anisotropic Two-Dimensional Disordered Wigner Solid, Physical Review Letters (2022). [DOI: 10.1103/PhysRevLett.129.036601](https://doi.org/10.1103/PhysRevLett.129.036601)

<https://phys.org/news/2022-08-evidence-disordered-quantum-wigner-solid.html>

## Allowing Social Robots TO Learn Relations between Users' Routines and their Mood

Social robots, robots that can interact with humans and assist them in their daily lives, are gradually being introduced in numerous real-world settings. These robots could be particularly valuable for helping older adults to complete everyday tasks more autonomously, thus potentially enhancing their independence and well-being. Researchers at University of Bari have been investigating the potential using social robots for ambient assisted living applications for numerous years. Their most recent paper, published in UMAP'22 Adjunct: Adjunct Proceedings of the 30th ACM Conference on User Modeling, Adaptation and Personalization, specifically explores the value of allowing social robots who are assisting seniors to learn the relationships between a user's routines and his/her mood.



"Social robots should support older adults with daily activity and, at the same time, they should contribute to emotional wellness by considering affective factors in everyday situations," Berardina De Carolis, Stefano Ferilli and Nicola Macciarulo wrote in their paper. "The main goal of this research is to investigate whether it is possible to learn relations between the user's affective state state and daily routines, made by activities, with the aid of a social robot, Pepper in this case." The "mood-personalized" assisted living approach devised by De Carolis and her colleagues is based on a system called WoMan (Workflor Management). This system, introduced in one of their previous papers, can continuously learn and refine the routines of users, using first-order logic reasoning. In their recent study, the team implemented the WoMan system using the Pepper robot. Pepper is a semi-humanoid mobile robot manufactured by SoftBank Robotics, which can interact with humans and detect their basic emotions.

"WoMan will be used as a back-end module of the Daily Diary application running on the Pepper robot to collect data concerning daily activities and their relation to emotions and mood," De Carolis, Ferilli and Macciarulo wrote in their paper. So far, the team outlined their proposed approach and investigated whether it can effectively learn the relationships between a user's daily routines and his/her mood. In addition, they created a proof of concept of their approach,



designing a dialog application for the Pepper robot called the DailyDiary (DD). As its name suggests, the DD application can be used to collect annotations summarizing a user's daily routine, activities and moods. The data collected by this application is then analyzed by a machine learning model, to better understand how users are feeling when completing different tasks.

"Results of this phase of the research will be used to assess the validity of the approach in ambient assisted living houses for seniors to make the social robot able to provide not only proactive service assistance but also an affective empathic experience," the researchers added in their paper. In their initial evaluations, De Carolis and her colleagues found that their learning model could learn to predict daily routines and the relations between activities and a user's mood with excellent accuracy. In their next studies, they plan to develop a complete version of their application and test it in a real-world setting. These future tests will re-assess their learning model's accuracy in predicting users' activities and moods in a real-world setting. In addition, they will try to determine how senior users experience the DD application and the Pepper robot running it, confirming whether the team's approach would be beneficial and well-accepted by seniors. If the researchers' future evaluations go well, their work could aid the development of more "seemingly empathic" robots, which can adapt their behavior to meet both the physical and emotional needs of vulnerable users.

More information: Berardina de Carolis et al, Ambient Assisted Living and Social Robots: Towards Learning Relations between User's Daily Routines and Mood, Adjunct Proceedings of the 30th ACM Conference on User Modeling, Adaptation and Personalization (2022). [DOI: 10.1145/3511047.3537691](https://doi.org/10.1145/3511047.3537691)

<https://techxplore.com/news/2022-08-social-robots-users-routines-mood.html>



*Tue, 02 Aug 2022*

## **All you need to know about ISRO's new SSLV rocket**

The India Space Research Organisation (ISRO) has announced that it will be launching the much-awaited new rocket, the small satellite launch vehicle (SSLV), on 7 August at 9:18 am from its Satish Dhawan Space Centre in Andhra Pradesh's Sriharikota. The SSLV (Small Satellite Launch Vehicle) aims to cater to the market for the launch of small satellites into Earth's low orbits that have emerged in recent years to cater to the needs of developing countries, universities for small satellites, and private corporations.

### **All you need to know**

It is the smallest vehicle weighing only 110-tonne. It will take only 72 hours to integrate, unlike the 70 days taken now for a launch vehicle. It can carry satellites weighing up to 500 kg to a low earth orbit while the tried and tested Polar Satellite Launch Vehicle (PSLV) can launch satellites weighing in the range of 1000 kg. It is perfectly suited for launching multiple microsatellites at a time and supports multiple orbital drop-offs. The key features of SSLV are low cost, low turn-



around time, flexibility in accommodating multiple satellites, launch-on-demand feasibility, minimal launch infrastructure requirements, etc.



*It is perfectly suited for launching multiple microsattellites at a time and supports multiple orbital drop-offs.*

On its first flight, the SSLV with the maximum luggage carrying capacity of 500 kg, will carry one of India's Earth Observation Satellites EOS 2 that will have applications in mapping and developing various GIS applications. It will carry a mid-wavelength infrared camera and a long-wavelength infrared camera with a resolution of 6 meters. The satellite EOS 2, weighing 142 kg, will have a mission life of ten months. It was formerly known as Microsatellite 2A. In its maiden flight itself, SSLV will also carry the AzadiSat, a satellite developed by 750 rural students from across the country coordinated by SpaceKidz India, a space start-up. ISRO's newly created commercial firm, New Space India Limited (NSIL) has been given the responsibility to cater the need of industry by mass production of SSLVs in partnership with the private sector in India through technology transfers.

<https://www.livemint.com/news/india/all-you-need-to-know-about-isro-s-new-sslv-rocket-11659429846299.html>

