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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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Press Information Bureau
Government of India

Ministry of Defence

Tue, 07 Dec 2021 6:16PM

Successful flight test of Vertical Launch Short Range Surface to Air Missile

Vertical Launch Short Range Surface to Air Missile was successfully flight tested today by Defence Research & Development Organisation (DRDO) from Integrated Test Range, Chandipur, off the coast of Odisha. The launch was conducted from a vertical launcher against an electronic target at a very low altitude. The flight path of the vehicle along with health parameters were monitored using a number of tracking instruments deployed by ITR, Chandipur. All sub-systems performed as per expectation.

Today's launch of the system was conducted to validate integrated operation of all weapon system components including the vertical launcher unit with controller, canisterised flight vehicle, weapon control system etc. required for future launches of the missile from Indian Naval Ships. The test launch was monitored by senior officials from DRDO & Indian Navy. The first trial was conducted on 22 February 2021 and this is confirmatory trial to prove the consistent performance of the configuration and integrated operation.

Raksha Mantri, Shri Rajnath Singh has congratulated DRDO, Indian Navy and industry for the successful flight test and stated that this system will further enhance defence capability of Indian Naval Ships against aerial threats.

Secretary Department of Defence Research & Development & Chairman DRDO, Dr G Satheesh Reddy has complemented the teams involved in the successful flight test and said that this has paved the way for integration of weapon system onboard Indian Naval Ships.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1778966>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 07 Dec 2021 6:16PM

सतह से हवा में वार करने वाली वर्टिकल लॉन्च शॉर्ट रेंज मिसाइल का सफल परीक्षण

आज ओडिशा के तट से दूर एकीकृत परीक्षण रेंज, चांदीपुर से वर्टिकल लॉन्च शॉर्ट रेंज सरफेस टू एयर मिसाइल का रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) द्वारा सफलतापूर्वक परीक्षण किया गया। यह प्रक्षेपण बहुत कम ऊंचाई पर एक इलेक्ट्रॉनिक लक्ष्य के खिलाफ एक वर्टिकल लांचर से किया गया था। आईटीआर, चांदीपुर द्वारा तैनात कई ट्रेकिंग उपकरणों का उपयोग करके तकनीकी मापदंडों के साथ इस वाहन के उड़ान पथ की निगरानी की गई। सभी उप-प्रणालियों ने अपेक्षा के अनुरूप प्रदर्शन किया।

भारतीय नौसेना के जहाजों से मिसाइल के भविष्य के प्रक्षेपण के लिए आवश्यक नियंत्रक, कनस्तरीकृत उड़ान वाहन, हथियार नियंत्रण प्रणाली आदि के साथ वर्टिकल लॉन्चर यूनिट सहित सभी हथियार प्रणाली घटकों के एकीकृत ऑपरेशन को मान्य करने के लिए आज प्रणाली का शुभारंभ किया गया। परीक्षण प्रक्षेपण की निगरानी डीआरडीओ और भारतीय नौसेना के वरिष्ठ अधिकारियों द्वारा की गई। पहला परीक्षण 22 फरवरी 2021 को आयोजित किया गया था और यह कॉन्फिगरेशन और एकीकृत ऑपरेशन के निरंतर प्रदर्शन को साबित करने के लिए पुष्टिकरण परीक्षण है।

रक्षा मंत्री श्री राजनाथ सिंह ने इस सफल परीक्षण के लिए डीआरडीओ, भारतीय नौसेना और उद्योग को बधाई दी है और कहा है कि यह प्रणाली हवाई खतरों के खिलाफ भारतीय नौसेना के जहाजों की रक्षा क्षमता को और बढ़ाएगी।

रक्षा अनुसंधान एवं विकास विभाग के सचिव तथा डीआरडीओ के अध्यक्ष डॉ. जी सतीश रेड्डी ने सफल उड़ान परीक्षण में शामिल टीमों की सराहना की और कहा कि इससे भारतीय नौसेना के जहाजों पर हथियार प्रणाली के एकीकरण का मार्ग प्रशस्त हुआ है।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1779029>

India successfully test-fires Vertically Launched Short Range Surface to Air Missile

The VL-SRSAM, indigenously designed and developed by DRDO for the Indian Navy, is meant for neutralising various aerial threats at close ranges, including sea-skimming targets.

By Meenakshi Ray

New Delhi: India successfully test-fired the Vertically Launched Short Range Surface to Air Missile (VL-SRSAM) from Integrated Test Range (ITR) in Chandipur off the coast of Odisha, the ministry of defence on Tuesday.

According to Defence Research and Development Organisation officials (DRDO), the air defence system can engage targets at around 15km. The VL-SRSAM, indigenously designed and developed by DRDO for the Indian Navy, is meant for neutralising various aerial threats at close ranges, including sea-skimming targets, the DRDO has said.

“The launch was conducted from a vertical launcher against an electronic target at a very low altitude. The flight path of the vehicle along with health parameters were monitored using a number of tracking instruments deployed by ITR, Chandipur. All sub-systems performed as per expectation,” the defence ministry said in a release.

The launch of the system was conducted to validate the integrated operation of all weapon system components, “including the vertical launcher unit with controller, canisterised flight vehicle, weapon control system etc. required for future launches of the missile from Indian Naval Ships”.

The test launch was monitored by senior officials of the DRDO and Indian Navy. The first trial was conducted on February 22 this year and this was a confirmatory trial to prove the consistent performance of the configuration and integrated operation.

Defence minister Rajnath Singh congratulated the DRDO, the Indian Navy and industry for the successful flight test and said the system will further enhance defence capability of Indian naval ships against aerial threats.

The release added the department of defence research and development’s secretary and DRDO chairperson, Dr G Satheesh Reddy, also complemented the teams involved in the successful flight test.

They said this has paved the way for integration of weapon system onboard Indian naval ships, according to the release.

<https://www.hindustantimes.com/india-news/india-successfully-test-fires-vl-srsam-off-odisha-coast-101638882187256.html>



The test launch was monitored by senior officials of the DRDO and Indian Navy. (ANI Photo)

Missile developed to neutralise aerial threats at close ranges successfully tested for second time this year

The quick reaction surface-to-air-missile missile developed by DRDO was test launched from the Integrated Test Range at Chandipur near here at about 3.08 pm from a vertical launcher against an electronic target at a very low altitude.

Pune: The Vertical Launch Short Range Surface to Air Missile (VL-SRSAM) designed for deployment onboard Indian Naval warships was successfully flight tested on Tuesday by Defence Research & Development Organization (DRDO) for the second consecutive time since February this year.

VL-SRSAM is meant for neutralising various aerial threats at close ranges, including sea-skimming targets, which are assets that fly as close as possible to sea surface to avoid being detected by the radars onboard warships.

The test on Tuesday was conducted from the Integrated Test Range (ITR) at Chandipur, off the coast of Odisha. The launch was conducted from a vertical launcher against an electronic target at a very low altitude. “The flight path of the vehicle along with health parameters were monitored using a number of tracking instruments deployed by ITR, Chandipur. All sub-systems performed as per expectation,” said a press statement from the Ministry of Defence. In its maiden trial held on February 22, the DRDO had tested the weapon system twice.

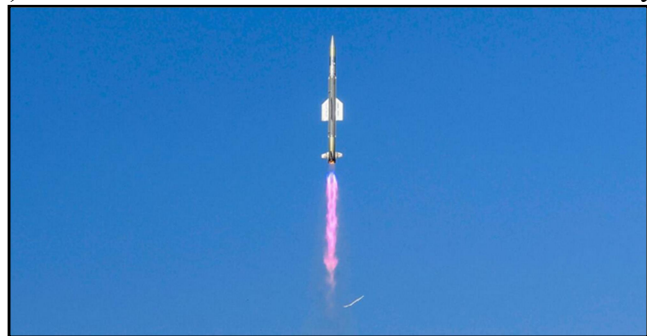
Tuesday’s launch of the system was conducted to validate integrated operation of all weapon system components, including the vertical launcher unit with controller, canisterised flight vehicle and weapon control system. The successful testing of these systems is crucial for future launches of the missile from Indian Naval ships.

The test launch on Tuesday was monitored by senior officials from DRDO and the Indian Navy.

The key DRDO facilities that contributed to the development of the system are Defence Research and Development Laboratory (DRDL) and Research Centre Imarat (RCI), both from Hyderabad, and Research & Development Establishment (Engineers), based at Pune.

The press statement said: “Defence Minister Rajnath Singh has congratulated DRDO, Indian Navy and industry for the successful flight test and stated that this system will further enhance defence capability of Indian Naval Ships against aerial threats. DRDO Chairman Dr G Satheesh Reddy has complimented the teams involved in the successful flight test and said that this has paved the way for integration of weapon systems onboard Indian Naval Ships.”

<https://indianexpress.com/article/india/india-flight-tests-vl-srsam-indian-navy-7661203/>



Vertical Launch Short Range Surface to Air Missile being flight tested by Defence Research and Development Organisation (DRDO) from Integrated Test Range, Chandipur, off the coast of Odisha. (PTI Photo)

DRDO carries out successful test firing of surface-to-air missile

The missile has an operational range of 50 to km distance

A vertical-launched short-range surface-to-air missile was successfully flight tested at an integrated test range off the coast of Odisha on Tuesday by the DRDO.

The missile, launched from the test range at Chandipur near here at 3.08 pm, will be deployed onboard various frontline ships of the Indian Navy, officials said.

The defence ministry said the flight testing of the missile system was conducted to validate the integrated operation of all its weapon system components.

Defence Minister Rajnath Singh congratulated all the stakeholders involved in the missile project including the Defence Research and Development Organisation (DRDO) and the Indian Navy.

He said the system will further enhance the defence capability of Indian Naval ships against aerial threats.

"The launch was conducted from a vertical launcher against an electronic target at a very low altitude. The flight path of the vehicle along with health parameters was monitored using a number of tracking instruments deployed by the Integrated Test Range, Chandipur," the ministry said in a statement. It said all sub-systems of the missile performed as per expectation.

"Today's launch of the system was conducted to validate the integrated operation of all weapon system components including the vertical launcher unit with controller, canisterised flight vehicle, weapon control system etc," the ministry said.

It said the test launch was monitored by senior officials from the DRDO and the Indian Navy.

"The first trial was conducted on February 22 and this is a confirmatory trial to prove the consistent performance of the configuration and integrated operation," the ministry said.

The ministry also put out a tweet, saying, "RM Shri @rajnathsigh has congratulated @DRDO_India, @indianavy and industry for the successful flight test of Vertical Launch Short Range Surface to Air Missile. He said that this sytem would further enhance defence capability of Indian naval Ships against aerial threats."

DRDO Chairman G Satheesh Reddy complimented the teams involved in the successful flight test and said that this has paved the way for the integration of weapon systems onboard Indian naval ships. The missile has an operational range of 50 to 60 km and features mid course inertial guidance through fibre optic gyroscope and active radar homing in terminal phase, it said.

Odisha Chief Minister Naveen Patnaik tweeted, 'Congratulate @DRDO_India and @indiannavy on successful flight testing of Vertical Launch Shroort Range Surface to Air Missile (VL-SRSAM) from Chandipur, off the coast of #Odisha."

In the morning ahead of the test firing, the Balasore district administration as a safety measure temporarily shifted more than 4,500 people residing within 2.5 km radius of the launch pad No 3 of the ITR from where the weapon with a dummy pay load was positioned and launched.

A district revenue official said "On the request of ITR authority these people residing in six hamlets in close proximity to the ITR launch site had to be temporarily shifted to nearby shelter centers with compensation. They will return to their homes after DRDO gives the green signal for it.



Photo: ANI

https://www.business-standard.com/article/current-affairs/india-successfully-test-fires-vertically-launched-short-range-missile-121120701152_1.html

समंदर में और ताकतवर हुई इंडियन नेवी, DRDO ने किया इस खतरनाक मिसाइल का परीक्षण

सरहद पर चीन (China) और पाकिस्तान से बढ़ते खतरों को देखते हुए भारत (India) की रक्षा तैयारियां लगातार जारी हैं। भारत ने मंगलवार को जमीन से हवा में मार करने वाली कम दूरी की मिसाइल का परीक्षण (Missile Testing) किया।

- चांदीपुर से दागी गई मिसाइल
- नेवी और DRDO के अफसर रहे मौजूद
- रक्षा मंत्री ने दी वैज्ञानिकों को बधाई

बालेश्वर (ओडिशा): सरहद पर चीन (China) और पाकिस्तान से बढ़ते खतरों को देखते हुए भारत (India) की रक्षा तैयारियां लगातार जारी हैं। भारत ने मंगलवार को जमीन से हवा में मार करने वाली कम दूरी की मिसाइल का परीक्षण (Missile Testing) किया। इस मिसाइल को नेवी के लिए विकसित किया जा रहा है।

चांदीपुर से दागी गई मिसाइल

रक्षा मंत्रालय के मुताबिक मंगलवार को DRDO ने ओडिशा के चांदीपुर में कम दूरी की मारक क्षमता वाली मिसाइल का सफल परीक्षण (Missile Testing) किया। यह मिसाइल जमीन से हवा में मार कर सकती है। इस मिसाइल को भारतीय नौसेना के विभिन्न पोतों पर तैनात किया जाएगा।

नेवी और DRDO के अफसर रहे मौजूद

मंत्रालय ने कहा, 'बेहद कम ऊंचाई वाले एक इलेक्ट्रॉनिक निशाने के खिलाफ मिसाइल को वर्टिकल लांचर से दागा गया। मिसाइल की उड़ान, उसके पथ और अन्य आंकड़ों, मानदंडों को रिकॉर्ड किया गया।' मंत्रालय ने कहा कि मिसाइल की प्रणाली ने आशा के अनुरूप काम किया। इस परीक्षण (Missile Testing) को देखने के लिए डीआरडीओ और भारतीय नौसेना के वरिष्ठ अधिकारी भी चांदीपुर में मौजूद रहे।

रक्षा मंत्री ने दी वैज्ञानिकों को बधाई

रक्षा मंत्री राजनाथ सिंह ने इस सफल परीक्षण पर DRDO, नेवी और प्रोजेक्ट से जुड़े सभी लोगों और संगठनों को बधाई दी है। उन्होंने कहा कि यह मिसाइल प्रणाली हवाई खतरों के खिलाफ भारतीय नौसेना की क्षमता को और मजबूत बनाएगी। डीआरडीओ के प्रमुख जी. सतीश रेड्डी ने भी परीक्षण में शामिल वैज्ञानिकों को इसके लिए बधाई दी।

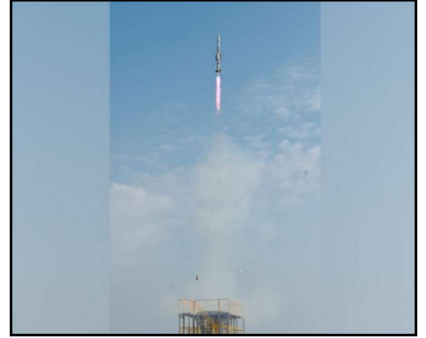
<https://zeenews.india.com/hindi/india/drdo-test-fired-surface-to-air-missile-for-indian-navy-at-chandipur-odisha/1042910>

DRDO ने किया जमीन से हवा में मार करने वाली मिसाइल का सफल परीक्षण, नौसेना के युद्धपोतों पर होगी तैनात

भारतीय नौसेना व डीआरडीओ ने मिलकर कम दूरी की मारक क्षमता वाले मिसाइल को तैयार किया है। मंगलवार को DRDO व नौसेना के अधिकारी भी इस परीक्षण के दौरान मौजूद रहे। इसी साल 22 फरवरी को इसका पहला परीक्षण किया गया था।

By Monika Minal

नई दिल्ली: भारत ने मंगलवार को छोटी दूरी वाले एक मिसाइल का सफल परीक्षण किया जो जमीन से हवा में मार कर सकती है। रक्षा अनुसंधान व विकास संगठन (DRDO) ने मंगलवार को जमीन से हवा में मार करने वाली मिसाइल का सफल परीक्षण किया। यह परीक्षण ओडिशा के तट से कुछ दूर चांदीपुर में किया गया। इस बारे में रक्षा मंत्रालय ने बताया कि इस मिसाइल को वर्टिकल लांचर से कम दूरी की सतह से लांच किया गया।



मंत्रालय की ओर से यह भी बताया गया कि उम्मीद के अनुसार ही मिसाइल का प्रदर्शन रहा। भारतीय नौसेना ने इसे तैयार किया है। मंगलवार को DRDO व नौसेना के अधिकारी भी इस परीक्षण के दौरान मौजूद रहे। इसी साल 22 फरवरी को इसका पहला परीक्षण किया गया था।

मंत्रालय ने कहा, 'बेहद कम ऊंचाई वाले एक इलेक्ट्रॉनिक निशाने के खिलाफ मिसाइल को वर्टिकल लांचर से दागा गया। मिसाइल की उड़ान, उसके पथ और अन्य आंकड़ों, मानदंडों को रिकॉर्ड किया गया।' मंत्रालय ने कहा कि मिसाइल की प्रणाली ने आशा के अनुरूप काम किया। इस परीक्षण (Missile Testing) को देखने के लिए DRDO और भारतीय नौसेना के वरिष्ठ अधिकारी भी चांदीपुर में मौजूद रहे।

इस मिसाइल की रेंज 50 से 60 किलोमीटर है और ये जमीन से ही हवा में मार कर सकती है। दूसरे शब्दों में हवा से आने वाले खतरे को इस मिसाइल के जरिए हवा में ही नष्ट किया जा सकता है। इस मिसाइल को नौसेना के युद्धपोतों पर तैनात किया जाएगा ।

रक्षा मंत्री राजनाथ सिंह ने इस सफल परीक्षण पर DRDO, नेवी और प्रोजेक्ट से जुड़े सभी लोगों और संगठनों को बधाई दी। उन्होंने कहा कि यह मिसाइल प्रणाली हवाई खतरों के खिलाफ भारतीय नौसेना की क्षमता को और मजबूत बनाएगी। डीआरडीओ के प्रमुख जी. सतीश रेड्डी ने भी परीक्षण में शामिल वैज्ञानिकों को इसके लिए बधाई दी।

<https://www.jagran.com/news/national-drdo-successfully-test-fires-vertically-launched-short-range-surface-to-air-missile-22275009.html>

India develops AESA radar to make IAF fighters more lethal

Project director D Seshagiri of Electronics and Radar Development Establishment (LRDE) confirmed this and said that the developed AESA radar is 95% indigenous, with only one imported subsystem.

By Shishir Gupta

New Delhi: Later this month, the Indian Air Force (IAF) will demonstrate the use of an indigenously developed active electronically scanned array (AESA) radar, making India one of the few countries to have an indigenous force-multiplier that lies at the heart of electronic warfare, long-range missiles, and long-distance, precision-guided ammunition.

Project director D Seshagiri of Electronics and Radar Development Establishment (LRDE) confirmed this and said that the developed AESA radar is 95% indigenous, with only one imported subsystem. It has the capacity to track 50 targets in the sky at a range in excess of 100km and engage four of them simultaneously.

In the next five years, all 83 of IAF's Tejas Mark I A fighters will have this radar, as will the future twin-engine AMCA fighter developed by the Aeronautical Development Agency (ADA).

The AESA radar will be mounted on the radar cone of Su-30 MKI aircraft as well as carrier-based MiG-29 K fighters of the Indian military, according to Seshagiri. "Already, the LRDE has signed an MoU with Hindustan Aeronautics Limited for being the lead integrator of the radar on the Tejas Mk I A with four identified vendors including BEL being the suppliers of key sub-systems."

The first 16 Tejas MK 1A aircraft will be fitted with Israeli ELM 2052 AESA radars and the remaining will be fitted with the indigenous Uttam AESA radar, HT has learnt. "The radar has already been tested on two Tejas fighters as well as Hawker Siddeley 800 executive jet for over 250 hours. The radar will be finally demonstrated in a flight this month with the force multiplier ready for production. Only the US, the EU, Israel, and China have AESA radar capability," Seshagiri said.

The National Flight Testing Centre, which is manned by IAF, has already greenlighted the radar after successful performance tests. Earlier, India was using primary radars on its fighters as well as indigenous airborne warning and control systems planes. The Pakistani Air Force's retaliation for the Balakot strike in February 2019 would have turned costly for Islamabad if Indian fighters had AESA radars mounted on intercepting fighters.

The AESA radar is also the key to the DRDO-developed Astra air-to-air missile, which has a range well over 120km, and will deliver guided ammunition over long distances. This radar will nullify the air superiority China had gained with its J20 multi-role fighters, as the Indian-developed AESA radar compares well with that developed by Beijing.

<https://www.hindustantimes.com/india-news/iaf-to-showcase-use-of-indigenous-aesa-radar-101638924141445.html>



The AESA radar will be mounted on the radar cone of Su-30 MKI aircraft as well as carrier-based MiG-29 K fighters of the Indian military, according to Seshagiri.

झांसी में बनेगी आकाश मिसाइल, दुश्मन को करेगी नेस्तनाबूद

झांसी: दुश्मन को उसकी धरती पर जाकर नेस्तनाबूद करने वाली आकाश मिसाइल का निर्माण झांसी में होगा। भारत डायनामिक्स लिमिटेड यहां एरच में इकाई की स्थापना करेगी। अगले साल यूनिट निर्माण का काम शुरू हो जाएगा। कंपनी यहां 400 करोड़ रुपये का निवेश करेगी।

आकाश मिसाइल भारतीय सेना की बड़ी ताकत मानी जाती है। ये जमीन से हवा में 18 किलोमीटर (59,000 फुट) तक की ऊंचाई पर टारगेट को भेदने में सक्षम है, जबकि जमीन से जमीन पर 30 किमी की दूरी पर स्थित दुश्मन के ठिकाने को नेस्तनाबूद कर सकती है। इसे डिफेंस रिसर्च एंड डेवलपमेंट ऑर्गनाइजेशन (डीआरडीओ) द्वारा विकसित किया गया है।

जबकि, इसका निर्माण रक्षा मंत्रालय के उपक्रम भारत डायनामिक्स लिमिटेड (बीडीएल) द्वारा किया जा रहा है। दुश्मन पर जमीन और हवा में वार करने वाली इस मिसाइल का निर्माण झांसी में होगा। 400 करोड़ रुपये की लागत से बीडीएल यहां उत्पादन इकाई लगाएगी। इसकी आधारशिला 19 नंबर को झांसी आए प्रधानमंत्री नरेंद्र मोदी ने रखी थी। ये इकाई झांसी के गरौठा तहसील के कस्बे एरच के पास 185 हेक्टेअर भूमि पर स्थापित की जाएगी। ये जमीन उत्तर प्रदेश विकास प्राधिकरण (यूपीडा) द्वारा किसानों से ली जा चुकी है। यूपीडा जमीन बीडीएल को हस्तांतरित करेगा। इसे लेकर प्रक्रिया शुरू हो चुकी है। बीडीएल की ओर से प्रस्तावित जमीन का सर्वे कर लिया गया है। अगले साल इकाई की स्थापना का काम शुरू हो जाएगा।

भारत डायनामिक्स लिमिटेड की इकाई की स्थापना के संबंध में शासनादेश जारी हो गया है। यहां कंपनी आकाश मिसाइल बनाएगी। जमीन पहले से ही यूपीडा द्वारा ली जा चुकी है। अगले साल बीडीएल की यूनिट की स्थापना का काम शुरू हो जाएगा।

- मनीष चौधरी, उपायुक्त - उद्योग

<https://www.amarujala.com/uttar-pradesh/jhansi/akash-missile-will-be-made-in-jhansi-will-destroy-the-enemy-jhansi-news-jhs210367776>



प्रधानमंत्री के झांसी आगमन पर किले की तलहटी में लगाई गई थी यह मिसाइलें। अमर उजाला

सेना में जल्द शामिल होगी "निर्भय मिसाइल", 1000 किलोमीटर दूरी तक है मारक क्षमता

नई दिल्ली। सतह से हवा में मार करने वाली निर्भय क्रूज मिसाइल के उन्नत संस्करण का चांदीपुर में एकीकृत परीक्षण रेंज (आईटीआर) के लॉन्च पैड नंबर 3 से दोपहर 3:08 बजे सफलतापूर्वक परीक्षण किया गया। मिसाइल ने स्वदेशी क्रूज इंजन के साथ लगभग 150 किलोमीटर तक उड़ान भरी और उम्मीद के मुताबिक इंजन ने अपनी कार्यक्षमता दिखाई। उपयोगकर्ता परीक्षण के अगले दौर के बाद निर्भय क्रूज मिसाइलों को औपचारिक रूप से सेना में शामिल किये जाने की उम्मीद है।

निर्भय क्रूज मिसाइल के अब तक आठ विकास परीक्षण पूरे किए जा चुके हैं। आकाश में मंडराने और पैंतरेबाजी के प्रदर्शन में माहिर यह मिसाइल लंबी दूरी तक परमाणु हथियार ले जाने और सभी मौसम में कई लक्ष्यों के बीच हमला करने में सक्षम है। छह मीटर लंबी और लगभग 1500 किलोग्राम वजन वाली यह मिसाइल 1000 किलोमीटर से अधिक दूरी तक मार कर सकती है। दो पंखों के साथ यह मिसाइल 500 मीटर से लेकर चार किलोमीटर की ऊंचाई पर उड़ान भरने में सक्षम है। मिसाइल को टेक ऑफ के लिए ठोस रॉकेट बूस्टर से संचालित किया जाता है, जिसे उन्नत प्रणाली प्रयोगशाला (एएसएल) में विकसित किया गया है। आवश्यक वेग और ऊंचाई तक पहुंचने पर मिसाइल में लगा टर्बोफैन इंजन इग्निशन के रूप में प्रयोग किया जाता है।

दुश्मन के रडार से पहचानना मुश्किल -

दुश्मन के रडार से बचने के लिए यह नीची ऊंचाई पर भी उड़ान भर सकती है। भू-भाग पर चलने वाली मिसाइल होने के कारण निर्भय को दुश्मन के रडार से पहचानना मुश्किल है। मिसाइल अपने लक्ष्य के क्षेत्र को कई मिनट तक घेरती रहती है और फिर सही समय पर सही जगह से टकराती है। इस मिसाइल के सभी पांचों विकास परीक्षण पूरे किये जा चुके हैं। इसलिए अब उपयोगकर्ता परीक्षण किए जा रहे हैं। रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने निर्भय मिसाइल के विकास परीक्षण में सभी मिशन उद्देश्यों को पूरा करने के बाद स्वदेशी रूप से विकसित छोटे टर्बोफैन इंजन के साथ परीक्षण करने की योजना बनाई थी। यह मिशन की आवश्यकताओं के आधार पर अलग-अलग प्रकार के 24 हथियारों को वितरित करने में भी सक्षम है।

150 किलोमीटर तक उड़ान भरी

इसी क्रम में मंगलवार को भारत ने ओडिशा के तट पर डीआरडीओ ने सबसोनिक क्रूज मिसाइल 'निर्भय' का देसी माणिक टर्बो फैन इंजन के साथ सफलतापूर्वक परीक्षण किया। स्वदेशी प्रौद्योगिकी क्रूज मिसाइल (आईटीसीएम) ने स्वदेशी क्रूज इंजन के साथ लगभग 150 किलोमीटर तक उड़ान भरी। डीआरडीओ के मुताबिक निकट भविष्य में और उपयोगकर्ता परीक्षण किए जाएंगे। निर्भय लंबी दूरी की सभी मौसम में इस्तेमाल की जाने वाली सबसोनिक क्रूज मिसाइल है जिसे भारत में वैमानिकी विकास प्रतिष्ठान (एडीई) ने डिजाइन और विकसित किया है। मिसाइल को कई प्लेटफार्मों से लॉन्च किया जा सकता है और यह पारंपरिक और परमाणु हथियार ले जाने में सक्षम है। यह वर्तमान में चीन के साथ गतिरोध के दौरान वास्तविक नियंत्रण रेखा (एलएसी) में सीमित संख्या में तैनात है।



<https://www.swadeshnews.in/desh/indian-forces-alert-after-omicrons-knock-791249?infinitescroll=1>

DRDO on Twitter

 **रक्षा मंत्री कार्यालय/ RMO India** @DefenceMinIndia · 3h
RM Shri @rajnathsingh has congratulated @DRDO_India , @indiannavy and the industry for the successful flight test of Vertical Launch Short Range Surface to Air Missile. He said that this system would further enhance defence capability of Indian Naval Ships against aerial threats.



 **ANI** @ANI · Dec 7, 2021

India successfully test-fired the Vertically Launched Short Range Surface to Air Missile (VL-SRSAM) from off the coast of Odisha. The air defence system can engage targets at around 15 km is being developed by DRDO for naval warships: DRDO officials

 **ANI** @ANI

The Defence Research and Development Organisation (DRDO) officials said that India has successfully test-fired the Vertically Launched Short Range Surface to Air Missile (VL-SRSAM) from off the coast of Odisha.



5:57 PM · Dec 7, 2021

Defence Strategic: National/International



Press Information Bureau
Government of India

Ministry of Defence

Tue, 07 Dec 2021 12:40PM

Curtain Raiser Panex-21

A Curtain Raiser Event for Humanitarian Assistance and Disaster Relief exercise, PANEX-21, for the member nations of BIMSTEC countries, was held at Kothari Auditorium DRDO Bhawan, New Delhi on 07 Dec 2021. The exercise is planned to be conducted from 20-22 Dec 21 at Pune and will witness participation from subject matter experts and delegates from India, Bangladesh, Nepal, Bhutan, Myanmar, Sri Lanka and Thailand.

The event was presided over by Mr Ajay Bhatt, hon'ble Raksha Rajya Mantri in the august presence of many distinguished civilian and military guests to include Mr Tenzin Lekphell, Secretary General, BIMSTEC, Chief



of Defence Staff Gen Bipin Rawat, Chief of Army Staff Gen Manoj Mukund Naravane, Chief of Air Staff Air Chief Marshal VR Chaudhari, Chief of Naval Staff Admiral R Hari Kumar, Chief of Integrated Staff(CISC) Air Marshal BR Krishna and the High Commissioners and Ambassadors of the BIMSTEC Nations.

In his opening address the COAS, Gen MM Naravane, welcomed all the delegates of the member states to the event and urged them to utilize this opportunity to develop mechanisms for close transnational coordination to combat contingencies like the Pandemic in the future. The Chief of Defence Staff, Gen Bipin Rawat, in his talk on 'Def Cooperation among BIMSTEC Nations' highlighted the importance of drawing Common Legal Frameworks and setting up Information Sharing Mechanism to facilitate defence cooperation between security and judicial agencies of the member nations.

During his address, Hon'ble Raksha Rajya Mantri, Shri Ajay Bhatt drew attention of the participants to the significance attached by India to the BIMSTEC, as part of our "Neighborhood First" policy. "The success of the last two BIMSTEC Disaster Management Exercises (DMEx-2017 at Delhi and DMEx-2020 at Puri) speak of the close coordination mechanism that the BIMSTEC nations share", he said.

He mentioned that managing Natural Disasters in the backdrop of a viral pandemic creates complex risks which cannot be combated by any single agency, but needs a whole of the Nation approach. He highlighted the swift and coordinated rescue and relief operation which were launched in India despite rising number of COVID cases and ongoing National lockdown. Concerted efforts were made by all agencies & organisations involved in providing relief to the affected population and every national resource was employed to save precious lives and minimize

losses of livestock, property and infrastructure. He also laid emphasis on joint strategy and cooperation in overcoming the pandemic situations such like COVID.

He urged the Nation states to evolve a comprehensive BIMSTEC structure for capability development and training and to have a regional pool of Disaster Management experts aided by institutional organisations, mechanism, protocols and legal frameworks for mobilizing resources for joint responses for disasters.

A poster commemorating the forthcoming Exercise was also unveiled by Mr Ajay Bhatt during the event. The exercise will witness conduct of a Seminar, Table Top Exercises & Multi Agency Exercise planned from 20 Dec to 22 Dec 21 at Pune. The culmination of the event will be with the capability demonstration by Indian Industries in association with FICCI to showcase their capabilities, innovations and range of products available to assist government agencies in planning, preparation and conduct of Humanitarian Assistance and Disaster Relief operations.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1778741>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 07 Dec 2021 12:40PM

पैनेक्स-21 की झलक

नई दिल्ली में रक्षा अनुसंधान एवं विकास संगठन- डीआरडीओ भवन के कोठारी ऑडिटोरियम में 07 दिसंबर 2021 को बिम्सटेक देशों के सदस्य राष्ट्रों के लिए मानवीय सहायता एवं आपदा राहत अभ्यास, पैनेक्स-21 से पूर्व एक कार्यक्रम आयोजित किया गया। यह अभ्यास 20 से 22 दिसंबर 2021 तक पुणे में आयोजित करने की योजना है और इसमें भारत, बांग्लादेश, नेपाल, भूटान, म्यांमार, श्रीलंका तथा थाईलैंड के विषय विशेषज्ञों एवं प्रतिनिधियों की भागीदारी होगी।

इस कार्यक्रम की अध्यक्षता माननीय रक्षा राज्य मंत्री श्री अजय भट्ट ने की थी। इस दौरान कई विशिष्ट सैन्य और असेन्य अतिथिगण भी उपस्थित हुए। इनमें बिम्सटेक के महासचिव श्री तेनजिन लेकफेल, चीफ ऑफ डिफेंस स्टाफ जनरल बिपिन रावत, सेनाध्यक्ष जनरल मनोज मुकुंद नरवणे, वायु सेना प्रमुख एयर चीफ मार्शल वीआर चौधरी, नौसेना स्टाफ के प्रमुख एडमिरल आर हरि कुमार, एकीकृत स्टाफ के प्रमुख (सीआईएससी) एयर मार्शल बीआर कृष्णा और बिम्सटेक राष्ट्रों के उच्चायुक्त तथा राजदूत शामिल थे।



अपने उद्घाटन भाषण में सेनाध्यक्ष जनरल मनोज मुकुंद नरवणे ने इस आयोजन में शामिल सदस्य देशों के सभी प्रतिनिधियों का स्वागत किया और उनसे भविष्य में महामारी जैसी आकस्मिक आपदाओं से निपटने में संयुक्त अंतरराष्ट्रीय समन्वय हेतु तंत्र विकसित करने के लिए इस अवसर का उपयोग करने का आग्रह किया। चीफ ऑफ डिफेंस स्टाफ जनरल बिपिन रावत ने 'बिम्सटेक राष्ट्रों के बीच रक्षा सहयोग' पर चर्चा करते हुए सदस्य देशों की सुरक्षा एवं न्यायिक एजेंसियों के बीच रक्षा सहयोग की सुविधा के लिए सामूहिक कानूनी ढांचे को तैयार करने और सूचना साझाकरण तंत्र विकसित करने के महत्व पर प्रकाश डाला।

माननीय रक्षा राज्य मंत्री श्री अजय भट्ट ने अपने संबोधन के दौरान प्रतिभागियों का ध्यान भारत की "पड़ोसी पहले" नीति के हिस्से के रूप में, बिम्सटेक को भारत द्वारा दिए गए महत्व की ओर आकर्षित किया। उन्होंने कहा कि पिछले दो बिम्सटेक आपदा प्रबंधन अभ्यास (दिल्ली में डीएमईएक्स-2017 और पुरी में डीएमईएक्स-2020) की सफलता आपसी समन्वय तंत्र को बढ़ावा देती है, जिसे बिम्सटेक राष्ट्र साझा करते हैं।

श्री अजय भट्ट ने कहा कि एक विषाणुजनित महामारी की पृष्ठभूमि में प्राकृतिक आपदाओं का प्रबंधन जटिल जोखिम पैदा करता है, जिसका मुकाबला किसी एक संस्था द्वारा नहीं किया जा सकता है, इसके लिए पूरे राष्ट्र के संयुक्त दृष्टिकोण की आवश्यकता होती है। उन्होंने तेजी से और समन्वित बचाव एवं राहत अभियान पर प्रकाश डाला, जो भारत में कोविड के मामलों की बढ़ती संख्या तथा चल रहे राष्ट्रीय लॉकडाउन के बावजूद शुरू किया गया था। उन्होंने कहा कि प्रभावित जनमानस को राहत प्रदान करने में शामिल सभी एजेंसियों और संगठनों द्वारा मिलजुल कर प्रयास किए गए तथा हर राष्ट्रीय संसाधन को लोगों के कीमती जीवन बचाने और पशुधन, संपत्ति एवं बुनियादी ढांचे के नुकसान को कम करने के लिए तैयार किया गया। उन्होंने कोविड जैसी महामारी की स्थिति पर काबू पाने के लिए संयुक्त रणनीति और सहयोग पर भी जोर दिया।

रक्षा राज्य मंत्री ने सदस्य देशों से क्षमता विकास और प्रशिक्षण के लिए एक व्यापक बिम्सटेक अवसंरचना विकसित करने तथा आपदाओं के लिए संयुक्त कार्रवाई हेतु संसाधन जुटाने में संस्थागत संगठनों, तंत्र, प्रोटोकॉल एवं कानूनी ढांचे द्वारा सहायता प्राप्त आपदा प्रबंधन विशेषज्ञों का एक क्षेत्रीय पूल बनाने का आग्रह किया।

इस कार्यक्रम के दौरान श्री अजय भट्ट द्वारा आगामी अभ्यास के उपलक्ष्य में एक पोस्टर का भी अनावरण किया गया। इस अभ्यास दौरान 20 दिसंबर से 22 दिसंबर 2021 तक पुणे में एक सेमिनार, टेबल टॉप अभ्यास और बहु-एजेंसी प्रशिक्षण की योजना बनाई गई है। कार्यक्रम का समापन फिक्की के सहयोग से भारतीय उद्योगों द्वारा मानवीय सहायता एवं आपदा राहत कार्यों की योजना बनाने, कार्यक्रम तैयार करने तथा संचालन में सरकारी एजेंसियों की सहायता के लिए अपनी क्षमताओं, नवाचारों और उपलब्ध उत्पादों की श्रृंखला का प्रदर्शन करने के साथ होगा।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1778800>

INDIA
TODAY

Wed, 08 Dec 2021

CDS Rawat warns against biological warfare, says countries must prepare to tackle threat

Chief of Defence Staff (CDS) General Bipin Rawat issued a warning against biological warfare, saying that countries must be prepared to deal with the threat.

By Manjeet Negi

New Delhi: Chief of Defence Staff (CDS) General Bipin Rawat has warned the BIMSTEC countries (Bangladesh, Bhutan, India, Nepal, Sri Lanka, Myanmar and Thailand) against biological warfare. General Rawat said biological warfare could be evolving and the countries needed to prepare to tackle it.

General Rawat was speaking at the curtain raiser event Panex 21 of the disaster management exercise involving BIMSTEC member countries. BIMSTEC stands for Bay of Bengal Initiative for

Multi-Sectoral Technical and Economic Cooperation, a multi-lateral group for regional cooperation.

He said biological warfare “is also becoming a new kind of warfare”.

General Rawat said, “If biological warfare is beginning to take shape, we need to put our act together and strengthen ourselves to ensure our nations are not affected by these viruses and diseases.”

The curtain raiser event was also addressed by Indian Army Chief General Manoj Mukund Naravane, who joined General Rawat in emphasising the need to prepare for tackling viral outbreaks.

Referring to Omicron variant of SARS-CoV-2, the coronavirus that causes Covid-19, General Naravane said the emergence of a new mutant variant implied that the pandemic was far from over.

General Rawat said, “If it [virus] is going to mutate in other forms, we have to remain prepared for it...It is very important for all of us that we put our heads together and support each other in any of our nations.”

The CDS said during the times of disasters including health-related such as Covid-19 pandemic, the armed forces of the world should make special preparations to help their civilian populations.

Speaking on the occasion, Minister of State for Defence Ajay Bhatt urged BIMSTEC members to work together to combat natural and man-made disasters.

<https://www.indiatoday.in/india/story/cds-rawat-warns-against-biological-warfare-says-countries-must-prepare-tackle-threat-1885124-2021-12-07>



General Bipin Rawat said that we need to strengthen ourselves to ensure our nations are not affected by viruses and diseases (Photo: File)

DECCAN Chronicle

Wed, 08 Dec 2021

Armed Forces hold heliborne exercise in Kashmir mountains

It said that the Heli-dropped task force operated in snow-clad regions at heights over 9,000 feet
By Yusuf Jameel

Srinagar: The Army together with Indian Air Force (IAF) and the Navy conducted a heliborne exercise in the higher reaches of Kashmir Valley on Tuesday as part of a joint defence preparedness in the border region.

The defence sources here said that the exercise in which the heliborne columns of the three armed forces participated using latest helicopters and other equipment was aimed at fine tuning operational and logistics aspects of Heliborne operations.

Srinagar-based defence spokesperson Colonel Emron Musavi said that the exercise was conducted under the auspices of the Army’s 15 Corps which is also known as Chinar Corps. “A helicopter borne training and validation exercise was conducted in the higher reaches of Kashmir Valley. This was a tri-service exercise undertaken in Kashmir with the IAF, the Navy and the Army,” he said.



A helicopter flies during a joint exercise by the Indian Air Force, Navy and Army at snow clad higher reaches of Gulmarg on the heights of 9000 feet, in Baramulla district of North Kashmir, Tuesday, Dec. 7, 2021. (PTI)

He added that the exercise was “planned to validate the joint capability to insert the task force tactically behind enemy lines in an intense air defence and electronic warfare operating environment”.

A statement issued by the Army here said, “The successful conduct of the mission validated the true spirit of jointness achieved in planning, utilisation of resources and accomplishment of laid down mission objectives as a true reflection of the tri-service ethos of the Indian Armed forces”.

It said that the Heli-dropped task force operated in snow-clad regions at heights over 9,000 feet. The Heli Borne task force included troops from Infantry, The Special Forces and the MARCOS from the Indian Navy. The Heli-drop exercise included full transportation and armed helicopters from Indian Army and Indian Air Force including the Apaches (Boeing AH-64 Apache is a twin-turboshaft attack helicopter with a tailwheel-type landing gear arrangement and a tandem cockpit for a crew of two).

“Aspects related to electronic warfare were also validated,” it said and added, “The exercise showcased the capability of the Chinari Corps and the Indian Army to carry out successful operations in high altitude areas incorporating all facets of contemporary and modern battlefield in synergy with IAF and Indian Navy”. End it

<https://www.deccanchronicle.com/nation/in-other-news/081221/armed-forces-hold-heliborne-exercise-in-kashmir-mountains.html>



Wed, 08 Dec 2021

President Kovind reviews SU-30 MKI Aircraft, Akash Missile System at Pune Air Force Station

Lohegaon: President of India Ram Nath Kovind and his wife Savita Kovind today visited Air Force Station Pune on the occasion of ‘Azadi Ka Amrit Mahotsav’.

On arrival at the air base, the President was received by Air Marshal Vikram Singh, Air Officer Commanding in Chief, South Western Air Command and Dr Arathi Singh, President Air Force Wives Welfare Association (Regional), South Western Air Command.

Thereafter, the President was conducted for a fleet review by Air Commodore H Assudani, Air Officer Commanding, Air Force Station Pune. The review included SU-30 MKI aircraft and the ‘Made in India’ Akash Missile System.

The President witnessed a breathtaking air display, comprising a large number of fighter aircraft and helicopters. The highlight of the air display was a fly past by a large formation of Jaguar aircraft, which painted the skies of Pune with a tattoo of ‘75’ signifying ‘75 years of India’s Independence’.

The President flew a ‘sortie’ in the state of the art, SU-30 MKI simulator, and was shown the exceptional capabilities of the fighter aircraft. Before departing the air base, he interacted with aircrew who participated in the review and flying display and air warriors of Air Force Station, Pune.

<https://www.punekarnews.in/president-kovind-reviews-su-30-mki-aircraft-akash-missile-system-at-pune-air-force-station/>



President Kovind witnesses air display at Pune IAF station

Mr. Kovind is on a four-day visit to Maharashtra from Monday.

Pune: President Ram Nath Kovind on Tuesday visited the Air Force station in Pune, where he witnessed a breathtaking air display comprising a large number of fighter aircraft and helicopters, interacted with air warriors and experienced full mission simulator of SU-30 MKI fighter jet.

The President, who is also the supreme commander of the defence forces, flew a 'sortie' in the state of the art SU-30 MKI simulator and was shown the exceptional capabilities of the fighter aircraft, an official release said. Mr. Kovind is on a four-day visit to Maharashtra from Monday. He started his tour by visiting the historic Raigad fort near Mumbai by ropeway. The Raigad fort was made the capital of the Maratha kingdom when Chhatrapati Shivaji was coronated as king in 1674.



President Ram Nath Kovind visited the Air Force Station, Pune. Photo: Twitter/rashtrapatibhvn

His office, in a tweet, said, "President Ram Nath Kovind visited the Air Force Station, Pune. The President witnessed a vibrant air display and interacted with the air warriors. The President also experienced the SU-30 MKI Full Mission Simulator during his visit." The Press Information Bureau (PIB), in a release, said the President, upon his arrival here, was received by Air Marshal Vikram Singh, Air Officer Commanding in Chief, South Western Air Command, and Dr (Mrs) Arathi Singh, President, Air Force Wives Welfare Association (Regional), South Western Air Command.

Thereafter, Mr. Kovind was conducted for a fleet review by Air Commodore H Assudani, Air Officer Commanding, Air Force Station, Pune, it said. The review included SU-30 MKI aircraft and the 'Made in India' Akash missile system.

"The hon'ble President witnessed a breathtaking air display, comprising a large number of fighter aircraft and helicopters. The highlight of the air display was a flypast by a large formation of Jaguar aircraft, which painted the skies of Pune with a tattoo of '75', signifying '75 years of India's Independence," said the release. During his visit, Mr. Kovind flew a 'sortie' in the state of the art SU-30 MKI simulator and was shown the exceptional capabilities of the fighter aircraft, it said. Before leaving the airbase in Lohegaon, he interacted with aircrew who participated in the review and the flying display, and also air warriors. On Wednesday, Mr. Kovind will present the President's Standard to the Navy's 22nd Missile Vessel Squadron in Mumbai, the Rashtrapati Bhavan earlier said.

<https://www.thehindu.com/news/national/president-kovind-witnesses-air-display-at-pune-iaf-station/article37887436.ece>

China has deployed secret missiles in cargo ships to be used for surprise attacks: Report

Secretly, China has been developing Trojan Horse-style missiles hidden in shipping containers that can be unleashed on enemy ports, experts have said

By Aanchal Nigam

Secretly, China has been developing Trojan Horse-style missiles hidden in shipping containers that can be unleashed on enemy ports when needed, experts have said. In an exclusive report, *The*

Sun Online stated that military analysts believe China's massive fleet of freighters and fishing vessels could be turned into warships with the use of secretive container missiles.

In the latest revelation that brings additional focus to China's hidden motives, the British media outlet stated that the sheer number of container ships makes it challenging to pinpoint which ones are used by China than the warships in a war-like situation. Similar to the fabled Trojan Horse, the missiles would be quietly smuggled into the periphery of an enemy port on a civilian vessel before being used for a surprise attack.

The Sun Online spoke to Rick Fisher, a senior official in Asian military affairs at the International Assessment and Strategy Center, who revealed that even though the Chinese have not officially confirmed if they have the missiles, it is 'likely that they have them'. Additionally, it was also warned in a study by Stockton Center for International Law that the weapons could further violate the naval laws.

Jim Fanell, a retired Navy captain and a former Pacific Fleet intelligence chief has previously noted that a containerised anti-ship missile would be a significant threat to the United States Navy. The latest *The Sun Online* report comes in the backdrop of China increasingly coming under fire from the global community over its human rights abuses, authoritarian regime among other violations. Most recently, US-China tensions reached a new high with America announcing a complete diplomatic boycott of the Beijing Winter Olympic Games. China is known to be aggressively developing its military and is also squaring up to the US, stated the report adding that its reach has expanded to as far as Africa. It is also pertinent to note that the mock-up of the missiles which are now reported to be used by China, appeared first at an arms fair back in 2016. Since then, there had been speculations about being in service with China's armed forces.

Weapon fits Chinese strategic preference

Fisher reportedly also believed that the secret weapon fits perfectly with China's military strategy and most likely it would be used as an offensive capability against their enemies. These missiles have the potential to be smuggled into foreign ports anywhere in the world. Fisher told *The Sun Online*, "Chinese strategic preferences for surprise would strongly argue for acquisition" of the missiles. He further added that these would be fitted to "nondescript small Chinese ships in order to mount surprise missile raids against shore defences to assist follow on amphibious or airborne invasion forces". As per the report, Fisher said that shipping container missile launchers can be smuggled through ports or through highway ports of entry to be deployed in the desired region. These can then be stored for several years in a climate-controlled building within range of US military bases before being taken out when needed for military operations.

Containerised missiles offer China a 'wide array of options'

Sun Online stated that the containerised missiles used by China offer the Communist leadership of the country "a wide array of options". He noted that if China uses them, "Washington would be in chaos, would not know against whom to retaliate". These even include "using larger container ships, thousands of fishing ships or stored containers in ports, to undertake military or terror mission strikes in a manner that can be denied if desired".

"The CCP (Chinese Communist Party) is fully capable of using containerized missiles to sow chaos when desired," he insisted.

Where can China store them?

The media outlet stated that for instance, China could store its missile launching containers near the Port of Seattle. Fisher noted that China would wait for the day when they can ultimately launch an electromagnetic pulse warhead-armed missiles over the nearby nuclear ballistic missile submarine base. He was quoted by the report as saying, "The EMP blast might take out electronics on the [submarines] and all over the base without having to launch a nuclear missile from China."

"Washington would be in chaos, would not know against whom to retaliate, and perhaps China uses American distraction to begin its real objective, the military conquest of Taiwan," he further added, as per *The Sun Online*. <https://www.republicworld.com/world-news/china/china-has-deployed-secret-missiles-in-cargo-ships-to-be-used-for-surprise-attacks-report.html>

Algorithm to increase the efficiency of quantum computers

Quantum computers have the potential to solve important problems that are beyond reach even for the most powerful supercomputers, but they require an entirely new way of programming and creating algorithms.

Universities and major tech companies are spearheading research on how to develop these new algorithms. In a recent collaboration between University of Helsinki, Aalto University, University of Turku, and IBM Research Europe-Zurich, a team of researchers have developed a new method to speed up calculations on quantum computers. The results are published in the journal *PRX Quantum* of the American Physical Society.

"Unlike classical computers, which use bits to store ones and zeros, information is stored in the qubits of a quantum processor in the form of a quantum state, or a wavefunction," says postdoctoral researcher Guillermo García-Pérez from the Department of Physics at the University of Helsinki, first author of the paper.

Special procedures are thus required to read out data from quantum computers. Quantum algorithms also require a set of inputs, provided for example as real numbers, and a list of operations to be performed on some reference initial state.

"The quantum state used is, in fact, generally impossible to reconstruct on conventional computers, so useful insights must be extracted by performing specific observations (which quantum physicists refer to as measurements)," says García-Pérez.

The problem with this is the large number of measurements required for many popular applications of quantum computers (like the so-called Variational Quantum Eigensolver, which can be used to overcome important limitations in the study of chemistry, for instance in drug discovery). The number of calculations required is known to grow very quickly with the size of the system one wants to simulate, even if only partial

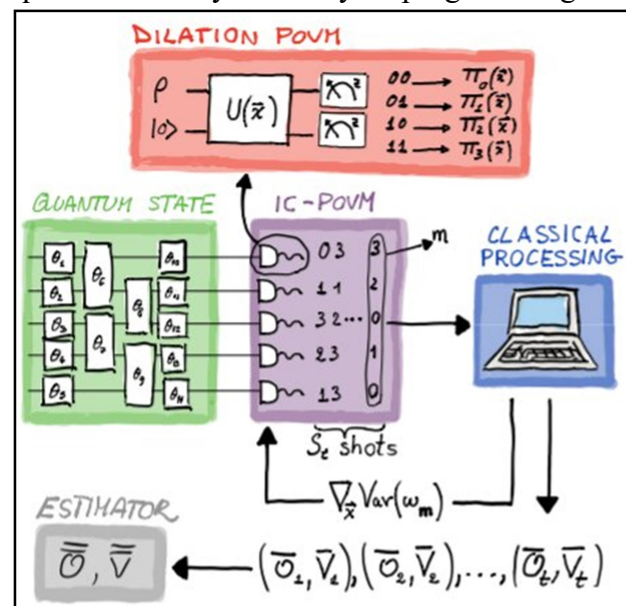


FIG. 1. The adaptive measurement scheme. The sketch represents a typical measurement step of a variational algorithm. The ansatz prepares a state $|\psi(\theta)\rangle$ (green box) for which the mean of some observable O must be evaluated. Our algorithm is an efficient measurement subroutine in this process. It relies on parametric informationally complete POVMs (purple box) implemented with ancillary qubits (red box). These are explained in detail in Appendix A. Initially, we start by performing S_1 measurements using the POVM corresponding to parameters x_1 , and obtain S_1 outcomes m_1, \dots, m_{S_1} . The measurement data are postprocessed efficiently on a classical device (blue box) twice, with two different goals. First, we estimate the mean of the observable, \bar{O}_1 , and the corresponding error of the estimation, \bar{V}_1 , as explained in Sec. III A. Second, we calculate the gradient of the estimation variance, $\nabla_x \text{Var}(\omega_m)$, in POVM parameter space, and thus find a better POVM for iteration 2 (see Sec. III B and Appendix B). At every step t , the variables \bar{O}_t and \bar{V}_t integrate all the estimations for $t \leq t$ while minimizing the overall statistical error (see Sec. III C and Appendix D). The process is repeated iteratively until \bar{V}_t is below some desired threshold. Credit: DOI: 10.1103/PRXQuantum.2.040342

information is needed. This makes the process hard to scale up, slowing down the computation and consuming a lot of computational resources.

The method proposed by García-Pérez and co-authors uses a generalized class of quantum measurements that are adapted throughout the calculation in order to extract the information stored in the quantum state efficiently. This drastically reduces the number of iterations, and therefore the time and computational cost, needed to obtain high-precision simulations.

The method can reuse previous measurement outcomes and adjust its own settings. Subsequent runs are increasingly accurate, and the collected data can be reused again and again to calculate other properties of the system without additional costs.

"We make the most out of every sample by combining all data produced. At the same time, we fine-tune the measurement to produce highly accurate estimates of the quantity under study, such as the energy of a molecule of interest. Putting these ingredients together, we can decrease the expected runtime by several orders of magnitude," says García-Pérez.

More information: Guillermo García-Pérez et al, Learning to Measure: Adaptive Informationally Complete Generalized Measurements for Quantum Algorithms, *PRX Quantum* (2021). DOI: [10.1103/PRXQuantum.2.040342](https://doi.org/10.1103/PRXQuantum.2.040342)
<https://phys.org/news/2021-12-algorithm-efficiency-quantum.html>



Wed, 08 Dec 2021

Physicists discover special transverse sound wave

Can you imagine sound traveling in the same way as light does? A research team at City University of Hong Kong (CityU) has discovered a new type of sound wave: The airborne sound wave vibrates transversely and carries both spin and orbital angular momentum like light does. The findings shattered scientists' previous beliefs about the sound wave, opening an avenue to the development of novel applications in acoustic communications, acoustic sensing and imaging.

The research was initiated and co-led by Dr. Shubo Wang, Assistant Professor in the Department of Physics at CityU, and conducted in collaboration with scientists from Hong Kong Baptist University (HKBU) and the Hong Kong University of Science and Technology (HKUST). It was published in *Nature Communications*, titled "Spin-orbit interactions of transverse sound."

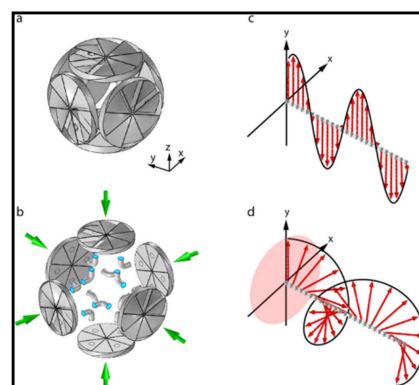


Illustration of the "meta-atom" and transverse sound. Credit: S. Wang et al, DOI: [10.1038/s41467-021-26375-9](https://doi.org/10.1038/s41467-021-26375-9)

Beyond the conventional understanding of sound wave

The physics textbooks tell us there are two kinds of waves. In transverse waves like light, the vibrations are perpendicular to the direction of wave propagation. In longitudinal waves like sound, the vibrations are parallel to the direction of wave propagation. But the latest discovery by scientists from CityU changes this understanding of sound waves.

"If you speak to a physicist about airborne transverse sound, s/he would think you are a layman without training in university physics because textbooks say that airborne sound (i.e., sound propagating in the air) is a longitudinal wave," said Dr. Wang. "While the airborne sound is a longitudinal wave in usual cases, we demonstrated for the first time that it can be a transverse wave under certain conditions. And we investigated its spin-orbit interactions (an important property only exists in transverse waves), i.e. the coupling between two types of angular momentum. The finding provides new degrees of freedom for sound manipulations."

The absence of shear force in the air, or fluids, is the reason why sound is a longitudinal wave, Dr. Wang explained. He had been exploring whether it is possible to realize transverse sound, which requires shear force. Then he conceived the idea that synthetic shear force may arise if the air is discretized into "meta-atoms," i.e., volumetric air confined in small resonators with size much smaller than the wavelength. The collective motion of these air "meta-atoms" can give rise to a transverse sound on the macroscopic scale.

Conception and realization of 'micropolar metamaterial'

He ingeniously designed a type of artificial material called "micropolar metamaterial" to implement this idea, which appears like a complex network of resonators. Air is confined inside these mutually connected resonators, forming the "meta-atoms." The metamaterial is hard enough so that only the air inside can vibrate and support sound propagation. The theoretical calculations showed that the collective motion of these air "meta-atoms" indeed produces the shear force, which gives rise to the transverse sound with spin-orbit interactions inside this metamaterial. This theory was verified by experiments conducted by Dr. Ma Guancong's group in HKBU.

Moreover, the research team discovered that air behaves like an elastic material inside the micropolar metamaterial and thus supports transverse sound with both spin and orbital angular momentum. Using this metamaterial, they demonstrated two types of spin-orbit interactions of sound for the first time. One is the momentum-space spin-orbit interaction, which gives rise to negative refraction of the transverse sound, meaning that sound bends in the opposite directions when passing through an interface. Another one is the real-space spin-orbit interaction, which generates sound vortices under the excitation of the transverse sound.

The findings demonstrated that airborne sound, or sound in fluids, can be a transverse wave and carry full vector properties such as spin angular momentum the same as light does. It provides new perspectives and functionalities for sound manipulations beyond the conventional scalar degree of freedom.

"This is just a precursor. We anticipate more explorations of the intriguing properties of the transverse sound," Dr. Wang said. "In future, by manipulating these extra vector properties, scientists may be able to encode more data into the transverse sound to break the bottleneck of traditional acoustic communication by normal sound waves."

The interaction of spin with orbital angular momentum enables unprecedented sound manipulations via its angular momentum. "The discovery may open an avenue to the development of novel applications in acoustic communications, acoustic sensing and imaging," he added.

Dr. Wang is the first author and the corresponding author of the paper. Dr. Ma is another corresponding author. Collaborators include Professor Li Jensen from The Hong Kong University of Science and Technology, Ms. Tong Qing, a Ph.D. student from CityU, and other researchers from HKBU.

More information: Shubo Wang et al, Spin-orbit interactions of transverse sound, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-26375-9](https://doi.org/10.1038/s41467-021-26375-9)

Journal information: *Nature Communications*
<https://phys.org/news/2021-12-physicists-special-transverse.html>

Development of a transparent and flexible ultra-thin memory device

A two-dimensional (2D) nanomaterial-based flexible memory device is a critical element in the next-generation wearable market because it plays a crucial role in data storage, processing, and communication. An ultra-thin memory device materialized with a 2D nanomaterial of several nanometers (nm) can significantly increase the memory density, leading to the development of a flexible resistance-variable memory with the implementation of a 2D nanomaterial. However, memories using conventional 2D nanomaterials have limitations owing to the weak carrier trapping characteristics of the nanomaterials.

At the Institute of Advanced Composite Materials, Korea Institute of Science and Technology (KIST, President Yoon, Seok-Jin), a research team led by Dr. Dong-Ick Son announced the development of a transparent and flexible memory device based on a heterogeneous low-dimensional ultra-thin nanostructure. To this end, monolayered zero-dimensional (0D) quantum dots were formed and sandwiched between two insulating 2D hexagonal boron nitride (h-BN) ultra-thin nanomaterial structures.

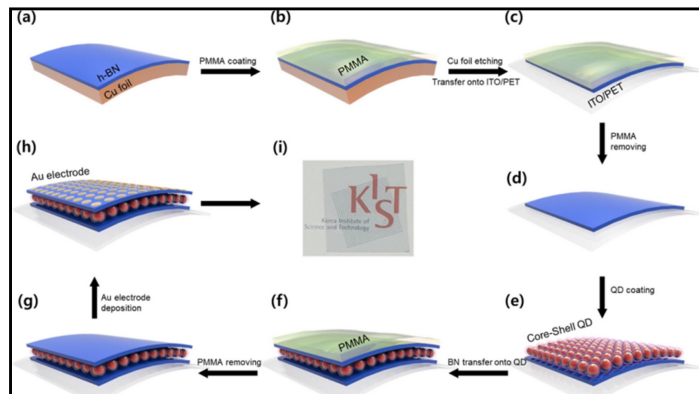
The research team materialized a device that could become a next-generation memory candidate by introducing 0D quantum dots with excellent quantum limiting properties into the active layer, controlling carriers in 2D nanomaterial. Based on this, 0D quantum dots were shaped in a vertically stacked composite structure that was sandwiched between 2D hexagonal h-BN nanomaterials to produce a transparent and flexible device. Therefore, the developed device maintains above 80% transparency and memory function even when bent.

Dr. Dong-Ick Son stated, "Instead of conductive graphene, by presenting a quantum dot stacking control technology on insulating hexagonal h-BN, we have established the foundation for ultra-thin nanocomposite structure research, and significantly revealed the fabrication and driving principle of next-generation memory devices." He then added, "We plan to systematize the stack control technology for the composition of heterogeneous low-dimensional nanomaterials in the future and expand the scope of its application."

The research was published in *Composites Part B: Engineering*.

More information: Jaeho Shim et al, Memory effect of vertically stacked hBN/QDs/hBN structures based on quantum-dot monolayers sandwiched between hexagonal boron nitride layer, *Composites Part B: Engineering* (2021). DOI: [10.1016/j.compositesb.2021.109307](https://doi.org/10.1016/j.compositesb.2021.109307)

<https://phys.org/news/2021-12-transparent-flexible-ultra-thin-memory-device.html>



(a-c) hBN transfer to the ITO/PET substrate; (d) hBN/ITO/PET substrate; (e) formation of QDs monolayer using a spin-coating technique; (f-g) hBN transfer to the QD/hBN /ITO/PET substrate (h) Au electrode deposition on hBN/QD/hBN/ITO/PET by using a thermal evaporation process; (i) photographs of the device. Credit: Korea Institute of Science and Technology (KIST)

People with schizophrenia five times more likely to die from COVID-19

By Michael Addelman

People with psychotic disorders, such as schizophrenia, are five times more likely to die from COVID-19 and three times more likely to be hospitalized according to new research by University of Manchester health data scientists.

The most detailed study to date examining COVID-19 outcomes in people with different diagnoses of severe mental illness in the UK is published today in the journal *Molecular Psychiatry*.

People with psychotic disorders showed 4.84 times higher odds of dying from COVID-19, compared to those without severe mental illness. The odds of dying from COVID-19 were 3.76 higher in people with bipolar disorder and 1.99 higher in people with major depressive disorder.

Among people with COVID-19, those with psychotic or bipolar disorders had the highest rates of infection leading to hospitalization: 35.8 percent and 37.3 percent respectively, compared to 16.6 percent among with those without severe mental illness.

And among people with COVID-19 who were hospitalized, over half of those with psychotic disorders—52.6 percent—did not survive compared to 37.5 percent among with those without severe mental illness.

The study was conducted in the UK Biobank, which is a large-scale biomedical database and research resource containing genetic, lifestyle and health information from half a million UK participants.

UK Biobank's database, which includes blood samples, heart and brain scans and genetic data of the 500,000 volunteer participants, is globally accessible to approved researchers who are undertaking health-related research that's in the public interest.

Of the individuals included in this study, 1,925 had a recorded history of schizophrenia or other psychotic disorders in their lifetime, 1,483 had bipolar disorder and 41,448 had major depressive disorder.

The samples were compared with 402,440 UK Biobank participants with no indicated history of these conditions.

UK Biobank participants were tracked from 31 January 2020, the first COVID-19 related death in the UK, until 28 February the next year.

A total of 16,282 people tested positive for COVID-19, while 2,885 were hospitalized and 1,081 died.

Though UK Biobank participants are now mostly over 65 years of age, and 95 percent white, the authors argue the results still have important implications for public health.

The higher rates of adverse COVID-19 outcomes among people with severe mental illness were partly linked to a range of factors including being male, belonging to an ethnic minority, older age and having certain respiratory and metabolic conditions.

"This is the most comprehensive study yet to examine COVID-19 outcomes in people with different types of severe mental illness in the UK. It shows that people with severe mental illnesses, and particularly psychosis, experience significantly poorer outcomes resulting from

COVID-19, which are only partly explained by pre-existing physical health conditions," says Dr. Lamiece Hassan.

However, over half of the excess risk could not be attributed to any of the sociodemographic, clinical or lifestyle factors measured, including a range of pre-existing physical health conditions.

Lead author Dr. Lamiece Hassan from The University of Manchester said: "This is the most comprehensive study yet to examine COVID-19 outcomes in people with different types of severe mental illness in the UK.

"It shows that people with severe mental illnesses, and particularly psychosis, experience significantly poorer outcomes resulting from COVID-19, which are only partly explained by pre-existing physical health conditions.

Co-author Dr. Brendon Stubbs from Kings College London added: "Engagement and action from all people working in the COVID-19 and physical health area is needed to address these disparities, to adopt a proactive approach to protecting this population in both the short and long-term."

"That could, for example, include providing tailored health interventions for people living with mental illness, increasing access to vaccination programs and/or increasing the availability of screening and treatment for COVID-19, along with other physical health conditions which may worsen the health and social implications from COVID-19 for these underserved populations."

Dr. Joe Firth from The University of Manchester said: "The COVID-19 pandemic has further highlighted the poor physical health outcomes we see for people who experience severe mental illness. Clearly, there is an urgent need to provide enhanced care for this particularly high-risk group."

More information: Lamiece Hassan et al, Disparities in COVID-19 infection, hospitalisation and death in people with schizophrenia, bipolar disorder, and major depressive disorder: a cohort study of the UK Biobank, *Molecular Psychiatry* (2021). DOI: [10.1038/s41380-021-01344-2](https://doi.org/10.1038/s41380-021-01344-2)

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<https://medicalxpress.com/news/2021-12-people-schizophrenia-die-covid-.html>

