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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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*Fri, 25 June 2021 6:34PM*

## **DRDO successfully test fires Enhanced Range 122mm Caliber Rocket**

Defence Research and Development Organisation (DRDO) successfully test fired enhanced range versions of indigenously developed 122mm Caliber Rocket from a Multi-Barrel Rocket Launcher (MBRL) on June 25, 2021 at Integrated Test Range (ITR), Chandipur off the coast of Odisha. Four enhanced range version of 122mm rockets were test fired with full instrumentation and they met the complete mission objectives. These rockets have been developed for Army applications and can destroy targets up to 40 km.

All the flight articles were tracked by Range instruments, including Telemetry, Radar and Electro Optical Tracking System deployed by ITR and Proof and Experimental Establishment (PXE).

The rocket systems have been developed jointly by Pune-based Armament Research and Development Establishment (ARDE) and High Energy Materials Research Laboratory (HEMRL) with manufacturing support from M/s Economic Explosives Limited, Nagpur. This enhanced rocket system would replace the existing 122mm Grad rockets.

Raksha Mantri Shri Rajnath Singh has congratulated DRDO and the Industry on the successful launch of 122mm Caliber Rocket. Secretary, Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy commended the efforts of the teams involved in successful trials.

<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1730350&RegID=3&LID=1>



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## डीआरडीओ ने 122 मिमी कैलिबर रॉकेट के उन्नत संस्करण का सफलतापूर्वक परीक्षण किया

रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने 25 जून 2021 को ओडिशा के चांदीपुर तट पर एकीकृत परीक्षण रेंज (आईटीआर) में एक मल्टी-बैरल रॉकेट लॉन्चर (एमबीआरएल) से स्वदेशी रूप से विकसित 122 मिमी कैलिबर रॉकेट के उन्नत रेंज संस्करणों का सफलतापूर्वक परीक्षण किया। 122 मिमी कैलिबर रॉकेट के चार उन्नत संस्करणों को लॉन्चर से सभी उपकरणों के साथ दागा गया और इस परीक्षण ने मिशन के सभी उद्देश्यों को पूरा किया। इस तरह के रॉकेट भारतीय सेना द्वारा इस्तेमाल करने के लिए विकसित किए गए हैं और ये रॉकेट 40 किलोमीटर की दूरी तक के लक्ष्य को भेद सकते हैं।

परीक्षण के दौरान आईटीआर और प्रूफ एंड एक्सपेरिमेंटल एस्टैब्लिशमेंट (पीएक्सई) द्वारा स्थापित किये गए टेलीमेट्री, रडार तथा इलेक्ट्रो ऑप्टिकल ट्रैकिंग सिस्टम सहित अन्य रेंज उपकरणों द्वारा सभी गतिविधियों को ट्रैक किया गया था।

इस रॉकेट सिस्टम को पुणे स्थित आर्मामेंट रिसर्च एंड डेवलपमेंट एस्टैब्लिशमेंट (एआरडीई) और हाई एनर्जी मैटेरियल्स रिसर्च लेबोरेटरी (एचईएमआरएल) द्वारा संयुक्त रूप से विकसित किया गया है। इसके निर्माण कार्य में मेसर्स इकोनॉमिक एक्सप्लोसिव्स लिमिटेड नागपुर की सेवाएं भी ली गई हैं। यह उन्नत किस्म की रॉकेट प्रणाली मौजूदा 122 मिमी ग्रेड रॉकेटों का स्थान लेगी।

रक्षामंत्री श्री राजनाथ सिंह ने 122 मिमी कैलिबर रॉकेट के सफल परीक्षण पर डीआरडीओ एवं उद्योग जगत को बधाई दी है। रक्षा अनुसंधान एवं विकास विभाग के सचिव तथा डीआरडीओ के अध्यक्ष डॉ जी सतीश रेड्डी ने इन सफल परीक्षणों में शामिल टीमों के प्रयासों की सराहना की है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1730441>



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*Fri, 25 June 2021 6:46PM*

## **DRDO successfully test fires Enhanced Pinaka Rocket**

Continuing the development of Artillery Rocket Systems, Defence Research and Development Organisation (DRDO) successfully test fired extended range version of indigenously developed Pinaka rocket from a Multi-Barrel Rocket Launcher (MBRL) on 24<sup>th</sup> and 25<sup>th</sup> June 2021 at Integrated Test Range (ITR), Chandipur off the coast of Odisha.

Twenty-five Enhanced Pinaka Rockets were launched in quick succession against targets at different ranges. All the mission objectives were met during the launches. The enhanced range version of Pinaka Rocket System can destroy targets at distances up to 45 kms.

All the flight articles were tracked by Range instruments including Telemetry, Radar and Electro Optical Tracking System deployed by ITR & Proof and Experimental Establishment (PXE).

The rocket system has been developed jointly by Pune based Armament Research and Development Establishment (ARDE) and High Energy Materials Research Laboratory (HEMRL) with manufacturing support from M/s Economic Explosives Limited, Nagpur. The development of Enhanced Pinaka system was taken up to achieve longer range performance.

Raksha Mantri Shri Rajnath Singh has congratulated DRDO and the Industry on the successful launch of Enhanced Pinaka Rockets. Secretary, Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy commended the efforts of the teams involved in the successful trials.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1730354>



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## डीआरडीओ ने उन्नत पिनाका रॉकेट का सफल परीक्षण किया

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने आर्टिलरी रॉकेट सिस्टम के विकास को जारी रखते हुए 24 और 25 जून 2021 को मल्टी-बैरल रॉकेट लॉन्चर (एमबीआरएल) से देश में विकसित पिनाका रॉकेट के विस्तारित रेंज संस्करण का सफलतापूर्वक परीक्षण किया। यह परीक्षण ओडिशा के सुदूर तटीय क्षेत्र चांदीपुर के एकीकृत परीक्षण रेंज (आईटीआर) से किया गया।

परीक्षण के दौरान 25 उन्नत पिनाका रॉकेटों को लॉन्च किया गया। जिन्हें एक के बाद एक लगातार लक्ष्य के तरफ प्रक्षेपित किया गया। परीक्षण के दौरान सभी उद्देश्यों को हासिल कर लिया गया। उन्नत पिनाका रॉकेट सिस्टम 45 किलोमीटर तक की दूरी पर स्थित लक्ष्य को भेद सकता है।

इस दौरान आईटीआर और प्रूफ एंड एक्सपेरिमेंटल एस्टैब्लिशमेंट (पीएक्सई) द्वारा तैनात रेंज उपकरण टेलीमेट्री, रडार और इलेक्ट्रो ऑप्टिकल ट्रैकिंग सिस्टम के जरिए सभी प्रक्षेपणों पर नजर रखी गई।

रॉकेट सिस्टम को पुणे स्थित आयुध अनुसंधान एवं विकास प्रतिष्ठान (एआरडीआई) और उच्च ऊर्जा सामग्री अनुसंधान प्रयोगशाला (एचईएमआरएल)द्वारा संयुक्त रूप से मेसर्स इकोनॉमिक एक्सप्लोसिव्स लिमिटेड, नागपुर के मैनुफैक्चरिंग सहयोग के साथ विकसित किया गया है। उन्नत पिनाका प्रणाली को लंबी दूरी के लक्ष्यों को भेदने के लिए विकसित किया गया है।

रक्षा मंत्री श्री राजनाथ सिंह ने उन्नत पिनाका रॉकेट के सफल प्रक्षेपण पर डीआरडीओ और उद्योग जगत को बधाई दी है। रक्षा अनुसंधान एवं विकास विभाग के सचिव और डीआरडीओ के अध्यक्ष डॉ जी सतीश रेड्डी ने सफल परीक्षणों में शामिल टीमों के प्रयासों की सराहना की।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1730440>

## DRDO successfully test fires enhanced versions of 122 mm caliber rocket

### *Synopsis*

*Four enhanced versions of the rocket were fired from a multi-barrel launcher with full instrumentation and they completed mission objectives, it said.*

The Defence Research and Development Organisation (DRDO) on Friday successfully test fired enhanced range versions of its 122mm caliber rocket at the Chandipur test range in Odisha, the Defence Ministry said. These rockets have been developed for the Indian Army and can destroy targets up to 40 km, the ministry said in a statement.

Four enhanced versions of the rocket were fired from a multi-barrel launcher with full instrumentation and they completed mission objectives, it said.

"All the flight articles were tracked by range instruments, including telemetry, radar and electro-optical tracking system deployed by integrated test range and Proof and Experimental Establishment (PXE)," the statement mentioned.

Defence Minister Rajnath Singh congratulated the DRDO and the industry on the aforementioned successful tests on Friday.

<https://economictimes.indiatimes.com/news/defence/drdo-successfully-test-fires-enhanced-versions-of-122-mm-caliber-rocket/articleshow/83849750.cms>



**Watch: DRDO successfully test-fires extended range version of Pinaka rocket**



## 122 एमएम कैलिबर रॉकेट के एडवांस वर्जन का सफलतापूर्वक परीक्षण, जानें कितनी है मारक क्षमता

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने ओडिशा के चांदीपुर परीक्षण रेंज में अपने 122 मिमी कैलिबर रॉकेट के उन्नत रेंज के संस्करणों का सफल परीक्षण किया। मंत्रालय ने एक बयान में कहा कि ये रॉकेट भारतीय सेना के लिए विकसित किए गए हैं।

नई दिल्ली: रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने शुक्रवार को ओडिशा के चांदीपुर परीक्षण रेंज में अपने 122 मिमी कैलिबर रॉकेट के एडवांस रेंज के एडिशनस का सफल परीक्षण किया। मंत्रालय ने एक बयान में कहा कि ये रॉकेट भारतीय सेना के लिए विकसित किए गए हैं और ये रॉकेट 40 किलोमीटर तक के लक्ष्य को नष्ट कर सकते हैं।

बयान में कहा गया कि रॉकेट के चार एडवांस वर्जन को एक मल्टी-बैरल लांचर से पूरे उपकरण के साथ दागा गया। इस टेस्टिंग के बाद मिशन के उद्देश्यों को पूरा किया। परीक्षण से पहले आईटीआर और प्रूफ एंड एक्सपेरिमेंटल एस्टाब्लिशमेंट (पीएक्सई) द्वारा तैनात टेलीमेट्री, रडार और इलेक्ट्रो ऑप्टिकल ट्रैकिंग सिस्टम सहित रेंज उपकरणों द्वारा सभी उड़ान से जुड़े सिस्टम को ट्रैक किया गया था।



रॉकेट सिस्टम को पुणे स्थित आर्मामेंट रिसर्च एंड डेवलपमेंट एस्टेब्लिशमेंट (एआरडीई) द्वारा संयुक्त रूप से विकसित किया गया है। मैसर्स इकोनॉमिक एक्सप्लोसिव्स लिमिटेड, नागपुर के निर्माण समर्थन के साथ उच्च ऊर्जा सामग्री अनुसंधान प्रयोगशाला (एचईएमआरएल)। यह उन्नत रॉकेट प्रणाली मौजूदा 122 मिमी ग्रेड रॉकेटों की जगह लेगी।

रक्षा मंत्री राजनाथ सिंह ने शुक्रवार को इन रॉकेट के सफल परीक्षणों पर डीआरडीओ और रक्षा उद्योग को बधाई दी। रक्षा अनुसंधान एवं विकास विभाग के सचिव और डीआरडीओ के अध्यक्ष डॉ जी सतीश रेड्डी ने सफल परीक्षणों में शामिल टीमों के प्रयासों की सराहना की।

<https://navbharattimes.indiatimes.com/india/drdo-successfully-test-fired-improved-versions-of-122-mm-caliber-rocket/articleshow/83849598.cms>

## India successfully test-fires advanced version of Pinaka, 122 mm caliber rockets

*Indigenously developed by DRDO, the rockets were fired from multi-barrel Rocket Launcher (MBRL) at the Integrated Test Range (ITR) on salvo mode meeting all the mission objectives*

*By Hemant Kumar Rout*

Bhubaneswar: India successfully test-fired an advanced version of Pinaka rocket system and 122-mm caliber rocket from a test facility off Odisha coast. As many as 25 extended range Pinaka rockets and four 122-mm rockets were launched in quick succession against targets at different ranges.

Indigenously developed by DRDO, the rockets were fired from Multi-Barrel Rocket Launcher (MBRL) at the Integrated Test Range (ITR) on salvo mode meeting all the mission objectives.

Defence sources said while 22 rounds of Pinaka rocket were test-fired on Thursday, three rounds of the same system and four rounds of 122-mm rockets were tested on Friday. The enhanced range version of the Pinaka system can destroy targets at distances up to 45 km.



Advanced Pinaka rocket being test-fired from ITR off Odisha coast on Friday. (Photo | Special arrangement)

This was the first mission in the last three months and it was conducted amid the Covid-19 restrictions. “The flight test of rockets were tracked by range instruments including telemetry, radar and electro-optical tracking system deployed by ITR and Proof and Experimental Establishment,” said a defence official.

Pinaka has been developed jointly by Pune-based Armament Research and Development Establishment (ARDE) and High Energy Materials Research Laboratory (HEMRL) with manufacturing support from Economic Explosives Limited, Nagpur. The new rocket will replace the existing Pinaka Mk-I rockets.

The 15-foot long rocket weighs around 280 kg and can carry warheads up to 100 kg. The trials were conducted with some improvements in the system making it more lethal. The unguided rocket system can neutralise large areas with rapid salvos.

DRDO Chairman G Satheesh Reddy said the quick reaction time and high rate of fire of the system will give an edge to the armed forces during a low-intensity conflict situation. The development of the extended range Pinaka system was taken up to achieve longer range performance, he added.

Developed by ARDE and HEMRL, the upgraded 122-mm rocket system will replace the existing 122-mm Grad rockets. The rockets have been developed for Army applications and can destroy targets up to 40 km.

Defence Minister Rajnath Singh congratulated DRDO and Industry on the successful launch of both the rocket systems. He also commended the efforts of the teams involved in the mission.

<https://www.newindianexpress.com/nation/2021/jun/25/india-successfully-test-fires-advanced-version-of-pinaka-122-mm-caliber-rockets-2321443.html>



Sat, 26 June 2021

# **DRDO successfully test-fires indigenous Pinaka rocket, 122mm Caliber rocket systems**

*The Defence Research and Development Organization (DRDO) successfully test-fired enhanced range versions of its indigenously developed Pinaka rocket system and 122mm Caliber rocket system*

*By Roopashree Sharma*

The Defence Research and Development Organization (DRDO) successfully test-fired enhanced range versions of its indigenously developed Pinaka rocket system and 122mm Caliber rocket system from a Multi-Barrel Rocket Launcher (MBRL) on June 24 and 25, 2021 at the Chandipur's Integrated Test Range in Odisha, informed the Defence Ministry.

Both, the Pinaka and 122mm Caliber rocket systems have been developed jointly by Pune-based Armament Research and Development Establishment (ARDE) and High Energy Materials Research Laboratory (HEMRL) with manufacturing support from M/s Economic Explosives Limited, Nagpur.

Rajnath Singh, Union Defence Ministry congratulated DRDO on the successful launch of Pinaka 122mm Caliber rocket systems.

Dr G Satheesh Reddy, Chairman DRDO and Secretary, Department of Defence R&D applauded the efforts of the team involved in the development and trials of the Pinaka and 122mm Caliber rocket systems.

## **DRDO test-fires Pinaka rocket system: Key points**

- Twenty-five enhanced range versions of Pinaka rockets were test-fired on June 24 and June 25, 2021, at Chandipur's Integrated Test Range in Odisha. All the flight articles successfully achieved the mission objectives.
- These enhanced systems of Pinaka rockets can destroy targets up to 45 km.
- Range instruments, including Telemetry, Radar and Electro-Optical Tracking System deployed by ITR and Proof and Experimental Establishment (PXE) were used to track the accuracy of target achieved by the flight articles.
- The Pinaka rocket system was developed to achieve longer-range performance.

## **DRDO test-fires 122 mm Caliber rocket system: Key points**

- Four enhanced versions of 122 mm Caliber rockets were successfully test-fired from a Multi-Barrel Rocket Launcher (MBRL) at Chandipur's Integrated Test Range in Odisha on June 25, 2021.
- All the flight articles test-fired with full instrumentation successfully achieved the mission objectives.
- Range instruments, including Telemetry, Radar and Electro-Optical Tracking System deployed by ITR and Proof and Experimental Establishment (PXE) tracked all the flight articles that were test-fired.
- These 122mm Caliber rocket systems have been specifically developed for Army applications.
- These enhanced 122mm Caliber rocket systems will replace the existing 122mm Grad rockets and can destroy targets up to 40 km.

<https://www.jagranjosh.com/current-affairs/drdo-successfully-test-fires-indigenous-pinaka-rocket-122mm-caliber-rocket-systems-1624649522-1>

## DRDO successfully test-fires enhanced Pinaka rocket made by city-based EEL

Here is a good news for Nagpur. Defence Research and Development Organisation (DRDO) has successfully test-fired extended range version of indigenously developed Pinaka rocket from a Multi-Barrel Rocket Launcher (MBRL) at Integrated Test Range (ITR), Chandipur off the coast of Odisha. The rocket system has been developed with manufacturing support from M/s Economic Explosives Limited (EEL), Nagpur.



DRDO conducted the successful test-firing on June 24 and June 25, continuing with development of Artillery Rocket Systems. As many as 25 Enhanced Pinaka Rockets were launched in quick succession against targets at different ranges. All the mission objectives were met during the launches, read an official statement. The enhanced range version of Pinaka Rocket System can destroy targets at distances up to 45 kms, it added.

All the flight articles (rockets) were tracked by range instruments including Telemetry, Radar and Electro Optical Tracking System deployed by ITR, and Proof and Experimental Establishment.

The rocket system has been developed jointly by Pune-based Armament Research and Development Establishment (ARDE) and High Energy Materials Research Laboratory (HEMRL) with manufacturing support from M/s Economic Explosives Limited, Nagpur. The development of enhanced Pinaka system was taken up to achieve longer range performance.

Rajnath Singh, Defence Minister, congratulated DRDO and the industry on successful launch of Enhanced Pinaka Rockets. Dr G Satheesh Reddy, Secretary, Department of Defence Research and Development and Chairman of DRDO, commended the efforts of the teams involved in the successful trials.

On November 4, 2020, an important milestone was reached by the private industry in the field of ammunition development and manufacturing. Six Pinaka enhanced rockets manufactured at Economic Explosives Limited, Nagpur and co-developed with DRDO were successfully test-fired at ITR, Balasore. Now, after seven months since then, successful test-firing of extended range version of indigenously developed Pinaka rocket has been carried out.

Pinaka rockets were designed more than 20 years ago by ARDE and HEMRL laboratories of DRDO. In last few years, Pinaka enhanced rockets have been co-developed under a development-cum-production partner model with EEL, Nagpur. The Mk-1 enhanced rockets have 25 per cent more range (47.5 km from 37.5 km) and 5 years extra shelf-life (15 years against 10 years) than the earlier developed Mk-1 rockets. These also have a superior construction technique with changed propellant casting, which leads to better reliability.

In 2017, Defence Acquisition Council had cleared a proposal to buy Mk-1 rockets from private sector. The Indian Army was awaiting development of Pinaka Mk-1 enhanced rocket at EEL. The company is making all variants of Pinaka rockets at its composite manufacturing facility at Nagpur. Last year, it was also executing an order for Pinaka guided extended range rocket, which was dubbed as a strategic game-changer for the country.

EEL entered defence and aerospace sector about 10 years ago. It makes high technology missiles, space rockets, as well as other munitions. EEL also had signed a contract to supply 1 million modern multi-mode hand grenades for the Indian Army and the Indian Air Force.

<https://www.thehitavada.com/Encyc/2021/6/26/DRDO-successfully-test-fires-enhanced-Pinaka-rocket-made-by-city-based-EEL.html>

## City's Solar Group hits bull's eye with enhanced Pinaka rockets

By Shishir Arya

Nagpur: City's Solar Group on Friday successfully test-fired enhanced range version of Pinaka rockets, which has been co-developed by the company along with Armament Research and Development Establishment (ARDE) — an arm of the Defence Research and Development Organization (DRDO).

The enhanced range rockets can fire up to 45km as against the extended range version, which can fire up to 40km.

The successful test clears the way for the company to participate in request for proposal (RFP), which may be floated by the Army in coming days for buying the rockets.

Solar Group's defence business is undertaken by its 100% subsidiary Economic Explosives Limited (EEL).

This is the first private entity to have co-developed the artillery rocket system along with the ARDE and High Energy Materials Research Laboratory (HEMRL). This means the company has invested into the development of the rockets. Being a co-developer, Solar Group gets first exclusive production right for the system. The company has invested around Rs45 crore in the co-development project, said a source.

On Friday, Solar's 25 rockets of 122mm were fired from a mutli-barrel launcher at the integrated test range in Chandipur in Odisha. The rockets fired in quick succession were aimed at targets at different ranges. "All the mission objectives were met during the launches, the flight articles were tracked by range instruments including telemetry, radar and electro optical tracking system," said a note shared by the company.

Apart from the 25 enhanced range rockets, four of Pinaka extended range rockets, which can destroy a target up to 40km, were fired too. The mission objectives were met, said the note.

The two rockets are slated to replace the existing Pinaka MK1 rockets, at present being used by the Army. The MK1 are also made by the ordnance factories.

The first stage tests took place during November last year. On Friday, the last stage of the DRDO level tests were completed. Now, the Army can take up its user trials on initiating the procurement process by floating RFPs.

The user trials are expected to happen after the RFP is floated. Being a co-developer of the rocket systems gives an advantage to Solar Group.

The company, which has emerged as a major private sector entity for making ammunitions, is also expected to hold user trials for 81mm calibre of mortar shell in a week.

Solar Group, which has bagged the order to make the latest multimodal hand-grenades for the Army, is also the first private company to make the product. The delivery of the first batch is expected soon. The multimodal grenades will be replacing the World War II design M36 grenades.

<https://timesofindia.indiatimes.com/city/nagpur/citys-solar-group-hits-bulls-eye-with-enhanced-pinaka-rockets/articleshow/83853133.cms?from=mdr>



The successful test clears the way for the company to participate in request for proposal (RFP), which may be floated by the Army in coming days for buying the rockets.



## डीआरडीओ ने पिनाक रॉकेट के अपग्रेड रेंज का किया सफल परीक्षण, तबाह होंगे दुश्मनों के मंसूबे

डीआरडीओ ने कहा है कि पिनाक एक फ्री फ्लाइट आर्टिलरी रॉकेट सिस्टम है जिसकी रेंज 40 किलोमीटर है। पिनाक रॉकेट्स (Pinaka missile) को मल्टी-बैरल रॉकेट लॉन्चर से छोड़ा जाता है।

हाइलाइट्स:

- ओडिशा तट के पास चांदीपुर एकीकृत परीक्षण रेंज में ये सफलतापूर्वक परीक्षण
- पिनाक एक फ्री फ्लाइट आर्टिलरी रॉकेट सिस्टम है
- पिनाक रॉकेट्स को मल्टी-बैरल रॉकेट लॉन्चर से छोड़ा जाता है

बालासोर: रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने ओडिशा तट के पास चांदीपुर में एकीकृत परीक्षण केंद्र (आईटीआर) से स्वदेशी पिनाक रॉकेट के उन्नत संस्करण का परीक्षण किया। आधिकारिक सूत्रों ने शुक्रवार को इस बारे में बताया। परीक्षण के दौरान कुल 25 पिनाक रॉकेट बृहस्पतिवार और शुक्रवार को अलग-अलग दूरी पर लक्ष्य को सटीकता से भेदने में कामयाब रहे। एक अधिकारी ने बताया कि 122 एमएम कैलिबर रॉकेट को मल्टी बैरल रॉकेट लॉन्चर (एमबीआरएल) से छोड़ा गया।



एक सूत्र ने बताया, 'मिशन के दौरान लक्ष्य सफलतापूर्वक भेद दिए गए। पिनाक रॉकेट प्रणाली के विस्तारित रेंज के तहत 40 किलोमीटर की दूरी तक लक्ष्य को भेदा जा सकता है।' रॉकेट ने कितनी सटीकता से निशाना साधा, इस पर विभिन्न उपकरणों के जरिए निगरानी की गयी।

इस पिनाक रॉकेट में खास क्या है?

पुणे स्थित आयुध अनुसंधान एवं विकास स्थापना (एआरडीई) और उच्च ऊर्जा सामग्री अनुसंधान प्रयोगशाला (एचईएमआरएल) ने इकनॉमिक एक्सप्लोसिव लिमिटेड, नागपुर की मदद से इस रॉकेट प्रणाली को विकसित किया है। सूत्रों ने बताया कि लंबी दूरी की क्षमता को प्राप्त करने के लिए उन्नत पिनाक प्रणाली का विकास किया गया है।

रक्षा मंत्री राजनाथ सिंह ने दी बधाई

रक्षा मंत्री राजनाथ सिंह ने उन्नत पिनाक रॉकेट के कामयाब परीक्षण पर डीआरडीओ और उद्योग को बधाई दी है। रक्षा विभाग (अनुसंधान एवं विकास) के सचिव और डीआरडीओ के अध्यक्ष डॉ जी सतीश रेड्डी ने भी रॉकेट के सफल परीक्षण में शामिल टीम के प्रयासों की सराहना की।

40 किलोमीटर तक के लक्ष्य को कर देंगे तबाह

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने शुक्रवार को ओडिशा के चांदीपुर परीक्षण रेंज में अपने 122 मिमी कैलिबर रॉकेट के उन्नत रेंज के संस्करणों का सफल परीक्षण किया। मंत्रालय ने एक बयान में कहा कि ये रॉकेट भारतीय सेना के लिए विकसित किए गए हैं और ये रॉकेट 40 किलोमीटर तक के लक्ष्य को नष्ट कर सकते हैं।

बयान में कहा गया कि रॉकेट के चार उन्नत संस्करणों को एक मल्टी-बैरल लांचर से पूरे उपकरण के साथ दागा गया और उन्होंने मिशन के उद्देश्यों को पूरा किया।

<https://navbharattimes.indiatimes.com/state/other-states/other-cities/drdo-successfully-test-fired-the-upgrade-range-of-pinaka-rocket-watch-video/articleshow/83850837.cms>



Sat, 26 June 2021

## पिनाका रॉकेट प्रणाली के एडवांस वर्जन का DRDO ने किया सफल परीक्षण, रक्षा मंत्री ने ट्वीट कर दी बधाई

स्वदेशी तकनीक से निर्मित पिनाका रॉकेट प्रणाली का डीआरडीओ ने शुक्रवार को सफल परीक्षण किया। रक्षा अनुसंधान एवं विकास संगठन ने ट्वीट कर ये जानकारी दी। रॉकेट प्रणाली का परीक्षण ओडिशा तट के पास चांदीपुर एकीकृत परीक्षण रेंज में किया गया है।

By Amrit Kumar

नई दिल्ली: पूरी तरह से स्वदेशी तकनीक से निर्मित पिनाका रॉकेट प्रणाली का डीआरडीओ ने शुक्रवार को सफल परीक्षण किया। रक्षा अनुसंधान एवं विकास संगठन ने ट्वीट कर ये जानकारी दी। रॉकेट प्रणाली का परीक्षण ओडिशा तट के पास चांदीपुर एकीकृत परीक्षण रेंज में किया गया है। साथ ही बताया गया है कि, परीक्षण के दौरान लगातार 25 रॉकेट छोड़े गए और लक्ष्य पूरा करने में सफलता हासिल हुई है। स्वदेशी तकनीक से निर्मित पिनाका गाइडेड रॉकेट लांच सिस्टम का अपग्रेड संस्करण है, जो मौजूदा पिनाका एमके-1 रॉकेट की जगह लेगा जिनका मौजूदा वक्त में उत्पादन किया जा रहा है। इस सिस्टम की मदद से 45 किलोमीटर तक की दूरी पर लक्ष्य को नष्ट किया जा सकता है।



सुरक्षा से समझौता नहीं की नीति

गौरतलब है कि भारत दुश्मनों को सबक सिखाने के लिए हर तरह से तैयार रहना चाहता है। देश में बीते दो महीनों में 11 मिसाइलों का परीक्षण किया गया है। इन मिसाइलों का परीक्षण ऐसे वक्त में हुआ है, जब पूर्वी लद्दाख में LAC पर भारत और चाइना के बीच कई महीनों से तनाव चल रहा है। पिनाका सिस्टम के एक दस्ते में 6 लॉन्चिंग वेहिकल होते हैं। साथ ही लोडर सिस्टम, रडार और लिंक विद नेटवर्क सिस्टम और एक कमांड पोस्ट होती है। सभी मिसाइलों को टेलीमेट्री, रडार और इलेक्ट्रो-ऑप्टिकल ट्रैकिंग सिस्टम जैसे अत्याधुनिक उपकरणों की मदद से ट्रैक किया जाता है। ये सिस्टम 44 सेकंड में 72 रॉकेट छोड़ सकता है। पिनाका को दो निजी कंपनियों - लार्सन एंड टुब्रो डिफेंस और टाटा पावर स्ट्रेटेजिक इंजीनियरिंग डिवीजन द्वारा बनाया गया है।

भगवान शिव के अस्त्र है 'पिनाका'

पिनाका रॉकेट प्रणाली का मार्च के महीने में राजस्थान की पोखरण रेंज में भी 3 सफल परीक्षण किए गए थे। अब ओडिशा में हुए सफल परीक्षण को सेना की ताकत बढ़ाने की दिशा में पुखता कदम माना जा

రహా హే। భగవాల శంకర కే అస్త్ర, అనకా ధనుష 'పినాక' కే నామ పర ఇస సిస్టమ్ కు బనాయా గయా హే। ఇస రకషా ప్రణాలీ కు LOC పర తేనాత కరనే కే మకసద సే డేవలప కియా గయా హే।

రకషా మంత్రి నే దీ బధాई

దేశ కే రకషా మంత్రి రాజనాథ సింహ నే పినాకా రౌకెట్ కే సఫల పరీక్షణ పర డీఆర్డీఆం కు బధాई దీ హే। వహీ రకషా అనుసంధాన అంర వికాస విభాగ కే సచివ అంర డీఆర్డీఆం కే అధ్యక్ష జీ సతీశ రెడ్డి నే పరీక్షణం కీ సఫలతా పర సభీ కే ప్రయాసం కు సరాహా హే।

<https://www.jagran.com/news/national-drdo-successfully-tests-upgraded-pinaka-rocket-system-in-odisha-21772393.html>



Sat, 26 June 2021

## DRDO Pinaka Rockets: పినాక రాకెట్ల ప్రయోగాలు

### విజయవంతం: డీఆర్డీవో

భారత రక్షణ పరిశోధన అభివృద్ధి సంస్థ (డీఆర్డీవో) శనివారం నాడు పినాక రాకెట్లను పరీక్షించింది. పినాక రాకెట్లు అనుకున్న మేరకు సత్ఫలితాలను అందించాయని డీఆర్డీవో పేర్కొంది.

By Venkara Chari

DRDO Pinaka Rockets: భారత రక్షణ పరిశోధన అభివృద్ధి సంస్థ (డీఆర్డీవో) శనివారం నాడు పినాక రాకెట్లను పరీక్షించింది. పినాక రాకెట్లు అనుకున్న మేరకు సత్ఫలితాలను అందించాయని డీఆర్డీవో పేర్కొంది. మొత్తం 25 రాకెట్లను ప్రయోగించారు. అన్నీ కూడా విజయవంతంగా లక్ష్యాలను చేదించాయని పేర్కొంది. సామర్థ్యం పెంచిన తరువాత వీటిని టెస్టు చేశారు. మొత్తానికి సామర్థ్యం పెంచిన తరువాత పినాక రాకెట్లు విజయవంతం కావడంతో డీఆర్డీవో వర్గాలు సంతోషంలో మునిగిపోయాయింట.



Drdo Pinaka Rockets

గత రెండు రోజులుగా ఒడిశాలోని చాందీపూర్ లో గల టెస్టింగ్ రేంజ్ నుంచి ఈ పరీక్షలు చేపట్టినట్లు డీఆర్డీవో తెలిపింది. ఈమేరకు పలు రాకెట్లకు నిర్దేశించిన వేర్వేరు దూరాల్లోని టార్గెట్లను విజయవంతంగా చేరుకున్నాయంట. పినాక రాకెట్ 45 కిలోమీటర్ల దూరంలోని టార్గెట్లను సక్సెస్ఫుల్గా చేదించాయంట. కాగా, ఇండియన్ ఆర్మీ సూచనల మేరకు పినాక రాకెట్ లో పలు మార్పులు చేసింది. టెలిమెట్రీ, రాడార్, ఎలక్ట్రో ఆప్టికల్ ట్రాకింగ్ వ్యవస్థల సహాయంతో పినాక రాకెట్ల కక్ష్యను డీఆర్డీవో పరిశీలించింది. ఈమేరకు అనుకున్న ఫలితాలు ఇవ్వడంతో.. త్వరలోనే ఆర్మీకి అప్పగించనున్నట్లు పేర్కొంది.



ప్రయోగాలకు సంబంధించిన వీడియోను మనీష్ ప్రసాద్ అనే జర్నలిస్ట్ సోషల్ మీడియాలో పంచుకున్నాడు. అయితే, ఈ ప్రయోగాల్లో ఆర్మీ అధికారులు కూడా పాల్గొన్నారని డిఆర్డీవో పేర్కొంది.

<https://tv9telugu.com/national/drdo-successfully-test-fires-pinaka-rockets-490418.html>



Sat, 26 June 2021

## DRDO gets another big success, find out what's special

*By Laxman Chaurasiya*

New Delhi: India on Thursday successfully test-fired its subsonic cruise nuclear-capable missile Nirbhay with a distance of 1000 km from the Integrated Test Range (ITR) at Chandipur on the Odisha coast. Sources in the Defence Research and Development Organisation (DRDO) said that the missile was test-fired from the launch complex of ITR III at around 10.45 pm.

India's Fearless Missile is compared to the US Tomahawk and Pakistan's Babur missile. Nirbhay, capable of carrying up to 300 kg of nuclear weapons and equipped with state-of-the-art technology, can also be released from the ground surface, air and underwater submarines. According to sources, the two-stage 'Nirbhay' missile took a unique trajectory across its route for purpose.



Being the same surface missile, it is difficult to identify Nirbhay from the enemy's radar. Sources said the missile surrounds its target area for several minutes and then hits the right place at the right time. Earlier in March this year, the Defence Research and Development Organisation conducted a successful flight test of a solid fuel Ramjet missile propulsion system from Chandipur Test Centre in Odisha. DRDO said in a statement that all sub-systems including booster motor and nozzle-less motor performed as expected (due to flight test).

<https://english.newstracklive.com/news/another-success-for-drdo-successful-test-of-subsonic-cruise-nuclear-missile-nirbhay-mc23-nu915-ta322-1167335-1.html>

## DRDO को मिली एक और कामयाबी, सबसोनिक क्रूज परमाणु मिसाइल निर्भय का किया सफल टेस्ट

भूभाग पर चलने वाली मिसाइल होने के कारण निर्भय को दुश्मन के रडार से पहचानना मुश्किल है। सूत्रों ने कहा कि मिसाइल अपने लक्ष्य के क्षेत्र को कई मिनट तक घेरती रहती है और फिर सही समय पर सही जगह से टकराती है।

*Edited By: दीपक पोखरिया*

भारत ने गुरुवार को ओडिशा तट के चांदीपुर में एकीकृत परीक्षण रेंज (आईटीआर) से 1000 किलोमीटर की दूरी के साथ अपनी सबसोनिक क्रूज परमाणु-सक्षम मिसाइल निर्भय का सफल परीक्षण किया। रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) के सूत्रों ने कहा कि मिसाइल का परीक्षण लगभग 10 बजकर 45 मिनट पर आईटीआर के III के लॉन्च कॉम्प्लेक्स से किया गया।



भारत की निर्भय मिसाइल की तुलना अमेरिका के टॉमहॉक और पाकिस्तान के बाबर मिसाइल से की जाती है। करीब 300 किलोग्राम तक परमाणु अस्त्र ले जाने में सक्षम और अत्याधुनिक टैक्नालॉजी से लैस निर्भय को जमीन की सतह, हवा और पानी के नीचे पनडुब्बियों से भी छोड़ा जा सकता है। सूत्रों ने कहा कि दो चरणों वाली इस 'निर्भय' मिसाइल ने लक्ष्य के लिए अपने पूरे रास्ते में एक अनूठी ट्रेजेक्टरी ली।

भारत की निर्भय मिसाइल की तुलना अमेरिका के टॉमहॉक और पाकिस्तान के बाबर मिसाइल से की जाती है।

निर्भय को दुश्मन के रडार से पहचानना मुश्किल

सतह पर चलने वाली मिसाइल होने के कारण निर्भय को दुश्मन के रडार से पहचानना मुश्किल है। सूत्रों ने कहा कि मिसाइल अपने लक्ष्य के क्षेत्र को कई मिनट तक घेरती रहती है और फिर सही समय पर सही जगह से टकराती है। इससे पहले इसी साल मार्च महीने में रक्षा अनुसंधान एवं विकास संगठन ने ठोस ईंधन वाली रैमजेट मिसाइल प्रणोदन प्रणाली का ओडिशा के चांदीपुर परीक्षण केंद्र से सफल उड़ान परीक्षण किया।

डीआरडीओ ने एक बयान में कहा कि बूस्टर मोटर और नोजल-लेस मोटर सहित सभी उप प्रणालियों ने उम्मीद के अनुरूप (उड़ान परीक्षण के दौरान) प्रदर्शन किया। वर्तमान में एसएफडीआर मिसाइल प्रपल्शन टेक्नोलॉजी विश्व में सिर्फ गिने-चुने देशों के पास ही उपलब्ध है। वहीं इससे पहले भारतीय अंतरिक्ष अनुसंधान संगठन ने 28 फरवरी को हिंद महासागर क्षेत्र में सैन्य और मर्चेट नेवी के जहाजों की गतिविधियों की निगरानी के वास्ते डीआरडीओ की तरफ से विकसित एक उपग्रह 'सिंधू नेत्र' प्रक्षेपित किया था।

<https://www.tv9hindi.com/india/another-success-for-drdo-successful-test-of-subsonic-cruise-nuclear-missile-nirbhay-710598.html>

## अग्नि प्राइम: चंद्र घंटों बाद हवा से बातें करेगी यह शक्तिशाली मिसाइल, परीक्षण की सभी तैयारियां पूरी

सार

अग्नि सीरीज की सबसे आधुनिक मिसाइल अग्नि प्राइम का आज परीक्षण किया जाएगा। इस अत्याधुनिक मिसाइल को 4,000 किलोमीटर की रेंज वाली अग्नि-4 और 5,000 किलोमीटर की अग्नि-5 मिसाइलों में इस्तेमाल होने वाली अत्याधुनिक तकनीकों को मिलाकर विकसित किया गया है।

विस्तार

अग्नि सीरीज के सबसे अत्याधुनिक वर्जन अग्नि प्राइम नामक मिसाइल के परीक्षण की सभी तैयारियां पूरी कर ली गई हैं। रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) द्वारा विकसित इस मिसाइल का आज यानी सोमवार को दोपहर 12 बजे परीक्षण किया जाएगा।

अग्नि प्राइम मिसाइल को डीआरडीओ ने विकसित किया है। अग्नि प्राइम मिसाइल को 4,000 किलोमीटर की रेंज वाली अग्नि-4 और 5,000 किलोमीटर की अग्नि-5 मिसाइलों में इस्तेमाल होने वाली अत्याधुनिक तकनीकी को मिलाकर तैयार किया गया है। अग्नि प्राइम मिसाइल की मारक क्षमता 1000 से 1500 किलोमीटर है, लेकिन यह मिसाइल अत्याधुनिक साजो सामान से सुसज्जित है।



मोबाइल लॉन्चर से भी कर सकेंगे फायर

अग्नि प्राइम मिसाइल दो स्टेज और सॉलिड फ्यूल पर आधारित है। इसे एडवांस रिंग-लेजर गायरोस्कोप पर आधारित जड़त्वीय नेविगेशन सिस्टम द्वारा निर्देशित किया जाएगा। दोनों चरणों में समग्र रॉकेट मोटर्स हैं। इसका गाइडेंस सिस्टम इलेक्ट्रोमैकेनिकल एक्ट्यूएटर्स से लैस हैं। रक्षा विभाग से जुड़े सूत्रों ने बताया कि सिंगल स्टेज वाले अग्नि-1 के विपरीत, डबल स्टेज वाले अग्नि प्राइम फ्लैक्सिबिलिटी के साथ सड़क और मोबाइल लॉन्चर दोनों से फायर किया जा सकता है।

स्लीक डिजाइन, अधिक मारक क्षमता

सूत्रों के मुताबिक, अग्नि प्राइम में अत्याधुनिक तकनीक के प्रयोग के कारण यह पिछले संस्करण की तुलना में कम वजन वाली स्लीक मिसाइल शक्ति है। इससे इसकी मारक क्षमता पहले तुलना में अधिक घातक होगी। हालांकि, सूत्र ने ज्यादा जानकारी देने से साफ इनकार कर दिया।

1989 में हुआ था अग्नि-1 का परीक्षण

भारत ने मई, 1989 में पहली बार मध्यम दूरी की बैलेस्टिक मिसाइल अग्नि-1 का टेस्ट किया था। उस वक्त इसकी मारक क्षमता 700 से 900 किलोमीटर थी। वर्ष 2004 में सेना में शामिल किया गया था। यदि अग्नि प्राइम का टेस्ट सफल रहता है तो यह अग्नि-1 की जगह ले लेगी। भारत अब तक अग्नि सीरीज की पांच मिसाइल विकसित कर चुका है।

<https://www.amarujala.com/india-news/agni-prime-missile-test-drdo-set-to-back-in-action-with-agni-prime-test-scheduled-today-12-pm>

## **Indian, Russian BrahMos boasts total \$6B portfolio of defense deals to be signed in 2021**

The joint Russian-Indian venture BrahMos Aerospace plans to sign \$1 billion worth of new contracts by the year-end, which will take the company's yearly total to \$6 billion.

"We plan to sign a number of contracts soon. Thus, our total order portfolio will amount to \$6 billion by the end of this year," a company spokesperson told Sputnik.

Most orders were placed by land forces, 40 percent, the spokesperson said. Navy and air forces accounted for 30 percent of the orders each. At the moment, the worth of BrahMos' contracts signed in 2021 is just over \$5 billion.

BrahMos Aerospace, established in 1998, specializes in producing cruise missiles and supporting equipment, such as launchers and missile guidance systems.

Earlier, there were reports that India and the Philippines had signed an agreement for a potential supply of BrahMos missiles that the Philippine government believes will boost its coastal defense, Straits Times had reported.



File Image: BrahMos Missile – Wikimedia Commons

The BrahMos is a medium-range supersonic missile that can be launched from submarines, ships, aircraft or land-based platforms. It is considered to be the fastest supersonic missile in the world that can achieve a speed 2.8 times the speed of sound.

The missile can be used for coastal defense and ground attack and is expected to boost the Philippines firepower of the island nation as it faces hostilities from China, the Straits Times had reported.

The name of BrahMos comes with the amalgamation of rivers Brahmaputra and Moskva and is jointly produced by Indian DRDO and Mashinostroyeniya of Russia.

"India's missile development program has made sure that its missiles are upgraded and new systems are also developed. BrahMos has undergone development through the early 2000s till date. Its land-to-land, submarine-fired and now air-fired variants have been developed stage by stage. Each new version has something additional compared to the previous version," said a DRDO scientist.

The Indian Navy inducted the BrahMos missiles on its warships in 2005 while the army began acquiring them from 2007. After the Indian Air Force successfully air-launched a Mach 2.8 supersonic surface-attack missile of this category from a fighter jet, it became the first in the world to do so.

<https://eurasianimes.com/indian-russian-brahmos-boasts-total-6b-portfolio-of-defense-deals-to-be-signed-in-2021/>

## Deoghar airport likely to be operational from Sep

Ranchi: Deoghar airport is likely to be operational from September as the Union Civil Aviation Ministry is chalking out a plan for the formal inauguration of the airport on September 17 coinciding with the birthday of Prime Minister Narendra Modi.

But Bokaro airport will have to wait for some more time.

BJP's Godda MP Nishikant Dubey claimed that the proposal for inauguration has been discussed with Union Civil Aviation Minister Hardeep Singh Puri who has been reviewing the progress of development work of this airport. Puri had even visited Deoghar last year for physical inspection of the construction work.

Once complete, this will be the second airport in Jharkhand after Ranchi. It will be capable of handling flights including large aircraft and is expected to boost regional connectivity and tourism.

This airport is being jointly developed by the Airports Authority of India (AAI), Defence Research and Development Organisation (DRDO) and the Jharkhand government. Prime Minister Narendra Modi laid the foundation stone of this airport on May 25, 2018.

Spread over 653.75 acres of land the project cost of this airport is Rs 401.34 crore. Its terminal building is being built over an area of 4,000sqm whereas the runway is 2,500 metres long.

Meanwhile, the AAI has set the target to complete the remaining work by mid of August including the approach road it has also decided to install a heavy solar power plant to make the airport self-powered. The AAI has planned to use the parking area spread over 20000 square feet to install solar panels.

But residents of Bokaro will have to wait for their airport. However, AAI in December last year had initially planned to host commercial flights to Patna and Calcutta by the end of July. But the Covid 19 pandemic severely hit the construction work. There were only 25 percent of the work that needed to be finished. The construction work has been expedited once again and it is likely to be completed by August.

The project includes a terminal building to accommodate 300 passengers, runway, apron and taxi track for ATR-72 type aircraft.

After Deoghar; Bokaro will be the second airport set-up under UDAN, the centrally sponsored scheme for regional air-connectivity. The airport is owned by Bokaro Steel Plant which is a subsidiary of the Steel Authority of India Limited (SAIL). In April 2018, SAIL had signed a MOU with AAI and the Union civil aviation ministry to develop its three airstrips namely Rourkela (West Bengal), Bokaro (Jharkhand) and Burnpur (Odisha) under UDAN.

BSL too has applied for the aerodrome license at the Directorate General of Civil Aviation (DGCA) which is very much required to operationalize Bokaro airport.

<https://www.dailypioneer.com/2021/state-editions/deoghar-airport-likely-to-be-operational-from-sep.html>

## **COVID 19: DRDO's Contribution**

### **THE TIMES OF INDIA**

*Mon, 28 June 2021*

## **DRDO's drug lures virus by looking like glucose: Expert**

*By Surendra Singh*

New Delhi: Defence Research and Development Organisation's drug 2-deoxy-D-glucose (2-DG), which has been granted permission by drug regulator DCGI for emergency use as adjunct therapy in moderate to severe Covid patients, was "initially developed to check the growth of cancerous cells". As 2-DG's defence mechanism to check the growth of cancerous cells was the same as depriving the coronavirus of glucose in infected cells, the DRDO decided to perform clinical trials on this drug on the suggestions of its scientists after the regulator's nod last year, a defence expert revealed.

Former DRDO veteran Ravi Kumar told TOI, "Coronavirus uses glucose in infected cells as an energy source to multiply. 2-DG lures the virus by looking like glucose, which the virus feeds on but gets weakened and thus the viral load gets reduced in patients after some days of drug intake."

In the 2-DG arm, a significantly higher proportion of patients improved symptomatically and became free from supplemental oxygen dependence (42% vs 31%) by Day 3. Similar trend was observed in patients aged over 65 years, an MoD statement said recently.

Talking to TOI, Praveen Chandra, Medanta hospital's chairman of interventional cardiology, said 2-DG has been tried till now on 15-20 patients in their hospital. "It has been quite good and improvements have been seen in patients after its second dose", he said, adding, "We have not yet seen any side effects".

<https://timesofindia.indiatimes.com/home/science/drdo-drug-lures-virus-by-looking-like-glucose-expert/articleshow/83908692.cms>

## **Business Standard**

*Sat, 26 June 2021*

## **Shilpa Medicare gains on DRDO nod for manufacturing 2DG**

Shilpa Medicare rose 3.85% to Rs 572 after the company announced that it had received an in-principle approval from Defence Research & Development Organisation (DRDO) to manufacture and sale of 2-Deoxy-D-Glucose (2DG).

2DG has been given emergency approval by the Drug Controller General of India (DCGI) for COVID-19 patients in the country. Shilpa Medicare Limited is only the second company in India to have entered into similar arrangement with DRDO.

Shilpa has been continuously striving to contribute towards the fight against COVID-19 and this is yet another step by the company after its recently announced arrangement for manufacture and supply of Sputnik V vaccine.

Shilpa Medicare is a global brand in manufacturing and supplying of affordable API and formulation globally in different regulated markets.



The company's consolidated net profit slumped 77.35% to Rs 7.83 crore on 5.44% decrease in revenue from operations to Rs 208.03 crore in Q4 March 2021 over Q4 March 2020.

(This story has not been edited by Business Standard staff and is auto-generated from a syndicated feed.)

[https://www.business-standard.com/article/news-cm/shilpa-medicare-gains-on-drdo-nod-for-manufacturing-2dg-121062500587\\_1.html](https://www.business-standard.com/article/news-cm/shilpa-medicare-gains-on-drdo-nod-for-manufacturing-2dg-121062500587_1.html)

**mint**

Sat, 26 June 2021

## Shilpa Medicare gets DRDO nod to manufacture & sell 2DG covid drug

*2DG has been given emergency approval by the Drug Controller General of India (DCGI) for COVID-19 patients in the country*

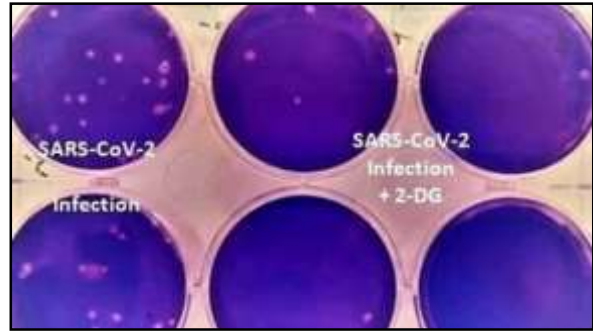
Shilpa Medicare on Friday announced that the company has received an in-principle approval from Defence Research & Development Organisation (DRDO) to manufacture and sale of 2-Deoxy-D-Glucose (2DG).

2DG has been given emergency approval by the Drug Controller General of India (DCGI) for COVID-19 patients in the country. Shilpa Medicare Limited is only the second company in India to have entered into similar arrangement with DRDO, the company said in an exchange filing.

"Shilpa has been continuously striving to contribute towards the fight against COVID-19 and this is yet another step by Shilpa after its recently announced arrangement for manufacture and supply of Sputnik V vaccine," the company said.

Shares of Shilpa Medicare were up nearly 4% at ₹572.6 per share on the BSE.

<https://www.livemint.com/companies/news/shilpa-medicare-gets-drdo-nod-to-manufacture-sell-2dg-covid-drug-11624603747055.html>



DRDO's 2DG drug (DRDO)

**हिन्दुस्तान**

Sat, 26 June 2021

## आक्सीजन जेनरेटर प्लांट की हुई टेस्टिंग

बरेली: 300 बेड कोविड अस्पताल में बन रहे आक्सीजन जेनरेटर प्लांट की शुक्रवार को टेस्टिंग हुई। डीआरडीओ की टीम के सामने टेक्निकल स्टाफ ने आक्सीजन प्लांट चलाकर देखा। कई बार टेस्टिंग के बाद कोई खामी नहीं आई। अब आक्सीजन प्लांट से वार्ड तक पाइप का कनेक्शन होने का काम रह गया है। शुक्रवार की सुबह डीआरडीओ की टीम कोविड अस्पताल पहुंची। साथ में सीएमएस डा. वागीश वैश्य भी थे। टीम ने आक्सीजन जेनरेटर मशीन की टेस्टिंग की। मशीन चलाकर देखी गई। एडीएसआईसी डा. सुबोध शर्मा ने बताया कि टेस्टिंग सफल रही है। जल्द ही वार्ड में कनेक्शन किया जाएगा।

<https://www.livehindustan.com/uttar-pradesh/bareilly/story-oxygen-generator-plant-testing-4159513.html>

## जिला महिला और पुरुष दोनों चिकित्सालय में लगेंगे ऑक्सीजन प्लांट, सर्वे शुरू

जिला महिला और पुरुष चिकित्सालय में अलग-अलग ऑक्सीजन प्लांट लगेंगे। जिला पुरुष अस्पताल में डीआरडीओ तो जिला महिला चिकित्सालय में हाइट्स ऑक्सीजन प्लांट लगाएगा। प्लांट लगाने में सहयोगी कंपनी नेशनल हाईवे अथारिटी ऑफ इंडिया की टीम ने यहां पहुंचकर सर्वे शुरू कर दिया है।

दूसरी लहर की तरह तीसरी लहर में ऑक्सीजन की किल्लत न आए, इसके लिए सरकार की ओर से लगाए जा रहे ऑक्सीजन प्लांटों के आखिर बिजनौर में लगने का समय भी आ गया है। इसके लिए बिजनौर पहुंचकर एनएचएआई ने सर्वे शुरू कर दिया है। सीएमओ डॉ. विजय कुमार गोयल ने इसकी पुष्टि की। उन्होंने बताया, कि जिला पुरुष अस्पताल में 160 बेड के लिए ऑक्सीजन प्लांट रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) लगाएगा। डीआरडीओ को देश भर में ऐसे 500 मेडिकल ऑक्सीजन प्लांट लगाने की जिम्मेदारी सौंपी गयी है। ये ऑक्सीजन प्लांट्स एलसीए तेजस फाइटर जेट्स की ऑक्सीजन सप्लाई करने वाली तकनीक पर आधारित है। सूत्रों के अनुसार एक ऑक्सीजन प्लांट पर करीब 80 लाख रुपये का खर्च आएगा। यह पीएमकेयर फंड से होगा।

जिला महिला अस्पताल 100 बेड का प्लांट लगाने की जिम्मेदारी सिविल इंजीनियरिंग कंपनी हाइट्स को दी गयी है। यहां पहुंचकर डीआरडीओ और हाइट्स की सहयोगी नेशनल हाईवे अथारिटी ऑफ इंडिया कंपनी ने सर्वे शुरू कर दिया है। कहां बेस बनना है और कैसे-कैसे पाइप लाइन का काम होना है, ताकि हर बेड पर ऑक्सीजन की सप्लाई पहुंच सके, यह भी सर्वे में देखा जा रहा है। मध्य जुलाई तक यहां ऑक्सीजन प्लांट का काम पूरा हो जाने की उम्मीद जताई गयी है।

-जिला पुरुष चिकित्सालय में 160 और जिला महिला अस्पताल में 100 बेड के लिए ऑक्सीजन प्लांट डीआरडीओ व हाइट्स की ओर से लगाया जा रहा है। सर्वे शुरू हो गया है।

-डॉ. विजय कुमार गोयल, सीएमओ, बिजनौर

<https://www.livehindustan.com/uttar-pradesh/bijnor/story-oxygen-plants-will-be-set-up-in-both-district-women-39-s-and-men-39-s-hospitals-survey-started-4165645.html>



## पंजाब: मेडिकल ऑक्सीजन के लिए लगेंगे 75 पीएसए प्लांट, तय समय में काम की हिदायत

सार

जुलाई के अंत तक सभी प्लांटों में उत्पादन शुरू करने के निर्देश  
कोविड की तीसरी लहर से निपटने के लिए प्रदेश ने शुरू की तैयारी

विस्तार

कोविड-19 की तीसरी लहर से निपटने की तैयारियों के तहत मेडिकल ऑक्सीजन का उत्पादन बढ़ाने के लिए पंजाब सरकार की ओर से जुलाई के अंत तक 75 और प्रेशर स्विंग एडसोर्प्शन (पीएसए) प्लांट स्थापित किए जाएंगे। रविवार को एलान करते हुए मुख्य सचिव विनी महाजन ने बताया कि संबंधित विभागों को अगले माह के अंत तक ये प्लांट लगाने और जीवन रक्षक गैस का उचित प्रेशर और शुद्धता सुनिश्चित करने के निर्देश दिए हैं। इससे राज्य की स्वास्थ्य संस्थाओं में मेडिकल ऑक्सीजन सप्लाई की मांग पूरी होगी। पीएसए प्लांटों की स्थापना और इससे जुड़े कार्यों की समीक्षा के लिए बुलाई गई उच्च स्तरीय वर्चुअल मीटिंग की अध्यक्षता करते हुए मुख्य सचिव ने संबंधित अधिकारियों को हिदायत दी कि प्लांटों की स्थापना से पहले की सभी गतिविधियों को 15 जुलाई तक पूरा किया जाए, ताकि प्लांटों की स्थापना और इनको चलाने का काम 25 जुलाई तक पूरा किया जा सके।

इसके अलावा उन्होंने इससे संबंधित अन्य कार्यों जैसे साइट तैयार करने, जेनरेटरों और गैस पाइपलाइन नेटवर्क के लिए नोडल अधिकारी नियुक्त करने को भी कहा। महाजन ने कहा कि सुचारु कामकाज और नियमित रूप से जानकारी उपलब्ध करवाने के लिए प्रत्येक साइट का एक व्हाट्सएप ग्रुप बनाया जाए, जिसमें डिप्टी कमिश्नर, सभी नोडल अफसर, काम करने वाली एजेंसी और अस्पताल सुपरिंटेंडेंट शामिल हों।

प्रतिदिन 50 एमटी ऑक्सीजन उत्पादन की क्षमता

जलापूर्ति एवं स्वच्छता विभाग के प्रमुख सचिव जसप्रीत तलवार, जो राज्य के ऑक्सीजन प्रबंधन ग्रुप के प्रमुख भी हैं, ने मुख्य सचिव को बताया कि पंजाब के पास जालंधर और लुधियाना में 1400 लीटर प्रति मिनट (एलपीएम) की क्षमता वाले अपने दो पीएसए प्लांट हैं। भारत सरकार की ओर से मुख्य तौर पर राज्य के मेडिकल कॉलेजों और जिला अस्पतालों के लिए 42 प्लांट अलॉट किए गए हैं, जबकि विभिन्न एजेंसियों/निजी संस्थाओं ने राज्य के लिए और 33 प्लांटों की व्यवस्था की है। उन्होंने कहा कि इससे राज्य की ऑक्सीजन उत्पादन क्षमता प्रतिदिन तकरीबन 50 मीट्रिक टन से अधिक हो जाएगी।

केंद्र से प्लांटों की साइटें 10 जुलाई तक होंगी तैयार

मीटिंग में बताया गया कि पांच पीएसए प्लांट पहले ही स्थापित किए जा चुके हैं, जो अभी परीक्षण के अधीन हैं। अन्य पांच प्लांट स्थापित करने के लिए साइट तैयार कर ली गई है और डीआरडीओ को यह प्लांट बरनाला, होशियारपुर, फिरोजपुर, कपूरथला और तरनतारन में लगाने के बारे में बताया गया है।

एनएचएआई, जो भारत सरकार के प्लांटों के लिए साइट तैयार करने वाली एक कार्यकारी एजेंसी है, को अलॉट किए गए कार्यों को 10 जुलाई तक पूरा करने के लिए कहा है। एनएचएआई के आरओ आरपी सिंह ने भरोसा दिया कि भारत सरकार के प्लांटों के लिए साइट तैयार करने संबंधी सभी कार्य निर्धारित समय में पूरे कर लिए जाएंगे।

<https://www.amarujala.com/chandigarh/punjab-news-75-psa-plants-to-be-set-up-for-medical-oxygen>

## DRDO on Twitter



**#WATCH** | DRDO successfully test fired the extended-range version of indigenously developed Pinaka rocket from a Multi-Barrel Rocket Launcher (MBRL) on 24th and 25th June 2021 at Integrated Test Range (ITR), Chandipur off the coast of Odisha.



6:47 PM · Jun 25, 2021



# Defence Strategic: National/International



Press Information Bureau  
Government of India

Ministry of Defence

Sun, 27 June 2021 3:02PM

## **Raksha Mantri Shri Rajnath Singh interacts with 300 veterans in Leh, as part of his three-day visit to Ladakh;**

### *Reiterates Government's commitment towards ex-servicemen welfare*

Raksha Mantri Shri Rajnath Singh interacted with 300 veterans, including Ashok Chakra winner Naib Subedar (Honorary) Chhering Mutup (Retd) and Maha Vir Chakra winner Colonel Sonam Wangchuk (Retd), at Leh, Ladakh on June 27, 2021. In his address, Shri Rajnath Singh lauded the unparalleled dedication of the veterans in ensuring safety and security of the nation, reiterating the Government's commitment towards the welfare of the ex-servicemen. He said Prime Minister Shri Narendra Modi's decision to roll out 'One Rank One Pension' scheme, ending a decades long wait, was a testimony to the Government's unwavering commitment towards the welfare and satisfaction of the veterans. "Our aim is to take care of you in the same way as you all have taken care of the security of the country," he said.

Listing out other measures taken by the Government to ensure the welfare of the veterans, the Raksha Mantri said a number of steps have been taken to address the issue of resettlement, including organising job fairs through Directorate General Resettlement, in which a large number of veterans were given employment. He added that a number of online services under 'Digital India' have been introduced for the veterans. These include launch of 'e-Sehat' portal to provide tele-medicine services, especially during the ongoing COVID-19 pandemic and the introduction of Interactive Voice Response System (IVRS) to address the problems faced by the ex-servicemen.

Lt Governor of Ladakh Shri RK Mathur, MP from Ladakh Shri Jamyang Tsering Namgyal, Chief of Army Staff General MM Naravane and General Officer-Commanding-in-Chief, Northern Command Lt Gen YK Joshi were present on the occasion.

Later, Shri Rajnath Singh met the elected representatives of Ladakh Autonomous Hill Development Councils, Leh, Kargil and officials in Leh.

Earlier in the day, the Raksha Mantri reached Leh on a three-day visit to Ladakh. During his stay, he will inaugurate infrastructure projects constructed by Border Roads Organisation (BRO) and interact with troops deployed in the region.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1730689>



पत्र सूचना कार्यालय  
भारत सरकार

रक्षा मंत्रालय

Sun, 27 June 2021 3:02PM

## रक्षा मंत्री श्री राजनाथ सिंह ने लद्दाख की अपनी तीन दिवसीय यात्रा के दौरान लेह में 300 पूर्व सैनिकों के साथ बातचीत की;

*पूर्व सैनिकों की भलाई के प्रति सरकार की प्रतिबद्धता दोहराई*

रक्षा मंत्री श्री राजनाथ सिंह ने दिनांक 27 जून, 2021 को लद्दाख के लेह में अशोक चक्र विजेता नायब सूबेदार (मानद) छेरिंग म्यूटुप (सेवानिवृत्त) और महावीर चक्र विजेता कर्नल सोनम वांगचुक (सेवानिवृत्त) समेत 300 पूर्व सैनिकों के साथ बातचीत की। अपने संबोधन में श्री राजनाथ सिंह ने पूर्व सैनिकों के कल्याण के प्रति सरकार की प्रतिबद्धता को दोहराते हुए राष्ट्र की सुरक्षा और संरक्षा सुनिश्चित करने में उनके अद्वितीय समर्पण की सराहना की। उन्होंने कहा कि प्रधानमंत्री श्री नरेंद्र मोदी का दशकों लंबे इंतजार को समाप्त करते हुए वन रैंक वन पेंशन योजना शुरू करने का फैसला पूर्व सैनिकों के कल्याण और संतुष्टि के प्रति सरकार की अटूट प्रतिबद्धता का प्रमाण है। उन्होंने कहा कि हमारा मकसद आपका भी उसी तरह से खयाल रखना है जिस तरह आप सभी ने देश की सुरक्षा का ध्यान रखा है।

पूर्व सैनिकों की भलाई को सुनिश्चित करने के लिए सरकार द्वारा किए गए अन्य उपायों का उदाहरण देते हुए रक्षा मंत्री ने कहा कि पुनर्वास के मामले के समाधान के लिए अनेक कदम उठाए गए हैं, जिनमें पुनर्वास महानिदेशालय के माध्यम से रोजगार मेलों का आयोजन शामिल है, जिसमें बड़ी संख्या में पूर्व सैनिकों को रोजगार दिया गया। उन्होंने कहा कि पूर्व सैनिकों के लिए डिजिटल इंडिया के तहत कई ऑनलाइन सेवाएं शुरू की गई हैं। इनमें विशेष रूप से चल रही कोविड-19 महामारी के दौरान टेली-मेडिसिन सेवाएं प्रदान करने के लिए ई-सेहत पोर्टल का शुभारंभ और पूर्व सैनिकों की समस्याओं के समाधान के लिए इंटरएक्टिव वॉयस रिस्पॉंस सिस्टम (आईवीआरएस) की शुरुआत शामिल है।

इस अवसर पर लद्दाख के लेफ्टिनेंट गवर्नर श्री आरके माथुर, लद्दाख से सांसद श्री जामयांग सेरिंग नामग्याल, सेना प्रमुख जनरल एम एम नरवणे और उत्तरी कमान के जनरल ऑफिसर-कमांडिंग-इन-चीफ लेफ्टिनेंट जनरल वाई के जोशी उपस्थित थे।

बाद में श्री राजनाथ सिंह ने लद्दाख स्वायत्त पर्वतीय विकास परिषद लेह, कारगिल के निर्वाचित प्रतिनिधियों और लेह में अधिकारियों से मुलाकात की।

इससे पहले रक्षा मंत्री लद्दाख की तीन दिवसीय यात्रा पर लेह पहुंचे। अपने प्रवास के दौरान वे सीमा सड़क संगठन (बीआरओ) द्वारा निर्मित बुनियादी ढांचा परियोजनाओं का उद्घाटन करेंगे और क्षेत्र में तैनात सैनिकों के साथ बातचीत करेंगे।

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**Press Information Bureau**  
**Government of India**

**Ministry of Defence**

*Fri, 25 June 2021 2:17PM*

## **Raksha Mantri Shri Rajnath Singh reviews progress of construction of first Indigenous Aircraft Carrier at Kochi;**

*Terms IAC as a shining example of AatmaNirbhar Bharat  
that will secure India's interests in maritime domain*

Raksha Mantri Shri Rajnath Singh reviewed the progress of construction of first Indigenous Aircraft Carrier (IAC) built by M/s Cochin Shipyard Ltd., at Kochi on June 25, 2021. Shri Rajnath Singh was accompanied by Chief of the Naval Staff Admiral Karambir Singh and Flag Officer Commanding-in-Chief, Southern Naval Command Vice Admiral AK Chawla. The Raksha Mantri visited the construction site and was briefed about the successful Basin Trials completed during November 2020. He was also apprised of the progress achieved on integration of a number of other navigational, communication and operational systems since then, as it prepares for its maiden Contractor Sea Trials (CST) which is expected in the forthcoming months.

The IAC would be commissioned as INS Vikrant in the first half of 2022, which would be the most potent sea-based asset. The ship shall operate MiG-29K fighter aircraft, Kamov-31 Air Early Warning Helicopters, the soon to be inducted MH-60R multi-role helicopter and the indigenously manufactured Advanced Light Helicopters. It would offer an incomparable military instrument with its ability to project Air Power over long distances, including Air Interdiction, Anti-Surface Warfare, offensive and defensive Counter-Air, Airborne Anti-Submarine Warfare and Airborne Early Warning.

During the visit, an exhibition showcasing Indian Navy's various ongoing innovations, indigenisation and operations aligning with the nation's fight against the COVID-19 pandemic was also organised for the Raksha Mantri. The major exhibits included the Oxygen Recycling System (ORS), which is currently under clinical trials at Sree Chitra Tirunal Institute for Medical Science and Technology; Navrakshak PPE and masks currently being used in PM CARES Hospitals; Remote Patient Monitoring System and several such other innovations which had provided affordable, effective and user-friendly medical solutions. The Raksha Mantri was also apprised about the assistance rendered to civil agencies such as the Fire Safety Audit of hospitals and specialised training on PSA Oxygen Plants in addition to an overview of the Samudra Setu II and Oxygen Express Operations. The Raksha Mantri also interacted with 10-year-old Veer Kashyap, a student of Navy Children School Kochi, who had won the Pradhan Mantri Bal Puraskar 2021 for developing an innovative board game 'Corona Yuga' for educating and creating awareness about the pandemic among the public at large.

The Raksha Mantri was also informed about the activities being conducted and planned by Indian Navy towards 'Swarnim Vijay Varsh' being celebrated by the Armed Forces to commemorate the victory of 1971 war and 'Azadi Ka Amrit Mahotsav' to commemorate the 75<sup>th</sup> anniversary of India's Independence.

Shri Rajnath Singh also visited some of the training establishments under Southern Naval Command and appreciated the efforts of the Indian Navy for continuously providing professional training not only to the Officers and Sailors of Indian Navy but also to friendly foreign Navies even amidst the COVID-19 pandemic. He interacted with the officers and sailors of the Kochi area over lunch traditionally called 'Barakhana'.

The Raksha Mantri expressed satisfaction at the progress of construction of Indigenous Aircraft Carrier, describing it as a shining example of 'AatmaNirbhar Bharat' envisioned by Prime Minister Shri Narendra Modi. He stated that IAC has nearly 75 per cent indigenous content - from design to

steel used in construction to key weapons and sensors. He recalled a recent approval accorded by the Defence Acquisition Council for RFP of Project 75-I under the Strategic Partnership model, which will give further fillip to indigenous development of niche manufacturing technologies.

Shri Rajnath Singh highlighted the combat capability, reach and versatility of the aircraft carrier, saying that it will add formidable capabilities in the defence of the country and help secure India's interests in maritime domain. Appreciating the fact that significant progress was made on the construction of IAC despite COVID-19, he said the commissioning of IAC will be a befitting tribute to 75 years of India's independence.

The Raksha Mantri reaffirmed the Government's commitment towards a strong Indian Navy, saying that "IAC and Project Seabird at Karwar, which will be the Asia's largest Naval Base, as the examples of our unwavering focus". He listed out the measures being taken by the Government to modernise the Indian Navy, with emphasis on indigenisation, which will enhance the Navy's operational reach and prowess. He assured all possible support to the Navy for bolstering their operational preparedness, saying that a strong Naval force is crucial for peace, security and prosperity.

On the Galwan incident, Shri Rajnath Singh said Indian Navy's proactive forward deployment signalled that the country wants peace but is ready for any eventuality. "Indian Navy remains poised and combat ready to tackle any challenge," he said. The Raksha Mantri reiterated the Prime Minister's vision of SAGAR (Security and Growth for All in the Region) and the wider goal of a free, open and inclusive Indo-Pacific to ensure peace and stability in the region.

The Raksha Mantri lauded Indian Navy for its contribution in the fight against COVID-19 - from bringing back Indian citizens from overseas during Operation Samudra Setu I and ferrying in Liquid Medical Oxygen from abroad during Operation Samudra Setu II - despite the danger of spread of the virus onboard warships. He also commended the Search and Rescue (SAR) efforts by Navy during Cyclone Tauktae and Cyclone Yaas.

On June 24, 2021, Shri Rajnath Singh had visited the Karwar Naval Base and reviewed the progress of ongoing infrastructure development under 'Project Seabird', as part of his two-day visit to the Southern Naval Command.

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पत्र सूचना कार्यालय  
भारत सरकार

रक्षा मंत्रालय

Fri, 25 June 2021 2:17PM

## रक्षा मंत्री श्री राजनाथ सिंह ने कोच्चि में प्रथम स्वदेशी विमानवाहक पोत के निर्माण कार्य की प्रगति की समीक्षा की

*श्री राजनाथ सिंह ने स्वदेशी विमानवाहक पोत को आत्मनिर्भर भारत का  
एक शानदार उदाहरण बताया जो समुद्री क्षेत्र में भारत के हितों की रक्षा करेगा*

रक्षा मंत्री श्री राजनाथ सिंह ने 25 जून, 2021 को कोच्चि में मेसर्स कोचीन शिपयार्ड लिमिटेड द्वारा निर्मित प्रथम स्वदेशी विमानवाहक पोत (आईएसी) के निर्माण की प्रगति की समीक्षा की। श्री राजनाथ सिंह के साथ नौसेना प्रमुख एडमिरल करमबीर सिंह और फ्लैग ऑफिसर कमांडिंग इन चीफ, दक्षिणी नौसेना कमान वाइस एडमिरल ए के चावला भी थे। रक्षा मंत्री ने निर्माण स्थल का दौरा किया और उनको नवंबर 2020 के दौरान पूरा किए गए सफल बेसिन ट्रायल्स के बारे में जानकारी दी गई। तब से कई अन्य नौवहन, संचार और परिचालन प्रणालियों के एकीकरण पर हासिल की गई प्रगति के बारे में भी उन्हें बताया गया, क्योंकि इससे ही स्वदेशी विमानवाहक पोत के प्रथम कांटेक्टर सी ट्रायल्स (सीएसटी) की तैयारी होती है जिनका आगामी महीनों में होना अपेक्षित है।

स्वदेशी विमानवाहक पोत को 2022 की पहली छमाही में आईएनएस विक्रांत के रूप में नौसेना में कमीशन किया जाएगा, जो समुद्र में सबसे शक्तिशाली परिसंपत्ति होगी। यह जहाज मिग-29के लड़ाकू विमान, कामोव-31 एयर अर्ली वार्निंग हेलीकॉप्टरों का संचालन करेगा, जल्द ही एमएच-60आर बहु-भूमिका हेलीकॉप्टर और स्वदेश निर्मित उन्नत हल्के हेलीकॉप्टरों को भी इसमें शामिल किया जाएगा। यह लंबी दूरी पर वायु शक्ति को प्रोजेक्ट करने की क्षमता के साथ एक अतुलनीय सैन्य उपकरण होगा जिसमें वायु निषेध, एन्टी सरफेस वारफेयर, आक्रामक और रक्षात्मक काउंटर-एयर, एयरबोर्न एंटी-सबमरीन वारफेयर एवं एयरबोर्न अर्ली वार्निंग शामिल हैं।

यात्रा के दौरान रक्षा मंत्री के लिए भारतीय नौसेना के विभिन्न जारी नवाचारों, स्वदेशीकरण और सहयोगों को प्रदर्शित करने वाली एक प्रदर्शनी का भी आयोजन किया गया। प्रमुख प्रदर्शनों में ऑक्सीजन रीसाइक्लिंग सिस्टम (ओआरएस) शामिल था, जो वर्तमान में श्री चित्रा तिरुनल इंस्टीट्यूट फॉर मेडिकल साइंस एंड टेक्नोलॉजी में नैदानिक परीक्षणों के तहत है, वर्तमान में पीएम केयर अस्पतालों में इस्तेमाल किए जा रहे नवरक्षक पीपीई और मास्क; रिमोट पेशेंट मॉनिटरिंग सिस्टम और ऐसे कई अन्य नवाचार जिन्होंने किफायती, प्रभावी और उपयोगकर्ता के अनुकूल चिकित्सा समाधान प्रदान किए। रक्षा मंत्री को सिविल एजेंसियों को दी जाने वाली सहायता जैसे अस्पतालों के अग्नि सुरक्षा ऑडिट परीक्षा और पीएसए ऑक्सीजन संयंत्रों पर विशेष प्रशिक्षण के अलावा समुद्र सेतु ॥ और ऑक्सीजन एक्सप्रेस ऑपरेशन के बारे में भी अवगत कराया गया। रक्षा मंत्री ने नेवी चिल्ड्रन स्कूल कोच्चि के छात्र 10 वर्षीय वीर कश्यप से भी बातचीत की, जिन्होंने बड़े पैमाने पर जनता के बीच महामारी के बारे में जागरूकता पैदा करने के लिए एक अभिनव बोर्ड गेम 'कोरोना युग' विकसित करने के लिए प्रधानमंत्री बाल पुरस्कार 2021 जीता था।

रक्षा मंत्री को 1971 के युद्ध की जीत के उपलक्ष्य में सशस्त्र बलों द्वारा मनाए जा रहे 'स्वर्णिम विजय वर्ष' और भारत की आजादी की 75वीं वर्षगांठ के उपलक्ष्य में 'आजादी का अमृत महोत्सव' के लिए भारतीय नौसेना द्वारा आयोजित गतिविधियों के बारे में भी बताया गया।

श्री राजनाथ सिंह ने दक्षिणी नौसेना कमान के तहत कुछ प्रशिक्षण प्रतिष्ठानों का भी दौरा किया और कोविड-19 महामारी के बीच भी न केवल भारतीय नौसेना के अधिकारियों और नाविकों को बल्कि मित्र विदेशी नौसेनाओं को भी लगातार पेशेवर प्रशिक्षण प्रदान करने के लिए भारतीय नौसेना के प्रयासों की सराहना की। उन्होंने पारंपरिक रूप से 'बाराखाना' कहे जाने वाले दोपहर के भोजन पर कोच्चि क्षेत्र के अधिकारियों और नाविकों के साथ बातचीत की।

रक्षा मंत्री ने स्वदेशी विमानवाहक पोत के निर्माण की प्रगति पर संतोष व्यक्त करते हुए इसे प्रधानमंत्री श्री नरेन्द्र मोदी द्वारा परिकल्पित 'आत्मनिर्भर भारत' का जीता जागता उदाहरण बताया। उन्होंने कहा कि स्वदेशी विमानवाहक पोत डिजाइन से लेकर निर्माण में इस्तेमाल होने वाले स्टील तक और प्रमुख हथियारों एवं सेंसरों तक लगभग 75 प्रतिशत स्वदेशी सामग्री से बना है। उन्होंने रणनीतिक साझेदारी मॉडल के तहत प्रोजेक्ट 75-I के आरएफपी के लिए रक्षा अधिग्रहण परिषद द्वारा हाल ही में दी गई मंजूरी को याद किया जो आला विनिर्माण प्रौद्योगिकियों के स्वदेशी विकास को और बढ़ावा देगा।

श्री राजनाथ सिंह ने विमानवाहक पोत की युद्धक क्षमता, पहुंच और बहुमुखी प्रतिभा पर प्रकाश डालते हुए कहा कि इससे देश की रक्षा में अभूतपूर्व क्षमताएं बढ़ जाएंगी और समुद्री क्षेत्र में भारत के हितों को सुरक्षित करने में मदद मिलेगी। कोविड-19 के बावजूद स्वदेशी विमानवाहक पोत (आईएसी) के निर्माण पर महत्वपूर्ण प्रगति की सराहना करते हुए उन्होंने कहा कि आईएसी का कमीशन होना भारत की आजादी के 75 साल के लिए अनुकूल सम्मान होगा।

रक्षा मंत्री ने एक मजबूत भारतीय नौसेना के प्रति सरकार की प्रतिबद्धता की पुष्टि करते हुए कहा कि "आईएसी और कारवार में प्रोजेक्ट सीबर्ड, जो एशिया का सबसे बड़ा नौसैनिक अड्डा होगा, हमारे अटूट फोकस का उदाहरण है।" उन्होंने स्वदेशीकरण पर जोर देते हुए भारतीय नौसेना के आधुनिकीकरण के लिए सरकार द्वारा किए जा रहे उपायों को सूचीबद्ध किया, जिससे नौसेना की सैन्य अभियान संबंधी पहुंच और कौशल में वृद्धि होगी। उन्होंने नौसेना को उनकी सैन्य तैयारियों को मजबूत करने के लिए हर संभव मदद का आश्वासन देते हुए कहा कि शांति, सुरक्षा और समृद्धि के लिए एक मजबूत नौसैनिक बल महत्वपूर्ण है।

गलवान घाटी की घटना पर श्री राजनाथ सिंह ने कहा कि भारतीय नौसेना की सक्रिय अग्रिम तैनाती से संकेत मिलता है कि देश शांति चाहता है लेकिन साथ ही किसी भी स्थिति के लिए तैयार है। उन्होंने कहा, "भारतीय नौसेना किसी भी चुनौती से निपटने और मुकाबला करने के लिए तैयार है।" रक्षा मंत्री ने सागर (क्षेत्र में सभी के लिए सुरक्षा और विकास) के प्रधानमंत्री के दृष्टिकोण और क्षेत्र में शांति और स्थिरता सुनिश्चित करने के लिए एक स्वतंत्र, खुले और समावेशी हिंद-प्रशांत के व्यापक लक्ष्य को दोहराया।

रक्षा मंत्री ने कोविड-19 के खिलाफ लड़ाई में योगदान के लिए ऑपरेशन समुद्र सेतु-I के दौरान युद्धपोतों पर वायरस के फैलने का खतरा होने के बावजूद विदेशों से भारतीय नागरिकों को वापस लाने और ऑपरेशन समुद्र सेतु-II के दौरान विदेशों से तरल चिकित्सा ऑक्सीजन में लाने तक भारतीय नौसेना की सराहना की। उन्होंने चक्रवात तौकते और चक्रवात यास के दौरान नौसेना द्वारा खोज और बचाव (एसएआर) के प्रयासों की भी सराहना की। 24 जून, 2021 को श्री राजनाथ सिंह ने कारवार नौसैनिक अड्डे का दौरा किया और दक्षिणी नौसेना कमान की अपनी दो दिवसीय यात्रा के हिस्से के रूप में 'परियोजना सीबर्ड' के तहत चल रहे बुनियादी ढांचे के विकास की प्रगति की समीक्षा की।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1730413>





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*Fri, 25 June 2021 4:43PM*

## **Army Chief visits Army training command at Shimla**

The Chief of the Army Staff, General MM Naravane visited the Shimla based Army Training Command (ARTRAC) on 25 June 2021. He was briefed on a range of issues including strategic - military futures, doctrinal corrections, operational challenges and preparedness, technological infusion and training pedagogy.

The COAS was apprised about a number of initiatives being undertaken to maximise the effectiveness of the Indian Army and steps taken to make professional military education (PME) more contemporary and responsive to current challenges.

General Naravane also called on His Excellency Shri Bandaru Dattatraya, the Hon'ble Governor of Himachal Pradesh and discussed issues of mutual interest.

Later, the Army Chief and the President Army Wives Welfare Association (AWWA) interacted and honoured the Next of Kin of Sepoy Ankush, Sena Medal (Posthumous), who had made the supreme sacrifice during the Galwan standoff on the Northern borders in June 2020.

The COAS is scheduled to return to New Delhi on 26 June 2021.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1730315>



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Fri, 25 June 2021 4:43PM

## सेना प्रमुख ने शिमला में सेना के प्रशिक्षण कमान का दौरा किया

सेना प्रमुख जनरल एम एम नरवणे ने 25 जून 2021 को शिमला स्थित आर्मी ट्रेनिंग कमांड (आर-ट्रैक) का दौरा किया। उन्हें सामरिक सैन्य भविष्य, सैद्धांतिक सुधार, सैन्य अभियान संबंधी चुनौतियां एवं तैयारी, प्रौद्योगिकी समावेश और प्रशिक्षण सहित कई विषयों से अवगत कराया गया।

सेना प्रमुख को थल सेना की प्रभाव क्षमता बढ़ाने के लिए की गई कई पहल और मौजूदा चुनौतियों से निपटने के लिए पेशेवर सैन्य शिक्षा (पीएमई) को कहीं अधिक समकालिक बनाने को लेकर उठाये गये कदमों के बारे में बताया गया

जनरल नरवणे ने हिमाचल प्रदेश के राज्यपाल श्री बंडारू दत्तात्रेय से भी मुलाकात की और आपसी हित के मुद्दों पर चर्चा की।

बाद में सेना प्रमुख और आर्मी वाइक्स वेलफेयर एसोसिएशन (एडब्लूडब्लूए) अध्यक्ष ने मुलाकात की और सिपाही अंकुश के निकट परिजन को सेना मेडल (मरणोपरांत) से सम्मानित किया। जून 2020 में उत्तरी सीमा पर गलवान गतिरोध के दौरान सर्वोच्च बलिदान देने को लेकर उन्हें सेना पदक से सम्मानित किया गया।

सेना प्रमुख का 26 जून 2021 को नई दिल्ली लौटने का कार्यक्रम है।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1730434>



*Fri, 25 June 2021 6:21PM*

## **Western Air Command Commanders' Conference**

The two day Station Commanders' Conference of Western Air Command was held on 24 and 25 Jun 21 at New Delhi. Considering the ongoing pandemic, the conference was conducted in a hybrid mode where a few of the commanders attended through video tele conferencing. Air Chief Marshal RKS Bhadauria PVSM AVSM VM ADC, Chief of the Air Staff (CAS) was the chief guest and was received by Air Marshal VR Chaudhari PVSM AVSM VM, AOC-in-C WAC.

The CAS during his address emphasized the need for critical analysis and measures to enhance Op preparedness, further improvement in maintenance practices and ensuring robust physical and cyber security. He directed the commanders to ensure that the operational readiness of all platforms, weapon systems and assets are kept at the highest level.

The CAS appreciated the swift response and high commitment shown by all bases in WAC in the recent standoff on our Northern frontiers despite the constraints posed by the ongoing pandemic. The CAS complimented the response and efforts of each station in initiating tasks related to COVID-19.

He also appreciated the aerospace safety record of WAC and urged the Commanders to continue their efforts towards a safe operational environment. He underlined the future of IAF by enhancing operational capability through force structuring along with self reliance and indigenization with an aim to transform the IAF into a potent Aerospace Power.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1730345>



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Fri, 25 June 2021 6:21PM

## पश्चिम वायु कमान में कमांडरों का सम्मेलन

पश्चिम वायु कमान के कमांडरों का दो दिवसीय सम्मेलन 24 एवं 25 जून 21 को नई दिल्ली में आयोजित किया गया। कोविड महामारी के चलते यह सम्मेलन मिश्रित रूप से आयोजित किया गया जिसमें कुछ कमांडर विडियो कॉन्फ्रेंसिंग द्वारा सम्मेलन में शामिल हुए। मुख्य अतिथि एयर चीफ मार्शल राकेश कुमार सिंह भदौरिया, परम विशिष्ट सेवा मेडल, अति विशिष्ट सेवा मेडल, वायु सेना मेडल, एडीसी, वायु सेना अध्यक्ष की अगुवाई पश्चिम वायु कमान के वायु अफसर कमांडर-इन-चीफ एयर मार्शल विवेक राम चौधरी परम विशिष्ट सेवा मेडल, अति विशिष्ट सेवा मेडल, वायु सेना मेडल द्वारा की गई।

वायु सेना अध्यक्ष ने अपने संबोधन में गहन विश्लेषण और संक्रियात्मक तैयारियों को उन्नत बनाने के उपायों, रखरखाव के तरीकों में सुधार और अभेद्य वास्तविक एवं साइबर सुरक्षा की आवश्यकता पर बल दिया। उन्होंने कमांडरों को सभी प्लेटफॉर्म, शस्त्र प्रणाली और परिसंपत्तियों की उच्च स्तर पर संक्रियात्मक तैयारियों को सुनिश्चित करने के निर्देश दिए।

महामारी की चुनौतियों के बावजूद भी उत्तरी सीमा पर हाल ही में उभरे तनाव में त्वरित प्रतिक्रिया और उच्च समर्पण के प्रदर्शन के लिए वायु सेना अध्यक्ष ने पश्चिम वायु कमान के सभी वायु सेना प्रतिष्ठानों की प्रशंसा की। वायु सेना अध्यक्ष ने कोविड संबंधी कार्यों के लिए प्रत्येक स्टेशन के प्रयासों और किए गए कार्यों की सराहना की।

उन्होंने पश्चिम वायु कमान के उड़ान सुरक्षा रेकॉर्ड की भी प्रशंसा की और सभी कमांडरों से सुरक्षित संक्रियात्मक वातावरण के लिए गंभीर प्रयास करते रहने का आग्रह किया। भारतीय वायु सेना के संभावित अन्तरिक्ष शक्ति में परिवर्तन के लक्ष्य के लिए आत्म निर्भरता और भारतीयकरण से शक्ति संरचना द्वारा अपनी संक्रियात्मक क्षमता को बढ़ते हुए भारतीय वायु सेना के भविष्य को प्रभावी बनाने पर जोर दिया।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1730349>



*Fri, 25 June 2021 4:12PM*

## **Integrated bilateral exercise of Indian Navy and Indian Air Force with US Navy concludes in Indian Ocean Region**

The two-day integrated bilateral exercise between Indian and US Forces in the Indian Ocean Region concluded on June 24, 2021. Indian Navy along with Indian Air Force participated with US Navy Carrier Strike Group in the exercise.

The exercise has been a key enabler in building interoperability and strengthening the defence coordination between the two nations and witnessed high tempo-naval operations at sea. These included intense air dominance exercises, advanced air defence exercises, anti-submarine exercises, tactical manoeuvres and cross deck helicopter operations.



Participation of Indian Navy in the exercise included Guided Missile Stealth Destroyer Kochi, Guided Missile Frigates Teg, maritime air dominance fighter MiG 29K, Long Range Maritime Patrol Aircraft P8I, Seaking 42B and Kamov AEW helicopters. The IAF hardware included Jaguars & Su 30 MKI fighters, AWACS, AEW&C, and Air to Air Refueller aircraft. The US side was represented by the Nimitz class aircraft carrier Ronald Reagan with her integral maritime air element comprising F18 fighters, E2D AEW&C aircraft and MH60R ASW helicopters, Arleigh Burke class guided missile destroyer USS Halsey and Ticonderoga class guided missile cruiser USS Shiloh.

The exercise has been another milestone in strengthening cooperation between the two countries and reinforcing the shared values as partner militaries, in ensuring freedom of seas and commitment to an open, inclusive Indo-Pacific and a rules-based international order.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1730308>





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Fri, 25 June 2021 4:12PM

## भारतीय नौसेना और भारतीय वायुसेना का अमेरिकी नौसेना के साथ हिंद महासागर क्षेत्र में एकीकृत द्विपक्षीय अभ्यास समाप्त

हिंद महासागर क्षेत्र में भारतीय और अमेरिकी सेनाओं के बीच दो दिवसीय एकीकृत द्विपक्षीय अभ्यास 24 जून, 2021 को संपन्न हुआ। भारतीय नौसेना ने भारतीय वायु सेना के साथ मिलकर इस अभ्यास में अमेरिकी नौसेना के कैरियर स्ट्राइक ग्रुप के साथ भाग लिया।

यह युद्धाभ्यास दोनों देशों के बीच अंतरसंचालनीयता की स्थापना करने और रक्षा समन्वय को मजबूत करने में काफी महत्वपूर्ण रहा है और इस दौरान समुद्र में उच्च गति-नौसैनिक अभियानों का संचालन किया गया। इनमें वायु प्रभुत्व अभ्यास, उन्नत वायु रक्षा अभ्यास, पनडुब्बी रोधी अभ्यास, सामरिक युद्धाभ्यास और क्रॉस डेक हेलीकॉप्टर ऑपरेशन शामिल थे।

युद्धाभ्यास में भारतीय नौसेना की ओर से गाइडेड मिसाइल स्टील्थ विध्वंसक कोटिच, गाइडेड मिसाइल फ्रिगेट्स तेग, मैरीटाइम एयर डॉमिनांस फाइटर मिग 29के, लंबी दूरी का समुद्री गश्ती विमान पी8आई, सीकिंग 42बी और कामोव एईडब्ल्यू हेलीकॉप्टर शामिल थे। भारतीय वायु सेना की ओर से जगुआर और सुखोई 30 एमकेआई लड़ाकू विमान, अवाक्स, एईडब्ल्यू एंड सी और एयर टू एयर रिफ्यूलर विमान शामिल थे। अमेरिका की ओर से निमित्ज श्रेणी के विमानवाहक पोत रोनाल्ड रीगन के साथ एकीकृत एफ-18 लड़ाकू विमानों, ई2डी एईडब्ल्यू एंड सी विमान और एमएच60आर एएसडब्ल्यू हेलीकॉप्टर, आर्ले बर्क क्लास गाइडेड मिसाइल विध्वंसक यूएसएस हैल्सी और टाइकॉनडेरेंगा क्लास गाइडेड मिसाइल क्रूजर यूएसएस शीलो शामिल थे।



यह अभ्यास दोनों देशों के बीच सहयोग को मजबूत करने और साझेदार सेनाओं के रूप में साझा मूल्यों को मजबूत करने, समुद्रों की स्वतंत्रता और खुली, समावेशी हिंद-प्रशांत और नियम आधारित अंतरराष्ट्रीय व्यवस्था के प्रति प्रतिबद्धता सुनिश्चित करने में एक और मील का पत्थर रहा है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1730436>



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*Sat, 26 June 2021 6:36PM*

## **INS Tabar deployed to participate in joint exercises with friendly Navies in Africa and Europe**

Towards enhancing military cooperation with friendly nations, Indian Naval Ship Tabar commenced her prolonged deployment on 13 June and will visit a number of ports in Africa and Europe till end September. During port visits, Tabar will conduct professional, social and sporting interactions. The ship will also participate in a number of joint exercises with friendly navies.

During the deployment, INS Tabar will transit across the Gulf of Aden, Red Sea, Suez Canal, Mediterranean Sea, North Sea and Baltic Sea while making port calls at Djibouti, Egypt, Italy, France, UK, Russia, Netherlands, Morocco, and Arctic Council countries like Sweden and Norway. In addition to PASSEX with host navies of countries being visited, the ship is also scheduled to participate in bilateral exercises like Ex Konkarn with Royal Navy, Ex Varuna with French Navy and Ex Indra with Russian Federation Navy.

The deployment will also see participation by the ship in the Russian Navy Day celebrations from 22 to 27 July.

The ship will operate in conjunction with the friendly navies, so as to build military relations, develop interoperability and project long range sustenance. IN undertakes regular overseas deployments particularly in the maritime areas of primary interest. These engagements are aimed to further strengthen maritime security in the region and to consolidate combined operations against maritime threats. These interactions will also offer an opportunity to navies to observe and imbibe the 'Best Practices' followed in each other's Navy.

INS Tabar, is a Talwar-class stealth Frigate built for Indian Navy in Russia. The ship is commanded by Captain M Mahesh and has a complement of 300 personnel. The ship is equipped with a versatile range of weapons and sensors and is among the earliest stealth frigates of the Indian Navy. The ship is part of the Indian Navy's Western Fleet which is based at Mumbai under Western Naval Command.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1730562>

## IAF, ISRO developing real-time aircraft tracking system for transport fleet

*The technical specifications for the system have been framed by ISRO*

*By Vijay Mohan*

Chandigarh: The Indian Air Force, in collaboration with the Indian Space Research Organisation (ISRO), is developing a real time aircraft tracking system (RTATS) that will be retrofitted in its transport fleet.

The technical specifications for the system have been framed by ISRO and the development and fabrication of the prototypes would be done by the industry, according to IAF sources. The trials and evaluation would be done by the IAF on AN-32 aircraft at one of its bases.

The RTATS is required to be compatible with the Global Navigation Satellite System of India's GAGAN regional satellite navigation system and Navigation with Indian Constellation (NavIC), as well as America's Global Positioning System, using both standard positioning services as well as restricted services.

GAGAN was conceived by the Ministry of Civil Aviation for management and surveillance of the Indian airspace, while NavIC has a wider footprint, covering south Asia, south-east Asia, China, the Middle East, south-western Europe and the Indian Ocean region, including the eastern coast of Africa and Western Australia. Both these systems have been developed by ISRO.

Many military as well as civilian organisations across the globe use various kinds of RTATS for tracking aircraft movements as well as managing airspace. Contemporary tracking systems use a network of satellites and ground receiving stations. Flight data transmitted from an aircraft is captured by an overhead satellite and beamed to the earth, where it is recorded and disseminated to the stakeholders. It can also be used to transmit distress signals in an emergency.

The IAF is also equipping some of its larger transport aircraft with the Automatic Dependent Surveillance-Broadcast (ADS-B), a new generation, highly accurate satellite-based aircraft positioning and tracking system, the use of which has already become mandatory in some countries.

Real-time tracking using ADS-B and other open source information is also available to aviation enthusiasts and the general public through many websites and mobile applications. These give out an aircraft's flight path, location, speed and altitude. Though primarily focused on civilian aircraft, some military aircraft also show up on these applications.

The IAF had earlier installed emergency beacons in some of its transport planes, but these are activated only in case of an accident to transmit the location of the site and do not beam flight data.

<https://www.tribuneindia.com/news/nation/iaf-isro-developing-real-time-aircraft-tracking-system-for-transport-fleet-274383>



Photo for representation only. Reuters file



## Military to go for indigenised clothing and equipment, time for gloves from Myanmar, rain bags from Sri Lanka over

*Since 100% FDI is allowed in defence sector, the companies from which the clothing and equipment was being imported should be asked to set up shop in India for impetus to the local textile and leather industry*

*By Shishir Gupta*

The Ministry of Defence has a list of 209 items including cruise missiles, next generation corvettes, tank engines and towed artillery guns which have been placed under negative import list to boost Atmanirbhar Bharat programme of Prime Minister Narendra Modi.

Import restrictions on the second list of 108 items will progressively come into effect from December 2021 to December 2025. The first list of defence imports under negative category was issued in August 2020.

While both the Department of Military Affairs (DMA) and Department of Defence (DOD) are on the same page as far as indigenisation is concerned, the fact remains is that Indian military still imports clothing and equipment from abroad despite a thriving textile industry in the country.

The unsavoury truth is that Indian gloves for Siachen front is imported from a company in Myanmar, while the sleeping bags for the glacier are manufactured by a company in Sri Lanka. While a Kanpur based company is supplying military boots to Israeli army, the Indian Army is getting specialized boots made in Italy. The list goes on. During his tenure as secretary (defence production), the present defence secretary Ajay Kumar pushed for indigenisation of military clothing was back in 2018 but the Indian Army replied back with a long term indigenisation plan. Secretary Kumar told the military that since 100% FDI is allowed in defence sector, the companies from which the clothing and equipment was being imported should be asked to set up shop in India for impetus to the local textile and leather industry. He pushed for Indian shoe-makers for military as there was a thriving leather industry in Kanpur and Agra. With the military clothing now under department of military affairs (DMA), its secretary and present Chief of Defence Staff General Bipin Rawat is pushing for total indigenisation of clothing. In fact, recently the CDS visited a Bengaluru based clothing manufacturer to ask him whether he could supply sleeping bags, camouflage tents and jackets to the Indian military.

The answer was that the qualitative and quantitative requirements of the military were designed in such a way that the Indian manufacturers found difficult to compete in an unfavourable environment. For instance, the heavy snow parkas were tested for being rain proof despite the fact that it never rains in Siachen Glacier with temperatures way below zero.

“Even though military clothing budget would be between ₹200-400 crore for the Indian military, there is no reason for them to seek foreign manufacturers when the same quality is available with Indian textile manufacturers. Or, there is always an option of asking the company to set shop in India under the Atmanirbhar Bharat initiative,” said a senior defence ministry official.

<https://www.hindustantimes.com/india-news/indian-military-to-go-for-indigenised-clothing-and-equipment-101624700078255.html>



The unsavoury truth is that Indian gloves for Siachen front is imported from a company in Myanmar, while the sleeping bags for the glacier are manufactured by a company in Sri Lanka. (File photo)

## Defence innovation needs top-down reforms

*Laboratories or institutions exploring new frontiers in technology or weapon systems must, of necessity, be of an intellectual explorer's mindset — quite the opposite of the rule-bound administrators — as they thrive on an out-of-the-box thinking and risk-taking leading to innovative solutions. The very idea of placing the Defence Innovation Organisation under a government department, hence, appears flawed*

*By Air Marshal Brijesh D Jayal (retd)*

The Ministry of Defence recently released a document outlining a set of 20 reforms that have been introduced across the defence sector. This is a welcome change on the part of a ministry that has traditionally been seen to stay in the background, taking refuge under the national security blanket.

Amongst the list are the two important elements — of bringing atmanirbharta to defence and of reforming defence R&D — both of which are aimed towards meeting the requirements of the armed forces through indigenous sources whilst aiming to make India a hub of defence manufacturing.

Self-reliance in the field of defence production has been a cherished objective of successive governments dating back many decades. But the nation still finds itself in the unenviable state of being the second largest international arms importer.

A weakness is clearly underlying the state of affairs. This weakness is the result of our following an archaic organisational model where both defence R&D and production remain under the Ministry of Defence. This business model is not practised by any western democracy boasting of an internationally competitive defence industry.

Two examples merit mention in the furtherance of this view. The first is the recent announcement by the Defence Minister of budgetary allocation for the Innovations for Defence Excellence (iDEX)-Defence Innovation Organisation (DIO), which was recently formed. Through funding start-ups or individual innovators, the latter is expected to create an ecosystem fostering innovation and technology development in the defence and aerospace sectors.

Whilst the spirit behind this initiative is laudable, what undermines confidence is that this organisation will also be under the Department of Defence Production in the MoD when it is well known that the government bureaucracy's work culture is rule-and-precedence bound. It is inhibited further by the shadow of agencies like the CAG, CBI and CVC.

Laboratories or institutions exploring new frontiers in technology or weapon systems must, of necessity, be of an intellectual explorer's mindset — quite the opposite of the rule-bound administrators — as they thrive on an out-of-the-box thinking and risk-taking leading to innovative solutions. The very idea of placing the DIO under a government department, hence, appears flawed and a contradiction.

This view is reinforced if one considers that the DRDO already has a network of advanced technology centres within academic institutes funded and tasked to pursue research directed towards conceiving and developing next-generation defence technologies. That notwithstanding these, the MoD still finds need for an innovation organisation speaks for itself.

The second example is that of aeronautics. It needs recalling that it was in the early fifties that the government had authorised the development of HF-24 fighter aircraft, with the then Prime



**Laudable:** The budgetary allocation for the Innovations for Defence Excellence-Defence Innovation Organisation is expected to foster technology development. PTI

Minister stating that it would aid in the development of a modern aircraft industry in India. HAL commenced design in 1956 and the aircraft entered the IAF service in 1967, being at the time the first Asian jet fighter (outside of the USSR) to go into production.

In 1970, Vikram Sarabhai had proposed to the Administrative Reforms Commission an organisational model with a ministry of advanced technologies comprising separate commissions for atomic energy, space, earth sciences and aeronautics.

It speaks for his foresight that in all the fields, except aeronautics, the government followed this model and the nation is today on a par internationally. Only aeronautics remained the technological orphan, confined to the folds of the MoD, with continuing dependence on imports.

It was to address this weakness that the Aeronautical Society of India had, in 1994, under APJ Abdul Kalam's presidentship, proposed a national aeronautics policy, wherein it had been stated: "Aviation is one of the most significant technological influences of modern time and empowers the nation with strength for international partnership. It is a major tool for economic development and has significant role in national security and international relations...."

Further, industrial aeronautics is an area where much commonality exists between the rapidly expanding civil aviation sector and military aviation, and, from a defence-industrial policy viability point of view, can contribute to the economies of scale and international footprint.

This proposal was lost in our bureaucratic jungle and an updated version submitted in 2004 appears to have suffered the same fate. So much for dynamism in the South Block towards making India a defence manufacturing hub of international standing!

In fairness, for the first time, we now have a vision promoting innovation in the defence industrial sector originating from the highest level of government leadership. There is, hence, cause for optimism that there is willingness to shed past baggage.

To benefit from this positive climate and claim Indian aeronautics' rightful place, however, we first need take an innovative look at the higher-level defence organisation model with reference to the place of defence R&D and production within it.

Indeed, for an innovative attitude to take root in the mindset of the national security establishment, innovative administrative reforms starting from top to down are the need of the day. Not the reverse, as appears to be in the case of iDEX-DIO, or, indeed, of the integrating of operational commands.

<https://www.tribuneindia.com/news/comment/defence-innovation-needs-top-down-reforms-274009>



Press Information Bureau  
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Ministry of Science & Technology

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## Cost-effective, bio-compatible nanogenerators can harvest electricity from vibrations for optoelectronics, self-powered devices

Scientists have fabricated a simple, cost-effective, bio-compatible, transparent nanogenerator that can generate electricity from vibrations all around for use in optoelectronics, self-powered devices, and other biomedical applications.

Searching for renewable energy resources with reduced carbon emissions is one of the most urgent challenges due to the increasing threat of global warming and energy crisis. Some of the unconventional methods to generate electricity include piezoelectric, thermoelectric, and electrostatic techniques used in devices like touch screens, electronic displays, and so forth.

The triboelectric nanogenerators (TENG) make use of mechanical energy in the form of vibrations present everywhere in different forms to generate electricity. The energy harvesting TENG works on the principle of creation of electrostatic charges via instantaneous physical contact of two dissimilar materials followed by generation of potential difference when a mismatch is introduced between the two contacted surfaces through a mechanical force. This mechanism drives the electrons to move back and forth between the conducting films coated on the back of the tribo layers. The method employed till date to design TENG use expensive fabrication methods like photolithography or reactive ion etching, and additional process like electrode preparation and so on.

Dr. Shankar Rao and his team from the Centre for Nano and Soft Matter Sciences, Bengaluru, an autonomous institute under the Department of Science & Technology, Government of India, have designed a transparent TENG, using thermoplastic polyurethanes (TPU) either in the form of electrospun nanofibers or as a flat film using the simpler Doctor's blade technique, along with Polyethylene terephthalate (PET) as tribo layers. TPU nanofibers are obtained from the electrospinning (ES) technique. The Doctor's blade technique, a routine procedure adapted in a variety of situations, squeezes the material through a blade and the substrate yielding a uniform thin layer. The easy availability of the active material and the simplicity of the fabrication process make it cost-effective over currently available fabrication techniques. The resulting device is also highly efficient, robust, and gives reproducible output over long hours of operation. The results were published in 'Journal of Nanoscience and Nanotechnology'. The fabricated device could light up eleven LEDs by gentle hand tapping and could be a potential candidate for use in optoelectronics, self-powered devices, and other biomedical applications.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1730432>

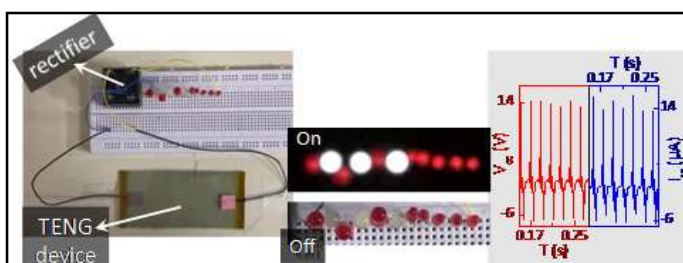


Image of the flexible and transparent TENG device with PET as one and thermoplastic polyurethane (TPU) as the complementing tribolayer. With the application of a small force of 0.33N, the device provided 21.4 V and 23  $\mu$ A as open-circuit voltage and short-circuit current, respectively, indicating the high efficiency of the device. In addition, the gentle hand tapping on the TENG device can power up to 11 light-emitting diodes (LEDs).





## किफायती, जैव-संगत नैनोजेनेरेटर्स ऑप्टोइलेक्ट्रॉनिक्स, स्व-चालित उपकरणों के लिए वाइब्रेशन से बिजली संचय कर सकते हैं

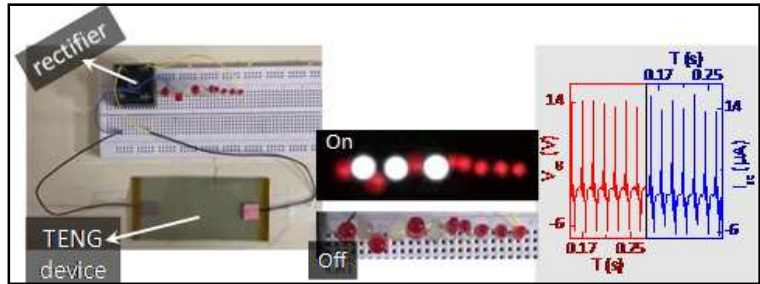
वैज्ञानिकों ने एक सरल, किफायती, जैव-संगत, पारदर्शी नैनोजेनेरेटर का निर्माण किया है जो ऑप्टोइलेक्ट्रॉनिक्स, स्व-चालित उपकरणों तथा अन्य बायोमेडिकल ऐप्लीकेशनों में उपयोग के लिए चारों तरफ के वाइब्रेशन से बिजली पैदा कर सकता है।

ग्लोबल वार्मिंग तथा ऊर्जा संकट के बढ़ते खतरे के कारण कम कार्बन उत्सर्जन के साथ नवीकरणीय ऊर्जा के स्रोतों की खोज वर्तमान की सबसे बड़ी चुनौतियों में से एक है। बिजली पैदा किए जाने की कुछ गैर पारंपरिक पद्धतियों में पाइजोइलेक्ट्रिक, थर्मोइलेक्ट्रिक तथा इलेक्ट्रोस्टैटिक तकनीक शामिल है जिसका उपयोग टच स्क्रीन, इलेक्ट्रॉनिक डिस्प्ले आदि जैसे डिवाइसों में किया जाता है।

ट्राइबोइलेक्ट्रिक नैनो जेनेरेटर (टीईएनजी) बिजली पैदा करने के लिए विभिन्न रूपों में हर जगह पाए जाने वाले वाइब्रेशन के रूप में मैकेनिकल एनर्जी का उपयोग करता है। ऊर्जा संचय करने वाला टीईएनजी दो असमान सामग्रियों के तात्कालिक भौतिक संपर्क के माध्यम से इलेक्ट्रोस्टैटिक चार्ज के निर्माण के सिद्धांत पर काम करता है जिसके बाद संभावित अंतर पैदा होता है जब एक मैकेनिकल बल द्वारा दो कांटेक्ट्स सतहों के बीच एक बेमेल प्रस्तुत किया जाता है।

यह तंत्र इलेक्ट्रान को ट्राइबो परतों के पीछे कोट की गई कंडक्टिंग फिल्मों के बीच आगे पीछे हिलने को प्रेरित करता है। टीईएनजी को डिजाइन करने के लिए अभी तक प्रयुक्त पद्धति में फोटोलिथोग्राफिक या रिएक्टिव आयन इचिंग जैसी महंगी फैब्रिकेशन पद्धतियों तथा इलेक्ट्रोड प्रीपैरेशन जैसी अतिरिक्त प्रक्रिया आदि का उपयोग किया जाता रहा है।

भारत सरकार के विज्ञान एवं प्रौद्योगिकी विभाग के तहत बंगलुरु स्थित एक स्वायत्तशासी संस्थान सेंटर फॉर नैनो एंड सॉफ्ट मैटर साइंसेज के डॉ. शंकर राव एवं उनकी टीम ने इलेक्ट्रोस्पिन नैनोफाइबर या ट्राइबो परतों के रूप में पोलिथिलीन टेरेफथैलेट (पीईटी) के साथ साथ सरल डॉक्टर्स ब्लेड तकनीक का उपयोग करते हुए एक फ्लैट फिल्म के रूप में थर्मोप्लास्टिक पोलियूरेथैन्स (टीपीयू) का उपयोग करते हुए एक पारदर्शी टीईएनजी डिजाइन की है। टीपीयू नैनोफाइबर इलेक्ट्रोस्पिनिंग (ईएस) तकनीक से प्राप्त की जाती है। डॉक्टर्स ब्लेड तकनीक कई प्रकार की स्थितियों में प्रयोग में लाई जाने वाली एक रूटीन प्रक्रिया है जो एक ब्लेड और सबस्ट्रेट के जरिये सामग्री को निचोड़ती है तथा एक समान पतली परत उत्पन्न करती है। सक्रिय सामग्री की सहज उपलब्धता तथा फैब्रिकेशन प्रक्रिया की सरलता इसे वर्तमान में उपलब्ध फैब्रिकेशन



पूरक ट्राइबोलेयर के रूप में थर्मोप्लास्टिक पोलियूरेथैन्स (टीपीयू) और पीईटी के साथ लचीली और पारदर्शी डिवाइस टीईएनजी का एक चित्र। 0.33एन के एक छोटे बल के उपयोग के साथ, इस डिवाइस ने ओपेन सर्किट वोल्टेज तथा शॉर्ट सर्किट करंट के रूप में क्रमशः 21.4 वी तथा 23  $\mu$ ए उपलब्ध कराया जो इस डिवाइस की उच्च प्रभावशीलता को दर्शाता है। इसके अतिरिक्त, टीईएनजी डिवाइस पर हाथ से नरमी से थपथपाए जाने पर 11 लाइट-इमिटिंग डियोड्स (एलईडी) प्रज्वलित हो सकते हैं।

तकनीकों की तुलना में किफायती बनाती है। इसके परिणामस्वरूप तैयार डिवाइस काफी प्रभावी, मजबूत भी होती है तथा प्रचालन के लंबे समय तक रिप्रोड्यूसिबल आउटपुट प्रदान करती है। इसके परिणाम 'जर्नल ऑफ नैनोसाइंस तथा नैनोटेक्नोलॉजी' में प्रकाशित हुए थे।

यह फैब्रिकेटेड डिवाइस हाथ से नरमी से थपथपाए जाने पर 11 एलईडी को प्रज्वलित कर सकते हैं तथा ऑप्टोइलेक्ट्रॉनिक्स, स्व-चालित उपकरणों तथा अन्य बायोमेडिकल ऐप्लीकेशनों में उपयोग के लिए एक संभावित उपकरण हो सकते हैं।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1730477>



Sat, 26 June 2021

## Electron-pair discovery advances field of quantum materials

By Linda Glaser

In 2016, physicist J.C. Séamus Davis discovered an elusive state of quantum matter in the cuprates, which are copper oxide materials laced with other atoms. That launched a new sub-field in the study of quantum materials.

But whether this was a unique phenomenon in the cuprates or a universal and important property of nature remained unknown—until now.

Using an improved version of the radically new quantum microscope technology he developed for this purpose, Davis and his team have now found the same exotic state of quantum matter in a widely used and conventional type of material, the transition metal dichalcogenides (TMD).

Their paper, "Discovery of a Cooper-pair Density Wave State in a Transition-metal Dichalcogenide," published June 25 in *Science*. Co-authors include Cornell postdoctoral fellows Xiaolong Liu and Yi Xue Chong, and Rahul Sharma, Ph.D. '20, a postdoc at the University of Maryland.

Cooper-pair density waves are a form of exotic quantum matter in which pairs of electrons—instead of forming a conventional "superconductor," where all are in the same freely moving state—freeze into an electron-pair crystal, also known as a pair density wave (PDW) state.

The discovery that PDWs exist in standard materials like TMDs is exciting, Davis said, because they provide a rich platform for discovery of new states of quantum matter and for development of new technologies.

"The study of TMD materials has recently become one of the hottest topics in condensed matter physics," said Davis, the James Gilbert White Distinguished Professor Emeritus of physics in the College of Arts and Sciences (A&S), who also holds professorships at the University of Oxford, in England, and University College Cork, in Ireland. "There are hundreds of these materials in the world and they're very widely used in technology or research, including by several groups at Cornell."

Davis broke his own record for spatial resolution with the scanning Josephson tunneling microscope he invented, improving it in this study by a factor of about 100 (from nanometers down



This composite image shows where the selenium atoms reside in the crystal of niobium diselenide, a transition metal dichalcogenide, using conventional scanned tunneling microscopy (left, in grey) and where the electron pairs are observed using scanned Josephson tunneling microscopy (right, in blue). Credit: Davis Lab/Provided



to around 10 picometers). He also increased the imaging efficiency by a factor of about 250, reducing Josephson junction array image acquisition times from a month down to a few hours.

Because the microscope is extremely sensitive to vibrations and to acoustic and mechanical noise and is thus designed to operate with no human beings in the lab, Davis said that the pandemic had minimal impact on its use for the research.

"If all preparations are made correctly, you press the button and the microscope very quietly does its work with nobody in the lab. The microscope stores the image and alerts you when it's done," said Davis. "Each individual experiment is roughly 10 days, though the whole experimental campaign takes years."

The TMD discovery will be a boon to the many physicists at Cornell doing groundbreaking quantum materials research, Davis said, "including theorists like Eun-Ah Kim [professor of physics in A&S], whose theories on this exotic state of matter can now be subjected to experimental tests."

The work was funded by the Gordon and Betty Moore Foundation, which Davis said also funded the development of the scanning Josephson tunneling microscope when no one else would.

"It was believed that such a microscope was extremely difficult if not impossible to implement," said Davis, "but the Moore Foundation took the risk. They deserve a great deal of the credit for this new quantum matter visualization technology."

**More information:** Xiaolong Liu et al, Discovery of a Cooper-pair density wave state in a transition-metal dichalcogenide, *Science* (2021). DOI: [10.1126/science.abd4607](https://doi.org/10.1126/science.abd4607)

**Journal information:** [Science](https://phys.org/news/2021-06-electron-pair-discovery-advances-field-quantum.html)  
<https://phys.org/news/2021-06-electron-pair-discovery-advances-field-quantum.html>



Sat, 26 June 2021

## Making equal-size colloidal quantum dots

Quantum dots (QDs) are semiconductor particles only a few nanometers across that, thanks to their small size, exhibit peculiar optical and electronic properties due to quantum mechanics. With existing and foreseen applications in screens, lighting, lasers, and energy harvesting, research in quantum dots has been steadily progressing. In particular, colloidal QDs (CQDs) have been in the nanotechnology spotlight for over a decade.

CQDs are semiconductor nanocrystals that can be produced easily from solution-based processes, which make them suitable for mass production. However, for CQD-based devices to operate at their best, the quantum dots should be monodisperse—that is, they should all have the same size. If their sizes are not equal (polydisperse), the energetic disorder within the optoelectronic device increases, which in turn hinders its performance. While some strategies exist to combat polydispersity in CQDs, the problem is trickier to avoid in perovskite-based CQDs (Pe-CQDs), which require a purification step with an antisolvent. This step invariably leads to nanoparticle agglomeration, and ultimately, large variations in size between quantum dots.



Credit: CC0 Public Domain

Although producing well-purified monodisperse Pe-CQDs might be necessary to produce highly efficient solar cells, no one has carefully explored the relationship between polydispersity and photovoltaic (conversion) performance. To fill in this knowledge gap, Dr. Younghoon Kim and Assistant Professor Jongmin Choi from Daegu Gyeongbuk Institute of Science and Technology, Korea, recently led a team of scientists in a study that published in *ACS Energy Letters*. The

researchers used a technique called gel permeation chromatography to 'filter' and group nanoparticles based on their size, as confirmed by several measurements of their optical properties as well as transmission electron microscopy. With this approach, they managed to obtain suspensions of Pe-CQDs with different degrees of polydispersity.

Afterwards, they used these suspensions to fabricate solar cells and demonstrate the link between polydispersity and performance. As expected, the monodisperse suspension resulted in a better solar cell thanks to its homogeneous energy landscape, which led to higher light absorption within the optimal frequency band. "With the monodisperse Pe-CQDs, our solar cells reached a power conversion efficiency of 15.3% and an open-circuit voltage of 1.27 V. These values are the highest ever reported for Pe-CQDs based on CsPbI<sub>3</sub>, the perovskite we used," highlights Dr. Kim.

Overall, this study is a steppingstone in the field of solar cells based on Pe-CQDs, which still need to outperform their silicon-based counterparts to warrant commercialization. "Research on Pe-CQD solar cells began about four years ago, so further studies are needed to improve device performance and stability. Still, our approach for minimizing energetic disorder using monodisperse Pe-CQDs paves the way to further develop their potential in optoelectronic applications," concludes Dr. Choi.

**More information:** Seyeong Lim et al, Monodisperse Perovskite Colloidal Quantum Dots Enable High-Efficiency Photovoltaics, *ACS Energy Letters* (2021). DOI: [10.1021/acsenergylett.1c00462](https://doi.org/10.1021/acsenergylett.1c00462)  
<https://phys.org/news/2021-06-equal-size-colloidal-quantum-dots.html>

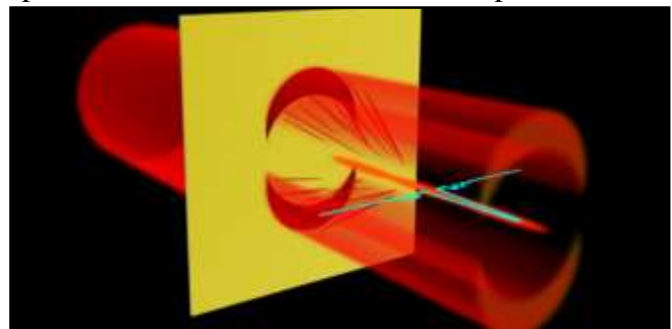


Sat, 26 June 2021

## Optical superoscillation without side waves

Optical superoscillation refers to a wave packet that can oscillate locally in a frequency exceeding its highest Fourier component. This intriguing phenomenon enables production of extremely localized waves that can break the optical diffraction barrier. Indeed, superoscillation has proven to be an effective technique for overcoming the diffraction barrier in optical superresolution imaging. The trouble is that strong side lobes accompany the main lobes of superoscillatory waves, which limits the field of view and hinders application.

There also are tradeoffs between the main lobes and the side lobes of superoscillatory wave packets: reducing the superoscillatory feature size of the main lobe comes at the cost of enlarging the side lobes. This happens mainly because superoscillation is a local phenomenon, yet the overall width of the wave packet is wider than the optical diffraction limit.



A pair of moonlike sharp-edge apertures enables generation of diffractive focusing light spot sized within the optical diffraction limit, while eliminating side waves along the symmetric cut. Credit: Yanwen Hu.

Precise engineering of the interference of diffracted light fields emitted from complex nanostructures can produce structural masks that enable significant optical superoscillation. But structural masks require optimization and complex fabrication, and the resulting light field is still limited by high-intensity side lobes. Producing superoscillatory waves with appreciable feature size while maintaining a larger field of view has remained challenging until now.

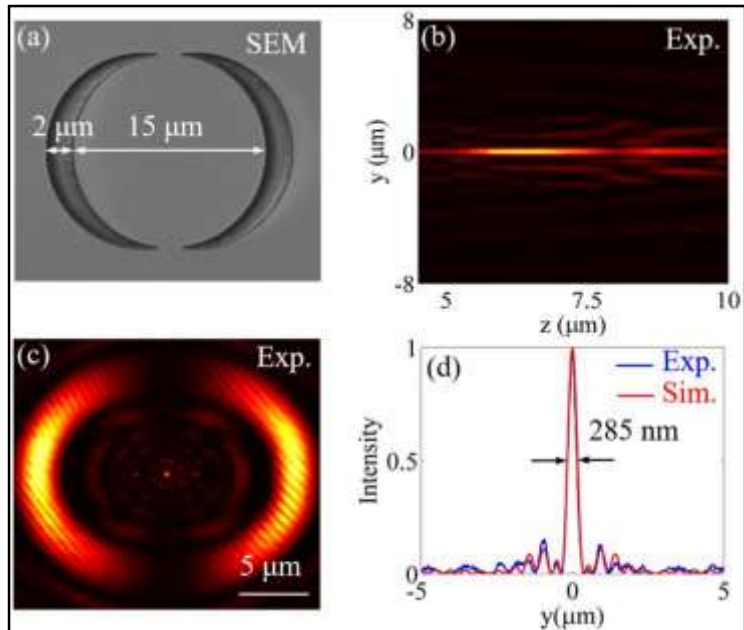
As reported in *Advanced Photonics*, researchers from Jinan University, Guangzhou, China, recently developed a way to eliminate, to some extent, the tradeoffs involved in superoscillatory wave packets. They demonstrate, both experimentally and theoretically, generation of superoscillatory light spots without side lobes.

A central microdisc with cylindrical diffraction gives rise to a superoscillatory light spot of a size within the optical diffraction limit. A pair of sharp-edged apertures ensures constructive interference with the high-spatial-frequency waves. That interference effectively eliminates side lobes along a symmetric cut that can be adjusted in the transverse plane by rotating the moonlike apertures.

According to Yanwen Hu, a doctoral student working under the supervision of Zhenqiang Chen in the Department of Optoelectronic Engineering at Jinan University, "Due to its easy design, based on clear physics, the sharp-edged aperture is a promising candidate for realization of superoscillatory waves."

Hu explains further that the cylindrical diffraction of the central microdisc produces superoscillatory waves with Bessel-like forms. These forms enable the delicate structures of the superoscillatory waves propagating in free space to travel much farther than the evanescent light waves. According to Hu, this intriguing propagation effect of superoscillation holds promise for potential application in nanoparticle manipulation, as well as superresolution imaging.

**More information:** Yanwen Hu et al, Optical superoscillatory waves without side lobes along a symmetric cut, *Advanced Photonics* (2021). DOI: [10.1117/1.AP.3.4.045002](https://doi.org/10.1117/1.AP.3.4.045002)  
<https://phys.org/news/2021-06-optical-superoscillation-side.html>



Generation of optical superoscillatory waves without side lobes along a dimension. (a) Electron micrograph of the sample used for experiment. (b) Experiment measurement for free-space propagation of the superoscillatory waves. (c) Experimental intensity distribution of the superoscillating focusing wave in the transverse plane at  $z = 6.2 \mu\text{m}$ . (d) Intensity profiles along  $y$  axis ( $x = 0$ ) of (c). The full width at half maximum was indicated experimentally in the panel. The blue curve represents the experiment while the red curve denotes the simulation. Credit: Hu et al., doi 10.1117/1.AP.3.4.045002.

# Covid third wave: Who is likely to be more vulnerable? Doctor explains

- *Speaking to a news agency, the doctor said, 'In the third Covid wave, we're looking at people who are not vaccinated yet'*

Ahead of a possible third wave of Covid-19, Dr Rupali Basu, CEO of Woodlands Hospital, said that some vulnerable groups might be especially at risk. Speaking to news agency ANI, the doctor said, "In the third Covid wave, we're looking at people who are not vaccinated yet."

"Children below 18, pregnant mothers. These people are most vulnerable. We have to be very cautious and follow proper Covid appropriate behaviour," the Woodlands Hospital doctor added.

### '3rd-wave unlikely to be as severe as 2nd wave'

A study done by the Indian Council of Medical Research (ICMR) has found that the substantial third wave of COVID-19 could occur but it may not be as severe as the second wave.

The study titled 'Plausibility of the third wave of COVID-19 in India: A mathematical modelling based analysis', was published on Friday in the peer-reviewed Indian Journal of Medical Research.

"This study demonstrates plausible mechanisms by which a substantial third wave could occur, while also illustrating that it is unlikely for any such resurgence to be as large as the second wave," the study said. However, the researchers also noted that the projections were subject to uncertainties and scaling up vaccinations is the only way to 'mitigate against any eventuality'.

"Preparedness planning for any potential future wave will benefit by drawing upon the projected numbers based on the present modelling exercise," it added.

In the study, researchers examined four potential mechanisms of the third wave of COVID-19 using a compartmental model of SARS-CoV-2 transmission.

"In the first mechanism, the possibility of waning immunity was considered that would put previously exposed individuals at risk. Second, the emergence of a new viral variant that is capable of escaping immunity to previously circulating strains. Third, the emergence of a new viral variant that is more transmissible than the previously circulating strains. Fourth, of current lockdowns affording fresh opportunities for transmission," the study read.

The result of the study said that the Immune-mediated mechanisms (waning immunity, or viral evolution for immune escape) are unlikely to drive a severe third wave if acting on their own unless such mechanisms lead to a complete loss of protection among those previously exposed.

The researchers highlighted that a new, more transmissible variant will also need to have a very high infection rate ( $R_0 > 4.5$ ) to cause the third wave on its own.

The R-value refers to the rate at which an infection spreads within the population.

The ICMR study mentioned that two mechanisms where a severe third wave is possible. First is a new variant that is more transmissible and is also capable of escaping prior immunity and second, when lockdowns are highly effective in limiting transmission and subsequently released.

Researchers suggested that rapid scale-up of vaccination efforts could play an important role in mitigating these and future waves of the disease.

<https://www.livemint.com/news/india/covid-third-wave-children-below-18-pregnant-women-likely-to-be-more-vulnerable-says-doctor-11624713091182.html>

