

July  
2021

# 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

खंड : 46      अंक : 144      23 जुलाई 2021

Vol.: 46      Issue : 144      23 July 2021



रक्षा विज्ञान पुस्तकालय  
Defence Science Library  
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र  
Defence Scientific Information & Documentation Centre  
मेटकॉफ हाउस, दिल्ली - 110 054  
Metcalf House, Delhi - 110 054

# CONTENTS

S. No.	TITLE	Page No.
<b>DRDO News</b>		<b>1-7</b>
<b>DRDO Technology News</b>		<b>1-5</b>
1.	Lt Gen CP Mohanty, Vice Chief of the Army Staff proceeds on two day visit to Bengaluru	1
2.	उप सेना प्रमुख लेफ्टिनेंट जनरल सीपी मोहंती दो दिवसीय बेंगलुरु दौरे पर रवाना	2
3.	Andhra Pradesh: DRDO's Rs 25 crore anti-drone technology to safeguard Tirupati temple	3
4.	BSF to test DRDO anti-drone system on border, IED laden UAV shot down in Jammu	4
5.	BrahMos eyes lighter version of missiles for Indian HAL Tejas & Sukhoi Fighter Jets	5
<b>COVID 19: DRDO's Contribution</b>		<b>6-7</b>
6.	On the brink: Guru Nanak Dev varsity's attempt to save a 'wonder herb' that helps cure post-Covid complications	6
<b>Defence News</b>		<b>8-12</b>
<b>Defence Strategic: National/International</b>		<b>8-12</b>
7.	Indian Navy exercises with Royal Navy Carrier Strike Group	8
8.	भारतीय नौसेना का रॉयल नेवी कैरियर स्ट्राइक ग्रुप के साथ युद्धाभ्यास	9
9.	Senior officers of armed forces meet over theaterisation issue	10
10.	India to take part in 17-nation Zapad-2021 wargames in Russia	11
11.	India, China likely to hold 12th round of military talks very soon: Sources	12
<b>Science &amp; Technology News</b>		<b>13-19</b>
12.	Gaganyaan 1st uncrewed mission unlikely before June 2022; no life support systems testing	13
13.	New quantum research gives insights into how quantum light can be mastered	14
14.	Imaging tool under development exposes concealed detonators—and their charge	15
15.	Antimatter from laser pincers	16
<b>COVID-19 Research News</b>		<b>18-19</b>
16.	Research finds novel coronavirus, related to SARS-Cov-2 that causes Covid-19, in horseshoe bats in UK	18



Press Information Bureau  
Government of India

Ministry of Defence

Thu, 22 July 2021 2:27PM

## **Lt Gen CP Mohanty, Vice Chief of the Army Staff proceeds on two day visit to Bengaluru**

Lt Gen CP Mohanty, Vice Chief of the Army Staff is currently on a two day visit to Bengaluru. On 22 July 2021, the Vice Chief interacted with indigenous defence manufacturers, Tata Advanced Systems Limited (TASL) and M/s Aroo Private Limited. He was briefed by the manufacturers on progress being made in electronics, optronics and ammunition related to platforms such as artillery guns. He also witnessed advances made in special winter clothing. The Vice Chief reviewed the progress made by the Helicopter Division of HAL and interacted with the representatives of the design bureau of both the ALH and LCH.

On 23 July, the VCOAS will interact with the representatives of DPSUs such as BEL and ISRO and witness various demonstrations and briefings on the Akash Missile System, Tactical Communication and encryption devices and satellite communication equipment. The Vice Chief will also interact with Dr K Sivan, Chairman ISRO. The regional heads of Larsen and Toubro (L&T) will brief the Vice Chief on unmanned ground systems, avionics and CBRN systems.

The VCOAS will address wide ranging issues with the City Defence majors, which require impetus and hand holding. Focus will also be on niche technologies in the domains of missiles, AI, UAVs, robotics, unmanned ground systems and avionics. 'Atmanirbharta in Defence' will remain the underlying theme during his interactions with the Defence Industry.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1737681>





पत्र सूचना कार्यालय  
भारत सरकार

रक्षा मंत्रालय

Thu, 22 July 2021 2:27PM

## उप सेना प्रमुख लेफ्टिनेंट जनरल सीपी मोहंती दो दिवसीय बंगलुरु दौरे पर रवाना

उप सेना प्रमुख लेफ्टिनेंट जनरल सीपी मोहंती इस समय बंगलुरु के दो दिवसीय दौरे पर हैं। दिनांक 22 जुलाई 2021 को उन्होंने स्वदेशी रक्षा निर्माताओं, टाटा एडवांस्ड सिस्टम्स लिमिटेड (टीएसएल) और मेसर्स अरु प्राइवेट लिमिटेड के साथ बातचीत की। उन्हें निर्माताओं द्वारा आर्टिलरी गन जैसे प्लेटफॉर्म से संबंधित इलेक्ट्रॉनिक्स, ऑप्टोनिक्स और गोला-बारूद के क्षेत्र में हुई प्रगति के बारे में जानकारी दी गई। उन्होंने सर्दियों के विशेष तौर पर बने कपड़ों के मामले में की गई प्रगति को भी देखा। उप सेना प्रमुख ने एचएएल के हेलीकाप्टर डिवीजन द्वारा की गई प्रगति की समीक्षा की और एएलएच और एलसीएच दोनों के डिजाइन ब्यूरो के प्रतिनिधियों के साथ बातचीत की।



23 जुलाई को उप सेना प्रमुख बीईएल और इसरो जैसे डीपीएसयू के प्रतिनिधियों के साथ बातचीत करेंगे और आकाश मिसाइल प्रणाली, सामरिक संचार और एन्क्रिप्शन

उपकरणों और उपग्रह संचार उपकरणों पर विभिन्न प्रदर्शनों और ब्रीफिंग में भी हिस्सा लेंगे। उप सेना प्रमुख इसरो के चेयरमैन डॉ. के सिवन से भी बातचीत करेंगे। लार्सन एंड टुब्रो (एलएंडटी) के क्षेत्रीय प्रमुख मानवरहित ग्राउंड सिस्टम, एवियोनिक्स और सीबीआरएन सिस्टम के बारे में उप सेना प्रमुख को ब्रीफ करेंगे।

उप सेना प्रमुख शहर की रक्षा कंपनियों के साथ विस्तार से मसलों का समाधान करेंगे, जिसके लिए प्रोत्साहन और उनका साथ देने की आवश्यकता है। मिसाइलों, एआई, यूएवी, रोबोटिक्स, मानवरहित ग्राउंड सिस्टम और एवियोनिक्स के क्षेत्र में आला प्रौद्योगिकियों पर भी ध्यान केंद्रित किया जाएगा। रक्षा उद्योग के साथ बातचीत के दौरान 'रक्षा में आत्मनिर्भरता' अंतर्निहित विषय रहेगा।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1737755>

## Andhra Pradesh: DRDO's Rs 25 crore anti-drone technology to safeguard Tirupati temple

Tirupati: Tirumala Tirupati Devasthanams (TTD) will become the first temple administration in the country to deploy the Defence Research and Development Organisation's (DRDO) anti-drone technology to safeguard the iconic Lord Venkateswara temple at Tirumala.

Following the terror attack on an Air Force base in Jammu in June in which a drone was used, DRDO arranged a demonstration of its anti-drone system at Kolar in Karnataka for all the three services on July 6. TTD vigilance and security wing chief, Gopinath Jatti, also attended the demonstration with the representatives of various police departments from across the country.

The DRDO system, which would involve detection, jamming and countermeasures, is estimated to cost Rs 25 crore a piece.

But it would be made available at Rs 22 crore a piece if the purchase order is for 100 systems or more.

DRDO, which has designated the defence PSU Bharat Electronics Ltd (BEL) to manufacture and market its anti drone systems for now, is also in talks with some top companies for transfer of technology partners to scale up production and bring down costs.

The system comes with a detection capability of up to 4 km with "soft kill" options by way of radio frequency jamming that disables the drone's communication and GPS and neutralises remote locating system. Both these options have a range of 3 km.

The system also offers the "hard kill" option, in which it physically detects, targets and destroys small drones in the range of 150 m to 1 km.

Following the advice of TTD's chairman and executive officer Dr K S Jawahar Reddy, the vigilance and security wing is hoping to deploy the system within the earliest possible time frame. TTD sources said BEL officials would soon inspect the Tirumala temple and its security cordons.

<https://timesofindia.indiatimes.com/city/visakhapatnam/andhra-pradesh-tirumala-tirupati-devasthanams-set-to-be-first-temple-body-to-deploy-anti-drone-technology/articleshow/84664655.cms>



File photo DRDO-developed counter-drone system to detect and neutralize aerial threat.

## BSF to test DRDO anti-drone system on border, IED laden UAV shot down in Jammu

*The Pakistan-based Islamist and Khalistani terror groups are increasing used unmanned drones to target, drop and supply weapons, explosives and ammunition across the western borders to their terror network within India, particularly in Jammu and Kashmir and Punjab*

*By Shishir Gupta*

New Delhi: The Border Security Force (BSF) has asked the Defence Research and Development Organisation (DRDO) to bring the prototype anti-drone system to Jammu and Punjab sectors for testing under real conditions. The anti-drone system was tested successfully under controlled conditions at a DRDO facility before BSF officials and security agencies in Karnataka's Kolar earlier this month.

The Pakistan-based Islamist and Khalistani terror groups are increasing used unmanned drones to target, drop and supply weapons, explosives and ammunition across the western borders to their terror network within India, particularly in Jammu and Kashmir and Punjab. While Pakistan based Lashkar-e-Taiba (LeT) jihadis targeted the Jammu airbase on June 27 with two drones, an IEDs carrying drone was shot down by Jammu and Kashmir police near Gurachak village, eight kilometres within Indian territory, in the Akhnoor-Sunderbani sector on Friday morning.



The DRDO's anti-drone system is seen during Republic Day last year.

According to security officials who attended the Kolar test, the DRDO anti-drone system performed well in controlled conditions. The DRDO anti-drone system has a radar detection range of four kilometres, a jamming range of more than two kilometres and a kill range of more than one kilometre. The system was tested at the NSG facility in Manesar this January 8, 2021. The system was also tried in an operation on the Amritsar border in the 2020 winter.

While the army and the security forces are still to deploy the DRDO anti-drone system, Bharat Electronics Limited and three private Indian companies have signed transfer of technology agreements with the government agency to mass-produce the system.

Although a tested anti-drone system travels with Prime Minister Narendra Modi's security cavalcade, the DRDO system has been deployed during Republic and Independence Days since 2020. It was also deployed during US President Donald Trump's official visit to India on February 24-25, 2020, including in the then Motera Stadium.

Union home minister Amit Shah is pressing hard on DRDO to produce efficient anti-drone technology as intelligence agencies are warning that the Pakistan-based terror groups will soon be using artificial intelligence and robotics to target India as there will be total deniability from Pakistan and no loss of jihadi life.

Although the Punjab sector is facing a drone menace since August 2019, the drone attack on the Jammu airbase raised serious concerns as the unmanned platform not only travelled 30 kilometres to and fro from the border but also dropped RDX explosives on the installations at the airbase. It was only due to high winds that the targets—air traffic control and a helicopter—were missed but the targets had been fixed through precise latitude and longitude using GPS.

<https://www.hindustantimes.com/india-news/bsf-to-test-drdo-anti-drone-system-on-border-ied-laden-uav-shot-down-in-jammu-101627010670994.html>



## **BrahMos eyes lighter version of missiles for Indian HAL Tejas & Sukhoi Fighter Jets**

The joint Russian-Indian venture BrahMos Aerospace is planning to develop a lighter version of its missile but with similar operational characteristics, BrahMos co-director Alexander Maksichev told Sputnik.

“We now want to make a missile with the same characteristics but of a smaller size. This work is planned. If it is smaller, then it will probably be on Sukhoi planes, and if it fits Tejas [Indian single-engine multirole light fighter], then it will be just wonderful,” he said on the sidelines of the International Aviation and Space Salon MAKS-2021 outside Moscow.

The current version of BrahMos weighs 2.5 tonnes, which is “a fairly large missile,” Maksichev noted.

Speaking of the process of equipping the Indian air force’s Sukhoi Su-30MKI fighters with BrahMos cruise missiles, Maksichev said that the tests were completed back in 2019.

“We have a serial order. We supply serial missiles for aircraft. The aircraft have also been prepared [to be equipped with cruise missiles] ... Everything goes as planned. A squadron called Tiger Sharks has been formed. Training and launches are underway. And successful launches,” he said.

The executive recalled that the BrahMos missiles have a range of 300 kilometers (186 miles).

“We even had a test when a jet took off from the west coast, flew all over India, refueled, launched a missile and returned ... It launches a missile without entering the enemy counteraction zone. This is the most important thing. This increases the combat survivability of the aircraft. Plus the missile itself is very powerful and highly effective,” he added.

Earlier in the year during Aero India 2021, Maksichev had stated that – “Russian-Indian company BrahMos Aerospace is considering a possibility of creating a lightweight version of the Brahmos for the Tejas fighter. We will inform you as soon as everything is ready.”

“Our missile has adapted well to the Su-30, and now the new Indian Tejas jet is under consideration as a carrier of our missile. Therefore, there is a wish of the Indian side to adapt the missile,” he explained.

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

<https://eurasianimes.com/brahmos-eyes-lighter-version-of-missiles-for-indian-hal-tejas-sukhoi-fighter-jets/>



### On the brink: Guru Nanak Dev varsity's attempt to save a 'wonder herb' that helps cure post-Covid complications

*The wonder herb, known as solo plant or aptly as 'Sanjeevni' in Leh and Ladakh where it is found and is 'endangered', grows at an altitude of 14,000 to 16,000 feet in the Trans-Himalayan region. The medicinal plant is scientifically known as Rhodiola*

*By Navjeevan Gopal*

Amritsar-based Guru Nanak Dev University (GNDU) is looking for pharmaceutical and herbal companies to exploit the benefits of an 'endangered wonder herb' that can be grown using the varsity's technology for high-altitude solo plants in controlled lab conditions and can potentially be a game-changer in lung complications arising out of Covid-19 infections.

The wonder herb, known as solo plant or aptly as 'Sanjeevni' in Leh and Ladakh where it is found and is 'endangered', grows at an altitude of 14,000 to 16,000 feet in the Trans-Himalayan region. The medicinal plant is scientifically known as Rhodiola.

According to GNDU Biotechnology department's Dr Pratap Singh Pati, "the solo plant is used to cure high altitude sickness, cancer, anxiety, and inflammation. In addition, it has cardioprotective, neuroprotective, and hepatoprotective properties. The medicinal properties of this plant are attributed to a wide range of secondary metabolites such as Rosavin, Rosarin, Rosin, Salidroside and important antioxidants".

Dr Pati, an Indian National Science Academy (INSA) awardee and Fullbright Senior Research Fellow (University of Kentucky, USA), told The Indian Express, "Rosavin, an important secondary metabolite of Rhodiola plant was found very effective against pulmonary fibrosis, which is a life-threatening, and against progressive lung diseases with high mortality. In the Covid-19 scenario when researchers are looking for a potent drug for effective treatment against pulmonary fibrosis, Rhodiola which produces such pharmaceutically active molecules could be the wonder herb."

The solo plant was mentioned two years ago by Prime Minister Narendra Modi in his address to the nation. Modi had then pointed out the vast medicinal properties of solo plants and how it could change the lives of local farmers in Ladakh growing them.

However, as per researchers at GNDU, the 'wonder herb' is "endangered" and the university made an attempt to propagate and multiply the plant using in vitro methodology, where it grew and multiplied the plant using required climatic variables.

Dr Pati told The Indian Express that the plant was 'endangered' due to a number of factors, which include "climatic changes, construction activities and indiscriminate harvesting by the locals. Due to a set of such factors, the solo plant is on the verge of extinction".

Dr Pati said GNDU Biotechnology department started work on the project after being approached by Defence Research and Development Organisation (DRDO) around five years ago.



"In traditional practices, local practitioners use the herb," said Dolker, adding that the idea was aimed to ensure mass propagation of the plant and accordingly a protocol was developed for the same. (Representational image)



He said that the DRDO allocated “Rs 8 to Rs 9 lakh for the project”, which was aimed at propagating to multiply the plant in vitro.

Dechen Dolker, a PhD research scholar in GNDU biotechnology department in GNDU from Leh, said she was associated with the research as it was her dissertation project related to DRDO’s move to give a push to grow the solo plant.

“In traditional practices, local practitioners use the herb,” said Dolker, adding that the idea was aimed to ensure mass propagation of the plant and accordingly a protocol was developed for the same.

Dr Pati added, “We have developed a robust in vitro propagation system for mass multiplication of *Rhodiola imbricata*, the indigenous variants of the plant found in Trans-Himalayan region. The advantage of this system is to multiply and grow healthy plants throughout the year under controlled conditions. Further, it will enable the conservation of this rare endangered plant that could provide raw materials to the herbal industry for making life-saving formulations. At present, a team of students and interns are working to enhance important metabolites of this plant.”

“We look forward to players in the pharmaceutical and herbal industry to use the technology developed by us,” said Dr Pati.

<https://indianexpress.com/article/cities/chandigarh/on-the-brink-guru-nanak-dev-varsitys-attempt-to-save-a-wonder-herb-that-helps-cure-post-covid-complications-7417688/>



Press Information Bureau  
Government of India

Ministry of Defence

Thu, 22 July 2021 6:33PM

### Indian Navy exercises with Royal Navy Carrier Strike Group

Indian Navy participated in a two-day bilateral Passage Exercise (PASSEX) with Royal Navy Carrier Strike Group (CSG)-21 led by HMS Queen Elizabeth in the Bay of Bengal from 21 to 22 Jul 21. The bilateral Maritime Exercise was designed to hone the ability of the two navies to operate together in the maritime domain.

The maiden exercise between Indian Navy and the Royal Navy's latest Aircraft Carrier, HMS Queen Elizabeth included participation of CSG-21 comprising Type 23 Frigates and an *Astute*-class submarine in addition to the other surface combatants. Indian Navy was represented by *IN Ships Satpura, Ranvir, Jyoti, Kavaratti, Kulish* and a submarine. Anti-Submarine Warfare capable Long Range Maritime Reconnaissance Aircraft P8I also participated in the exercise.



With the presence of the CSG-21 in the Indian Ocean, the ongoing exercise has afforded excellent opportunity to engage over the entire spectrum of maritime operations including ASW, Anti-Air and Anti-Surface warfare. The exercise also witnessed the maiden participation of the F 35 B Lightning which operate from the deck of HMS Queen Elizabeth.

Regular *IN-RN* interactions over the years have augmented their professional content, interoperability and adaptability in the ever-changing security scenarios. The inter-operability achieved over the years has ensured a quantum jump in the complexity and scale of professional exchanges which is being further enhanced by the presence of the Royal Navy's Carrier Strike Group in the Indian Ocean.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1737833>



पत्र सूचना कार्यालय  
भारत सरकार

रक्षा मंत्रालय

Thu, 22 July 2021 6:33PM

## भारतीय नौसेना का रॉयल नेवी कैरियर

### स्ट्राइक ग्रुप के साथ युद्धाभ्यास

भारतीय नौसेना ने दिनांक 21 से 22 जुलाई 2021 तक बंगाल की खाड़ी में रॉयल नेवी कैरियर स्ट्राइक ग्रुप (सीएसजी)-21, जिसका नेतृत्व एचएमएस क्वीन एलिजाबेथ ने किया, के साथ दो दिवसीय द्विपक्षीय पैसेज युद्धाभ्यास (पासेक्स) में भाग लिया। द्विपक्षीय समुद्री अभ्यास दोनों नौसेनाओं की समुद्री क्षेत्र में एक साथ काम करने की क्षमता को बेहतर बनाने के लिए डिजाइन किया गया था।



भारतीय नौसेना और रॉयल नेवी के नवीनतम एयरक्राफ्ट कैरियर, एचएमएस क्वीन एलिजाबेथ के बीच पहले अभ्यास में सीएसजी-21 की भागीदारी शामिल थी जिसमें टाइप 23 फ्रिगेट और अन्य सतह पर कारगर लड़ाकों के अलावा एक एस्ट्यूट क्लास पनडुब्बी शामिल थी। भारतीय नौसेना का प्रतिनिधित्व आईएन शिप सतपुड़ा, रणवीर, ज्योति, कवरत्ती, कुलिश और एक पनडुब्बी द्वारा किया गया था। पनडुब्बी रोधी युद्ध में सक्षम लंबी दूरी के समुद्री टोही विमान पी8। ने भी अभ्यास में भाग लिया।

हिंद महासागर में सीएसजी-21 की उपस्थिति के साथ, जारी अभ्यास ने एएसडब्ल्यू, एंटी-एयर एवं एंटी-सरफेस वारफेयर सहित समुद्री सैन्य अभियानों के समूचे आयाम शामिल करने का उत्कृष्ट अवसर प्रदान किया है। इस अभ्यास में एफ 35 बी लाइटनिंग की पहली भागीदारी भी देखी गई जो एचएमएस क्वीन एलिजाबेथ के डेक से संचालित होता है।

वर्षों से नियमित भारतीय नौसेना- रॉयल नेवी के बीच साहचर्य ने लगातार बदलते सुरक्षा परिदृश्यों में उनकी पेशेवर क्षमता, अंतःक्रियाशीलता और अनुकूलन क्षमता को बढ़ाया है। पिछले वर्षों में हासिल की गई अंतर-संचालनीयता ने पेशेवर आदान-प्रदान की जटिलता और उसके परिमाण में एक बड़ा उछाल सुनिश्चित किया है जिसे हिंद महासागर में रॉयल नेवी के कैरियर स्ट्राइक ग्रुप की उपस्थिति से और अधिक बढ़ाया जा रहा है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1737865>

## Senior officers of armed forces meet over theaterisation issue

By Elizabeth Roche

- *The Indian government plans to condense its existing 19 commands into five unified or theatre commands, aimed at smoother planning and military response, resulting in a unified approach to fighting any future war*

New Delhi: Senior officers of the Indian Army, Navy and Air Force met in New Delhi on Thursday to iron out differences over a major military reform -- theaterisation.

A meeting was underway, a person familiar with the matter said, to sort out the differences in the Indian government's plans to condense its existing 19 commands into five unified or theatre commands, aimed at smoother planning and military response, resulting in a unified approach to fighting any future war.

At present the Indian Army and Air Force have seven commands each while the Indian Navy has three. Then there is the tri-services Andaman and Nicobar Command (ANC) and the Strategic Forces Command, which looks after nuclear assets.



The process of creating the new theatre commands is being led by Chief of Defence Staff General Bipin Rawat. (PTI)

Under current plans, five integrated commands are to be formed – the Northern Land Theatre which will look after Jammu and Kashmir, Ladakh and Central sector, the Western Land Theatre which will be Pakistan focused, the Eastern Land Theatre, the Maritime Theatre Command and the Air Defence Command.

The process of creating the new theatre commands is being led by Chief of Defence Staff General Bipin Rawat. But internal differences over the structure and scope of the theatre commands have come out in public with Rawat terming the Indian Air Force as a support arm of the Indian military in a television interview. This description was opposed by the Indian Air Force chief Rakesh Kumar Singh Bhadauria who said that airpower had a much bigger role to play than just a supporting role.

The need for a unified approach to warfighting came up after the 1999 Kargil War. The Kargil Review Committee and the then Group of Ministers besides the Naresh Chandra Committee had called for structural changes in higher defence management. But it was the Shekatkar committee, headed by former Lieutenant General D.B. Shekatkar, which recommended the creation of the post of Chief of Defence Staff and unified theatre commands.

<https://www.livemint.com/news/india/senior-officers-of-armed-forces-meet-over-theaterisation-issue-11626954340182.html>

Fri, 23 July 2021

## India to take part in 17-nation Zapad-2021 wargames in Russia

*Zapad-2021 is a part of the annual series of large scale exercises that serve as a capstone to the Russian Armed Forces annual training cycle*

*By Anish Kumar*

Amidst the ongoing border tussle with China and reiteration of ceasefire understandings with Pakistan, Indian armed forces will be participating in the exercise Zapad-2021 along with them, being held in Russia from September 3, wherein troops of 17 countries have been invited.

The countries invited include China, Pakistan, Armenia, Belarus, Nepal, Sri Lanka, Indonesia, Uzbekistan, Turkmenistan, Vietnam, Serbia, Mongolia, Myanmar, Kazakhstan, Tajikistan and Kyrgyzstan.

The 14-day-long exercise is scheduled to take place at Mulino Training Ground in Nizhniy, which is 423 km east of Moscow.

Zapad-2021 is a part of the annual series of large scale exercises that serve as a capstone to the Russian Armed Forces annual training cycle.

The series rotates through four main Russian strategic Commands, including Zapad (West), Vostok (East), Tsentr (Center) and Kavkaz (Caucasus).

These exercises are a means of gauging battle-readiness in each of Russia's four military districts.

In 2019, the Indian Army had participated in Exercise Tsentr with a strength of 140 personnel while stayed away from the 2020 Kavkaz exercise, citing the COVID-19 pandemic.

In the Kavkaz exercise, China and Pakistan had also participated in the joint exercise.

Besides, there are two exercises that are also planned in Russia -- Exercise Indira and the Shanghai Cooperation Organisation Military exercise.

Exercise Indira will be held from August 1-13, in which a unit of Mechanised Infantry is participating.

The joint exercise is designed to improve interoperability and the relationship between the two nations. A total of 250 personnel will be participating in the exercise from the Indian side.

<https://newsable.asianetnews.com/india-defence/250-indian-soldiers-to-take-part-in-17-nation-zapad-2021-wargames-in-russia-qwn9w4>





## India, China likely to hold 12th round of military talks very soon: Sources

*Sources said China had suggested that the talks should be held on July 26. However, India has asked it to work out fresh dates as the Indian Army would be occupied with events related to the Kargil Vijay Diwas at this time*

*By Manjeet Negi*

New Delhi: India and China are likely to hold the 12th round of military talks on the situation in eastern Ladakh and the Line of Actual Control (LAC) "very soon", sources in the Army have told India Today TV.

The sources said China had suggested that the talks should be held on July 26. However, India has asked it to work out fresh dates as the Indian Army would be occupied with events related to the Kargil Vijay Diwas at this time. "Fresh dates for the military talks are being worked out between the two sides," an Army source privy to the development said.

In the meeting, India and China are expected to discuss disengagement from existing friction points in Depsang plains, Gogra and Hot Springs regions of eastern Ladakh.

The Indian side has made it clear that it would agree for de-escalation only if it is simultaneous, the extent of withdrawal of troops is equal on both sides and the process addresses mutual security concerns.

### Foreign Ministers have agreed for early talks: MEA

Meanwhile, Spokesperson of the Ministry of External Affairs (MEA) Arindam Bagchi said External Affairs Minister S Jaishankar in his recent meeting with his Chinese counterpart agreed that the next round of the military commander-level talks should be convened "at the earliest".

"You are aware that EAM S Jaishankar met State Councilor and Foreign Minister of China Wang Yi on July 14 in Dushanbe on the sidelines of the SCO Foreign Ministers' meeting. The two leaders agreed that the next round of the military commander-level talks should be convened at the earliest." He added that the two sides agreed that the in the meeting, India and China should discuss all remaining issues and seek a "mutually acceptable solution".

"There was also an understanding that both sides will continue to ensure stability on the ground and neither side will take any unilateral action that could increase tension," Bagchi said.

He added that S Jaishankar recalled that both sides had agreed that a prolongation of the existing situation on LAC was not in the interest of either side, and that it was "visibly impacting the relationship in a negative manner".

"He emphasised that maintenance of peace and tranquility in the border areas has been the foundation for the development of ties (between India and China) since 1988. Attempts to change status quo last year, which also disregarded commitments under the 1993 and 1996 agreements, have inevitably affected ties. It was, therefore, in mutual interest that the two sides work towards early resolution of the remaining issues along the LAC in eastern Ladakh, while fully abiding by bilateral agreements and protocols," the spokesperson said.

<https://www.indiatoday.in/india/story/india-china-likely-to-hold-12th-round-of-military-talks-very-soon-1831370-2021-07-22>



India and China have been in the midst of a bitter standoff in eastern Ladakh since April last year. Above: A portion of the Pangong Lake that has been one of the friction points between the two sides. (Photo: Reuters)

### Gaganyaan 1st uncrewed mission unlikely before June 2022; no life support systems testing

By Chetan Kumar

The first uncrewed mission part of the Gaganyaan programme, which ISRO was hoping to launch by December this year, has been postponed to next year. In fact, it is unlikely to be launched before June 2022.

Scientists associated with the programme said while there has been progress made on the human rating of systems, especially the launch vehicle, there's still a lot of work pending. "...Which is why we are looking at the second half of 2022 for the first uncrewed mission. It could even be August," one of them said.

ISRO chairman K Sivan told TOI: "It's now impossible to carry out the first uncrewed mission this year as we've lost a lot of time because of lockdowns and work is only picking up now. It'll happen only next year around June."

This change is likely to impact the overall timeline of the programme, which initially hoped to send Indian astronauts to space by 2022.

#### No Life Support System

Multiple scientists said that the first uncrewed mission may see the orbital module stay in orbit for multiple days — could even be as long as a week — but that not all systems that will eventually be part of the human spaceflight will be part of this mission.

Sivan said: "It's likely to stay in orbit for a 'long time' as we'll test all systems for extremes. But we're yet to decide for how long we'll keep it there."

He, however, confirmed that this mission won't be testing the crucial environment and life support systems. "...As far as life support systems go, it is more important to conduct extensive ground tests than to do an actual flight test — which is also critical — and we will, therefore, be testing those on the ground first and use it as part of the second uncrewed mission," Sivan said.

The development of these systems will be the most challenging part of human spaceflight, and Sivan said Isro is doing it indigenously. However, sources said ISRO could be getting help indirectly from other space agencies.

#### Flight Performance & Vyomitra

"The first mission is mainly for flight performance systems. The human-rated launch vehicle will be demonstrated. After injecting the module into orbit, we need to test the worldwide tracking networks. And, we need to test the return flight. Here we'll look at both the thermal protection and other systems of the module during its return, and also the recovery response after it lands back," Sivan said. ISRO will also be testing both the audio and video links through the launch and the orbiting of the module. Vyomitra, the half-humanoid designed by ISRO, is also likely to make it in the first mission.

"...We are aiming to send Vyomitra, but the crew module won't be pressurised (like it would be with astronauts) so not all aspects of human activity will be mimicked by the robot in the first mission," Sivan added. Although ISRO has shortlisted some experiments, what may eventually make it as part of the first mission is yet to be decided.

<https://timesofindia.indiatimes.com/home/science/gaganyaan-1st-uncrewed-mission-unlikely-before-june-2022-no-life-support-systems-testing/articleshow/84655380.cms>

## New quantum research gives insights into how quantum light can be mastered

A team of scientists at Los Alamos National Laboratory propose that modulated quantum metasurfaces can control all properties of photonic qubits, a breakthrough that could impact the fields of quantum information, communications, sensing and imaging, as well as energy and momentum harvesting. The results of their study were released yesterday in the journal *Physical Review Letters*, published by the American Physical Society.

"People have studied classical metasurfaces for a long time," says Diego Dalvit, who works in the Condensed Matter and Complex Systems group at the Laboratory's Theoretical Division. "But we came up with this new idea, which was to modulate in time

and space the optical properties of a quantum metasurface that allow us to manipulate, on-demand, all degrees of freedom of a single photon, which is the most elementary unit of light."

Metasurfaces are ultrathin structures that can manipulate light in ways not usually seen in nature. In this case, the team developed a metasurface that looked like an array of rotated crosses, which they can then manipulate with lasers or electrical pulses. They then proposed to shoot a single photon through the metasurface, where the photon splits into a superposition of many colors, paths, and spinning states that are all intertwined, generating so-called quantum entanglement—meaning the single photon is capable of inheriting all these different properties at once.

"When the metasurface is modulated with laser or electrical pulses, one can control the frequency of the refracted single photon, alter its angle of trajectory, the direction of its electric field, as well as its twist," says Abul Azad from the Center for Integrated Nanotechnologies at the Laboratory's Materials Physics and Applications Division.

By manipulating these properties, this technology could be used to encode information in photons traveling within a quantum network, everything from banks, quantum computers, and between Earth and satellites. Encoding photons is particularly desirable in the field of cryptography because "eavesdroppers" are unable to view a photon without changing its fundamental physics, which if done would then alert the sender and receiver that the information has been compromised.

The researchers are also working on how to pull photons from a vacuum by modulating the quantum metasurface.

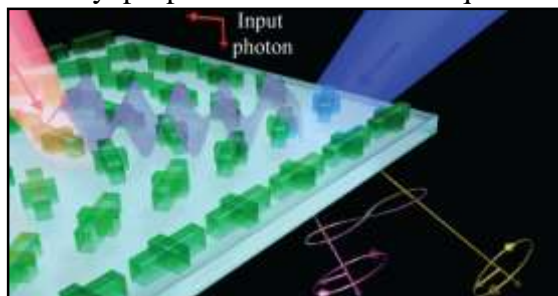
"The quantum vacuum is not empty but full of fleeting virtual photons. With the modulated quantum metasurface one is able to efficiently extract and convert virtual photons into real photon pairs," says Wilton Kort-Kamp, who works in the Theoretical Division at the Lab's Condensed Matter and Complex Systems group.

Harnessing photons that exist in the vacuum and shooting them in one direction should create propulsion in the opposite direction. Similarly, stirring the vacuum should create rotational motion from the twisted photons. Structured quantum light could then one day be used to generate mechanical thrust, using only tiny amounts of energy to drive the metasurface.

**More information:** Wilton J. M. Kort-Kamp et al, Space-Time Quantum Metasurfaces, *Physical Review Letters* (2021). DOI: [10.1103/PhysRevLett.127.043603](https://doi.org/10.1103/PhysRevLett.127.043603)

**Journal information:** [Physical Review Letters](https://www.aps.org/publications/physrevlett)

<https://phys.org/news/2021-07-quantum-insights-mastered.html>



A metasurface with all-optical modulation of the refractive index induces color-spin-path quantum entanglement on a transmitted single photon. Credit: Los Alamos National Laboratory

## Imaging tool under development exposes concealed detonators—and their charge

Behold the neutron, the middle child of subatomic particles. At times overshadowed by its electrically charged siblings the proton and the electron, neutrons quietly play important roles in national security. They start nuclear reactions for weapons and power plants. They bombard materials for nuclear safety tests. And now they have a new skill: telling whether a concealed, electric detonator is charged.

Sandia quantum-sensing expert Yuan-Yu Jau is helping neutrons develop their talent. He's leading an effort to build a new kind of neutron-based imaging system. When finished, it will enable people to safely examine sealed metal boxes when opening them could be dangerous, whether that's because inside is an explosive weapon or a malfunctioning, high-voltage fire set at a missile range.

"There are no other technologies that can directly image an electric field with physical barriers," Jau said. "One advantage of this imaging technology is that it can absolutely determine the magnitudes and directions of the electric fields."

Jau has already shown neutrons are up to the task at a large, specialized facility—the National Institute of Standards and Technology Center for Neutron Research in Gaithersburg, Maryland. He is currently exploring how to redesign the system into a smaller, fieldable prototype for security applications.

Compact neutron generators are commercially available for laboratory, medical and industrial uses, but by and large, these spit out neutrons with so much energy that the imaging system cannot manipulate and analyze them. Jau is working toward building a custom generator that tosses neutrons with much lower energies.

The National Nuclear Security Administration is funding his efforts.

### Neutron spin exposes electric fields

A metal box, or Faraday cage, blocks electromagnetic waves attempting to enter or exit. This conceals electrically charged devices inside and makes contents difficult to probe without opening the box. Charged particles like protons and electrons have trouble penetrating the barrier, which gives neutral neutrons the opportunity to shine.

Neutrons pass through metal with relative ease, and although they don't have an electric charge, they do spin. That spin changes ever so slightly when the particle passes through an electric field. Jau takes advantage of this phenomenon by polarizing neutrons, so they all have the same spin, and firing them through a metal box into a detector on the other side.

Some of the neutrons will never make it to the detector because they bump into the concealed object. The neutrons that make it create an X-ray-like silhouette on the detector. Of these particles, any that also pass through an electric field will have a different spin when they hit the detector than when they started. This creates a second image that shows where electric fields are. From that picture, operators can decipher the voltage of the object and whether it's charged, even if it is turned off or in sleep mode.

According to Jau, neutrons also could be used in similar ways for other applications. They could be used to study electrical properties of new materials, analyze storage capacity in advanced batteries or diagnose electrical components of complex, assembled machines without removing them.



Sandia National Laboratories researchers, from left, Yuan-Yu Jau, George Burns, Justin Christensen and Ed Bielejec plan to test a future neutron generator for an electric-field imaging system at Sandia's Ion Beam Laboratory. Credit: Randy Montoya



"In practice, different applications require different electric-field sensitivity and imaging resolution," Jau said. "It doesn't mean that our proof-of-concept demonstration is ready for all applications. Several of them can already be done using the demonstrated experimental setup, but some others require further improvements in performance or in fieldable technologies."

In other words, the mighty neutron might have more surprise talents to show off in the future.

**More information:** Yuan-Yu Jau et al, Electric Field Imaging Using Polarized Neutrons, *Physical Review Letters* (2020). DOI: [10.1103/PhysRevLett.125.110801](https://doi.org/10.1103/PhysRevLett.125.110801)

**Journal information:** *Physical Review Letters*  
<https://phys.org/news/2021-07-imaging-tool-exposes-concealed-detonatorsand.html>



Fri, 23 July 2021

## Antimatter from laser pincers

In the depths of space, there are celestial bodies where extreme conditions prevail: Rapidly rotating neutron stars generate super-strong magnetic fields. And black holes, with their enormous gravitational pull, can cause huge, energetic jets of matter to shoot out into space. An international physics team with the participation of the Helmholtz-Zentrum Dresden-Rossendorf (HZDR) has now proposed a new concept that could allow some of these extreme processes to be studied in the laboratory in the future: A special setup of two high-intensity laser beams could create conditions similar to those found near neutron stars. In the discovered process, an antimatter jet is generated and accelerated very efficiently. The experts present their concept in the journal *Communications Physics*



At the European XFEL in Schenefeld near Hamburg, researchers from Helmholtz-Zentrum Dresden-Rossendorf are setting up the Helmholtz International Beamline for Extreme Fields (HIBEF). For this purpose, the Dresden scientists are installing two high-power lasers at the HED (High Energy Density) station. Credit: European XFEL / Jan Hosan

The basis of the new concept is a tiny block of plastic, crisscrossed by micrometer-fine channels. It acts as a target for two lasers. These simultaneously fire ultra-strong pulses at the block, one from the right, the other from the left—the block is literally taken by laser pincers. "When the laser pulses penetrate the sample, each of them accelerates a cloud of extremely fast electrons," explains HZDR physicist Toma Toncian. "These two electron clouds then race toward each other with full force, interacting with the laser propagating in the opposite direction." The following collision is so violent that it produces an extremely large number of gamma quanta—light particles with an energy even higher than that of X-rays.

The swarm of gamma quanta is so dense that the light particles inevitably collide with each other. And then something crazy happens: According to Einstein's famous formula  $E=mc^2$ , light energy can transform into matter. In this case, mainly electron-positron pairs should be created. Positrons are the antiparticles of electrons. What makes this process special is that "very strong magnetic fields accompany it," describes project leader Alexey Arefiev, a physicist at the University of California at San Diego. "These magnetic fields can focus the positrons into a beam and accelerate them strongly." In numbers: Over a distance of just 50 micrometers, the particles should reach an energy of one gigaelectronvolt (GeV) - a size that usually requires a full-grown particle accelerator.



## Successful computer simulation

To see whether the unusual idea could work, the team tested it in an elaborate computer simulation. The results are encouraging; in principle, the concept should be feasible. "I was surprised that the positrons that were created in the end were formed into a high-energy and bundled beam in the simulation," Arefiev says happily.

What's more, the new method should be much more efficient than previous ideas, in which only a single laser pulse is fired at an individual target: According to the simulation, the "laser double strike" should be able to generate up to 100,000 times more positrons than the single-treatment concept.

"Also, in our case, the lasers would not have to be quite as powerful as in other concepts," Toncian explains. "This would probably make the idea easier to put into practice." However, there are only few places in the world where the method could be implemented. The most suitable would be ELI-NP (Extreme Light Infrastructure Nuclear Physics), a unique laser facility in Romania, largely funded by the European Union. It has two ultra-powerful lasers that can fire simultaneously at a target—the basic requirement for the new method.

### First tests in Hamburg

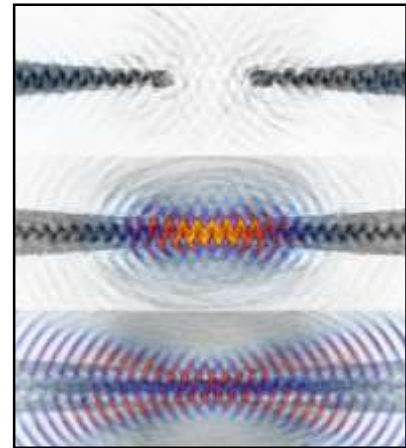
Essential preliminary tests, however, could take place in Hamburg beforehand: The European XFEL, the most powerful X-ray laser in the world, is located there. The HZDR plays a major role in this large-scale facility: It leads a user consortium called HIBEF, which has been targeting matter in extreme states for some time. "At HIBEF, colleagues from HZDR, together with the Helmholtz Institute in Jena, are developing a platform that can be used to experimentally test whether the magnetic fields actually form as our simulations predict," explains Toma Toncian. "This should be easy to analyze with the powerful X-ray flashes of the European XFEL."

For astrophysics as well as nuclear physics, the new technique could be exceedingly useful. After all, some extreme processes in space are also likely to produce vast quantities of gamma quanta, which then quickly materialize again into high-energy pairs. "Such processes are likely to take place, among others, in the magnetosphere of pulsars, i.e. of rapidly rotating neutron stars," says Alexey Arefiev. "With our new concept, such phenomena could be simulated in the laboratory, at least to some extent, which would then allow us to understand them better."

**More information:** Yutong He et al, Dominance of  $\gamma$ - $\gamma$  electron-positron pair creation in a plasma driven by high-intensity lasers, *Communications Physics* (2021). DOI: [10.1038/s42005-021-00636-x](https://doi.org/10.1038/s42005-021-00636-x)

**Journal information:** [Communications Physics](https://phys.org/news/2021-07-antimatter-laser-pincers.html)

<https://phys.org/news/2021-07-antimatter-laser-pincers.html>



The images show how the density of the plasma (shown here in black and white) evolves over time during irradiation with two counter-propagating high-intensity laser pulses. The high-energy radiation produced during this process is highlighted in color as gamma photon density. These photons are so close together from the time the two lasers clashed that they can collide to create matter-antimatter pairs. Credit: Toma Toncian

## Research finds novel coronavirus, related to SARS-Cov-2 that causes Covid-19, in horseshoe bats in UK

*The virus could mutate if a Covid-19 infected human passes it to an infected bat, the researchers said. They also asked anyone who comes into contact with bats or their droppings to wear appropriate personal protective equipment*

*By Srivatsan K C, Edited By Avik Roy*

New Delhi: A novel coronavirus, related to SARS-CoV-2 that causes Covid-19 in humans, has been detected in horseshoe bats in the United Kingdom, a new collaborative research from the University of East Anglia, Zoological Society of London (ZSL) and Public Health England (PHE) showed. The researchers, however, said that there is no evidence that the virus has been transmitted to humans, or that it could in future, unless it mutates.

The new virus falls within the subgroup of coronaviruses called sarbecoviruses which contains both SARS-CoV-2, that causes Covid-19, and SARS-CoV, which was responsible for the 2003 SARS outbreak.

Researchers from the University of East Anglia collected faecal samples from more than 50 lesser horseshoe bats from places like Somerset, Gloucestershire and Wales. The samples were then sent to the Public Health England for viral analysis, the university's website said.



The genome sequencing of the bat samples has detected the presence of novel coronavirus in one of the samples.(Reuters)

The genome sequencing of the bat samples has detected the presence of novel coronavirus in one of the samples. It has been named 'RhGB01' by the team. The sarbecovirus, SARS-related coronavirus, has been found for the first time in a lesser horseshoe bat and it is also the first to be discovered in the United Kingdom.

Also, the researchers said that the bats would have "almost certainly" harboured the virus for a very long time and this is the first time that this has been tested and so has been found now. Unless the virus mutates, they are unlikely to pose a direct risk to humans, they added.

The virus could mutate if a Covid-19 infected human passes it to an infected bat, the researchers said. They also asked anyone who comes into contact with bats or their droppings to wear appropriate personal protective equipment (PPE).

"Horseshoe bats are found across Europe, Africa, Asia and Australia and the bats we tested lie at the western extreme of their range," said professor Diana Bell of the University of East Anglia. "Our research extends both the geographic and species ranges of these types of viruses and suggests their more widespread presence across more than 90 species of horseshoe bats," she added.

"Our findings highlight the need for robust genotype testing for these types of viruses in bat populations around the world. And it raises an important question about what other animals carry these types of viruses," she further said.

“Our findings highlight that the natural distribution of sarbecoviruses and opportunities for recombination through intermediate host co-infection have been underestimated,” said Prof Andrew Cunningham from the Zoological Society of London.

Ensuring that the UK virus is not a threat to humans, Cunningham said, “But the problem is that any bat harbouring a SARS-like coronavirus can act as a melting pot for virus mutation.”

“Preventing transmission of SARS-CoV-2 from humans to bats, and hence reducing opportunities for virus mutation, is critical with the current global mass vaccination campaign against this virus,” Prof Cunningham further said.

The closest relative to the virus was found to be one discovered in a Blasius’ bat from Bulgaria in 2008, further analysis of the virus in comparison with others found in horseshoe bat species in China, southeast Asia and Europe showed.

<https://www.hindustantimes.com/world-news/research-finds-novel-coronavirus-related-to-sars-cov-2-in-horseshoe-bats-in-uk-101626795475866.html>

