

Feb
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 : 38 23 फरवरी 2021

Vol.: 46 Issue : 38 23 February 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.
DRDO News		1-10
DRDO Technology News		1-10
1.	Raksha Mantri Shri Rajnath Singh inaugurates DRDO Skill Development Centre for Fire Safety Training	1
2.	रक्षा मंत्री श्री राजनाथ सिंह ने डीआरडीओ के अग्नि सुरक्षा प्रशिक्षण के लिए कौशल विकास केंद्र का उद्घाटन किया	2
3.	Successful Launches of VL-SRSAM Missile System	4
4.	DRDO successfully launches VL-SRSAM twice	5
5.	DRDO conducts first launch of the VL-SRSAM	6
6.	डीआरडीओ ने सतह से हवा में मार करने वाली स्वदेशी मिसाइल का किया सफल परीक्षण	7
7.	51% of new Tejas fighter jets to have indigenous Uttam radars, says DRDO Chairman	8
8.	India to equip its Tejas Mk-1A Fighter Jets with homegrown 'Uttam' Radars — Reports	9
9.	U'Khand deluge: Home Secy directs DRDO, state to keep constant watch	10
Defence News		11-21
Defence Strategic National/International		11-21
10.	Prime Minister delivers keynote address at webinar on effective implementation of Budget provisions in defence sector;	11
11.	वायुसेना प्रमुख का बांग्लादेश दौरा	13
12.	CAS visit to Bangladesh	14
13.	Rear Admiral Atul Anand, VSM takes over as Flag Officer Commanding Maharashtra Naval Area (FOMA)	14
14.	रियर एडमिरल अतुल आनंद, वीएसएम ने महाराष्ट्र नौसेना क्षेत्र के फ्लैग ऑफिसर कमांडिंग (एफओएमए) के रूप में कार्यभार संभाला	15
15.	₹70,221 crore reserved in defence budget for domestic procurement, says Rajnath Singh	16
16.	Lt Gen B S Raju to be new Director General of Military Operations of Indian Army	17
17.	Hindustan Shipyard to build 5 naval support vessels with Turkish help	18
18.	India, France to hold naval drills	19
19.	Indian Navy completes one of largest-ever war drills to counter China in Indian Ocean Region	20
Science & Technology News		21-27
20.	Researchers create 'beautiful marriage' of quantum enemies	21
21.	Lack of symmetry in qubits can't fix errors in quantum computing, might explain matter/antimatter	23
22.	New catalyst could enable better lithium-sulfur batteries, power next-gen electronics	25
COVID-19 Research News		26-27
23.	Blood thinners may protect against COVID-19 complications	26



**Press Information Bureau
Government of India**

Ministry of Defence

Mon, 22 Feb 2021 6:40PM

Raksha Mantri Shri Rajnath Singh inaugurates DRDO Skill Development Centre for Fire Safety Training

Raksha Mantri Shri Rajnath Singh has inaugurated Skill Development Centre (SDC) for Fire Safety Training of Defence Research and Development Organisation (DRDO) at Pilkhuwa in Uttar Pradesh through virtual mode on February 22, 2021. The facility, created by Delhi based DRDO laboratory Centre for Fire, Explosive and Environment Safety (CFEES); is aimed at developing trained human resources, fire safety technology and products to save precious human lives and valued assets.

In his inaugural address, Raksha Mantri congratulated DRDO for this significant step in the field of fire safety. He emphasised that in any fire tragedy the nation loses precious lives and valuable assets. To prevent such losses, this Training Centre will go a long way in ensuring quality training to the personnel and preventing such mishaps.

The first of its kind in India, the SDC has been created by adopting state of art technology and setting up of simulation systems for validation of fire at realistic scale in order to meet the challenges and enhance the skills of Defence Fire Service Personnel and combatants from the Armed Forces. Spread in 24 acres area at Pilkhuwa, the DRDO facility would be utilised for imparting fire prevention and fire-fighting training to the Fire Service personnel of Indian Armed Forces, DRDO, Ordnance Factories, Coast Guard and defence undertakings. In addition, trainees from Bhutan, Sri Lanka and other neighbouring countries would also be imparted training at the Centre. The facility is likely to strengthen their knowledge and fire-fighting skills and prepare them for handling fire threats in the emerging high-tech environment. Training of fire personnel in such high standard facilities will result in high levels of fire safety awareness and implementation of safety provisions in defence establishments thus leading to minimisation of losses and property due to fire accidents.

Constructed as per International standards, the SDC has four bays with fire-fighting and rescue appliances such as hydraulic platform, air crash fire tender and emergency rescue tender, which will be used for imparting practical/hands-on training besides an important life-saving personal protective equipment for the fire fighters. The Centre has a Fire Drill Tower with emergency escape chute which would be used for simulation of fire in high rise buildings, Breathing Apparatus Training Facility, a Model Fire Station housing specialised fire-fighting and rescue appliances, LPG Petroleum Tank Farm Simulator, Fire Suit Test and Evaluation facility, a Hostel and Transit Facility and Administrative and Training Facility. The facility would be maintained by



CFEES, which carries out safety audits, training activities and R&D activities in the area of fire, explosive & environment safety. Every year 400-500 personnel are being trained by CFEES in modules customised to the needs of Ministry of Defence (MoD) establishments.

Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy in his address appreciated the endeavor of the CFEES towards indigenisation of fire safety equipment and test facilities for evaluation of fire safety products. He stated that the establishment of Skill Development Centre is another step initiated by DRDO towards endorsing Prime Minister Shri Narendra Modi's call for 'Atmanirbhar Bharat'.

Director General Human Resources Shri K S Varaprasad, Director General System Analysis & Modelling Ms Nabanita Radhakrishnan, Director CFEES, Shri Rajiv Narang and other dignitaries of MoD were also present on the occasion.

<https://pib.gov.in/PressReleasePage.aspx?PRID=169997>



Press Information Bureau
Government of India

रक्षा मंत्रालय

Mon, 22 Feb 2021 6:40PM

रक्षा मंत्री श्री राजनाथ सिंह ने डीआरडीओ के अग्नि सुरक्षा प्रशिक्षण के लिए कौशल विकास केंद्र का उद्घाटन किया

रक्षा मंत्री श्री राजनाथ सिंह ने दिनांक 22 फरवरी, 2021 को वर्चुअल माध्यम से उत्तर प्रदेश के पिलखुवा में रक्षा अनुसंधान और विकास संगठन-डीआरडीओ के अग्नि सुरक्षा प्रशिक्षण के लिए कौशल विकास केंद्र (एसडीसी) का उद्घाटन किया। दिल्ली स्थित डीआरडीओ अग्नि, विस्फोटक और पर्यावरण सुरक्षा प्रयोगशाला केन्द्र-सी एफ ई ई एस द्वारा बनाई गई इस सुविधा का उद्देश्य प्रशिक्षित मानव संसाधन, अग्नि सुरक्षा प्रौद्योगिकी और उत्पादों को विकसित करना है ताकि जानमाल के नुकसान को बचाया जा सके।

अपने उद्घाटन भाषण में रक्षा मंत्री ने रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) को अग्नि सुरक्षा के क्षेत्र में इस महत्वपूर्ण कदम के लिए बधाई दी। उन्होंने इस बात पर जोर दिया कि किसी भी अग्निकांड में हमारा राष्ट्र बहुमूल्य जीवन



और बहुमूल्य संपत्ति खो देता है। इस तरह के नुकसान को रोकने के लिए यह प्रशिक्षण केंद्र कार्मिकों को गुणवत्तापूर्ण प्रशिक्षण सुनिश्चित करने और ऐसी दुर्घटनाओं को रोकने में एक लंबा रास्ता तय करेगा।

भारत में अपनी तरह का यह पहला कौशल विकास केंद्र (एसडीसी) अत्याधुनिक प्रौद्योगिकी अपनाकर और यथार्थवादी पैमाने पर अग्नि के दृष्टिकोण से सिमुलेशन सिस्टम स्थापित करके बनाया गया है ताकि चुनौतियों का सामना किया जा सके और सशस्त्र बलों से रक्षा अग्निशमन सेवा के कार्मिकों और लड़ाकों के कौशल को बढ़ाया जा सके। पिलखुवा में 24 एकड़ क्षेत्र में फैली रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) की इस सुविधा का उपयोग अग्निशमन रोकथाम और अग्निशमन प्रशिक्षण प्रदान करने के लिए भारतीय सशस्त्र बलों, डीआरडीओ, आयुध कारखानों, तटरक्षक बल और रक्षा उपक्रमों के अग्निशमन

सेवा कर्मियों द्वारा किया जाएगा। इसके अलावा भूटान, श्रीलंका और अन्य पड़ोसी देशों के प्रशिक्षुओं को भी इस केंद्र में प्रशिक्षण दिया जाएगा। यह संभावना है कि यह सुविधा उनके ज्ञान और अग्निशमन कौशल को मजबूत करने और उभरते उच्च तकनीकी वातावरण में आग के खतरों से निपटने के लिए उन्हें तैयार करेगी। ऐसी उच्च स्तरीय सुविधाओं में अग्निशमन कर्मियों के प्रशिक्षण से रक्षा प्रतिष्ठानों में उच्च स्तरीय अग्नि सुरक्षा जागरूकता एवं सुरक्षा संबंधी प्रावधानों का कार्यान्वयन होगा जिसके परिणामस्वरूप अग्नि दुर्घटनाओं के कारण होने वाले नुकसान और संपत्ति को कम से कम किया जा सकेगा ।

कौशल विकास केंद्र (एसडीसी) के पास अंतर्राष्ट्रीय मानकों के अनुसार निर्मित चार बे हैं जिनमें हाइड्रोलिक प्लेटफार्म, एयर क्रैश फायर टेंडर और आपातकालीन बचाव टेंडर जैसे अग्निशमन और बचाव उपकरण हैं, जिनका उपयोग अग्निशमन कर्मियों के लिए एक महत्वपूर्ण जीवन रक्षक व्यक्तिगत सुरक्षा उपकरण के अलावा व्यावहारिक/ हाथ से प्रशिक्षण देने के लिए किया जाएगा । केंद्र के पास एक आपातकालीन पलायन शूट वाला एक फायर ड्रिल टॉवर है जिसका उपयोग ऊंची इमारतों में आग के मिथ्याभास, ब्रीदिंग एपराटस ट्रेनिंग फैसिलिटी, विशेष अग्निशमन और बचाव उपकरणों समेत एक मॉडल फायर स्टेशन, एलपीजी पेट्रोलियम टैंक फार्म सिम्युलेटर, फायर सूट टेस्ट और मूल्यांकन सुविधा, एक छात्रावास और ट्रांजिट सुविधा और प्रशासनिक और प्रशिक्षण सुविधा है। इस सुविधा का सेंटर फॉर फायर, एक्सप्लोसिव एंड एनवायरनमेंट सेफ्टी (सीएफईईएस) द्वारा रखरखाव किया जाएगा, जो आग, विस्फोटक और पर्यावरण सुरक्षा के क्षेत्र में सुरक्षा ऑडिट, प्रशिक्षण गतिविधियों और अनुसंधान और विकास गतिविधियों को अंजाम देती है। प्रत्येक वर्ष 400-500 कर्मियों को रक्षा मंत्रालय के प्रतिष्ठानों की आवश्यकताओं के अनुकूल मॉड्यूल में सेंटर फॉर फायर, एक्सप्लोसिव एंड एनवायरनमेंट सेफ्टी (सीएफईईएस) द्वारा प्रशिक्षित किया जा रहा है ।

रक्षा अनुसंधान एवं विकास विभाग के सचिव तथा रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के अध्यक्ष डॉ. जी सतीश रेड्डी ने अपने संबोधन में अग्नि सुरक्षा उपकरणों के स्वदेशीकरण और अग्नि सुरक्षा उत्पादों के मूल्यांकन के लिए परीक्षण सुविधाओं की दिशा में सेंटर फॉर फायर, एक्सप्लोसिव एंड एनवायरनमेंट सेफ्टी (सीएफईईएस) के प्रयास की सराहना की। उन्होंने कहा कि कौशल विकास केंद्र (एसडीसी) की स्थापना रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) द्वारा प्रधानमंत्री श्री नरेंद्र मोदी के 'आत्मनिर्भर भारत' के आह्वान की पुष्टि करने की दिशा में शुरू किया गया एक और कदम है ।

इस अवसर पर महानिदेशक मानव संसाधन श्री के एस वरप्रसाद, महानिदेशक प्रणाली विश्लेषण एवं मॉडलिंग सुश्री नवनीता राधाकृष्णन, निदेशक सीएफईईएस श्री राजीव नारंग और रक्षा मंत्रालय के अन्य गणमान्य लोग भी उपस्थित थे।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1700074>



Successful Launches of VL-SRSAM Missile System

Defence Research & Development Organisation (DRDO) conducted two successful launches of Vertical Launch Short Range Surface to Air Missile (VL-SRSAM).

The launches were carried out today from a static vertical launcher from Integrated Test Range (ITR), Chandipur off the coast of Odisha. Indigenously designed and developed by DRDO for Indian Navy, VL-SRSAM is meant for neutralizing various aerial threats at close ranges including sea-skimming targets. The current launches were carried out for demonstration of vertical launch capability as part of its maiden launch campaign. On both occasions, the missiles intercepted the simulated targets with pinpoint accuracy. The missiles were tested for minimum and maximum range. VL-SRSAM with Weapon Control System (WCS) were deployed during the trials.

The launches were monitored by senior scientists from various DRDO labs involved in the design and development of the system such as DRDL, RCI, Hyderabad and R&D Engineers, Pune.

During the test launches, flight path and vehicle performance parameters were monitored using flight data, captured by various Range instruments such as Radar, EOTS and Telemetry systems deployed by ITR, Chandipur.

The present trials have proved the effectiveness of the weapon system and few more trials will be conducted shortly before deployment on Indian Naval ships. Once deployed, the VL-SRSAM system will prove to be a force multiplier for the Indian Navy.

Raksha Mantri Shri Rajnath Singh congratulated DRDO on the successful trials. Dr G Satheesh Reddy, Secretary DD R&D & Chairman DRDO congratulated the teams involved in successful flight test of VL-SRSAM Missile System.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1700039>



DRDO successfully launches VL-SRSAM twice

The launches were carried out from a static vertical launcher from Integrated Test Range (ITR), Chandipur

Balasore (Odisha): The Defence Research and Development Organisation (DRDO) on Monday conducted two successful launches of vertical launch short range surface-to-air missile (VL-SRSAM) off the Odisha coast in Balasore.

The launches were carried out from a static vertical launcher from Integrated Test Range (ITR), Chandipur.

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

The launches were carried out for demonstration of vertical launch capability as part of its maiden launch campaign.

On both the occasions, the missiles intercepted the simulated targets with pinpoint accuracy. They were tested for minimum and maximum range.

The VL-SRSAM with weapon control system (WCS) was deployed during the trials.

The launches were monitored by senior scientists from various DRDO labs involved in the design and development such as DRDL, RCI, Hyderabad and R&D Engineers, Pune.

The flight path and vehicle performance parameters were monitored using flight data, captured by various range instruments such as Radar, EOTS and telemetry systems deployed by the ITR, Chandipur.

The trials have proved the effectiveness of the weapon system and few more trials will be conducted shortly before deployment on the ships.

Once deployed, the VL-SRSAM system will prove to be a force multiplier for the Navy.

Defence Minister Rajnath Singh congratulated DRDO on the successful trials. Dr. G Satheesh Reddy, Secretary, Department of Defence R&D and Chairman, DRDO congratulated the teams involved in the successful flight test of VL-SRSAM Missile System.

Taking to twitter, Odisha Chief Minister Naveen Patnaik said, “Congratulate @DRDO_India on the successful launch of indigenously developed vertical launch short range surface-to-air-missile (VL-SRSAM)@indiannavy, off the coast of #Odisha.” As a safety measure, the Balasore district administration in consultation with the ITR authority at Chandipur temporarily evacuated 6,322 people residing in five hamlets within 2.5-km radius of the launch pad.

They were put up at the nearest shelter centres in the morning, a revenue official said.

<https://www.thehindu.com/sci-tech/science/drdo-successfully-launches-vl-srsam-twice/article33906926.ece>



Indigenously designed and developed Vertical Launch Short Range Surface to Air Missile (VL-SRSAM) by DRDO for Indian Navy underwent two successful launches on February 22, 2021. Twitter/@DRDO_India

DRDO conducts first launch of the VL-SRSAM

The missile, based on the 'Astra' platform, would augment the Navy's capabilities

The Defence Research & Development Organisation (DRDO) conducted its maiden launch of the Vertical Launch Short Range Surface to Air Missile (VL-SRSAM) on Monday from the Integrated Test Range (ITR) off the Odisha coast.

Based on the Astra missile, the VL-SRSAM was successfully launched from a static vertical launcher. Like the Astra air-to-air missile, it is intended to neutralise aerial threats at close range including sea-skimming targets that could be a threat to Naval assets. The VL-SRSAM could replace the Barak-1 missiles, with a 2019 Request For Proposal from the Navy stating it was seeking to procure a replacement for the Israeli missile.



The VL-SRSAM in flight | DRDO

The current launches were carried out for demonstration of vertical launch capability as part of its maiden launch campaign, DRDO said. On both occasions, the missiles intercepted the simulated targets with pinpoint accuracy. The missiles were tested for minimum and maximum range. VL-SRSAM with Weapon Control System (WCS) were deployed during the trials.

The launches were monitored by senior scientists from various DRDO labs involved in the design and development of the system such as DRDL, RCI, Hyderabad and R&D Engineers, Pune.

During the test launches, flight path and vehicle performance parameters were monitored using flight data, captured by various Range instruments such as Radar, EOTS and Telemetry systems deployed by ITR, Chandipur.

The present trials have proved the effectiveness of the weapon system and few more trials will be conducted shortly before deployment on Indian Naval ships. Once deployed, the VL-SRSAM system will prove to be a force multiplier for the Indian Navy.

Defence Minister Rajnath Singh congratulated DRDO on the successful trials. Dr G. Satheesh Reddy, Secretary DD R&D & Chairman DRDO congratulated the teams involved in successful flight test of VL-SRSAM Missile System.

Several countries have converted their air-to-air missiles to other formats: The US converted the AIM-7 Sparrow into the RIM-7 Sea Sparrow, the French MICA missile has a land-launched variant called VL-MICA.

The Astra missile has various operational ranges, from 110km with the MK 1 (expected to be integrated onto the indigenously developed HAL Tejas) to the 350km Mk 3 under development.

<https://www.theweek.in/news/india/2021/02/22/drdo-conducts-first-launch-of-vl-srsam.html>

डीआरडीओ ने सतह से हवा में मार करने वाली स्वदेशी मिसाइल का किया सफल परीक्षण

By Kuldeep Singh

भारत में ही विकसित कम दूरी की सतह से हवा में मार करने वाली मिसाइल (वीएल-एसआरएसएए) का सोमवार को दो बार सफल परीक्षण किया गया। रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने बताया कि बिलकुल पतली मिसाइल किसी भी आकाशीय खतरे को कम दूरी में समाप्त करने में सक्षम है और इसे नौसेना में शामिल किया जाएगा।

उन्होंने कहा कि सोमवार दोपहर को चांदीपुर स्थित एकीकृत परीक्षण रेंज से जमीन से मोबाइल लॉन्चर के जरिये इसका परीक्षण किया गया। उन्होंने कहा कि मिसाइल को लॉन्च करने से लेकर बंगाल की खाड़ी में लक्ष्य को भेदने तक कई रडार और इलेक्ट्रो ऑप्टिक यंत्रों से इसकी



निगरानी की गई। सूत्रों ने कहा कि सुरक्षा के मद्देनजर परीक्षण रेंज के अधिकारियों ने बालासोर के जिला प्रशासन से तालमेल कर 6322 लोगों को इलाके के ढाई किलोमीटर की परिधि से खाली करा लिया गया।

<https://www.amarujala.com/india-news/drdo-successfully-test-fired-indigenous-surface-to-air-missile-vl-srsam-twice>

51% of new Tejas fighter jets to have indigenous Uttam radars, says DRDO Chairman

Uttam is an AESA radar that is capable of tracking targets and taking hi-resolution pictures required for reconnaissance missions

Keeping in line with the Indian government's push for indigenous components in defence equipment, about 51 per cent of the new LCA Tejas fighters to be inducted into the Indian Air Force (IAF) would have the locally-developed Uttam radars. The Uttam radars will be replacing Israeli radars that are there in the first batch of these aircraft.

This is being seen as a boost to indigenous defence technologies and would increase the Hindustan Aeronautics Limited's (HAL) role when it comes to Tejas aircraft.

It is to be noted that about 123 Tejas aircraft are going to be inducted into the IAF. The IAF will get around 40 in initial and final operational clearance configurations and 83 [Tejas](#) Mark-1A aircraft ordered earlier this month. The first 40 will have Israeli mechanical radars and 83 Mk-1A fighters will get Active electronically scanned array (AESA) radars.



This is being seen as a boost to indigenous defence technologies. (File image)

The Times of India quoted Defence Research and Development Organisation's Chairman, Sateesh Reddy, as saying, "We will have the Uttam radar from the 21st Tejas Mk-1A to be produced. Uttam has performed better than anticipated in the trials so far."

Reddy further added that they had signed an MoU with the HAL regarding the same. About 63 of the 83 therefore will be indigenous Uttam radars developed by the DRDO lab, LRDE (Electronics and Radar Development Establishment).

Uttam is an AESA radar that is capable of tracking targets and taking hi-resolution pictures required for reconnaissance missions. The project director of Uttam, Seshagiri P, said that it was being tested on two LCAs and one executive jet.

The Times of India quoted him as saying, "On the LCAs, testing is for air-to-air mode at present. The range of the radar should be almost commensurate to launch a BVR (beyond visual range) weapon; it's specified to be so. But we're getting a range that's better than that. We are a couple of sorties away from starting a joint evaluation. After this, it will be ready for user evaluation."

<https://www.dnaindia.com/india/report-51-percent-of-new-tejas-fighter-jets-to-have-indigenous-uttam-radars-says-drdo-chairman-2876866>

India to equip its Tejas Mk-1A Fighter Jets with homegrown ‘Uttam’ Radars — Reports

India’s DRDO has said that Tejas Mk-1A fighters will have the homegrown ‘Uttam’ radar, according to reports. The move is in sync with the Modi government’s Atmanirbhar Bharat (self-reliant India) initiative

By Aakriti Sharma

The first batch of Tejas fighter jets will be equipped with the Uttam radars. Of the 123 Tejas fighters that the Indian Air Force will get, 40 will have Israel’s mechanical radars and 83 will have Active Electronically Scanned Array (AESA) radars.

Defence Research and Development Organisation (DRDO) chairman Sateesh Reddy has told *Times of India*: “We will have the Uttam radar from the 21st Tejas Mk-1A.” This means 20 of the 83 Tejas will have Israeli AESA radars and the 63 will be equipped with Uttam radars. He said Uttam has performed better than anticipated in the trials.



India’s Tejas fighter

Produced by Electronics and Radar Development Establishment (LRDE), a DRDO lab in Bengaluru, Uttam is a state-of-the-art AESA radar, which can track multiple targets and take high-resolution pictures.

Uttam’s project director Seshagiri P has said that the radar is being tested on two Light Combat Aircraft (LCA) and one executive jet. He told TOI that on the LCAs, testing is for air-to-air mode at present.

“The range of the radar should be almost commensurate to launch a BVR (beyond-visual-range) weapon; it’s specified to be so. But we’re getting a range that’s better than that. We are a couple of sorties away from starting a joint evaluation. After this, it will be ready for user evaluation,” he said.

Uttam’s three basic modes – air-to-air, air-to-sea, and air-to-ground – have been tested on the executive jet. “The same needs to be ported on LCA and checked for performance. There’s a fourth mode called navigation terrain avoidance, weather mode (rain-bearing clouds),” he said.

Producer of Tejas, Hindustan Aeronautics Limited’s (HAL) Chairman and Managing Director R Madhavan has said they have placed orders for 20 Israeli AESA radars and Uttam should be ready shortly thereafter.

He said their target is to increase indigenous content in Tejas from 62% to 65%, and this will help in achieving that goal. The move is in tandem with the government’s push for promoting indigenously-developed defense equipment.

<https://eurasianimes.com/india-to-equip-its-tejas-mk-1a-fighter-jets-with-homegrown-uttam-radars-reports/>

U’Khand deluge: Home Secy directs DRDO, state to keep constant watch

New Delhi: Union Home Secretary Ajay Bhalla on Monday directed the DRDO and the Uttarakhand administration to keep a constant watch on the situation in Chamoli district where flash floods triggered by an avalanche wreaked havoc earlier this month, assuring all assistance from the Central agencies to the state government.

In a multi-agency meeting, Bhalla also reviewed the status of a natural lake formed after the flash floods in the upper catchment of the Rishiganga river in Chamoli district.

The Home Secretary received information regarding reports collected by a joint team of Indo-Tibetan Border Police (ITBP) and the Defence Research and Development Organisation (DRDO), which recently completed inspection of the natural lake formed in the Murenda area.

The lake’s frontage is approximately 90 to 100 metres and its length is around 500 metres.

Uttarakhand Chief Secretary, who joined the meeting virtually with his team, informed that based on the physical assessment of the lake made on site by multiple scientific agencies and satellite data, there is no imminent danger as the volume of water is less than expected which is flowing through a natural channel that has been widened.

Bhalla reviewed the action being taken to allow for more flow of water and removal of some obstructions which have formed at the site of the lake.

Both the DRDO and the state administration have been asked to keep watch on the situation in coordination with the Central and state agencies, an MHA statement said.

The Home Secretary also assured continued help and assistance from Central agencies to the state government as and when required to handle the situation arising out of the temporary obstruction.

The meeting was also attended by the Director General of ITBP, Member Secretary of National Disaster Management Authority (NDMA), DG National Disaster Response Force (NDRF), DRDO Chairman, senior officials of the Ministry of Power, officers from the IDS headquarters, and scientists from various Central agencies along with other senior officials of the Union Home Ministry.

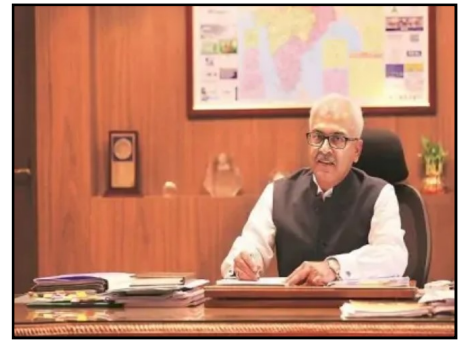
The deadly flash floods triggered by a snow avalanche on February 7 had washed away a 520 MW downstream NTPC hydro power project at Tapovan, covering an approximately 14 sq km area. The lake was formed after the flash floods.

Another team of the Geological Survey of India (GSI) and the Wadia Institute of Himalayan Geology is also on the spot since Saturday to inspect the lake.

Nearly 204 persons went missing after the deluge in the Rishiganga river that also completely destroyed the 13.2 MW Rishiganga project.

Meanwhile, scientists and other agencies are continuously observing the Rishiganga lake at a height of 14,000 feet in Chamoli district.

<https://www.siasat.com/ukhand-deluge-home-secy-directs-drdo-state-to-keep-constant-watch-2095949/>



Defence Strategic: National/International



Press Information Bureau
Government of India

Ministry of Defence

Mon, 22 Feb 2021 6:34PM

Prime Minister delivers keynote address at webinar on effective implementation of Budget provisions in defence sector;

Government aims to ensure transparency, predictability and Ease of Doing Business in defence sector, says Shri Narendra Modi

Raksha Mantri hails Union Budget as crucial step to achieve self-reliance in defence production; Rs 70,221 crore outlay for domestic defence procurement

Government actively promoting export-oriented defence industry under 'Make in India, Make for the World' mantra, says Shri Rajnath Singh

Prime Minister Shri Narendra Modi delivered a keynote address at a 'Webinar on Budget Announcements 2021-22: Galvanising Efforts for Atmanirbhar Bharat' on effective implementation of the Union Budget provisions in the defence sector in New Delhi on February 22, 2021. The Prime Minister said, the webinar assumes great significance as it is focusing on the important issue of making the country's defence sector self-reliant.

Shri Modi said, since 2014, it has been the endeavor of the Government to move forward in the defence sector with transparency, predictability and ease of doing business. He said, the Government has taken steps to bring about de-licensing, de-regulation, export promotion, foreign investment liberalisation, etc.



The Prime Minister said that his government has relied on the capabilities of our engineers and scientists on developing the Tejas fighter aircraft and today Tejas is flying gracefully in the skies. A few weeks back, an order worth Rs. 48,000 crore was placed for Tejas.

The Prime Minister added that India has made a list of 101 important items related to defence, which can be manufactured indigenously with the help of our local industries. He said, a timeline has been set so that the domestic industry can plan to meet these requirements.

The Prime Minister said it is called a negative list in the official language but it is a positive list in the language of self-reliance. This is the positive list on which the country's manufacturing capacity is going to increase, that will generate employment and will reduce India's dependence on foreign countries for our defence needs.

In his opening remarks, Raksha Mantri Shri Rajnath Singh hailed Union Budget as a healthy mix of promise, potential and progress. He stressed that forward-looking agenda of the Budget will provide support to the defence and security of the country.

Shri Rajnath Singh said, “The Budget focuses on accelerating economic growth and creating job opportunities to reverse the adverse impact of COVID-19 pandemic with ‘Atmanirbhar Bharat’ at the core.”

The Raksha Mantri stated that the vision of self-reliant India of the Government defined the approach towards the defence sector in this year’s Budget. The Defence Budget has seen an unprecedented increase of 18.75 per cent in capital outlay over and above last financial year (FY) and 30 per cent the year before, which is the highest in the last one and a half decade.

Shri Rajnath Singh termed threat perceptions, aspirations, capacity & capability development initiatives and technological advancements as major factors that drive procurement decisions in defence. He underlined the close cooperation between the Armed Forces and manufacturers to reduce the gap between the aspirations of the Armed Forces and actual delivery by the manufacturers.

The Raksha Mantri stated that ‘Make in India, Make for the World’ is the only mantra to stay abreast with latest technological advancements and remain frugal at the same time. Emphasising that the defence industry can only thrive by going global, he said, the Government is actively promoting not only domestic manufacturing but also an export-oriented defence industry.

“The most important factor that is going to drive the domestic industry is ‘Atmanirbhar Bharat’,” Raksha Mantri underlined, saying that the Government is willing to deal with higher initial costs to build the defence industry for the future. He added that the focus of the Government is on ‘Ease of Doing Business’ to encourage foreign Original Equipment Manufacturers (OEMs) to set up manufacturing units in India, develop Joint Ventures with domestic defence sector.

Shri Rajnath Singh listed out number of initiatives taken by the Government to promote domestic defence manufacturing. He shed light on the plans to spend \$130 billion on military modernisation in the next five years, mentioning about the recent order of 83 indigenously designed and developed Light Combat Aircraft MK 1A, Tejas, worth Rs 48,000 crore, awarded to Hindustan Aeronautics Limited (HAL) during the recently held Aero India 2021. He added that the contract for indigenously designed Light Combat Helicopter is likely to be signed soon.

The Raksha Mantri also touched upon the bifurcation of capital procurement budget into domestic and foreign capital procurement routes to ensure more procurement from domestic industry. “The Ministry has planned to invest about 63 per cent of the outlay for 2021-22 on domestic procurement, i.e., about Rs 70,221 crore for domestic defence procurement. This increase will have a positive impact on enhanced domestic procurement, having multiplier effect on our industries including MSMEs and Start-ups. It would also increase the employment in defence sector,” he said.

The Raksha Mantri added that during the current financial year, Rs 75,000 crore worth Acceptance of Necessity (AoN) has been accorded, of which 87 per cent relate to ‘Make in India’. He stated that the Ministry is also working on bringing down the delays in timelines of capital acquisition.

Shri Rajnath Singh added that MoD has planned to channelise about Rs 1,000 crore during 2021-22 for procurement from Innovations for Defence Excellence (iDEX) start-ups to give a major boost to innovative defence technology and support start-ups base in the country.

The Raksha Mantri said, the initiatives taken by the Government have resulted in staggering 700 per cent growth in defence exports in the last six years. India entered into the list of top 25 exporters in the world, he said, citing data published by Stockholm International Peace Research Institute (SIPRI) in 2020.

Captains of Industry from SIDM, FICCI, PHDCC appreciated the Ministry’s policies for encouraging domestic manufacturing and gave a few suggestions for consideration.

In his closing remarks, Raksha Mantri responding to their proposals, made the following announcements:

- Another list of items that will be not be imported to be notified in March 2021.
- The Letter of Intent (LoI) for Light Utility Helicopters (LUH) will be given to HAL so that the helicopters can be inducted into the Armed Forces coinciding with the 75th Anniversary of India's Independence.
- Procurement from private sector will not be limited to 15 per cent but will go much beyond that.
- The 'AON' contract conversion would be completed within two years under close monitoring.
- Projects worth Rs 500 crore to Rs 2,000 crore will be announced on competitive basis and will be finalised within one year.
- A "Fund of Funds" worth Rs 10,000 crore has been created for Start-ups and MSMEs. Complete support would be provided to the Defence and Aerospace sector in utilising the fund.
- Acceptance in principle would be accorded for at least five Make-1 projects this year.

Secretary Department of Military Affairs & Chief of Defence Staff General Bipin Rawat, Defence Secretary Dr Ajay Kumar, Secretary (Defence Production) Shri Raj Kumar, captains of industry also addressed the webinar. Senior civil and military officials of MoD, industry representatives and innovators attended the webinar.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1699992>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Mon, 22 Feb 2021 4:44PM

वायुसेना प्रमुख का बांग्लादेश दौरा

वायुसेना प्रमुख एयर चीफ मार्शल आरकेएस भदौरिया, पीवीएसएम एवीएसएम वीएम एडीसी ने दिनांक 22 फरवरी 2021 को बांग्लादेशी वायुसेना के प्रमुख (बीएएफ) एयर चीफ मार्शल मसीहुज्जमान सरनियाबत, बीबीपी, ओएसपी, एनडीयू, पीएससी के निमंत्रण पर आधिकारिक रूप से बांग्लादेश की सद्भावनायात्रा शुरू की। बांग्लादेश के वायुसेना प्रमुख ने हाल ही में वायु सेनास्टेशन येलाहंका में चीफ्स ऑफ एयर स्टाफ कॉन्क्लेव 21 में अपने देश का प्रतिनिधित्व किया था, जहां उन्होंने इस महीने की शुरुआत में बैंगलुरु में एयरो इंडिया 2021 में एक प्रतिनिधिमंडल का नेतृत्व किया था।

चार दिवसीय यात्रा के दौरान भारतीय वायुसेना प्रमुख और शामिल प्रतिनिधिमंडल का वरिष्ठ गणमान्य लोगों से बातचीत करने और बांग्लादेश वायुसेना (बीएएफ) के प्रमुख सामरिक ठिकानों का दौरा करने का कार्यक्रम है। वे साझा आपसी हितों के क्षेत्र में हुई प्रगति पर चर्चा करेंगे और आपसी सैन्य सहयोग को आगे बढ़ाने के लिए मार्ग की तलाश करेंगे।

वायुसेना प्रमुख (सीएस) की बांग्लादेश यात्रा बांग्लादेश और भारतीय सशस्त्र बलों दोनों के लिए एक महत्वपूर्ण कालखंड में आयोजित हुई है क्योंकि दोनों 1971 के युद्ध के 50 साल मना रहे हैं। इससे दोनों देशों की वायुसेना के बीच मौजूदा पेशेवर संबंध और दोस्ताना ताल्लुकात में वृद्धि होगी।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1699979>



**Press Information Bureau
Government of India**

Ministry of Defence

Mon, 22 Feb 2021 4:44PM

CAS visit to Bangladesh

Air Chief Marshal RKS Bhadauria, PVSM AVSM VM ADC Chief of the Air Staff, embarked on an official goodwill visit to Bangladesh on 22 Feb 21 on an invitation from Air Chief Marshal Masihuzzaman Serniabat, BBP, OSP, ndu, psc Chief of Air Staff, Bangladesh Air Force (BAF). Chief of Air Staff Bangladesh recently represented his country at the Chiefs' of Air Staff Conclave 21 at Air Force Station Yelahanka where he led a delegation to Aero India 2021 earlier this month at Bengaluru.

During the course of the four-day visit, the CAS and delegation are scheduled to interact with senior dignitaries and visit key operational bases of BAF. They will discuss the progress made in areas of shared interests and explore avenues to further mutual military cooperation.

The visit of the CAS to Bangladesh comes at a significant period for both Bangladesh and Indian Armed Forces as the two celebrate 50 years of the 1971 war. It will enhance the existing professional ties and bonds of friendship between the two Air Forces.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1699947>



**Press Information Bureau
Government of India**

Ministry of Defence

Mon, 22 Feb 2021 4:25PM

Rear Admiral Atul Anand, VSM takes over as Flag Officer commanding Maharashtra Naval Area (FOMA)

Rear Admiral Atul Anand, VSM, has assumed the office of Flag Officer Commanding Maharashtra Naval Area on 22 Feb 2021. The formal handing/ taking over ceremony was held at INS Kunjali, where Rear Admiral Atul Anand was presented a guard of honour at a ceremonial parade. Rear Admiral Atul Anand was commissioned on 01 Jan 1988, in the Executive Branch of the Indian Navy.

He is an alumnus of the National Defence Academy, Khadakvasla, the Defence Services Command and Staff College, Mirpur, Bangladesh and the National Defence College, New Delhi. He has also attended the prestigious Advance Security Cooperation Course at the Asia Pacific Centre for Security Studies, Hawaii, USA. His educational qualifications include an M Phil, M Sc (Defence and Strategic Studies), Masters in Defence Studies and a BSc degree.



A recipient of the VishishtSeva Medal, the Admiral has held several key command appointments in his naval career including the command of Torpedo Recovery Vessel IN TRV A72, Missile Boat INS Chatak, Corvette INS Khukri and the Destroyer INS Mumbai. He has also served as the Navigating Officer of IN Ships Sharda, Ranvijay and Jyoti. In addition, he was the Direction Officer of the Sea Harrier Squadron INAS 300 and Executive Officer of the destroyer INS Delhi.

His important Staff appointments include Joint Director Staff Requirements, Directing Staff at the Defence Services Staff College, Wellington, Director Naval Operations and Director Naval Intelligence (Ops). He has also served as the Principal Director Naval Operations and the Principal Director Strategy, Concepts and Transformation at Integrated Headquarters, Ministry of Defence (Navy). As a Flag Officer, he has served as Assistant Chief of Naval Staff (Foreign Cooperation and Intelligence) at IHQ MoD (N) and Deputy Commandant & Chief Instructor at the National Defence Academy, Khadakvasla.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1699939>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Mon, 22 Feb 2021 4:25PM

रियर एडमिरल अतुल आनंद, वीएसएम ने महाराष्ट्र नौसेना क्षेत्र के फ्लैग ऑफिसर कमांडिंग (एफओएमए) के रूप में कार्यभार संभाला

रियर एडमिरल अतुल आनंद, वीएसएम ने दिनांक 22 फरवरी 2021 को महाराष्ट्र नौसेना क्षेत्र की कमान संभालने वाले फ्लैग ऑफिसर कमांडिंग का पदभार संभाला है। औपचारिक रूप से यह समारोह आईएनएस कुंजली में आयोजित किया गया जहां रियर एडमिरल अतुल आनंद को एक औपचारिक परेड में गार्ड ऑफ ऑनर दिया गया। रियर एडमिरल अतुल आनंद को भारतीय नौसेना की कार्यकारी शाखा में दिनांक 1 जनवरी 1988 को कमीशन प्रदान किया गया था।



वह नेशनल डिफेंस एकेडमी, खड़कवासला, डिफेंस सर्विसेज कमांड एंड स्टाफ कॉलेज, मीरपुर, बांग्लादेश और नेशनल डिफेंस कॉलेज, नई दिल्ली के पूर्व छात्र रहे हैं। उन्होंने अमेरिका के हवाई स्थित एशिया पैसिफिक सेंटर फॉर सिक्योरिटी स्टडीज में प्रतिष्ठित एडवांस सिक्योरिटी कोऑपरेशन कोर्स में भी भाग लिया है। उनकी शैक्षणिक योग्यता में एमफिल, एमएससी (डिफेंस एंड स्ट्रेटेजिक स्टडीज), मास्टर्स इन डिफेंस स्टडीज और बीएससी की डिग्री शामिल है।

विशिष्ट सेवा मेडल पाने वाले एडमिरल अतुल आनंद ने अपने नौसैनिक कैरियर में कई प्रमुख पदभार संभाले हैं, जिनमें टारपीडो रिकवरी वेसल आईएन टीआरवी ए72 की कमान, मिसाइल बोट आईएनएस चेतक, कार्वेट आईएनएस खुकरी और विध्वंसक आईएनएस मुंबई शामिल हैं। उन्होंने भारतीय नौसेना के पोत आईएनएस शारदा, रणविजय और ज्योति के नेविगेशन ऑफिसर के रूप में भी काम कर चुके हैं। इसके अलावा वह सी हैरियर स्क्वाड्रन आईएनएस 300 के डायरेक्शन ऑफिसर और विध्वंसक आईएनएस दिल्ली के एग्जीक्यूटिव ऑफिसर थे।

उनकी महत्वपूर्ण स्टाफ नियुक्तियों में जॉइंट डायरेक्टर, स्टाफ रिकवायरमेंट्स, डिफेंस सर्विसेज स्टाफ कॉलेज वेलिंगटन में डायरेक्टिंग स्टाफ, नौसेना संचालन और नौसेना आसूचना (ऑप्स) में डायरेक्टर होना

शामिल हैं। उन्होंने रक्षा मंत्रालय (नौसेना) के एकीकृत मुख्यालय में प्रिंसिपल डायरेक्टर नेवल ऑपरेशंस एवं प्रिंसिपल डायरेक्टर स्ट्रेटेजी कॉन्सेप्ट्स एंड ट्रांसफॉर्मेशन के रूप में भी कार्य किया है। एक फ्लैग ऑफिसर के रूप में उन्होंने रक्षा मंत्रालय (नौसेना) के एकीकृत मुख्यालय में असिस्टेंट चीफ ऑफ नेवल स्टाफ (फॉरेन कोऑपरेशन एंड इंटेलिजेंस) और राष्ट्रीय रक्षा अकादमी, खड़कवासला में डिप्टी कमांडेंट एंड चीफ इंस्ट्रक्टर के रूप में भी कार्य किया है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=169973>

THE HINDU

Tue, 23 Feb 2021

₹70,221 crore reserved in defence budget for domestic procurement, says Rajnath Singh

Prime Minister says the 21st century defence sector cannot stand without private sector partnership

By Dinakar Peri

New Delhi: About ₹70,000 crore of the capital allocation of ₹1.35 lakh crore in the defence budget would be reserved for domestic procurements and a second negative list of items that could be procured only locally by the Services would be issued, Defence Minister Rajnath Singh said on Monday.

“My Ministry has planned to invest, about 63% of the outlay for 2021-22 on domestic procurement, i.e. about ₹70,221 crore for domestic defence procurement during for 2021-22,” Mr. Singh stated at a webinar organised by the Department of Defence Production and the Society of Indian Defence Manufacturers.

Defence Secretary Ajay Kumar said the new negative list was expected to be issued in March and around 10 mid-sized projects would be given to industry in April. The deal for Light Combat Helicopters was also set to be signed shortly while the deal for Light Utility Helicopters was expected by August 2022.

Addressing the webinar, Prime Minister Narendra Modi said the 21st century defence sector cannot stand without private sector partnership. “I would urge the private sector to come forward with not just manufacturing capabilities but also with design and development,” he said.

In the budgetary allocation for 2021-22, the capital allocation for defence saw an increase of ₹21,326 crore or 18.75% compared to Budget Estimates (BE) of last year. Last year, for the first time, the government introduced a separate allocation for domestic procurement within the defence budget and reserved ₹52,000 crore for 2020-21.

Support to start-ups

Mr. Singh announced that to support start-ups, the Ministry planned to channelise about ₹1000 crore during 2021-22 for procurement from start-ups under the Innovation for Defence Excellence (iDEX) initiative.

As part of a series of efforts to streamline defence procurement, Mr. Singh said, the Ministry was working on bringing down the delays in timelines of capital acquisition. “We will make efforts



Union Defence Minister Rajnath Singh during a webinar on Defence Budget, at South Block in New Delhi, Monday, Feb. 22, 2021. | Photo Credit: PTI

to complete the defence acquisition within 2 years, instead of the existing 3-4 years being taken on the average,” he observed.

Last year, the Defence Ministry notified a list of 101 items on the negative import list and Mr. Singh said they intended to notify the next list of items and request the Secretary, Department of Military Affairs (DMA), that they should also consider including certain spares currently being procured from outside so that could also be indigenised.

“The embargo on imports is planned to be progressively implemented between 2020 to 2024. All necessary steps would be taken to ensure that timelines for production of equipment as per the negative import list are met,” he stated.

Mr. Modi termed the negative list for imports a positive list in the language of self-reliance. “This is a positive list that will increase our manufacturing capacities, generate new employment, reduce dependence on imports, and will give a guarantee to the products being manufactured in India to be consumed in India,” he stated.

Defence exports

Both Mr. Modi and Mr. Singh stressed on simultaneously boosting defence exports and reducing imports.

“Our initiatives have resulted in a staggering 700% growth in defence exports in the last six years,” Mr. Singh said, adding that India had found a place in the list of top 25 exporters in the world as per data published by Swedish think tank SIPRI in 2020.

<https://www.thehindu.com/news/national/70221-crore-reserved-in-defence-budget-for-domestic-procurement-rajnath-singh/article33901213.ece>

THE ECONOMIC TIMES

Tue, 23 Feb 2021

Lt Gen BS Raju to be new Director General of Military Operations of Indian Army

Synopsis

Lt Gen Raju, who has extensive experience in counter-terror operations, will succeed Lt Gen Paramjit Singh who has taken charge as Deputy Chief of the Army Staff (strategy).

Lt Gen B S Raju, the General-Officer-Commanding of the Srinagar-based Chinar Corps, will be the new Director General of Military Operations (DGMO) of the Indian Army, official sources said on Saturday.

Lt Gen D P Pandey, currently serving as the Director General of the Territorial Army, will succeed Lt Gen Raju at the crucial corps that carries out the Army's counter-insurgency operations in Kashmir, they said.

Lt Gen Raju, who has extensive experience in counter-terror operations, will succeed Lt Gen Paramjit Singh who has taken charge as Deputy Chief of the Army Staff (strategy).

The new post of deputy chief of the army staff (strategy) was created to deal with military operations, military intelligence, strategic planning and operational logistics.



Lt Gen Raju is expected to take charge as the new DGMO in late March or early April, the sources said. He had served as the commander of the Army's 'Victor Force' which is responsible for counter-insurgency operations in the volatile south Kashmir region.

Lt Gen D P Pandey was commissioned into the Sikh Light Infantry regiment in December 1985 and is an alumnus of the National Defence Academy, Khadakwasla, Pune and Indian Military Academy, Dehradun.

He had multiple tenures in high altitude areas and commanded a battalion in Siachen Glacier and Chushul sector in Ladakh. He has also commanded a Rashtriya Rifles sector and a counter-insurgency unit in the Kashmir valley.

Lt Gen Pandey has held numerous prestigious staff appointments which included Director in Infantry Directorate.

<https://economictimes.indiatimes.com/news/defence/lt-gen-b-s-raju-to-be-new-director-general-of-military-operations-of-indian-army/articleshow/81150460.cms>



Tue, 23 Feb 2021

Hindustan Shipyard to build 5 naval support vessels with Turkish help

The project, estimated to cost between \$1.5 billion and \$2 billion, will involve transfer of technology from Turkey's Anadolu Shipyard

By Rezaul H Laskar, Rahul Singh

Visakhapatnam-based Hindustan Shipyard Limited (HSL) is expecting an order from the Indian Navy by the year end for building five mammoth naval support vessels with transfer of technology from a Turkish shipbuilding firm, people familiar with the developments said on Monday.

The project, estimated to cost between \$1.5 billion and \$2 billion, will involve transfer of technology from Anadolu Shipyard, part of the TAIS consortium of Turkey, with which HSL signed an agreement for technical collaboration last year.

HSL is expected to deliver the first fleet support vessel (FSV) to the navy within four years of the go-ahead, with the other ships to be delivered at the rate of one every 10 months to 12 months. The vessels will be 230 metres long and have a displacement of 45,000 tonnes. FSVs carry fuel and other supplies for warships.

“The agreement with the Turkish consortium will kick in after HSL gets an order from the Indian Navy. If all goes well, that could happen by October 2021. Several Indian vendors will also be involved in the project,” said one of the people cited above, speaking on condition of anonymity.

Unlike other massive projects of this type, which usually witness at least one of the vessels being constructed in the country providing the technology and know-how, the Turkish side has decided to go ahead with transfer of technology from the initial stages and back the “Make in India” initiative by constructing all five vessels at HSL, said a second person who too declined to be named.

“Turkey’s shipyards are fully booked for a long time and there is nothing to lose by transferring technology and having all the vessels built in India. Turkish engineers will come to India to assist with the project,” the second person said.



Indian Navy is keeping a sharp eye on the IOR, it is also playing a key role in the Ladakh sector. Its P-8I maritime patrol and reconnaissance aircraft, imported from the US, are being used for surveillance of the Ladakh sector and gathering intelligence

Besides designs, the Turkish consortium will provide engineering services, planning and preparation of specifications, the people said. The transfer of technology will also boost India's shipbuilding capabilities, they added.

Maritime affairs expert, Rear Admiral (retired) Sudarshan Shrikhande, said: "There is a need for the navy to have fleet support ships. While HSL may have a sort of a collaborative arrangement for transfer of technology and building these in Visakhapatnam, one is not aware if a contract may be in the offing or whether discussions are continuing."

TAIS, which is a member of Turkey's largest industrial group, and HSL concluded an agreement for cooperation in the first quarter of last year, after the issue had come under a cloud for some time because of Turkish President Recep Tayyip Erdogan's criticism of the Indian government's decision to scrap Jammu and Kashmir's special status in 2019. Questions were also raised in some quarters because of the strong defence ties between Turkey and Pakistan.

The Turkish consortium was the lowest bidder for the contract to make the FSVs. Moreover, some other bidders had insisted that at least one of the vessels should be made in a foreign shipyard. The agreement with TAIS was signed after clearance by the Indian defence ministry, the people cited above said.

Sameer Patil, fellow for international security studies at Gateway House, said both countries were displaying pragmatism against a backdrop of long-standing concerns in India about Turkey's defence relationship with Pakistan.

"Turkey under President Erdogan has focused on building commercial relations with all countries. This pragmatism is being seen in this effort to collaborate with India despite the proximity with Pakistan. India wants to build its naval capabilities and Turkey has a defence industry that is very advanced," he said.

"If Turkey is offering transfer of technology, why should we say no?" Patil said, noting that Turkish company Savronik was given sub-contracts for building key parts of the strategic Atal Tunnel under Rohtang Pass in Himachal Pradesh.

<https://www.hindustantimes.com/india-news/hindustan-shipyard-to-build-5-naval-support-vessels-with-turkish-help-101614007642406.html>



Tue, 23 Feb 2021

India, France to hold Naval drills

The nuclear-powered French carrier force, comprising two frigates and one support ship, has for several months been on mission "Clemenceau 21", which deals with fighting terrorism in the Mediterranean, Indian Ocean and Arabian Sea/ Persian Gulf

By Shishir Gupta

New Delhi: India and France will cement their defence cooperation in April when the Charles de Gaulle aircraft carrier strike force will conduct exercises with INS Vikramaditya in two phases in the Arabian Sea and Indian Ocean, according to people familiar with the matter.

The dates of the exercises are being scheduled between the two navies, the people added.

The nuclear-powered French carrier force, comprising two frigates and one support ship, has for several months been on mission "Clemenceau 21", which deals with fighting terrorism in the Mediterranean, Indian Ocean and Arabian Sea/ Persian Gulf.

According to Indian Navy officers aware of the developments, the Western Fleet with its newly appointed commander Rear Admiral Ajay Kochhar will conduct advanced exercises with the French carrier task force. While Charles de Gaulle is a 42,500 tonne aircraft carrier with Rafale M fighters on board, INS Vikramaditya is a conventionally powered aircraft carrier with displacement of 44,500 tonne and has MiG-29K aircraft on board.

April will also see renewed engagement with France with foreign minister Jean-Yves Le Drian visiting India to deliver a lecture at a think-tank and engage in a political dialogue. Both India and France have convergence over freedom of navigation in the Indo-Pacific, with Paris appointing a special envoy for the region.

To add to this will be the arrival of seven Rafale jets from France between April 19 and 23, after which the first squadron of the French omni-role fighter will be completed at the Ambala airbase. The remaining 18 fighters will be deployed at Hashimara in the eastern sector to cover the strategic Siliguri corridor.

India and France have strengthened their bilateral relationship with convergence in the UN Security Council and building the Indian Air Force's capacity through the purchase of medium transport aircraft and multi-role transport tankers.

The two countries have also joined hands in development of air independent propulsion for conventional submarines for future Indian submersible ships.

<https://www.hindustantimes.com/india-news/india-france-to-hold-naval-drills-101614043125884.html>



Tue, 23 Feb 2021

Indian Navy completes one of largest-ever war drills to counter China in Indian Ocean Region

India has successfully completed the Navy's largest war game, the biennial 'Theatre Level Operational Readiness Exercise' (TROPEX-21), aimed at countering China's increasing naval presence in the Indian Ocean region

By Aakriti Sharma

The exercise which began in early January involved a large number of warships, submarines, and aircraft over a vast geographical expanse in the Indian Ocean Region. The units of the Indian Army, the Indian Air Force, and the Coast Guard also participated.

The exercise aimed at testing the combat readiness in a complex multi-dimensional scenario set in the context of the current "geostrategic environment" concluded last week. The Navy's statement said:

"The theatre level exercise also aims to validate Navy's offensive-defense capabilities, safeguard national interests in the maritime domain and promote stability and peace in the IOR."

Navy Chief Admiral Karambir Singh on February 19 carried out a detailed review of the recently-concluded exercise. He said the lessons of the exercise will provide the planners with accurate assessments to fine-tune force structuring, warfighting concepts, operational logistics as also material and training imperatives.

The different phases witnessed multiple 'on-target' ordnance deliveries, including missiles, torpedoes, and rockets from the front-line warships, aircraft, and submarines and demonstrated the lethal firepower of the Navy and reaffirmed its capability to carry out long-range maritime strikes in the Indian Ocean Region (IOR).

To "validate the coastal defense set-up of the country", the first phase had witnessed the Navy conducting 'Sea Vigil' along the entire coastline and island territories of the nation. It included the participation of all stakeholders in coastal security.



In the following phase, a large-scale tri-service joint amphibious exercise, AMPHEX-21 was conducted in the Andaman and Nicobar group of Islands.

The exercise, the Navy said, was conducted with the aim to validate the capabilities to safeguard the territorial integrity of the nation's island territories and enhance operational synergy and joint warfighting capabilities among the three services.

The exercise has come at a time when China continues to expand its footprint in the Indian Ocean Region. India, which has for long not faced any serious maritime threats in the Indian Ocean, is now ramping up military capabilities to counter any potential misadventure by its neighbor.

"China's growing Indian Ocean presence is not just about contesting India's strategic role in the IOR, but it is part of a determined agenda to 'emerge as a key player in the IOR' which feeds into China's larger objective of becoming a global maritime power1," writes Darshana M. Baruah, a scholar with the South Asia Program at the Carnegie Endowment for International Peace.

Among the many concerns for India are the PLA Navy's growing strength, China's growing maritime ties with countries in the IOR, and the increasing naval presence in the region.

Indian Navy Chief Admiral Karambir Singh had said in January that both Chinese research vessels and fishing boats have been sighted in the Indian Ocean, including in the Indian Exclusive Economic Zone (EEZ).

<https://eurasianimes.com/indian-navy-completes-one-of-largest-ever-war-drills-to-counter-china-in-indian-ocean-region/>

Science & Technology News



Tue, 23 Feb 2021

Researchers create 'beautiful marriage' of quantum enemies

By Syl Kacapyr

Cornell University scientists have identified a new contender when it comes to quantum materials for computing and low-temperature electronics.

Using nitride-based materials, the researchers created a material structure that simultaneously exhibits superconductivity—in which electrical resistance vanishes completely—and the quantum Hall effect, which produces resistance with extreme precision when a magnetic field is applied.

"This is a beautiful marriage of the two things we know, at the microscale, that give electrons the most startling quantum properties," said Debdeep Jena, the David E. Burr Professor of Engineering in the School of Electrical and Computer Engineering and Department of Materials Science and Engineering. Jena led the research, published Feb. 19 in *Science Advances*, with doctoral student Phillip Dang and research associate Guru Khalsa, the paper's senior authors.

The two physical properties are rarely seen simultaneously because magnetism is like kryptonite for superconducting materials, according to Jena.

"Magnetic fields destroy superconductivity, but the quantum Hall effect only shows up in semiconductors at large magnetic fields, so you're having to play with these two extremes," Jena said. "Researchers in the past few years have been trying to identify materials which show both properties with mixed success."

The research is the latest validation from the Jena-Xing Lab that nitride materials may have more to offer science than previously thought. Nitrides have traditionally been used for manufacturing LEDs and transistors for products like smartphones and home lighting, giving them a reputation as an industrial class of materials that has been overlooked for quantum computation and cryogenic electronics.

"The material itself is not as perfect as silicon, meaning it has a lot more defects," said co-author Huili Grace Xing, the William L. Quackenbush Professor of Electrical and Computer Engineering and of Materials Science and Engineering. "But because of its robustness, this material has thrown pleasant surprises to the research community more than once despite its extremely large irregularities in structure. There may be a path forward for us to truly integrate different modalities of quantum computing—computation, memory, communication."

Such integration could help to condense the size of quantum computers and other next-generation electronics, just as classical computers have shrunk from warehouse to pocket size.

"We're wondering what this sort of material platform can enable because we see that it's checking off a lot of boxes," said Jena, who added that new physical phenomena and technological applications could emerge with further research. "It has a superconductor, a semiconductor, a filter material—it has all kinds of other components, but we haven't put them all together. We've just discovered they can coexist."

For this research, the Cornell team began engineering epitaxial nitride heterostructures—atomically thin layers of gallium nitride and niobium nitride—and searching for conditions in which magnetic fields and temperatures in the layers would retain their respective quantum Hall and superconducting properties.

They eventually discovered a small window in which the properties were observed simultaneously, thanks to advances in the quality of the materials and structures produced in close collaboration with colleagues at the Naval Research Laboratory.

"The quality of the niobium-nitride superconductor was improved enough that it can survive higher magnetic fields, and simultaneously we had to improve the quality of the gallium-nitride semiconductor enough that it could exhibit the quantum Hall effect at lower magnetic fields," Dang said. "And that's what will really allow for potential new physics to be seen at low temperature."

Potential applications for the material structure include more efficient electronics, such as data centers cooled to extremely low temperatures to eliminate heat waste. And the structure is the first to lay the groundwork for the use of nitride semiconductors and superconductors in topological quantum computing, in which the movement of electrons must be resilient to the material defects typically seen in nitrides.

"What we've shown is that the ingredients you need to make this topological phase can be in the same structure," Khalsa said, "and I think the flexibility of the nitrides really opens up new possibilities and ways to explore topological states of matter."

More information: Phillip Dang et al, An all-epitaxial nitride heterostructure with concurrent quantum Hall effect and superconductivity, *Science Advances* (2021). DOI: [10.1126/sciadv.abf1388](https://doi.org/10.1126/sciadv.abf1388)

Journal information: [Science Advances](https://www.science.org)
<https://phys.org/news/2021-02-beautiful-marriage-quantum-enemies.html>



Doctoral students Phillip Dang (left) and Reet Chaudhuri at the National High Magnetic Field Laboratory, where measurements were made on a material structure that concurrently has superconductivity and the quantum Hall effect. Credit: Provided by Jena-Xi Lab

Lack of symmetry in qubits can't fix errors in quantum computing, might explain matter/antimatter

By Charles Poling

A team of quantum theorists seeking to cure a basic problem with quantum annealing computers—they have to run at a relatively slow pace to operate properly—found something intriguing instead. While probing how quantum annealers perform when operated faster than desired, the team unexpectedly discovered a new effect that may account for the imbalanced distribution of matter and antimatter in the universe and a novel approach to separating isotopes.

"Although our discovery did not cure the annealing time restriction, it brought a class of new physics problems that can now be studied with quantum annealers without requiring they be too slow," said Nikolai Sinitsyn, a theoretical physicist at Los Alamos National Laboratory. Sinitsyn is author of the paper published Feb. 19 in *Physical Review Letters*, with coauthors Bin Yan and Wojciech Zurek, both also of Los Alamos, and Vladimir Chernyak of Wayne State University.

Significantly, this finding hints at how at least two famous scientific problems may be resolved in the future. The first one is the apparent asymmetry between matter and antimatter in the universe.

"We believe that small modifications to recent experiments with quantum annealing of interacting qubits made of ultracold atoms across phase transitions will be sufficient to demonstrate our effect," Sinitsyn said.

Explaining the matter/antimatter discrepancy

Both matter and antimatter resulted from the energy excitations that were produced at the birth of the universe. The symmetry between how matter and antimatter interact was broken but very weakly. It is still not completely clear how this subtle difference could lead to the large observed domination of matter compared to antimatter at the cosmological scale.

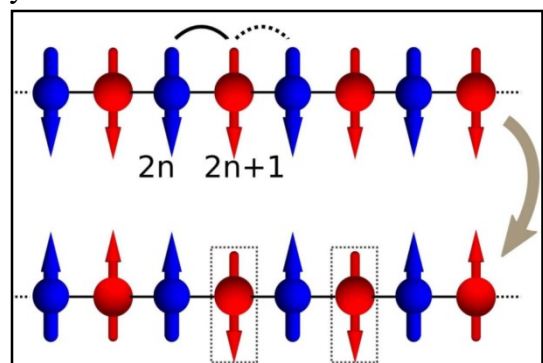
The newly discovered effect demonstrates that such an asymmetry is physically possible. It happens when a large quantum system passes through a phase transition, that is, a very sharp rearrangement of quantum state. In such circumstances, strong but symmetric interactions roughly compensate each other. Then subtle, lingering differences can play the decisive role.

Making quantum annealers slow enough

Quantum annealing computers are built to solve complex optimization problems by associating variables with quantum states or qubits. Unlike a classical computer's binary bits, which can only be in a state, or value, of 0 or 1, qubits can be in a quantum superposition of in-between values. That's where all quantum computers derive their awesome, if still largely unexploited, powers.

In a quantum annealing computer, the qubits are initially prepared in a simple lowest energy state by applying a strong external magnetic field. This field is then slowly switched off, while the interactions between the qubits are slowly switched on.

"Ideally an annealer runs slow enough to run with minimal errors, but because of decoherence, one has to run the annealer faster," Yan explained. The team studied the emerging effect when the annealers are operated at a faster speed, which limits them to a finite operation time.



A new paper seeking to cure a time restriction in quantum annealing computers instead opened up a class of new physics problems that can now be studied with quantum annealers without requiring they be too slow. Credit: Los Alamos National Laboratory

"According to the adiabatic theorem in quantum mechanics, if all changes are very slow, so-called adiabatically slow, then the qubits must always remain in their lowest energy state," Sinitsyn said. "Hence, when we finally measure them, we find the desired configuration of 0s and 1s that minimizes the function of interest, which would be impossible to get with a modern classical computer."

Hobbled by decoherence

However, currently available quantum annealers, like all quantum computers so far, are hobbled by their qubits' interactions with the surrounding environment, which causes decoherence. Those interactions restrict the purely quantum behavior of qubits to about one millionth of a second. In that timeframe, computations have to be fast—nonadiabatic—and unwanted energy excitations alter the quantum state, introducing inevitable computational mistakes.

The Kibble-Zurek theory, co-developed by Wojciech Zurek, predicts that the most errors occur when the qubits encounter a phase transition, that is, a very sharp rearrangement of their collective quantum state.

For this paper, the team studied a known solvable model where identical qubits interact only with their neighbors along a chain; the model verifies the Kibble-Zurek theory analytically. In the theorists' quest to cure limited operation time in quantum annealing computers, they increased the complexity of that model by assuming that the qubits could be partitioned into two groups with identical interactions within each group but slightly different interactions for qubits from the different groups.

In such a mixture, they discovered an unusual effect: One group still produced a large amount of energy excitations during the passage through a phase transition, but the other group remained in the energy minimum as if the system did not experience a phase transition at all.

"The model we used is highly symmetric in order to be solvable, and we found a way to extend the model, breaking this symmetry and still solving it," Sinitsyn explained. "Then we found that the Kibble-Zurek theory survived but with a twist—half of the qubits did not dissipate energy and behaved 'nicely.' In other words, they maintained their ground states."

Unfortunately, the other half of the qubits did produce many computational errors—thus, no cure so far for a passage through a phase transition in quantum annealing computers.

A new way to separate isotopes

Another long-standing problem that can benefit from this effect is isotope separation. For instance, natural uranium often must be separated into the enriched and depleted isotopes, so the enriched uranium can be used for nuclear power or national security purposes. The current separation process is costly and energy intensive. The discovered effect means that by making a mixture of interacting ultra-cold atoms pass dynamically through a quantum phase transition, different isotopes can be selectively excited or not and then separated using available magnetic deflection technique.

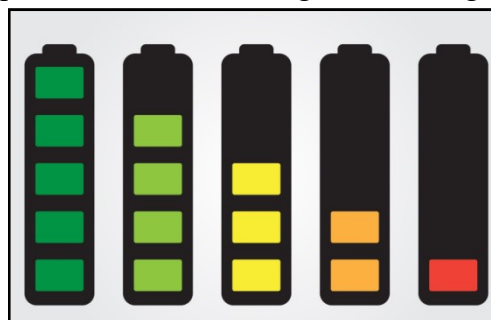
More information: Bin Yan et al, Nonadiabatic Phase Transition with Broken Chiral Symmetry, *Physical Review Letters* (2021). DOI: [10.1103/PhysRevLett.126.070602](https://doi.org/10.1103/PhysRevLett.126.070602)

Journal information: [Physical Review Letters](https://phys.org/news/2021-02-lack-symmetry-qubits-errors-quantum.html)
<https://phys.org/news/2021-02-lack-symmetry-qubits-errors-quantum.html>

New catalyst could enable better lithium-sulfur batteries, power next-gen electronics

At the heart of most electronics today are rechargeable lithium-ion batteries (LIBs). But their energy storage capacities are not enough for large-scale energy storage systems (ESSs). Lithium-sulfur batteries (LSBs) could be useful in such a scenario due to their higher theoretical energy storage capacity. They could even replace LIBs in other applications like drones, given their light weight and lower cost.

But the same mechanism that is giving them all this power is keeping them from becoming a widespread practical reality. Unlike LIBs, the reaction pathway in LSBs leads to an accumulation of solid lithium sulfide (Li_2S_6) and liquid lithium polysulfide (LiPS), causing a loss of active material from the sulfur cathode (positively charged electrode) and corrosion of the lithium anode (negatively charged electrode). To improve battery life, scientists have been looking for catalysts that can make this degradation efficiently reversible during use.



Credit: CC0 Public Domain

In a new study published in *ChemSusChem*, scientists from Gwangju Institute of Technology (GIST), Korea, report their breakthrough in this endeavor. "While looking for a new electrocatalyst for the LSBs, we recalled a previous study we had performed with cobalt oxalate (CoC_2O_4) in which we had found that negatively charged ions can easily adsorb on this material's surface during electrolysis. This motivated us to hypothesize that CoC_2O_4 would exhibit a similar behavior with sulfur in LSBs as well," explains Prof. Jaeyoung Lee from GIST, who led the study.

To test their hypothesis, the scientists constructed an LSB by adding a layer of CoC_2O_4 on the sulfur cathode.

Sure enough, observations and analyses revealed that CoC_2O_4 's ability to adsorb sulfur allowed the reduction and dissociation of Li_2S_6 and LiPS. Further, it suppressed the diffusion of LiPS into the electrolyte by adsorbing LiPS on its surface, preventing it from reaching the lithium anode and triggering a self-discharge reaction. These actions together improved sulfur utilization and reduced anode degradation, thereby enhancing the longevity, performance, and energy storage capacity of the battery.

Charged by these findings, Prof. Lee envisions an electronic future governed by LSBs, which LIBs cannot realize. "LSBs can enable efficient electric transportation such as in unmanned aircrafts, electric buses, trucks and locomotives, in addition to large-scale energy storage devices," he observes. "We hope that our findings can get LSBs one step closer to commercialization for these purposes."

Perhaps, it's only a matter of time before lithium-sulfur batteries power the world.

More information: Jin Won Kim et al, Improved Redox Reaction of Lithium Polysulfides on the Interfacial Boundary of Polar CoC_2O_4 as a Polysulfide Catenator for a High-Capacity Lithium-Sulfur Battery, *ChemSusChem* (2020). DOI: [10.1002/cssc.202002140](https://doi.org/10.1002/cssc.202002140)

<https://phys.org/news/2021-02-catalyst-enable-lithium-sulfur-batteries-power.html>

Blood thinners may protect against COVID-19 complications

By Jocelyn Solis-Moreira

- *A new study has found that administering heparin-based blood thinners to patients with COVID-19 in the first 24 hours of hospital admission reduced the risk of death.*
- *The researchers observed a 27% reduced risk of 30-day mortality among patients who received blood thinners.*
- *Severe bleeding that required a blood transfusion occurred in 4.6% of patients and was not significantly linked with early intervention to prevent coagulation.*

The ongoing COVID-19 pandemic has caused more than 2 million deaths throughout the world. The United States currently has the highest number of related mortalities, more than 499,000 at the time of publication.

While emerging COVID-19 vaccines may eventually help reduce the number of deaths, the relatively slow rollout in many countries has led to concerns that seeing significant effects will take time.

Excessive blood clotting is a hallmark of some severe COVID-19 cases. In May 2020, thrombosis expert Prof. Beverley Hunt told *Medical News Today* that she was surprised to find such high levels of clotting factors in the blood of patients with severe COVID-19.

“Now we know that these patients have incredibly sticky blood. This stickiness is causing them to have deep vein thrombosis. And of course, if you have a deep vein thrombosis, bits of it can break off and travel through your body and block some of the blood supply to the lungs,” Prof. Hunt explained.

At the hospital where she works, patients were routinely receiving small doses of anticoagulants to reduce the risk of blood clotting. And as data on the use of blood thinners began to emerge, updates to clinical guidelines followed suit.

The National Institutes of Health (NIH) recommend that everyone who is hospitalized for COVID-19 treatment, except those who are pregnant, receive prophylactic anticoagulants.

Recently, a team of researchers in the United Kingdom and the U.S. published data from an observational cohort study. They found that anti-clotting therapy was linked with significantly fewer deaths among people admitted to the hospital with COVID-19.

“Our results provide strong, real-world evidence to support guidelines recommending the use of prophylactic anticoagulation as initial treatment for patients with COVID-19 on hospital admission,” the researchers write.

The results of the study were recently published in *BMJ*.

Collecting patient data

The team analyzed electronic health record data from veterans registered with the U.S. Department of Veteran Affairs who were admitted to a hospital with COVID-19 between March 1 and July 31, 2020.

They collected information from 4,297 veterans who had tested positive for COVID-19 either 14 days before admission or within 14 days of the hospital stay.

People were excluded from the study if they had used anticoagulants — drugs that prevent excessive blood clotting — in the 30 days before the admission. People were also excluded if they were actively bleeding or had severe anemia.

The median age was 68 years old, and most patients were men living in urban environments in the south. Among the patients, 45.1% were non-Hispanic Black, 37.3% were non-Hispanic white, and 11.8% were Hispanic.

Of the 4,297 patients in the study, 3,627, or 84.4%, received prophylactic anticoagulation medication within 24 hours of hospital admission. This medication is used to prevent blood clots in the veins, or venous thromboembolism.

About 30.2% of the patients received subcutaneous heparin, a drug that prevents blood clots from forming, and 69.1% received a blood thinner called enoxaparin.

Reduced risk of death

The 30-day mortality rate was lower among the patients who received prophylactic anticoagulation medication than those who did not.

The researchers write that:

“Receiving prophylactic anticoagulation was associated with a 27% decreased risk of death over the first 30 days, compared with receiving no anticoagulation.”

A total of 622 deaths occurred among the 4,297 patients in the study within 30 days of admission to the hospital. Of that number, 513 of the deaths involved patients who received prophylactic anticoagulation. The researchers note that 82% of the deaths occurred during the hospital stay.

“The evidence of benefit was strongest among patients not admitted to the [intensive care unit] within the first 24 hours of admission,” they observe in their study paper.

Only 4.6% of patients experienced a bleeding event that required a transfusion. This adverse effect was not associated with the prophylactic anticoagulation medication.

Several study limitations

This study was observational, and without the results of a randomized clinical trial, it is difficult to confirm whether the anticlotting treatment was effective or whether another variable, such as a patient characteristic or another treatment, could have influenced the results.

Another major limitation is the lack of an official cause of death for these patients. While the researchers reason that the reports strongly indicated venous and arterial thrombosis, it is possible that other COVID-19 complications may have been fatal.

Also, the researchers did not account for some risk factors for venous thromboembolism, such as immobility, weakened or impaired muscle movement, or specific thromboembolism biomarkers. This was because the information was not fully available to them at the time of the analysis.

In addition, the findings may not apply to the general population, as the study only included older participants, who had an increased risk of other health conditions. And only a fraction of the patient cohort was female.

Refining hospital guidelines

The [Centers for Disease Control and Prevention \(CDC\)](#) report that an increased risk of thromboembolism is associated with severe COVID-19, and they say that treatment guidelines for COVID-induced blood clotting are always being updated as new information emerges.

The researchers conclude that their results give real-world evidence of the effectiveness of blood-thinning medication upon hospital admission.

The NIH have now updated their guidelines for COVID-19 hospital admission to recommend early intervention with blood-thinning medication when appropriate.

<https://www.medicalnewstoday.com/articles/blood-thinners-may-protect-against-covid-19-complications#Several-study-limitations>

