

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 : 42 27-28 फरवरी 2021

Vol.: 46 Issue : 42 27-28 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		1-7
DRDO Technology News		1-7
1.	उत्तम रडार से सुसज्जित होंगे स्वदेश युद्धक तेजस	1
2.	Plan to encourage local players in defence procurement, says Scientist	3
3.	IAF jets to feature in Sri Lankan Air Force's 70th anniversary celebrations	4
4.	Battle of Tanks – How Will India's homegrown Arjun MK-1A Main Battle Tank fare Against Pakistan's Al-Khalid?	5
Defence News		7-21
Defence Strategic National/International		7-21
5.	President reviews Tri-Service Guard of Honour at INS Utkrosh	7
6.	राष्ट्रपति ने आईएनएस उत्कर्ष पर ट्राई सर्विस गार्ड ऑफ ऑनर का निरीक्षण किया	8
7.	Rear Admiral Sanjay Sharma took over as Admiral superintendent, Naval ship repair yard (Kochi)	8
8.	रीयर एडमिरल संजय शर्मा ने नेवल शिप रिपेयर यार्ड (कोच्चि) के एडमिरल सुपरिटेण्डेंट के रूप में पदभार संभाला	9
9.	Rear Admiral S Venkat Raman takes charge of Naval war college at Goa	9
10.	रीयर एडमिरल एस वेंकट रमन ने गोवा में नेवल वॉर कॉलेज का कार्यभार संभाला	10
11.	Commodore Mahadevu Goverdhan Raju, NM takes over as Naval Officer-In-Charge (Andhra Pradesh)	10
12.	कमोडोर महादेव गोवर्धन राजू, एनएम ने नौसेना ऑफिसर इंचार्ज (आंध्र प्रदेश) का पदभार संभाला	11
13.	श्रीलंकाई वायुसेना के 70 वें सालगिरह महोत्सव में भारतीय वायुसेना की भागीदारी	12
14.	IAF Participation in 70th Anniversary Celebrations of Slaf	13
15.	Rationale behind India developing fleet of aircraft carriers	13
16.	Nature of war is constant, its character keeps changing, Says Army Chief	15
Science & Technology News		22-28
17.	Countdown begins for ISRO'S first mission in 2021; new satellite to carry Bhagavad Gita, PM Modi's photo	22
18.	The hunt for the quantum collapse	23
19.	Nuclear physicists on the hunt for squeezed protons	24
20.	Scientists investigate Walker breakdown in 3-D magnetic nanowires	26
COVID-19 Research News		27-28
21.	Vitamin B6 may help keep Covid-19's cytokine storms at bay: Study	27



Sun, 28 Feb 2021

'उत्तम राडार' से सुसज्जित होंगे स्वदेशी युद्धक तेजस

83 में से 63 युद्धकों में होगा स्वदेशी राडार
कई खूबियों वाला यह राडार बढ़ाएगा तेजस की मारक क्षमता

By Rajeev Mishra

बेंगलूरु.

भारतीय वायुसेना में शामिल किए जाने वाले 83 तेजस मार्क-1 ए युद्धकों में से लगभग 63 विमानों को स्वदेशी अत्याधुनिक राडार 'उत्तम' से सुसज्जित किया जाएगा। यह एक्टिव इलेक्ट्रॉनिकली-स्कैन्ड-राडार(एआइएसए) है जो इजरायली राडार की जगह लेगा।

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) की प्रयोगशाला इलेक्ट्रॉनिक एवं राडार विकास प्रतिष्ठान (एलआरडीइ) द्वारा स्वदेशी तकनीक से विकसित किया जा रहा उत्तम राडार एक साथ कई मिशनों को अंजाम देगा। यह दुश्मन के ठिकानों की पहचान कर उसे ध्वस्त करने में सक्षम होगा वहीं, टोही मिशन के दौरान दुश्मन के ठिकानों की हाई-रिजोल्यूशन तस्वीरें उपलब्ध कराएगा।

63 तेजस होंगे उत्तम से लैस

रक्षा अधिकारियों का कहना है कि कुल 83 तेजस युद्धकों में से 63 तेजस में यह राडार लगाया जाएगा। यानी, 21 वें तेजस मार्क-1-ए से उत्तम राडार का इंटीग्रेशन शुरू होगा। डीआरडीओ के चेयरमैन सतीश रेड्डी ने कहा कि 'अभी तक के परीक्षणों में उत्तम राडार का प्रदर्शन उम्मीदों से बेहतर रहा है। इस राडार को तेजस में इंटीग्रेट करने के लिए एचएएल से पहले ही करार हो चुका है।'

समय पर होगी आपूर्ति

वहीं एचएएल के अध्यक्ष एवं प्रबंध निदेशक आर.माधवन ने कहा 'हम उत्तम राडार को तेजस में लगाने की योजना बना रहे हैं। तेजस मार्क-1 ए विमानों की आपूर्ति तय समय सीमा पर शुरू हो जाएगी। इसलिए 20 इजरायली राडार के आर्डर दिए जाएंगे। तब तक स्वदेशी उत्तम राडार तैयार हो जाएंगे।'



बच नहीं पाएंगे दुश्मनों के ठिकाने

फिलहाल तेजस में इजरायली कंपनी एल्टा (इएलटीए) का राडार 'इएल/एम-20520' लगा हुआ है। लेकिन, उत्तम मल्टी मोड राडार है जो हवा से हवा में, हवा से जमीन पर और हवा से समुद्र में दुश्मनों के ठिकानों को ध्वस्त करने में सक्षम होगा। यह विश्व के किसी भी अन्य राडार की तुलना में अपने वर्ग में सर्वश्रेष्ठ होगा। एक तरफ यह दुश्मन के छिपे हुए ठिकानों की पहचान करने में सक्षम होगा वहीं दूसरी ओर यह दुश्मनों के वार से भी एयरक्राफ्ट को बचाएगा। यानी, दोस्त और दुश्मन विमानों की बखूबी पहचान होगी। युद्ध क्षेत्र में यह आसपास की परिस्थितियों से पायलट को बेहतर ढंग से अवगत कराएगा। बेहद सटीकता के साथ मल्टीपल टारगेट की पहचान करना इस राडार की सबसे बड़ी खूबी होगी।

परीक्षण उत्साहजनक

राडार परियोजना के निदेशक पी. शेषगिरि ने बताया कि तेजस सीमित शृंखला उत्पादन के दो विमानों एलएसपी-2 और एलएसपी-3 के अलावा एक अन्य जेट विमान में इसका परीक्षण हो रहा है। अभी तक इस राडार का 230 घंटे से अधिक का परीक्षण हो चुका है। तेजस पर इसका परीक्षण हवा से हवा में हुआ है। इसके लिए रेंज दृश्य सीमा से परे (बीवीआर) मार करने वाली मिसाइलों के योग्य होना चाहिए। लेकिन, उत्तम राडार में इससे भी बेहतर रेंज हासिल करने की कोशिश हो रही है। वहीं, जेट विमान में हवा से हवा, हवा से समुद्र और हवा से जमीन के लिए परीक्षण हो रहा है।

<https://www.patrika.com/bangalore-news/desi-radar-developed-by-drdo-will-replace-israeli-radar-6718681/>

Plan to encourage local players in defence procurement, says Scientist

₹70,000 crore was earmarked in the Budget for acquisition from indigenous sources'

Visakhapatnam: The defence sector, especially research organisations such as DRDO, is opening up and it is being done in tune with the concept of Atmanirbhar Bharat said Director General Naval Systems and Materials, DRDO, Samir V. Kamat.

The Distinguished Scientist was here to deliver a talk on 'Ease of doing business: Atmanirbhar Bharat', organised by the Confederation of Indian Industry (CII) here on Friday.

He pointed out that as part of the opening up of the sector to the private players, the Defence Acquisition Procedure -2020 was drafted to simplify the hitherto cumbersome trial procedure and bring down the time taken in decision making.

He said that in the recent Budget about ₹70,000 crore was earmarked for acquisition in the defence sector from indigenous sources.

The Ministry of Defence has put a ban on procurement of about 101 times from foreign sources and the DRDO has put a ban on 108 items. "The idea is to encourage local players," he said.

'No royalty'

The DRDO has also started the Development-cum- Production Partner concept to give opportunity for local players to tie-up with the organisation. "We have also removed the royalty for ToT (Transfer of Technology) and domestic industries can approach the DRDO. We have also opened up the patents free of cost for local industries, as part of Atmanirbhar Bharat," said Mr. Kamat.

He also stressed on the idea of more cooperation between the academia and defence research and development.

"Only a few industries in the country are coming forward to work on critical defence research. At this juncture we need more and based on it we have started a few centres for excellence in a few universities and institutes for higher learning," he said.

The DRDO is also working towards coming out with a policy to fund startups and work more closely with stakeholders, which includes MSME, private industry and research centres.

He agreed that there were a few perennial challenges such as regularising the order book, delayed payment and slow decision making, and efforts are on to iron them out.

Earlier, Ragam Kishore, CEO and director of Vizag Seaport, said that maritime industry was closely monitoring the Major Port Authority Bill, as it might lead to the theme of the conference, in its true sense.

He agreed that there has been a paradigm shift in the maritime sector after it was opened up for private players, but a lot needs to be done.

Pointing out the lacunae he said, in India there are only three ports that can handle cape size vessels of 1.8 lakh tonnes and the main issue that still persists is storage and clearance of cargo.

According to him, the horizontal cargo movement from the wharfs to the hinterland needs to be improved and only then there would ease of doing business, in the maritime sector.

Introducing the topic, vice-chairman of CII, AP State council, D. Tirupathi Raju said that the concept of 'Atmanirbhar' exemplifies 'Ease of doing business'.

Chairman of CII, AP, D. Ramakrishna, said that rules of the game has changed with the advent of information highway and the challenge is how fast one adopts to it.

Collaboration with stakeholders and re-engineering of business, holds the key.

Chairman of VPT K. Rama Mohan Rao, J. Srinivasa Raju, Chairman CII- Visakhapatnam Zone, and Lt. Cdr Ravindranath Reddy, Deputy Chief Executive Officer of A.P. Maritime Board, also spoke.

<https://www.thehindu.com/news/national/andhra-pradesh/plan-to-encourage-local-players-in-defence-procurement-says-scientist/article33949754.ece>



Sun, 28 Feb 2021

IAF jets to feature in Sri Lankan Air Force's 70th anniversary celebrations

"Suryakirans, Sarang and LCA Tejas will participate in an air show at Galle Face, Colombo, scheduled from March 3 to 5 as part of the 70th anniversary celebrations of SLAF," the IAF said in a statement

Suryakirans, Sarang and Light Combat Aircraft Tejas will participate in an air show in Colombo from March 3 to 5 as part of the 70th anniversary celebrations of the Sri Lankan Air Force, the Indian Air Force said on Saturday.

The IAF's aerobatic display teams, the fixed wing 'Suryakirans' and rotary wing 'Sarang', along with Tejas arrived at Colombo on Saturday.

"Suryakirans, Sarang and LCA Tejas will participate in an air show at Galle Face, Colombo, scheduled from March 3 to 5 as part of the 70th anniversary celebrations of SLAF," the IAF said in a statement.

The IAF and SLAF have seen active exchanges and interactions for a number of years in diverse fields like training, operational exchanges and through professional military education courses.

"IAF's participation in the 70th anniversary celebration of SLAF is a further manifestation of the strong professional bonds that the two air forces share," the IAF said.

The IAF Suryakiran Aerobatic Team (SKAT) had earlier toured Sri Lanka in 2001 for the 50th anniversary celebrations of SLAF.

As the IAF aircraft take to the skies of Colombo to mark the event, they will script another significant chapter in the traditionally strong IAF-SLAF ties, it added.

<https://www.hindustantimes.com/india-news/iaf-jets-to-feature-in-sri-lankan-air-force-s-70th-anniversary-celebrations-101614425397192.html>



The IAF's aerobatic display teams, the fixed wing 'Suryakirans' and rotary wing 'Sarang', along with Tejas arrived at Colombo on Saturday. (Representative Image)(PTI)

Battle of Tanks – How will India’s homegrown Arjun MK-1A Main Battle Tank fare Against Pakistan’s Al-Khalid?

India’s Defence Acquisitions Council (DAC) on February 23 cleared the proposal for the acquisition of the indigenous Arjun MK-1A battle tanks for around Rs 8,400 crore. How will the Indian tank fare in a battle when pitted against Pakistan’s Al-Khalid and Al-Zarar

By Younis Dar

The improved version of the Arjun tank was formally handed over by Prime Minister Narendra Modi to the Indian Army a week ago. The ‘Acceptance of Necessity’ was granted by the DAC to enable the Indian Army to acquire 118 Arjun Mk-1A tanks, which are said to be among the most advanced main battle tanks in the world.

The series of upgrades on the new version of the tank is believed to give it a decisive edge over all the tanks possessed by the Pakistan army.

The tank has been designed and manufactured by the Heavy Vehicle Factory of the government’s Combat Vehicle Research and Development Establishment (CVRDE), and it rolled out with around 71 improvements, which make it an entirely different beast from the Arjun Mk-1 tanks currently in service with the army.



The Chinese VT-4 tanks in the Tibet region

“Of the 71, 14 are major improvements in firepower, mobility and protection,” NDTV quoted V Balamurugan, the Director of the Combat Vehicles Research & Development Establishment (CVRDE) that has designed the Arjun.

“The tank has an enhanced hunter-killer capability. The commander has a panoramic sight which, enables day-and-night surveillance with 360-degree coverage. This enables him to detect targets and engage them personally or handover the target to the gunner to prosecute.”

With a capability to carry around 39 rounds of different types of ammunition, Mk-1A is dubbed a formidable challenge for the adversary tanks. The new Arjun is armed with thermobaric shells designed as bunker-busters that can be used to target soldiers, additionally, a penetration-cum-blast round adds decisive firepower to the tank.

Other ammunition addition includes the FSAPDS (Fin Stabilised Armour Piercing Discarding Sabots) and High Explosive Squash Head (HESH), used to break the enemy tank armor.

However, the Mk-1A lacks the capability to fire an anti-tank missile, although missiles can be fired from the tank, a capability expected to be added soon. One significant success has been almost 53 percent indigenous content in the tank, which is a remarkable improvement from the 41 percent used on earlier models. Another noteworthy upgrade in the tank is its transmission system, which can withstand grenade and missile attacks more easily.

The Kanchan modular composite armor protects this beast from all sides from anti-tank ammunition, giving it an all-round protection. The Arjun comes with a 12.7 mm anti-aircraft machine gun, also useful for ground targets, and operated from within the crew compartment. The tank is also armed with an indigenous 120-mm caliber rifle gun and anti-personnel co-axle 7.62 mm machine gun.

Arjun Mk-1A Vs Pakistani Tanks

Pakistan's tank inventory is more diverse and based mainly on Chinese and Ukrainian technology, some of which have been produced in collaboration with the Chinese, including Al-Khalid and Al-Zarar. The T-80UD tanks are Ukrainian, while the Type-85, 69, 59 are Chinese.

Al-Zarar

The Pakistan army fields around 2,400 MBTs grouped into around 50 armored regiments. The inventory is mainly of the Type-59/Al-Zarrar tanks, around 1,100 of them. Al Zarar is a second-generation MBT derived from Type 59 MBT, which in turn was based on the Soviet T-54A. The force also fields some 50 older T-54/T-55 MBTs.

Al-Zarrar boasts of a 125mm smoothbore gun, which is the tank's primary armament. Then there is a 12.7mm Type 54 anti-aircraft heavy machine gun, operated from inside the turret and two 7.62mm coaxial machine guns. The tank can fire armor-piercing fin-stabilized discarding sabot (APFSDS), high explosive anti-tank fin-stabilized warheads (HEAT-FS), HE-FS and anti-tank guided missile rounds.

Al-Khalid

Pakistan and China came together in the 1990s to co-produce around 350 Al Khalid MBT, which is based on the Chinese Type 90-IIM tank. Around 20 upgraded Al Khalid I MBTs have also been deployed by the army. Another version, called the Al Khalid III MBT, is in development.

The modernized and latest version of the tank Al Khalid-1 was inducted into Pakistan Army in June last year and is equipped with enhanced protection against smart ammunition and other forms of top attacks.

According to the website of its manufacturer, the upgraded Al Khalid-1 has improved Muzzle Reference System, Solid State Auto Loader, Improved Radiation Detector, and independent and effective command and control system for deeper and long-distance operations.

Most importantly, the tank is capable of sustainable operations in a nuclear environment because of its life support system. Al Khalid-1 has been designed for "higher strategic and tactical mobility," the website adds. It is also said to be capable of fighting in built-up areas or urban warfare.

T-80UD

Another powerful tank in the Pakistan army – T-80UD MBT, an improved variant of the Soviet-made T-64 MBT – which has been compared to India's Arjun variants, has evolved to be a formidable machine with multiple modern upgrades. First introduced into service in the late 1990s, the country has received around 320 tanks from Ukraine between 1997 and 2002.

"Pakistan's T-80UD tanks could be upgraded to the standards of the T-84 'Oplot-M' MBT, a much-improved variant of the T-84 (which in turn is an improved version of the T-80), featuring a larger turret mounting sophisticated sensors and, among other things, a panoramic thermal-imaging system," Franz-Stefan Gady wrote in *The Diplomat*.

The T-80 Main Battle Tank (MBT) was specifically designed to engage enemy armored vehicles, troops, fortifications, and low-flying helicopters regardless of the visibility factors of it being night or day in all-weather conditions.

Whether moving or stationary, the T-80's advanced fire control system jointly with the 125mm 2A46M smoothbore main gun ensures target kill with the first-round. The T-80s have reportedly fared a lot better due to their superior turbine engine in comparison to T-72s and even T-90s in extreme cold conditions, resulting in their popularity even in today's times.

Pakistan Army's latest acquisition has been the Chinese-made VT-4 Main Battle Tank. The country said the tank will be deployed in an offensive role by strike formations. According to experts, VT-4 can challenge any modern tank in the world with its advanced armor protection, maneuverability, firepower capabilities, and state-of-the-art technology.

Among its most significant capabilities, the VT-4 is equipped with a 125-millimeter smoothbore gun, can fire armor-piercing fin-stabilized discarding-sabot (APFSDS), high explosive anti-tank cartridges, and missiles with a 5-kilometer range.

Although both India and Pakistan are aggressively modernizing their armored platforms, it's difficult to compare the outcome of a tank battle between the two countries. The tanks of both countries boast of potent firepower and maneuverability, with India leading Pakistan in the first factor, while preceding it in the second.

The German engines employed by the Indian tanks give them an advantage over Pakistan's inventory which has mainly Ukrainian tanks. On the other hand, the Pakistani tanks boast of increased maneuverability and agility, which can be a decisive advantage in a close-quarter battle.

For long, the Indian Army has been complaining of the heavy structure of the Arjun tanks although no progress was made in the subsequent upgrades to reduce the tank's weight, which could prove disadvantageous in certain war conditions.

The speed of modernization of the armored platforms can also prove decisive, including the latest upgrades, that incorporate the latest in technology and weaponry.

<https://eurasianimes.com/indias-homegrown-arjun-mk-1a-battle-tank-fare-against-pakistans-al-khalid/>

Defence News

Defence Strategic: National/International



Press Information Bureau
Government of India

Ministry of Defence

Fri, 26 Feb 2021 6:49PM

President reviews Tri-Service Guard of Honour at INS Utkrosh

President of India Shri Ram Nath Kovind was accorded a formal welcome on his arrival at Port Blair. The President was received by the Lieutenant Governor of Andaman & Nicobar Islands Admiral DK Joshi (Retd), Lieutenant General Manoj Pande, Commander-in-Chief Andaman and Nicobar Command (CINCAN) and senior government officials. Supreme Commander of the Armed Forces Shri Ram Nath Kovind reviewed a 150 men Tri-Service Guard of Honour by personnel of Andaman and Nicobar Command (ANC).

<https://pib.gov.in/PressReleasePage.aspx?PRID=170117>
1





पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Sat, 26 Feb 2021 6:49PM

राष्ट्रपति ने आईएनएस उत्कर्ष पर ट्राई सर्विस गार्ड ऑफ ऑनर का निरीक्षण किया

राष्ट्रपति श्री रामनाथ कोविंद का पोर्ट ब्लेयर पहुंचने पर औपचारिक स्वागत किया गया। राष्ट्रपति का स्वागत अंडमान निकोबार द्वीप समूह के उप राज्यपाल एडमिरल डीके जोशी (सेवानिवृत्त), लेफ्टिनेंट जनरल मनोज पांडे, कमांडर-इन-चीफ अंडमान और निकोबार कमान (सीआईएनसीएन) और वरिष्ठ सरकारी अधिकारियों ने किया। सशस्त्र सेनाओं के सर्वोच्च कमांडर राष्ट्रपति श्री रामनाथ कोविंद ने अंडमान निकोबार कमान (एएनसी) के 150 कार्मिकों द्वारा दिए गए ट्राई सर्विस गार्ड ऑफ ऑनर का निरीक्षण किया।



<https://pib.gov.in/PressReleasePage.aspx?PRID=1701284>



Press Information Bureau
Government of India

Ministry of Defence

Fri, 26 Feb 2021 6:48PM

Rear Admiral Sanjay Sharma took over as Admiral superintendent, Naval ship repair yard (Kochi)

Rear Admiral Sanjay Sharma took over as Admiral Superintendent, Naval Ship Repair Yard (Kochi) from Rear Admiral Deepak Bansal, VSM on 26 Feb 21. Before assuming charge, Rear Admiral Sharma paid floral tributes at the memorial of 'The Unknown Worker'.

Rear Admiral Sanjay Sharma was commissioned in the Indian Navy on 01 Aug 86. Prior to this appointment, the Flag Officer has held various important appointments at IHQ MoD(N), Advanced Technology Vessel Program and Headquarters Eastern Naval Command at Visakhapatnam.

The incumbent Rear Admiral Deepak Bansal, who spent fourteen months at the helm of NSRY (Koc), would assume charge as Assistant Chief of Naval Staff (Air Materiel) at IHQ MoD (Navy).

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701170>





पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Fri, 26 Feb 2021 6:48PM

रीयर एडमिरल संजय शर्मा ने नेवल शिप रिपेयर यार्ड (कोच्चि) के एडमिरल सुपरिटेण्डेंट के रूप में पदभार संभाला

रीयर एडमिरल संजय शर्मा ने दिनांक 26 फरवरी 2021 को रीयर एडमिरल दीपक बंसल, वीएसएम से एडमिरल सुपरिटेण्डेंट, नेवल शिप रिपेयर यार्ड (कोच्चि) का पदभार संभाला। कार्यभार संभालने से पहले रीयर एडमिरल शर्मा ने 'द अननोअन वर्कर' के स्मारक पर पुष्पांजलि अर्पित की।

रीयर एडमिरल संजय शर्मा को दिनांक 01 अगस्त 1986 को भारतीय नौसेना में कमीशन प्रदान किया गया था। इस नियुक्ति से पहले फ्लैग ऑफिसर एकीकृत रक्षा मुख्यालय, रक्षा मंत्रालय (नौसेना) में एडवांस्ड टेक्नोलॉजी वेसल प्रोग्राम और विशाखापट्टनम में पूर्वी नौसेना कमान मुख्यालय में विभिन्न महत्वपूर्ण नियुक्तियों पर तैनात रहे हैं।

अब तक इस पद पर रहे रीयर एडमिरल दीपक बंसल, जिन्होंने एनएसआरवाई में शीर्ष स्तर पर 14 महीने गुजारे, अब एकीकृत रक्षा मुख्यालय, रक्षा मंत्रालय, नौसेना में असिस्टेंट चीफ ऑफ नेवल स्टाफ (एयर मटेरियल) का कार्यभार संभालेंगे।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701279>



Press Information Bureau
Government of India

Ministry of Defence

Fri, 26 Feb 2021 6:17PM

Rear Admiral S Venkat Raman takes charge of Naval war college at Goa

Rear Admiral S Venkat Raman, VSM on Friday assumed command of the prestigious Naval War College of the Indian Navy, at Goa. The Admiral took charge of the Navy's Apex Training Institution from Rear Admiral Sanjay Jasjit Singh, AVSM, NM. The Naval War College conducts training for senior officers, including foreign participants, on defence planning, strategic and operational subjects, with a view to promote a culture of strategic and operational thinking.

Rear Admiral Venkat Raman, is an alumnus of the National Defence Academy Khadakvasla. Commissioned on 01 January 1990, the Rear Admiral is a specialist in Communications and Electronic Warfare and has tenanted various appointments onboard frontline warships of the Indian Navy. His sea tenures include command of the stealth frigate Tabar. Prior to taking over command at Goa, the Rear Admiral was heading the Directorate of Naval Intelligence at Naval Headquarters.

He has completed several post graduate study programmes, including Masters in Defence and Strategic Studies in addition to a Masters in Management Studies from the College of Defence Management.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701158>





पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Fri, 26 Feb 2021 6:17PM

रीयर एडमिरल एस वेंकट रमन ने गोवा में नेवल वॉर कॉलेज का कार्यभार संभाला

रीयर एडमिरल एस. वेंकट रमन, वीएसएम ने शुक्रवार को गोवा में भारतीय नौसेना के प्रतिष्ठित नेवल वॉर कॉलेज की कमान संभाली। एडमिरल ने नौसेना की शीर्ष प्रशिक्षण संस्था का कार्यभार रीयर एडमिरल संजय जसजीत सिंह, एवीएसएम, एनएम से ग्रहण किया। नेवल वॉर कॉलेज सामरिक एवं रणनीतिक सोच की संस्कृति को बढ़ावा देने के उद्देश्य से रक्षा योजना, रणनीतिक और सामरिक विषयों पर विदेशी प्रतिभागियों समेत वरिष्ठ अधिकारियों के लिए प्रशिक्षण आयोजित करता है।

रीयर एडमिरल वेंकट रमन, राष्ट्रीय रक्षा अकादमी खड़कवासला के पूर्व छात्र हैं। उनको दिनांक 01 जनवरी 1990 को नौसेना में कमीशन प्रदान किया गया, रीयर एडमिरल संचार और इलेक्ट्रॉनिक युद्ध में विशेषज्ञ है और उन्होंने भारतीय नौसेना के फ्रंटलाइन युद्धपोतों पर विभिन्न नियुक्तियों को संभाला है। समुद्र में उनके कार्यकाल में स्टील्थ फ्रिगेट तबर की कमान शामिल है। गोवा में कमान संभालने से पहले रीयर एडमिरल नौसेना मुख्यालय में नौसेना आसूचना निदेशालय का नेतृत्व कर रहे थे।

उन्होंने कॉलेज ऑफ डिफेंस मैनेजमेंट से मास्टर्स इन मैनेजमेंट स्टडीज के अलावा मास्टर्स इन डिफेंस एंड स्ट्रैटेजिक स्टडीज सहित कई पोस्ट ग्रेजुएट स्टडी प्रोग्राम पूरे किए हैं।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701278>



Press Information Bureau
Government of India
Ministry of Defence

Fri, 26 Feb 2021 5:32PM

Commodore Mahadevu Goverdhan Raju, NM takes over as Naval Officer-In-Charge (Andhra Pradesh)

Commodore M Goverdhan Raju, NM took over as Naval Officer-in-Charge (Andhra Pradesh) from Commodore Sanjiv Issar at an impressive ceremonial parade held in the Naval Base at Visakhapatnam on 26 Feb 21.

Cmde Raju is an alumnus of Sainik School, Korukonda and National Defence Academy, Khadakvasla. He was commissioned into the Indian Navy on 01 Jul 1989 and is a specialist in Navigation and Direction.

He held a spectrum of highly challenging operational, staff and training appointments viz; the commissioning crew of INS Sagardhwani, specialist and executive officer appointments on frontline warships, Joint Director Staff Requirements at Naval Headquarters, Director (Training & Policy) at HQ Integrated Defence Staff, Principal Director (Training) at the premier training establishment, Indian



Naval Academy (Ezhimala) and Director, Maritime Warfare Centre (Vizag).

He has also carried out the duties of Fleet Operations Officer of Eastern Fleet during Dec 2014-May 2016, and he concurrently carried out the duties as the Chief Coordinator for Static Review, Operational Demonstration, Passage Exercise etc. during the prestigious International Fleet Review-2016 and contributed to its grand success.

He is also a graduate of Defence Services Staff College, Wellington, Army War College, Mhow and National Defence College, Mirpur (Bangladesh).

He has the distinction of commanding four *IN* Ships viz; Torpedo Recovery Vessel-71, Ocean Going Minesweeper Ratnagiri, Dhanush OPV Suvarna and Destroyer Ranvijay, as well as two shore units; the premier training establishment INS Chilka with concurrent charge as Naval Officer-in-Charge (Odisha), and the Forward Operating Base INS Sardar Patel with concurrent charge as Naval Officer-in-Charge (Gujarat).

He is a proud recipient of Nao Sena Medal (Devotion to Duty) in 2014.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701124>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Fri, 26 Feb 2021 5:32PM

कमोडोर महादेव गोवर्धन राजू, एनएम ने नौसेना ऑफिसर इंचार्ज (आंध्र प्रदेश) का पदभार संभाला

कमोडोर एम गोवर्धन राजू, एनएम ने दिनांक 26 फरवरी 2021 को विशाखापत्तनम स्थित नौसेना बेस में आयोजित एक शानदार औपचारिक परेड में कमोडोर संजीव इस्सर से नौसेना ऑफिसर इंचार्ज (आंध्र प्रदेश) का पदभार संभाला।

कमोडोर राजू सैनिक स्कूल कोरूकोडा और नेशनल डिफेंस एकेडमी खड़कवासला के पूर्व छात्र हैं। उन्हें दिनांक 01 जुलाई 1989 को भारतीय नौसेना में कमीशन प्रदान किया गया था और वह नेविगेशन और डायरेक्शन में विशेषज्ञ हैं।

वह अत्यधिक चुनौतीपूर्ण सामरिक, स्टाफ और प्रशिक्षण नियुक्तियों पर काबिज़ रहे हैं; जैसे- आईएनएस सागरध्वनि के कमीशनिंग क्रू में शामिल रहे हैं, अग्रिम युद्धपोतों पर विशेषज्ञ और एग्जीक्यूटिव ऑफिसर नियुक्तियां संभाली हैं, नौसेना मुख्यालय में संयुक्त निदेशक स्टाफ रिक्वायरमेंट्स, एकीकृत रक्षा मुख्यालय में डायरेक्टर (ट्रेनिंग एवं पॉलिसी), प्रमुख प्रशिक्षण प्रतिष्ठान भारतीय नौसेना अकादमी (एझिमाला) में प्रधान निदेशक (प्रशिक्षण) और मेरीटाइम वॉरफेयर सेंटर (विशाखापट्टनम) में निदेशक।

उन्होंने दिसंबर 2014 से मई 2016 के दौरान पूर्वी बेड़े के फ्लीट ऑपरेशंस ऑफिसर के कर्तव्यों का भी निर्वहन किया है और उन्होंने प्रतिष्ठित अंतर्राष्ट्रीय फ्लीट रिव्यू-2016 के दौरान चीफ कोऑर्डिनेटर फॉर स्टैटिक रिव्यू, ऑपरेशनल डेमोंस्ट्रेशन, पैसेज एक्सरसाइज इत्यादि के रूप में भी अपना कर्तव्य निभाया और इस आयोजन की अभूतपूर्व सफलता में योगदान दिया।

वह डिफेंस सर्विसेज स्टाफ कॉलेज, वेलिंगटन, आर्मी वॉर कॉलेज, महू और नेशनल डिफेंस कॉलेज मीरपुर (बांग्लादेश) से भी ग्रेजुएट हैं।

उन्हें भारतीय नौसेना के चार जहाजों की कमान संभालने का गौरव प्राप्त है, यथा; टारपीडो रिकवरी वेसल-71, ओशियन गोइंग माइनस्वीपर रत्नागिरी, धनुष ओपीवी सुवर्णा और विध्वंसक रणविजय, साथ ही

दो शोर युनिट्स; नौसेना ऑफिसर इंचार्ज (ओडिशा) के रूप में समवर्ती प्रभार के साथ प्रमुख प्रशिक्षण प्रतिष्ठान आईएनएस चिल्का और नौसेना ऑफिसर इंचार्ज (गुजरात) के समवर्ती प्रभार के साथ फॉरवर्ड ऑपरेटिंग बेस आईएनएस सरदार पटेल में तैनाती ।

वह 2014 में नौसेना मेडल (कर्तव्य के प्रति निष्ठा) के एक गौरवान्वित प्राप्तकर्ता हैं।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701272>



पत्र सूचना कार्यालय
भारत सरकार
रक्षा मंत्रालय

Sat, 27 Feb 2021 4:19PM

श्रीलंकाई वायुसेना के 70 वें सालगिरह महोत्सव में भारतीय वायुसेना की भागीदारी

भारतीय वायु सेना की एयरोबेटिक डिस्प्ले टीम फिक्स्ड विंग "सूर्यकिरन्स" और रोटरी विंग 'सारंग' हल्के लड़ाकू विमान तेजस के साथ श्रीलंका वायु सेना (एसएलएएफ) के कमांडर एयर मार्शल सुदर्शना पथिराना के निमंत्रण पर दिनांक 27 फरवरी 2021 को श्रीलंका के कोलंबो पहुंचीं। सूर्यकिरन्स, सारंग और एलसीए तेजस की टीम श्रीलंकाई वायुसेना के 70 वीं वर्षगांठ समारोह के हिस्से के रूप में दिनांक 03-05 मार्च 2021 से कोलंबो के गाले फेस में निर्धारित एक एयर शो में भाग लेंगी।

भारतीय वायुसेना और श्रीलंकाई वायुसेना (एसएलएएफ) के बीच प्रशिक्षण, सामरिक आदान-प्रदान और पेशेवर सैन्य शिक्षा पाठ्यक्रमों के माध्यम से विविध क्षेत्रों में कई वर्षों से सक्रिय आदान-प्रदान और बातचीत हुई है।

श्रीलंकाई वायुसेना (एसएलएएफ) के 70 वीं वर्षगांठ समारोह में भारतीय वायुसेना की भागीदारी दोनों वायुसेनाओं के बीच साझा किए जाने वाले मजबूत पेशेवर संबंध की एक और अभिव्यक्ति है। भारतीय वायु सेना के सूर्यकिरण एयरोबेटिक टीम (एसकेएटी) ने इससे पहले वर्ष 2001 में श्रीलंकाई वायुसेना (एसएलएएफ) के 50 वें सालगिरह समारोह में हिस्सा लेने के लिए श्रीलंका का दौरा किया था। भारतीय वायु सेना के विमान जब इस कार्यक्रम में भाग लेने के लिए कोलंबो के आसमान में जाएंगे, तो वे एक बार फिर पारंपरिक रूप से मजबूत भारतीय वायुसेना- श्रीलंकाई वायुसेना (एसएलएएफ) के संबंधों में एक और महत्वपूर्ण अध्याय की पटकथा लिखेंगे।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1701367>





Sat, 27 Feb 2021 4:19PM

IAF Participation in 70th Anniversary Celebrations of Slaf

The Indian Air Force aerobatic display teams, the fixed wing ‘Suryakirans’ and rotary wing ‘Sarang’, along with Light Combat Aircraft Tejas arrived at Colombo, Sri Lanka, on 27 Feb 21 on an invitation from Air Marshal Sudarshana Pathirana, Commander of the Sri Lanka Air Force (SLAF). The Suryakirans, Sarang and LCA Tejas will participate in an Air Show at Galle Face, Colombo, scheduled from 03–05 Mar 21 as part of the 70th anniversary celebrations of SLAF.

IAF & SLAF have seen active exchanges and interactions for a number of years in diverse fields like training, operational exchanges and through professional military education courses.

IAFs participation in the 70th anniversary celebration of SLAF is a further manifestation of the strong professional bonds that the two Air Forces share. The IAF Suryakiran Aerobatic Team (SKAT) had earlier toured Sri Lanka in 2001 for the 50th anniversary celebrations of SLAF. As the IAF aircraft take to the skies of Colombo to mark the event, they will script another significant chapter in the traditionally strong IAF-SLAF ties.



<https://pib.gov.in/PressReleasePage.aspx?PRID=1701329>



Sun, 28 Feb 2021

Rationale behind India developing fleet of aircraft carriers

At present, India has two aircraft carriers - INS Vikramaditya and INS Viraat, while it is planning to develop the third - INS Vishaal by 2030. The question arises why is India developing a fleet of aircraft carriers?

Washington DC: At present, India has two aircraft carriers - INS Vikramaditya and INS Viraat, while it is planning to develop the third - INS Vishaal by 2030. The question arises why is India developing a fleet of aircraft carriers? Robert Farley, writing for The National Interest - American bimonthly international affairs magazine, wrote that the rationale behind India's carrier force development has three reasons.

The first is the support of a conventional war against Pakistan, which would involve strikes against Pakistani naval assets and land bases. Second, the carriers make the Indian Navy the preeminent force in the Indian Ocean, better able to command the area than any foreign competitor.

The third prong involves geopolitical competition with China. Regarding Pakistan, Vikrant and Vikramaditya would struggle in strike operations because of limitations on aircraft weight,

although they certainly would attract Pakistani attention. Meanwhile, the Indian Navy being the preeminent force in the Indian Ocean, Indian carriers will always have better access to bases and support facilities in the Indian Ocean than China, the United Kingdom, or even the United States, and the presence of the carriers facilitates the projection of Indian power and the management of trade protection.

The third and main reason, competition with China - Beijing has managed to leapfrog Indian naval aviation development in a relatively short period of time. Although China lacks India's experience with carriers, it boasts a remarkably efficient shipbuilding industry and an increasingly sophisticated aviation sector, making it less dependent on foreign



INS Vikramaditya (File Photo). Image Credit: ANI

technology. Although India may struggle to keep up with Chinese construction, it can leverage geography (proximity to bases) to its advantage in the most likely areas of any conflict, reported The National Interest. Despite considerable economic challenges, India took carrier aviation very seriously in the years after independence. Unlike China (or even the Soviet Union), India focused on carriers instead of submarines.

INS Vikrant, a Majestic-class light carrier, served from 1961 until 1997, fighting effectively in the 1971 war. INS Viraat, formerly the Centaur-class carrier HMS Hermes, joined the Indian Navy in 1987 and served until 2016. The operational INS Vikramaditya, former Kiev-class warship Admiral Gorshkov, was inducted into service in 2014. The 45,000-ton INS Vikramaditya could operate around twenty MiG-29K fighters, along with utility helicopters.

The ship offered the Indian Navy the chance to redevelop its aviation muscles after years of operating only VSTOL (vertical and/or short take-off and landing) aircraft from Viraat. Vikramaditya was only the first step towards recapitalizing the aviation wing of the Indian Navy. The second step was the new INS Vikrant, a 40,000-ton ski-jump carrier built in India's Cochin Shipyard. Laid down in 2009, Vikrant is expected to finally enter service around 2020, with an air wing similar to that of Vikramaditya, reported The National Interest.

For the time being, India has decided to stick with the MiG-29K as its primary naval combat aircraft, rather than the Su-33, the F/A-18, or the Dassault Rafale. Both Boeing and Dassault remain at least somewhat hopeful of exporting carrier-borne fighters to India. Even Saab expressed an interest in converting the Gripen for naval service. The Indian Navy also contemplated developing a navalised version of the HAL Tejas, but (for now) has wisely rejected the complicated effort to convert the troubled fighter, wrote Robert Farley. With one large carrier in service and another on the way, India has become one of the world's pre-eminent naval aviation powers.

India has committed to carrier aviation and has the resources and experience to develop a successful force. The next step in India's naval aviation project will be INS Vishaal, a 65,000-ton conventionally propelled, domestically produced CATOBAR (Catapult Assisted Take-Off But Arrested Recovery) carrier. With experience gleaned from the experience with Vikrant, the design and construction of the carrier will hopefully go more smoothly.

It appears as if India will have unprecedented access to US technology for the construction of Vishaal, including the EMALS electromagnetic catapult system used on the Gerald R Ford class. Unlike Vikrant or Vikramaditya, Vishaal will be able to launch and recover heavy strike aircraft, as well as early warning planes such as the E-2 Hawkeye. Vishaal is supposed to enter service by 2030, although that timeline may be optimistic, said Robert Farley. (ANI)

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

<https://www.devdiscourse.com/article/international/1476561-rationale-behind-india-developing-fleet-of-aircraft-carriers>



Sun, 28 Feb 2021

Nature of war is constant, its character keeps changing, Says Army Chief

Editor's Note

Army Chief General Manoj Mukund Naravane addressed a seminar on the theme of national security organised by Vivekananda International Foundation on 24th February in New Delhi. Transcription of his full speech on the "Role of Indian Army in Dealing with Contemporary National Security Challenges," is reproduced below:

Transcription of General MM Naravane's Speech

The broad theme of my talk today, shall be "The Role of Indian Army in dealing with Contemporary National Security Challenges". However, rather than taking you through the entire journey, I have picked on few areas, that may incite greater interest. Like building blocks of a security mosaic, these impact the future role, and shape of the Indian Army, in National Security. I shall also touch upon the contribution of the IA, towards Nation Building, especially in the contemporary context.



The world at large is slowly recovering, from a year long fight with COVID. The disruptive powers of the pandemic, have been adequately demonstrated and acknowledged. We have come to accept, that many things as we knew them, will never be the same again.

The character of war too, has been rapidly evolving. Allow me to mention here, this small, but distinct difference between, the 'nature' and 'character' of war. The nature of war in terms of, the organised nature of violence, in terms of the blood and gore, in terms of the victor, imposing his will on the vanquished, is constant and unchanging. As to how wars will be fought in terms of, weapons, technology, and the strategic context however, changes rapidly. So, while the nature of war is constant, the character keeps evolving and changing.

Just as a new clock, cannot change the nature of time itself, the rapid and transformative advances in technology, will not change the nature of war itself. Since, the nature of war is unchanging, force and violence will not disappear. They will only manifest in newer forms.

Hard power will always be relevant. It will however, have to constantly discover newer ways of being utilitarian, and adapt to the changing strategic context.

These changes will however, greatly impact as to how wars will be fought, as we have been witnessing around us. We have seen how the very imaginative, and offensive use of drones in Idlib, and then in Armenia – Azerbaijan, challenged the traditional prima donnas; the tanks, the artillery and the dug in infantry. Large platforms, which were once the mainstay of the 20th century battlefield; the Main Battle Tanks, Fighter Aircrafts & Capital Ships, have been rendered relatively less significant, in the face of emerging battlefield challenges. We have also seen how disruptive technologies, are now driving doctrinal cycles like never before. It may not be inaccurate therefore, to infer that technology itself, is steadily emerging as a core combat capability.

The Role of the Indian Army, in the National Security construct, must be seen & understood, in the context of this evolving, and highly dynamic paradigm of, contemporary threats and challenges. I shall therefore, commence my talk this afternoon, on a subject that is, generating

much interest and discussion, in strategic – military circles across the globe; Multi Domain Operations, acronymmed, MDO.

Multi Domain Operations

MDO is a fast evolving concept, riding on developments in niche technologies. We need to figure out the specific contours of its applicability, in the Indian context. I shall flag a few issues for you today.

Let us first look, at some of the key drivers, behind the concept of Multi-Domain Operations. Well, for years our adversaries, have studied the attributes, especially the shortcomings, of Western style militaries, in war-fighting, and have developed stratagems to exploit the same. The Indian Army too, has been schooled in many of those precepts. So, even as we focus on fine-tuning our operational preparedness in hard core kinetics, they, the other side, have focused their energies in the ambiguous grey zone; seeking to out-manoeuve us in the competitive spaces, short of all out conflict. As we fixed our gaze on building core capacities, in land, sea and air, they took the battle to the newer domains of space, cyber, and informatics.

To put it more simply, I would like to draw an analogy, with a game of Football being played between two teams. Visualise, that on one side they are playing European style Soccer. An orderly game, where the rules are pretty stringent. Any physical contact earns you a red card. The other team though, is preparing for a totally different kind of Football, American style Rugby. The game, unlike the earlier one, is intensely physical & complex. To an onlooker, it's often difficult to make out, who has the advantage in the ongoing tussle. Even the shape of the ball is different, as is the goal and the scoring system. In such a contest, there is little doubt as to who will win. Do I need to emphasize, that the first team better change- and change fast!

MDO: Concept/Postulates

The concept of MDO therefore, is a structured attempt, to find answers to these new levers, of competition and combat. It is a given that combat is no longer confined, to the traditional domains, but is expanding steadily, to the newer domains, of Cyber, Space, the Electromagnetic Spectrum, and the Digital Spaces.

“In order to win Future Wars, mere mastery of the traditional domains of Land, Sea and Air will no longer suffice”.

Then, there is also the need to address, threats posed by new actors, both in the kinetic and non – kinetic spaces. Further, as the adversary expands the contest to the grey zone, there is a dire need for modern militaries, to be as proficient in this form of warfare, as in hard core kinetics. For that “we need to shed the classical war and peace disposition, and enhance cross governmental fusion. Concurrently, we need to address the growing challenges, posed by adversaries in stand-off deterrence.

Therefore, as an operational concept, MDO influences both Force Structuring and Capability Development. In order to effectively fulfill our role, in the National Security Construct, and meet these new challenges posed by Multi-Domain Operations, the organisational structure, of the Indian Army has to concurrently evolve. “The establishment of the Defence Cyber Agency and the Defence Space Agency, underscores our intent, to leverage the new domains of warfare”.

Some of you in the audience would recall, the swarm drone offensive striking multiple targets, showcased during the Army Day Parade, on 15th January to be more precise, at the Army Parade Ground in Delhi Cantonment. Such swarms can overwhelm, and effectively suppress the enemy's Air Defence Capability, creating windows of opportunities for our strike elements. The kamakazi strikes displayed by these drones, against tanks and static targets, is a reality to be factored into our future plans. Moreover, it is no longer necessary to score a physical hit, to destroy a target. Offensive capabilities in the digital domain, can effectively neutralise satellites and networks, denying them at critical junctures, to decisively alter the course of the conflict. The swarm drone demonstration, was a message to our adversaries that;

“The Indian Army is steadily inducting niche capabilities to enhance our combat proficiencies for Future Wars.”

Concurrently, we are also working towards penetrating, the Anti – ccess Bubble of our adversaries, by investing in long range vectors, as also through the smart leveraging of our aircraft and aerial platforms.

The concept of MDO, is founded on integration and convergence. The CDS and DMA framework, is indeed a huge step forward. However, we still have a long way to go, in the domain of jointness and integration. Information Manoeuvre, is another essential attribute of MDO that we need to embrace.

Ongoing developments along our Northern Borders, should cause us to ponder over, yet another reality, i.e, the nature of our unsettled borders, and consequently, challenges with regard to the preservation, of our territorial integrity and sovereignty. Without doubt, there are newer threats on the horizon,

but the hard reality, is that legacy challenges, have not quite gone away. In fact, they have only grown, in scale and intensity.

“While the Indian Army will continue to prepare, and adapt to the future, the more proximate, real and present dangers, on our active borders cannot be ignored”.

As you would know, the Transition from a Manpower Intensive Army to a Technologically Oriented Army is already underway. However, in spite of these changes, the requirement of “Boots on Ground” will remain an operational imperative, that cannot be wished away.

One of the major challenges, before us today, is that of growing capability enhancements, in an era of finite budgets. There are no easy answers. I have come to believe that, “the future lies in becoming, agile, smart, fleet footed and innovative, in thought and action alike”.

No military however, can hope to transform and truly modernize, if it is dependent, on foreign technology and weapon systems. The Atmanirbhar Bharat call, of our Hon’ble Prime Minister, envisions creating such indigenous capabilities, as are required for preparing the Indian Armed Forces, for the future battlefield to that end.

“The Capability Development roadmap of the Indian Army, is aligned to the vision of Atmanirbharta”.

Capability Development

This brings me to the second part of my talk, an area that requires sustained effort and investment. I shall spend a few minutes, on the ongoing Capability Development in the Indian Army, to fulfill one of its foremost Roles, that of preserving the Sovereignty, and Territorial Integrity of the Nation.

There is a dynamic relationship between evolving security threats, and capability development, each trying to outsmart the other. Thus, to remain current and relevant, capability development must foresee future threats, and evolve accordingly.

The twin challenges of COVID, and the belligerence of our adversary on the Northern Borders, have brought to fore the vulnerability of global supply chains, underscoring the critical need for self-reliance.

Today, self-reliance in defence, has become a strategic necessity. It is imperative for us, to invest in building long term indigenous capabilities, for application across the entire spectrum of conflict. Niche technologies, including Artificial Intelligence (AI), autonomous & unmanned systems, long range precision technology, Internet of Things (IoT), 5G, Quantum Computing, Directed Energy Systems, to name a few, will certainly need to be acquired, infused and absorbed, as part of a deliberate and continuous process. It is a vital facet of our operational needs, at Strategic, Operational and even Tactical level, and must be addressed in an acceptable timeframe.

However, it must be appreciated, that the dual requirement of fast-tracking modernization, and simultaneously promoting self-reliance, are indeed challenging objectives, for a developing nation like India. Considering the quick pace of defence modernization, being undertaken by our adversaries, we cannot afford to be lagging behind. Towards meeting modern

day defence requirements, I would like to dwell upon, what we are doing, while contributing towards, a secure and self-reliant India.

What Are We Doing?

We are aware, that the indigenous defence industry, is a big enabler for self-reliance, in capability building, and a pre-requisite to maintaining strategic influence, and freedom of action. Our external dependence for weapons and ammunition, creates vulnerabilities during military crises. However, in the last few years, we have tried to reverse this trend, by boosting indigenization, and focusing on dual purpose, high end technology. This approach, will not only ensure self-reliance, but will also hold good, during times of emergency.

The Indian Army remains committed, towards all-out support, to enable our industry, especially in the domain of R&D, which will afford cutting edge technology, to win the wars of tomorrow. We are committed to procuring indigenous equipment, and weapon systems, as nothing could be more motivating for any Army, than to fight and win its wars, with indigenous technologies and weapons. It may be noted, that 75% of Priority 1 projects of 13th Army Plan, costing over ₹ 1,50,000 crore, are supporting our efforts, towards indigenization.

For the Indian Army, the percentage of global schemes contracted, has been going down over the past two years. There are a number of schemes in the pipe line, which have a wholly indigenous content, whether it be the 10m short span, modular bridge or the ATAGS. The Government is also focusing, on increasing the indigenous content, in equipment under manufacture in the country, with ToT, in order to assist MSMEs. I was at the Hazira plant of L&T last week, to roll out the 100th K9Vajra Gun for the Indian Army. The Army has recently ordered M4 QRF vehicles, for protected mobility, along northern borders, from the Pune based, Bharat Forge Company, of the Kalyani Group. We can justifiably be proud of these efforts, which are being put in by the industry, to realise the vision of *Atmanirbharta*.

However, an important issue that one needs to keep in mind, is that indigenous development alone, cannot fill the existing and envisaged operational voids, due to lack of niche technologies and manufacturing capabilities. Hence, the inescapable requirement, on a certain percentage of imports.

“One cannot afford to have an operational void, when the enemy is at the gates”

This Army-Industry partnership, is critical towards meeting the contemporary threats, and challenges while concurrently realizing, the vision of *Atmanirbhar Bharat*. Let me briefly spell out few initiatives, being taken to give a boost to our industry.

The Army Design Bureau, since inception in 2017, is harnessing the potential of local industry, and academia for addressing the requirements of the Indian Army. It has undertaken, pan-India mapping of institutions including IITs. Hand holding of Industry, by providing Firing Ranges, Testing Facilities, Equipment and Weapon System, Innovation Competitions, ‘Def-Expo’ etc, have resulted in coherent development of capabilities, aligned to the requirements of the Indian Army.

The outreach to Industry by the Indian Army, has enabled local players & start-ups, to showcase their equipment. Many of these have been demonstrated, and evaluated in actual operational areas. The contract for 120 Tactical UAVs with Idea Forge, which is one of the promising Defence Start-Ups, has been recently concluded for ₹ 124 cr. Evaluation of a number of indigenous defence equipment, offered by MSMEs and Start-Ups is underway. These contracts, infuse new hope and energy, into these nascent start-ups, and give them confidence, that even they can pitch their products, alongside the big players. The Indian Army has also filed for 15 IPRs this year, and few more are in the pipeline. Further, we have already initiated 15 projects, as a follow up of Suo-Moto Proposals, received from the Industry. This has generated enthusiasm and confidence, in the local industry.

We have also brought about, major structural changes in our organisation, by aligning both the revenue, and capital routes of procurement, under the Deputy Chief of Army Staff (Capability Development and Sustenance). The huge potential of technological research, offered by Indian

Institutes of Technology, and Start-up Incubation Centres, established by these Institutes, is being tapped for progressing, indigenous development of niche technologies.

The iDEX platform provides, an opportunity to young innovators and Start-ups, to come up and provide solutions, to the challenges thrown out under this scheme. Presently under the iDEX – Defence India Start-up Challenge (DISC) scheme, we have four ongoing projects, with 14 Start-ups that are being funded by the Indian Army.

Evolving Security Challenges in the North East & Way Forward

I have spoken on the Shape of Future Wars, and our ongoing endeavor, towards Capability Development, to effectively play our mandated Role, in meeting the contemporary threats. I would now stretch my talk, to the domain of Internal Security, a domain that commits large resources, and requires sustained commitment. I shall talk about the Internal Security situation, in a region, that has been extensively debated, and forms the cornerstone of our aspirational drive, towards a 5 trillion economy in the near future.

Yes, I am referring to the Security Challenges that confront the North East. Having spent much time there, in various capacities and appointments, the North East occupies a special place in my heart. The Indian Army is playing a pivotal role, in the transformation that is taking place, in the Security environment, setting the stage for other stakeholders, to play their role in the development of the NER.

India's North East Region, is extraordinarily diverse and colourful. The nine states, including West Bengal & Sikkim, that comprise the region, share almost 98% of their borders with five countries. It is the Centre of Gravity, for sub-regional connectivity, and thus remains, the launch pad for Act East initiatives.

Regional Construct

The internal dynamics in the North East, is intricately linked, to the Regional Security Construct. This is characterized by rising Chinese belligerence in the Indo-Pacific, its hostility towards weaker nations, and relentless drive to create regional dependencies, through debt traps like the BRI. The resultant Sino-US rivalry, has created regional imbalances & instability. The increasing footprints of China, in India's neighbourhood, and its attempts to unilaterally alter the status-quo, along our disputed borders, have created an environment, of confrontation & mutual distrust.

Another factor that is acutely linked to security is regional & internal connectivity. With failure to deliver on promises, Delivery Deficit has plagued our efforts, at improving regional connectivity. On the internal front also, infrastructure development has been marred, by numerous challenges. Multi-agency involvement, and varied source of funds, coupled with environmental factors, remain major stumbling blocks.

Internal Security

However, there have been encouraging developments too. There has been significant improvement, in the Internal Security situation. As you would know, the states of Mizoram, Tripura, Meghalaya, and large parts of Assam, are practically free from insurgency. The violence levels, have also gradually gone down, over the years. While relentless operations, by the Security Forces, and proactive Govt policies have laid the foundation, favourable external environment, with Myanmar and Bangladesh, has struck at the roots, of various insurgent organisations.

Realignment of the CI/ CT Strategy

With the improving situation, realignment of the CI/ CT Strategy by the Indian Army has been underway in the North East. Force Calibration, with gradual disengagement from CI/CT operations, has resulted in greater focus towards Northern Borders & the IMB. This has already resulted, in the disengagement of 14 Infantry Battalions. Two Division Headquarters, earlier part of the CI grid, are now solely focusing on their operational role, along the Northern Borders. This has been a significant achievement. The operational responsibility of these areas, has now been taken over by the Assam Rifles, under the operational control of the Indian Army.

The Realigned CI Strategy, seeks to establish effective inter-state linkages. Resultantly, a detailed Army study has proposed an umbrella organization, coined the North East Integrated Security Council, to galvanise the strategy, efforts & resources, amongst all stakeholders. Let me spend a few minutes on this proposed model, as it seeks to create multi-agency coordination, so critical for taking the region forward.

Multi-Agency Coordination: Establishment of NE Integrated Security Council

A common thread that runs along the North East States, is a lack of coordination, amongst various agencies. The Policy Disconnect, further accentuated by the feeling that affairs of NER are being run from Delhi. Most of the CAPF and Central Agencies, are headquartered at Delhi. National priorities, political compulsions of the States, & local aspirations are seldom aligned, creating dissonance in execution.

To set the score right, and unleash the tremendous potential of the NE, there is therefore the need, for establishing an organization that can synergise multi-agency coordination, and optimise resource & effort. The Realigned Strategy for the North East, proposes a robust and effective, NE Integrated Security Council.

With the Minister of State for Home, as the Chairman at the apex level, the organisation seeks to galvanise, the efforts of all stakeholders, which includes policymakers, as well as the authorities responsible, to execute these policies. The Army with its wide footprint across the Region, is ideally suited to play the role of regional coordinator. The organisation includes, the Dy NSA for inter-ministerial coordination at Delhi, while Regional Coordination could be under the Army Commander Eastern Command, at Kolkata. With the inclusion of State Chief Secretaries, and DGPs as well as DGs of CAPF, the proposed organization, will address operational and strategic issues, and ensure coordinated multipronged response, at the regional level. I had earlier mentioned, about the need for inter-government fusion, and working across silos. These efforts are in line with our mandated Role, and underscore our commitment, to contribute to the Whole of Government effort, alongside other stakeholders, to National Security.

While I have spoken on the Role of the Indian Army, in dealing with the contemporary threats, and challenges to National Security, an equally important facet, is our contribution to Nation Building. The operational challenges, along our Western and Northern Borders, have been further exacerbated, due to the impact of the COVID pandemic, over the past one year. With its wide footprint across the country, the Army was able to considerably augment, the National effort. Timely and crucial aid, rendered to our citizens, and to Friendly Foreign Countries, in the initial months of 2020, when we ourselves were gearing up, to combat the pandemic needs special mention.

A medical team of IA doctors, and Nursing staff was placed, at the Narela Quarantine Facility, where Indian Nationals were being evacuated, under the Vande Bharat Mission. A central quarantine facility, was est at Chennai for Indian Nationals, being deported from Oman. Medical Teams were also deployed, for the COVID medical facility, on wheels at Shakurbasti, and at Sardar Vallabh Bhai Patel COVID care facility.

As part of the National Effort, the Indian Army has set up quarantine facilities, at 12 locations across the country, for civilian evacuees from various foreign countries. Military Hospitals have also extended, their services to civilians. 15 ambulances of Indian Army, were provided to the Delhi Government.

We are equally conscious, of our responsibility towards our neighbours. The Indian Army was proactive, in providing medical support to our neighbours, in these challenging times, prominent being the medical assistance, to Nepal, Maldives and Kuwait.

Even while this fight against COVID, was at its peak, the Indian Army, was reaching out to render timely assistance, to the civil authorities in areas of natural disaster, and national contingencies.

Disaster struck Baghjan oil fields in Assam, in June last year, when due to a fire accident during maintenance, the fire spread to the oil well. Army columns were mobilized, to not only contain the

fire, but also relocate villagers to safety of relief camps. A major task was the construction, of 150m Pontoon Bridge, in temperatures rising above 75 degrees, to contain the fire, and provide a safe passage to the fire fighters. Relocation of more than 7000 villagers, to safety under challenging conditions, capped the herculean effort.

Conduct of Flood Relief Operations, in Karnataka and Telangana in October last year, aid to civil authorities during Cyclone NIVAR, in Puducherry in November, and assistance in controlling the Forest Fires, in the Dzakou Valley in Nagaland, in Jan this year have been, some of our notable contributions, besides a large number of assistance at the local level.

In fact, the most recent contribution, has been in the assistance provided, in the aftermath of the Flash Floods in Chamoli region, of Uttarakhand earlier this month. Four infantry columns, two Engineer Task forces and medical resources, in addition to aviation assets, were immediately pressed into service. Clearance of the tunnel, is still in progress and the Indian Army, is providing all possible assistance, to the joint efforts underway.

Conclusion

Towards the end, would like to conclude by saying that the challenges to National Security, will continue to evolve, and test our ability to adapt to change. I have made an attempt, to touch upon a few facets of National Security, and the Role of the Indian Army, in meeting the contemporary challenges, as also our ongoing contribution to Nation Building. Integration, resource optimization, cross-government fusion and sustained investment in niche capabilities, to keep ahead of our adversaries, remain stepping stones, towards the larger objectives of National Security.

The Indian Army is undergoing a silent transformation to remain a potent and capable instrument of the Nation to face future challenges. Rebalancing of Forces, Organisational Restructuring and Capability Development in new domains of warfare, are concurrently taking place.

I wish to thank once again, the Vivekananda International Foundation, for giving me this opportunity to share my views. I wish the Institution, continued success in its efforts, towards initiating and nurturing Indian strategic thought.

<https://bharatshakti.in/nature-of-war-is-constant-its-character-keeps-changing-says-army-chief/>

Countdown begins for ISRO'S first mission in 2021; new satellite to carry Bhagavad Gita, PM Modi's photo

The nanosatellite will carry a copy of the Bhagavad Gita and a photograph of Prime Minister Narendra Modi on the top panel to show solidarity and gratitude for his aatmanirbhar initiative and space privatization

By Nagarjun Dwarkanath

Bengaluru: The Indian Space Research Organisation is gearing up for its first launch of 2021 which is scheduled at 10:24 am from the Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota, Andhra Pradesh on Sunday. This is for the first time that an Indian rocket will launch 637-kg Amazonia-1 of Brazil as primary satellite from the launch pad of the Sriharikota spaceport in Andhra Pradesh's Nellore district, about 100 kms from Chennai.

Named Satish Dhawan Satellite or SD Sat (after founding father of the Indian Space program Prof. Sathish Dhawan), it will send names of 25,000 individuals to space. The nanosatellite will carry a copy of the Bhagavad Gita in the form of an SD card and a photograph of Prime Minister Narendra Modi on the top panel to show solidarity and gratitude for his aatmanirbhar initiative and space privatisation. The names of Isro chairperson Dr K Sivan and scientific secretary Dr R Umamaheswaran have been etched on the bottom panel.

Countdown for the launch of [#PSLVC51](#)/Amazonia-1 mission commenced today at 0854Hrs (IST) from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota.

The satellite will carry 18 co-passenger payloads (four from ISRO's Indian National Space Promotion and Authorisation Centre, three UNITYsats from a consortium of 3 Indian academic institutes and the SD SAT from SKI) and 14 from NSIL. Developed by Chennai-based SpaceKidz India, it will also carry three payloads — one to study space radiation, one to study the magnetosphere, and another that will demonstrate a low-power wide-area communication network.

PSLV-C51/Amazonia-1 is the first dedicated commercial mission of NSIL, which is undertaking it under a commercial arrangement with Seattle, US-based satellite rideshare and mission management provider, Spaceflight Inc. "We are eagerly looking forward to the launch. We are very proud to launch the first Brazilian-built satellite, Chairman and Managing Director of NSIL, G Narayanan, was quoted as saying by PTI.

"This satellite would further strengthen the existing structure by providing remote sensing data to users for monitoring deforestation in the Amazon region and analysis of diversified agriculture across the Brazilian territory," an ISRO statement said.

<https://www.indiatoday.in/india/story/countdown-begins-for-isro-first-mission-2021-new-satellite-to-carry-bhagavad-gita-pm-modi-photo-1773787-2021-02-27>

The hunt for the quantum collapse

The most famous cat in science is Schrödinger's cat, the quantum mechanical mammal, which can exist in a superposition, a state that is alive as well as dead. The moment you look at it, one of both options is chosen. Leiden University physicists simulated an experiment to catch this mysterious moment of choice red handed.

In quantum mechanics, the physics of the smallest bits of matter, this moment of choosing is called the collapse of the wave. In the journal *Physics Status Solidi B*, Tom van der Reep, Tjerk Oosterkamp and other physicists of Leiden University and Geneva University describe how they hope to catch this mysterious moment using a quantum mechanical setup using photons of microwaves in the roles of the dead-and-alive cat.

"Superpositions are quite common in quantum mechanics," says Oosterkamp, "but in the macroscopic world in which we live, you never see them." A cat is either alive or dead, not both. According to the widely accepted Copenhagen interpretation of quantum mechanics, this is because the superposition disappears as soon as one makes a measurement on the photon (or the cat).

Collapse of the wave function

Oosterkamp adds: "But nowhere in this Copenhagen interpretation, it is explained how this would work. What exactly is "a measurement"? Any measurement apparatus will consist of atoms obeying the laws of quantum mechanics, so what sets the measurement process apart? Is it the size of the measurement apparatus? Its mass? Something else? Nobody knows. There are even interpretations in which a measurement only occurs when it is done by a conscious observer, or in which the Universe would split up in several variants.

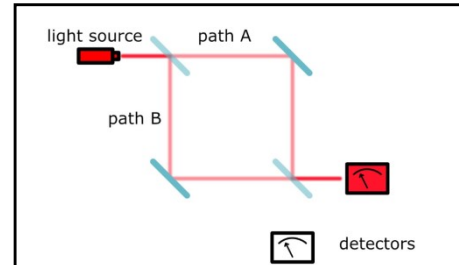
The Leiden physicists decided to open the hunt for the collapse from the perspective of an amplifier that is as simple as possible. They're starting out with photons of microwaves, a form of light, in a superposition. In their setup, the photons take a route A as well as route B.

This superposition can be detected by merging routes A and B again. The particles will interfere with themselves, which means that they will only be detected in one of two exit directions. When there is no superposition, and hence no interference, the particles will exit in both directions. So far, this is standard quantum mechanical fare, proven in many experiments.

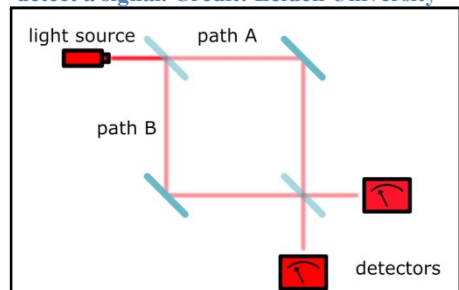
Low temperatures

The next step is introducing a measurement. "In every measurement in a quantum mechanical system, there is an element of amplification," says Oosterkamp, "since you are translating a small signal to a larger one. So perhaps this amplification step constitutes the cause of the collapse of the wave function."

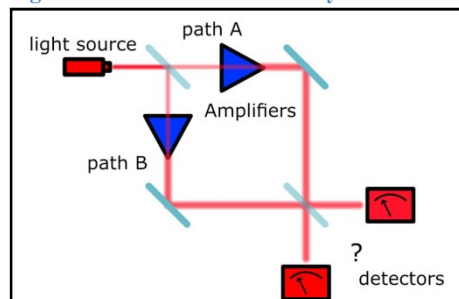
So the physicists place a so-called parametrical amplifier in route A and B of their setup. This is a type of amplifier that can be described well quantum mechanically, which is based on a large number of superconducting Josephson junctions.



Interference of superpositions going through A and B: only one detector will detect a signal. Credit: Leiden University



No interference: both detectors detect light. Credit: Leiden University



What will happen when the photons are amplified? Will the wave function collapse? Credit: Leiden University

For this, an ultra-cold temperature of 50 millikelvin is needed, a twentieth of a degree Celsius above the absolute zero temperature of -273,15 degrees Celsius. Such low temperatures are also needed to ensure that the disappearance of interference is not just caused by the heat in the setup.

Red handed

The idea is to slowly ramp up the amplification, and see what happens to the interference. In their article, the physicists describe how the collapse of the wave function would cause a 'measurable decrease' of the interference. So the setup is a way to catch the collapse red-handed.

"If we succeed at that, that would be terrific," says Oosterkamp. "Of course, then you would want to tweak the parameters to see what changes will influence the moment of collapse. But in this piece, we show that it can be done."

Quantum computers

The paper was a calculation exercise, the setup is now being built. Oosterkamp's group has the right cooling machines to execute the experiments, but it will be a hell of a job to develop the necessary parametric amplifiers that pair a high amplification with very low production of heat.

The experiment is a cooperation with colleague Alessandro Bruno, who started the company QuantWare, which produces these amplifiers for future quantum computers. "Hopefully, tests will show that the amplifiers remain cold enough," says Oosterkamp. "Then, we can really hope to carry out these experiments."

More information: Thomas H. A. van der Reep et al. An Experimental Proposal to Study Collapse of the Wave Function in Traveling-Wave Parametric Amplifiers, *Physics Status Solidi B* (2020). DOI: [10.1002/pssb.202000567](https://doi.org/10.1002/pssb.202000567)
<https://phys.org/news/2021-02-quantum-collapse.html>



Sat, 27 Feb 2021

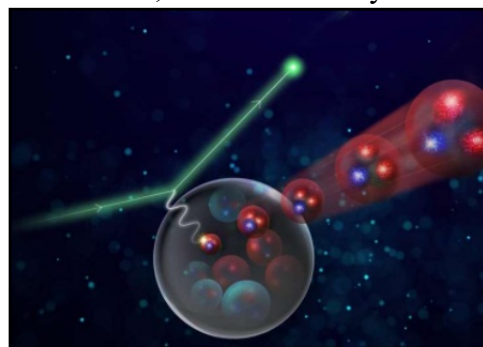
Nuclear physicists on the hunt for squeezed protons

While protons populate the nucleus of every atom in the universe, sometimes they can be squeezed into a smaller size and slip out of the nucleus for a romp on their own. Observing these squeezed protons may offer unique insights into the particles that build our universe.

Now, researchers hunting for these squeezed protons at the U.S. Department of Energy's Thomas Jefferson National Accelerator Facility have come up empty handed, suggesting there's more to the phenomenon than first thought. The result was recently published in *Physical Review Letters*.

"We were looking to squeeze the proton such that its quarks are in a small-size configuration. And that's a pretty tough thing to do," said Holly Szumila-Vance, a Jefferson Lab staff scientist.

Protons are made of three quarks bound up by the strong force. In an ordinary proton, the strong force is so strong that it leaks out, making the proton stick to other protons and neutrons around it in the nucleus. That's according to quantum chromodynamics, or QCD, the theory that



A new experiment used high-energy electrons to knock out protons from within a carbon nucleus in search of "squeezed protons". These are protons that are "squeezed" such that their constituent quarks are in a small size configuration, allowing them to slip out of the nucleus without interacting with other protons or neutrons, an effect called color transparency. The new experiment pushed the measurements to the highest speeds ever explored with electrons, but found that the knocked-out protons behave just as ordinary protons. Credit: DOE's Jefferson Lab

describes how quarks and the strong force interact. In QCD, the strong force is also referred to as the color force.

However, QCD also predicts that the proton can be squeezed such that the quarks become more tightly knit—essentially wrapping themselves up so tightly in the color force that it no longer leaks out of the proton. When that happens, the proton no longer sticks to other particles and can move freely through the nucleus. This phenomenon is called "color transparency," since the proton has become invisible to the color force of the particles around it.

"It's a fundamental prediction of quantum chromodynamics, the theory that describes these particles," Szumila-Vance explained.

An earlier experiment showed color transparency in simpler particles made of quarks called pions. Where protons have three quarks, pions have just two. In addition, another experiment conducted with protons had also suggested that protons also may exhibit color transparency at energies well within reach of the recently upgraded facility at Jefferson Lab.

"We expected to find the protons squeezed just like the pions," said Dipangkar Dutta, a professor at Mississippi State University and a spokesperson for the experiment. "But we went to higher and higher energies and are still not finding them."

The experiment was one of the first to run in the Continuous Electron Beam Accelerator Facility, a DOE Office of Science User Facility, following its 12 GeV upgrade. In the experiment, the nuclear physicists directed high-energy electrons from CEBAF into the nuclei of carbon atoms. They then measured the outgoing electrons and any protons that came out.

"This was an exciting experiment to be a part of. It was the first experiment to run in Experimental Hall C after we upgraded the hall for 12 GeV running," said Szumila-Vance. "These were the highest-momentum protons measured at Jefferson Lab, and the highest-momentum protons ever produced by electron scattering."

"At the energies we are probing, the proton is usually decimated, and you're looking at the debris of the proton," Dutta explained. "But in our case, we want the proton to stay a proton, and the only way that that can happen is if the quarks kind of squeeze together, hold each other much more tightly so that they can escape together from the nucleus."

While the nuclear physicists observed several thousand protons in the experiment, they did not find the tell-tale signs of color transparency in the new data.

"I think this tells us that the proton is more complicated than we expected," said Szumila-Vance. "This is a fundamental prediction of the theory. We know that it has to exist at some high energy, but just don't yet know where that will happen."

The researchers said the next step is to better understand the phenomenon in simpler particles where it has already been observed, so that improved predictions can be made for more complex particles, such as protons.

More information: D. Bhetuwal et al, Ruling out Color Transparency in Quasielastic C12(e,e'p) up to Q2 of 14.2 (GeV/c)², *Physical Review Letters* (2021). DOI: [10.1103/PhysRevLett.126.082301](https://doi.org/10.1103/PhysRevLett.126.082301)

Journal information: [Physical Review Letters](https://phys.org/news/2021-02-nuclear-physicists-protons.html)
<https://phys.org/news/2021-02-nuclear-physicists-protons.html>

Scientists investigate Walker breakdown in 3-D magnetic nanowires

Physicists from Russia, Chile, Brazil, Spain and the U.K., have studied how the magnetic properties change in 3-D nanowires, promising materials for various magnetic applications, depending on the shape of their cross-section. In particular, they more deeply probed the Walker breakdown phenomenon, which may have implications for future technology development. The research outcome appears in *Scientific Reports*.

The cross-sectional geometry of a three-dimensional nanowire affects the domain wall dynamics and therefore is crucial for their control. In turn, managing the DW dynamics under external conditions is necessary in order to develop future electronics and computing devices operating on new physical principles. Such equipment will be faster, more reliable, smaller, and more energy-efficient. An example is magnetic memory, generators of magnetic signals and magnetic logic devices.



FEFU spin nano lab, research equipment Credit: FEFU

The domain wall dynamics in magnetic [nanowires](#) is curbed by the Walker breakdown phenomenon. That is the loss of the linear dependence of the velocity of domain walls on the magnitude of the external magnetic field when the field exceeds a critical value known as the Walker field.

"We managed to find out that the oscillatory behavior of the DW in a nanowire with a polygonal cross-section comes from energy changes due to deformations of the DW shape during the rotation around the nanowire. Thus, a deeper understanding of the Walker breakdown phenomenon is provided," says research participant Yuri Ivanov, a docent at the Department of Computer Systems, Far Eastern Federal University School of Natural Sciences. "We have studied 3-D nanostructures in which domain walls can oscillate not only along the nanowire but also around it. This double oscillation can be considered as a basis, when designing, for example, the sources of radiofrequency electromagnetic radiation (nano-oscillators) for smartphones of the new generation."

The production of 3-D magnetic nanowires is a fast-growing area of research. The material secures a special position among prospective magnetic nanostructures. The different cross-sectional shapes and curvatures of nanowires determine their dynamic and static magnetic properties. However, it is extremely difficult to study these properties due to the three-dimensional structure of the nano-objects.

Next, the scientists plan the development of a theoretical model to predict the change in the dynamic magnetic properties in 3-D nanowires of various cross-sections and curvatures.

More information: Dora Altbir et al, Tuning domain wall dynamics by shaping nanowires cross-sections, *Scientific Reports* (2020). DOI: [10.1038/s41598-020-78761-w](https://doi.org/10.1038/s41598-020-78761-w)

Journal information: [Scientific Reports](#)

<https://phys.org/news/2021-02-scientists-walker-breakdown-d-magnetic.html>

Vitamin B6 may help keep Covid-19's cytokine storms at bay: Study

The study paper published in the journal Frontiers in Nutrition found that vitamin B6 may help calm cytokine storms and unclog blood clots linked to Covid-19's lethality. But the research on it is lacking.

A recent study led by food scientist Thanutchaporn Kumrungsee can be the first step in showing vitamin B6's potential in lowering the odds of patients becoming seriously ill with the coronavirus.

The study paper published in the journal Frontiers in Nutrition found that vitamin B6 may help calm cytokine storms and unclog blood clots linked to Covid-19's lethality. But the research on it is lacking.

Studies have so far explored the benefits of vitamins D and C and minerals like zinc and magnesium in fortifying immune response against Covid-19. But research on vitamin B6 has been mostly missing.

"In addition to washing your hands, food and nutrition are among the first lines of defense against Covid-19 virus infection. Food is our first medicine and kitchen is our first pharmacy," Kumrungsee, an associate professor at Hiroshima University's Graduate School of Integrated Sciences for Life, said.

"Recently, many scientists have published papers regarding the role of diets and nutrients in the protection against Covid-19. However, very few scientists are paying attention to the important role of vitamin B6," she added.

In their paper, she and her fellow researchers pointed out growing evidence showing that vitamin B6 exerts a protective effect against chronic illnesses such as cardiovascular diseases and diabetes by suppressing inflammation, inflammasomes, oxidative stress, and carbonyl stress.

"Coronaviruses and influenza are among the viruses that can cause lethal lung injuries and death from acute respiratory distress syndrome worldwide. Viral infections evoke a 'cytokine storm,' leading to lung capillary endothelial cell inflammation, neutrophil infiltration, and increased oxidative stress," they said.

Kumrungsee explained that thrombosis (blood clotting) and cytokine storm (hyper inflammation) might be closely linked to the graveness of Covid-19. Cytokine storms happen when the immune system dangerously goes into overdrive and starts attacking even the healthy cells. Meanwhile, blood clots linked to Covid-19 can block capillaries, damaging vital organs like the heart, lungs, liver, and kidneys.

Vitamin B6 is a known anti-thrombosis and anti-inflammation nutrient. Deficiency in this vitamin is also associated with lower immune function and higher susceptibility to viral infections.

"Vitamin B6 has a close relationship with the immune system. Its levels always drop in people under chronic inflammation such as obesity, diabetes, and heart diseases. We can see from the news that obese and diabetic people are at high risk for Covid-19," Kumrungsee said.



Covid-19 patients in the Intensive Care Unit (ICU) of a Delhi hospital. (Representative Photo/Reuters)

"Thus, our attempt in this paper is to shed light on the possible involvement of vitamin B6 in decreasing the severity of Covid-19."

The associate professor said she is looking forward to clinical trials that would test their hypothesis.

"It is of great interest to examine if vitamin B6 exerts protection against novel types of virus infection and pneumonia which will be encountered in the future. At present, there is few information regarding the protective role of nutrients against pneumonia and lung diseases," she said.

"After Covid-19, we should develop the area of nutrition for lung diseases such as pneumonia and lung cancer."

<https://www.hindustantimes.com/health/vitamin-b6-may-help-keep-covid-19-s-cytokine-storms-at-bay-study-101614333696522.html>

