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Navy to seek nod for expansion of nuke, diesel submarine fleet

The navy's new plan, inspired by a similar cabinet authorisation for 42 squadrons of the Indian Air Force, will seek approvals for six nuclear-powered attack submarines and 18 diesel attack submarines, a South Block official said

By Shishir Gupta

The Indian Navy intends to approach the government for authorised force levels of nuclear-powered and diesel-electric attack submarines in addition to the ballistic missile submarines with Strategic Force Command (SFC), people familiar with the matter said on Wednesday.

The navy's new plan, inspired by a similar cabinet authorisation for 42 squadrons of the Indian Air Force, will seek approvals for six nuclear-powered attack submarines and 18 diesel attack submarines, a South Block official said.

The authorisation for the diesel subs would include those with an air-independent propulsion system, or AIP, which ensures these submarines can remain under surface for a longer period and are quieter than the nuclear-powered submarine.

The proposed move comes at a time the Navy is finalising plans to seek approval from the Defence Acquisition Committee to build six nuclear-powered attack submarines, or SSNs, as part of the defence establishment's continuing focus on expanding the Navy's capabilities to counter the rise of China's navy in the Indian Ocean Region and beyond.

India currently has only one Akula class SSN on lease from Russia, Akula-II nuclear-powered attack boat INS Chakra, and 15 diesel-electric submarines, including the Scorpene-class submarine INS Kalvari. While three of the Kalvari class submarines have been commissioned, the remaining three will be fitted with the AIP system that makes the submarine more lethal than SSNs because its low radar signature minimises the possibility of detection.

The SSNs play a huge role in sea denial to the adversary and have the capability to remain under the sea without surfacing except for replenishing food stocks and other logistics.

The Indian Strategic Forces Command, which is part of the Nuclear Command Authority and is responsible for the management of the country's strategic nuclear weapons stockpile, has one 6,000 tonnes nuclear-powered ballistic missile submarine (SSBN) INS Arihant. The next SSBN, INS Arighat, is set to be commissioned in 2022, the 75th year of Independence and will have K-15 and K-4 nuclear-capable submarine-launched intermediate-range ballistic missiles on board. The K-15 is expected to have a range of up to 1,500 km while the K-4 is likely to have a maximum range of 3,500 km. Both missiles are being developed by the Defence Research and Development Organisation, or DRDO.



INS Karanj, India's third of six Scorpene class submarines, has superior stealth and several major combat capabilities. (AP Photo)

The DRDO also has long-term plans to develop and test-fire the K5 missile, which will have a range of 5,000km, the same range as the Agni-5 surface-to-surface missile.

The SSBN is the most potent of the nuclear triad due to its survival capabilities and forms the backbone of India's second-strike capability due to its no-first-use (NFU) policy as spelt out in the draft nuclear doctrine.

India's strategic ally France is willing to jointly design and develop SSNs with India, a partnership that will assume importance when Prime Minister Narendra Modi goes to Paris to hold a bilateral summit with President Emmanuel Macron after the completion of the India-EU summit at Lisbon on May 8. The French SSNs are based in Toulon in southern France, and its ballistic missile submarines in the port city of Brest in northwestern France.

India's national security establishment is already in touch with its French counterparts to ensure that the Indian Navy builds up enough deterrence in the Indo-Pacific in the face of the rapidly expanding PLA Navy. The Indian Navy expects the PLA Navy to start sending carrier strike force patrols to the Indian Ocean by 2023.

<https://www.hindustantimes.com/india-news/navy-to-look-for-expansion-of-nuke-diesel-submarine-fleet-101617845572473.html>



Thu, 08 April 2021

समुद्र में चीन-पाक को पछाड़ेगा भारत, नौसेना ने परमाणु-डीजल पनडुब्बी बेड़े के विस्तार के लिए सरकार से की मांग

भारत की रणनीतिक सहयोगी फ्रांस संयुक्त रूप से परमाणु ऊर्जा से चलने वाली पनडुब्बियों को डिजाइन करने और विकसित करने के लिए खुली है, एक साझेदारी जो पीएम मोदी के इस महीने पेरिस में राष्ट्रपति मैक्रोन से मिलने पर महत्वपूर्ण होगी

Edited By: **तनुजा जोशी**

भारतीय नौसेना ने सामरिक बल कमान (SFC) के साथ बैलिस्टिक मिसाइल पनडुब्बियों के अलावा, परमाणु ऊर्जा चालित और डीजल-इलेक्ट्रिक अटैक पनडुब्बियों के अधिकृत बल स्तरों के लिए सरकार से संपर्क करने का इरादा किया है। बुधवार को इस बात की जानकारी दी गई। दक्षिण ब्लॉक के एक अधिकारी ने कहा कि नौसेना की नई योजना, भारतीय वायु सेना के 42 स्क्वाड्रन के लिए एक समान कैबिनेट प्राधिकरण से प्रेरित है, जो 6 परमाणु-संचालित हमले पनडुब्बियों और 18 डीजल हमला पनडुब्बियों के लिए अनुमोदन की मांग करेगी।

डीजल सबसिंटेसन के लिए प्राधिकरण में एक एयर-इंडिपेंडेंट प्रोपल्शन सिस्टम या AIP शामिल होगा, जो सुनिश्चित करता है कि ये सबमरीन अधिक समय तक सतह पर रह सकती हैं और न्यूक्लियर-पावर्ड पनडुब्बी की तुलना में शांत होती हैं। प्रस्तावित कदम ऐसे समय में आया है जब नौसेना ने रक्षा अधिग्रहण समिति से छह परमाणु चालित हमले पनडुब्बियों, या एसएसएन के



File Pic- Submarine

निर्माण की मंजूरी लेने की योजना को अंतिम रूप दे रही है, नौसेना की क्षमताओं का विस्तार करने के लिए रक्षा प्रतिष्ठान के सतत फोकस के हिस्से के रूप में है।

पनडुब्बी बनाती है अधिक घातक

वर्तमान में भारत के पास रूस से पट्टे पर केवल एक अकुला श्रेणी का एसएसएन, अकुला-द्वितीय परमाणु-चालित हमला नाव आईएनएस चक्र, और स्कॉर्पीन श्रेणी की पनडुब्बी आईएनएस कलवरी सहित 15 डीजल-इलेक्ट्रिक पनडुब्बियां हैं, जबकि कलवरी श्रेणी की तीन पनडुब्बियों को चालू कर दिया गया है, शेष तीन को एआईपी प्रणाली से लैस किया जाएगा। ये पनडुब्बी को एसएसएन की तुलना में अधिक घातक बनाती है क्योंकि इसका कम रडार हस्ताक्षर पता लगाने की संभावना को कम करता है।

अगला SSBN, INS अरिघाट, आजादी के 75 वें वर्ष 2022 में स्थापित होने वाला है, और इसमें K-15 और K-4 परमाणु-सक्षम पनडुब्बी-लॉन्च की गई इंटरमीडिएट-रेंज बैलिस्टिक मिसाइलें होंगी। के -15 की सीमा 1,500 किमी तक होने की संभावना है, जबकि के -4 की अधिकतम सीमा 3,500 किमी है। दोनों मिसाइलों को रक्षा अनुसंधान और विकास संगठन, या डीआरडीओ द्वारा विकसित किया जा रहा है।

डीआरडीओ के पास K5 मिसाइल को विकसित करने और परीक्षण करने की दीर्घकालिक योजना भी है, जिसमें 5,000 किमी की रेंज होगी, वही अग्नि -5 सतह से सतह पर मार करने वाली मिसाइल है। SSBN अपनी जीवित रहने की क्षमताओं के कारण परमाणु त्रय का सबसे शक्तिशाली है और इसकी परमाणु-सिद्धांत का मसौदा तैयार करने में उपयोग नहीं होने के कारण भारत की दूसरी-स्ट्राइक क्षमता की रीढ़ बनाता है।

भारतीय नौसेना में हो रहा तेजी से विस्तार

भारत की राष्ट्रीय सुरक्षा स्थापना अपने फ्रांसीसी समकक्षों के साथ पहले से ही संपर्क में है ताकि यह सुनिश्चित हो सके कि भारतीय नौसेना तेजी से विस्तार करने वाली पीएलए नौसेना के सामने इंडो-पैसिफिक में पर्याप्त निरोध का निर्माण करती है। भारतीय नौसेना को उम्मीद है कि पीएलए नौसेना 2023 तक वाहक हड़ताल बल गश्ती दल हिंद महासागर में भेजना शुरू कर देगी।

<https://www.tv9hindi.com/india/navy-demands-green-light-from-government-for-expansion-of-nuclear-nad-diesel-submarine-fleet-608143.html>

DNA Analysis: भारतीय रेलवे का Arch of Chenab Bridge,

समझिए कैसे कश्मीर घाटी तक पहुंच होगी आसान

कश्मीर की खूबसूरत वादियां पहाड़ों के बीच बहती चिनाब नदी और उस पर भारतीय इंजीनियरिंग शानदार उदाहरण है, Arch of Chenab Bridge. ये पुल चिनाब नदी के तल से 359 मीटर ऊंचाई पर रेलवे के सिविल इंजीनियर्स की कारीगरी का शानदार नमूना है।

नई दिल्ली: आज हम आपको भारतीय इंजीनियरिंग के एक शानदार नमूने के बारे में बताएंगे। भारतीय रेलवे के सिविल इंजीनियर्स ने दुनिया का सबसे उंचा रेलवे ब्रिज बना लिया है। कश्मीर में चिनाब नदी पर Arch of Chenab Bridge तैयार किया गया है। इस रेलवे ब्रिज की ऊंचाई चिनाब नदी के तल से 359 मीटर है, जो अपने आप में एक वर्ल्ड रिकॉर्ड है।

कश्मीर से कन्याकुमारी तक का सफर

ये ऊधमपुर, श्रीनगर, बारामूला रेल लिंक प्रोजेक्ट का हिस्सा है। ये पूरा प्रोजेक्ट 272 किलोमीटर लंबा है। कटरा से बनिहाल तक के 111 किलोमीटर लंबे हिस्से को बनाने में ये पुल एक महत्वपूर्ण कड़ी था जिसे रेलवे ने 10 वर्षों में पूरा किया है। इस पुल के बनने से भारतीय रेल नेटवर्क अब कश्मीर से कन्याकुमारी तक जुड़ गया है। यानी कश्मीर से कन्याकुमारी तक का सफर अब रेलवे के जरिए भी मुमकिन हो सकेगा।



कुतुब मीनार से चार गुना बड़ा पुल

आपको जानकर आश्चर्य होगा कि ये कुतुब मीनार से चार गुना बड़ा है। कुतुब मीनार की ऊंचाई 73 मीटर है। इसी तरह एफिल टावर को अगर इस पुल के नीचे रख दिया जाए तो भी ये पुल उससे 35 मीटर उंचा होगा। एफिल टावर की ऊंचाई 324 मीटर है। भारतीय इंजीनियरों की इस कारीगरी ने रेलवे ब्रिज के मामले में चीन को भी पीछे छोड़ दिया है। इस पुल की लंबाई 1 हजार 315 मीटर है और ये कश्मीर के बक्कल और कौरी क्षेत्रों को आपस में जोड़ता है।

सीमा तक सैनिकों को लाने और ले जाने में लगेगा कम वक्त

इस पुल को इस तरह से तैयार किया गया है कि अगले 120 वर्ष तक इस पर से ट्रेन गुजर सकेंगी। इस पुल से एक फायदा ये भी होगा कि सीमा तक सैनिकों को लाने और ले जाने में अब कम वक्त लगेगा क्योंकि, रेलवे की मदद से सैनिक और बाकी सामग्री जल्दी पहुंचाई जा सकेगी। फिलहाल सैनिकों को सड़क मार्ग से ही कश्मीर तक और उसके बाद सीमा तक पहुंचाया जाता है।

पर्यटन और व्यापार को फायदा

इस पुल के बनने के बाद कश्मीर की तस्वीर भी बदलने वाली है क्योंकि, कश्मीर के अन्य हिस्से अब रेलवे नेटवर्क से जुड़ जाएंगे, जिससे कश्मीर के पर्यटन और व्यापार को काफी फायदा पहुंचेगा। कश्मीर की वादियों में बहती चिनाब नदी और उसके ऊपर बना दुनिया का सबसे उंचा ये ब्रिज जल्दी ही टूरिस्ट स्पॉट बन सकता है।

पुल को बनाने में लगा 10 साल का वक्त

ये पुल चिनाब नदी के तल से 359 मीटर ऊंचाई पर रेलवे के सिविल इंजीनियर्स की कारीगरी का शानदार नमूना है। चिनाब पर बने रेलवे ब्रिज के आर्च के आखिरी हिस्से ने जब इस पुल को जोड़ा तो भारत वो पहला देश बन गया जिसने

दुनिया का सबसे ऊंचा रेलवे ब्रिज बना लिया था। दो पहाड़ियों को जोड़ने वाले इस ब्रिज की लंबाई 1315 मीटर है यानी 1 किलोमीटर से ज्यादा। इस पुल को बनाने में 10 साल का वक्त लगा और इसका आर्च बनाने का काम पूरा होने के आखिरी दिन केबल्स के सहारे इस आखिरी हिस्से को उसमें लगाया गया।

कश्मीर घाटी तक पहुंच होगी आसान

अभी तक कश्मीर घाटी से पूरे देश हवाई और सड़क मार्ग से जुड़ा था, लेकिन रेलवे को कश्मीर घाटी तक पहुंचाने का मिशन पूरा करना था। इंजीनियर्स ने पूरी लगन और मेहनत के साथ इस पुल को तैयार किया क्योंकि, ये एक भागीरथ कार्य था। इससे पहले ऐसा काम भारत में नहीं हुआ था। रेलवे के लिए भी ये पुल बनाना एक चुनौती थी।

चुनौतीपूर्ण था काम

272 किमी लंबी उधमपुर-श्रीनगर-बारामूला रेल लिंक प्रोजेक्ट में उधमपुर से कटरा तक रेलवे लाइन पहले ही तैयार हो चुकी है। बनिहाल-श्रीनगर-बारामूला भी ऑपरेशनल है। दोनों ही रेलवे लाइन पर ट्रेन चल रही है, लेकिन इस प्रोजेक्ट का 111 किलोमीटर का हिस्सा जो कटरा से बनिहा तक था वो अभी तैयार नहीं हुआ, इसी पर रेलवे काम कर रहा है और ये पुल इसी का हिस्सा है।

उत्तर रेलवे के इस ब्रिज का निर्माण कोंकण रेलवे करवा रहा है। चिनाब के दो किनारों को कैसे जोड़ा जाए, इसको लेकर काफी मंथन आर्च के जरिए पुल बनाने का फैसला लिया गया क्योंकि, चिनाब की गहराई ज्यादा थी। इसलिए कंक्रीट के पिलर खड़े करके ब्रिज बनाना संभव नहीं था।

ब्रिज की खासियत

- इस ब्रिज की खासियत ये है कि आतंकवादी बम हमले और बड़े भूकंप झेलने में सक्षम है।
- ये रेलवे पुल 266 किमी प्रति घंटे की रफ्तार से चल रही हवाओं को भी झेल सकता है।
- माइनस 10 से माइनस 40 डिग्री तापमान में ही इस पर कोई असर नहीं पड़ेगा।
- इस पुल से 100 kmph की रफ्तार से ट्रेन गुजर सकेगी। हालांकि इस पर 30 किमी प्रति घंटे की स्पीड से ही ट्रेन चलाई जाएगी।
- पुल को ज्यादा सुरक्षित बनाने और आतंकी खतरे को देखते हुए DRDO की मदद भी ली गई है।
- इस ब्रिज की भव्यता का अंदाजा इसी से लगाया जा सकता है कि इसके निर्माण में 28 हजार 660 मीट्रिक टन स्टील का इस्तेमाल हुआ है।

कई देशों के एक्सपर्ट्स से लिया सहयोग

रेलवे ने इस आर्च ब्रिज को तैयार करने के लिए कई देशों के एक्सपर्ट्स का सहयोग लिया है। रेलवे ने फिनलैंड की मदद डिजाइन के लिए, आर्च बनाने के लिए जर्मनी, स्विट्जरलैंड की मदद ली। इसके फाउंडेशन और सुरक्षा के लिए अमेरिका और ब्रिटेन से तकनीकी मदद ली गई। इसके अलावा भारत के IIT दिल्ली, IIT रुड़की और IISC बेंगलुरु की भी मदद ली गई है। अब इस आर्च पर डेक तैयार किया जाएगा और फिर इस पर पटरी बिछाने का काम शुरू होगा। रेलवे अधिकारियों के मुताबिक, चिनाब ब्रिज को अगले साल मार्च तक तैयार कर लिया जाएगा। इस पुल तकनीकी विशेषता और इसकी सफलता पर पीएम मोदी खुश हैं।

पुल के पास ही बनाई गई वर्कशॉप में पुल से जुड़ा हर हिस्सा तैयार किया जाता है। इस प्रोजेक्ट को पूरा करने के लिए 200 से ज्यादा इंजीनियर और 3000 से ज्यादा मजदूर युद्ध स्तर पर लगे हुए हैं। आर्च का काम पूरा होते ही ये क्षण रेलवे और पूरे देश के लिए ऐतिहासिक हो गया क्योंकि, इस पुल के पूरा होने के बाद कश्मीर से लेकर कन्याकुमारी तक एक रेल नेटवर्क तैयार हो जाएगा।

<https://zeenews.india.com/hindi/india/dna-analysis-jammu-and-kashmir-indian-railways-arch-of-chenab-bridge/879884>

Tejas Jets: Malaysia gets serious about LCA Tejas; to visit India for full evaluation

By Younis Dar

In a development that could herald a new dawn for India's LCA Tejas fighter jets, the Malaysian Air Force team is arriving in India to "assess the suitability" of the fighter for a possible procurement order.

India's homegrown Tejas aircraft was recently ordered by the Indian Air Force (IAF) in large numbers, as it tries to bolster its squadron strength.

According to the report in Economic Times, the Malaysian team would be visiting Bengaluru within two months to have a tour of the LCA production facilities.

The travel schedule will also depend on the pandemic restrictions in the country. The team would also be given access to the test infrastructure and a demonstration of the fighter's combat capabilities, the paper quoted a source in the Indian government.

India is reportedly pitching the Mk1A version of the LCA Tejas which boasts of a modern AESA radar, new avionics, and the capability to integrate a variety of weaponry to the Malaysian Air Force.

Malaysia may likely order a total of 12 such aircraft, with a potential order of 24 more fighters in the future, the reports said.

Why LCA Tejas Jets For Malaysia

Malaysia has shortlisted the LCA Tejas as a top contender for the contract of its 36 new Light Combat Aircraft, on the back of low cost and modern combat capabilities. The experts are viewing this as the first potential sale for India's indigenous aircraft, with the jets of other countries falling short of satisfying the Malaysian air force.

Manufactured by Hindustan Aeronautics Limited (HAL), LCA Tejas is said to have a unique advantage – that it is equipped with advanced avionics and weapon system than other fighters in the race for the Malaysian Air Force contract.

Another major advantage the Indian fighter offers is the ease of weapons integration – Tejas can be integrated with Russian as well as Western weapons, which could prove a boon for the Malaysian Air Force which operates jets of both the blocs.

The Swedish Gripen jets have proved to be expensive, and the capabilities of Pakistan's Chinese-origin JF-17 were reportedly found to be lacking as compared to Tejas, whereas another contender, the South Korean T-50, does not stand much of a chance, as per reports.

Malaysia has been showing interest in the Indian fighter for a long time now, and after a few setbacks in the bilateral relations last year, there had been uncertainty over the feasibility of the fighter sale.

However, there seems to be a renewed optimism in the two countries' relations after a long pause. The Indian Air Force recently signed the contract for the acquisition of 83 Tejas Mark 1-A fighters, which in addition had already ordered 40 LCAs in two batches. The LCA Tejas is set to be the backbone of the future fleet of the IAF.

<https://eurasianimes.com/tejas-jets-malaysia-gets-serious-about-lca-tejas-to-visit-india-for-full-evaluation/>





**Press Information Bureau
Government of India**

Ministry of Defence

Wed, 07 April 2021 2:27PM

INS Sarvekshak in Mauritius

INS Sarvekshak, a hydrographic survey ship, is on a deployment to Mauritius for undertaking joint hydrographic surveys along with their Mauritian counterparts. During the deployment, training of Mauritian personnel on advanced hydrographic equipment and practices will also be undertaken. The ship visited Port Louis, Mauritius and commenced the hydrographic survey of 'Deep sea area off Port Louis'.

INS Sarvekshak, a specialised survey ship is fitted with state-of-the-art survey equipment like Deep Sea Multi-Beam Echo Sounder, Side Scan Sonars and a fully automated digital surveying and processing system. In addition, the ship carries an integral Chetak helicopter, which would be extensively deployed during the survey.

INS Sarvekshak has undertaken various foreign cooperation surveys over the last few years in Mauritius, Seychelles, Tanzania and Kenya.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1710075>





पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 07 April 2021 2:27PM

आईएनएस सर्वेक्षक मॉरीशस में

आईएनएस सर्वेक्षक एक हाइड्रोग्राफिक सर्वेक्षण पोत है। यह पोत मॉरीशस की नौसेना के साथ संयुक्त हाइड्रोग्राफिक सर्वेक्षण करने के लिए मॉरीशस में तैनाती पर है। इस तैनाती के दौरान उन्नत हाइड्रोग्राफिक (जलमाप चित्रण संबंधी) उपकरण और प्रक्रियाओं के बारे में मॉरीशस के कर्मियों को प्रशिक्षण दिया जाएगा। यह पोत पोर्ट लुइस, मॉरीशस के दौरे पर है और इसने पोर्ट लुइस के गहरे समुद्र क्षेत्र का हाइड्रोग्राफिक सर्वेक्षण शुरू किया है।

आईएनएस सर्वेक्षक एक विशेष सर्वेक्षण पोत है, जो 'डीप सी मल्टी-बीम इको साउंडर', साइड स्कैन सोनार जैसे अत्याधुनिक सर्वेक्षण उपकरणों से सुसज्जित है। इसमें पूरी तरह से स्वचालित डिजिटल सर्वेक्षण एवं प्रसंस्करण प्रणाली लगी है। इसके अलावा इस पोत पर चेतक हेलीकॉप्टर भी मौजूद है, जिसकी सर्वेक्षण के दौरान व्यापक रूप से तैनाती की जाएगी।



आईएनएस सर्वेक्षक ने पिछले कुछ वर्षों के दौरान मॉरीशस, सेशेल्स, तंजानिया और केन्या में अनेक विदेशी सहयोग सर्वेक्षण आयोजित किए हैं।

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1710108>



**Press Information Bureau
Government of India**

Ministry of Defence

Wed, 07 April 2021 12:42PM

Kazakhstan Defence Minister visits India for bilateral talks

Minister of Defence of Republic of Kazakhstan Lieutenant General Nurlan Yermekbayev is on an official visit to India from April 7-10, 2021. The Kazakh Defence Minister is scheduled to arrive in Jodhpur today and is expected to travel to Jaisalmer, New Delhi and Agra for meetings and visit to defence establishments.

Lieutenant General Nurlan Yermekbayev will hold a bilateral meeting with Raksha Mantri Shri Rajnath Singh in New Delhi on April 09, 2021. This will be the first meeting after Lieutenant General Nurlan Yermekbayev was re-appointed as Defence Minister of Kazakhstan.

The two Ministers had last met in Moscow on September 05, 2020 on the sidelines of Shanghai Cooperation Organisation (SCO) Defence Ministers' meeting. The Kazakh Defence Minister is in India on the invitation of Raksha Mantri.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1710043>



**पत्र सूचना कार्यालय
भारत सरकार**

रक्षा मंत्रालय

Wed, 07 April 2021 12:42PM

कजाकिस्तान के रक्षा मंत्री द्विपक्षीय बातचीत के लिए भारत आए

कजाकिस्तान गणराज्य के रक्षा मंत्री लेफ्टिनेंट जनरल नुरलान येरमेकबायेव भारत की सरकारी यात्रा पर आए हैं। 7-10 अप्रैल, 2021 तक की अपनी यात्रा के दौरान कजाक रक्षा मंत्री आज जोधपुर पहुंचेंगे और वहां से उनके जैसलमेर, नई दिल्ली और आगरा जाने का कार्यक्रम है, जहां वे विभिन्न बैठकों में भाग लेंगे और विभिन्न रक्षा प्रतिष्ठानों का दौरा करेंगे।

लेफ्टिनेंट जनरल नुरलान येरमेकबायेव 9 अप्रैल, 2021 को नई दिल्ली में भारत के रक्षा मंत्री श्री राजनाथ सिंह के साथ द्विपक्षीय बैठक में शामिल होंगे। लेफ्टिनेंट जनरल नुरलान येरमेकबायेव के कजाकिस्तान का दोबारा रक्षा मंत्री नियुक्त होने के बाद से यह उनकी किसी अन्य देश के रक्षा मंत्री के साथ पहली बैठक होगी।

दोनों मंत्रियों की पिछली मुलाकात 5 सितम्बर, 2020 को शंघाई कॉ-ऑपरेशन ऑर्गेनाइजेशन (एससीओ) की रक्षा मंत्री स्तरीय बैठक के समय मॉस्को में हुई थी। कजाक रक्षा मंत्री, भारत के रक्षा मंत्री के निमंत्रण पर भारत आए हैं।

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=1710087>

China capable of launching cyber-attacks against India, says CDS Gen Rawat

The CDS's comments come at a time when India and China are locked in a border standoff in eastern Ladakh and efforts are underway to withdraw front-line troops and weaponry from friction points along the contested Line of Actual Control (LAC)

By Rahul Singh

Chief of defence staff (CDS) General Bipin Rawat on Wednesday said China was ahead of India in technology, and it was capable of launching cyber-attacks against India. He said the biggest gap between the two countries was in the cyber domain and it was being addressed in a serious manner.

“We know China is capable of launching cyber-attacks on us. And that it (China) can disrupt a large amount of our systems,” Rawat said in response to a question after delivering a talk on Shaping the Armed Forces to Meet Likely Current and Future Challenges. Vivekananda International Foundation organised the event.

Rawat said India was trying to create systems for cyber defence to deal with such attacks. He said cyber agencies in the military were working to ensure that “the downtime and the effect of a cyber-attack” did not last long.

“We should be able to overcome cyber-attacks and continue with our systems either through an alternative or preventive means through firewalls. So, while we are trying to create firewalls for cyber-attacks, yet we are quite sure they (China) will be able to break through the firewalls...But then what we are trying to do is how long will your system be down, and how will you be able to operate through that phase of cyber-attack you have been put through. That is one thing we are looking at and addressing in a serious manner,” he said.

The CDS's comments come at a time when India and China are locked in a border standoff in eastern Ladakh and efforts are underway to withdraw front-line troops and weaponry from friction points along the contested Line of Actual Control (LAC).

Rawat said India was developing new technologies to bridge the gap with China. The CDS said closing the technology gap with the neighbour would require integration of the resources of the three services.

“The three services are at different levels as far as our technology orientation is concerned. The navy is far ahead of the army and the Indian Air Force (IAF) in the way they have imbibed technology. If you integrate, you will at least be able to catch up with them (China). We may not be able to fully catch up with China, so we are trying to develop some kind of a relationship with western nations to see how we can get better support from them during peacetime at least to see how we can overcome this deficiency,” Rawat said.

Cyber has, perhaps, come to acquire a pivotal position in any nation's security architecture, said Air Vice Marshal Manmohan Bahadur (retd), additional director general, Centre for Air Power Studies.

“While preparing to acquire offensive capability, it is critical that one's own systems are protected. While we may be lagging behind China, our nation does not lack cerebral capital to catch up unlike in other capital acquisitions. All efforts must be made to tap the nation's inherent cyber know-how to protect our vital infrastructure from cyber intrusions,” Bahadur said.



General Bipin Rawat has indicated that cyber agencies in the military were working to ensure that “the downtime and the effect of a cyber-attack” did not last long.(AFP)

Responding to a question on the challenges to theaterisation and the ongoing efforts to bring about jointness among the three services, Rawat said India as a nation believed in status quo and there was always a hesitation to change.

“Also, there is a feeling amongst the three services that army being a very large service --- compared to navy and IAF --- will possibly usurp the two entities and everything will become army-centric. I think this is a misnomer because the army, navy and IAF have their own specialties. They will retain their autonomy and integration will only ensure that we have systems that at least operate together,” Rawat said.

On women in the armed forces, the CDS said the services were opening more roles to them and there were some areas where they were performing better than men and vice-versa. He said the armed forces were looking at exploiting the capabilities of both men and women and ensuring they were utilised in roles they were best suited for.

“There are some tasks that are better performed by women. For example, when we look at cyber, artificial intelligence, quantum computing --- areas where you need concentration and the ability to sit long hours on the desk --- we have found that the women workforce is better capable than the men folk. So somewhere the women have shown better capability and there are some areas where men have better capability,” Rawat said.

One of the turning points for women in the military came in 2015 when IAF decided to induct them into the fighter stream. Tanks and combat positions in infantry are still no-go zones for women, who were allowed to join the armed forces outside the medical stream for the first time in 1992.

This year, the navy deployed four women officers on warships after a hiatus of almost 25 years. The army has decided to allow them to fly helicopters this year onwards.

<https://www.hindustantimes.com/india-news/china-capable-of-launching-cyber-attacks-against-india-says-cds-gen-rawat-101617808708167.html>

TIMESNOWNEWS.COM

Thu, 08 April 2021

Second list of defence items which must be bought from Indian vendors being prepared: CDS General Bipin Rawat

CDS General Bipin Rawat also said items which cannot be imported but must be bought from Indian vendors being prepared

By Srinjoy Chowdhury

New Delhi: With indigenization and integration the only way forward for the armed forces, General Bipin Rawat says, another list of 100 items that cannot be imported but must be bought from Indian vendors is being prepared.

The first 100 is already there and the CDS made it clear that if private vendors in India were given orders stretching to ten years for ammunition and other products, it will be easier for them to plan and produce the arms and ammunition.

When it came to integration, the CDS made it clear that the primary objective of the armed forces was seamless cooperation: two to three land-based theatre commands were being formed along with an air-defence and a maritime command. Eventually, these theatre commanders would take their orders directly from the chief of



CDS General Bipin Rawat (File photo)

defence staff and the army, navy and air force would be responsible for recruiting troops, training them and providing logistical support. The operational tasks-- of fighting wars-- will not be with the chiefs in the future.

Acknowledging that there was talk about the coming theatre commands would make the armed forces army centric, he said it would not be so. What uniform an officer or jawan was wearing would not be important: an army communication group was working directing with the air force right now, he said. Eventually, there will be an integrated logistics command and a National Maritime Commission, he added.

With requirements increasing, there will never be enough, he suggests. With over a third of the Centre's capital budget going to defence, there is a realization that radical ways have to be worked out.

The CDS pointed to three innovative ideas: first, the defence acquisition council or DAC of which he is the seniormost member, apart from the minister of defence and the minister of state for defence, has cleared the purchase of many weapon systems, giving them AON or Acceptance of Necessity status. But many of these weapon systems were outdated or as the CDS said "redundant."

Secondly, with the government accepting that whatever remained unspent of the capital budget would be rolled over, there would be no need to buy low-hanging fruit, even if they aren't weapons that are really necessary.

Thirdly, the savings from having a smaller army and therefore, reduced manpower costs, could be returned to the armed forces as capital expenses.

<https://www.timesnownews.com/india/article/second-list-of-defence-items-which-must-be-bought-from-indian-vendors-being-prepared-cds-general-bipin-rawat/742284>



Thu, 08 April 2021

IAF Chief visits DSSC Wellington, Sulur Air Base

Coimbatore: The Chief of Air Staff, Air Chief Marshal R.K.S. Bhadauria, visited the Defence Services Staff College (DSSC), Wellington, the Air Base and 5 Base Repair Depot (5 BRD) at Sulur here on Wednesday, said defence sources.

Sharing photos of ACM Bhadauria's visit to the DSSC, the Indian Air Force tweeted that he addressed the faculty and the officers of the 76th Staff Course on the overall threat appreciation, leadership challenges of the future, and ways to reorient operational capability.

IAF also tweeted that the Chief of the Air Staff met the Air Officers Commanding and interacted with personnel of a Base Repair Depot (BRD) and an air base in the area of responsibility (AoR) of the Southern Air Command.

The tweet featured a photo of the IAF chief in the cockpit of an aircraft and another one of him inspecting a defence facility.

A defence spokesperson confirmed that the air base mentioned in the tweet was Sulur. The IAF chief arrived at Sulur Air Base in an AIF aircraft on Wednesday morning and left for Wellington. He returned to the Air Base and visited the 5 BRD before flying back to Bengaluru, the spokesperson said.

<https://www.thehindu.com/news/cities/Coimbatore/iaf-chief-visits-dssc-wellington-sulur-air-base/article34267303.ece>



The Chief of Air Staff, Air Chief Marshal R.K.S. Bhadauria, (second right) at the Defence Services Staff College in Wellington, the Nilgiris, on Wednesday.

Indian Army Chief General Naravane on a five-day visit to Bangladesh

Chief of Army Staff General MM Naravane on Thursday proceeded on a five-day visit to Bangladesh to enhance defence cooperation and strong bilateral ties between the two nations

Chief of Army Staff General MM Naravane on Thursday proceeded on a five-day visit to Bangladesh to enhance defence cooperation and strong bilateral ties between the two nations.

The information about his visit was shared by the Twitter handle of the Additional Directorate General of Public Information, IHQ of MoD (Army).

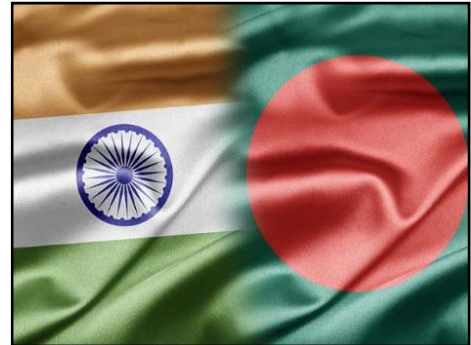
"General MM Naravane #COAS proceeded on a five-day visit to #Bangladesh. The visit aims to further enhance the defence cooperation and strong bilateral ties between #India and #Bangladesh. #IndiaBangladeshFriendship," tweeted ADG PI - Indian Army.

Earlier, the Indian Army delegation arrived in Dhaka on April 4 to participate in a multinational military exercise named 'Shantir Ogroshena 2021' (Front Runner of the Peace).

The Multinational Military Exercise is being held from April 4-12 to mark the birth centenary of the Bangabandhu Sheikh Mujibur Rahman and the golden jubilee of the liberation of Bangladesh.

(Only the headline and picture of this report may have been reworked by the Business Standard staff; the rest of the content is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/current-affairs/indian-army-chief-general-naravane-on-a-five-day-visit-to-bangladesh-121040800204_1.html



बांग्लादेश की पांच दिवसीय यात्रा पर रवाना हुए सेना प्रमुख, रक्षा सहयोग और मजबूत द्विपक्षीय संबंधों को बढ़ाना होगा मकसद

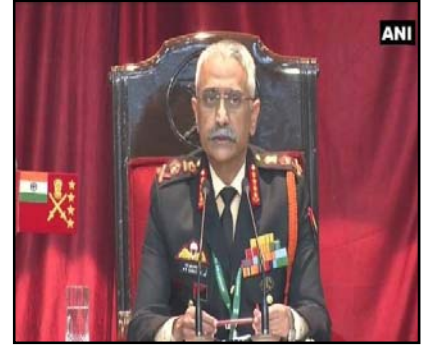
सेना प्रमुख जनरल मनोज मुकुंद नरवणे बांग्लादेश की यात्रा के लिए रवाना हो गए हैं। सेना की तरफ से आए ताजा बयान के मुताबिक सेना प्रमुख अगले पांच दिनों तक पड़ोसी देश के दौरे पर हैं।

By Pooja Singh

नई दिल्ली: सेना प्रमुख जनरल मनोज मुकुंद नरवणे (Army Chief General Manoj Mukund Naravane) बांग्लादेश की यात्रा के लिए रवाना हो गए हैं। सेना की तरफ से आए ताजा बयान के मुताबिक, सेना प्रमुख अगले पांच दिनों तक पड़ोसी देश के दौरे पर हैं। इस यात्रा का उद्देश्य भारत और बांग्लादेश के बीच रक्षा सहयोग और मजबूत द्विपक्षीय संबंधों को और आगे बढ़ाना है। इस यात्रा के बारे में अतिरिक्त सार्वजनिक सूचना महानिदेशालय, सेना के आइएसक्यू (IHQ) के ट्विटर हैंडल द्वारा जानकारी साझा की गई थी।

इससे पहले गए थे ढाका

ट्वीट कर कहा, 'सेना प्रमुख बांग्लादेश के पांच दिवसीय दौरे पर आगे बढ़े। इस यात्रा का उद्देश्य भारत और बांग्लादेश के बीच मजबूत सहयोग और मजबूत द्विपक्षीय संबंधों को बढ़ाना है। बता दें कि इससे पहले 4 अप्रैल को भारतीय सेना का प्रतिनिधिमंडल ढाका में एक बहुराष्ट्रीय सैन्य अभ्यास में भाग लेने के लिए गया था, जिसका नाम 'शान्तिर ऑर्गोसेना 2021' (फ्रंट रनर ऑफ़ द पीस) था।



4-12 अप्रैल तक बहुराष्ट्रीय सैन्य अभ्यास

गौरतलब है कि यहां पर बंगलाबंधु शेख मुजीबुर रहमान की जन्म शताब्दी और बांग्लादेश मुक्ति की स्वर्ण जयंती को चिह्नित करने के लिए 4-12 अप्रैल से बहुराष्ट्रीय सैन्य अभ्यास आयोजित किया गया है।

रिपोर्ट के मुताबिक, इस दौरान सेना प्रमुख 12 अप्रैल को माली, दक्षिण सूडान और मध्य अफ्रीकी गणराज्य के संयुक्त राष्ट्र मिशनों के सैन्य कमांडरों और रॉयल भूटानी सेना के उप-मुख्य संचालन अधिकारी के साथ बातचीत करने करेंगे।

<https://www.jagran.com/news/national-army-chief-manoj-mukund-naravane-proceeded-on-five-day-5-visit-to-bangladesh-aims-to-bilateral-ties-21538795.html>

Atmanirbhar Bharat: Starting-up the defence sector

Start-ups can transform India's military capability and help India achieve tech self-reliance

By Sameer Patil

India's start-up ecosystem, which is propelling the digital economy, is expanding its presence in defence. In a sector notorious for 'middlemen' and a less-than-optimal weapons procurement system, start-ups are infusing fresh energy and purpose by innovating niche, cutting-edge technologies for the military. If nurtured properly, these start-ups can transform India's military capability and achieve tech self-reliance, while building much-sought-after investment linkages with the Silicon Valley.

India is the world's largest arms importer. This is ironic, since the country has long sought self-reliance in defence. Those efforts have yielded little. Beyond serial licensed production of equipment in defence PSUs, true self-reliance has proved difficult. In recent years, 'Make in India' has attempted to change this by promoting the private sector's role in defence production and R&D. The production aspect is yielding slow change, but what has received traction is R&D.

In tapping start-ups, India is following the lead set by Israel and the US, which, very early on, saw and seeded start-up innovation for national security.

In the US, the CIA was one of the first to set up a venture capital firm, In-Q-Tel, in 1999. It provided seed funding to several start-ups, including the big data analytics company Palantir Technologies, which played a crucial role in hunting for Osama bin Laden. Today, Palantir is hailed as a 'tech unicorn' and is a symbol of the defence innovation base in Silicon Valley and other parts of the US. The Pentagon, too, established the Defense Innovation Unit to work closely with the tech industry and start-ups to shortlist, fund and develop emerging technologies.

Likewise, a thriving defence innovation base in and around Tel Aviv has given Israel a technological military edge in a region surrounded by hostile neighbours.

India began this journey just a few years ago. Today, several start-ups are engaged in developing prototypes and products for the Indian military across technologies. Notable are ideaForge (drones), Tonbo Imaging (imaging and sensor systems), IROV (EyeROV) Technologies (underwater drone) and Axio Biosolutions (surgical and wound care). Among these, ideaForge and Tonbo are already significant players with their combat-proven technologies. For instance, ideaForge's drones for the military and the paramilitary have been used in many surveillance, reconnaissance and counterinsurgency operations. Tonbo's imaging and sensor systems improve the lethality of munitions and missiles of the military, and have had their systems' combat-readiness tested by the US Special Forces and Israel Defense Forces.

The government is also tapping the start-up ecosystem through its flagship Innovations in Defence Excellence (iDEX) programme. iDEX works with R&D institutes, academia, industry, start-ups and individual innovators by providing them funding of up to Rs 1.5 crore to create solutions for the military's technological problems. Since its launch in 2018, iDEX has been hosting the Defence India Startup Challenge (DISC), which awards start-ups for mentoring and funding, based on their ability to solve specific technological challenges posed by the military. So far, 60 start-ups have been beneficiaries, and iDEX has identified technologies such as soldier



Likewise, a thriving defence innovation base in and around Tel Aviv has given Israel a technological military edge in a region surrounded by hostile neighbours.

protection systems, secure hardware encryption devices, unmanned surface and underwater vehicles, 4G/LTE tactical local area network, foliage penetration radar, artificial intelligence-based satellite image analysis, among others.

As is the norm with defence R&D worldwide, these technologies are dual-use. For instance, IROV Technologies' underwater drone being developed with the DRDO for surveillance and repair will also have a commercial case. Likewise, Axio Biosolutions, which has created haemostatic dressing—specialised bandages for treating injured personnel in combat—can also be used for similar purposes in any accident or disaster-like situation. These technologies can be used for the homeland security products market, currently dominated by Chinese companies like DJI (drone maker) and Hikvision (IoT solutions and video security systems provider).

The evolving defence start-up ecosystem is enabling a much-needed commercial synergy between India and the US, as many Indian start-ups have participation from Silicon Valley venture firms like Artiman Ventures (Tonbo), Accel and IDG (Axio Biosolutions), Intel Capital (Saankhya Labs), WRVI Capital (ideaForge). This will only expand as India and the US deepen collaboration in defence technology.

One policy change is needed—reduction of the lengthy defence acquisition procedure, which typically takes 7-8 years for major weapons. Longer timelines don't fit with start-up business models, neither they will be appropriate given the rapid pace of technological obsolescence. The government will need to devise and enforce shorter timelines commensurate with the start-up culture.

The government has correctly internalised the global technological trend. Now it needs to execute it.

(The author is fellow, International Security Studies Programme, Gateway House)

<https://www.financialexpress.com/opinion/atmanirbhar-bharat-starting-up-the-defence-sector/2228977/>



Thu, 08 April 2021

Nanoparticles reveal their location via mirror selfi

Can a mirror turn an orange into a doughnut? The answer is definitely no in the real (macro) world. But at the nanoscale, a mirror can turn an 'orange' shaped pattern into a 'doughnut' shaped pattern by overlapping the 'orange' with its reflected mirror image.

A team of researchers from the University of Technology Sydney (UTS) has shown for the first time that fluorescent nanoparticles placed near a mirror generate unique patterns that can be used to pinpoint their location.

The researchers attribute this effect to the light emitting nanoparticle's interference with its own mirror image. Using this method they can also detect the size of particles to a resolution of one nanometre—or around 1/80,000th of the diameter of a human hair.

This breakthrough in ultra-sensitive measuring technology, published in *Nature Communications*, could have many applications including tracking and analyzing disease causing viruses and other pathogens.



Can a mirror turn an orange into a doughnut? Credit: Dr Fan Wang

"When we look in a mirror it doesn't change our physical shape, but that's not the case with emission patterns of nanoparticles," says leading co-author Dr. Fan Wang from the UTS Institute for Biomedical Materials and Devices.

"If you put a nanoparticle in front of a mirror, it will change its image by itself, and the image shape reflects the spacing between the particle and the mirror. This is due to the phase difference between the emitter and its image," he says.

The researchers describe this encoding of position information from a particle emission's self-interference as the "SELFI effect". The resulting patterns include Gaussian, doughnut and archery target shapes.

"To the best of our knowledge, the spatial distribution of the spontaneous emission's SELFI from multiple emitters at the nanoscale has not been reported," says leading co-author Professor Dayong Jin.

"This SELFI leads to a fast, high-resolution and anti-drift sensing method to accurately resolve the position of a single nanoparticles."

The nanoparticles are doped with many rare-earth element ions to achieve the necessary luminescence to create an effective SELFI.

The authors note this new method is suitable for conventional widefield fluorescence microscopy setups without requiring system modification.

More information: Yongtao Liu et al, Axial localization and tracking of self-interference nanoparticles by lateral point spread functions, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-22283-0](https://doi.org/10.1038/s41467-021-22283-0)

Journal information: *Nature Communications*
<https://phys.org/news/2021-04-nanoparticles-reveal-mirror-selfi.html>

Thin cuprous iodide film will enable better optoelectronic devices

By Riken

A defect-free thin film of cuprous iodide—made up of just one crystal—has been fabricated by RIKEN physicists. The atomically flat sample is a boost for producing better semiconductors.

Semiconductors lie at the heart of many optoelectronic devices including lasers and light-emitting diodes (LEDs). Engineers would love to use cuprous iodide—an example of a halide compound—for semiconductors because it is an excellent conductor that is stable above room temperature. The trouble is that it is tough to fabricate a genuinely thin film of cuprous iodide without impurities. The usual method involves depositing the film from a solution. "But a solution process can't make a high-quality thin film from cuprous iodide," says Masao Nakamura of the RIKEN Center for Emergent Matter Science.

Instead, Nakamura and his co-workers used an alternative technique known as molecular beam epitaxy, in which the film is gradually grown on top of a substrate, at an elevated temperature and in a vacuum. Molecular beam epitaxy is already commonly employed in manufacturing semiconductors. But it is hard to use for cuprous iodide because the material is highly volatile—meaning that it easily evaporates during the process, rather than settling into a film. To overcome this difficulty, the team began growing their film at a lower temperature and then increased the temperature. "This two-step process we newly developed was highly effective," says Nakamura.

The team had another trick to raise the quality of their film. They chose indium arsenide as the substrate since its lattice spacing is very similar to that of cuprous iodide. "If the lattice spacing is not well matched, many defects will form in the material," explains Nakamura.

Nakamura and his colleagues then tested the purity of their sample using a technique called photoluminescence spectroscopy, which involves firing photons, or particles of light, at the surface of the material. These photons are absorbed by the material, exciting its electrons to a higher energy state and causing them to emit new photons (Fig. 1). Monitoring the emitted light allowed the team to determine that they had created a single-crystal film, free from defects. "We expected the quality to improve using our method," says Nakamura. "But the results exceeded our expectations."

Nakamura and his team now plan to sandwich together semiconductors made of different halides and investigate new properties that arise. "We will explore emerging novel functionalities and physics at the halide interfaces," says Nakamura.

More information: S. Inagaki et al. Heteroepitaxial growth of wide bandgap cuprous iodide films exhibiting clear free-exciton emission, *Applied Physics Letters* (2021). DOI: [10.1063/5.0036862](https://doi.org/10.1063/5.0036862)
<https://phys.org/news/2021-04-thin-cuprous-iodide-enable-optoelectronic.html>

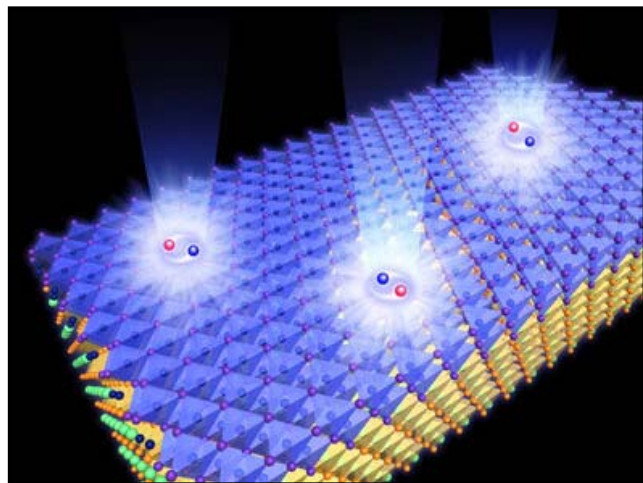


Figure 1: A thin film of cuprous iodide crystals (blue) on an indium arsenide substrate (yellow). The sample's purity was tested by shining photons onto the surface to create electron-hole pairs (red and blue spheres) and monitoring the light that was emitted (white rays). Credit: RIKEN Center for Emergent Matter Science

New estimate of muon's magnetic field strength aligns with standard model of particle physics

A new estimation of the strength of the magnetic field around the muon—a sub-atomic particle similar to, but heavier than, an electron—closes the gap between theory and experimental measurements, bringing it in line with the standard model that has guided particle physics for decades.

A paper describing the research by an international team of scientists appears April 8, 2021 in the journal *Nature*.

Twenty years ago, in an experiment at Brookhaven National Laboratory, physicists detected what seemed to be a discrepancy between measurements of the muon's "magnetic moment"—the strength of its magnetic field—and theoretical calculations of what that measurement should be, raising the tantalizing possibility of physical particles or forces as yet undiscovered. The new finding shrinks this discrepancy, suggesting that the muon's magnetism is likely not mysterious at all. To achieve this result, instead of relying on experimental data, researchers simulated every aspect of their calculations from the ground up—a task requiring massive supercomputing power.

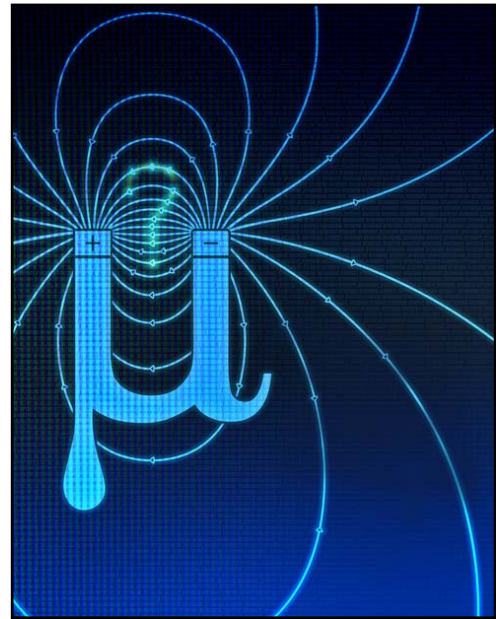
"Most of the phenomena in nature can be explained by what we call the 'standard model' of particle physics," said Zoltan Fodor, professor of physics at Penn State and a leader of the research team. "We can predict the properties of particles extremely precisely based on this theory alone, so when theory and experiment don't match up, we can get excited that we might have found something new, something beyond the standard model."

For a discovery of new physics beyond the standard model, there is consensus among physicists that the disagreement between theory and measurement must reach five sigma—a statistical measure that equates to a probability of about 1 in 3.5 million.

In the case of the muon, measurements of its magnetic field deviated from the existing theoretical predictions by about 3.7 sigma. Intriguing, but not enough to declare a discovery of a new break in the rules of physics. So, researchers set out to improve both the measurements and the theory in the hopes of either reconciling theory and measurement or increasing the sigma to a level that would allow the declaration of a discovery of new physics.

"The existing theory for estimating the strength of the muon's magnetic field relied on experimental electron-positron annihilation measurements," said Fodor. "In order to have another approach, we used a fully verified theory that was completely independent of reliance on experimental measurements. We started with rather basic equations and built the entire estimation from the ground up."

The new calculations required hundreds of millions of CPU hours at multiple supercomputer centers in Europe and bring theory back in line with measurement. However, the story is not over



Artist's conception of the mystery of the magnetic moment of the muon—a sub-atomic particle similar to, but heavier than, an electron (represented by the Greek letter mu). A new estimate of the strength of the muon's magnetic field closes the gap between theory and experimental measurements, bringing it in line with the standard model of particle physics. Credit: Dani Zemba, Penn State

yet. New, more precise experimental measurements of the muon's magnetic moment are expected soon.

"If our calculations are correct and the new measurements do not change the story, it appears that we don't need any new physics to explain the muon's magnetic moment—it follows the rules of the standard model," said Fodor. "Although, the prospect of new physics is always enticing, it's also exciting to see theory and experiment align. It demonstrates the depth of our understanding and opens up new opportunities for exploration."

The excitement is far from over.

"Our result should be cross-checked by other groups and we anticipate them," said Fodor. "Furthermore, our finding means that there is a tension between the previous theoretical results and our new ones. This discrepancy should be understood. In addition, the new experimental results might be close to old ones or closer to the previous theoretical calculations. We have many years of excitement ahead of us."

More information: Leading hadronic contribution to the muon magnetic moment from lattice QCD, *Nature* (2021). DOI: [10.1038/s41586-021-03418-1](https://doi.org/10.1038/s41586-021-03418-1)

Journal information: *Nature*

<https://phys.org/news/2021-04-strength-muon-magnetic-field-aligns.html>

COVID-19 Research News

 **The Indian EXPRESS**

Thu, 08 April 2021

New research: 1 in 3 Covid-19 survivors face neuro or mental health issues in 6 months

The estimated incidence of being diagnosed with a neurological or mental health disorder following Covid-19 infection was 34%

By Anuradha Mascarenhas

Pune: One in three Covid-19 survivors received a neurological or psychiatric diagnosis within six months of infection with the SARS-CoV-2 virus, an observational study of more than 230,000 patient health records published in *The Lancet Psychiatry* journal estimates. The study looked at 14 neurological and mental health disorders.

Since the Covid-19 pandemic began, there has been growing concern that survivors might be at increased risk of neurological disorders. A previous observational study by the same research group reported that Covid-19 survivors are at increased risk of mood and anxiety disorders in the first three months after infection. However, until now, there have been no large-scale data examining the risks of neurological as well as psychiatric diagnoses in the six months after Covid-19 infection.

This latest study analysed data from the electronic health records of 236,379 Covid-19 patients from the US-based TriNetX network, which includes more than 81 million people.



This latest study analysed data from the electronic health records of 236,379 Covid-19 patients from the US-based TriNetX network, which includes more than 81 million people.

Patients who were older than 10 years and who became infected with the SARS-CoV-2 virus after January 20, 2020, and were still alive on December 13, were included in the analysis. This group was compared with 105,579 patients diagnosed with influenza and 236,038 patients diagnosed with any respiratory tract infection (including influenza).

Overall, the estimated incidence of being diagnosed with a neurological or mental health disorder following Covid-19 infection was 34%. For 13% of these people, it was their first recorded neurological or psychiatric diagnosis.

The most common diagnoses after Covid-19 were anxiety disorders (occurring in 17% of patients), mood disorders (14%), substance misuse disorders (7%), and insomnia (5%). The incidence of neurological outcomes was lower, including 0.6% for brain haemorrhage, 2.1% for ischaemic stroke, and 0.7% for dementia.

The authors say their findings should aid service planning and highlight need for ongoing research. “Although the individual risks for most disorders are small, the effect across the whole population may be substantial for health and social care systems due to the scale of the pandemic and that many of these conditions are chronic. As a result, health care systems need to be resourced to deal with the anticipated need, both within primary and secondary care services.”

Risks of a neurological or psychiatric diagnosis were greatest in, but not limited to, patients who had severe Covid-19. Compared to the overall 34% incidence, a neurological or psychiatric diagnosis occurred in 38% of those who had been admitted to hospital, 46% of those in intensive care, and 62% in those who had delirium (encephalopathy) during their Covid-19 infection.

Dr Max Taquet, a co-author of the study, from the University of Oxford, said: “Our results indicate that brain diseases and psychiatric disorders are more common after Covid-19 than after flu or other respiratory infections, even when patients are matched for other risk factors. We now need to see what happens beyond six months. The study cannot reveal the mechanisms involved, but does point to the need for urgent research to identify these, with a view to preventing or treating them.”

<https://indianexpress.com/article/explained/1-in-3-covid-survivors-face-neuro-or-mental-health-issues-in-6-months-study-7261872/>

