Jan
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 : 16 22 जनवरी 2021

Vol. : 46 Issue : 16 22 January 2021

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

CONTENTS

DRDO News

DRDO Technology News

ThePrint

Fri, 22 Jan 2021

India to see tremendous increase in defence exports in next 4-5 years, says DRDO Chairman

There will be a lot of 'indigenous content' in the Indian armed forces, said Chairman of Defence Research and Development Organisation G Satheesh Reddy at a webinar Thursday

New Delhi: There will be tremendous increase in defence exports from India in the next four to ve years, chairman of the state-run Defence Research and Development Organisation (DRDO) G Satheesh Reddy said on Thursday. "Within next 4-5 years, this country will have a lot of indigenous content in the Indian armed forces and we will be seeing tremendous amount of increase in exports," he said at a webinar organised by industry body CII.

Reddy enlisted a number of measures the government and the DRDO have taken to boost the participation of private defence industry.

"In each project of ours, we have invited development and production partner from the industry. Even critical systems like missiles have been opened to the private industry," he said.

File photo of DRDO Chairman - G Satheesh Reddy | Twitter @DRDO_India

Recently, the government has approved the export of Akash missiles to various countries, he mentioned.

On December 30, 2020, the government had approved the export of indigenously-developed surface-to-air Akash missile system and set up a panel to ensure faster approvals for acquisition proposals by various countries.

Reddy said a country is "real Atmanirbhar (self-reliant)" when the design, development and production of state-of-the-art systems that are required by the armed forces are done within the country.

India is one the largest importers of arms globally. According to estimates, the Indian armed forces are projected to spend around USD 130 billion in capital procurement in the next ve years.

However, the government now wants to reduce dependence on imported military platforms and decided to support the domestic defence manufacturing.

The defence ministry has already set a goal of a turnover of USD 25 billion (Rs 1.75 lakh crore) in defence manufacturing in the next ve years that included an export target of USD 5 billion (Rs 35,000 crore) worth of military hardware.

https://theprint.in/defence/india-to-see-tremendous-increase-in-defence-exports-in-next-4-5-years-says-drdo-chairman/589667/

THE WEEK

Fri, 22 Jan 2021

HAL announces 1st test of smart weapon from upgraded Hawk jet

HAL said it is in discussions with the services for integration of weapons on Hawk

For several years now, the Indian Air Force has been battling both a fall in fleet strength and budgetary constraints. To meet the shortfall in combat aircraft while not emptying coffers, HAL has been proposing a 'low cost' home-built solution: Arming the Indian Air Force's fleet of over 100 Hawk advanced jet trainers. The Hawk is designed to be capable of carrying up to 3 tonnes of weapons or fuel under its wings or fuselage.

As part of this initiative, HAL developed the 'Hawk-i' upgrade of the Hawk. This internally funded upgrade of the Hawk was intended to transform the aircraft from a trainer providing training with sensors and weapons in peacetime into a potent combat platform during conflict. Arun Jaitley dedicated the Hawk-i to the nation when he was defence minister in 2017.

The Hawk-i | HAL

While the Indian Air Force has yet to sign any contract to arm its Hawk trainers, on Thursday, HAL announced the Hawk-i had test-fired an anti-airfield weapon.

In a press release, HAL said the Hawk-i test-fired the Smart Anti Airfield Weapon (SAAW) off the coast of Odisha on Thursday. HAL claimed the SAAW is the first smart weapon fired from an Indian Hawk.

“HAL has been focusing on the Atmanirbhar Bharat campaign. The company-owned Hawk-i platform is being extensively used for certification of systems and weapons developed indigenously by DRDO and CSIR labs” said Mr. R. Madhavan, CMD, HAL. HAL announced it is in discussions with the Indian armed forces for integration of various weapons on the Hawk. The Indian Navy also operates the Hawk to train its pilots.

The SAAW is an aircraft-launched, advanced, precision strike weapon weighing 125kg. It is used to attack and destroy enemy airfield assets such as radars, bunkers, taxi tracks and runways within a range of 100km. SAAW has been previously successfully test fired from Jaguar aircraft.

In 2019, a British aviation website reported HAL was looking to integrate two British-origin weapons—the Advanced Short Range Air-to-Air Missile (ASRAAM) and the Brimstone air-to-surface missile—on the Hawk and other fighters of the Indian Air Force.

Integration of weapons such as the SAAW, ASRAAM and Brimstone would give the Indian Air Force's Hawk fleet considerable potential to engage in combat, while having low operating costs. The Hawk is a British-designed aircraft, which was built under licence in India.

https://www.theweek.in/news/india/2021/01/21/hal-announces-1st-test-of-smart-weapon-from-upgraded-hawk-jet.html

Hindustan Times

Fri, 22 Jan 2021

Hawk-i aircraft test-fires DRDO's smart weapon

The Smart Anti-Airfield Weapon (SAAW) is a precision strike weapon that can be used to target enemy airfield assets such as radars, bunkers, taxi tracks and runways

By Rahul Singh

Hindustan Aeronautics Limited (HAL) on Thursday announced that a Hawk-I aircraft successfully fired a Smart Anti-Airfield Weapon (SAAW) for the first time off the coast of Odisha, in what is being seen as a significant boost to an upgrade programme for the Hawk advanced jet trainer operated by the Indian Air Force and the Indian Navy.

The SAAW is a precision strike weapon that can be used to target enemy airfield assets such as radars, bunkers, taxi tracks and runways. Indigenously developed by the Defence Research and Development Organisation's research centre Imarat, the weapon has a range of 100 km. It was test-fired from the IAF's Jaguar fighter planes.

HAL successfully test-fired a Smart Anti-Airfield Weapon (SAAW) from the Hawk-i aircraft off the coast of Odisha on Thursday (ANI Photo)

It is the first smart weapon to be fired from an Indian Hawk Mk132 trainer aircraft. "HAL has been focusing on the Atmanirbhar Bharat campaign. The company-owned Hawk-I platform is being extensively used for certification of systems and weapons developed indigenously by DRDO and Council of Scientific and Industrial Research labs," HAL chairman R Madhavan said. The plane was flown by HAL test pilots Wing Commanders (retd) P Awasthi and M Patel.

https://www.hindustantimes.com/india-news/hawki-aircraft-test-fires-drdo-s-smart-weapon-101611279354221.html

अमर उजाला

Fri, 22 Jan 2021

दुश्मन के 100 किमी दूर ठिकाने को तबाह करेगा 'हॉक आई' विमान, एचएएल ने किया सफल परीक्षण

बंगलुरू: भारत ने स्वदेशी हॉक आई विमान से बृहस्पतिवार को स्मार्ट एंटी एयरफील्ड वेपन (सॉ) का सफल परीक्षण किया है। हिंदुस्तान एयरोनॉटिक्स लिमिटेड (एचएएल) ने देश के इस पहले स्मार्ट हथियार का परीक्षण ओडिशा के तट से किया है। सॉ 100 किमी दूर स्थित दुश्मन के रडार, बंकर, टैक्सी ट्रैक, रनवे समेत किसी भी किसी भी ठिकाने को तबाह कर सकता है।

एचएएल ने 125 किमी वजनी हथियार को स्वदेशी हॉक-आई विमान से ओडिशा तट पर किया परीक्षण

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) द्वारा विकसित इस 125 किलो वजनी हथियार का पहले जगुआर विमान से इस हथियार का सफल परीक्षण किया गया था। एचएएल के परीक्षण पायलटों रिटायर्ड विंग कमांडर पी अवस्थी और रिटायर्ड विंग कमांडर एम पटेल ने हॉक-एमकेआई 132 विमान से उड़ान भरी और इस हथियार का परीक्षण किया।

हॉक-आई विमान का सफल परीक्षण - फोटो : twitter@HALHQBLR

एचएएल ने कहा, परीक्षण ने सभी मिशन उद्देश्यों को पूरा किया। नौसेना और वायुसेना के लिए इस स्मार्ट हथियार को खरीदने के लिए सरकार बीते साल सितंबर में मंजूरी दे चुकी है।

राफेल में भी लगाए जाने की योजना

यह एक तरह का निर्देशित बम है, जो मिसाइल या रॉकेट की तुलना में बहुत सस्ता होगा। भारतीय वायुसेना में शामिल होने पर इस हथियार को राफेल के साथ एकीकृत करने की योजना है। इस परियोजना को 2013 में केंद्र सरकार ने मंजूरी दी थी।

अब तक नौ परीक्षण, रुद्रम भी खरी उतरी

हथियार का पहला सफल परीक्षण मई, 2016 में किया गया था। इसके बाद नवंबर, 2017 में एक और सफल परीक्षण किया गया था। इसके बाद 16 और 18 अगस्त 2018 के बीच तीन सफल परीक्षण किए गए, जिससे कुल परीक्षणों की संख्या आठ हो गई।

बृहस्पतिवार को किया गया परीक्षण 9वां था। उल्लेखनीय है कि पिछले साल डीआरडीओ द्वारा विकसित रुद्रम एंटी रेडिएशन मिसाइल का सफल परीक्षण सुखोई-30 लड़ाकू विमान से किया गया था।

https://www.amarujala.com/india-news/hal-successfully-test-fires-aerial-installations-destroyer-from-hawk-i-aircraft-in-in-odisha-offshore-area

जागरण

Fri, 22 Jan 2021

खतरनाक पहाड़ी और बर्फबारी से प्रभावित हो रहे ऑलवेदर रोड निर्माण में अब डीआरडीओ की तकनीक से होगा काम

प्रदेश में बन रही करीब 900 किलोमीटर की आलवेदर रोड परियोजना को लेकर अब रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) भी मदद करेगा। इससे कुमाऊं एवं गढ़वाल दोनों मंडलों में इस काम को और मजबूती मिलने की उम्मीद है।

By Skand Shukla

हल्द्वानी: प्रदेश में बन रही करीब 900 किलोमीटर की आलवेदर रोड परियोजना को लेकर अब रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) भी मदद करेगा। इससे कुमाऊं एवं गढ़वाल दोनों मंडलों में इस काम को और मजबूती मिलने की उम्मीद है। गढ़वाल में चारधाम मार्ग के अलावा कुमाऊं में टनकपुर से चम्पावत के बीच 150 किलोमीटर निर्माणाधीन रोड में कई पर्वतीय हिस्से बेहद खतरनाक हैं। इसके चलते निर्माण फाइनल करने की तिथि भी आगे खिसक रही है। ऐसे में भारत सरकार की इस महत्वाकांक्षी परियोजना में डीआरडीओ भूस्खलन, बर्फ के बीच निर्माण एवं बारिश से सड़क को नुकसान को कम करने में तकनीकी मदद करेगा।

राज्य में आलवेदर रोड पीएम नरेंद्र मोदी का ड्रीम प्रोजेक्ट भी है। इस परियोजना को तकनीकी रूप से और सशक्त बनाने के लिए सड़क परिवहन एवं राजमार्ग मंत्रालय का डीआरडीओ से करार होना राज्य की बड़ी उपलब्धि मानी जा रही है। डीआरडीओ सचिव डा. सतीश रेड्डी के तकनीकी सलाहकार व वरिष्ठ वैज्ञानिक डा. संजीव कुमार जोशी बताते हैं, इस करार का लाभ उत्तराखंड को मिलेगा। इस समय उत्तराखंड में विषम भौगोलिक परिस्थिति वाले दुर्गम क्षेत्रों से आलवेदर रोड का निर्माण भी हो रहा है। जहां भूस्खलन से लेकर बर्फ वाले कठिनतम क्षेत्र हैं। इन जगहों पर डीआरडीओ की लैब अत्याधुनिक तकनीक की मदद से सड़क मार्ग के निर्माण कार्य को आगे बढ़ाएगी और मजबूती भी प्रदान करने का काम करेगी।

डीजीआरई की हाइटेक तकनीक ऐसे करेगी काम

डीआरडीओ की डिफेंस जीओ इंफारमेटिक्स रिसर्च इस्टेब्लिशमेंट (डीजीआरई) की हाइटेक लैब हैं। जहां तमाम तरह के स्ट्रक्चर तैयार करने के लिए अनुसंधान होते रहते हैं। डा. जोशी बताते हैं, जहां भूस्खलन आम समस्या है, उन जगहों पर तमाम तरह के पौधे उगाए जा सकते हैं। ऐसे एक हजार तरीके के पौधे हैं जो मिट्टी को बांधे रखने के साथ तमाम खूबियों वाले हैं। इसके अलावा उन जगहों पर मजबूत स्ट्रक्चर बनाए जाते हैं, जिसे गैलरी कहते हैं। ऐसे ही एवलांच (हिमस्लखन) वाले जगहों पर भी स्नो गैलरीज बनाई जाती हैं। असल में हिमालयी पहाड़ कमजोर हैं, इसलिए उन जगहों पर मिट्टी का सर्वे कर सड़क निर्माण करने की तकनीक इस्तेमाल जा सकती है।

कई सुरंगें भी बनेंगी

उत्तराखंड राज्य में 10 मीटर की न्यूनतम चौड़ाई के साथ प्रस्तावित दो-लेन राष्ट्रीय राजमार्ग है। परियोजना में लगभग 900 किलोमीटर राष्ट्रीय राजमार्ग शामिल हैं, जो पूरे उत्तराखंड राज्य को जोड़ेगा। इस परियोजना में कई सुरंगें और बर्फ की गैलरी बनाई जानी हैं।

उत्तराखंड में चारधाम परियोजना अच्छी पहल है। इसमें डीआरडीओ तकनीकी सलाह देगा। राज्य में आने वाले वर्षों में सड़क परिवहन का बेहतर लाभ लिया जा सकेगा। इस परियोजना के पूरा होने से पहले ही राज्य को पर्यावरण के

अनुकूल औद्योगिक विकास की पहल करनी चाहिए। ऐसे में साफ्टवेयर उद्योग या इलेक्ट्रानिक्स उद्योग जैसे प्रमुख उद्योगों को आगे बढ़ाने का सही समय है। संजीव कुमार जोशी, वरिष्ठ वैज्ञानिक, डीआरडीओ

https://www.jagran.com/uttarakhand/nainital-drdo-technology-will-work-in-the-construction-of-allweather-road-21296639.html

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Thu, 21 Jan 2021 5:44PM

Raksha Mantri Shri Rajnath Singh and his Indonesian counterpart express satisfaction on defence cooperation in telephonic talk

Raksha Mantri Shri Rajnath Singh held a telephonic conversation with Minister of Defence of Republic of Indonesia General Prabowo Subianto on January 21, 2021. Both Ministers expressed satisfaction at the ongoing defence cooperation between the two countries in spite of the limitations imposed by COVID 19.

The two Ministers exchanged views on security situation in the region and the need for a free and open maritime order based on the rule of law.

They expressed satisfaction at further promoting defence ties between the two countries. During the telephonic conversation, the Ministers reviewed the progress on various bilateral defence cooperation initiatives and expressed commitment to further elevate engagements between the Armed Forces under the framework of the Comprehensive Strategic Partnership. The Ministers agreed that both countries need to enhance cooperation in Defence Industry and Technology domain and look forward to even greater synergy in this field.

https://pib.gov.in/PressReleasePage.aspx?PRID=1690914

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 21 Jan 2021 5:44PM

रक्षा मंत्री श्री राजनाथ सिंह और इंडोनेशिया के रक्षा मंत्री ने टेलीफोन पर हुई बातचीत में रक्षा सहयोग पर संतोष व्यक्त किया

रक्षा मंत्री श्री राजनाथ सिंह ने 21 जनवरी, 2021 को इंडोनेशिया के रक्षा मंत्री, जनरल प्रबोवो सुबिआन्तो के साथ टेलीफोन पर बातचीत की। दोनों मंत्रियों ने कोविड-19 के कारण उत्पन्न हुई बाधाओं के बावजूद दोनों देशों के बीच चल रहे रक्षा सहयोग पर संतोष व्यक्त किया।

दोनों मंत्रियों ने इस क्षेत्र में सुरक्षा स्थिति और कानून के आधार पर एक स्वतंत्र और खुली समुद्री व्यवस्था की आवश्यकता पर अपने विचारों का आदान-प्रदान किया।

दोनों मंत्रियों ने दोनों देशों के बीच रक्षा संबंधों को और अधिक बढ़ावा देने पर सहमति व्यक्त की। टेलीफोन पर हुए बातचीत के दौरान, दोनों मंत्रियों ने विभिन्न द्विपक्षीय रक्षा सहयोग पहलों की प्रगति की समीक्षा की और व्यापक रणनीतिक साझेदारी की अवसंरचना के अंतर्गत सशस्त्र बलों के बीच संबंधों को और अधिक बढ़ावा देने के लिए अपनी प्रतिबद्धता व्यक्त की। दोनों मंत्रियों ने इस बात पर सहमति व्यक्त की कि दोनों देशों को रक्षा उद्योग और प्रौद्योगिकी के क्षेत्र में सहयोग को बढ़ावा देने की आवश्यकता है और इस क्षेत्र में और भी ज्यादा तालमेल की आशा करते है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1691015

Press Information Bureau
Government of India

Ministry of Defence

Thu, 21 Jan 2021 5:07PM

Shri Rajnath Singh confers Raksha Mantri Padak and Commendation to NCC bravehearts

Raksha Mantri Shri Rajnath Singh during his visit to National Cadet Corps (NCC) Republic Day Camp 2021, on January 21, 2021 conferred Raksha Mantri Padak and Commendation Cards to NCC Cadets, for their exemplary performance and devotion to duty, at an impressive 'Investiture Ceremony', held at Delhi Cantt in New Delhi.

Shri Rajnath Singh was received by the Director General NCC Lieutenant General Tarun Kumar Aich. A contingent of smartly turned out NCC cadets drawn from the three wings namely Army, Navy and Air Force, presented an impressive Guard of Honour to the Raksha Mantri.

Raksha Mantri Padak has been awarded to Senior Under Officer (SUO) Prashant Kumar Tiwari of Bihar & Jharkhand Directorate and Lt Commander Jitendra Pal Singh of Uttar Pradesh Directorate. The Padak was instituted in 1989. Since

then it is awarded to the most deserving cadet every year for bravery or exceptional service of the highest order. Raksha Mantri Commendation Cards have also been awarded to Lt Shivani Sharma of Jammu, Kashmir & Ladakh Directorate, SUO Shreeshma Hegde of Karnataka & Goa Directorate, Cadet Syed Shajeed, West Bengal & Sikkim Directorate and Senior GCI Neeva Singh of Delhi Directorate.

In his address, Shri Rajnath Singh complimented the NCC for its contribution as frontline Corona Warriors through 'Exercise NCC Yogdan' in which 1,39,961 cadets & 21,380 staff from all over the country participated in prevention of COVID-19 pandemic by taking up various activities like traffic management, distribution of food and essential items, queue management, preparation and distribution of mask to needy people, etc. Raksha Mantri also praised NCC for taking up initiative towards digitisation by launching NCC Training App and Digital Forum for benefits of all its cadets and associate NCC officers.

Referring to the expansion of NCC by one lakh cadets in the border and coastal areas announced by Prime Minister Shri Narendra Modi from the rampart of Red Fort on August 15, 2020, Raksha Mantri expressed his happiness and complimented NCC for completing the target of enrolment of one lakh cadets in a short span of time in 1,104 schools and colleges in the border and coastal areas.

Shri Rajnath Singh also complimented the NCC fraternity, for making invaluable contributions towards Digital India, Atmanirbhar Bharat, National integration and Nation Building, through multifarious activities. He said that the NCC is doing a yeoman service to the Nation by transforming the youth of the Nation into a cohesive and disciplined force.

https://pib.gov.in/PressReleasePage.aspx?PRID=1690896

Press Information Bureau
Government of India

Ministry of Defence

Thu, 21 Jan 2021 3:46PM

Indian Army Signs MoU with SIDM on Indigenisation and Innovation Partnership

An MoU between the Indian Army & Society of Indian Defence Manufacturers (SIDM) was signed on 21 January 2021 to provide further impetus to indigenisation under the Hon'ble Prime Minister's vision of 'Atmanirbhar Bharat' and to achieve strategic independence by reducing dependence on foreign origin equipment. This MoU was signed on the occasion of 25 Years of Army-Industry Partnership with Confederation of Indian Industry (CII). Collaboration between the Indian Army and industry started in 1995 with the indigenisation of spares and has progressed to major defence platforms and a wide range of weapons and equipment.

Increasing security challenges due to India's rising stature in the international community, apart from unresolved borders and revisionist adversaries require continuous and concerted capability building of the Army through modernisation to address them. This can be done by equipping the Army with indigenously built equipment. In order to optimise capability building and single contact with the industry, Indian Army has reorganised itself by aligning both the revenue and capital routes of procurement under Deputy Chief of Army Staff (Capability

Development & Sustenance). Army Design Bureau (ADB) has been established to act as a direct facilitator with the industry and thereby connect the defence manufacturers directly with the user. These changes have resulted in a collaborative engagement between the technology provider, the equipment manufacturer and the user.

The Government has made necessary policy changes to support indigenisation and achieving self-reliance in defence sector with the active support from the Army. Industry associations have provided a common platform for industry to interact with Indian Army to showcase their expertise. The inputs of industry go a long way in effecting policy modulation and changes. With the signing of MoU with SIDM, Indian Army has reiterated it's firm resolve towards achieving self-reliance by supporting and handholding indigenous defence industry.

https://pib.gov.in/PressReleasePage.aspx?PRID=1690860

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 21 Jan 2021 3:46PM

भारतीय सेना ने स्वदेशीकरण एवं नवाचार साझेदारी पर एसआईडीएम के साथ समझौते पर हस्ताक्षर किए

प्रधानमंत्री के 'आत्मनिर्भर भारत' के दृष्टिकोण के तहत स्वदेशीकरण पर जोर देने तथा विदेश में तैयार उपकरणों पर निर्भरता घटाकर रणनीतिक आत्मनिर्भरता प्राप्त करने के लिए भारतीय सेना और सोसायटी ऑफ इंडियन डिफेंस मैन्युफैक्चरर्स (एसआईडीएम) के बीच 21 जनवरी, 2021 को एक समझौते पर हस्ताक्षर किए गए। भारतीय उद्योग परिसंघ (सीआईआई) के साथ सेना - उद्योगजगत के बीच साझेदारी के 25 वर्ष पूरे होने के अवसर पर इस समझौते पर हस्ताक्षर किए गए। कल-पुर्जों के स्वदेशीकरण के साथ 1995 में भारतीय सेना और उद्योगजगत के बीच साझेदारी शुरू हुई और प्रमुख रक्षा मंचों तथा विभिन्न हथियारों एवं उपकरणों को लेकर इसमें काफी प्रगति हुई।

अनिर्णीत सीमाओं और संशोधनवादी प्रतिकूलताओं के अलावा, अंतर्राष्ट्रीय समुदाय में भारत की महिमा बढ़ने के कारण सुरक्षा की बढ़ती चुनौतियों के समाधान के लिए सेना के आधुनिकीकरण के द्वारा निरंतर क्षमता निर्माण की जरूरत है। सेना को अपने देश में निर्मित उपकरणों से सुसज्जित करके ऐसा करना संभव है। क्षमता निर्माण को मनोनुकूल बनाने और उद्योगजगत के साथ एकल संपर्क कायम करने के क्रम में, भारतीय सेना ने सैन्य उप-प्रमुख (क्षमता विकास संपोषण) के नेतृत्व में राजस्व और खरीद के पूंजीगत रूटों के बीच तालमेल कायम करके खुद को पुनर्संगठित किया है। उद्योगजगत के साथ प्रत्यक्ष सुविधा प्रदाता के रूप में काम करने के लिए सैन्य डिजाइन ब्यूरो (एडीबी) की स्थापना की गई है और इसके द्वारा रक्षा निर्माताओं को सीधे तौर पर उपभोक्ताओं के साथ जोड़ दिया गया है। इन

बदलावों के परिणामस्वरूप प्रौद्योगिकी प्रदान करने वालों, उपकरण निर्माताओं और उपभोक्ताओं के बीच सहयोगात्मक संबंध कायम हुए हैं।

सरकार ने सेना के सक्रिय सहयोग से रक्षा के क्षेत्र में स्वदेशीकरण को समर्थन देने तथा आत्मनिर्भरता तक पहुंचने के उद्देश्य से नीति संबंधी आवश्यक बदलाव किए हैं। उद्योग संघों ने अपनी विशेषज्ञता प्रदर्शित करने को लेकर भारतीय सेना के साथ संपर्क कायम करने के उद्देश्य से उद्योगजगत के लिए एक साझा मंच प्रदान किया है। उद्योगजगत से प्राप्त सुझावों ने नीतिगत संशोधनों एवं परिवर्तनों को काफी प्रभावित किया है। एसआईडीएम के साथ समझौते पर हस्ताक्षर होने से, भारतीय सेना ने स्वदेशी रक्षा उद्योग को समर्थन एवं सहायता देकर आत्मनिर्भर बनने की दिशा में अपना दृढ़ संकल्प दोहराया है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1690936

Press Information Bureau
Government of India

Ministry of Defence

Thu, 21 Jan 2021 1:30PM

Training for Joint Operation in Andaman Sea: Exercise Kavach

A large scale Joint Militaryexercise 'Exercise Kavach' involving assets ofIndian Army, Indian Navy, Indian Air Force and Indian Coast Guard is being conducted in the coming week under the aegis of the Andaman and Nicobar Command (ANC), the only Joint Forces Command of the country. The exercise would involve participation and deployment of elements of Army's Amphibious Brigade along with supporting forces includingSpecial Forces of Navy, Armour/Mechanised components, Naval Ships comprising Destroyers, ASW Corvettes and Landing Ships withship-bornehelicopters of Eastern Naval Command and ANC, Jaguar Maritime Strike and Transport aircrafts from Indian Air Force and assets of Coast Guard.

The exercise involves synergised application of maritime surveillance assets, coordinated air and maritime strikes, air defence, submarine and landing operations. Concurrently Joint Intelligence Surveillance and Reconnaissance (ISR) exercise involving various technical, electronic and human intelligence from three services will be conducted. The ISR exercise will validate the capabilities of intelligence gathering from space, air, land and sea-based assets/ sensors, its analysis and sharing to achieve battle field transparency for quick decision making at different stages of operations.

The joint force would execute multi domain, high intensity offensive and defensive manoeuvres in the Andaman Sea and Bay of Bengal and carry out amphibious landingoperations, air landed operation, helicopters-borne insertion of Special Forces from sea culminating in tactical follow-on operations on land.The tri-services exerciseaims to fine tune joint war-fighting capabilities and SOPs towards enhancing operational synergy.

https://pib.gov.in/PressReleasePage.aspx?PRID=1690793

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Thu, 21 Jan 2021 1:30PM

अंडमान सागर में संयुक्त संचालन – अभ्यास कवच के लिए प्रशिक्षण

देश के एकमात्र संयुक्त बल कमान - अंडमान एवं निकोबार कमान (एएनसी) के तहत भारतीय सेना, भारतीय नौसेना, भारतीय वायुसेना एवं भारतीय तटरक्षक के संसाधनों को मिलाकर एक वृहद संयुक्त सैन्य अभ्यास - अभ्यास कवच को अगले सप्ताह संचालित किया जाएगा। इस अभ्यास में नौसेना के विशेष बलों, पूर्व नौसेना कमान एवं एएनसी के आर्मर/मैकेनाइज्ड घटकों, विध्वंसकों सहित नौसेना जहाजों, एएसडब्ल्यू कोर्वेटों एवं हेलिकॉप्टरों से लैस जहाज सहित लैंडिंग जहाजों, भारतीय वायुसेना के जगुआर मैरीटाइम स्ट्राइक एवं परिवहन विमानों सहित समर्थक बलों के साथ सेना के जलस्थली ब्रिगेड के घटकों की भागीदारी एवं तैनाती शामिल होगी।

इस अभ्यास में समुद्री निगरानी संसाधनों का इस्तेमाल में तालमेल कायम करना, वायु एवं समुद्री हमलों, वायु रक्षा, पनडुब्बी तथा लैंडिंग संचालनों के बीच समन्वय कायम करना शामिल है। इसमें तीनों सेनाओं के विभिन्न तकनीकी, इलेक्ट्रॉनिक तथा मानवीय इंटेलिजेंस सहित सतत संयुक्त इंटेलिजेंस निगरानी एवं सैनिक सर्वेक्षण (आईएसआर) अभ्यास का संचालन किया जाएगा। आईएसआर अभ्यास से अंतरिक्ष, वायु, भूमि एवं समुद्र आधारित संसाधनों/सेंसरों से प्राप्त इंटेलिजेंस की क्षमताओं को मान्यता मिलेगी और इनका विश्लेषण तथा साझेदारी करने से संचालन के विभिन्न चरणों में शीघ्र निर्णय कायम करने के लिए युद्ध मैदान में पारदर्शिता कायम होगी।

संयुक्त बल अंडमान सागर एवं बंगाल की खाड़ी में बहुक्षेत्रीय, उच्च मारक क्षमता तथा रक्षात्मक प्रणाली को कार्यान्वित करेगा तथा जलस्थली लैंडिंग, एयर लैंडिंग संचालन, हेलिकॉप्टर से सुसज्जित समुद्र से लेकर भूमि तक विशेष बलों के संचालन के कार्य को पूरा करेगा। तीनों सेनाओं के अभ्यास का लक्ष्य संयुक्त युद्धक क्षमताओं को बेहतर बनाना और संचालन संबंधी तालमेल बढ़ाने की दिशा में मानक संचालन प्रक्रिया तैयार करना है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1690885

INDIA TODAY

Fri, 22 Jan 2021

CDS Gen Bipin Rawat to fly in French Rafale fighter today

In the ongoing Indo-French wargames Desert Knight-21, Chief of Defence Staff (CDS) General Bipin Rawat will undertake a sortie in a French Rafale fighter on Thursday

By Manjeet Negi

New Delhi: In a sign of strong military ties between India and France, Chief of Defence Staff General Bipin Rawat will undertake a sortie in a French Air Force (FAF) Rafale fighter in Rajasthan's Jodhpur on Thursday.

General Rawat will undertake the sortie on Thursday afternoon, and fly in the jet, Indian Air Force (IAF) officials told India Today.

The all-important exercise is taking place soon after the Pakistani-Chinese aircraft flew together in an exercise opposite the Jodhpur sector — Bhullari. After the sortie, the CDS will also be briefed on the scope of the exercise, and how it is going to help the IAF's capabilities to undertake joint operations.

The IAF kickstarted a five-day mega air exercise with French Air and Space Force involving Rafale fighter jets near Rajasthan's Jodhpur on Wednesday. (Photo: ANI)

Under the exercise, four French Rafale fighters, Desert Knight-21, landed in Jodhpur after flying directly for around four hours from the Djibouti air base, using their A-330 multi-role tanker transport aircraft — which also landed in Jodhpur.

Exercise Desert Knight-21 started at the Jodhpur Air Force Station on Wednesday (January 20), and will conclude on Sunday (January 24).

The French are participating with Rafale, Airbus A-330 Multi-Role Tanker Transport (MRTT), A-400M Tactical Transport aircraft and approximately 175 personnel. The IAF aircraft participating in the exercise include Mirage 2000, Su-30 MKI, Rafale, IL-78 Flight Refuelling Aircraft, AWACS and AEW&C aircraft. The exercise marks an important milestone in the series of engagements between the two air forces.

As part of Indo-French defence cooperation, the IAF and the French Air and Space Force held six editions of air exercises named 'Garuda' — the latest being in 2019 at air force base Mont-de-Marsan in France. As measures to further the existing cooperation, the two forces have been gainfully utilising available opportunities to conduct "hop-exercises".

The French Air and Space Force deployment, while ferrying to Australia for EX Pitchblack in 2018, was hosted by the IAF at the air force stations in Agra and Gwalior, for exercise with fighters and MRTT aircraft. Currently, the French detachment for EX Desert Knight-21 is deployed in Asia as part of their 'Skyros Deployment', and has ferried in forces to the Air Force Station in Jodhpur.

https://www.indiatoday.in/india/story/cds-general-bipin-rawat-to-fly-in-french-rafale-fighter-today-1761304-2021-01-21

FINANCIAL EXPRESS
Read to Lead

Fri, 22 Jan 2021

Niche technologies needed to face challenges from adversaries says Army Chief

It also aims at enhancing research and academic collaboration for in developing innovative solutions to deal with the defence capability requirements

By Huma Siddiqui

In view of the pace of defence modernisation being undertaken by the adversaries, the country was lagging behind slightly, says the Indian Army Chief.

Speaking at an event to commemorate '25 years of Army-Industry partnership', organised by the Society of Indian Defence Manufacturers (SIDM), Army Chief Gen Manoj Naravane on Thursday said, "Continued heavy dependence of the on imports needed to be addressed through indigenous capability development."

However, "one cannot afford to have "operational voids when the enemy is at the gates", he stated.

Terming 2020 as a unique year and the challenges faced, in his address at a seminar on Army-industry partnership, Gen MM Naravane talked about the `belligerence' on the northern borders and the way the events of the past year have brought to the fore the vulnerability of global supply chains, underscoring the necessity for self-reliance.

He brought out that 75 per cent of Priority-1 Projects in the 13th Army Plan, costing over Rs 1, 50,000 crore are marked for Make in India Programmes. (File image)

"Niche technologies, including AI, autonomous unmanned systems, 5G, long-range precision technology, quantum computing, swarm drones and all these will certainly need to be acquired & absorbed as part of our deliberate & continuous process."

Talking about the partnership with the private sector, the army chief said, "For self-reliance and capability building, the defence industry is a big enabler. And it is a prerequisite to take care of our strategic influence and freedom of action. Major defence platforms, including artillery guns, bridges, radars and a wide range of weapons, ammunition & equipment is being provided by the private sector."

To effectively harness the potential of the industry towards defence Indigenisation, the Army Design Bureau has been reaching out to the industry. And, "The dependence of the armed forces on equipment of foreign origin needs to be addressed in the right earnest through indigenous capability development and towards meeting the modern-day defence requirements."

He brought out that 75 per cent of Priority-1 Projects in the 13th Army Plan, costing over Rs 1, 50,000 crore are marked for Make in India Programmes. And to enable faster procurement of equipment, the Procurement Procedures can have more flexibility in its operations and interpretations.

He further stated that the capital and revenue procurement routes of procurement have aligned under the Deputy Chief of Army Staff (Capability Development and Sustenance). "Combining these routes will result in optimal capability building and will act as a single point of contact with the Industry", he said.

He encouraged the private industry to take advantage of the government's reform measures to boost domestic defence production, and reiterated Army's support to them.

What did Dr G Satheesh Reddy, Secretary, Department of Defence R&D and Chairman, DRDO say?

He highlighted how DRDO's support to the Industry through a number of schemes. And that the DRDO is ready to support MSMEs and the youth who are venturing into the defence production. According to him, the organisation has given funding of Rs 10 crore to around 25 Indian companies in the past year.

"Today, 85-87% of the Akash air defence systems by value are coming from the private industry," he stated. Similarly, a majority of the components for indigenous radars were also being supplied by the private sector.

There are 1,800 private industries as Tier-1 and Tier-2 suppliers and more than 10,000 industries at the Tier-3 level who supply to DRDO. Efforts are on to try indigenising spares and components for major platforms through Technology Development Fund. These include all major systems like SU-30MKI fighters, T-90 and T-72 tanks.

Mr Jayant D Patil, President, SIDM

In his opening remarks, he highlighted the Indian Army's support and its guidance to the industry through its outreach programs which helped the industry understand its requirements and the journey towards 'Atmanirbharta' in the defence sector.

At the seminar, an MoU was signed between the Indian Army and the SIDM for strengthening efforts towards Indigenisation.

What is the MoU about?

It calls both the Indian Army and SIDM to work jointly encourage the Indian defence industry including start-ups and MSMEs.

It also aims at enhancing research and academic collaboration for in developing innovative solutions to deal with the defence capability requirements.

The first formal "Army – Industry Partnership" Conference was a two-day event held in 1995.

https://www.financialexpress.com/defence/niche-technologies-needed-to-face-challenges-from-adversaries-says-army-chief/2176235/

Fri, 22 Jan 2021

Self-Reliance in defence is "Strategic Necessity", Says Army Chief

While addressing the arms-industry partnership virtually, the Army Chief General Manoj Mukund Naravane pitched for a self-reliant India to become the main player in the global economy

New Delhi: Observing that India has "lagged behind slightly" in terms of the quick pace modernisation undertaken by our adversaries, and dependence of Indian armed forces on equipment of foreign origin needs to be addressed, Army chief General Manoj Mukund Naravane on Thursday said self-reliance in the defence sector has become a strategic necessity.

While addressing the arms-industry partnership virtually, the Army Chief pitched for a self-reliant India to become the main player in the global economy.

"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. Considering the quick pace of defence modernisation being undertaken by our adversaries, we are lagging behind slightly. The continuous and heavy dependence of Indian armed forces on equipment of foreign origin needs to be addressed through indigenous capability development," he said.

Reviewing the last year, the Army Chief said, "2020 was a unique year with twin challenges of the COVID pandemic and the belligerence on the northern borders. The events of the past year have brought to the fore the vulnerability of global supply chains, underscoring the need for self-reliance."

The Army Chief said that private industries are providing defence equipment including artillery guns, radars, and a large numbers of weapons.

"Self-reliant India will enable the country to depend on itself in all areas and become the main player in the global economy," he said.

General Naravane further pitched for the armed forces to equip themselves with niche technologies.

General Naravane further pitched for the armed forces to equip themselves with niche technologies. (File)

"Niche technologies, including artificial intelligence, autonomous unmanned systems, long-range precision technology, quantum computing, swarm drones are a better few and all these will certainly need to be acquired and absorbed as part of our deliberate and continuous process," he said.

https://www.ndtv.com/india-news/self-reliance-in-defence-is-strategic-necessity-says-army-chief-general-manoj-mukund-naravane-2356095

Outlook

Fri, 22 Jan 2021

Tezpur Air Force Station ready to face any challenge in eastern sector: IAF

Tezpur, Jan 21 (PTI) The Tezpur Air Force Station in Assam is capable of taking on any challenge in the eastern sector of the country, its new Air Officer Commanding (AOC) Air Commodore Dharmendra Singh Dangi has said. Interacting with reporters, Air Commodore Dangi, who took over the command of the Tezpur Air Force Station from Air Commodore Tejpal Singh on Wednesday said, "The Indian Air Force (IAF) is growing by leaps and bounds and we are capable of taking on any challenge".

Air Commodore Dangi, who was commissioned in the fighter stream of the IAF on December 19, 1992, said that he had served in Tezpur Air Force Station from 2009 to 2011 and was looking forward to work from here for the second time.

Having more than 3,000 flying hours to his credit, the new AOC is a qualified instructor, a test pilot and an alumnus of National Defence Academy.

Air Commodore Dangi had headed the Rafale Project Management Team in France till the induction of the combat aircraft in the IAF.

He has flown Tiger Moth aircraft, MiG-21, MIG-27 and front line fighter SU-30 MKI. *(Disclaimer: This story has not been edited by Outlook staff and is auto-generated from news agency feeds. Source: PTI)*

https://www.outlookindia.com/newsscroll/tezpur-air-force-station-ready-to-face-any-challenge-in-eastern-sector-iaf/2014636

नवभारत टाइम्स

Fri, 22 Jan 2021

आर्मी चीफ ने कहा- दुश्मनों के मुकाबले भारत में सैन्य आधुनिकीकरण की गति मंद, जानें हमारी सेना के पास क्या-क्या कमी

भारतीय वायुसेना के लिए कुल 42 स्क्वैड्रन कपैसिटी मंजूर की गई है। इस लिहाज से देखें तो उसके पास अब भी 9 स्क्वैड्रन की कमी है। स्वाभाविक है कि इसी कमी को पूरा करने के लिए 83 तेजस विमान खरीदने का फैसला किया गया।

नवीन कुमार पाण्डेय

हाइलाइट्स:

- ***आर्मी चीफ जनरल एमएम नरवणे ने देश में सैन्य आधुनिकीकरण की गति पर चिंता व्यक्त की***
- ***उन्होंने कहा कि जिस तेजी से हमारे दुश्मन देश सेना को सशक्त कर रहे हैं, वो तेजी हमारे पास नहीं है***
- ***भारत में सैन्य आधुनिकीकरण की जरूरत दशकों से महसूस की जा रही थी***

नई दिल्ली: भारतीय सेना के तीनों अंगों- जल सेना, थल सेना और वायु सेना के आधुनिकीकरण की जरूरत बहुत लंबे समय से महसूस की जा रही है। इनके पास जवानों, कर्मचारियों और अफसरों से लेकर साजो-सामान तक की कमी है। हालांकि, नरेंद्र मोदी सरकार ने सैन्य आधुनिकीकरण की दिशा में कदम उठाया है। इसके तहत सरकार ने रक्षा क्षेत्र में प्रत्यक्ष विदेशी निवेश (FDI) की सीमा बढ़ाकर अब 100% कर दी है।

भारत में सैन्य आधुनिकीकरण की गति मंद। (सांकेतिक तस्वीर)

आर्मी चीफ की चिंता

लेकिन, आर्मी चीफ जनरल एमएम नरवणे का कहना है कि हमारे दुश्मन सैन्य आधुनिकीकरण की दिशा में जिस तेजी से बढ़ रहे हैं उतनी तेजी से हम नहीं बढ़ रहे। गुरुवार को 'आर्मी- इंडस्ट्री पार्टिनरशिप के 25 साल' के वेबिनार में आर्मी चीफ ने कहा कि भारतीय आर्म्ड फोर्स की विदेशी उपकरणों पर निर्भरता को स्वदेशी क्षमता बढ़ाकर कम करना चाहिए। उल्लेखनीय है कि केंद्रीय कैबिनेट ने हाल ही में एयरफोर्स के लिए हिंदुस्तान एयरोनॉटिक्स लिमिटेड (HAL) से 83 हल्के युद्धक विमान खरीदने के प्रस्ताव को मंजूरी दी है। ये 83 तेजस विमान पूर्णतः स्वदेशी हैं जो निश्चित रूप से भारतीय वायुसेना की क्षमता बढ़ाएंगे।

चीन के साथ तनाव के बीच आई थी चिंताजनक खबर

ध्यान रहे कि पूर्वी लद्दाख में वास्तविक नियंत्रण रेखा (LAC) पर चीन के साथ तनाव के बीच पिछले वर्ष जून महीने में खबर आई थी कि भारतीय सेना को 45 जरूरी साजो-सामान की कमी हो गई है। इस लिस्ट में कई तरह के गोला-बारूद, लद्दाख जैसे ठंडे इलाकों में रहने के लिए गर्म कपड़े और पैराशूट शामिल थे। तब सेना ने डिपार्टमेंट ऑफ डिफेंस प्रॉडक्शन (डीडीपी) के जरिए ऑर्डनेंस फैक्ट्री बोर्ड (ओएफबी) से इन जरूरी सामानों की सप्लाई सुनिश्चित करने की मांग की थी।

हमारे सहयोगी अखबार टाइम्स ऑफ इंडिया ने डीडीपी के दस्तावेजों की पड़ताल में पाया था कि इन जरूरी चीजों में से 20 गोला-बारूद से जुड़ी थीं। दूसरी 21 चीजों में कॉम्बैट ड्रेस, कोट ईसीसी (भीषण ठंड के लिए जरूरी कोट), पॉन्चो (कंबल जैसा लबादा) और ग्लेशियर के लिए कैप, सप्लाई गिराने वाले उपकरण और पैराशूट शामिल थे। इसके साथ ही

डीडीपी ने तीन आर्टिलरी गन की सप्लाई में कमी का संकेत दिया था। इस तरह की 167 गन भी ओएफबी के पास नहीं पहुंची थी। इसके अलावा 196 माइन प्रटेक्टेड (बारूद रोधी) गाड़ियों की सप्लाई भी नहीं हुई थी। पिछले साल संसद में मुद्दा उठा तो पता चला कि भारतीय सेना में जवानों और अधिकारियों भी कमी है। थल सेना (Indian Army) में 45 हजार से अधिक सैनिकों की कमी है। इनमें लेफ्टिनेंट रैंक से ऊपर के 7,000 अधिकारियों की भर्ती की भी दरकार है।

42 को मंजूरी लेकिन सिर्फ 33 स्क्वैड्रन

वायुसेना के पास 33 फाइटर एयरक्राफ्ट स्क्वैड्रन हैं। हर स्क्वैड्रन में 16 एयरक्राफ्ट और दो-दो सीटों वाले दो ट्रेनर एयरक्राफ्ट होते हैं। यानी, भारतीय वायुसेना के पास 500 से ज्यादा युद्धक विमान हैं। यह आंकड़ा सुनने में तो ठीक लगता है लेकिन चीन और पाकिस्तान जैसे पड़ोसियों से पैदा हुई चुनौतियों के लिहाज से ये पर्याप्त मालूम नहीं पड़ते। भारतीय वायुसेना के लिए कुल 42 स्क्वैड्रन कपैसिटी मंजूर की गई है। इस लिहाज से देखें तो उसके पास अब भी 9 स्क्वैड्रन की कमी है। स्वाभाविक है कि इसी कमी को पूरा करने के लिए 83 तेजस विमान खरीदने का फैसला किया गया।

आधुनिकीकरण की दिशा में बढ़े कदम, लेकिन...

भारतीय वायुसेना को युद्धक विमानों के अलावा अटैक हेलिकॉप्टरों, AWACS प्लैटफॉर्म, हवा में ईंधन भरने वाले विमानों की भी दरकार है। अभी भारतीय वायुसेना के बेड़े में मिग-21 BIS, जगुआर, मिराज 2000, मिग-29, सुखोई-30 MKI और कुछ तेजस विमान हैं जिन्हें 2018 में बेड़े में शामिल किया गया था। इनके अलावा, वायुसेना में साल 2004 से ब्रिटेन के ट्रेनर एयरक्राफ्ट हॉक भी शामिल हैं। वहीं, रूस निर्मित छह आईएल-78 टैंकर भी भारतीय वायुसेना के पास हैं, लेकिन अभी ऐसे 6 और टैंकरों की कमी है।

इतना ही नहीं, भारतीय सेना को मानवरहित विमानों (UAV), अटैक हेलिकॉप्टरों आदि की भी कमी है। वायुसेना के पास अमेरिकी अपाचे हेलिकॉप्टर तो हैं, सोवियत जमाने के एमआई 25/35 और HAL निर्मित स्वदेशी अडवांस्ड लाइट हेलिकॉप्टर भी हैं। जहां तक बात युद्धक विमानों की है तो 83 तेजस एयरक्राफ्ट की खरीद को मंजूरी देने से पहले फ्रांस से पांच राफेल विमान आ चुके हैं। वहीं, रूस से एस-400 मिसाइल सिस्टम की डील पर मुहर लग चुकी है।

फ्रांस का ऑफर

उधर, फ्रांस ने भारत को एयरबस 330 मल्टि-रोल ट्रांसपोर्ट टैंकर एयरक्राफ्ट बेचने का प्रस्ताव रखा है। एयरबस 330 उड़ान के वक्त हवा में ईंधन भरने का काम करता है। इस मिड एयर रीफ्यूलर टैंकर से भारतीय वायुसेना की मारक क्षमता बढ़ सकती है। रिपोर्ट में रक्षा सूत्रों के हवाले से कहा गया है कि भारतीय वायुसेना एक ब्रिटिश कंपनी से वेट लीज पर एक Airbus 330 MRTT लेना चाहती थी, इस बीच फ्रांस की तरफ से यह प्रस्ताव आ गया। फ्रांस का ऑफर है कि भारत को बहुत सस्ती कीमत पर छह एयरक्राफ्ट दिए जाएंगे जिसका 30 सालों तक रखरखाव की जिम्मेदारी उसकी होगी। ये एयरक्राफ्ट 5-7 साल पुरानी हैं।

https://navbharattimes.indiatimes.com/india/army-chief-says-military-modernization-speed-in-india-is-slow-compared-to-enemies-know-what-our-army-lacks/articleshow/80398159.cms

INDIA TODAY

Fri, 22 Jan 2021

Indian Navy's P-8I maritime patrol aircraft taking part in anti-submarine warfare exercise

Each exercise is graded, and the nation scoring the highest total points will receive the coveted Dragon Belt award

By Manjeet Negi

New Delhi: The Indian Navy's P-8I maritime patrol aircraft taking part in a multilateral anti-submarine warfare exercise Sea Dragon-2021 in Guam. Along with India, America, Japan, Canada and Australia are taking part in the drills which would involve tracking submarines.

Sea Dragon 2021, centers on anti-submarine warfare (ASW) training and excellence to include 125 hours of in-flight training ranging from tracking simulated targets to the final problem of finding and tracking USS Chicago (SSN 721), a U.S. Navy Los Angeles-class nuclear submarine.

Photo for representation

During classroom training sessions, pilots and flight officers from all countries will build plans and discuss incorporating tactics, capabilities and equipment for their respective nations into the exercise.

Each exercise is graded, and the nation scoring the highest total points will receive the coveted Dragon Belt award. The belt was formally introduced last year when awarded to the Royal New Zealand Air Force (RNZAF).

https://www.indiatoday.in/india/story/indian-navy-s-p-8i-maritime-patrol-aircraft-taking-part-in-anti-submarine-warfare-exercise-1761307-2021-01-21

THE NEW INDIAN EXPRESS

Fri, 22 Jan 2021

'Indian Navy needs fleet of SSNs, nuclear-powered general-purpose attack submarines'

By this metric, even with a lower single platform cost, an SSK fleet would cost 1.3 to 3.5 times more than an SSN fleet, to maintain the same on-station capability," the IDSA report stated

By C Shivakumar

Chennai: In a bid to transform Indian Navy into a true blue-water force, the navy requires a fleet of SSNs, a nuclear-powered general-purpose attack submarines, to meet its great power expectations in the Indo-Pacific and beyond, in the decades to come, according to Commodore Roby Thomas.

Commodore Thomas, a Senior Fellow at the Manohar Parrikar Institute for Defence Studies and Analyses, in his paper Nuclear Attack Submarines: The Elixir for a True Blue-Water Navy published at Journal of Defence Studies, stated that notwithstanding the current Covid-19-related economic contractions, India needs to 'keep its eye on the horizon' and astutely plan its rise by facilitating the strengthening of its maritime capacities, like its SSN fleet, to meet its great power expectations in the Indo-Pacific and beyond, in the decades to come.

While SSNs are known to be more expensive to build and maintain than original diesel-electric submarine, classified as SSK, which has undergone numerous iterations since World War II and is as relevant now as it was then, Commodore Thomas says on the metrics of life-cycle cost and equivalent effectiveness have proven otherwise.

For representational purposes. (File | EPS)

"Instead of comparing the life-cycle cost of a single SSK to that of one SSN, a study by US Navy considered it more prudent to compare the total life-cycle cost of the number of SSKs that would provide equivalent on-station capability to one SSN. The study indicated that it would require anywhere between 2.2 to 6 SSKs to have the equivalent effectiveness of one SSN. Therefore, by this metric, even with a lower single platform cost, an SSK fleet would cost 1.3 to 3.5 times more than a SSN fleet, to maintain the same on-station capability," the IDSA report states.

Currently, India has 16 diesel-electric submarine (SSKs), one nuclear-powered general-purpose attack submarines (SSN), which is leased from Russia and one ballistic missile submarines (SSBN).

"Nuclear submarines are national strategic assets and even the best of friends do not part with this technology. For example, notwithstanding theclosest of relations between the US and the UK post-World War II, the US only gave Britain the reactor to operationalise its first SSN, HMS Dreadnought, and subsequently the Trident SLBM, but never the entire submarine. Similarly, Russia provided India with SSNs on lease to gain experience and training, never to own. Conversely, if you pay the right price, you may buy or make in collaboration a conventional submarine,

but never an SSN. As this technology takes decades to develop, nurture and maintain, it needs to be a very carefully thought through strategy by any country which seeks to make and maintain a presence on the world stage.," the IDSA report states.

Commodore Thomas said that Indian Navy leased the second nuclear-powered attack submarine from Russia, INS Chakra II, in 2012 for a period of 10 years. This is to be followed by the lease of another nuclear attack vsubmarine from Russia in 2025, to be christened Chakra III, also for a period of 10 years. "These on-lease nuclear attack submarines are critical towards providing vital operational experience and training to the submarine crew. However, to exploit the complete operational envelope of nuclear attack submarines, India would need have its own Indian made nuclear attack submarines. The construction of six of these was sanctioned by the Cabinet Committee on Security (CCS) in 2015," he says.

Commodore Roby Thomas says that Indian Navy's planned expansion, with a focus on 'capabilities' instead of 'numbers', was detailed in the Indian Navy's Maritime Capability Perspective Plan (MCPP). This was further deliberated during the Naval Commanders Conference held in April 2019, where the need to boost operational capability was highlighted with a view to expand the Indian Navy's overall influence in the strategic maritime zones. This required the Indian Navy to have a force level of 200 ships, 500 aircraft and 24 attack submarines. This was further reiterated by the Chief of Naval Staff, Admiral Karambir Singh, in the vCommanders Conference in October 2019, when he stressed the need to bridge the capability gaps, especially in light of the increasing mandate of the Indian Navy in the Indian Ocean Region (IOR), says Commodore Thomas.

Commodore Thomas also said that first Indian-made nuclear-propelled ballistic missile submarine, INS Arihant, in August 2016 completed its first deterrent patrol in November 2018. The second in the class, INS Arighat, was launched in November 2017 and is expected to join the submarine fleet after its trials.

Factfile:

1. SSBNs or ballistic missile Submarines, are nuclear propelled. They carry multiple sets of submarine-launched ballistic missiles (SLBMs), tipped with single or multiple nuclear warheads. Their

primary mission is to fulfil the vital third leg of the nuclear triad. Undetected ballistic missile submarine would assure a devastating retaliation or an assured second strike capability.

2. SSGN or guided-missile nuclear submarine carry both conventional and nuclear-tipped cruise missiles. These submarines are regarded as tactical rather than strategic weapons. Though operated mostly by the Soviets during the Cold War, the US has currently four such submarines.

3. SSNs or nuclear attack Submarines, are designed for speed and agility and are considered the most versatile of all submarine classes. Due to their innate advantages of

almost unlimited underwater endurance and high sustained speeds, they are capable of multitasking on numerous critical missions while out of base port on a single prolonged duration patrol.

4. SSK or original diesel-electric Submarine, has undergone numerous iterations since World War II and is as relevant now as it was then. Though designed and constructed by

only a handful of countries, today the conventional submarine is operated by over 35 navies and these numbers are expanding. These submarines are operationally limited by the need to charge their batteries, using their diesel engines for a certain period of time every day at sea, which is termed as their 'indiscretion rate'.

(India has 16 SSKs, 1 SSN, which is leased from Russia, and one SSBN)

https://www.newindianexpress.com/nation/2021/jan/22/indian-navy-needs-fleet-of-ssns-nuclear-powered-general-purpose-attack-submarines-2253375.html

TIMESNOWNEWS.COM

Fri, 22 Jan 2021

Exercise Kavach: Army, Navy, Air Force to fine tune joint war-fighting capabilities - All you need to know

Excercise Kavach will enhance the fine-tune joint war-fighting capabilities of Indian Army, Indian Air Force and Indian Navy

New Delhi: The three wings of the Indian armed forces will be holding a massive joint military exercise 'Excercise Kavach' next week, the defence ministry said. The exercise will be conducted under the aegis of Andaman and Nicobar Command (ANC).

Indian Navy warship (PIB)

The exercise would involve participation of Indian Army, Indian Air Force and Indian Navy. Notably, ANC is the only Joint Forces Command of the country. The joint military exercise will enhance the fine-tune joint war-fighting capabilities of the tri-services and SOPs towards enhancing operational synergy.

'Excercise Kavach' will witness the deployment of Army's Amphibious Brigade, Special Forces of Navy, Armour/Mechanised components, naval ships comprising destroyers, ASW Corvettes and Landing Ships with ship-borne helicopters. The IAF will display its firepower with Jaguar Maritime Strike and transport aircraft. The Indian Coast Guard will also be included in the large scale Joint Military exercise.

The tri-services exercise involves synergised application of maritime surveillance assets, coordinated air and maritime strikes, air defence, submarine and landing operations.

"Concurrently Joint Intelligence Surveillance and Reconnaissance (ISR) exercise involving various technical, electronic and human intelligence from three services will be conducted. The ISR exercise will validate the capabilities of intelligence gathering from space, air, land and sea-based assets/ sensors, its analysis and sharing to achieve battle field transparency for quick decision making at different stages of operations," the defence ministry statement stated.

During the exercise, Army, Navy and Air Force would execute multi-domain, high-intensity offensive and defensive manoeuvres in the Andaman Sea and Bay of Bengal and carry out amphibious landing operations, air landed operation, helicopters-borne insertion of Special Forces from sea culminating in tactical follow-on operations on land.

https://www.timesnownews.com/india/article/exercise-kavach-army-navy-air-force-to-fine-tune-joint-war-fighting-capabilities-all-you-need-to-know/710392

Hindustan Times

Fri, 22 Jan 2021

Army plans to deploy 10,000 troops as LAC reinforcements

On January 12, army chief General Manoj Mukund Naravane said the army was in the process of reducing its footprint in the Northeast to sharpen its focus on external threats

By Rahul Singfh

With a planned and gradual drawdown of soldiers underway in the Northeast, where the security situation has significantly improved, the Indian Army plans to redeploy up to 10,000 extra troops by the year-end to carry out the force's primary task --- dealing with the Chinese threat in the eastern sector, people familiar with the development said on Tuesday on condition of anonymity.

These soldiers are part of a reserve division whose elements can be swiftly marshalled to support front-line troops guarding the Line of Actual Control (LAC) with China to deal with any contingency in the sensitive sector, the people said.

While around 3,000 soldiers have already been pulled out of counter-insurgency and internal security duties in the Northeast, another 7,000 soldiers are expected to be withdrawn by the year-end, said one of the people cited above.

The move will help the army focus on the borders and train for conventional operations, experts said.

These soldiers are part of a reserve division whose elements can be swiftly marshalled to support front-line troops guarding the Line of Actual Control (LAC) with China to deal with any contingency in the sensitive sector, the people said.(PTI fILE)

Several parliamentary panels have made recommendations in their reports to reduce the army's exposure to counter-insurgency and counter-terrorism duties because it results in blunting the force's focus on its main task --- defending the country from external aggression.

Also, the Kargil Review Committeem (KRC), which tabled its report in Parliament in February 2000, said the army's role in counter-insurgency and counter-terrorism duties was resulting in the development of a mindset that distracts it from performing its primary role. The KRC underlined the pressing need to evolve a long-term strategy to reduce the army's role in counter-insurgency and counter-terrorism operations.

On January 12, army chief General Manoj Mukund Naravane said the army was in the process of reducing its footprint in the Northeast to sharpen its focus on external threats. No such drawdown of troops is currently planned in Jammu and Kashmir though, he stressed.

The planned pull out of some units from a counter-insurgency role in the Northeast is a good step, said former Northern Army commander Lieutenant General DS Hooda (retd).

“The security situation is almost completely under control and it can now be handled by the police and central armed police forces. It will enable Eastern Command formations to focus on their primary role along the Northern borders,” he said.

With both the Line of Control (LoC) with Pakistan and LAC being volatile, any reduction in internal security duties would be of great help in effective management of the borders and training for conventional operations, Hooda added.

The internal security situation in the Northeast has improved considerably with a large number of insurgent cadres surrendering before the security forces, and successful operations carried out last year.

Compared to 2018, there was a 40% increase in the apprehension of insurgents last year, a 60% decline in violent incidents and a140% increase in seizure of contraband, resulting in choking the supply of funds, according to government data accessed by Hindustan Times.

“There has been a progressive decline in violence over a period of time. However, continued efforts are needed to achieve the desired level of peace, especially in Manipur, Nagaland and south Arunachal Pradesh,” said a second official. More troops will be withdrawn when the situation further stabilises in these states.

Excellent coordination with Myanmar (Op Sunrise) has also made it hard for Indian insurgent groups to set up camps and operate from there, said a third official. However, one concern that remains is that the cadre strength of valley-based insurgent groups (VBIGs) in Manipur remains intact, he said.

“The current focus of all stakeholders is primarily on the ongoing Naga peace talks,” said a fourth official.

On the situation in Assam, he said the army had gradually started disengaging from the counter-insurgency grid in lower Assam and begun handing over the operational responsibility to the state government.

“A comprehensive view of the security situation in lower Assam is being taken post the Bodoland Territorial Council elections that were held in December 2020 and a decision on disengagement of remaining forces will also be deliberated upon subsequently,” he added.

https://www.hindustantimes.com/india-news/army-plans-to-deploy-10-000-troops-as-lac-reinforcements-101611266923783.html

Fri, 22 Jan 2021

Lasers create miniature robots from bubbles

Robots are widely used to build cars, paint airplanes and sew clothing in factories, but the assembly of microscopic components, such as those for biomedical applications, has not yet been automated. Lasers could be the solution. Now, researchers reporting in *ACS Applied Materials & Interfaces* have used lasers to create miniature robots from bubbles that lift, drop and manipulate small pieces into interconnected structures.

Credit: CC0 Public Domain

As manufacturing has miniaturized, objects are now being constructed that are only a few hundred micrometers long, or about the thickness of a sheet of paper. But it is hard to position such small pieces by hand. In previous studies, scientists created microscopic bubbles using light or sound to assemble 2-D items. Also, in a recent experiment, microbubbles produced by lasers, focused and powerful beams of light, could rotate shapes in 3-D space. Although these bubble microrobots could manipulate 2-D and 3-D objects, they could not connect independent components and then move them as a singular entity. So, Niandong Jiao, Lianquing Liu and colleagues wanted to build on their previous work with lasers to develop bubble microbots that can form inseparable shapes and control their movement.

The researchers created microbubbles in water by focusing a laser underneath a small part made of resin. The bubble's size was controlled by rapidly switching the laser on and off, with a higher amount of time in the 'on position' resulting in larger bubbles. Then, the team made a mobile bubble robot by shifting the laser's location. Once the laser turned off, the bubbles dissolved slowly, dropping the resin in place. The team then combined multiple bubbles with different functions to produce microrobots that could lift and drop parts, move single pieces to designated positions, act as a rotational axis or push assembled objects. Unbreakable connections were made with various joints, producing three- and four-pronged gears, a snake-shaped chain and a miniature 3-D vehicle. The bubble microrobots have implications for the future of manufacturing, including biological tissue engineering, the researchers say.

More information: Liguo Dai et al. Integrated Assembly and Flexible Movement of Microparts Using Multifunctional Bubble Microrobots, *ACS Applied Materials & Interfaces* (2020). DOI: 10.1021/acsami.0c17518

Journal information: *ACS Applied Materials and Interfaces*

https://phys.org/news/2021-01-lasers-miniature-robots.html

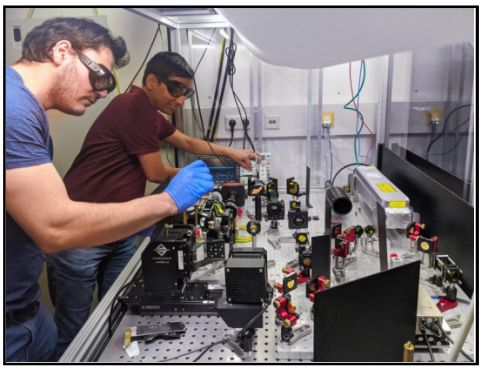
Fri, 22 Jan 2021

Innovations through hair-thin optical fibers

Scientists at the University of Bonn have built hair-thin optical fiber filters in a very simple way. They are not only extremely compact and stable, but also color-tunable. This means they can be used in quantum technology and as sensors for temperature or for detecting atmospheric gases. The results have been published in the journal *Optics Express*.

Optical fibers not much thicker than a human hair today not only constitute the backbone of our world-wide information exchange. They are also the basis for building extremely compact and robust sensors with very high sensitivity for temperature, chemical analysis and much more.

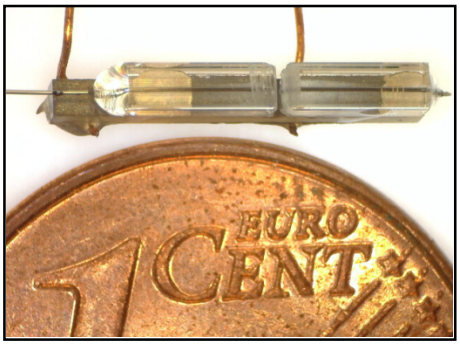
Optical resonators or filters are important components cutting out very narrow spectral lines from white light sources. In the simplest case such filters are built from two opposing mirrors tossing light back and forth as precisely as the pendulum of a clock work. The color of the filtered light is set by the mirror separation.



Carlos Saavedra (left) and Deepak Pandey (right) prepare the optical microfilter for test measurements. Credit: Uni Bonn

Suitable mirrors with high quality have been integrated with the end of such hairlike fibers for some time. Researchers of the University of Bonn have succeeded to build in a simple way such hairlike optical fiber resonators. They are not only extremely compact and stable but also allow to tune their color: they have glued the fiber ends carrying the mirrors into a common ferrule which can be stretched by means of a piezo crystal and hence control the mirror separation.

"The miniaturized optical filter makes a further contribution to making photonics and quantum technologies the decisive technology of the 21st century," says Prof. Dr. Dieter Meschede from the Institute of Applied Physics at University of Bonn. The scientist is a member of "Matter and light for quantum computing" (ML4Q) Cluster of Excellence of the Universities of Bonn and Cologne and RWTH Aachen University and is also a member of the Transdisciplinary Research Area "Building Blocks of Matter and Fundamental Interactions" at the University of Bonn.



The miniaturized optical filter is located in the central slot of the sleeve mount. Credit: © Uni Bonn

Miniaturized highly stable optical precision filters are promising multiple applications: they can store light energy within such a small volume such that already single photons can be efficiently stored and manipulated. Their high sensitivity suggests to build extremely compact and selective sensors, e.g. for detecting atmospheric gases. Using even more stable materials for the ferrule tiny optical clock works with extremely high frequency stability may be built.

More information: Carlos Saavedra et al, Tunable fiber Fabry-Perot cavities with high passive stability, *Optics Express* (2020). DOI: 10.1364/OE.412273

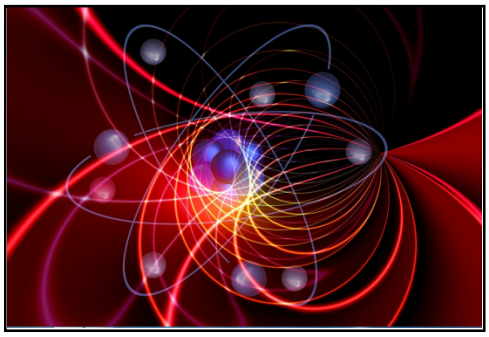
Journal information: *Optics Express*

https://phys.org/news/2021-01-hair-thin-optical-fibers.html

Fri, 22 Jan 2021

Researchers improve data readout by using 'quantum entanglement'

Researchers say they have been able to greatly improve the readout of data from digital memories—thanks to quantum entanglement.



Credit: CC0 Public Domain

The research team, which included researchers from the Italian Institute of Metrological Research (INRIM) and the University of York, say the findings could have major applications for digital storage devices, including optical memories such as CD or BluRay disks.

This is the first experimental demonstration that quantum sources of light can enhance the readout of information from digital memories, an advance that could potentially lead to faster access of data in large databases and to construct memories with higher capacities in our next-generation computers.

In an optical memory, bits are read by shining a laser beam over the reflecting surface of the disk. In the memory, each microscopic cell has one of two possible levels of reflectivity, representing the values "zero" and "one" of a bit.

As a result, the laser beam reflected from a cell may be more or less intense depending on the value of the bit. The intensity of the beam is then registered by a detector and finally translated into an electrical signal.

However, when the intensity of the laser beam becomes too low, for example as a result of an increased speed of the disk, energy fluctuations prevent the correct retrieval of the bits, introducing too many errors.

The study showed how to fix this problem by resorting to more sophisticated light sources, where the use of quantum entanglement completely removes the unwanted fluctuations.

The researchers say the consequences of the study go far beyond applications to digital memories. In fact, the same principle can be used in spectroscopy and the measurement of biological samples, chemical compounds and other materials.

The scheme also paves the way for non-invasive, ultra-sensitive measurements by greatly reducing the optical power without reducing the amount of information recovered from the systems.

Another promising perspective explored by the researchers is to extend the method to the recognition of complex patterns in conjunction with modern machine-learning algorithms, with potential implications for bio-imaging.

Professor Stefano Pirandola, from the Department of Computer Science at the University of York, said: "This experiment finally shows how we can harness quantum entanglement to better read information from memory devices and other physical systems."

The findings are reported in the journal *Science Advances*.

More information: Giuseppe Ortolano et al. Experimental quantum reading with photon counting, *Science Advances* (2021). DOI: 10.1126/sciadv.abc7796

Journal information: *Science Advances*

https://phys.org/news/2021-01-readout-quantum-entanglement.html

PHYS.ORG

Fri, 22 Jan 2021

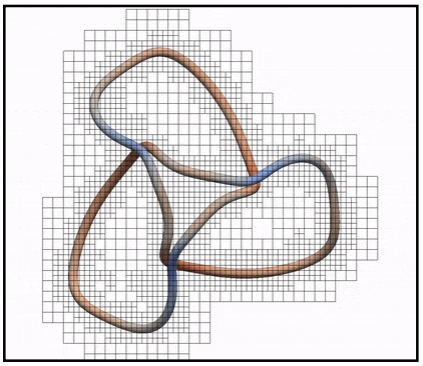
Turbulence model could help design aircraft capable of handling extreme scenarios

In 2018, passengers onboard a flight to Australia experienced a terrifying 10-second nosedive when a vortex trailing their plane crossed into the wake of another flight. The collision of these vortices, the airline suspected, created violent turbulence that led to a free fall.

To help design aircraft that can better maneuver in extreme situations, Purdue University researchers have developed a modeling approach that simulates the entire process of a vortex collision at a reduced computational time. This physics knowledge could then be incorporated into engineering design codes so that the aircraft responds appropriately.

The simulations that aircraft designers currently use capture only a portion of vortex collision events and require extensive data processing on a supercomputer. Not being able to easily simulate everything that happens when vortices collide has limited aircraft designs.

With more realistic and complete simulations, engineers could design aircraft such as fighter jets capable of more abrupt maneuvers or helicopters that can land more safely on aircraft carriers, the researchers said.



A new modeling approach allows engineers to simulate an entire vortex collision without needing to do extensive data processing on a supercomputer. Credit: Purdue University video/Xinran Zhao

Mechanical engineering professor Carlo Scalo and his research team use supercomputers to develop models that efficiently simulate vortex flow phenomena.

"Aircraft in extreme conditions cannot rely on simple modeling," said Carlo Scalo, a Purdue associate professor of mechanical engineering with a courtesy appointment in aeronautics and astronautics.

"Just to troubleshoot some of these calculations can take running them on a thousand processors for a month. You need faster computation to do aircraft design."

Engineers would still need a supercomputer to run the model that Scalo's team developed, but they would be able to simulate a vortex collision in about a tenth to a hundredth of the time using far less computational resources than those typically required for large-scale calculations.

The researchers call the model a "Coherent-vorticity-Preserving (CvP) Large-Eddy Simulation (LES)." The four-year development of this model is summarized in a paper published in the *Journal of Fluid Mechanics*.

"The CvP-LES model is capable of capturing super complex physics without having to wait a month on a supercomputer because it already incorporates knowledge of the physics that extreme-scale computations would have to meticulously reproduce," Scalo said.

Former Purdue postdoctoral researcher Jean-Baptiste Chapelier led the two-year process of building the model. Xinran Zhao, another Purdue postdoctoral researcher on the project, conducted complex, large-scale computations to prove that the model is accurate. These computations allowed the researchers to create a more detailed representation of the problem, using more than a billion points. For comparison, a 4K ultra high definition TV uses approximately 8 million points to display an image.

Building off of this groundwork, the researchers applied the CvP-LES model to the collision events of two vortex tubes called trefoil knotted vortices that are known to trail the wings of a plane and "dance" when they reconnect.

This dance is extremely difficult to capture.

"When vortices collide, there's a clash that creates a lot of turbulence. It's very hard computationally to simulate because you have an intense localized event that happens between two structures that look pretty innocent and uneventful until they collide," Scalo said.

Using the Brown supercomputer at Purdue for mid-size computations and Department of Defense facilities for large-scale computations, the team processed data on the thousands of events that take place when these vortices dance and built that physics knowledge into the model. They then used their turbulence model to simulate the entire collision dance.

Engineers could simply run the ready-made model to simulate vortices over any length of time to best resemble what happens around an aircraft, Scalo said. Physicists could also shrink the model down for fluid dynamics experiments.

"The thing that's really clever about Dr. Scalo's approach is that it uses information about the flow physics to decide the best tactic for computing the flow physics," said Matthew Munson, program manager for Fluid Dynamics at the Army Research Office, an element of the U.S. Army Combat Capabilities Development Command's Army Research Laboratory.

"It's a smart strategy because it makes the solution method applicable to a wider variety of regimes than many other approaches. There is enormous potential for this to have a real impact on the design of vehicle platforms and weapons systems that will allow our soldiers to successfully accomplish their missions."

Scalo's team will use Purdue's newest community cluster supercomputer, Bell, to continue its investigation of complex vortical flows. The team also is working with the Department of Defense to apply the CvP-LES model to large-scale test cases pertaining to rotorcrafts such as helicopters.

"If you're able to accurately simulate the thousands of events in flow like those coming from a helicopter blade, you could engineer much more complex systems," Scalo said.

More information: Xinran Zhao et al. Direct numerical and large-eddy simulation of trefoil knotted vortices, *Journal of Fluid Mechanics* (2021). DOI: 10.1017/jfm.2020.943

Journal information: *Journal of Fluid Mechanics*

https://phys.org/news/2021-01-turbulence-aircraft-capable-extreme-scenarios.html

The Indian EXPRESS

Fri, 22 Jan 2021

Experts Explain: How do vaccines work, and do they help?

Covid-19 vaccine: Five days into India's mass vaccination programme, there are some concerns over vaccine hesitancy. At this crucial moment in the fight against the novel coronavirus pandemic, two of the country's most eminent vaccine scientists weigh in on some old and new questions

By Shahid Jameel , Virander S Chauhan

It has been five days since India began vaccination against the novel coronavirus disease. More than 7 lakh people have been given one of the two vaccines approved by the regulator. But several people, including some doctors and other healthcare workers, continue to be hesitant. This has led to concerns over 'vaccine hesitancy'.

Vaccines are a product of science. If the scientific method and process is followed scrupulously, based on data and evidence, there should be little room for doubt. This is a good time to revisit some of the usual questions regarding vaccines, and to address fresh questions that are emerging.

How do vaccines work; and do they help?

A vaccine is a substance that resembles the disease-causing agent (called pathogen, the coronavirus in this case) that trains the body's immune system and creates a 'memory'. When the pathogen infects in future, this memory is rapidly deployed to destroy it and prevent disease.

Evidence shows that incidence of an infectious disease goes down rapidly following the deployment of vaccines against it; several human diseases are now vaccine preventable. Besides the eradication of smallpox and near eradication of polio, vaccines have resulted in the prevention of over 20 other life-threatening diseases, avoiding an estimated 2-3 million deaths annually. India's Universal Immunization Programme, among the world's largest, immunizes about 26 million children every year. It is estimated that every dollar spent on childhood vaccines adds $44 to the economy by ensuring that children grow up to be healthy adults.

The experts

Shahid Jameel, one of India's best known virologists, is currently director of Trivedi School of Biosciences at Ashoka University. He has previously worked with the Delhi-based International Centre for Genetic Engineering and Biotechnology (ICGEB) and served as chief executive of the Wellcome Trust/DBT Alliance which funds health research. Virander Singh Chauhan is a former director of ICGEB. He is best known for his efforts towards developing a vaccine for malaria.

Vaccines take long to develop. How could the Covid-19 vaccines be ready so soon?

It can indeed take several years to develop a vaccine. After a proof of concept has been established in research laboratories, controlled manufacturing processes are developed to make stable and highly pure products that are tested on animals and then on humans for safety and effectiveness. Clinical trials in human beings are carried out in three phases to seek specific answers.

Phase 1: is done in typically 20-100 healthy volunteers to see if the vaccine is safe, if it appears to work, whether there are any serious side effects, and if these are related to the size of the dose.

Phase 2: uses several hundred volunteers to determine the most common short-term side effects, and how well the immune system responds to the vaccine — what is known as 'immunogenicity'.

Phase 3: involves thousands of volunteers in a blinded manner to compare those who get the vaccine to those who don't (they get a placebo or dummy) to re-confirm safety, serious side-effects if any, and most importantly, whether the vaccine is efficacious in preventing infection and/or disease.

In the present case, vaccines for Covid-19 have been readied within a year. There are currently 68 Covid-19 vaccines in human clinical trials, of which 20 have reached phase 3 testing, eight have received limited or emergency use approval, and two have been approved for full use.

There are several reasons why Covid-19 vaccines were developed so quickly. Scientific information has been shared openly, and it helped that the virus was similar to the SARS-CoV-1 and MERS viruses on which considerable work had already been done. It took just 63 days from the availability of the genome sequence (on January 11, 2020), for the Moderna mRNA-1273 vaccine to enter phase 1 trial in the United States.

Regulators have also allowed parallel phases of clinical testing and reviewing of data to expedite the process. Large investments by governments and innovative financial models allowed pharmaceutical companies to work on developing the vaccine without having to absorb all the financial risk.

Another crucial reason was the use of every available vaccine platform to produce a Covid-19 vaccine, including those that had so far not produced a vaccine for humans. The vaccines made by Pfizer/BioNTech and Moderna both directly deliver an mRNA fragment into human cells to produce the viral Spike protein which raises anti-viral immunity. This technology had been in development for about a decade for anti-cancer vaccines.

Similarly, non-replicating viral vectors had been in development for years. An experimental adenovirus-based Ebola vaccine was used to vaccinate about 60,000 people in West Africa during the 2014-16 Ebola outbreak. Researchers at Oxford University in the United Kingdom had been using the chimpanzee adenovirus platform for several experimental vaccines, which was quickly repurposed to develop a Covid-19 vaccine. Finally, vaccines based on inactivated viruses is a time-tested method, which has been used in the ICMR/Bharat Biotech vaccine as also in at least three vaccines from China.

It is important to also understand the limitations of each platform. The mRNA is a fragile molecule that requires protection, including frozen storage, which complicates its rollout logistics. Viral vector vaccines are more stable (2 to 8 deg C storage), but the same vector cannot be used for another disease in the same person because anti-vector immunity will make it ineffective. Though inactivated viral vaccines are generally safe, similar vaccines against respiratory syncytial virus and measles were withdrawn as they exacerbated the disease.

Did the Covid-19 vaccines get approval prematurely?

The pandemic has presented a unique opportunity to compress the vaccine development timeline without compromising on safety. Regulators have invoked Emergency Use Authorization (EUA), which is a mechanism to facilitate the availability of vaccines during public health emergencies. EUA does not compromise on safety, and includes a review of all phase 1 and phase 2 data and up to two months (for US FDA) or 70 days (for European Medicines Agency) of phase 3 follow-up, including an interim analysis for efficacy. It allows vaccines to be used in an emergency in groups that are at high risk of infection, morbidity, and mortality.

In India, the approval to Bharat Biotech's Covaxin in "clinical trial mode" did lead to some confusion. It was also described as a "backup" vaccine, which could have suggested to some that it was somehow inferior to the other vaccine. As we have already noted above, Covaxin is based on a time-tested technology, which most likely makes it very safe.

EUA to drugs and vaccines are legitimate methods to deal with a medical emergency, but the way in which this issue was communicated in India left much to be desired.

Will the vaccines work against variant viruses?

Though coronaviruses mutate slower than other RNA viruses, new variants have emerged independently in the UK, South Africa, and Brazil that have now spread to over 50 countries,

including India. These viruses have key changes in the Spike protein, allowing them to better attach to and enter cells. They multiply and transmit more efficiently, estimated at 30% to 70% more efficiently for the UK variant.

A key mutation called N501Y is found in the receptor-binding domain of the Spike protein, which is also the target of virus-neutralizing antibodies. While work is on in multiple laboratories to directly test this, some early data show that viruses with or without this mutation are neutralized equally well by the blood serum of recovered Covid-19 patients.

Variant viruses don't always come from foreign shores. They can also emerge within. Increased genomic surveillance of infected persons within the country will provide early warning of this. However, our sequencing density is very low, with only about 5,000 virus sequences available from over 10 million confirmed cases in India. This has to increase, especially now that vaccines are being deployed, which would put additional pressure on viruses to mutate.

Any cases of vaccine failure — such as those who get the disease even after getting fully vaccinated — should be investigated for what viral variants they harbour, and if these can be neutralized by the sera of recovered patients and vaccinated persons.

Should those already infected take the vaccine?

It is advisable to take the vaccine because we do not fully understand the duration of protection following a natural infection. Available data suggest that neutralizing antibodies wane off in 3 to 5 months, but other arms of the immune response are likely to protect longer. If vaccine supplies are limited, which is unlikely in India, people with prior infection may delay their vaccination by a few months.

(This article first appeared in the print edition on January 21, 2021 under the title 'Value of vaccines'.)
https://indianexpress.com/article/explained/coronavirus-covid-vaccines-immune-system-virus-7155076/