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THE HINDU

Mon, 20 Sept 2021

Anti-tank missile completes all trials

Process for issuing Acceptance of Necessity by Army for Helina has started, says Project Director

By Dinakar Peri

New Delhi: The helicopter-launched Nag Anti-Tank Guided Missile (ATGM), Helina, being developed indigenously, has completed all trials and the process for issuing of Acceptance of Necessity (AoN) by the Army has started, said Sachin Sood, Project Director of Helina and Dhruvastra at the Defence Research and Development Laboratory (DRDL) Hyderabad, a laboratory of the Defence Research and Development Organisation (DRDO).

Defence mode: The Air Force had asked for the feasibility of integrating the Helina on the Light Combat Helicopter.

"The launcher and missile are ready. There are some Human-Machine Interface [HMI] to be realised, which are going on now," Dr. Sood told *The Hindu*.

While the cost estimate was yet to be done, each missile was expected to cost under ₹1 crore, and around 500 missiles and 40 launchers would be required initially, he added.

Once the AoN is issued, the Request for Proposal (RFP) would be issued. Some firing trials would be done from the first production lot by the Army at a later stage.

Helina is a third-generation fire-and-forget class ATGM mounted on an indigenous Advanced Light Helicopter (ALH), and has a minimum range of 500 metres and a maximum range of 7 kilometres. All issues with the minimum range had been sorted out and the integration with other weapons on the platform was over, said Dr. Sood.

Stating that the Air Force had asked for the feasibility of integrating the Helina on the soon-to-be inducted Light Combat Helicopter (LCH), Dr. Sood said this would be done and would bring in economies of scale in the production of the missile. "There is also very good export potential," Dr. Sood added.

https://www.thehindu.com/news/national/anti-tank-missile-completes-all-trials/article36556641.ece

THE NATIONAL INTEREST

Sun, 19 Sept 2021

These Indian Supersonic Missiles give China nightmares

China is right to be worried

BY Sebastien Roblin

Here's What You Need to Remember: Although China is upset about the BrahMos missile's presence on its border, it probably should be more worried that India is announcing it is close to a deal for selling the weapon to Vietnam.

While many of us remain mesmerized by the unfolding shambles in the Middle East, the world's two most populous countries have gotten into a tiff over missiles. And I'm *not* referring to the ballistic kind for once.

"India deploying supersonic missiles on the border has exceeded its own needs for self-defense and poses a serious threat to China's Tibet and Yunnan provinces," complained the People's Liberation Army Daily. "The deployment of BrahMos missile is bound to increase the competition and antagonism in the China–India relations and will have a negative impact on the stability of the region."

"Our threat perceptions and security concerns are our own, and how we address these by deploying assets on our territory should be no one else's concern," an Indian military source sniffed in response.

We'll first look at the BrahMos's capabilities and why they are considered a big deal, then plunge into why their deployment and export by is perceived as such a threat by China.

Indeed, the BrahMos cruise missile is stealthy, fast and extremely difficult to shoot down. It also has become a point of contention in a complicated web of overlapping alliances between India, China, Russia and potentially Vietnam.

Supersonic Carrier Killers

BrahMos began in the 1990s as a joint project between Russia and India to develop an Indian version of the P-800 Oniks cruise missile. The missile's name is a portmanteau of the rivers Brahmaputra and Moskva in India and Russia, respectively.

Cruise missiles are designed to be fired at long ranges from their targets so as not to expose the launching platform to enemy retaliation. The quintessential cruise missile is the Tomahawk, developed in the United States. Fired by ships and aircraft, the 2,900-pound missile can cruise up to one thousand miles (depending on the model) at a speed of five hundred miles per hour—roughly the speed of a typical airliner—before slamming into its target.

During the Cold War, Russia developed a *different* style of cruise missile designed to take out American aircraft carriers. These flew over the speed of sound to better evade the carrier's defenses—which include air-to-air missiles fired by fighters, surface-to-air missiles and Gatling-cannon Close-in weapon systems, or CIWS. They were also larger to increase the likelihood of achieving a kill in one hit.

Ramjets were used to maintain high speeds over long distances. A ramjet uses incoming air at high speeds to achieve compression instead of using a compressor, saving on fuel. However, a ramjet needs a boost from another source to help it achieve that airflow in the first place. In the case of the BrahMos, a rocket provides the initial acceleration before the ramjet takes over.

The BrahMos is actually slightly faster at Mach 2.8 than the P-800. It also weighs *twice* as much as a Tomahawk, at six thousand pounds.

The combination of twice the weight and four times greater speed as a Tomahawk result in vastly more kinetic energy when striking the target. Despite having a smaller warhead, the effects on impact are devastating.

Even more importantly, the BrahMos's ability to maintain supersonic speeds while skimming at low altitude makes it very difficult to detect and intercept. To cap it off, the BrahMos performs an evasive "S-maneuver" shortly before impact, making it difficult to shoot down at close range.

A modern ship targeted by the BrahMos could respond with layered defenses to shoot down the missiles: ripple-fired medium- and short-range antiaircraft missiles and close-range CIWS. But an effective attack would involve firing multiple missiles in order to overwhelm these defensive countermeasures.

If the attack is launched within 120 kilometers of the target, it can skim at very low altitude the entire way to the target. While missiles can be detected earlier if benefiting from AWACs aircraft, a ship would likely detect a sea-skimming missile at range of only thirty kilometers, affording the vessel only a thirty second time window to respond. One intriguing analysis argues that a U.S. Arleigh Burke-class destroyer, with its layered air defenses, could not handle more twelve BrahMos missiles at once and that an entire carrier battle group would be saturated by more than sixty-four.

Of course, though India has some unpleasant memories of an encounter with a U.S. carrier group in the past, they probably have a different foe in mind.

In any case, the BrahMos has a major limitation…

The Missile Technology Control Regime

The BrahMos has a relatively short range—only 190 miles (290 kilometers)—under half the range of the Russian Oniks missile. This means that BrahMos launch platforms need to be relatively close to their targets—potentially within ranges they may be detected and fired back at.

This was purposefully done in order to conform to the Missile Technology Control Regime (MTCR), a partnership of thirty-five countries which restricts the export of cruises missiles with ranges over three hundred kilometers. Russia is a member of the partnership—and just this June 28, India acceded into membership. And here we get into some interesting geopolitical strategy.

China is *not* a member of the regime, but would dearly appreciate the chance to deal in the market. India, on the other hand, would like to join the Nuclear Suppliers Group which regulates which nuclear technologies are permitted for trade. But China blocked its accession in June this year.

By adhering to the MTCR, India gained access to it—and now hopes to use that access as leverage versus China. Notionally, they could arrange a quid pro quo trading Indian NSG membership for Chinese admission to the MTCR. Whether it will work out that way remains to be seen.

Multiple Targets for Multiple Launchers

The BrahMos isn't just an antishipping weapon—it also can hit ground-based targets, and is ideal for precision attacks against fixed installations such as radars, command centers, airbases and enemy missile batteries. It can also potentially carry a 660-pound nuclear warhead, though that doesn't appear to be its primary intended use.

There are quite a few variants of the BrahMos missile designed to be used by the different platforms of the Indian military against either land or naval targets.

The Indian Navy's BrahMos missiles mostly use eight-cell Vertical Launch System launchers. Six of its frigates and two destroyers have a single BrahMos launcher, while three of its destroyers have twin launchers. More BrahMos equipped ships are under construction.

The Navy has also successfully tested in 2013 a submarine-launched version which is expected to enter service in future vessels. Submarine-launched BrahMoses could potentially be launched fairly close to the target without being detected.

India has also developed the BrahMos-A, designed to be launched from its Su-30MKI strike fighters. Finding a ways to mount such a heavy missile on a fighter plane has taken years of work—in the end, the Su-30s had to be specially modified for the task. The first test flight was carried out in June this year. India has already requisitioned two hundred BrahMos-As, and plans to convert forty Su-30MKIs to carry them. This offers yet another flexible means to deliver the missiles close enough to their intended targets.

Finally, there are ground-launched Mobile Autonomous Launcher systems mounted on twelve-wheeler trucks. These are organized in regiments of five launchers with over 100 missiles. India is deploying a fourth missile regiment to Arunachal Pradesh, reportedly at cost of over 4,300 crore (over $640 million dollars.)

These are what have spooked the Chinese military, particularly since the new Block III missiles are designed to steep dive at seventy-degree angles to hit targets on the rear slopes of mountains. This has obvious application against the heavily militarized Himalayan border with China.

that India is pressing ahead with the development of even deadlier BrahMos variants. To begin with, some reports imply India tested in 2012 a version with a new satellite guidance system and a range of five hundred kilometers. Some argue that even the regular BrahMos may be capable of going further than its claimed 290-kilometer range.

India will also soon introduce the next-generation BrahMos-NG, which is smaller (only three thousand pounds,) faster (Mach 3.5,) and stealthier (smaller Radar-Cross Section.) It should be deployable from land, sea and air systems, including multiple missiles carried on fourth-generation fighters.

Additionally, India will soon be testing a scramjet-powered *hypersonic* BrahMos II missile capable of zipping along at Mach 7. Needless to say, these would be even harder to detect and shoot down and afford defending ships just seconds to react. The U.S. military has only just begun development a hypersonic missile of its own.

Russia, for its part, has appreciated the BrahMos's commercial success, but seems to have only limited intention of fielding it: it may potentially deploy the system to Gorshkov-class frigates. It has more capable Zircon missiles (believed to be the model for the BrahMos II) in development and longer-range Oniks missiles already in service.

https://nationalinterest.org/blog/reboot/these-indian-supersonic-missiles-give-china-nightmares-193884

THE HINDU

Sat, 18 Sept 2021

Award for DRDO Scientist

Hyderabad: APJ Abdul Kalam Missile Complex, DRDO, Advanced Systems Laboratory (ASL)'s project director N. Kishore Nath has been conferred the prestigious Institution of Engineers (India) - M.P. Baya National Award 2020 in recognition of his significant R&D contributions and technological advancements in mechanical engineering. The award was conferred as part of Engineers' Day celebrations at IEI, Udaipur, Rajasthan.

Dr. Nath is widely known for his contributions in design and development of Agni missile systems and advanced technologies for numerous defence and aerospace applications in India. He obtained B.Tech in Mechanical Engineering from JNTU Anantapur and pursued his ME and Ph.D from Osmania University.

https://www.thehindu.com/news/cities/Hyderabad/award-for-drdo-scientist/article36522482.ece

Telangana Today

Sat, 18 Sept 2021

Project Director at DRDO Hyderabad conferred with M. P. Baya National Award

Hyderabad: The Project Director, Advanced Systems Laboratory (ASL), Dr APJ Abdul Kalam Missile Complex, DRDO, Hyderabad, Dr N Kishore Nath has been conferred with the prestigious M.P. Baya National Award – 2020 of Institution of Engineers, India, in recognition of his significant research and development (R&D) contributions in mechanical engineering, according to a press release. The award was conferred to him as part of Engineers Day celebrations on Wednesday, at IEI, Udaipur, Rajasthan.

Dr N Kishore Nath, Project Director, ASL receiving IEI M.P. Baya National Award 2020.

Dr Kishore Nath is widely known for his R&D contributions in design and development of Agni missile systems and advanced technologies for numerous defence and aerospace applications in India. He obtained B.Tech in Mechanical Engineering from JNTU Anantapur and pursued his ME and Ph.D from Osmania University, Hyderabad.

In a career spanning over two and half decades, Dr Kishore Nath has played vital role in the development of mission critical technologies including composites, airframe structures, flex nozzle systems and solid propulsion systems. He is a Fellow of many scientific/professional bodies and also has received many awards including DRDO Performance Excellence, Manager of the Year, National Design Award in Mechanical Engineering, press release added.

https://telanganatoday.com/project-director-at-drdo-hyderabad-conferred-with-m-p-baya-national-award

नवभारत टाइम्स

Mon, 20 Sept 2021

AUKUS समझौता भारत के लिए इशारा तो नहीं?

इंडियन नेवी के पास सिर्फ एक परमाणु पनडुब्बी

वर्तमान में भारतीय नौसेना में आईएनएस अरिहंत नाम की परमाणु पनडुब्बी ही कार्यरत है। इससे पहले रूस से लीज पर ली गई आईएनएस चक्र परमाणु पनडुब्बी भारतीय समुद्री क्षेत्र की रखवाली करती थी। लेकिन, 10 साल की लीज पूरी होने के बाद जून शुरुआत में भारत ने आईएनएस चक्र को वापस कर दिया था।

By प्रियेश मिश्र

नई दिल्ली/मॉस्को: अमेरिका और ऑस्ट्रेलिया के बीच हुई परमाणु पनडुब्बियों के सौदे ने पूरी दुनिया में बवाल मचाया हुआ है। AUKUS नाम की इस डील से न केवल चीन बल्कि यूरोप के कई देश भी अमेरिका और ऑस्ट्रेलिया के खिलाफ खड़े हो गए हैं। फ्रांस ने तो इसे पीठ में चाकू घोंपना करार दिया है। वहीं, चीन ने उग्र प्रतिक्रिया देते हुए कहा है कि इससे एशिया में हथियारों की रेस बढ़ेगी। ऑस्ट्रेलिया को परमाणु पनडुब्बी देने का सौदा इंडो-पैसिफिक में चीन की आक्रामकता को कम करने के लिए किया गया है। चीन इस समय भारत के लिए भी हिंद महासागर में मुश्किलें खड़ी कर रहा है। ऐसे में विशेषज्ञों का मानना है कि भारत को भी अपनी नौसेना में परमाणु पनडुब्बियों की संख्या को बढ़ाना चाहिए।

2019 की मीडिया रिपोर्ट्स के अनुसार, भारत ने रूस के साथ परमाणु पनडुब्बियों की खरीद को लेकर एक सीक्रेट डील की थी। इस डील की कुल लागत तब 3 बिलियन डॉलर बताई गई थी। इसके तहत 2025 में भारत को रूस से एक परमाणु पनडुब्बी मिलेगी, जिसे आईएनएस चक्र III के नाम से जाना जाएगा। यह पनडुब्बी भी आईएनएस चक्र की तरह भारतीय नौसेना में अगले 10 साल तक सेवा देगी। भारत को जो पनडुब्बी मिलने वाली है वह रूस की अकूला II क्लास की K-322 Kashalot है। इसमें इंट्रीग्रेडेड सोनार सिस्टम लगा हुआ है, जो काफी दूर से बिना किसी हलचल के दुश्मन की लोकेशन के बारे में पता लगा लेता है। भारत के आईएनएस अरिहंत में भी ऐसा ही सिस्टम लगाया गया है।

भारत के पास सिर्फ एक परमाणु पनडुब्बी

वर्तमान में भारतीय नौसेना में आईएनएस अरिहंत नाम की परमाणु पनडुब्बी ही कार्यरत है। इससे पहले रूस से लीज पर ली गई आईएनएस चक्र परमाणु पनडुब्बी भारतीय समुद्री क्षेत्र की रखवाली करती थी। लेकिन, 10 साल की लीज पूरी होने के बाद जून शुरुआत में भारत ने आईएनएस चक्र को वापस कर दिया था। जिसके बाद दोबारा रूस से एक नई परमाणु पनडुब्बी को लीज पर लेने के लिए बातचीत की जा रही है। अगर सबकुछ सही रहा तो रूसी राष्ट्रपति व्लादिमीर पुतिन के आगामी भारत दौरे के समय इस डील पर हस्ताक्षर भी कर दिए जाएंगे।

रूस से परमाणु पनडुब्बी लीज के लिए हो रही बात

2019 की मीडिया रिपोर्ट्स के अनुसार, भारत ने रूस के साथ परमाणु पनडुब्बियों की खरीद को लेकर एक सीक्रेट डील की थी। इस डील की कुल लागत तब 3 बिलियन डॉलर बताई गई थी। इसके तहत 2025 में भारत को रूस से एक परमाणु पनडुब्बी मिलेगी, जिसे आईएनएस चक्र III के नाम से जाना जाएगा। यह पनडुब्बी भी आईएनएस चक्र की तरह भारतीय नौसेना में अगले 10 साल तक सेवा देगी। भारत को जो

पनडुब्बी मिलने वाली है वह रूस की अकूला II क्लास की K-322 Kashalot है। इसमें इंट्रीग्रेडेड सोनार सिस्टम लगा हुआ है, जो काफी दूर से बिना किसी हलचल के दुश्मन की लोकेशन के बारे में पता लगा लेता है। भारत के आईएनएस अरिहंत में भी ऐसा ही सिस्टम लगाया गया है।

भारत भी कर रहा स्वदेशी परमाणु पनडुब्बियां बनाने की तैयारी

चीन और पाकिस्तान की ओर से हिंद महासागर क्षेत्र में लगातार बढ़ते खतरे को देखते हुए भारत ने रक्षा तैयारियों को तेज किया हुआ है। एक रिपोर्ट के अनुसार, नौसेना की ताकत में इजाफा करने के लिए भारत छह परमाणु शक्ति चलित पनडुब्बियों को नौसेना में शामिल करने की तैयारी कर रहा है। 1.2 लाख करोड़ के इस सौदे को जल्द ही सरकार की तरफ से मंजूरी दी जा सकती है। ये पनडुब्बियां पारंपरिक हथियारों जैसे तारपीडो और मिसाइलों से लैस होगी। अभी तक यह साफ नहीं हुआ है कि इन पनडुब्बियों से परमाणु मिसाइलें दागी जाएंगी या नहीं।

नौसेना डिजाइन निदेशालय को सहयोग देगा डीआरडीओ

अगर सबकुछ पूर्व निर्धारित योजना के अनुसार चलता रहा तो अगले 10 सालों में ये पनडुब्बियां भारतीय नौसेना में शामिल हो जाएंगी। इस परियोजना के प्रारंभिक डिजाइन वाले चरण को सफलतापूर्वक पूर्ण किया जा चुका है। डीआरडीओ के सहयोग से नौसेना डिजाइन निदेशालय अब इन पनडुब्बियों की जटिल और विस्तृत डिजाइन को तैयार करने की तैयारी कर रहा है।

2015 में मोदी सरकार ने इस परियोजना को दी थी मंजूरी

साल 2015 में मोदी सरकार ने भारतीय नौसेना के लिए लंबित परियोजना को आगे बढ़ाते हुए छह परमाणु शक्ति चलित अटैक पनडुब्बियों (एसएसएन) के निर्माण को मंजूरी दी थी। इन पनडुब्बियों को विशाखापत्तनम में शिप बिल्डिंग सेंटर में बनाया जाएगा। हालांकि यहां पहले से ही अरिहंत श्रेणी की एक अन्य पनडुब्बी का निर्माण किया जा रहा है।

भारत के पास वर्तमान में 15 पनडुब्बियां

भारतीय नौसेना इस समय कुल 15 पनडुब्बियों का संचालन कर रही है जिसमें आईएनएस अरिहंत परमाणु शक्ति संचालित हैं। इस परियोजना में भारत को अरिहंत के निर्माण से जुड़े अनुभव काम आएंगे। एसएसएन श्रेणी की ये पनडुब्बियां ज्यादा गहराई तक गोता लगाने में सक्षम होंगी। जबकि इनके सोनार और रडार पहले की तुलना में ज्यादा एडवांस होंगे। उर्जा को पैदा करने के लिए इन पनडुब्बियों में नवीन तकनीकी वाले परमाणु रिएक्टर लगाए जाएंगे।

https://navbharattimes.indiatimes.com/world/other-countries/indian-navy-nuclear-attack-submarines-aukus-pact-signal-for-india-to-counter-china-in-indian-ocean/articleshow/86340863.cms

COVID 19: DRDO's Contribution

RisingKashmir

Sun, 19 Sept 2021

Dr.Jitendra conducts Khonmoh tour; visits DRDO hospital, Industrial Estate SIDCO

Srinagar**:** As part of the public outreach programme of Union Government in Jammu and Kashmir, Union Minister of State, Dr.Jitendra Singh Saturday conducted an extensive tour of Khonmoh area of district Srinagar.

The official spokesperson said that the minister was accompanied by Advisor to Lieutenant Governor, Baseer Ahmad Khan; Principal Secretary, Science and Technology, Alok Kumar; Deputy Commissioner, Srinagar, Mohammad Aijaz Assad; Principal GMC, Dr.Samia Rashid and other concerned officers of various departments.

During the tour, Dr.Jitendra Singh visited DRDO Hospital, Khonmoh and inspected the facilities and health care services being provided to the patients there, the statement said.

The minister took a detailed round of the hospital and enquired about the patient admissions and status of patients who are being treated currently at the hospital.

Interacting with the doctors and staff of the hospital, the minister lauded their exemplary services during the critical times of COVID-19 and asked them to utilise the potential of this state of art hospital by providing best health care services to the people.

The Union Minister asked Principal GMC and DC Srinagar to setup a dialysis center at the hospital with required number of doctors and technicians for smooth functioning of the centre.

Meanwhile, Dr.Jitendra Singh visited Industrial Estate SIDCO-1st and held an extensive interaction with the DDC members, BDC members, Sarpanches, Panches and various industrial associations including Industrial Association Khanmoh, Stone Quarry Association, Female Entrepreneurs Association, SHG members among others.

Dr. Singh said that under the leadership of Prime Minister, NarendraModi, the culture of work has changed and the dynamics of development has improved. The present government has strengthened the grassroots democracy and the three tier system of PRIs has been established across Jammu and Kashmir. The PRI representatives have been empowered and more powers have been devolved to them, he added.

Dr. Singh highlighted that the developmental plans are being drafted with due consultation of PRI representatives and they are being made an essential part of development structure of Jammu and Kashmir. He added that PMGSY roads and the roads under CRF should be constructed after deliberations with PRI members.

Highlighting about various initiatives of central government for industrial sector of J&K, Dr. Singh said that the new industrial policy will change the face of industrial sector here. He added that during the present government the development of the country as well as Jammu and Kashmir has been taken to a new level, the example being the North East Development model. Advisor to Lieutenant Governor, Baseer Khan said that with the creation of three tier PRI system, the present government has established an interface between public and administration. He added that plan

formulation, policy making, execution of works and other powers have been devolved to PRIs and more steps are being taken to empower them.

Meanwhile, Dr.Jitendra Singh also visited Centre of Excellence, Zawoora wherein he inaugurated the high density and imported variety fruit stalls exhibition and also interacted with progressive farmers.

While addressing the gathering, Dr.Jitendra Singh said that Jammu and Kashmir has vast potential for producing high class varieties of fruit produce and there is a need of showcasing the fruit produce of the region on big platforms so that maximum buyers from outside are attracted towards it.

Dr. Singh further emphasised that there is a need of branding the local products and consultants should be hired for proper marketing and branding of horticulture produce here. He added that the Agriculture and horticulture sector will be the frontline sector for entrepreneurship in coming years.

Later on, the minister also visited grade separator at Panthachowk being constructed under the Bharat Mala project and inspected the ongoing works.

Earlier during the day, Dr. Singh inaugurated a Medical Camp organized jointly by NMO, NHM J&K and SevaBharati NGO.

https://www.risingkashmir.com/-Dr-Jitendra-conducts-Khonmoh-tour--visits-DRDO-hospital--Industrial-Estate-SIDCO-92108

जागरण

Sat, 18 Sept 2021

महिला चिकित्सालय में आक्सीजन प्लांट का शुभारंभ

शुक्रवार की देर शाम केंद्रीय गृह राज्य मंत्री भारत सरकार व सांसद अजय कुमार मिश्र टेनी अपने संसदीय क्षेत्र पहुंचे।

लखीमपुर: शुक्रवार की देर शाम केंद्रीय गृह राज्य मंत्री, भारत सरकार व सांसद अजय कुमार मिश्र टेनी अपने संसदीय क्षेत्र लखीमपुर खीरी पहुंचे।

जहां उन्होंने विधायक (सदर) योगेश वर्मा के साथ जिला महिला चिकित्सालय में भारत सरकार द्वारा डीआरडीओ के सहयोग से बने एक हजार लीटर पर मिनट क्षमता वाले आक्सीजन प्लांट का विधिवत शुभारंभ किया।

केंद्रीय गृह राज्य मंत्री ने जिला महिला चिकित्सालय पहुंचकर नवनिर्मित आक्सीजन प्लांट का शिलापट का अनावरण एवं फीता काटकर लोकार्पण किया। इसके बाद उन्होंने बटन दबाकर आक्सीजन प्लांट को चालू किया। यह आक्सीजन प्लांट भारत सरकार की ओर से डीआरडीओ ने बनाया।

केंद्रीय गृह राज्यमंत्री अजय मिश्र टेनी ने कहा कि जिले में 10 आक्सीजन प्लांट बनने प्रस्तावित थे, जिनमें छह सामुदायिक स्वास्थ्य केंद्रों व एक जिला चिकित्सालय, एक जिला महिला चिकित्सालय में आक्सीजन प्लांट क्रियाशील हो गए हैं। वहीं जल्द ही 200 बेड एमसीएच हास्पिटल व सामुदायिक स्वास्थ्य केंद्र गोला में शुरू हो जाएंगे। कोरोना की दूसरी लहर में आक्सीजन की काफी आवश्यकता थी। जिसका संज्ञान लेकर केंद्र व प्रदेश सरकार ने बड़ी संख्या में आक्सीजन प्लांट लगवाए। देश में आक्सीजन के उत्पादन में अबतक 12 फीसदी की वृद्धि हुई है। आने वाली किसी भी चुनौती से निपटने के लिए केंद्र व प्रदेश सरकार पूरी तरह तत्पर है।

इस मौके पर डीएम डा. अरविद कुमार चौरसिया, सीडीओ अनिल कुमार सिंह, सीएमओ डा. शैलेंद्र भटनागर, एसडीएम सदर डा. अरुण कुमार सिंह, एसीएमओ डा. अश्विनी, केंद्रीय गृह राज्य मंत्री के प्रतिनिधि अरविद संजय, अंबरीश सिंह, मुख्य चिकित्सा अधीक्षक(महिला) डा. ज्योति मल्होत्रा, डा. सीएस सिंह, जिला कार्यक्रम प्रबंधक अनिल यादव सहित डीआरडीओ के तकनीकी अधिकारी मौजूद रहे।

https://www.jagran.com/uttar-pradesh/lakhimpur-kheri-oxygen-plant-start-in-hospital-22030423.html

नईदुनिया

Sat, 18 Sept 2021

जिला अस्पताल आक्सीजन आपूर्ति में आत्मनिर्भरः फग्गन सिंह कुलस्ते

प्रधानमंत्री नरेन्द्र मोदी के 71वें जन्मदिवस के अवसर पर आक्सीजन प्लांट के लोकार्पण कार्यक्रम को वर्चुअल रूप से संबोधित करते हुए केंद्रीय इस्पात एवं ग्रामीण विकास राज्यमंत्री फग्गन सिंह कुलस्ते ने कहा कि स्वास्थ्य सेवाओं को बेहतर और आत्मनिर्भर बनाने के लिए केंद्र एवं प्रदेश सरकार संकल्पित हैं।

मंडला: प्रधानमंत्री नरेन्द्र मोदी के 71वें जन्मदिवस के अवसर पर आक्सीजन प्लांट के लोकार्पण कार्यक्रम को वर्चुअल रूप से संबोधित करते हुए केंद्रीय इस्पात एवं ग्रामीण विकास राज्यमंत्री फग्गन सिंह कुलस्ते ने कहा कि स्वास्थ्य सेवाओं को बेहतर और आत्मनिर्भर बनाने के लिए केंद्र एवं प्रदेश सरकार संकल्पित हैं। उन्होंने कहा कि आक्सीजन प्लांट स्थापित होने से जिला अस्पताल अब आक्सीजन आपूर्ति के लिए पूरी तरह आत्मनिर्भर हो गया है। कोरोना की संभावित तीसरी लहर में आक्सीजन आपूर्ति की किसी भी विकट परिस्थिति से निपटने के लिए अस्पताल प्रबंधन तैयार है। कोरोना संक्रमण जैसी विषम परिस्थितियों में यह प्लांट वरदान साबित होगा। श्री कुलस्ते ने कहा कि कोरोना काल में आक्सीजन आपूर्ति की समस्या सामने आई थी। जिससे निपटने के लिए सरकार द्वारा आक्सीजन प्लांटों का निर्माण करवाया जा रहा है।

इस आक्सीजन प्लांट से जिला अस्पताल में भर्ती हर मरीज के बिस्तर तक आक्सीजन सप्लाई की जाएगी। इस अवसर पर राज्यसभा सदस्य संपतिया उईके ने कहा कि वर्तमान सरकार ने स्वास्थ्य सेवाओं को सुदृढ़ बनाने की दिशा में प्रभावी कार्य किया है। कोरोना की दूसरी लहर में आक्सीजन तथा अस्पतालों में बिस्तरों की कमी को ध्यान में रखते हुए सरकार ने अस्पतालों में कोरोना मरीजों के लिए पृथक से बिस्तरों की व्यवस्था की है वहीं आक्सीजन प्लांट के माध्यम से आक्सीजन की कमी को दूर करने का प्रयास किया जा रहा है। इससे पूर्व कार्यक्रम के प्रारंभ में मुख्य चिकित्सा एवं स्वास्थ्य अधिकारी डॉ श्रीनाथ सिंह द्वारा आक्सीजन प्लांट के संबंध में विस्तृत जानकारी दी गई। उन्होंने बताया कि जिला अस्पताल परिसर में आक्सीजन के दो प्लांट स्थापित किये गए हैं जो कि डीआरडीओ और भारत पेट्रोलिम और प्राकृतिक गैस मंत्रालय के सहयोग से पीएम केयर योजना अंतर्गत प्राप्त हुए हैं। दोनों प्लांट की क्षमता क्रमशः 1000 एवम 1100 लीटर प्रति मिनिट है। उन्होंने बताया कि नैनपुर में 500 लीटर प्रति मिनिट क्षमता का प्लांट स्थापित किया गया है। इस अवसर पर राज्यसभा सदस्य संपतिया उईके ने फीता काटकर आक्सीजन प्लांट का लोकार्पण किया।

ये रहे उपस्थित

जिला चिकित्सालय में संपन्ना हुए कार्यक्रम में राज्यसभा सदस्य संपतिया उईके, विधायक मंडला देवसिंह सैयाम, जिला पंचायत अध्यक्ष सरस्वती मरावी, उपाध्यक्ष शैलेष मिश्रा, नगरपालिका अध्यक्ष पूर्णिमा शुक्ला, सांसद प्रतिनिधि जयदत्त झा एवं प्रफुल्ल मिश्रा, नगरपालिका अध्यक्ष पूर्णिमा शुक्ला, अपर कलेक्टर मीना मसराम, वेदप्रकाश कुलस्ते, अनुराग चौरसिया, मुख्य चिकित्सा एवं स्वास्थ्य अधिकारी डॉ श्रीनाथ सिंह उपस्थित रहे।

https://www.naidunia.com/madhya-pradesh/mandla-mandla-news-7042290

THE TIMES OF INDIA

Sun, 19 Sept 2021

CM inaugurates 72 oxygen plants, 50 more by month-end

By Faryal Rumi

Patna: CM Nitish Kumar inaugurated 72 pressure swing adsorption (PSA) oxygen generation plants on the occasion of Prime Minister Narendra Modi's 71st birthday on Friday. Of them, 38 plants have been set up under the PM Cares Fund and another 34 by the state government and also through donations and corporate social responsibility funds. The plants will augment medical oxygen capacity by 32.46 metric tonne (MT).

Health minister Mangal Pandey said the Centre has cooperated a lot in the supply and installation of PSA oxygen generation plants. These plants are being installed in collaboration with various central agencies like DRDO HITES and CMSS. The civil work of the sites has been done by the NHAI. Apart from this, 50 PSA plants are being installed by the state government with the help of various agencies, he said.

"Some PSA plants have also been provided by social organizations. The civil work of these sites is being done by the BMSICL. After the installation of all the 122 plants, there will be no shortage of oxygen in the state during the emergency or anticipated third wave of Covid-19. For the operation of these plants, two technical personnel each from the health institutions concerned have been selected and trained," Pandey said.

The newly launched plants have been installed at PMCH, NMCH-Patna, IGIMS, SDH Barh and SDH Masaurhi, Darbhanga Medical College and Hospital, Jawaharlal Nehru Medical College and Hospital-Bhagalpur, Anugrah Narayan Magadh Medical College and Hospital-Gaya, SKMCH-Muzaffarpur, Vardhman Institute of Medical Sciences-Pawapuri, Jannayak Karpoori Thakur Medical College and Hospital-Madhepura and Govt Medical College-Bettiah.

Special secretary-cum-executive director, State Health Society and Bihar Aids Control Society, Sanjay Kumar Singh said 50 more oxygen plants are scheduled to become operational by September-end. "About 46 more PSA plants are being installed at different health facilities across the state whereas four more machines will arrive soon. One PSA plant has the capacity to produce from 50 to 2,000 litres of oxygen per minute, depending on the size," he said.

https://timesofindia.indiatimes.com/city/patna/cm-inaugurates-72-oxygen-plants-50-more-by-month-end/articleshow/86327172.cms

THE HINDU

Mon, 20 Sept 2021

GRH gets one more oxygen generation plant

Three more plants will be commissioned soon, says Dean

Madurai: In a joint philanthropic gesture, Tamil Nadu Chamber of Commerce and Industry (TNCCI), Madura Coats and Fenner India have donated an oxygen generation plant costing about ₹90 lakh to Government Rajaji Hospital (GRH) here.

It was commissioned at a function in which Finance Minister P. T. R. Palanivel Thiaga Rajan and Commercial Taxes Minister P. Moorthy, MLAs G. Thalapathi and M. Boominathan, Collector Aneesh Sekhar, Corporation Commissioner K. P. Karthikeyan and officials of Health Department participated.

A new oxygen generator donated by philanthropists was commissioned at Government Rajaji Hospital in Madurai on Sunday. | Photo Credit: G. Moorthy

The philanthropists were represented by president N. Jegatheesan and senior president S. Rethinavelu of TNCCI, and manufacturing director A. Ramkumar and associate vice-president P. G. S. Selvan Dinesh Davidson of Madura Coats. The move follows an appeal from Chief Minister M. K. Stalin on May 18 to liberally contribute for establishing oxygen generation plants and other infrastructural facilities for the benefit of the public.

Speaking to *The Hindu*, GRH Dean A. Rathinavel said that the hospital had four oxygen generation plants which could produce around 2,000 litres a minute. If need arose, the production could be increased. For instance, if there were 25 to 30 patients on ventilator, the oxygen requirement may be anywhere around 1,000 litres/minute. If the patients were in regular isolation wards for COVID-19 virus, 1,000 litres of oxygen could serve 250 beds, he said.

Three more oxygen generation plants sponsored by the House of TVS and the DRDO had been installed and were on trial mode. They would be commissioned soon, he said.

All facilities ready

GRH doctors were of the view that with 189 fresh COVID-19 cases having been reported on Saturday, the hospital was comfortably placed with regard to infrastructural facilities. The oxygen support and bed strength had been increased and there was adequate manpower.

Dr. Aneesh Sekhar said that with intensified vaccination drive in rural areas, first dose of inoculation could be done to all the eligible people above 18 years soon. Dr. Karthikeyan said that they had roped in all Urban Primary Health Centres in the city to carry out the drive extensively.

The Corporation has opened vaccination centres at 253 sites, manned by 1,200 frontline workers, with a target to administer vaccine to 50,000 people.

https://www.thehindu.com/news/cities/Madurai/grh-gets-one-more-oxygen-generation-plant/article36555101.ece

पत्रिका

Mon, 20 Sept 2021

सआदत अस्पताल में नया ऑक्सीजन प्लांट हुआ शुरू

By Pawan Sharma

टोंक. कोविड 19 में ऑक्सीजन की किल्लत झेल चुके जिले के सबसे बड़े सआदत अस्पताल में पीएम केयर फंड, एनएचएआई व डीआरडीओ की ओर से स्थापित नए ऑक्सीजन जनरेशन प्लांट को शुरू कर दिया गया है।

प्लांट की संम्बधित कम्पनी ओर आईआरबी के इंजीनियरों ने शनिवार को सआदत अस्पताल में स्थापित किए प्लांट से जनरेट होने वाली ऑक्सीजन की गुणवत्ता की जांच की है। आईआरबी से आए संजय कुमार व हंसराज चौधरी ने बताया कि प्लांट के सिविल वर्क सहित बिजली का काम पूरा कर लिया गया गया है। गुणवत्ता की जांच का कार्य चल रहा है। इसके पूरा होने के बाद प्लांट को अस्पताल प्रशासन को सुपुर्द किया जाएगा।

प्लांट लगा रही कम्पनी की ओर से आए इंजीनियर रूपम ने बताया कि प्लांट से जनरेट होने वाली ऑक्सीजन की गुणवत्ता की जांच की जा रही है। जांच की प्रोग्रेस रिपोर्ट अस्पताल प्रशासन को सौंपने के बाद मरीजों के लिए प्लांट से पाइप लाइन द्वारा ऑक्सीजन की आपूर्ति शुरू कर दी जाएगी।

रूपम ने बताया कि इस ऑक्सीजन प्लांट से 1000 लीटर ऑक्सीजन का प्रति मिनट उत्पादन होगा। प्लांट द्वारा रोजाना 275 ऑक्सीजन सिलेंडर (डी साइज) के मिल सकेंगे। उल्लेखनिय है कि स्वास्थ्य एवं परिवार कल्याण मंत्रालय के अंतर्गत ऑक्सीजन प्लांट की मशीनरी सहित अन्य संसाधन का काम डिफेंस रिसर्च एंड डवलपमेंट ऑर्गेनाइजेशन (डीआरडीओ) की ओर से किया गया है।

सआदत अस्पताल में नया ऑक्सीजन प्लांट हुआ शुरू

https://www.patrika.com/tonk-news/new-oxygen-plant-started-in-saadat-hospital-7075977/

DRDO on Twitter

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Fri, 17 Sept 2021 10:30PM

Visit of Defence Secretary to Headquarters Southern Naval Command

Shri Ajay Kumar, Defence Secretary, visited Headquarters Southern Naval Command (HQ SNC) on 17 Sep 21. He was accompanied by VAdm SN Ghormade, Vice Chief of Naval Staff and by Shri Sanjiv Mittal, Financial Adviser (Defence Services). They visited various training establishments at HQSNC and also visited Indigenous Aircraft Carrier (IAC) to review its progress. The Defence Secretary was also given a demonstration of the indigenous Oxygen Recycling System and appraised about the Environmental Projects undertaken by Southern Naval Command. The Defence Secretary also met Vice Admiral AK Chawla, Flag Officer Commanding-in-Chief Southern Naval Command and discussed various issues pertaining to the Southern Naval Command.

https://pib.gov.in/PressReleasePage.aspx?PRID=1755947

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Fri, 17 Sept 2021 10:30PM

रक्षा सचिव का दक्षिणी नौसेना कमान मुख्यालय का दौरा

रक्षा सचिव श्री अजय कुमार ने 17 सितंबर 2021 को मुख्यालय दक्षिणी नौसेना कमान (मुख्यालय एसएनसी) का दौरा किया। रक्षा सचिव के साथ नौसेना स्टाफ के उप प्रमुख वाइस एडमिरल एस एन घोरमडे और वित्तीय सलाहकार (रक्षा सेवाएं) श्री संजीव मित्तल भी मौजूद थे। उन्होंने मुख्यालय दक्षिणी नौसेना कमान में विभिन्न प्रशिक्षण प्रतिष्ठानों का दौरा किया और स्वदेशी विमान कैरियर (आईएसी) की प्रगति की समीक्षा के लिए इसका भी मुआयना किया। रक्षा सचिव के समक्ष स्वदेशी ऑक्सीजन रिसाइक्लिंग प्रणाली का प्रदर्शन किया गया और दक्षिणी नौसेना कमान द्वारा शुरू की गई विभिन्न पर्यावरण परियोजनाओं से अवगत कराया गया। रक्षा सचिव ने फ्लैग ऑफिसर कमांडिंग-इन-चीफ दक्षिणी नौसेना कमान वाइस एडमिरल ए के चावला से भी मुलाकात की और दक्षिणी नौसेना कमान से संबंधित विभिन्न मुद्दों पर चर्चा की।

https://pib.gov.in/PressReleasePage.aspx?PRID=1755975

Press Information Bureau
Government of India

Ministry of Defence

Fri, 17 Sept 2021 10:01AM

Chief of the Air Staff visits Headquarters Central Air Command

Air Chief Marshal RKS Bhadauria PVSM AVSM VM ADC, Chief of the Air Staff (CAS) visited Headquarters, Central Air Command (CAC),Prayagraj on 16 Sep 21 for its Annual Commanders' Conference. The CAS was received by Air Marshal RJ Duckworth AVSM VSM, Air Officer Commanding-in-Chief (AOC-in-C) CAC. A ceremonial Guard of Honour was presented to the CAS on arrival at the Command Headquarters.

In his address to the Commanders, the CAS emphasised the need for critical analysis to enhance operational preparedness, focus on maintenance practices and ensure robust physical and cyber security. He directed the Commanders to ensure that the readiness of all platforms, weapon systems and assets are kept at the highest level. CAS appreciated the role of CAC in the recent flood relief efforts and aid to civil administration.

The CAS urged the Commanders to continue their efforts in ensuring a safe operational flying environment and stressed on the need to augment the combat capability of IAF through innovation, self-reliance and indigenisation.

https://pib.gov.in/PressReleasePage.aspx?PRID=1755628

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Fri, 17 Sept 2021 10:01AM

वायुसेनाध्यक्ष ने मध्य वायु कमान के मुख्यालय का दौरा किया

वायुसेनाध्यक्ष एयर चीफ मार्शल आरकेस भदौरिया पीवीएसएम एवीएसएम वीएम एडीसी ने वार्षिक कमाडंर सम्मेलन के अवसर पर 16 सितंबर, 21 को प्रयागराज स्थित मध्य वायु कमान मुख्यालय का दौरा किया। एयर मार्शल आरजे डकवर्थ एवीएसएम वीएसएम, एयर ऑफिसर कमानडिंग-इन-चीफ (एओसी-इन-सी) मध्य वायु कमान ने वायुसेनाध्यक्ष की अगवानी की। कमान मुख्यालय पहुंचने पर वायुसेनाध्यक्ष को रस्मी सलामी गारद पेश की गई।

कमाडंरों को सम्बोधित करते हुये वायुसेनाध्यक्ष ने कार्रवाई करने की तैयारियों और चाक-चौबंद रहने का अभ्यास का विश्लेषण करने तथा वास्तविक और साइबर सुरक्षा सुनिश्चित करने की आवश्यकता पर जोर दिया। उन्होंने कमाडंरों को निर्देश दिया कि वे सभी स्तरों पर कार्रवाई की तैयारी, हथियार प्रणाली और साजो-सामान को हमेशा दुरुस्त रखना सुनिश्चित करें। वायुसेनाध्यक्ष ने हाल में आई बाढ़ में राहत अभियान चलाने और सिविल प्रशासन की मदद करने के लिये मध्य वायु कमान की सराहना की।

वायुसेनाध्यक्ष ने सभी कमाडंरों से आग्रह किया के वे सुरक्षित उड़ान परिचालन वातावरण सुनिश्चित करें। उन्होंने इस बात पर बल दिया कि नवाचार, आत्मनिर्भरता और स्वदेशीकरण के जरिये भारतीय वायुसेना की युद्ध क्षमता बढ़ाई जानी चाहिये।

https://pib.gov.in/PressReleasePage.aspx?PRID=1755642

Press Information Bureau
Government of India

Ministry of Defence

Fri, 17 Sept 2021 5:26PM

15th edition of Indo - Nepal joint exercise Surya Kiran to commence from 20 September at Pithoragarh (UK)

15th Edition of Indo - Nepal Joint Military Training, Exercise Surya Kiran between Indian Army and Nepali Army is commencing from 20 September 2021 at Pithoragarh (UK). During this exercise, an Infantry Battalion from Indian Army and an equivalent strength from Nepali Army would be sharing their experiences gained during the conduct of various counter-insurgency operations over a prolonged period in their respective countries.

As part of the exercise, both the Armies would familiarise themselves with each other's weapons, equipment, tactics, techniques and procedures of operating in a counter-insurgency environment in mountainous terrain. Also, there would be a series of Expert Academic Discussions on various subjects such as Humanitarian Assistance and Disaster Relief, High Altitude Warfare, Jungle Warfare etc. The joint military training would culminate with a gruelling 48 hours exercise to validate the performance of both the armies in counter-insurgency in mountainous terrain. The exercise is part of an initiative to develop inter-operability and sharing expertise between the two nations.

This joint military training will go a long way in improving bilateral relations and also will be a major step towards further strengthening the traditional friendship between the two nations. Last edition of Exercise Surya Kiran was conducted in Nepal in 2019.

https://pib.gov.in/PressReleasePage.aspx?PRID=1755783

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Fri, 17 Sept 2021 5:26PM

भारत-नेपाल संयुक्त अभ्यास सूर्य किरण का 15वां संस्करण 20 सितंबर से पिथौरागढ़ (उत्तराखंड) में शुरू होगा

भारत-नेपाल संयुक्त सैन्य प्रशिक्षण अभ्यास सूर्य किरण का 15वां संस्करण 20 सितंबर 2021 से पिथौरागढ़ (उत्तराखंड) में शुरू हो रहा है। इस अभ्यास के दौरान, भारतीय सेना की एक इन्फैंट्री बटालियन और नेपाली सेना के समकक्ष सैन्य बल अपने-अपने देशों में लंबे समय तक विभिन्न आतंकवाद विरोधी अभियानों के संचालन के दौरान प्राप्त अपने अनुभवों को साझा करेंगे।

अभ्यास के अंतर्गत दोनों देशों की सेना एक-दूसरे के हथियारों, उपकरणों, रणनीति, तकनीकों और पहाड़ी इलाकों में आतंकवाद रोधी वातावरण में संचालन की प्रक्रियाओं से परिचित होंगी। इसके अलावा मानवीय सहायता और आपदा राहत, ऊंचाई वाले युद्ध, वनों में युद्ध आदि जैसे विभिन्न विषयों पर विशेषज्ञ अकादमिक चर्चाओं की एक श्रृंखला होगी। संयुक्त सैन्य प्रशिक्षण दोनों देशों की सेना के पहाड़ी इलाकों में उग्रवाद का मुकाबला करने में प्रदर्शन का परीक्षण करने के लिए 48 घंटे के कठिन अभ्यास के साथ

समाप्त होगा। यह अभ्यास दोनों देशों के बीच अंतर-संचालनीयता और विशेषज्ञता साझा करने के लिए एक पहल का हिस्सा है।

यह संयुक्त सैन्य प्रशिक्षण द्विपक्षीय संबंधों को बेहतर बनाने में एक लंबा रास्ता तय करेगा और दोनों देशों के बीच पारंपरिक दोस्ती को और मजबूत करने की दिशा में एक बड़ा कदम होगा। अभ्यास सूर्य किरण का अंतिम संस्करण 2019 में नेपाल में आयोजित किया गया था।

https://pib.gov.in/PressReleasePage.aspx?PRID=1755912

Mon, 20 Sept 2021

In first foreign visit after taking over as CDS, Gen Bipin Rawat to visit Russia, US

The CDS conference would be focusing on addressing the regional security issues and Afghanistan is also likely to come up for discussion, they said

In his first visit abroad after taking over as the Chief of Defence Staff (CDS), General Bipin Rawat will be visiting Russia and the US.

In first foreign visit after taking over as CDS, Gen Bipin Rawat to visit Russia, US

Rawat took over his new office as CDS on December 31, 2019, and since then has been declining foreign invitations for focusing on the new assignment of integrating the defence forces as a combined fighting force.

"There is a conference of the CDS-rank officers of the Shanghai Cooperation Agreement member countries. China and Pakistan are also part of this grouping," senior defence officials said.

The CDS conference would be focusing on addressing the regional security issues and Afghanistan is also likely to come up for discussion, they said.

The CDS would also witness the activities of the respective armed forces taking part in the SCO peace mission drills being held in Russia. Indian Army and Air Force are also taking part in the exercise there.

The visit will take place in the coming week and soon after return from Russia, Rawat would be leaving for the US for meeting his counterpart and other American military leadership at the Pentagon.

The two countries have been coming closer militarily in the last few years and have been holding multiple military exercises and hardware cooperation.

The Indian military saw a major change in senior-level structures under the Narendra Modi government as the focus is now on theatrisation of the fighting forces and bringing in more capabilities and jointness among the three services.

https://www.indiatvnews.com/news/india/after-taking-over-as-cds-general-bipin-rawat-to-visit-russia-us-734983

THE TIMES OF INDIA

Sat, 18 Sept 2021

Need to augment combat capability of IAF through innovation, self-reliance, says Air Chief Marshal Bhadauria

New Delhi: Chief of Air Staff (CAS) and Air Chief Marshal Rakesh Kumar Singh Bhadauria visited the Central Air Command Headquarters in Prayagraj on Thursday and urged the commanders to continue their efforts to ensure a safe flying environment and stressed the need to augment the combat capability of IAF through innovation, self-reliance and indigenisation.

Air Chief Marshal RKS Bhadauria

The Indian Air Force on Friday reported in a series of tweets that the CAS has visited the Central Air Command Headquarters for the Annual CDRS Conference. He urged the commanders to continue their efforts to ensure a safe flying environment.

"CAS emphasized the need for critical analysis to enhance operational preparedness, focus on maintenance practices and ensure robust physical and cyber security," said the IAF in a tweet.

"CAS urged the commanders to continue their efforts to ensure a safe flying environment and stressed the need to augment the combat capability of IAF through innovation, self-reliance and indigenisation," informed the Indian Air Force (IAF).

https://timesofindia.indiatimes.com/india/need-to-augment-combat-capability-of-iaf-through-innovation-self-reliance-says-air-chief-marshal-bhadauria/articleshow/86284159.cms

THE TIMES OF INDIA

Sun, 19 Sept 2021

Indian Army ready to face drone challenge, says Lt General MK Das

Jammu (Jammu & Kashmir): After reviewing the attestation parade of 460 new recruits of Jammu and Kashmir Light Infantry (JAK LI) held at Dansal village in Jammu today, Commandant of Officers Training Academy in Chennai and colonel of JAK LI regiment Lt Gen MK Das said that the Indian army is completely prepared to counter the drone challenge.

Addressing the media, Das said that the newly attested recruits of the JAK LI regiment were given contemporary training and are ready to face all kinds of contingencies and unforeseen situations.

"The unique thing about our regiment is that our troops hail from Jammu and Kashmir and Ladakh. So they have this ingrained quality to be much more security-conscious than others," he stated.

Speaking on the drone challenge and social media warfare, Das informed that the training of the recruits includes subjects like science and technology and cyber security and they are made familiar with all kinds of threats that can be posed by the adversaries.

"I would like to tell you that our army chief is taking the drone challenge very seriously. The Indian army and JAK LI regiment are completely prepared to face any kind of situation," he stated.

He further said that the newly attested recruits will be an inspiration for all the youths of Jammu and Kashmir and a befitting reply for those who want to mislead them.

https://timesofindia.indiatimes.com/india/indian-army-ready-to-face-drone-challenge-says-lt-general-mk-das/articleshow/86315404.cms

The Tribune

Mon, 20 Sept 2021

Army developing UAV-mounted electronic intelligence gadgets to overcome limitations of ground-based sensors

Range, capability of electronic signal capturing equipment enhances manifold when, when placed on an elevated platform than when operating from the ground

By Vijay Mohan

Chandigarh: The Indian Army has launched a project to develop an airborne system that can be mounted on unmanned aerial vehicles (UAV) in an attempt to overcome the functional limitations of ground-based electronic intelligence gathering equipment.

For representation. File photo

Operating height is of great importance as the range and capability of electronic signal capturing equipment, when placed on an elevated platform, enhances manifold when compared to the same equipment operating from the ground.

Termed as an 'Elevated Platform for Gathering Intelligence through Electronic Support Measures (ESM)', the project is being executed by the Army's Military College of Telecommunication Engineering located at Mhow near Indore. ESM gather intelligence through passive "listening" to radio transmissions or electromagnetic radiations and the data so generated can be used to assess the enemy's tactical activity or develop a library on the signature and capability of the adversary's equipment.

At present, the electronic warfare systems in the Indian Army are man pack or vehicle based. These systems have the inherent limitations with respect to deployability, flexibility and are severely restricted by various terrain parameters such as line of sight issues in the mountains and vulnerability to enemy aircraft in the plains of deserts, states a request for information (RFI) from the industry floated by the Army this week for the design and development of an elevated platform.

"The proposed system negates the above-mentioned requirements by incorporating an elevated platform. The system will increase flexibility in deployment, reduce deployment time and various limitations imposed by terrain. The qualitative requirements of the proposed system will enhance the ESM capability of the Indian Army and will enhance capability to detect, intercept, identify, locate, record, and analyse the electromagnetic transmission of the adversary at greater ranges," the RFI adds.

The system being developed will comprise a UAV on which the sensor and communications payload will be mounted and a ground station for launching controlling and recovering the UAV during operational missions. The ground stations will also be responsible for recording, processing, and analysing the data captured by the UAV.

The army's requirement is for a UAV with a flying endurance of more than six hours, payload capacity of at least 15 kg and a flight ceiling of 3,000 meters along with avionics such as GPS and collision detection and avoidance system.

https://www.tribuneindia.com/news/nation/army-developing-uav-mounted-electronic-intelligence-gadgets-to-overcome-limitations-of-ground-based-sensors-313349

THE TIMES OF INDIA

Sun, 19 Sept 2021

IAF to hold air show over Srinagar's Dal Lake on September 26

Srinagar: An air show will be held on September 26 where IAF's skydiving team Akash Ganga and Suryakiran Aerobatic and Display Team and paramotor flying will maneuver the skies over the famous Dal Lake, officials said on Saturday.

Sky-diving team of Akash Ganga of the IAF will maneuver the skies over the famous Dal Lake in Srinagar on September 26 (File photo for representation)

The air show will be organised by the Air Force Station Srinagar and the Jammu and Kashmir administration as part of the ongoing celebrations commemorating 'Azadi ka Amrit Mahotsav', they said.

The main aim of the exercise - under the theme 'Give Wings to Your Dream' - is to motivate the youth of the valley to join the Indian Air Force (IAF) and to promote tourism in the region, the officials said.

The event will be flagged off by lieutenant governor Manoj Sinha at the Sher-e-Kashmir International Conference Centre (SKICC) overlooking the Dal Lake.

More than 3,000 college and school students are expected to participate in the programme to witness the impressive maneuvers of the IAF, which will motivate them to dream about a career in the force and in the aviation sector, the officials said.

"The show will also develop passion among the students to give wings to their dreams. Along with the students, 700 teachers will also be present at the venue," they added.

During the demonstration, students will also be familiarised with the new technological advancements achieved and incorporated by the IAF while flying aircraft in the sky over the world-famous Dal Lake, the officials said.

Stalls will be established at SKICC where students will be familiarised with the achievements of the Air Force, employment opportunities in the IAF, recruitment rules and eligibility criteria, they added.

Srinagar-based PRO defence Col Emron Musavi said the display will include flypast by various aircraft of the IAF.

"The spectators would also get to witness paramotor flying and IAF's skydiving team Akash Ganga in action. 'Ambassadors of IAF', Suryakiran Aerobatic Display Team, will be performing in the valley after a gap of 14 years," he said.

Col Musavi said the symphony orchestra of the IAF would also be performing at the event.

The event would also consist of a photo exhibition depicting the history of the IAF, he said.

https://timesofindia.indiatimes.com/india/iaf-to-hold-air-show-over-srinagars-dal-lake-on-september-26/articleshow/86317321.cms

the pioneer

Sun, 19 Sept 2021

Work on defence industrial corridor gathering steam

Lucknow: With the Uttar Pradesh assembly elections round the corner, the work on the UP Defence Industrial Corridor is gathering steam and the UP Expressway Industrial Development Authority (UPEIDA) has established large land banks in its six nodes.

Prime Minister Narendra Modi visited Aligarh recently for the foundation stone laying ceremony of Raja Mahendra Pratap Singh State University. The ambitious Uttar Pradesh Defence Industrial Corridor project was launched by the prime minister in February 2018 and Aligarh is one of the six nodes of the corridor, Agra, Kanpur Nagar, Chitrakoot, Jhansi and Lucknow being the other five nodes.

The UPEIDA is the nodal agency for the defence industrial corridor project. The UPEIDA has established large land banks in the six nodes and in Aligarh alone, 20 companies have submitted proposals for setting up units and 19 have been allotted 55.40 hectares of land.

The companies have been able to cumulatively garner investments worth Rs 1,500 crore thus creating employment potential for 20,000 people in the months to come. Sources in the UPEIDA said that interest in the corridor was increasing and the state government was looking at allotting 30 acres more land in the Aligarh node as more investors had expressed a desire to set up their units there.

Two companies -- Encore Research Lab LLP and Allen and Alvan Private Limited -- are investing Rs 600 crore to make drones. Ten hectares of land in Aligarh has been allocated to them. One investor in Aligarh node said till date, the Aligarh node had been able to garner Rs 1,500 crore investment and it would shoot up to Rs 4,000 crore in days to come.

Land has been allotted to 20 companies so far. These companies will manufacture drones, guns, rifles, night vision goggles, ballistic helmets along with other equipment. As per sources, the land will be allocated to 15 more companies that have shown interest.

A UPEIDA official said: “Land bank of 1,000 hectares has been created in Jhansi, about 100 hectares in Chitrakoot and about 250 hectares in Kanpur Nagar for the defence industrial corridor nodes. The state government has shown a 200-acre piece of land in Lucknow to BrahMos Aerospace, which is planning to set up a manufacturing unit there."

With work on the defence industrial corridor moving at breakneck speed, many foreign investors and companies are showing interest. Recently, interest in the corridor was shown by the British High Commission too, the official added.

The government has been giving land and electricity at concessional rates, constructing boundary walls of the factory for the corridor. The land allotment has been done keeping in mind the distance from the main highway and airports. For example, land allocated in Aligarh is 20 minutes from the main highway.

In Jhansi, 15 hectares of land has been allocated to Delta Combat Systems Limited. The company is looking to set up a manufacturing unit of cartridges for assault, sniper and INSAS rifles. The investment by Delta Combat is Rs 150 crore.

https://www.dailypioneer.com/2021/state-editions/work-on-defence-industrial----corridor-gathering-steam.html

Hindustan Times

Sat, 18 Sept 2021

IAF to bolster fighter fleet with 24 second-hand Mirages

IAF's 35-year old Mirage fleet, which performed exceptionally during the 2019 Balakot operation, is undergoing a mid-life upgrade, the people said – with the trigger for the acquisition of the second-hand aircraft being the immediate need for 300 critical spares

By Shishir Gupta

New Delhi: The Indian Air Force (IAF) is set to acquire 24 second-hand Mirage 2000 fighters, made by Dassault Aviation, in an attempt to strengthen its ageing fleet of the fourth-generation fighters and also secure parts for its two existing squadrons of the aircraft, people familiar with the matter said on condition of anonymity. IAF has initialled a contract worth 27 million euros to buy the fighters, eight of which are in ready-to-fly condition, the people cited above added. That works out to a per-aircraft acquisition cost of 1.125 million euros. The people cited above said the aircraft will soon be shipped to India in containers.

Out of the 24 Mirage fighters, 13 are in complete condition with engine and airframe intact with eight of them ready to fly after servicing. (File Photo)

IAF's 35-year old Mirage fleet, which performed exceptionally during the 2019 Balakot operation, is undergoing a mid-life upgrade, the people said – with the trigger for the acquisition of the second-hand aircraft being the immediate need for 300 critical spares. The aircraft is becoming obsolete in France, they added, and IAF chief Air Chief Marshal RKS Bhaduaria decided to go in for the purchase.

Out of the 24 fighters, 13 are in complete condition with engine and airframe intact with eight of them (nearly half a squadron) ready to fly after servicing. The remaining 11 fighters are partially complete but with fuel tanks and ejection seats, which will be scavenged to secure parts for IAF's two existing squadrons of the fighter.

IAF purchased around 50 fourth-generation Mirage 2000 C and B fighters way back in 1985 with a maintenance contract that expired in 2005. It signed another contract in 2015-2016 with the French original equipment manufacturer.

The purchase highlights the importance of shifting spare parts and engine supply chains to India for future acquisitions as fighters abroad reach obsolescence much faster than in India. Until the Narendra Modi government took the decision of acquiring the 4.5 generation Rafale fighters (also from Dassault), the Mirage 2000 was India's front-line fighter, a position it has held since the Kargil war. The new Aatmanirbhar Bharat campaign should ensure that original equipment and spares are now manufactured in India so that there is no shortage of spares till the time the fighter is decommissioned, the people cited above said.

The other issue that flows out of this last-minute acquisition is that the IAF and the Indian Navy should plan their fighter acquisition so that there is synergy between the two forces and coherence is maintained in the supply of spare parts, experts said. It also points to the need for the defence ministry to accelerate decisions on replenishing the country's fighter fleet, especially because China has already moved to fifth-generation fighters and armed drones.

https://www.hindustantimes.com/india-news/iaf-to-bolster-fighter-fleet-with-24-second-hand-mirages-101631836620386.html

हिन्दुस्तान

Sat, 18 Sept 2021

24 और मिराज-2000 लड़ाकू विमानों को खरीदने जा रहा भारत, एयरस्ट्राइक व कारगिल में दिया था पाक को दर्द

By शिशिर गुप्ता

नई दिल्ली: जिस मिराज-2000 लड़ाकू विमानें ने कारगिल युद्ध का पासा पलट दिया था, जिसने पाकिस्तान की धरती में घुसकर जैश के आतंकी ठिकानों को ध्वस्त किया था, उस बेड़े की ताकत और बढ़ने वाली है। भारतीय वायुसेना 24 सेकेंड-हैंड मिराज के साथ अपने लड़ाकू बेड़े को और मजबूत करने वाली है। मामले से परिचित लोगों ने नाम न जाहिर होने देने की शर्त पर कहा कि भारतीय वायुसेना चौथी पीढ़ी के लड़ाकू विमानों के अपने पुराने बेड़े को मजबूत करने के प्रयास में दसॉल्ट एविएशन द्वारा बनाए गए 24 सेकेंड-हैंड मिराज 2000 लड़ाकू विमानों का अधिग्रहण करने और साथ ही विमान के अपने दो मौजूदा स्क्वाड्रनों के लिए सुरक्षित पुर्जे भी हासिल करने की तैयारी में है।

उनमें से एक अधिकारी ने कहा कि भारतीय वायुसेना ने इन लड़ाकू विमानों को खरीदने के लिए 27 मिलियन यूरो ((233.67 करोड़ रुपये) के अनुबंध पर हस्ताक्षर किए हैं, जिनमें से आठ उड़ने के लिए तैयार स्थिति में हैं। एक विमान की कीमत 1.125 मिलियन यूरो यानी (9.73 करोड़ रुपये) है। विमानों को जल्द ही कंटेनरों में भारत भेज दिया जाएगा। बता दें कि यह वही मिराज-2000 है, जिसने पाकिस्तान को कारिगल से लेकर एयरस्ट्राइक के वक्त बड़ा दर्द दिया है।

भारतीय वायुसेना का 35 वर्षीय पुराना मिराज बेड़ा, जिसने 2019 बालाकोट ऑपरेशन के दौरान असाधारण प्रदर्शन किया, मिड-लाइफ अपग्रेड के दौर से गुजर रहा है। वहीं दूसरे विमानों के लिए 300 महत्वपूर्ण पुर्जों की तत्काल आवश्यकता है। अधिकारी ने कहा कि ये विमान अब फ्रांस में अप्रचलित हो रहे हैं और वायुसेना प्रमुख एयर चीफ मार्शल आरकेएस भदौरिया ने इसे खरीदने का फैसला किया है।

24 लड़ाकू विमानों में से 13 इंजन और एयरफ्रेम के साथ बेहतर स्थिति में हैं, जिनमें से आठ (लगभग आधा स्क्वाड्रन) सर्विसिंग के बाद उड़ान भरने के लिए तैयार हैं। वहीं, बचे हुए 11 लड़ाकू विमान ईंधन टैंक और इजेक्शन सीटों के साथ आंशिक रूप से ठीक हैं, जिनका इस्तेमाल भारतीय वायुसेना के लड़ाकू विमानों के दो मौजूदा स्क्वाड्रनों को मोडिफिकेशन के लिए किया जाएगा।

भारतीय वायुसेना ने 1985 में करीब 50 चौथी पीढ़ी के मिराज 2000 C और B लड़ाकू विमानों को एक रखरखाव अनुबंध (मेंटेनेंस कॉन्ट्रैक्ट) के साथ खरीदा था, जो 2005 में समाप्त हो गया था। इसके बाद वायुसेना ने 2015-2016 में फ्रांसीसी मूल उपकरण निर्माता के साथ एक और अनुबंध पर हस्ताक्षर किए।

अधिकारी ने आगे कहा कि यह सौदा भविष्य में अधिग्रहण के लिए स्पेयर पार्ट्स और इंजन को भारत में स्थानांतरित करने के महत्व पर प्रकाश डालती है, क्योंकि भारत की तुलना में विदेशों में लड़ाकू विमान बहुत तेजी से चलन (इस्तेमाल) से बाहर हो जाते हैं। जब तक नरेंद्र मोदी सरकार ने 4.5 पीढ़ी के राफेल लड़ाकू विमान (डसॉल्ट से भी) का सौदा नहीं किया था, तब तक मिराज 2000 ही भारत की अग्रिम पंक्ति का लड़ाकू विमान था। यह कारगिल युद्ध के बाद से लेकर अब तक भारतीय बेड़े को मजबूती प्रदान किए

हुए है। आत्मानिर्भर भारत अभियान के तहत इस बात को सुनिश्चित करना चाहिए कि लड़ाकू विमानों के मूल उपकरण और स्पेयर पार्ट्स का निर्माण अब भारत में ही किया जाए ताकि लड़ाकू विमान के सेवा में रहने तक पुर्जों की कोई कमी न हो।

जानें लड़ाकू विमान मिराज 2000 के बारे में सबकुछ

- मिराज-2000 विमान की लंबाई 47 फीट और इस खाली विमान का वजन 7500 किलो है।
- मिराज-2000 13800 किलो गोला बारूद के साथ भी 2336 किमी प्रतिघंटा की स्पीड से उड़ सकता है।
- मिराज-2000 125 राउंड गोलियां प्रति मिनट दागता है और 68 मिमी के 18 रॉकेट प्रति मिनट दागता है।
- पहली बार 1970 में उड़ान भरने वाला मिराज 2000 फ्रेंच मल्टीरोल, सिंगल इंजन चौथी पीढ़ी का फाइटर जेट है। ये फाइटर जेट विभिन्न देशों में सेवा दे रहा है।
- मिराज-2000 एक साथ हवा से जमीन और हवा से हवा में भी मार करने में सक्षम है।
- दसॉल्ट मिराज 2000 लड़ाकू विमान ने कारगिल युद्ध में बड़ी भूमिका रही थी।
- अक्टूबर 1982 में भारत ने 36 सिंगल सीटर सिलेंडर मिराज 2000 एचएस और 4 ट्वीन सीटर मिराज 2000 टीएसएस का ऑर्डर दिया था।

https://www.livehindustan.com/national/story-indian-air-force-to-bolster-fighter-fleet-with-24-second-hand-mirages-4604601.html

Hindustan Times

Mon, 20 Sept 2021

Women may lead BRO projects along border

The development came 18 months after the Supreme Court ruled that women officers, who joined the Indian Army through short service commission (SSC), were entitled to permanent commission and command roles.

New Delhi: The Border Roads Organisation (BRO) plans to create four women-led road construction companies (RCC) to handle projects in forward areas along the India-China border, officials familiar with the development said on Sunday. Two women-led RCCs each will come up in the western and the north-eastern sectors, the defence ministry said in a statement.

The announcement comes weeks after BRO appointed a woman officer, Major Aaina Rana, as the commanding officer of the 75 RCC at Pipalkoti in Uttarakhand's Chamoli.(PTI)

The announcement comes weeks after BRO appointed a woman officer, Major Aaina Rana, as the commanding officer of the 75 RCC at Pipalkoti in Uttarakhand's Chamoli. She will be responsible for providing forward connectivity along the India-China border. Rana's RCC is the BRO's first women-led RCC as all three platoon commanders under her are women engineers.

"As India celebrates 75 years of Azaadi Ka Amrit Mahotsav, it also celebrates the ongoing efforts of our nation towards women empowerment…By empowering them with the tools of authority, responsibility and respect, BRO firmly believes that women will always be active participants in the endeavour of nation building," the statement said.

In April, BRO's Vaishali S Hiwase took over as the first woman commanding officer of an RCC responsible for providing forward connectivity along the India-China border in the northern sector.

BRO is building strategic roads in Ladakh, Jammu and Kashmir, Uttarakhand, Himachal Pradesh, Arunachal Pradesh and Sikkim and plans to complete all 61 strategic roads along the China border by December 2022 to allow swifter mobilisation of troops and stores to forward areas.

The move to create women-led RCCs comes at a time when new avenues are being opened for women in the armed forces and those wanting to join the armed forces.

Last month, the Indian Army promoted five women officers to the time-scale rank of colonel after the completion of the mandatory 26 years of service. That was the first time that women officers were promoted to the rank outside the medical, legal and education wings of the army.

The development came 18 months after the Supreme Court ruled that women officers, who joined the Indian Army through short service commission (SSC), were entitled to permanent commission and command roles.

The doors of the of the National Defence Academy (NDA), thus far a male preserve, are also being opened to women. Women were allowed to serve in select branches of the three services as SSC officers almost three decades ago. The headcount of women in the military has increased almost three-fold over the last six years, with more avenues being opened to them at a steady pace. As of February 2021, there were 9,118 women serving in the army, navy and air force.

One of the turning points for women in the military came in 2015 when the Indian Air Force decided to induct them into the fighter stream. Women are now being assigned to warships too, but tanks and combat positions in infantry are still no-go zones for them.

https://www.hindustantimes.com/india-news/women-may-lead-bro-projects-along-border-101632076881307.html

ThePrint

Sun, 19 Sept 2021

What are nuclear-powered submarines that Australia will acquire under first AUKUS initiative

Only six countries currently operate nuclear-powered submarines — China, France, India, Russia, the UK and the US.

By Raghav Bikhchandani

New Delhi: The US and UK are set to provide Australia with the technology to deploy nuclear-powered submarines, as part of the first initiative under the new trilateral security partnership AUKUS.

A US nuclear-powered submarine (representational image) | Wikimedia commons

"Under AUKUS, the three nations will focus immediately on identifying the optimal pathway to deliver at least eight nuclear-powered submarines for Australia," read a statement by the Australian government Thursday.

"Over the next 18 months, Australia, the UK and US will intensely examine the full suite of requirements that underpin nuclear stewardship and demonstrate a clear pathway to becoming a responsible and reliable steward of this sensitive technology," the statement added.

However, this move has drawn criticism from both China and France. According to China, the agreement could damage regional peace and stability while France accused the US of "stabbing it in the back" since the AUKUS partnership led to the scrapping of a historic $66 billion deal between France and Australia to build 12 Barracuda submarines, which was signed in June 2016.

The AUKUS agreement led to the scrapping of a historic $90 billion deal between France and Australia for nuclear-powered submarines.

ThePrint explains what nuclear-powered submarines are and the advantages of these submarines in a country's fleet.

Not a nuclear weapon

A nuclear-powered submarine, as the name suggests, is powered by a nuclear reactor but it is not a nuclear weapon.

Every nuclear-powered submarine draws from its own miniature nuclear reactor onboard, which is typically fuelled with uranium, according to a report in *The Conversation*. For such a reactor to work, uranium has to be 'enriched' to contain 50 per cent of a key isotope, uranium-235.

Natural uranium consists of approximately 99.3 per cent of the isotope uranium-238 and only 0.7 per cent of uranium-235. The process of enrichment can be carried out through gaseous diffusion, gas centrifuges or laser isotope separation.

According to the Australian government statement, "Nuclear-powered submarines do not have the same limitations that face conventional submarines on weapons storage, speed and endurance."

"They can stay completely submerged for many months, limiting the opportunities for detection by adversaries."

Only six nations own and operate these submarines currently: China, France, India, Russia, the UK and the US.

Types of nuclear-powered submarines

Nuclear-powered submarines can be divided into three broad categories — the nuclear-powered fast-attack submarines or SSNs, the nuclear-powered ballistic submarines or SSBNs and the nuclear-powered cruise missile submarines or SSGNs.

SSNs are the oldest type of nuclear-powered submarines and the first of these, the American-made Nautilus, was deployed in 1954 by the US. The Soviet Union, meanwhile, launched SSGNs in the late 1960s.

Unlike the standard SSN nuclear submarines, SSBNs and SSGNs are capable of firing ballistic missiles and cruise missiles, respectively.

The US currently operates three classes of SSNs — the Los Angeles, the Seawolf and the Virginia. The currently operational US SSBNs fall under the Ohio class, some of which were converted into SSGNs.

While the Los Angeles class was first built in 1982 and equipped with a vertical launch missile system with twelve launch tubes, the Seawolf class was commissioned in 1997 and represented greater maneuverability than the Los Angeles class, among other advancements.

The Virginia class is the newest American-made SSN and is a smaller attack submarine than the Seawolf class and was first commissioned in 2004. The Ohio class, meanwhile, was first built in 1981 and its fleet was restricted to a total of 14 by 2002.

The UK operates two classes of SSNs — Trafalgar (with five 533 mm torpedo tubes) and Astute (with six torpedo tubes) —and a single class of SSBNs, the Vanguard, which contains four torpedo tubes.

Australia will be acquiring the technology for and building eight SSNs, according to a report from the International Institute of Strategic Studies.

India and the nuclear submarine industry

India entered the nuclear-powered submarine fray in the late 1980s with the Chakra, an SSN on lease from the Soviet Union.

The original INS Chakra initially came to India on a three-year lease that began in 1988. Chakra II was inducted in 2012 and returned to Russia in June this year after its lease expired

Currently, India has a single Akula-class SSN in service, which was leased from Russia in 2011, and two Arihant-class SSBNs, the first of which was cleared for operations in 2016.

But more are on the way, with another Russian Akula-class SSN due for arrival in 2025, six submarines to be built as part of Project 75 and a new S5-class of SSBNs.

https://theprint.in/theprint-essential/what-are-nuclear-powered-submarines-that-australia-will-acquire-under-first-aukus-initiative/735854/

Hindustan Times

Sat, 18 Sept 2021

Is AUKUS pact a signal to India to go for nuclear attack submarines?

With a new aircraft carrier, six new Kalvari class diesel attack submarines and Vishakhapatnam class of destroyers, the Indian Navy is going to be very potent force in the Indo-Pacific by 2025

By Shishir Gupta

New Delhi: With Australia signing a pact with US and UK to go in for eight nuclear powered conventional attack submarines or SSNs to deter China in Indo-Pacific, India also needs to have a relook at its 1999 conventional submarine plan and move swiftly towards nuclear powered sub-surface vessels.

File picture of nuclear powered ballistic missile firing submarine INS Arighat, set to be commissioned next year.

While India has floated a Request for Information (RFI) for six new diesel attack submarines with air independent propulsion for longer duration under water under Project 75I, the rapidly changing security scenario in the Indo-Pacific calls for Modi government to put the plan of three SSNs on the front-burner. India as of now has one ballistic missile firing nuclear submarine or SSBN, INS Arihant, with another one, INS Arighat, ready for commissioning next year. It does not have a nuclear-powered conventional attack submarine, but the situation will change in 2025.

Although the French are understandably unhappy at Australia for unilaterally scuttling the USD 50 billion deal with Naval Group to build 12 AIP equipped diesel submarines in favour of SSNs under the newly unveiled AUKUS Anglo-Saxon pact, fact is that the rapidly building Chinese Navy needed a stronger response. The SSNs are only limited by food supplies and the mental framework of their crew and can-do sea access-sea denial patrols for more than 45 days. In short, Australia, which is at the receiving end of the belligerent Chinese like India and Japan, can deter the powerful PLA Navy, which has a series of SSNs and SSBNs and is acquiring longer sea legs by the day.

In this context, Indian national security planners also need to reconsider Project 75 I and Project 76, a follow-up of the previous one, and jump to Project 77 or the SSN project. Since submarine building takes at least a decade from the drawing board, India needs to prepare for a time when Chinese aircraft carriers and SSNs will be patrolling the Indian Ocean Region (IOR) apart from other global players.

It is not that the Modi government is sitting tight and watching the unfolding security situation in maritime dimension. With new aircraft carrier, INS Vikrant, INS Arighat SSBN, six new Kalvari class diesel attack submarines and Vishakhapatnam class of destroyers, the Indian Navy is going to be very potent force in the Indo-Pacific by 2025.

With US willing to sell armed Predator drones, Aegis integrated combat system and Tomahawk cruise missile to India, Modi government has enough options to project power in Indo-Pacific. India's key ally France is also willing to help in design and construction of SSNs as well as improve Indian military's over the horizon capabilities.

Just as US, India and Australia are focused on the Indo-Pacific, the new Japanese leadership is also shedding its pacifist approach faced with wolf-warriors of the Chinese Communist Party (CCP). The emerging leaders of the Liberal Democratic Party (LDP) after Prime Minister

Yoshihide Suga are conservative and nationalist in approach. Rather than be pushed around by Beijing, Japan is all ready to join hands with Quad partners in securing Indo-Pacific.

The AUKUS pact will not be without security ramifications for the Quad partners as there is a distinct possibility that China may build an SSN for its client Pakistan citing the transfer of nuclear reactor under AUKUS to Australia. This will create a bigger security headache for India and for other countries in the IOR. Time has come for India to revisit its deterrent capabilities and for Indian Navy to think beyond Karachi.

https://www.hindustantimes.com/india-news/is-aukus-pact-a-signal-to-india-to-go-for-nuclear-attack-submarines-101631944254552.html

BUSINESS INSIDER INDIA

Fri, 17 Sept 2021

The US Air Force's special operators are hustling to turn their biggest planes into flying boats

By Christopher Woody

- ***The prospect of a war in the Pacific has the US military thinking about how to spread out and conduct amphibious operations.***
- ***Those challenges have renewed the US military's interest in an old concept: amphibious aircraft.***
- ***US Air Force Special Operations Command now plans to rapidly develop an amphibious prototype of its workhorse plane, the MC-130J.***

Increasing tension with China has the US military looking for ways to spread out across the Pacific in order to counter Beijing's growing navy and missile arsenal.

The US Air Force in particular is looking to disperse its aircraft and airmen, and the service's special operators are now hustling to equip their workhorse plane to operate on land and water.

A rendering of an amphibious modification to an MC-130J Commando II. US Air Force Special Operations Command

US Air Force Special Operations Command said this week that it will conduct a rapid prototyping effort to increase the "runway independence and expeditionary capacity" of its MC-130J by developing "a removable amphibious float modification."

MC-130 variants have supported US military operations since the 1960s. The MC-130J is the latest version and is the backbone of AFSOC's fixed-wing force.

The $114 million aircraft has advanced navigation and radar systems that allow it to operate in unfriendly territory, but the MC-130J Commando II Amphibious Capability, as the effort is called, will allow it to support operations at sea and in near-shore areas, according to AFSOC.

MAC "allows the Air Force to increase placement and access for infiltration, exfiltration, and personnel recovery, as well as providing enhanced logistical capabilities," Lt. Col. Josh Trantham, AFSOC's science, systems, technology, and innovation deputy division chief, said in a release.

Seaborne operations offer "nearly unlimited" places for landing and would extend the reach and survivability of the MC-130J and the commandos who use it, Trantham said.

AFSOC is working with the Air Force Research Lab's Strategic Development Planning and Experimentation directorate and with private industry. The command plans to use a five-phase rapid prototyping schedule that will allow it to conduct an operational capability demonstration in 17 months.

AFSOC and private-sector representatives are already testing prototypes in the Digital Proving Ground, a virtual setting that includes virtual-reality modeling and computer-aided design — "paving the way" for more digital simulation and testing and the use of advanced manufacturing, the release said.

The effort also intends to "de-risk" the concept for potential use in a future program to give MC-130Js or other C-130 variants an amphibious capability.

The last US military seaplane left service with the US Coast Guard in 1983, 16 years after the Navy retired its last seaplane. Amphibious aircraft played an important role in World War II, but technological advances during the Cold War made them less valuable.

Interest in amphibious aircraft has increased in recent years, however. Several countries — including Russia and Japan — still operate them, and China's development of the AG600, the world's largest seaplane, is steadily advancing.

China has invested heavily in its fleet of military airlift planes in order to support long-range operations, and the AG600 provides "some niche but important capabilities," Timothy Heath, a senior international defense researcher at the RAND Corporation, told Insider earlier this year.

"An amphibious plane allows you to reach areas that otherwise are hard to get to. They can also support ships that are stranded at sea or just if it needs to connect with some ship at sea where there is no runway," Heath said.

China is expected to use the AG600 for search-and-rescue, transport, and firefighting, among other operations. It would be especially useful in the South China Sea, supporting operations around the island bases China has built there.

AFSOC officials have said amphibious aircraft would be a valuable capability in an era of great-power competition, and Trantham echoed that view in the release.

"MAC will be able to be used by our sister services, allies, and partners," Trantham said, and its use "alongside other innovative tools will provide even more complex dilemmas in future battlespaces for our strategic competitors."

https://www.businessinsider.com/air-force-special-operations-command-turning-mc130j-into-flying-boats-2021-9?amp&__twitter_impression=true

The Telegraph online

Mon, 20 Sept 2021

China builds 10 new airbases along the Line of Actual Control

Latest assessment strengthens suspicion that the Chinese have been using the time afforded by ongoing talks to buttress their positions in 'occupied' Ladakh zones

By Imran Ahmed Siddiqui

New Delhi: China appears to have built at least 10 new airbases along the Line of Actual Control in Ladakh, Uttarakhand and Arunachal Pradesh besides ramping up infrastructure at its exiting airbases close to the Indian frontier, sources in the security establishment have said.

The latest assessment has strengthened the suspicion that the Chinese have been using the time afforded by the ongoing talks with India to buttress their positions in the "occupied" zones in Ladakh.

"Intelligence reports suggest the Chinese have built at least 10 new airbases along the LAC in Ladakh, Uttarakhand and Arunachal Pradesh. This is very serious considering the 16-month-old border standoff in eastern Ladakh," a security official attached to the Union home ministry said.

He said the Chinese army had earlier built additional military camps as well as watchtowers with CCTV cameras atop them inside India-claimed lines in Ladakh to monitor Indian troop deployment.

"It's a matter of extreme concern the way they have been ramping up their military and air force infrastructure close to the LAC and also inside the occupied zones," the security official said.

"It's apparent that the Chinese are bolstering their positions while talks are under way to resolve the border standoff."

The standoff continues in Hot Springs and the Depsang Plains while there have been "partial" disengagements at the Galwan Valley, Pangong Lake and Gogra – but with both sides pulling back by an equal distance within India-claimed lines. This means India has ceded additional territory while the Chinese still remain within India-claimed lines, military veterans say.

On the strategically crucial Depsang Plains, the Chinese are said to be entrenched 18km inside India-claimed lines.

Military veterans suspect that China wants to establish a new status quo at the LAC, claiming the territory occupied since May last year as its own. They have flagged with concern the long absence of any reference to "status quo ante" in the official statements issued after each round of talks.

Defence ministry sources said India's military preparedness along the China frontier was being reviewed regularly. India has carried out mirror deployment at the LAC to match the Chinese, moving in additional troops, artillery and infantry combat vehicles, and is conducting regular aerial surveillance.

"The defence top brass have been conducting regular meetings to discuss infrastructure and capability development along the LAC," a ministry official said.

India has been building 73 roads of operational significance along the China frontier, he said, but at a far slower pace compared with China's rapid expansion of military infrastructure in the region.

https://www.telegraphindia.com/india/lac-china-builds-10-new-airbases-ramps-up-infrastructure-in-exiting-ones/cid/1831392

Hindustan Times

Sat, 18 Sept 2021

'India's first solar mission likely to launch next year': ISRO

The solar mission, Aditya L1, will provide more insights into the origin of the universe and many other unknowns

By Anonna Dutt

India's first solar mission, which was pushed from early 2020 due to the Covid-19 pandemic, is likely to be launched in the third quarter of 2022, when the country's second space observatory Xposat, aimed at helping astronomers study cosmic sources such as pulsars and supernova, will also be launched, senior officials from the Indian Space Research Organisation (ISRO) said.

Talking about the purely scientific missions at a conference this week, director of human spaceflight centre, Dr Unnikrishnan Nair, said, "The solar mission Aditya L1 will be launched in the third quarter of next year (2022) and will provide more insights into the origin of the universe and many other unknowns."

The spacecraft in the Aditya L1 mission will be sent 1.5 million km away from the Earth to L1 Lagrangian, a point between the Earth and the Sun where the gravitational pull of both the bodies on the satellite is equal to the centripetal force needed to keep the satellite in orbit. It is like a parking area in space and is great for observing several phenomena without hindrances from eclipses.

Xposat will be the other purely scientific mission that the space agency will undertake next year. It will be launched aboard a small satellite launch vehicle, which is currently in the development phase. The new launch vehicle is likely to have its first development flight by December this year. ISRO qualifies a launch vehicle to be mission-ready after two successful development flights.

"Xposat will allow us to study the polarisation of celestial events. It will be launched by an SSLV which is under development. The first development flight will be by the end of this year. Academicians are looking forward to the data generated from this mission," said Nair.

The SSLV, which is being developed for the commercial launch of small satellites, costs only ₹30 crore as compared to ₹120 crore for a polar satellite launch vehicle (PSLV). The SSLV can be assembled by a team of six scientists within seven days in comparison to a team of 600 that takes a couple of months to assemble a PSLV.

The Covid-19 pandemic severely affected the number of launches ISRO could undertake in 2020 and 2021. There has been a total of just four launches in the two years, of which, one was a purely commercial launch with the main payload being an earth observation satellite from Brazil called Amazonia-1.

Before the pandemic, the space agency had planned for 20 launches in the financial year 2020-21, including the first unmanned flight under the Gaganyaan mission. The Gaganyaan mission is also likely to be undertaken by the end of 2022 or in early 2023.

https://www.hindustantimes.com/india-news/indias-first-solar-mission-likely-to-launch-next-year-isro-101631860455183.html

THE TIMES OF INDIA

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Indian industry to produce two more entire rockets - GSLV-Mk III and SSLV: DoS

Bengaluru: The Department of Space (DoS) plans to realise entirely-built rockets -- GSLV-Mk III and SSLV -- from Indian industry partners, in addition to PSLV, according to a top official of its commercial arm NSIL.

NSIL (NewSpace India Limited) has received three bids -- HAL-L&T, BEL-Adani-BEML, and BHEL, in response to the request for proposal (RFP) floated by it for end-to-end production of PSLV (Polar Satellite Launch Vehicle).

"We are now going through the techno-commercial evaluation (in respect of the three bids)", NSIL Chairman and Managing Director, Radhakrishnan D, told PTI here.

He said the process will be completed within the next two months with one of the bidders bagging the contract. The selected bidder will be responsible for realisation of five numbers of PSLV.

Immediately after selection of the bidder to produce the entire PSLV, NSIL will release Expression of Interest (EOI) for end-to-end production of another operational rocket -- GSLV-Mk III (Geosynchronous Satellite Launch Vehicle) -- in a similar fashion, Radhakrishnan said.

"I am targeting before the end of this year (to release EOI for GSLV-Mk III)", he said. NSIL also has plans to realise SSLV (Small Satellite Launch Vehicle), being developed by the Indian Space Research Organisation (SSLV) with the first development flight expected by this year-end, through Indian industry partners.

"We are waiting for the first mission (of SSLV) to happen successfully", Radhakrishnan said. "This (SSLV) will be an ideal candidate for industry production".

SSLV is a three-stage all solid vehicle and has a capability to launch up to 500 kg satellite mass into 500 km low earth orbit (LEO) and 300 kg to Sun Synchronous Orbit (SSO).

The new generation compact rocket has been designed to meet "launch on demand" requirements in a cost-effective manner for small satellites in a dedicated and rideshare mode, according to officials of Bengaluru-headquartered ISRO.

Industrialisation of space activities is gaining momentum in India.

About 40 space startups and industries are in consultation with ISRO for support related to various domains of space activity such as development of satellites, launch vehicles, develop applications and provide space-based services.

India's Foreign Direct Investment policy in the space sector is also getting revised which, the ISRO Chairman and DoS Secretary K Sivan believe, will open up huge avenues for foreign companies to invest in the country.

Earlier this month, the DoS entered into a Framework MoU with two spacetech startups -- Skyroot Aerospace and Agnikul Cosmos -- for access to ISRO facilities and expertise towards the development and testing of subsystems/systems of space launch vehicles.

https://timesofindia.indiatimes.com/india/indian-industry-to-produce-two-more-entire-rockets-gslv-mk-iii-and-sslv-dos/articleshow/86338774.cms

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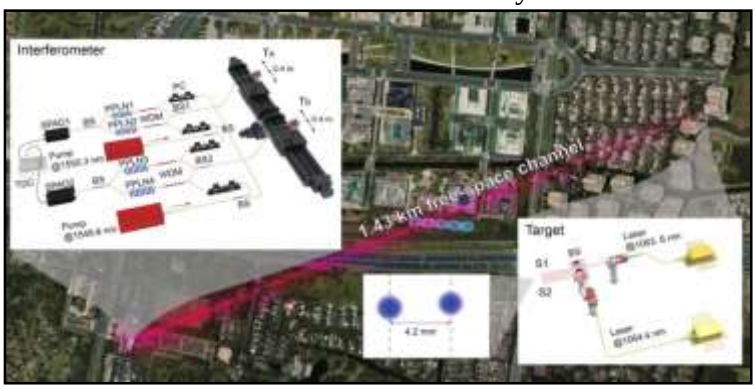
High-spatial-resolution interferometry enters the multi-wavelength era

Interferometers are widely used in various high spatial resolution imaging techniques to extend the diffraction limit. However, the conventional interferometric methods only work when the photons have the same wavelength.

Researchers from the University of Science and Technology of China (USTC) of the Chinese Academy of Sciences built a chromatic intensity interferometer by a periodically poled lithium niobate waveguide (PPLN) and successfully measured two very close laser sources of different wavelengths. This work was published in *Physical Review Letters*.



Scheme of the chromatic intensity interferometer. Credit: LIU Luchuan et al

In 2016, Frank Wilczek, a Nobel Prize winner, and his colleagues theoretically proposed that photons of different wavelengths could enter the detector to interfere and extract the phase information through introducing a color erasure detector, which was based on the frequency conversion into an intensity interferometer. This new technique was then named chromatic intensity interferometry.

Subsequently, Prof. PAN Jianwei's group built single-photon detectors with the PPLN waveguide created by Jinan Institute of Quantum Technology. Based on that, they demonstrated the intensity interference technique in the laboratory.

To verify the high spatial resolution imaging of the chromatic intensity interferometry, researchers carried out a series of field experiments. By using two pump lasers of different wavelengths (1063.6 nm and 1064.4 nm respectively) to pump a pair of parallel PPLN waveguides, they realized color erasure detectors which could not distinguish between photons of 1063.6 nm and 1064.4 nm.

With the two detectors, they installed two telescopes to build an intensity interferometer with a baseline length of 80 cm. After measuring the distance between two laser sources separated by 4.2 mm at a distance of 1.43 km by telescopes, they proposed a phase fitting method to obtain the angular distance between the two laser sources. Surprisingly, the results surpassed the diffraction limit of a single telescope by about 40 times, proving that the chromatic intensity interferometry had a higher spatial resolution.

With the multi-wavelength setting, this technique expands the application of intensity interferometry to diverse fields such as the astronomical observation, space remote sensing, and space debris detection.

More information: Lu-Chuan Liu et al, Improved Spatial Resolution Achieved by Chromatic Intensity Interferometry, *Physical Review Letters* (2021). DOI: 10.1103/PhysRevLett.127.103601

Journal information: *Physical Review Letters*

https://phys.org/news/2021-09-high-spatial-resolution-interferometry-multi-wavelength-era.html

PHYS.ORG

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Effect of electrons with negative mass in novel semiconductor nanostructures

A large international research collaboration led by Dr. Kai-Qiang Lin and Professor John Lupton from the Institute of Experimental and Applied Physics at the University of Regensburg has been able to measure the effect of electrons with negative mass in novel semiconductor nanostructures. The international team includes scientists from Berkeley and Yale (U.S.), Cambridge (England) and Tsukuba (Japan).

A red laser beam impinges on the atomically thin crystal WSe2, which converts the red light of the laser into a blue glow. Credit: Felix Hofmann

Many things in everyday life ring familiar only as positive quantities, the weight of an object, for example. Why matter always seems to have positive mass is one of the unsolved mysteries of physics. We may nowadays have almost become accustomed to the concept of negative interest rates, but what would happen if mass could turn negative?

Newtonian mechanics describes the consequences with the well-known equation Force=Mass*Acceleration, oder F=m*a. If a force acts on an object, it is accelerated. But watch out—if you try jump starting a car of negative mass, it will move towards you! Likewise, a golf ball of negative mass falling into water would not be slowed down by friction but would instead sink faster and faster!

Matter as we know it is basically composed of three elementary particles, the atomic nuclei with heavy protons and neutrons, and the light electrons. In general, the weight of a body is determined by the atomic nuclei. While the mass of the nuclei is a fixed quantity, the effective mass of the electrons is determined by the composition of the material in which they move. The mass directly affects the electronic properties of a material.

We all learnt in driving school that the braking distance increases quadratically with speed, another consequence of Newton's formula: the motional energy of a car rises with the square of the speed v, E=1/2*m*v^2. If the mass m were negative, however, the energy of a particle such as an electron would decrease with increasing speed—the "braking distance" decreases!

When an electron moves through a material it collides frequently with other electrons and nuclei. As with driving a car, such collisions lead to a slowing down of the movement in the case of positive mass. An electron with negative mass, on the other hand, also loses energy, but is accelerated thereby. The researchers have now been able to observe precisely this effect for the first time.

The Regensburg scientists used a new type of semiconductor material, a single atomically thick sheet of the crystal tungsten diselenide. When the material is irradiated with a laser, it begins to glow: an electron absorbs the energy of the laser and emits it again in the characteristic color of the material, red. This color corresponds to the fundamental energy of an electron in the semiconductor. Just as water always flows downhill, one would expect electrons with higher energy to always tend to this lowest fundamental energy. The semiconductor should always glow red. However, the team observed an astonishing effect. When irradiated with a red laser, the electrons emit not only red light, as expected, but also show a faint blue glimmer. Low-energy red light is therefore converted into blue light of higher energy, an extraordinary effect. By looking closely at the color distribution and brightness of this blue light, i.e. the optical spectrum, it can be concluded that the blue glow arises from electrons with negative mass. This unexpected

experimental finding could be substantiated with detailed quantum mechanical calculations of the electronic structure, which were carried out in this form for the first time.

At present, the discovery may still seem like more of a scientific oddity, but the scientists already have a number of possible applications in mind. For example, the concept may aid the development of superfast computers, where electrons move almost without resistance. The transition from positive to negative mass also creates so-called singularities. Such singularities—familiar from trying to divide something by zero on a calculator—are not entirely dissimilar to the black holes of cosmology.

Finally, due to the fact that the electrons in the semiconductor can apparently assume discrete energy states, as in an atom, it should be possible to transfer concepts of atomic quantum optics directly to the semiconductor. This could be used, for example, to develop new electronic components that convert the wavelength of light, store or even amplify light, or function as optical switches.

More information: Kai-Qiang Lin et al, Narrow-band high-lying excitons with negative-mass electrons in monolayer WSe2, *Nature Communications* (2021). DOI: 10.1038/s41467-021-25499-2

Journal information: *Nature Communications*

https://phys.org/news/2021-09-effect-electrons-negative-mass-semiconductor.html

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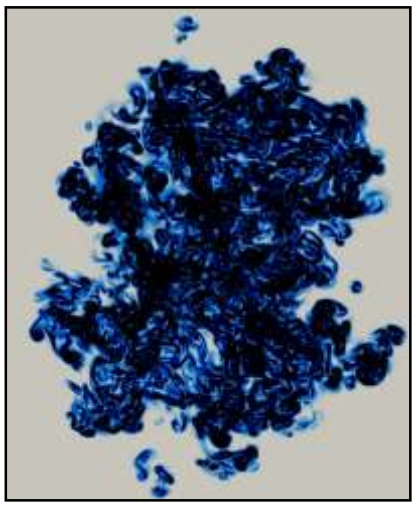
Fiber tracking method delivers important new insights into turbulence

Whether it's heart murmurs and pipeline transport of oil, or bumpy airplanes and the dispersal of pollutants, turbulence plays an important role in many everyday events. But despite being commonplace, scientists still don't fully understand the seemingly unpredictable behavior of the swirls and eddies in turbulent flows.



The swirls and eddies in turbulent flows occur at a wide range of scales. Credit: Complex Fluids and Flows Unit, OIST

Now, a new technique for measuring turbulent flows has been developed by an international collaboration of scientists from the Okinawa Institute of Science and Technology Graduate University (OIST) in Japan, along with the University of Genova, Italy, KTH Stockholm, Sweden and ETH Zurich, Switzerland. By using fibers rather than particles—the usual method of measurement—the researchers could get a more detailed picture of turbulent flows. Their method was reported on 17th September in the journal, *Physical Review X*.

"Turbulence is a very unique and complicated phenomena, it's even been called the last unsolved problem in classical physics," said Dr. Stefano Olivieri, a postdoctoral researcher from the Complex Fluids and Flows Unit at OIST, who was an author of the study. "It's difficult to predict, difficult to simulate, and difficult to measure."

Measuring turbulent flows is a pressing challenge for physicists for numerous reasons. Not only is turbulence characterized by its chaotic and random nature, but it also occurs across many scales at once. In turbulent flows, the swirling vortices of fluid break down into eddies that are smaller and smaller in scale, until eventually the eddies are so small and viscous that the kinetic energy of the fluid is transferred to the environment as heat.

Currently, the most common way to measure turbulent flows is by tracking the movement of particles, called tracers, that are added to the fluid. These particles are tiny and of similar density to the fluid, and so move at the same speed and in the same direction as the flow.

But in order to observe how each swirl of fluid is moving, looking at how one particle moves isn't enough. Physicists need to be able to determine how two particles that are a specific distance apart move in relation to each other. The smaller the eddy, the closer together the two particles need to be to characterize the motion of the vortex.

To make matters more challenging, one of the defining features of turbulence is its diffusivity—a turbulent flow will spread apart over time, and so too will the tracers, especially in open flows, like an ocean current. In many cases, tracers can quickly spread too far apart to measure how the eddies are behaving. "Every tracer particle is moving independently of each other, so you need lots of tracer particles in order to find ones that are the right distance apart," explained Professor Marco Rosti, who leads the OIST Complex Fluids and Flows Unit. "And too many tracer particles can actually disrupt the flow," he added. To circumvent this issue, the research team developed an innovative and easy solution to the problem: using fibers instead of tracer particles.

The researchers created a computer simulation where fibers of different lengths were added to a turbulent flow. These fibers were rigid, which kept the ends of each fiber a fixed distance apart. By tracking how each fiber moved and rotated within the fluid over time, the researchers were able to build up a picture that encompassed the full scale and structure of the turbulent flow.

"By using rigid fibers, we can measure the difference in the speed and the direction of the flow at two points a fixed distance apart, and we can see how these differences change depending on the scale of the eddy. The shortest fibers also allowed us to accurately measure the rate at which the kinetic energy of the fluid is transferred from the largest to the smallest scales, where it is then dissipated by heat. This value, called the energy dissipation rate, is a crucial quantity in the characterization of turbulent flows," said Prof. Rosti.

The researchers also performed the same experiment in the laboratory. They manufactured two different fibers, one made from nylon and the other from a polymer called polydimethylsiloxane. The team tested both these fibers by adding them to water tank containing turbulent water and found that the fibers gave similar results to the simulation.

However, using rigid fibers comes with one important caveat, the scientists emphasized, as the overall movement of the fiber ends is restricted.

"Due to the fiber rigidity, the fiber ends can't move towards each other, even if that's the direction of the flow. That means that a fiber cannot fully represent the movement of the flow in the same way that tracer particles can," explained Dr. Olivieri. "So before we even began simulations or lab experiments, we first needed to develop a suitable theory that took these limitations of movement into account. This was perhaps the most challenging part of the project."

The researchers also measured the same turbulent flow in the laboratory the conventional way, by adding a high concentration of tracer particles to the water tank. The results obtained from the two different methods were similar, verifying that the fiber method and the newly developed theory gave accurate information.

Moving forward, the researchers hope to expand their method to incorporate flexible fibers that have less restriction on how they move. They also plan to develop a theory that can help measure turbulence in more complex non-Newtonian fluids that behave differently from water or air.

"This new technique has a lot of exciting potential, especially for scientists studying turbulence in large, open flows like ocean currents," said Prof. Rosti. "And being able to easily measure quantities that were previously difficult to obtain moves us one step closer to fully understanding turbulence."

More information: Stefano Brizzolara et al, Fiber Tracking Velocimetry for Two-Point Statistics of Turbulence, *Physical Review X* (2021). DOI: 10.1103/PhysRevX.11.031060

Journal information: *Physical Review X*

https://phys.org/news/2021-09-fiber-tracking-method-important-insights.html

BUSINESS INSIDER INDIA

Sat, 18 Sept 2021

Scientists are getting closer to classifying long COVID as an autoimmune disease

By Aria Bendix

- ***Long COVID increasingly looks like an autoimmune disease.***
- ***Research suggests that one auto-antibody in particular may lead to harmful inflammation in long COVID patients.***
- ***These antibodies attack the body's own proteins and are a hallmark of many autoimmune diseases.***

Long COVID patients may finally get an answer as to why they're still sick.

The National Institutes of Health announced Wednesday that it's kicking off a $470 million study to figure out why COVID-19 symptoms persist for so long among many patients.

Maria Romero, a coronavirus long-hauler, in Stamford, Connecticut, on December 22, 2020. John Moore/Getty Images

Already, research has started to coalesce around a theory: The virus may set off an autoimmune reaction that causes lingering symptoms such as fatigue, shortness of breath, loss of smell, muscle aches, or brain fog.

"We can't say for sure that it's an autoimmune disease now, but it's really starting to look like it," John Arthur, a researcher at the University of Arkansas for Medical Sciences, told Insider.

In a study published this month, Arthur and his colleagues suggested that some people who get COVID-19 develop "auto-antibodies" that attack their own proteins - a hallmark of many autoimmune diseases. That process leads to inflammation that could trigger long COVID.

"Everything is sort of fitting together so far - we're just not quite totally there yet in terms of our understanding," Arthur said.

If the theory proves true, it would have implications for COVID-19 treatments. Certain blood-pressure medications, for instance, could be used to stifle the harmful cascade of inflammation. And there's already some evidence that vaccines help alleviate long COVID symptoms - perhaps because the shots help regulate the antibody response.

One particular auto-antibody could lead to inflammation in long COVID patients

One-third of coronavirus patients have at least one persistent symptom for 12 weeks or more, according to a recent study that hasn't yet been peer reviewed. Scientists have wrestled with the mystery of why that happens for more than a year.

"I see a lot of younger patients with chronic COVID symptoms and many of them have not even had any lung problems before COVID," Dr. Dixie Harris, a pulmonary physician at Intermountain Healthcare in Utah, told Insider. "They go from totally active, running marathons, to now on oxygen."

What scientists do know is that when a person gets infected, their body develops antibodies to neutralize the coronavirus. But some people's immune systems mistakenly identify those antibodies

as a foreign threat themselves, so they produce auto-antibodies to fight them. That appears to be the case for many long COVID patients.

Arthur's team analyzed blood samples from 32 COVID-19 patients who donated plasma to the University of Arkansas, and another 15 who'd been hospitalized there. Around 81% of the plasma donors and 93% of the hospitalized patients had developed a particular auto-antibody that inhibited their ACE2 enzymes. These enzymes serve as ports of entry for the coronavirus to invade our cells - but they're also vital to calming the immune system down.

When not enough ACE2 is present, the immune system can produce too much inflammation.

"It's the inhibition of that ACE2 enzyme that basically is plugging up the system," Arthur said. "It's like if you've got a bunch of hair in the drain and the water starts to accumulate on top."

But more research is needed to determine for sure whether these ACE2 antibodies cause long COVID. Researchers also aren't sure yet whether severe infections produce more auto-antibodies than mild ones. A May study found that to be the case, but Arthur noted that long COVID is also common among people whose infections were initially mild.

Scientists are eyeing blood-pressure medication as a potential treatment

Arthur's study offers some evidence that medications used to treat high blood pressure could be effective as long COVID treatments.

ACE2 normally helps regulate blood pressure by a converting a chemical that raises blood pressure into one that enhances blood flow. Long COVID may prevent that conversion process, allowing that first chemical to produce harmful levels of inflammation. But high blood pressure medications can blunt this inflammatory response.

Arthur's study also suggests that vaccines could balance the levels of coronavirus antibodies and auto-antibodies among long COVID patients. A UK survey from March that hasn't been peer reviewed found that 57% of people with long COVID saw their symptoms improve after getting vaccinated.

"That's one of the things that we're going to look at in the next stage," Arthur said, "to see what vaccine status does to the abundance of these ACE2 antibodies."

https://www.businessinsider.in/science/news/scientists-are-getting-closer-to-classifying-long-covid-as-an-autoimmune-disease/articleshow/86301277.cms