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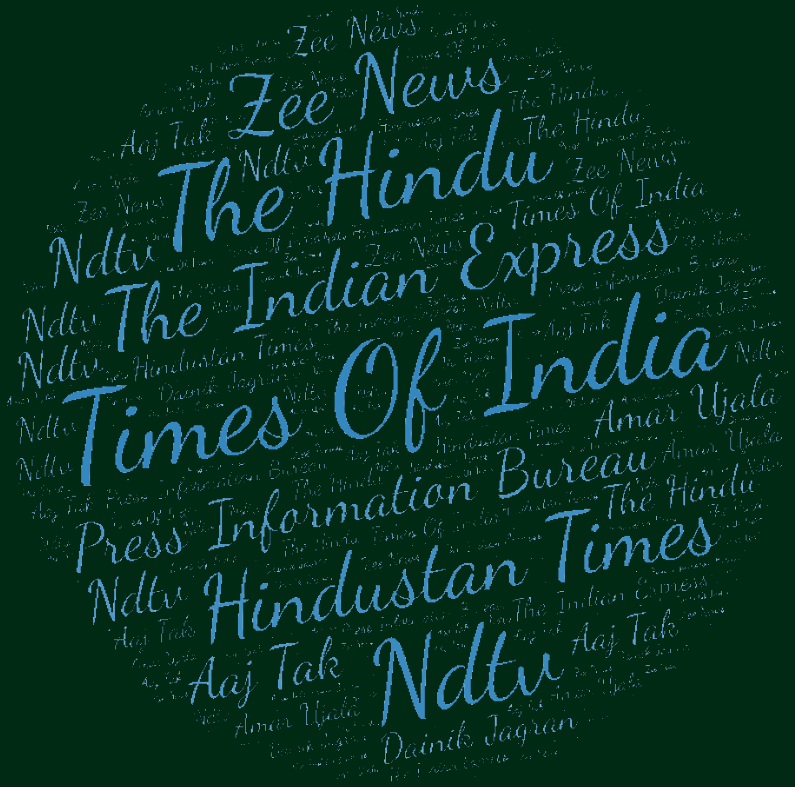

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DRDO Technology News

The Tribune

Sat, 14 May 2022

DRDO issues guidelines on free access to patents for boosting indigenous production

Over two years after the Defence Research and Development Organisation (DRDO) modified its Intellectual Property Rights (IPR) policy to grant the Indian industry royalty-free access to patents held for technologies developed by it, detailed guidelines on the subject have been issued. The new rules stipulate that a license for the patent will be given initially for a period of five years based upon the manufacturing capacity. The number of licenses issued to a single firm shall not be more than five and can be renewed after five years depending upon compliance of the license agreement and other defined factors. DRDO has also expanded the eligibility scope for licensees by including a clause stating that the applicant shall be a manufacturing entity or a system integrator and not a trading company. None of the promoters and directors of the applicant entity should have been wilful defaulters.

Applicants would be required to provide all necessary documentation including details of projects and supply orders successfully executed in the last two years, details of shareholders, promoters, associated firms and joint venture companies if any, as well as details of any vigilance actions, on-going investigation or suspension or blacklisting of the entity or any of its associates. To boost indigenous production and give a fillip to the 'Make in India' policy, DRDO had, in November 2019, decided to grant free access to patents held by it to an Indian company, startup or MSME incorporated as per law. A DRDO screening committee would review the requests for licenses by taking into account the applicant's financial and technical capabilities as well as national security and strategic implications.

Under the policy, no licence fee or royalty will be applicable on the use of Indian patents held by the research agency and only a processing fee of Rs 1,000 would be levied. Earlier, licence fee for patents and royalty could range anywhere from several lakh rupees to over a crore depending upon the type of technology involved, the cost of the project, baseline price and post-production quantum of sales to non-defence sector. There are about 450 patents covering missile technology, aeronautics, naval systems, life sciences, armaments, combat engineering, electronics and communication material, which can be used by the Indian industry for commercial production. Prior to this, the DRDO policy had called for managing intellectual property rights in an effective, efficient and ethical manner to derive full economic potential and consider opportunities for commercial exploitation of IP and wealth creation.

The license for the patent shall be given on non-exclusive basis with DRDO retaining complete title and ownership rights including unfettered rights to license the patents to additional parties. While the license recipients will be able to manufacture and sell products covered under the patent, they will also be required to submit details about the commercial working of the licensed patent on an annual basis to DRDO, which would be forwarded to the Controller General of Patents, Designs and Trademarks, as mandated by Indian patent laws and rules.

https://www.tribuneindia.com/news/nation/drdo-issues-guidelines-on-free-access-to-patents-for-boosting-indigenous-production-394855

THE TIMES OF INDIA

Sun, 15 May 2022

HEMRL bags award for R&D

Pune based High Energy Materials Research Laboratory was conferred with the 'Titanium award' for 2019 for outstanding research and development works in various projects of the armed forces over the last three years. Minister of state for defence Ajay Bhatt presented the trophy to KPS Murthy , the director of HEMRL, at a function held at DRDO Bhavan in New Delhi. The DRDO gives Titanium award every year to the laboratory showing an excellent performance in science, technology and other projectsf last five years. TNN.

https://timesofindia.indiatimes.com/city/pune/hemrl-bags-award-for-rd/articleshow/91570001.cms

THE TIMES OF INDIA

Wed, 18 May 2022

HANSA-NG completes in-flight engine relight test

The new generation two-seater trainer aircraft (HANSA-NG 2) designed and developed by National Aeronautics Laboratory (NAL) successfully completed its in-flight engine relight test on Tuesday. The test was conducted at the Defence Research and Development Organisation's (DRDO) Aeronautical Test Range (ATR) facility in Challakere. some 200km from Bengaluru.

https://timesofindia.indiatimes.com/city/bengaluru/hansa-ng-completes-in-flight-engine-relight-test/articleshow/91627688.cms

THE ECONOMIC TIMES

Tue, 17 May 2022

India's first indigenous trainer aircraft, HANSA-NG successfully completed engine relight test in air

'HANSA-NG', a two-seater flying trainer aircraft, design and developed by CSIR-NAL, has successfully completed in-flight engine relight test at DRDO's Aeronautical Test Range (ATR) facility at Challakere on Tuesday. Flight test was carried out at an altitude of 7,000-8,000 feet with the speed range of 60 to 70 knots by Wg Cdr K V Prakash and Wg Cdr NDS Reddy, Test Pilots from Aircraft and Systems Testing Establishment (ASTE), Indian Air force (IAF), NAL said in a release. In-flight engine relight capability of the aircraft was demonstrated with wind milling propeller and starter assisted start, it said, the aircraft handling characteristics and flight parameters were found to be normal during these test flights.

CSIR-NAL mentioned that the in-flight engine relight test is the most critical and important milestone towards certification of the aircraft by DGCA. The aircraft was ferried to ATR, Challakere on May 16, after obtaining necessary approvals from DGCA. The flight tests were monitored by Abbani Rinku, Project Director of HANSA along with design team of CSIR-NAL and flight test crew from ASTE - Wg Cdr Senthil Kumar, Flight Test Director, Sq Ldr Sahil Sarin, Safety pilot and Gp Capt M Rangachari, Chief Test Pilot, the release said. Jitendra J Jadhav, Director, CSIR-NAL said, the combined and coordinated efforts of the integrated team resulted in text book execution of the test flights.

https://economictimes.indiatimes.com/news/defence/indias-first-indigenous-trainer-aircraft-hansa-ng-successfully-completed-engine-relight-test-in-air/articleshow/91625453.cms?from=mdr

Defence News

Defence Strategic: National/International

NewsOnAIR

Wed, 18 May 2022

Defence Minister Rajnath Singh launches indigenous Navy destroyer warship INS Surat, frigate INS Udaygiri; Says Govt aims for Make-for-World and not just Make-In-India

Defense Minister Rajnath Singh today said in the years to come India will not only limit itself for building ships for Indian use but cater to the demand of the entire world. Speaking at the launch of indigenously built naval ships Surat and Udaygiri in Mumbai Mr Singh recalled India's long history spreading over many centuries of expertise in developing Naval warfare-based

technologies. The Defense Minister said considering the fact most of the international trade including 2/3 rd of oil trade, 1/3rd bulk cargo and more than half of container traffic in the Indo Pacific region are done sea route, it is imperative to maintain a safe and secure environment in the region, and India being an important stake holder has the responsibility to contribute for the same which can only be possible by creating a strong naval base. Mr Singh said Indian navy has been doing an unprecedented work in its research and developmental field because of which USINDOPACOM has expressed its desire to work with the Indian navy.

He said considering the uncertain situation developing in Indo pacific and Indian Ocean regions, the role of the Indian navy is going to be more crucial. He said as India is growing into a strong, prosperous nation and is going in the way to be a global power, the role of the Indian navy becomes extremely important. The Defence Minister launched the two indigenously built state of the art warship Surat and Udaygiri. The warships are a "true testament of Atmanirbhar Bharat" as approximately 75% of the orders for equipment and systems for the warships were given to indigenous firms including micro, small and medium enterprises. INS Surat is the fourth destroyer in Project 15B which is named after the second-largest commercial hub of western India. While INS Udaygiri is the third ship under Project 17A Frigates, named after the mountain ranges in Andhra Pradesh.

https://newsonair.com/2022/05/17/defence-minister-rajnath-singh-launches-indigenous-navy-destroyer-warship-ins-surat-frigate-ins-udaygiri-says-govt-aims-for-make-for-world-and-not-just-make-in-india/

Mon, 16 May 2022

भारत के वो 5 हथियार, जिनका हमला किसी 'प्रलय' से कम नहीं

इंडियन एयरफोर्स का तेजस-मार्क1

भारत में निर्मित तेजस मल्टीरोल हल्का फाइटर जेट है. इसे हिंदुस्तान एयरोनॉटिक्स लिमिटेड (HAL) ने बनाया है. यह 43.4 फीट लंबा है. विंगस्पैन 26.11 फीट है. ऊंचाई 14.5 फीट है. पूरे साजो-समान के साथ इसका वजन 13,500 KG होता है, खाली 6500 किलोग्राम. इसमें 2458 KG फ्यूल पड़ता है. अधिकतम 1980 किलोमीटर प्रति घंटा की गति से उड़ता है. यह एक बार में 1850 किलोमीटर उड़ान भर सकता है. कॉम्बैट रेंज 500 किलोमीटर है. यह अधिकतम 53 हजार फीट की ऊंचाई तक जा सकता है. इसमें 23 मिमी का ट्विन बैरल कैनन लगी है. इसमें 8 हार्डप्वाइंट्स हैं. या 8 रॉकेट, अलग-अलग तरह मिसाइल या बम लगा सकते हैं. या फिर आप इनका मिश्रण तैयार कर सकते हैं. इसमें हवा से हवा, हवा से सतह, एंटी-रेडिएशन और एंटी-शिप मिसाइलें लग सकती हैं. इसमें प्रेसिसन गाइडेड, लेजर गाइडेड, क्लस्टर म्यूनिशन, अनगाइडेड बम लगाए जा सकते हैं.

प्रलय मिसाइल

DRDO ने पिछली साल दिसंबर में प्रलय मिसाइल (Pralay Missile) का सफल परीक्षण किया था. यह छोटी दूरी की बैलिस्टिक मिसाइल (SRBM) है. प्रलय मिसाइल 150 से 500 किलोमीटर की दूरी तक दुश्मन के अड्डों को नष्ट करने में सक्षम है. इसकी सटीक मारक क्षमता और इसकी गति इसे अत्यधिक ताकतवर बनाती है. यह मिसाइल 5 टन वजनी है. इसमें 500 से 1000 किलोग्राम तक के पांरपरिक हथियार लगाए जा सकते हैं. यह इनर्शियल गाइंडेंस सिस्टम पर चलने वाली मिसाइल है. सॉलिड प्रोपेलेंट फ्यूल है. आपको बता दें कि यह भारत की तीन शॉर्ट रेंज बैलिस्टिक मिसाइल की तकनीक से मिलकर बन सकती है. ये हैं - प्रहार, पृथ्वी-2 और पृथ्वी-3 मिसाइल.

अगर पृथ्वी-3 मिसाइल के प्लेटफॉर्म को इसका आधार मानते हैं तो प्रलय (Pralay) मिसाइल के वॉरहेड में हाई एक्सप्लोसिव, पेनेट्रेशन, क्लस्टर म्यूनिशन, फ्रैगमेंटेशन, थर्मोबेरिक, केमिकल वेपन और रणनीतिक परमाणु हथियार भी लगाए जा सकते हैं. हालांकि इस बात की पुष्टि अभी तक डीआरडीओ या रक्षा मंत्रालय ने नहीं की है. प्रलय (Pralay) की टारगेट ध्वस्त करने की सटीकता 10 मीटर यानी 33 फीट है. इसका मतलब ये है कि अगर टारगेट से 33 फीट के दायरे में यह मिसाइल गिरती है, तो भी उतना ही नुकसान करेगी, जितना सटीक निशाने पर गिरती तो करती. इस मिसाइल में इंफ्रारेड या थर्मल स्कैनर लगा हो सकता है, जो टारगेट को अंधेरे में खोजकर उसे नष्ट कर सकता है.

एम9 रीपर/प्रीडेटर ड्रोन

एम9 रीपर/प्रीडेटर ड्रोन चमगादड़ की तरह रात में देख सकता है. उल्लू की तरह शांति से उड़ सकता है. बाज की तरह हमला करके गायब हो सकता है. यह एक शिकारी है. यह दुनिया का सबसे खुफिया और ताकतवर जासूस. इसका नाम है प्रिडेटर ड्रोन (Predator Drone). इसे एम9 रीपर ड्रोन भी कहते हैं. भारत जिस ड्रोन को अमेरिका से खरीदने की तैयारी में है उसे एमक्यू-9 बी (MQ-9B) लॉन्ग रेंज एंड्यूरेंस ड्रोन कहते हैं. यह हवा से जमीन पर मार करने वाली मिसाइलों से लैस है. यह एक बार में 35 घंटे की उड़ान भरने में सक्षम हैं. यह दुनिया का पहला ऐसा ड्रोन है जो हंटर-किलर यूएवी श्रेणी में ज्यादा समय तक (Long-Endurance) और ज्यादा ऊंचाई से निगरानी (High-Altitude Surveillance) करने में सक्षम हैं. भारतीय सेनाएं इसका उपयोग चीन, पाकिस्तान या फिर समुद्री सीमा की निगरानी और हमला करने के लिए कर सकती हैं. खास बात ये है कि इस ड्रोन की मदद से आप समुद्र के अंदर भी झांक सकते हैं. यह पानी की गहराई में मौजूद पनडुब्बियों पर भी नजर रख सकती है. इसकी रेंज 1900 किलोमीटर है. यह अपने साथ 1700 KG वजन का हथियार ले जा सकता है. इसे चलाने के लिए दो पायलटों की जरूरत होती हैं, जो ग्राउंड स्टेशन पर बैठकर वीडियो गेम की तरह इसे चलाते हैं. यह ड्रोन 482KM प्रतिघंटा की गति से उड़ता है. जो 50 हजार फीट की ऊंचाई से दुश्मन को देखकर उसपर मिसाइल से हमला कर सकता है.

S-400 एयर डिफेंस सिस्टम

भारत के S-400 की शुरुआत 28 अप्रैल 2007 से हुई है. यानी रूस का यह एयर डिफेंस सिस्टम नया और आधुनिक है. स्टॉकहोम इंटरनेशनल पीस रिसर्च इंस्टीट्यूट के अनुसार भारत का S-400 दुनिया का सबसे आधुनिक एयर डिफेंस सिस्टम है. S-400 के चार वैरिएंट्स हैं. जिनकी रेंज 40 किमी, 120 किमी, 200-250 किमी और सबसे अधिक 400 किलोमीटर है. S-400 के चारों वैरिएंट्स की अलग-अलग गति है- 40 KM रेंज वाले की गति 3185 KM/घंटा है, 120 KM रेंज वाले की स्पीड लगभग 3675 KM/घंटा, 200 और 250 KM रेंज वाले की गति 7285 KM/घंटा है और 400 किमी रेंज वाले की गति 17,287 किलोमीटर प्रतिघंटा है. S-400 एयर डिफेंस की मिसाइलें 20KM, 30KM और 60KM की ऊंचाई तक जाकर दुश्मन की मिसाइल को वहीं खत्म कर सकती हैं. S-400 एंटी-बैलिस्टिक मिसाइल सिस्टम 24KG और 180KG के हथियारों को लेकर उड़ सकता है. S-400 एयर डिफेंस एंटी-बैलिस्टिक मिसाइल सिस्टम एक साथ दुश्मन की कई मिसाइलों पर हमला करने में सक्षम है. इस सिस्टम से स्ट्रैटेजिक बमवर्षकों जैसे B-1, FB-111 और B-52 पर हमला कर सकता है. इलेक्ट्रॉनिक वॉरफेयर विमान जैसे EF-111A और EA-6, निगरानी विमान, अर्ली-वॉर्निंग राडार एयरप्लेन, फाइटर प्लेन, बैलिस्टिक मिसाइल आदि को निशाना बना सकता है.

राफेल फाइटर जेट

इंडियन एयरफोर्स का मल्टीरोल फाइटर जेट डैसो राफेल (Dassault Rafale) को उड़ाने के लिए एक या दो क्रू की जरूरत होती है. लंबाई 50.1 फीट, विंगस्पैन 35.9 फीट, ऊंचाई 17.6 फीट और खाली वजन 10, 300 किलोग्राम है. इसमें 4400 से 4700 किलोग्राम फ्यूल आता है. यह अधिकतम 1912 किलोमीटर प्रतिघंटा की रफ्तार से उड़ता है. इसकी कॉम्बैट रेंज 1850 किलोमीटर है. यह अधिकतम 51,952 फीट की ऊंचाई पर उड़ सकता है. राफेल जब सीधे आसमान की ओर उड़ान भरता है तब इसकी गति 304.8 मीटर प्रति सेकेंड होती है. इसमें 30 मिलिमीटर की एक 125 राउंड वाली ऑटोकैनन लगी है. इसके अलावा 14 हार्डप्वाइंट्स होते हैं वायुसेना के वर्जन के लिए और 13 नौसैनिक वर्जन के लिए. यानी सेनाओं के हिसाब से हथियार लगाने की सुविधा. इसमें हवा से हवा, हवा से जमीन, हवा से शिप और परमाणु हथियार ले जाने में सक्षम मिसाइलें लगाई जा सकती हैं. इसके अलावा इसमें कई तरह के बम लगा सकते हैं.

https://www.aajtak.in/amp/india/news/photo/indias-five-most-dangerous-weapons-tstrd-1464441-2022-05-16

The Indian EXPRESS

Wed, 18 May 2022

For a stronger navy, India needs to fast-track the submarine project

By Arun Prakash

A day before Prime Minister Narendra Modi was due to visit Paris to meet President Macron, the French defence major, Naval Group, announced its inability to participate in India's Project 75-I, under which conventional (non-nuclear or diesel-electric) submarines are to be built domestically. Coming on the heels of similar withdrawals from this competition by Russian and German submarine builders, this is bad news for the crucial project. Some also see it as a coercive tactic by the group to persuade India to buy more of its Scorpene class subs, of which six have been built under licence by Mazagon Docks Ltd (MDL).

A major issue of contention in Project 75-I appears to be the installation of an air independent propulsion system (AIP) on these vessels. Since conventional submarines are propelled underwater by electric-power, battery endurance remains a major limitation. The submarine has to periodically expose itself to draw air for running generators that charge their battery-banks. It was to overcome this major vulnerability that several types of propulsion systems were evolved in Europe using "air independent," closed-cycle diesel or steam engines which would endow conventional submarines with much longer underwater endurance. While protracted negotiations between the MoD and the French Naval Group were underway, none of the AIP systems had been fully proven. The contract for license-production of six Scorpenes was thus signed in 2005 without including this system. The Pakistan Navy (PN), obviously less risk-averse, acquired an untried French AIP system and installed it on three Agosta 90B submarines in 2008. What invests the P-75I programme with urgency is the fact that with the addition of eight Yuan Class Chinese submarines, the PN may field up to 11 AIP-equipped boats by 2028.

Project 75-I is also the first programme to be progressed under the MoD's new Strategic Partnership concept which ostensibly offers a "level-playing field" to the private sector. In this model, MDL and Larsen & Toubro will choose a foreign submarine-builder for collaboration and offer competing bids to build six modern conventional submarines. Here a quick look at the genesis and growth of our young submarine arm is useful. While Pakistan had acquired its first submarine from the US in 1963, it was only two years later that the Naval HQ revived an old proposal for creating a submarine arm. Since the USA and UK were offering only surplus WWII vintage submarines, we turned to the Soviets and between 1967 and 1974 acquired eight Foxtrot class boats of contemporary design along with a submarine depot ship.

The Foxtrots, having trained a whole generation of Indian submariners, a timely step for upgradation of capabilities was initiated by contracting for the modern Type-209 hunter-killer submarines built by HDW of Germany. Between 1986 and 1994, four of the Type 209 boats entered service; two built in Germany and two in MDL. Unfortunately, allegations of corruption in this deal scuttled plans for further indigenous construction. MDL closed its production line, representing a huge loss in terms of wasted skills/expertise and delays in capability accretion for

the Indian Navy. However, concurrent negotiations with the USSR had resulted in the induction of 10 improved boats of the Kilo Class between 1986 and 2000.

By now, the Naval HQ had projected the need for a standing force of 24 subs in order to meet the growing threats to India's maritime interests. In 1999, the government accorded approval to a "30-Year Submarine Building Plan," which envisaged the simultaneous serial production of two types of submarines in separate shipyards. One of the two types was to be an advanced submarine of imported design, and it was hoped that the second line would, in due course, deliver a home-grown product, designed by our own naval architects with foreign assistance. Delays in decision-making stalled the 30-year plan, and since 1999, the navy's submarine fleet has been seeing rapid obsolescence and steady depletion of force-levels. The 2005 contract for building six French Scorpene Class submarines under license from MDL served merely as a palliative measure, but even this programme saw huge delays over contractual issues. The sixth and last submarine was launched in April 2022, a full 17 years after signing of the contract.

With force-levels down to 17 ageing conventional submarines, the Indian Navy looked with hope at the Rs 43,000 crore Project 75-I. Commenced on time, this would have been the seamless follow-on to the Scorpene project; ensuring serial-production, and eventual indigenisation of this vital weapon-platform. However, policy flip-flops and sluggish decision-making have kept this project in limbo for over a decade. MDL, having launched the last of the Scorpenes, will start running down its state-of-the-art submarine-building facility, losing expertise and highly-skilled workers. An added complication has arisen from the otherwise welcome development by DRDO of an indigenous AIP system. Based on electrolytic fuel cells, this system produces energy by combining hydrogen and oxygen with only water as the waste product. It has no moving parts and is safer and more efficient than others.

The drawback, however, is that the 8-10 metre-long AIP module has to be installed on a submarine and subjected to stringent underwater trials before the Indian Navy can accept it as "operationally proven" for induction into service. Since installation and trials of this module will be a complex and time-consuming process, three major issues are likely to arise: (a) Who will provide a submarine for trials? (b) who will undertake installation and conduct trials? (c) and most crucially, (d) who in our system will take such crucial decisions in a timely manner? This long-neglected project brooks no further delay and is important enough to attract the time and attention of our highest decision-makers. A practical way forward is for one of the strategic partners and DRDO to jointly seek a foreign collaborator for P-75I who will install the indigenous AIP on the selected submarine and conduct collaborative trials. Once proven at sea, the indigenous AIP could be installed in all new subs and retrofitted in the old ones. There will certainly be a price to pay, but the alternative is too bleak to contemplate.

https://indianexpress.com/article/opinion/columns/induction-of-submarines-project-75-i-indian-navy-7919079/

THE HINDU

Tue, 17 May 2022

Chief of Defence Staff and top-level military reforms

What is the key role of CDS? Why is the government looking to streamline the post and the functions of the Department of Military Affairs?

It's now over five months since the country's first Chief of Defence Staff (CDS) General Bipin Rawat was killed in a chopper crash in the Nilgris in Tamil Nadu along with his wife and 12 other military personnel onboard. The Government is yet to announce a successor to the country's top military post. The reason for the delay, official sources say, is because the Government is reassessing the concept of the post as well as the Department of Military Affairs (DMA) and is looking to streamline the setup.

What is the role of the Chief of Defence Staff?

The Government's decision in 2019 to create the post of a CDS, a long-pending demand to bring in tri-service synergy and integration, is the biggest top-level military reform since independence. In December 2019, the Union Cabinet chaired by Prime Minister Narendra Modi had given approval to create the post of CDS in the rank of a four-star General with salary and perquisites equivalent to a Service Chief and then Army Chief Gen. Rawat was appointed to the post. In addition, the DMA was created as the fifth department in the Ministry of Defence (MoD) with the CDS functioning as its Secretary.

The broad mandate of the CDS includes bringing about jointness in "operations, logistics, transport, training, support services, communications, repairs and maintenance of the three Services, within three years of the first CDS assuming office." He will act as the Principal Military Adviser to Defence Minister on all tri-Services matters. However, the three Chiefs will continue to advise the Defence Minister on matters exclusively concerning their respective Services," a Government statement had said while adding that the CDS will not exercise any military command, including over the three Service Chiefs.

The CDS is also meant to bring about synergy and optimise procurements, training and logistics and facilitate restructuring of military commands for optimal utilisation of resources by bringing about jointness in operations, including through establishment of joint/ theatre commands. The CDS will also evaluate plans "for 'Out of Area Contingencies', as well other contingencies such as Humanitarian Assistance and Disaster Relief (HADR)," officials had stated. The specialised tri-service divisions — special operations, defence cyber and defence space — were also brought under the ambit of the CDS. Interestingly, while capital procurements are still with the DoD, the prioritisation is with the CDS. In the last three years, the Government had also announced a series of measures to cut down on defence imports and promote indigenous defence manufacturing.

Why the rethink?

Official sources said that with the experience of the last few years of having a CDS, there is a rethink that the appointment of a CDS in itself wasn't enough and there are several issues with respect to roles and responsibilities, issues of equivalence among others. "This made the Government pause, look back and reassess the entire reform process," one official said on

condition of anonymity. There is also dichotomy in the roles and responsibilities with the several hats worn by the CDS and also overlap in responsibilities between the DMA and DoD, officials stated while also adding that there is also a rethink on the ambitious timelines set for the creation of theatre commands and also the number of commands and their envisaged format.

While several options are being looked at, one of the ways to go forward would be to have a CDS with operational powers who will after due legislative changes have theatre commanders report to him while the Service Chiefs will look after the raise, train and sustain functions of respective Services, an official said. In this direction, it is being looked at if the Chief of Integrated Defence Staff to the Chairman, Chiefs of Staff Committee (CISC) can function as the Secretary DMA reporting directly to the CDS.

What has been the progress on theatre commands?

An ambitious agenda was set for the first CDS to reorganise the Indian armed forces into integrated theatre commands, which would be the biggest reorganisation of the military in 75 years and fundamentally change the way the three services operate together. Extensive studies were carried out by the Vice Chiefs of three Services on the theatre commands — land-based Western and Eastern theatre commands, maritime theatre command and an integrated air defence command. Gen. Rawat had stated that the Army's Northern Command would be left out of the ambit for now and integrated at a later stage.

However, differences continue to remain on certain aspects with the Air Force having some reservations with regard to the air defence command and the naming and rotation of the theatre commands among others. Additional studies were ordered, which are currently underway but the overall process has stalled in the absence of a CDS and continued differences.

https://www.thehindu.com/news/national/chief-of-defence-staff-and-top-level-military-reforms/article65419500.ece/amp/

THE ECONOMIC TIMES

Tue, 17 May 2022

Be prepared to repel security threat, develop Indian military into future force: Vice President M Venkaiah Naidu to Defence forces

India is facing multiple security challenges in a highly complex and unpredictable geo-political environment, Vice President M **Venkaiah Naidu** said on Tuesday and called upon the armed forces to be fully prepared to handle any challenge and repel any security threat firmly. Also, Venkaiah Naidu, who is the first Vice President to visit the **Defence Services Staff College**, Wellington, in the district, in 52 years, said taking into account new and emerging areas of conflict, the armed forces should develop the **Indian military** into a "**future force**." Previously, Gopal Swarup Pathak, then Vice President, visited the college in 1970. "We are facing both symmetric and asymmetric threats from outside and within. Therefore, our armed forces should be fully prepared to handle any challenge and repel any security threat firmly," the Vice

President said while addressing the officers and staff of Defence Services Staff College, Wellington.

Historically, India has never been expansionist in its outlook and her approach has always been of peaceful coexistence and one designed to deter the forces of terror and disruption. "The nation is confident that any attempt to challenge India's sovereignty by inimical forces would be dealt with strongly by our security forces," Naidu warned. Pointing out that wars today are no longer fought on battlefields alone but on different terrain, the Vice President said the hybrid nature of conflicts often makes it difficult to decide clear winners or losers in the conventional sense. Information and cyber warfare, increasing use of drones and robotics and space-based assets have brought a paradigm shift to the battlefield. "Therefore, our armed forces should focus on and develop capabilities in these new and emerging areas of conflict. It should be our vision to develop the Indian military into a 'future force'," he said.

As the officers step into the future, they will have to graduate from single service competencies to multi domain challenges requiring thorough understanding of joint and multi domain operations. "As Directing Staff and trainers of this prestigious Institution, you have to be catalysts of change and inculcate a sense of jointness and synergy amongst all students as you mould future leaders and soldiers." Self-reliance in defence and aerospace technology assumed paramount importance in an endeavour to create a Samarth Saksham Bharat he said and referred to the Centre's several policy initiatives and reforms to promote indigenisation and 'Aatmanirbharta' in defence manufacturing.

Apart from several other key policy measures, the conversion of Ordnance Factory Board (OFB) into seven new defence companies is also a praiseworthy move that would provide autonomy while enhancing efficiency, Naidu claimed. "Today, geostrategic and geopolitical compulsions, terrorism and climate change, have added to the complexity of the security matrix. Therefore, there is a need to have a deeper understanding of such issues," he urged. The VP underscored the importance of securing the national interests in the changing world order and also cater to emerging security challenges.

The Defence Services Staff College, the oldest and most prestigious tri-services institution of the nation, successfully conducted courses during COVID-19 by proactively adopting a hybrid system of online and contact teaching modules. Commandant of the Defence Services Staff College Lt Gen S Mohan ad Mrs Sashirekha Mohan, besides officers and veterans participated in the event.

https://economictimes.indiatimes.com/news/defence/be-prepared-to-repel-security-threat-develop-indian-military-into-future-force-vice-president-m-venkaiah-naidu-to-defence-forces/articleshow/91618219.cms?from=mdr

DECCAN HERALD

Mon, 16 May 2022

Looking for contract with Indian Navy, India trial of US naval jets could begin by month-end

After France, the United States is set for an operational demonstration of its naval combat jets to India. It is said that Boeing would bring its F-18 Super Hornet to Indian Navy's Shore-Based Testing Facility (SBTF) at Goa later this month to showcase the jets' capability. Although India possesses Russian-built MiG-29K as combat jets for its aircraft carrier warships, their poor serviceability has led to the Indian Navy looking for alternatives abroad, as home-grown naval jets are not yet operationally ready. Following the trials, the performance of F-18 and French Rafale-M would be compared and evaluated by the Indian Navy before a decision is taken to buy 26 jets in a government-to-government contract for India's two aircraft carriers – INS Vikramaditya and the upcoming INS Vikrant. Sources said the Indian Navy was looking for a stop-gap arrangement with two squadrons of imported jets, which would fly for the next 10-15 years before the Light Combat Aircraft-Navy (LCA-Navy) could be ready for induction by the middle of the next decade.

The trials of French origin Rafale-M took place in January at the angled ski-jump facility at INS Hansa in Goa. The flights continued for nearly two weeks. The US test flights may also occur for a similar period during which India, among other things, would closely examine the option of smooth movement of the aircraft from the flight deck to the maintenance hangar. The US jets come with a foldable wing to facilitate such a movement between the two decks. For the French-built Rafale, the solution was to remove a part of the aircraft's wings before the plane could be accommodated in the carrier's elevator. Although India's initial plan was to buy 57 deck-based fighters, it was revised after the Defence Research and Development Agency (DRDO) and Aeronautical Development Agency (ADA) substantially improved the LCA-Navy after receiving flak by then Indian Navy chief Admiral Sunil Lanba. Following the improvements, LCA-Navy carried out extensive trials at the SBTF and made an arrested landing onboard INS Vikramaditya as well. The DRDO and ADA now hope that a twin-engine version of the LCA-Navy would be ready for trial by 2026, and could be ready for induction into the Navy by 2032 if the trials produce good results.

https://www.deccanherald.com/national/north-and-central/looking-for-contract-with-indian-navy-india-trial-of-us-naval-jets-could-begin-by-month-end-1109801.html

THE ECONOMIC TIMES

Tue, 17 May 2022

UK 'strongly supports' Sweden, Finland joining NATO

The UK government has said it "strongly supports" the expansion of the North Atlantic Treaty Organisation (NATO) as Sweden and Finland confirmed their intention to apply for membership of the military alliance, in a historic shift of foreign policy stance in the wake of the Russia-

Ukraine conflict. UK Foreign Secretary Liz Truss said on Monday evening that the two Nordic countries should be integrated into NATO, which operates on a collective defence basis under which an attack against any one ally is considered as an attack against all allies. “The UK strongly supports applications for NATO membership from Finland and Sweden. They should be integrated into the alliance as soon as possible; their accession will strengthen the collective security of Europe,” said Truss. “We look forward to working with them as new NATO Allies and stand ready to offer them our every assistance during the accession process. Our mutual security declarations signed with Sweden and Finland last week by the Prime Minister [Boris Johnson] demonstrate our steadfast and unequivocal commitment to both countries during this process and beyond,” she said.

During his visit to Stockholm and Helsinki last week, Prime minister Johnson signed bilateral declarations with Sweden and Finland committing to further deepen defence and security partnerships with both countries in the lead up to their full-fledged NATO membership. Downing Street said the declarations marked a step-change in defence and security, intensifying intelligence sharing, accelerating joint military training, exercising and deployments, and bolstering security across all three countries and northern Europe. Sweden and Finland have been NATO partners for many years and have taken part in some of the alliance's tough operations. They also make a major contribution to security in the Baltic region, Northern Europe and the rest of the Euro-Atlantic area.

While there was less appetite for a full membership in the past, there is now greater political consensus within the countries to be included formally within the military alliance. It is in response to what is seen as Russia's aggressive stance towards Ukraine, a move that has shaken up European countries in the neighbourhood. NATO's current 30-strong membership includes the UK, the US, Canada and many European nations. Russian President Vladimir Putin sees the expansion of the alliance as a security threat and has warned of "consequences". Putin has previously told Finland it would be a "mistake" to join NATO, which was founded in 1949 to counter the threat from the Soviet Union.

He has also indicated Ukraine's intention to join the alliance as one of the reasons behind the current ongoing conflict. Sweden has been historically neutral since the Second World War II and Finland, which shares a border with Russia, has stayed away so far to avoid antagonising Putin.

https://economictimes.indiatimes.com/news/defence/uk-strongly-supports-sweden-finland-joining-nato/articleshow/91614552.cms?from=mdr

Tue, 17 May 2022

Scientists discover a key reason why running boosts brain health

Boost in nerve-growth protein helps explain why running supports brain health. Exercise increases levels of a chemical involved in brain cell growth, which bolsters the release of the "feel good" hormone dopamine, new research shows. Dopamine is a neurotransmitter that is known to play a key role in movement, motivation, and learning. Experts have long understood that regular running raises dopamine activity in the brain and may protect nerve cells from damage. In addition, past research has tied exercise-driven boosts in the dopamine-triggering chemical called brain-derived neurotrophic factor (BDNF) and in dopamine levels to improvements in learning and memory. However, the precise way these three factors interact has remained unclear until now.

Led by researchers at NYU Grossman School of Medicine, the investigation revealed that mice running on a wheel for 30 days had a 40% increase in dopamine release in the dorsal striatum, the part of the brain involved in movement, compared to levels in mice that did not exercise. In addition, the runners showed a nearly 60% increase in BDNF levels compared to their non-running counterparts. Notably, even after a week of rest, the increase in dopamine release remained elevated. Additionally, when BDNF levels were artificially reduced, running did not lead to additional dopamine release. "Our findings suggest that BDNF plays a key role in the long-lasting changes that occur in the brain as a result of running," says study lead author and neurobiologist Guendalina Bastioli, PhD. "Not only do these results help explain why exercise makes you move, think, and feel better, they also show that these benefits continue even if you do not work out every day," adds Bastioli, a postdoctoral fellow in the Department of Neuroscience at NYU Langone Health.

While researchers have previously measured dopamine activity during running, the new investigation provides insight into the longer-term behavior of the hormone and its effects on the brain well after exercise stops, according to Bastioli. The report was published online on May 16, 2022, in the *Journal of Neuroscience*. For the investigation, researchers provided dozens of male mice with unlimited access to either a freely rotating wheel or a locked wheel that could not move. After one month, the team measured dopamine release and BDNF levels in brain slices. They repeated this same process on a new group of rodents, some of which had been genetically modified to produce half as much BDNF as regular mice.

The study authors note that patients with Parkinson's disease and other movement disorders are often treated with drugs that mimic dopamine's effects on motor neurons. However, the mechanism behind dopamine's role in this protective benefit of exercise had not been thoroughly

explored. “Our results help us understand why exercise alleviates the symptoms of Parkinson’s disease, as well as those of neuropsychiatric disorders such as depression,” says study senior author and neuroscientist Margaret Rice, PhD. “Now that we know why physical activity helps, we can explore it as a means of augmenting or even replacing the use of dopamine-enhancing drugs in these patients.” Rice, a professor in the Departments of Neurosurgery and Neuroscience and Physiology at NYU Langone, cautions that while the preliminary findings in rodents were promising, future studies in humans will be required to fully understand the role of BDNF and dopamine in Parkinson’s disease.

She adds that the study team next plans to investigate the relationship between exercise and these chemicals in female mice, which notably run more frequently than males. In addition, the researchers intend to directly examine whether active mice indeed have improved motor skills compared with those with limited physical activity.

https://scitechdaily.com/scientists-discover-a-key-reason-why-running-boosts-brain-health/amp/

Tue, 17 May 2022

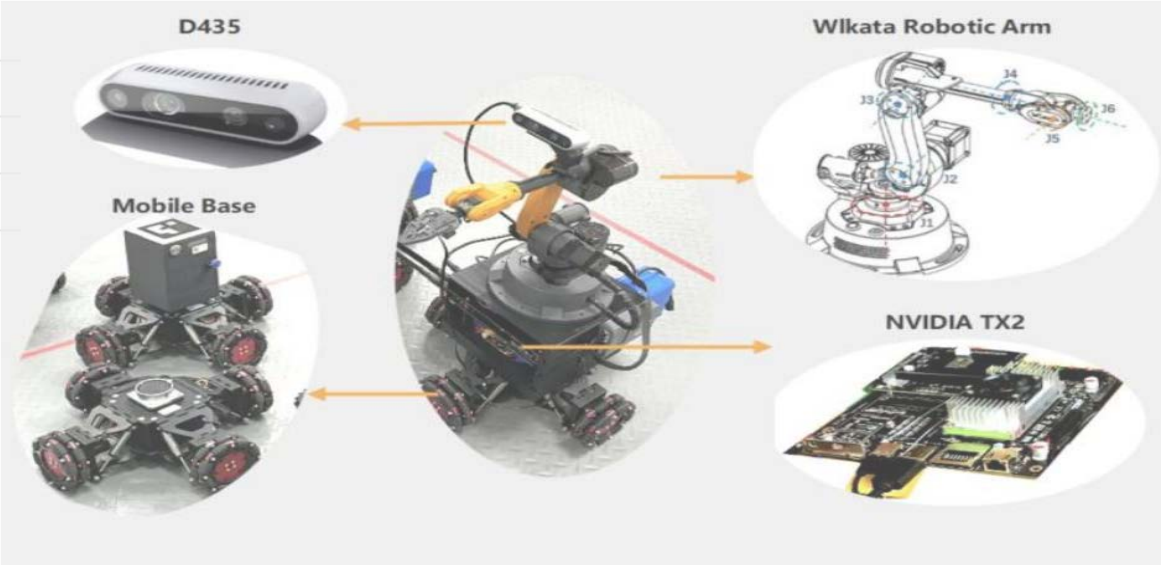
A new approach for safer control of mobile robotic arms

Researchers at Shanghai Jiao Tong University, University of Oxford, and the Tencent Robotics X Lab have recently introduced a configuration-aware policy for safely controlling mobile robotic arms. This policy, introduced in a paper pre-published on arXiv, can help to better guide the movements of a robotic arm, while also reducing the risk that it will collide with objects and other obstacles in its vicinity. "The preparatory work of this paper includes the completed vision-based grasping work of the mobile manipulator and the obstacle avoidance work realized by modeling the mobile manipulator in the simulation," Fan Ding, one of the researchers who carried out the study, told TechXplore. "The main goal of this paper is to use the constructed mobile manipulator system to verify our proposed safety control theory."

The new law introduced by Ding and his colleagues is designed to drive a mobile robotic arm towards a desired region in space, while preventing it from colliding with nearby objects or obstacles. The team specifically created this law with the hope that it could improve the performance and safety of robots operating in obstacle-clustered environments. In contrast with other methods and policies introduced in the past, the approach outlined in the recent paper also describes the spatial structure of the mobile robotic arm. This ultimately allowed the researchers to prevent collisions with nearby objects more efficiently.

"The configuration-aware part in this paper achieves the task of grasping objects, while for the task of obstacle avoidance, we set this part as prior knowledge and do not explore it," Ding explained. "The safety control of the mobile manipulator is realized by the real-time safety control law, which is obtained by solving a quadratic program containing a finite number of control barrier function constraints, which incorporate the spatial structure of the mobile manipulator. The overall computational efficiency of a robotic arm controller will not be greatly reduced with increasing complexity of the spatial structure."

So far, Ding and his colleagues evaluated their approach in a series of numerical simulations. Their findings were very promising, suggesting that their new policy could help to increase the safety and efficiency of the mobile robotic arm they applied it to. "The most notable achievement is to propose an online mobile manipulator obstacle avoidance method, which considers the spatial structure of the mobile manipulator and scales well with dimensions," Ding said. "Its possible impact is to propose a feasible solution for high-degree-of-freedom mobile robots to efficiently avoid obstacles."



Structure of the mobile robotic arm

In the future, the researchers hope to implement and evaluate their approach in real, physical robotic arms, to further confirm its effectiveness. In addition, their work might inspire the development of similar approaches to reduce the risks of robots colliding with obstacles in their surroundings. "In the future, the configuration-aware part will be applied to the obstacle avoidance of the mobile manipulator, instead of using the environment as a priori knowledge," Ding added. "In addition, they plan to explore routine planning for mobile base."

More information: *Fan Ding et al, Configuration-aware safe control for mobile robotic arm with control barrier functions. arXiv:2204.08265v2 [cs.RO]*, *arxiv.org/abs/2204.08265*

https://techxplore.com/news/2022-05-approach-safer-mobile-robotic-arms.html