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CONTENTS

S. No.	TITLE	Page No.
DRDO News		1-9
DRDO Technology News		1-9
1.	DRDO के हाइपरसोनिक मिसाइल प्रोग्राम को मिला ऐसा बूस्ट, सुपर मिलिट्री पॉवर बन जाएगा भारत	1
2.	Army to move Defence Ministry for 118 Arjun Mk-1A tanks	3
3.	DRDO की घातक कार्बाइन: एक मिनट में दागेगी 700 गोलियां	5
4.	DRDO's new carbine clears Army's final trials, ready for use	6
5.	Major milestone! When DRDO Army version missile completely, successfully destroyed this target	7
6.	सफेद दाग की दवा ल्यूकोस्किन खोजने वाले वैज्ञानिक को DRDO का 'साइंटिस्ट आफ द ईयर अवार्ड'	8
Defence News		9-41
Defence Strategic National/International		9-41
7.	Army Chief Naravane proceeds on 3-day visit to Republic of Korea	9
8.	Indian Army Chief MM Naravane 3 दिन के दौर पर South Korea खाना, रक्षा सहयोग बढ़ाने के लिए करेंगे चर्चा	10
9.	More muscle to IAF with at least 3 more Rafales flying-in next month	11
10.	आसमान में और बढ़ेगी भारत की ताकत, अगले महीने आ रहे तीन और राफेल	12
11.	Army to seek waiver from Defence Ministry to expedite helicopter deal	13
12.	Network Centric Warfare: Cooperative engagement capability of navies	14
13.	India to beef up security at Pangong Tso, govt fast-tracks procurement of patrol vessels	16
14.	Year-ender 2020 Apache, Romeo, T90s and more: 5 major defence deals inked by India in 2020	17
15.	Does Indian Navy need a third aircraft carrier? The debate, explained	18
16.	Project 75I Submarines: How India can make the most out of the strategic partnership model in defence	19
17.	Southern Naval Command conducts sailing expedition from Kochi to Lakshadweep's Androth Island	22
18.	Spooked By Ladakh Standoff, India Signs \$200m Deal for Israeli SPICE Bombs	23
19.	India has forced a stalemate in Ladakh. That's a defeat for China	26
20.	India-Australia boost defence cooperation amid frosty relation with China	28
21.	Indian Navy ends jam-packed year with Vietnamese Navy in South China Sea	30
22.	Myanmar Navy Commissions UMS Minye Theinkhathu, The Erstwhile INS Sindhuvir	31
23.	Hints of Chinese Naval Ambitions in the 2020s	32
24.	The Chinese challenge	36
25.	China sells 50 armed drones to Pakistan, begins psyops. It's a reminder Analysis	38
26.	India should be wary of China's naval network and the String of Pearls strategy to encircle the nation: Experts	39
27.	MEA: India, China agree next round of military talks should be held soon	41

Science & Technology News		42-51
28.	ISRO developing green propulsion for human space mission: K Sivan	42
29.	ISRO releases Chandrayaan-2 orbiter data: All you need to know	43
30.	Korean artificial sun sets the new world record of 20-sec-long operation at 100 million degrees	44
31.	Atomic-scale nanowires can now be produced at scale	46
32.	Shapeshifting crystals: Varying stability in different forms of gallium selenide monolayers	47
33.	Controlling the magnetic properties of complex oxide systems	48
COVID-19 Research News		49-51
34.	Researchers speculate PEG compound behind allergic reactions to Covid-19 vaccine: Report	49
35.	Indian Covid-19 vaccine Covaxin has drawn global attention: ICMR	50

नवभारत टाइम्स

Fri, 25 Dec 2020

DRDO के हाइपरसोनिक मिसाइल प्रोग्राम को मिला ऐसा बूस्ट, सुपर मिलिट्री पॉवर बन जाएगा भारत

*Hypersonic missile technology in India: हाइपरप्लेन बार-बार इस्तेमाल किया जा सकता है और यह अंतरिक्ष में उपग्रह भेजने वाले रॉकेटों का विकल्प बन सकता है।
फिलहाल उपग्रह छोड़ने के लिए हर बार नए रॉकेट बनाने पड़ते हैं।*

By Deepak Verma

भारत के हाइपरसोनिक मिसाइल विकास कार्यक्रम को गति देने के लिए बीते 19 दिसंबर को एक नई अहम सुविधा हासिल हुई है। हैदराबाद में रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) की प्रयोगशाला में एक नए हाइपरसोनिक विंड टनेल का उद्घाटन रक्षा मंत्री राजनाथ सिंह ने किया है जहां आवाज से 5 से 12 गुना अधिक गति वाली रॉकेट प्रणालियों का परीक्षण किया जा सकता है। ऐसी सुविधा अब तक केवल रूस और अमेरिका ने ही विकसित की है और भारत में इसका विकास पूरी तरह भारतीय औद्योगिक और वैज्ञानिक क्षमता के आधार पर किया गया है। इस सुविधा का इस्तेमाल हाइपरप्लेन जैसी अत्यधिक जटिल अंतरिक्ष व हमलावर मिसाइल प्रणालियों के विकास में किया जा सकता है। दुश्मन के ठिकानों पर मिसाइलों से अचूक हमला करने की भारत की क्षमता इस सुविधा (विंड टनेल) की वजह से बेमिसाल होगी। हाइपरसोनिक मिसाइलें जब दुश्मन की धरती पर गिरेंगी तो उसे अपने बचाव के लिए क्षण भर का भी वक्त नहीं मिलेगा। इस खास क्षमता के बारे में और बता रहे हैं वरिष्ठ डिफेंस एक्सपर्ट रंजीत कुमार।

हाइपरसोनिक मिसाइलों की रेस में तीसरे नंबर पर भारत

हमलावर बैलिस्टिक मिसाइलों के विकास की दौड़ में भारत पीछे रहा लेकिन देर से ही सही, मंजिल तक पहुंच चुका है। भारत ने अब तक 350 किलोमीटर मारक दूरी वाली पृथ्वी और सात सौ से 5,000 किलोमीटर क्षमता वाली अग्नि के अलावा पनडुब्बियों से छोड़ी जाने वाली मिसाइलों का भी सफल विकास किया है। अब भविष्य हाइपरसोनिक मिसाइलों का है जिनके विकास की दौड़ में भारत अमेरिका और रूस के बाद तीसरे स्थान पर चल रहा है। हालांकि चीन ने भी हाइपरसोनिक मिसाइल बनाई है लेकिन वह स्क्रेमजेट तकनीक वाली नहीं है।



DRDO के हाइपरसोनिक मिसाइल प्रोग्राम को मिला ऐसा बूस्ट, सुपर मिलिट्री पॉवर बन जाएगा

भारत की क्षमता से चीन को भी होने लगा खौफ

पारंपरिक मिसाइलों के विकास में विकसित देशों ने कई तरह के रोड़े अटकाए लेकिन इन बाधाओं को पार करते हुए भारतीय मिसाइल वैज्ञानिकों ने इतनी क्षमता तो हासिल कर ही ली है कि भारत से कई गुना अधिक मिसाइल भंडार रखने वाला चीन उससे खौफ खा रहा है। लेकिन अब जो मिसाइल क्षमता भारत अगले कुछ सालों के भीतर हासिल करने जा रहा है वह चीन के लिए भारी चिंता का विषय होगा। हाइपरसोनिक मिसाइलें आवाज से पांच से 8 गुना अधिक गति से जाने की क्षमता वाली कही जा सकती हैं। इससे कम गति से जाने वाली सुपरसोनिक मिसाइलें आवाज से दो-चार गुना अधिक मारक गति वाली होती हैं। आवाज से कम गति से मार करने वाली मिसाइलें सबसोनिक मिसाइल कही जाती हैं।



ब्रह्मोस से दोगुनी रफ्तार वाली मिसाइल चाहिए

भारत में पहले ही रूस के सहयोग से सुपरसोनिक क्रूज मिसाइल ब्रह्मोस का न केवल विकास हो चुका है बल्कि वह तीनों सेनाओं को सौंपी भी जा चुकी है। ब्रह्मोस की मारक गति आवाज से 2.8 गुना अधिक है और फिलहाल यह दुनिया की सबसे तेज गति से जाने वाली सुपरसोनिक क्रूज मिसाइल है। भारतीय मिसाइल वैज्ञानिकों की कोशिश है कि ब्रह्मोस की कम से कम दोगुनी गति से अधिक मारक गति वाली हाइपरसोनिक मिसाइल भारत के मिसाइल भंडार में शामिल हो। दुश्मन की हमलावर बैलिस्टिक मिसाइलों को आसमान में ही मार गिराने वाली एंटी मिसाइल प्रणालियों- अमेरिकी थॉड और पैट्रियट तथा रूसी एस-400 का विकास हो चुका है, इसलिए विकसित देशों की सेनाएं ऐसी हमलावर मिसाइलों की तलाश में हैं जिन्हें कोई एंटी मिसाइल बीच आसमान में ही ध्वस्त न कर सके।



HSTDV का सफल परीक्षण कर चुका है DRDO

डीआरडीओ को अब तक इसलिए कोसा जाता रहा है कि भारत की सेनाओं को आत्मनिर्भर बनने में वह खास योगदान नहीं कर सका है। वही डीआरडीओ अब दुनिया की इस सबसे अडवांस्ड शस्त्र प्रणाली से भारत को लैस करने का भरोसा दिला रहा है। इस हाइपरसोनिक कार्यक्रम से भारत को अंतरिक्ष और मिसाइल ताकत बनाने की दिशा में उसने अहम कदम उठाए हैं और इसको कामयाब बनाने के लिए भारत के राजनीतिक नेतृत्व को भी समुचित इच्छा शक्ति दिखानी होगी। बीते सात सितंबर को भारतीय मिसाइल वैज्ञानिकों ने ऐसे ही हाइपरसोनिक तकनीक प्रदर्शक यान (एचएसटीडीवी) का सफल परीक्षण कर हाइपरसोनिक दुनिया में अपने प्रवेश की घोषणा की थी। मिसाइल वैज्ञानिकों का दावा है कि हम चार से पांच सालों के भीतर ही आवाज से छह से सात गुना अधिक गति से मार करने वाली हाइपरसोनिक मिसाइलों का विकास कर सकेंगे।



कैसे काम करती हैं ये मिसाइलें?

इस मिसाइल में जिस इंजन का इस्तेमाल किया गया है, उसे स्क्रेमजेट इंजन कहते हैं जो हाइपरसोनिक गति से रॉकेट को आगे बढ़ाता है। इस इंजन को गति देने के लिए अपने साथ किसी तरह का ईंधन लेकर चलने की जरूरत नहीं होती है बल्कि यह हवा से ही ईंधन पैदा करता है। वायुमंडल में जो हवा होती है उसी से यह इंजन ऑक्सीजन खींचता है और फिर इसे ही जलाकर अपनी ऊर्जा हासिल करता है। हाइपरसोनिक गति से जाने की क्षमता वाले इस स्क्रेमजेट इंजन की बदौलत हाइपरप्लेन का विकास किया जा सकता है जिस पर किसी उपग्रह को सवार कर अंतरिक्ष में भेजा जा सकता है। यह हाइपरप्लेन बार-बार इस्तेमाल किया जा सकता है और यह अंतरिक्ष में उपग्रहों को भेजने वाले रॉकेटों का विकल्प बन सकता है।

सुपर मिलिट्री पॉवर बन जाएगा भारत

फिलहाल जब भी अंतरिक्ष में उपग्रह भेजना होता है, इसके लिए नया रॉकेट बनाना पड़ता है। इसी हाइपरप्लेन से मिसाइलें भी छोड़ी जा सकती हैं। इस तरह के हाइपरप्लेन की परिकल्पना नब्बे के दशक में भारत के महान रक्षा व मिसाइल वैज्ञानिक डॉ. ए.पी.जे. अब्दुल कलाम ने की थी। तब से ही प्रयोगशाला स्तर पर हाइपरसोनिक प्रणाली की अवधारणा विकसित करने और इसे साकार रूप देने के लिए हैदराबाद के रक्षा संस्थानों में शोध एवं विकास कार्य चल रहा था। इस तरह की अडवांस्ड रक्षा प्रणाली भारतीय सैन्य क्षमता में एक बड़ी खाई को भरने में मदद करेगी। अभी जब भारत बहुपक्षीय सुरक्षा चुनौतियों का सामना कर रहा है, ऐसी हाइपरसोनिक मिसाइल प्रणाली का स्वदेशी विकास भारतीय राजनीतिक नेतृत्व को दुनिया के बाकी प्रतिद्वंद्वी देशों से निबटने में आत्मशक्ति प्रदान करेगा। इस तरह की हमलावर शस्त्र क्षमता भारत को सुपर मिलिट्री पॉवर का दर्जा दिलाने में भी मददगार साबित होगी।

<https://navbharattimes.indiatimes.com/india/hypersonic-wind-tunnel-will-make-way-for-hyperplane-missile-system/articleshow/79939019.cms?story=6>



Sun, 27 Dec 2020

Army to move Defence Ministry for 118 Arjun Mk-1A tanks

It has 14 major upgrades over the Mk1 variant

By Dinakar Peri

New Delhi: After delays, the process for procurement of 118 indigenous Main Battle Tank (MBT) Arjun Mk-1A has commenced, according to an Army source. The cost as obtained from the Heavy Vehicles Factory (HVF), Avadi, is ₹8,956.59 crore.

“The file is currently with the Deputy Chief of Army Staff and will be shortly sent to Integrated Defence Staff (IDS) to put up the case. The case is planned to be fielded before the Defence Procurement Board (DPB) and the Defence Acquisition Council (DAC) in January 2021,” the source said. Issues with Arjun Mk1 ammunition, spares and repairs had also been resolved and the Defence Research and Development Organisation (DRDO) had set up an Arjun hub in Jaisalmer for spares and support, the source stated.

Stating that the Arjun Mk-1A would be without missile firing capability and would be incorporated as and when the development was complete, the source said that at the Arjun hub in Jaisalmer, 248 rotatables had been deposited.

The Arjun Mk-1A has 14 major upgrades over the Mk1 variant, which were formulated and approved in October 2018. Subsequently, limited user validation trials were carried out on all the

upgrades. Seven meetings were held involving various stakeholders to resolve all issues with respect to Arjun Mk-1A between October 2019 and July 2020. Following this, the Statement of Case with comments from all stakeholders was forwarded to the Deputy Chief of Army Staff — Capability Development and Sustenance, it has been learnt.

Tackling obsolescence

The Army has inducted two regiments of Arjun Mk1 between 2005 and 2010. Electronics would get obsolescent over 10-15 years and they needed to be constantly replaced, a defence official said. To address this, DRDO is working on obsolescence management of Arjun MBT and indigenisation of various assemblies and sub-assemblies, including Commander's Panoramic Sight (CPS) and Gunner's Main Sight (GMS) that are under indigenous development.

The indigenous CPS underwent successful trials earlier this month at the Pokhran field firing range and it was also demonstrated to the Deputy Chief of Army Staff. There would be some summer trials, the official said. The indigenous GMS was expected to be integrated by March 2021 and then go for summer trials, the official said.

Once the indigenous CPS and advanced GMS were incorporated, the indigenous content of MBT Arjun Mk-1A would increase from 41% to 54.3% during production, two officials independently stated.

On the process and timeline of the project, the official explained that once DAC approved the case, the Army would place indent with the HVF, Avadi. "That is also expected to happen before March 31, 2021. HVF will then build the first five tanks in 30 months which are called 'First of Production Model'," the official stated.

These five tanks will be put through General Service Quality Requirement (GSQR) evaluation by the Army and will accord Bulk Production Clearance (BPC) if found satisfactory. Once BPC was given, production would be done as per an agreed schedule, the official said.

Observing that if subsequently more numbers were ordered beyond 118, it would immensely benefit the domestic industry and the 'Make in India' effort, the official added that the indigenisation content could also progressively go to 70% with more numbers.

Missile firing trials

The advanced GMS of the Arjun Mk-1A had built-in laser target designator and the tank was customised for missile firing, a second official said. The missile is under development at the Armament Research and Development Establishment (ARDE), Pune, and trials are under way. Missile firing is under way at the ARDE. "A few more trials are required," the official stated.

To incorporate this capability on the existing Arjun Mk1 tanks, the DRDO had developed an external laser target designator, which could be retrofitted on the Mk1s in service, the official added.

<https://www.thehindu.com/news/national/army-to-move-defence-ministry-for-118-arjun-mk-1a-tanks/article33425919.ece>



Army chief Gen MM Naravane. File | Photo Credit: PTI

DRDO की घातक कार्बाइन: एक मिनट में दागेगी 700 गोलियां

ऐसी कार्बाइन जो स्टील से लेकर कवच तक को चीर देगी और दुश्मनों के चीथड़े उड़ा देगी।

JVPC नाम की इस कार्बाइन को DRDO ने बनाया है, जिसने सेना का फाइनल टेस्ट पास कर लिया है खास बातें

1. DRDO की कार्बाइन करेगी दुश्मनों का सर्वनाश
2. JVPC गैस ऑपरेटेड 5.56 x 30 एमएम हथियार

नई दिल्ली: रक्षा क्षेत्र में भारत के हाथ और मजबूत हो गए हैं। DRDO की बनाई अभेद्य मारक क्षमता वाली कार्बाइन ने सभी परीक्षणों को पूरा कर लिया है और सभी मानकों पर खरी उतरी है। भारतीय रक्षा अनुसंधान संगठन (DRDO) रक्षा क्षेत्र में भारत को लगातार सबल बना रहा है।

DRDO की बनाई गई यह कार्बाइन सेना के इस्तेमाल के लिए अब बिल्कुल तैयार है। इस कार्बाइन का पहला मकसद बिना किसी दुर्घटना के टारगेट को निष्क्रिय करना है।



Ministry of Home Affairs ट्रायल्स को पूरा किया

जानकारी के मुताबिक, संगठन ने इसे JVPC यानी जॉइंट वेन्चर प्रोटेक्टिव कार्बाइन नाम दिया है। यह कार्बाइन सबसे पहले पुरानी हो चुकी 9 एमएम कार्बाइन को रिप्लेस करेगी। इसके अलावा सेंट्रल आर्म्ड पुलिस फोर्स जैसे CRPF और BSF को भी आधुनिक हथियार मुहैया कराएगी।

इस कार्बाइन को DRDO की पुणे लैब और ऑर्डिनेंस फैक्ट्री बोर्ड ने मिलकर बनाया है। सबसे बड़ी बात इस आधुनिक हथियार ने पहले ही Ministry of Home Affairs ट्रायल्स को पूरा कर लिया है।

यह है कार्बाइन की खासियत

JVPC एक गैस चालित सेमी ऑटोमेटिक हथियार है। कार्बाइन का बैरल राइफल से छोटा होता है। इसे भारतीय सेना जनरल स्टाफ क्वालिटेटिव रिक्वायरमेंट के आधार पर तैयार किया गया था। यह कार्बाइन डीआरडोओ की पुणे स्थित लैब आर्मामेंट रिसर्च एंड डेवलपमेंट एस्टेब्लिशमेंट (ARDE) में भारतीय सेना के GSQR के आधार पर डिजाइन की गई है।

ये JVPC गैस ऑपरेटेड 5.56 x 30 एमएम हथियार है। JVPC को कभी कभी मॉडर्न सब मशीन कार्बाइन भी कहा जाता है जो हर मिनट 700 राउंड फायर कर सकती है।

DRDO और OFB ने मिलकर किया तैयार

JVPC को पुणे की DRDO फैसिलिटी और कानपुर की ऑर्डिनेंस फैक्ट्री बोर्ड Ordnance Factory Board-OFB ने मिलकर तैयार किया है। इस कार्बाइन का निर्माण SAF यानि स्मॉल आर्म्स फैक्ट्री कानपुर में किया जाएगा। इसके लिए गोलियां पुणे की एम्यूशन फैक्ट्री में तैयार होंगी।

1980 के आखिर में ARDE (Armament Research & Development Establishment) ने 5.56 x 45 mm क्षमता के हथियारों को बनाना शुरू किया था।

1994 में लॉन्च INSAS

इसे INSAS यानी इंडियन स्मॉल आर्म्स सिस्टम नाम दिया गया। इस तरह के हथियारों में रायफल और लाइट मशीनगन यानी LMG भी शामिल थी। INSAS पर कई तरह के टेस्ट किए गए। कई तरह के वातावरण में इनको इस्तेमाल किया गया और 1994 में लॉन्च किया गया।

ऐसे बनी अति आधुनिक कार्बाइन

INSAS तकनीक से बने हथियार में कुछ गंभीर खामियां रहीं लेकिन ये हथियार अभी भी आर्म्ड फोर्स द्वारा इस्तेमाल किए जाते हैं। हालांकि सशस्त्र दल कुछ अन्य विदेशी और देसी स्मॉल आर्म्स का इस्तेमाल भी करते हैं। INSAS की तकनीक पुरानी है। INSAS हथियारों में कार्बाइन भी शामिल थी लेकिन इसको विकसित नहीं किया गया था।

<https://zeenews.india.com/hindi/zee-hindustan/national/drdo-new-jvpc-carbine-will-fire-700-bullets-a-minute/815092>



Sat, 26 Dec 2020

DRDO's new carbine clears Army's final trials, ready for use

The newly-developed carbines are not just slated to replace the ageing 9 mm carbine currently in use by the armed forces but would also modernise the armoury of the Central Armed Police Forces, like the CRPF and BSF, and state police forces

By Sushant Kulkarni

Pune: Last week, the Defence Research and Development Organisation (DRDO) said that a Carbine, jointly developed by its Pune-based facility and the Ordnance Factory Board (OFB), had completed its final phase of user trials by the Army and was ready for induction.

The Joint Venture Protective Carbine (JVPC) is not just slated to replace the ageing 9 mm carbine currently in use by the armed forces but would also modernise the armoury of the Central Armed Police Forces (CAPFs), like the CRPF and BSF, and state police forces.

The primary objective of this weapon system is to injure or incapacitate the target without causing casualty.

The JVPC is primarily a gas-operated automatic 5.56 x 30 mm calibre weapon of a semi-bullpup category because of the positioning of its action and trigger. The carbine — a weapon that has a barrel shorter than rifle — has been designed as per Indian Army's General Staff Qualitative Requirements (GSQRs). The JVPC is also sometimes referred to as Modern Sub Machine Carbine (MSMC) that can fire at the rate of 700 rounds per minute.

The joint development has been done by Armament Research and Development Establishment (ARDE), a Pune-based facility of the DRDO and Small Arms Factory, Kanpur of the OFB. The weapon is manufactured at the SAF and Ammunition is manufactured at Ammunition Factory, Khadki (AFK) in Pune.

Around the late 1980s, the ARDE undertook a project to design and develop a family of small Arms in 5.56 x 45 mm calibre and which was later termed as INSAS (Indian Small Arms System). This family of weapons included rifle and light machine gun (LMG) along with its ammunition and



The primary objective of this carbine weapon system is to injure or incapacitate the target without causing casualty. (Photo via Ministry of Defence)

accessories. INSAS underwent a series of tests including those in a variety of harsh environments and was inducted in 1994.

These weapons, though with some serious issues, are still in use by the armed forces and security agencies in India along with other small arms of foreign and domestic make. The INSAS family also had a carbine in it, but its development did not materialise.

Sometime around 2005-06, the ARDE started working on a Multi-Caliber Individual Weapon System (MCIWS) with an interchangeable barrel to facilitate firing of 5.56×45 mm, 7.62×39 mm and 6.8×43 mm ammunition. However, this project was also subsequently set aside primarily due to lack of demand from the user.

Between early 2010 and 2015-16, a demand started coming from the Armed forces for a carbine, thus prompting the ARDE and OFB to join hands to develop JVPC. Some of the technological features from the previous development efforts were carried forward and since 2016-17, extensive trials of the JVPC commenced. Till now, the weapon system has undergone initial development trials, pre-user internal trials, user trials and trials by Director General of Quality Assurance (DGQA).

The weapon system has been designed keeping in mind the requirements of the Close Quarter Battle or CQB operations and its low recoil action ensures that the weapon is stable during firing, said a DRDO scientist, adding that a modular mechanism makes it easy for maintenance. The effective range of the carbine is more than 100 m and weighs about three kilograms. It can penetrate 3.5 mm mild steel and 23-layer soft armour at 100 metres.

Its key features like high reliability, low recoil, retractable butt, ergonomic design, single-hand firing capability, and multiple Picatinny rails for various attachments make it a very potent weapon for Counter Insurgency and Counter-Terrorism operations and also conventional battles. The weapon has already passed the Ministry of Home Affairs trials in the past and various CAPFs under the MHA and State Police bodies have started the procurement process.

<https://indianexpress.com/article/india/drds-new-carbine-clears-armys-final-trials-ready-for-use-7119746/>



Fri, 25 Dec 2020

Major milestone! When DRDO Army version missile completely, successfully destroyed this target

***Defence Research and Development Organisation (DRDO) has achieved a major milestone with the maiden launch of Medium Range Surface to Air Missile (MRSAM), Army Version from Integrated Test Range, Chandipur, off the Coast of Odisha
By Prashant Singh, Edited By Harish Dugh***

Defence Research and Development Organisation (DRDO) has achieved a major milestone with the maiden launch of Medium Range Surface to Air Missile (MRSAM), Army Version from Integrated Test Range, Chandipur, off the Coast of Odisha. The missile completely destroyed a high speed unmanned aerial target which was mimicking an aircraft with a direct hit.

Medium Range Surface to Air Missile (MRSAM), Army Version: All you need to know

- Army version of MRSAM is a surface to Air Missile developed jointly by DRDO, India and IAI, Israel for use of the Indian Army. MRSAM Army weapon system comprises of Command post, Multi-Function Radar and Mobile Launcher system.
- The complete Fire Unit has been used during the launch in the deliverable configuration. The team from the users i.e. Indian Army also witnessed the launch. Number of range instruments

such as Radar, Telemetry and Electro-Optical Tracking System were deployed and captured the complete mission data, validating the weapon system performance including the destruction of the target.

Raksha Mantri Rajnath Singh lauded the efforts of DRDO and associated team members involved in the mission and said that India has attained a high level of capability in the indigenous design and development of advanced weapon systems.

Secretary Dept. of Defence R&D and Chairman, DRDO Dr G Satheesh Reddy congratulated the DRDO community for successfully demonstrating the performance of the MRSAM Army weapon system registering direct target hit in its maiden launch. He also lauded the efforts of the entire team in realizing the system within record time and meeting the committed schedule.

<https://www.zeebiz.com/india/news-major-milestone-when-drdo-army-version-missile-completely-successfully-destroyed-this-target-144518>



Medium Range Surface to Air Missile (MRSAM), Army Version: All you need to know.



Sat, 26 Dec 2020

सफेद दाग की दवा ल्यूकोस्किन खोजने वाले वैज्ञानिक को DRDO का 'साइंटिस्ट आफ द ईयर अवार्ड'

रक्षा अनुसंधान और विकास संगठन (DRDO) ने सफेद दाग (White Spot) की प्रभावी दवा तैयार करने वाले वरिष्ठ वैज्ञानिक डॉ. हेमन्त कुमार पांडेय (DR. Hemant Kumar Pandey) को 'साइंटिस्ट ईयर आफ द अवार्ड'(Scientist of the Year Award) से सम्मानित किया है।

रक्षा अनुसंधान और विकास संगठन (DRDO) ने सफेद दाग (White Spot) की प्रभावी दवा समेत कई हर्बल उत्पाद तैयार करने वाले वरिष्ठ वैज्ञानिक डॉ. हेमन्त कुमार पांडेय (DR. Hemant Kumar Pandey) को 'साइंटिस्ट ईयर आफ द अवार्ड'(Scientist of the Year Award) से सम्मानित किया है। डीआरडीओ भवन में आयोजित एक कार्यक्रम में रक्षा मंत्री राजनाथ सिंह ने पांडेय को यह सम्मान प्रदान किया। पुरस्कार स्वरूप दो लाख रुपये की राशि के साथ प्रशस्ति पत्र प्रदान किया गया।

पांडेय डीआरडीओ की पिथौरागढ़ स्थिति प्रयोगशाला-रक्षा जैव ऊर्जा अनुसंधान संस्थान (DIBIR) में वरिष्ठ वैज्ञानिक पद पर तैनात हैं तथा पिछले 25 सालों से हिमालय क्षेत्र की जड़ी-बूटियों पर शोध कर रहे हैं। वैसे तो वह छह दवाओं और हर्बल उत्पादों की खोज कर चुके हैं, लेकिन उनकी सबसे बड़ी खोज सफेद दाग यानी ल्यूकोडर्मा की दवा ल्यूकोस्किन की खोज करना है।



सफेद दाग की दवा ल्यूकोस्किन खोजने वाले वैज्ञानिक को DRDO का 'साइंटिस्ट आफ द ईयर अवार्ड'

हिमालयी जड़ी-बूटियों से तैयार यह दवा सफेद दाग की समस्या का प्रभावी निदान करती है। इस तकनीक को कुछ साल पहले नई दिल्ली की एमिल फार्मास्युटिकल को हस्तांतरित किया गया था। मौजूदा समय में यह ल्यूकोस्किन एक प्रभावी दवा के रूप में अपनी पहचान बना चुकी है।

ल्यूकोस्किन को हिमालयी क्षेत्र में दस हजार फुट की ऊंचाई पर पाए जाने वाले औषधीय पौधे विषनाग से तैयार किया गया है। यह खाने और लगाने वाली दोनों स्वरूपों में उपलब्ध है। अब तक डेढ़ लाख से अधिक लोगों का इससे उपचार किया जा चुका है।

विश्व में वैसे तो एक से दो फीसदी लोग सफेद दाग की समस्या से प्रभावित हैं, लेकिन भारत में ऐसे लोग तीन से चार फीसदी होने का अनुमान है। इस हिसाब से यह संख्या पांच करोड़ बैठती है। यह आटो इम्यून डिसऑर्डर है, जिसमें त्वचा के रंग के लिए जिम्मेदार कुछ सूक्ष्म कोशिकाएं निष्क्रिय हो जाती हैं, हालांकि इसका शरीर की क्षमता पर किसी प्रकार का प्रभाव नहीं पड़ता है।

पांडेय ने इसके अलावा खुजली, दांत दर्द, रेडिएशन से बचाने वाली क्रीम, हर्बल हेल्थ उत्पाद आदि भी तैयार किए हैं, इनमें से ज्यादातर उत्पादों की तकनीक हस्तांतरित हो चुकी है।

<https://www.tv9hindi.com/india/white-spot-drdo-scientist-of-the-year-award-dr-hemant-kumar-pandey-424879.html>

Defence News

Defence Strategic: National/International

INDIA
TODAY

Mon, 28 Dec 2020

Army Chief Naravane proceeds on 3-day visit to Republic of Korea

During the visit, he will be meeting senior military and civilian leadership of the Republic of Korea, the Indian Army said

By Abhishek Bhalla

New Delhi: Indian Army Chief General MM Naravane has proceeded on a three-day visit to the Republic of Korea (ROK) from 28 to 30 December 2020.

During the visit, he will be meeting senior military and civilian leadership of the Republic of Korea, the Indian Army said.

General Naravane will lay wreath at National Cemetery and War Memorial in Seoul. He is scheduled to call on the Minister of National Defence, ROK Army Chief, Chairman of Joint Chiefs of Staff, and Minister of Defence Acquisition Planning Administration (DAPA) to discuss avenues for enhancing India-ROK defence relations.

The Army Chief will also visit the Korea Combat Training Centre in Inje Country, Gangwon Province and Advance Defence Development (ADD) at Daejeon.



Indian Army Chief Gen MM Naravane.
(Photo: PTI)

The visit like other recent ones to foreign countries is aimed at enhancing military diplomacy.

The Indian Army chief earlier this month visited United Arab Emirates (UAE) and Saudi Arabia from 9 to 14 December as part of India's military diplomacy in the neighbourhood.

This was the first visit by an Indian Army Chief to these two countries.

Recently the Army Chief had visited Nepal and also accompanied Foreign Secretary Harsh Shringla to Myanmar.

<https://www.indiatoday.in/india/story/army-chief-naravane-republic-of-korea-visit-1753697-2020-12-28>



Mon, 28 Dec 2020

Indian Army Chief MM Naravane 3 दिन के दौरे पर South Korea रवाना, रक्षा सहयोग बढ़ाने के लिए करेंगे चर्चा

**भारतीय सेना (Indian Army) के प्रमुख जनरल मनोज मुकुंद नरवणे (MM Naravane)
भारत और दक्षिण कोरिया (South Korea) के रक्षा क्षेत्र में सहयोग को बढ़ाने के लिए वहां
वरिष्ठ सैन्य अधिकारियों से बातचीत करेंगे। सेना प्रमुख का ये दौरा 3 दिन का है।**

By कृष्णमोहन मिश्रा

नई दिल्ली: भारतीय सेना के प्रमुख (Indian Army Chief) जनरल मनोज मुकुंद नरवणे (MM Naravane) तीन दिन की यात्रा पर आज (सोमवार) दक्षिण कोरिया (South Korea) रवाना हो गए। सेना प्रमुख दक्षिण कोरिया (South Korea) और भारत के रक्षा क्षेत्र में सहयोग को बढ़ाने पर चर्चा करेंगे।

तीन दिवसीय दौरे के दौरान भारतीय सेना के चीफ जनरल एम. एम. नरवणे (MM Naravane) दक्षिण कोरिया ([South Korea](#)) में वरिष्ठ सैन्य अधिकारियों के साथ मुलाकात करेंगे। इसके अलावा वो दक्षिण कोरिया के कॉम्बेट ट्रेनिंग सेंटर में भी जाएंगे। बता दें कि सेनाध्यक्ष 30 तारीख को भारत वापस आएंगे।



भारतीय सेना प्रमुख जनरल मनोज मुकुंद नरवणे
(फाइल फोटो) | फोटो साभार: PTI

इससे पहले चीन के साथ लगने वाली पूर्वी लद्दाख की वास्तविक नियंत्रण रेखा (Line of Actual Control) पर जारी तनाव के बीच सेना प्रमुख जनरल मनोज मुकुंद नरवणे (MM Naravane) ने 23 दिसंबर को बॉर्डर से सटे फॉरवर्ड इलाकों का दौरा किया। जान लें कि एलएसी पर चीन के साथ चल रहे विवाद को 6 महीने से ज्यादा हो चुके हैं।

गौरतलब है कि भारतीय सेना ([Indian Army](#)) प्रमुख जनरल एम. एम. नरवणे (MM Naravane) इसी दिसंबर महीने में खाड़ी देशों के 6 दिन के दौरे पर भी गए थे। ये पहली बार था जब भारतीय सेना के प्रमुख यूएई (UAE) और सऊदी अरब (Saudi Arab) के दौरे पर गए थे। इस दौरे में सेना प्रमुख जनरल एम. एम. नरवणे ने दोनों देशों से रक्षा क्षेत्र में सहयोग को बढ़ाने पर बातचीत की थी।

जनरल एम. एम. नरवणे (MM Naravane) ने खाड़ी देशों के दौरे के दौरान अपने समकक्षों और दोनों देशों की सीनियर मिलिट्री लीडरशिप से मुलाकात की थी। इस दौरान उन्होंने यूएई के वरिष्ठ सैन्य अधिकारियों से भारत-यूएई संबंधों को बेहतर बनाने पर भी चर्चा की थी।

<https://zeenews.india.com/hindi/india/indian-army-chief-mm-naravane-leaves-for-south-korea-on-3-day-tour-know-details/816610>

More muscle to IAF with at least 3 more Rafales flying-in next month

This batch of Rafale fighters will be the third set of deliveries of the French-origin aircraft to the Indian Air Force

By Rahul Singh, Edited By Sparshita Saxena

New Delhi: The Indian Air Force's solitary Rafale squadron will add more muscle with the arrival of at least three more fighter jets in January, a shot in the arm for the IAF that is grappling with a shortage of combat planes, people familiar with developments said on Saturday on the condition of anonymity.

This batch of Rafale fighters will be the third set of deliveries of the French-origin aircraft to the air force, which has ordered a total of 36 warplanes (equivalent of two squadrons) at a cost of Rs 59,000 crore.

“At least three Rafale jets will arrive in India next month. The dates are still being worked out. The planes will be flown to Jamnagar from France without a stopover on the way. Refuelling support will be provided by Indian and French tankers,” the people said.



File photo: Rafale combat aircraft at the Air Force Station in Ambala. (PTI)

The jets were ordered from France in September 2016 under a government-to-government deal. The delivery of the three jets in January will take the number of Rafales in the IAF's inventory to 11. The second batch of the IAF's three Rafale fighter jets had reached the Jamnagar airbase in Gujarat from France in early November before they flew to their homebase in Ambala. The first batch of five Rafale jets of the 36 ordered by the IAF reached the Ambala airbase on July 29 after a stopover at the Al Dhafra airbase near Abu Dhabi, although a formal induction ceremony took place later on September 10.

The arrival of more fighters will further boost the IAF's capability to rapidly deploy the advanced jets in the Ladakh theatre amid military tensions with China, as previously reported by Hindustan Times. The IAF has been operating the fighter jets - equipped with advanced weapons and sensors - in the Ladakh theatre where the military is on high alert to deal with any provocation by China amid a lingering border dispute.

The IAF will induct three to four jets every two months, with all the 36 planes likely to join its combat fleet by the year-end. The second Rafale squadron will be based at Hasimara in West Bengal to strengthen the IAF's capabilities in the eastern sector.

The Rafale fighters are the first imported jets to join the IAF in 23 years after the Russian Sukhoi-30 jets entered service in June 1997.

The twin-engine Rafale jets are capable of carrying out a variety of missions – ground and sea attack, air defence and air superiority, reconnaissance and nuclear strike deterrence. The fighters can carry almost 10 tonnes of weapons. India-specific enhancements on the Rafales include cold engine start capability to operate from high-altitude bases, radar warning receivers, flight data recorders with storage for 10 hours of data, infrared search and track systems, jammers and towed decoys to ward off incoming missiles.

<https://www.hindustantimes.com/india-news/more-muscle-to-iaf-at-least-3-more-rafales-to-fly-in-next-month/story-mrU4vkeBNw9osQvcdOogEL.html>

आसमान में और बढ़ेगी भारत की ताकत, अगले महीने आ रहे तीन और राफेल

By राहुल सिंह

नई दिल्ली: भारतीय वायु सेना की ताकत और बढ़ने वाली है। लड़ाकू विमानों की कमी से जूझ रही भारतीय वायु सेना को जनवरी में तीन और राफेल मिलने वाले हैं, जिसके बाद सेना की ताकत और बढ़ जाएगी। नाम न छापने की शर्त पर इससे जुड़े एक लोगों ने बताया कि जनवरी में भारतीय वायुसेना के स्क्वाड्रन में तीन और राफेल शामिल हो जाएंगे। फ्रांस निर्मित राफेल लड़ाकू विमानों की डिलीवरी का यह तीसरा सेट होगा।

बता दें कि भारत और फ्रांस के बीच 59000 करोड़ रुपए में कुछ 36 राफेल की डील हुई है। हालांकि राफेल के आने के लिए तारीख अभी निर्धारित नहीं की गई है। तीनों विमान फ्रांस से जामनगर के लिए उड़ान भरेंगे। रास्ते में विमानों को हवा में ही ईंधन की आपूर्ति की जाएगी। भारत और फ्रांस के बीच साल 2016 में सितंबर में राफेल के लिए डील पक्की हुई थी।



जनवरी में तीन विमानों की आपूर्ति के बाद भारतीय वायु सेना के पास कुल 11 राफेल हो जाएंगे। बता दें कि तीन राफेल विमानों की दूसरी खेप नवंबर में भारत पहुंची थी। फ्रांस से जामनगर पहुंचने के बाद इन तीन विमानों की अंबाला में तैनाती कर दी गई। इससे पहले 29 जुलाई को पांच राफेल विमानों का एक सेट भारत पहुंचा था।

बता दें कि पूर्वी लद्दाख में चीन से तनाव को देखते हुए भारतीय वायु सेना अपने फाइटर जेट की तैनाती कर चुकी है। तैनात किए गए लड़ाकू विमान पूरी तरह से हथियारों से लैश हैं। भारतीय सेना भी चीन के किसी उकसावे से निपटने के लिए पूरी तरह से अलर्ट पर हैं। मिली जानकारी के मुताबिक भारतीय वायु सेना हर दो महीने पर तीन से चार राफेल मिलेंगे।

साल के अंत तक सभी 36 राफेल विमानों के भारत आने की संभावना है। राफेल के दूसरे स्क्वाड्रन को पूर्वी क्षेत्र में भारतीय वायु सेना की ताकत को और मजबूत करने के लिये तैनात किया जा सकता है। 1997 के बाद लगभग 23 साल बाद ऐसा मौका है जब भारतीय वायु सेना लड़ाकू विमानों को इम्पोर्ट कर रही है। इससे पहले रूसी फाइटर जेट सुखोई-30 को शामिल किया गया था।

डबल इंजन वाले यह राफेल विमान कई तरह के मिशन को अंजाम देने में सक्षम हैं। राफेल विमान उड़ान भरते समय कम से कम 10 टन वजन के हथियार अपने साथ ले सकते हैं। इसके अलावा यह दुश्मनों के रडार को चकमा देने में सक्षम हैं।

<https://www.livehindustan.com/national/story-the-strength-of-the-indian-air-force-will-increase-further-at-least-3-more-rafales-to-fly-in-next-month-3707177.html>

Army to seek waiver from Defence Ministry to expedite helicopter deal

Cheetah and Chetak helicopters in dire need of replacement

By Dinakar Peri

New Delhi: With the deal for Ka-226T utility helicopters with Russia not concluded five years after it was announced and its fleet of Cheetah and Chetak helicopters at the end of their service life, the Army is set to approach the Defence Ministry for a waiver to take the deal forward.

“About 75% of the Army’s fleet of Cheetah and Chetak helicopters is over 30 years old. Some of them are about 50 years old. We need urgent replacements. The Ka-226T deal with Russia has been stuck over indigenisation. So the Army is approaching the Ministry of Defence [MoD] for a waiver to conclude the deal,” a defence official said on condition of anonymity.

Operational capability

Stating that the operational capability has already been impacted due to deficiencies and non-availability of replacement, the official stated, “The total technical life of these helicopters will start finishing from 2023 onwards. So the existing deficiencies will keep increasing.”

In 2015, India and Russia had concluded an Inter-Governmental Agreement (IGA) for at least 200 Ka-226T twin engine utility helicopters estimated to cost over \$1 billion with 60 helicopters to be directly imported and remaining 140 manufactured locally. They are to replace the ageing and obsolete Cheetah and Chetak fleet of the Army and the Air Force.

A joint venture India Russia Helicopters Limited (IRHL) has been set up between Hindustan Aeronautics Limited (HAL) and Russian Helicopters (RH) which will assemble the helicopters in India. The Request For Proposal (RFP) issued by the MoD to IRHL for 200 helicopters stated 70% localisation over which the final deal has been held up as the JV quoted localisation of 62.4% in its response.

Efforts to resolve this impasse in the last few months by adopting a revised methodology has not made any progress, it has been learnt. As the RFP states 70% indigenous content, it cannot be modified. Withdrawing it and issuing a new one would mean another 2-3 years lost. “The Army is now in a desperate situation for replacements and is preparing to take the case to the Defence Acquisition Council (DAC) for a waiver to proceed with 62.4%,” the official stated.

Import content

“Even indigenous platforms like Advanced Light Helicopter (ALH) and Light Combat Aircraft (LCA) have significant import content. How can an imported and assembled platform meet 70% requirement,” the official questioned. According to a March 2020 report of the Parliamentary Standing Committee on Defence, the ALH has 46% import content by value, LCA – 40% and SU-30MKI assembled by HAL with technology transfer also has 40%.

The issue has been taken up by Army Chief General Manoj Naravane with Defence Minister Rajnath Singh, another official said. The Army has around 185 Cheetah and Chetak helicopters with around 20 helicopters with HAL for overhaul for around a year at any point of time.



A Ka-226T light utility helicopter. Photo: [Twitter/@RusHeliCo](https://twitter.com/RusHeliCo)

The requirement

There is a requirement of around 400 such helicopters with the remaining to be met by the indigenous Light Utility helicopter being developed by HAL.

The first helicopter would be delivered within 36 months from the signing of the contract and order completed in eight years. The helicopter is powered by a French engine and would have 74% Russian content and 26% European content. It is not possible to meet the 70% localisation requirement on 160 helicopters, a diplomatic source said.

At Defexpo 2020 in Lucknow early this year, officials from RH explained that the localisation plan would be spread over four phases beginning with 3.3% indigenisation for 35 helicopters, going to 15% for next 25 helicopters, 35% for 30 helicopters in Phase 3 and eventually to 62.4% indigenisation in Phase 4 for the last 50 helicopters.

<https://www.thehindu.com/news/national/army-to-seek-waiver-from-defence-ministry-to-expedite-helicopter-deal/article33418788.ece>



Sat, 26 Dec 2020

Network Centric Warfare: Cooperative engagement capability of navies

At the most fundamental level, supporters of NCW advise strategists, planners, operators, and even members of the acquisition group to contemplate about warfighting in terms of nodes and networks instead of just weapons platforms

By Debajit Sarkar

For better or worse, acknowledged or not, Network-centric warfare (NCW) and its basic principles like Cooperative Engagement Capability are now entrenched in much of current thinking about military operations in NATO, Russia and China. At the most fundamental level, supporters of NCW advise strategists, planners, operators, and even members of the acquisition group to contemplate about warfighting in terms of nodes and networks instead of just weapons platforms. At its most elementary, this means that designing, sustaining, and defending connectivity (i.e., networks, varying from radios to fibre optics) is at least as significant as ships, aircraft, tanks, satellites, and sensors. At the core of NCW is to first fight for information predominance.

Recent Developments: Russian Navy's Network Centric Warfare Plan

The Russian Ministry of Defense announced last week that the nuclear submarines and Project 22350 frigates of the Russian Navy can be used to



At the core of Network Centric Warfare is to first fight for information predominance.

fire the hypersonic cruise missile Zircon at enemy targets. This seems to be a part of the Russian Navy's new net centricity plan, which means fighter planes and submarines can scout targets that other platforms can subsequently engage. Forward scouting submarines will be eavesdropping for targets and plotting their locations using sonar and will transmit target information to blue force platforms faraway away. Hypersonic cruise missiles are one of the cornerstones of any NCW plan because speed and precision make it possible to utilize specific battlefield opportunities and operate at a speed calculated to overpower an enemy's capability to respond. Hypersonic missiles offer a highly agile naval force, the ability to change from one rapid, precise operation to another at

will and to compress multifaceted targeting procedures to fit the almost real-time dimensions of the battlefield.

Indian Navy's Network Centric Warfare Capabilities

The Tri-Services Commanders Conference held annually focuses on joint planning and execution of 'Network Centric Warfare' scenarios on a regular basis. The Indian Navy already has a limited NCW capability in place where ships, fighter planes and submarines can scout targets that other platforms can subsequently engage. This means the fighter planes don't need to fly far and wide with high drag large and heavy anti-ship missiles. Instead, they can use sophisticated sensors and equipment to locate targets fit for engaging and submarines can do the same as well as small surface, subsurface and airborne drones presumably. If the various platforms of the Indian Navy – surface combatants, submarines, fighter planes, helicopters, drones are comprehensively networked to create near-real-time situational awareness the Navy could act constantly because they would no longer need to pause before deciding on further action; the information and coordination required would already be there. To this effect, the Indian Navy's design lab and the Defence Research & Development Organization (DRDO) need to develop not just state of the art sensors and information technologies that can compress this process significantly but also accelerate the observe–orient–decide–act (OODA) cycle and the process of generating combat power. A force-level vision is crucial in order to devise and design the Sensor Resource Management—whose performance and system boundary traverses Battle Force platforms. Having the best amalgam of information, sensors, and communications that comprise the information backplane of network-centric operations. Therefore, the Indian Navy can change the mode, course, and objectives of their actions, just as fast as they can bring speed and precision to targeting. At a time when the PLA-Navy is trying to dominate maritime operation in the Indian ocean the Indian Navy must focus on developing effective NCW capability.

If they are operating now with the INS Vikramaditya in dry dock I would expect a group of Indian surface combatants in the middle of the ocean won't expect too much from MiG-29K fighters in terms of support. Radar and sonar and satellite sources would probably suffice in peacetime. They have what are called commanders, who get information placed in front of them and they issue orders. A MiG-29K launched in the general direction from a radar or radio emission flying perhaps 600km and operating at 10km altitude might detect a target that turns out to be an enemy ship. The MiG 29K probably does not have anti-ship missiles with it... it probably has air to air weapons for self-defence in a lighter low drag load to allow higher speed while maintaining operational range. If it did have suitable anti-ship missiles then the commander could decide whether to attack or not and if they decided to attack then those heavy high drag Kh-35s or Kh-31s the MiG 29K was carrying could be launched at the target. It could monitor the results and then depart... of course if there are large numbers of enemy ships it could use its radar to locate them identify them and pass location and ID information back to the blue force ships and then depart the area before it gets engaged. Accelerating away and perhaps dropping to a low level if being tracked by missile targeting radar.

It would be flexible and would be largely based on the situation. During peacetime, the MiG would scan for targets and ID them and then continue its patrol. Submarines are more useful when the enemy does not know they are there. The submarine detects the target and passes information back to the ship and the ship launches the BRAHMOS supersonic missile (and in the near future a hypersonic version of the BRAHMOS). But of course, the submarine could launch a Harpoon missile too if it wanted to. However, remaining quiet and not launching weapons means it can remain where it is and monitor the results of the attack while looking for other enemy threats.

Network Centric Warfare: The Payoff

For navies, the real pay-off in network-centric operations is foreshortening conflict by causing the adversary to concede long before his means to challenge have been exhausted, or long before additional friendly forces could be expected to reach in the crisis area. This efficacy revolves around the proficiency of network-centric forces to carry out precise effects-based operations, that is, result-oriented, activity focused on rival behaviour. The purpose of these campaigns is

psychological rather than physical. Therefore, they are concentrated on the enemy's decision-making procedure and aptitude to take decisive action in some coherent manner—particularly getting inside the enemy's OODA loop and prompting exploiting chaos. The know-how, precision, speed, and swiftness brought by network-centric operations constitute the price of admission into this realm.

(The author is a subject matter expert on competitive intelligence and market research in the aerospace and defence industry. Views expressed are personal.)

<https://www.financialexpress.com/defence/network-centric-warfare-cooperative-engagement-capability-of-navies/2157387/>

ThePrint

Fri, 25 Dec 2020

India to beef up security at Pangong Tso, govt fast-tracks procurement of patrol vessels

The 135-km long Pangong Tso, a landlocked lake that is partly in the Ladakh region and partly in Tibet, has seen tensions between India and China since May

By Snehesh Alex Philip

New Delhi: With summers expected to heighten tensions in eastern Ladakh, the government has fast-tracked the construction of 12 indigenous fast patrol vessels with specialised capabilities to counter Chinese boats in the Pangong Tso.

Sources in the defence and security establishment told ThePrint that the Goa Shipyard will be asked to prioritise the construction of the new vessels for Pangong Tso, which is frozen during winter.

“The timeline will be part of the final contract to be signed. These are extraordinary times and hence the project will be fast-tracked,” a source said.

Sources said that normally a shipyard would take about a year to construct the vessels but the Goa Shipyard, which won the contract this week, will be asked to expedite the process so that the vessels could be deployed sooner than expected.

The 135-km long Pangong Tso, a landlocked lake that is partly in the Ladakh region and partly in Tibet, has seen tensions between India and China since May.

The lake's northern bank juts forward like a palm, and the various protrusions are identified as “fingers” to demarcate territory. India asserts that the Line of Actual Control is at Finger 8, but China claims areas up to Finger 2 even though patrol by vehicles on land are only until Finger 4.

It is in the waters of the lake, two-thirds of which is controlled by China, with just about 45 km on the Indian side, that the Chinese carry out aggressive manoeuvres.

More powerful and bigger than current vessels

The sources said that the new Army vessels are bigger and more powerful than the ones being used by the troops currently.

Also, unlike earlier ones, the new vessels will have steel hulls, which will come handy to counter the alleged Chinese tactics of ramming their vessels onto Indian boats.

The ramming often ends up damaging the Indian boats. Moreover, the Chinese have bigger vessels, which carry double of what the current Indian vessels allow.



File photo | Defence Minister Rajnath Singh addresses troops at the Pangong Tso in Ladakh, 17 July | Photo: ANI

Sources said that a specialised team from the Navy had gone to the Pangong Tso and studied the terrain and challenges.

The final technical requirements for the boats was firmed up by the Army, taking into consideration the inputs provided by the Navy.

<https://theprint.in/defence/india-to-beef-up-security-at-pangong-tso-govt-fast-tracks-procurement-of-patrol-vessels/573182/>



Fri, 25 Dec 2020

Year-ender 2020 | Apache, Romeo, T90s and more: 5 major defence deals inked by India in 2020

Year-ender 2020: As the year comes to an end, here is a look at top five defence deals signed by the country in 2020

New Delhi: The year 2020 was an eventful and important year for the Indian Armed Forces as the country signed several significant defence deals with the United States of America (USA) and Russia to boost its defence sector. Apart from signing major defence deals, the government also introduced an import embargo on 101 items beyond given timeline to "boost indigenisation of defence production". The Centre has repeatedly stressed that it aims to increase the defence manufacturing in India to boost this crucial sector.

With 2020 coming to an end, here are some major defence deals inked by India this year:

MH-60 Romeo and Apache Helicopters:

US President Donald Trump visited India this year in February for the 'Namaste Trump' event. During his visit, India and the US signed a whopping USD 3 billion deal to purchase 24 MH-60R Romeo helicopters and six AH-64E Apache attack helicopters for the Armed Forces.

While the Apache helicopters were purchased for the Army, the Romeo helicopters were bought for the Navy. The Romeos will replace the British-made Sea King choppers in India's fleet while the Apaches will replace the old Russian Mi-35s. The deal is expected to boost the Armed Forces and make them ready for future conflicts.



(file picture)

India, Israel sign Rs 880 crore deal

This year, the Centre also signed a major Rs 800 crore defence deal with Israel. The deal signed between the countries was to purchase light machine guns (LMGs) and automatic weapons for soldiers of the Indian Army deployed at the Line of Control (LoC).

Under this deal, India will purchase Negev NG-7 7.62×51mm LMGs. The Negev NG-7 7.62×51mm LMGs, which weights 7.95 kg, can fire 600 rounds in the semi-automatic mode and 750 in the fully automatic mode and has a barrel length of 508 mm.

India, US sign armed drones deal

Ending the long wait, India signed a major deal with the US this year to acquire 30 armed drones. The armed drones will be equally distributed between the three services. Under this USD 3 billion deal, India will get 30 predator Guardian drones that are manufactured by General Atomics.

The drones are expected to help the Armed Forces expand their surveillance and reconnaissance missions along the borders as they can stay in the air for nearly 27 hours and can carry deadly weapons.

India-Russia defence deal

Amid escalating tensions with China, Defence Minister Rajnath Singh went Moscow this year and signed a major defence deal with the Russian government to procure arms, ammunition, tanks and submarines. During his visit, the defence minister also signed a contract to extend the building license of T90 tanks until 2028. The T90 main battle tank is Indian Army primary tank and it currently operates around 1,025 of them.

Apart from the T90s, India also signed a USD 16 billion deal with Russia to procure assault rifles and Kamov helicopters. To boost air defence, India signed an air-to-air missile deal with Russia worth Rs 1,500 crore to procure R-27 air-to-air missiles for Air Force's Su-30 MKI fighter jets.

Air Force One deal with the US

During Donald Trump's visit to India in February this year, India also signed a USD 190 million deal with the US for two self-protection suites (SPS). The jet, which arrived in India this year, has been named as Air India One and will be used by President, Vice President and the Prime Minister. It is equipped with an advanced and secured communication system and includes a big suit and medical centre.

<https://english.jagran.com/india/yearender-2020-apache-romeo-t90s-and-more-5-major-defence-deals-inked-by-india-in2020-10021515>

TIMESNOWNEWS.COM

Fri, 25 Dec 2020

Does Indian Navy need a third aircraft carrier? The debate, explained

*The debate around a third aircraft essentially arises from
the monumental cost outlay required to build one*

Key Highlights

- ***The third aircraft carrier, INS Vishal, still to be approved, may cost up to \$8 billion and is likely to take 14 years to build***
- ***Some, including officers from the Navy itself, have contended that the naval defence budget may be better spent in modernising India's submarine fleet***
- ***In recent years, the Indian Navy has also been the victim of falling budgets***

A third aircraft carrier is an “operational necessity” said Navy Chief Admiral Karmabir Singh reviving the discussion within India's defence establishment over whether the in-operation INS Vikramaditya and the INS Vikrant (currently undergoing sea trials) needs a partner to expand the Navy's force projection in the Indian Ocean. The Navy chief's words are a reiteration of a similar call he made earlier this month on Navy Day when he said, “air power at sea is absolutely required.”

However, his pitch appears at odds with India's Chief of Defence Staff General Bipin Rawat's who chimed into the debate on December 15, suggesting that India's priorities may lie elsewhere, drawing attention to the need for India to “utilise its large number of island territories for strengthening security along the sea lanes of communication.”

The debate around a third aircraft essentially arises from the monumental cost outlay required to build one. India acquired the INS Vikramaditya – a modified version of Russian Navy Admiral Gorshkov -16 years ago at an expense of \$2.35 billion following negotiations that stretched over a decade. The original price touted for the carrier was \$974 million. Moreover, along with the 45

MiG-29K aircraft and further modifications, the total price of the endeavour lies somewhere between \$6 billion and \$7 billion.

The INS Vikrant, already significantly behind schedule, was originally priced at \$420 million, but as per some estimates, coupled with the 36 aircraft that will serve as its fleet and cost overruns, the total outlay could rise as high as \$11 billion.

The third aircraft carrier, INS Vishal, still to be approved, may cost up to \$8 billion and is likely to take 14 years to build. If one was to include the cost of the aerial fleet (likely to be made up of F-18E or Rafale aircraft), the total cost could reach \$17 billion.

Given the staggering costs associated with the third aircraft carrier and the constantly evolving dynamic in maritime warfare and security, some, including officers from the Navy itself, have contended that the naval defence budget may be better spent in modernising India's submarine fleet. India's submarine numbers have fallen to 15, of which 13 were between 19 and 33 years old, with some close to retirement.

This represents a shortfall of nine from what the Navy has projected to have by 2030 as per its Maritime Capability Perspective Plan. Moreover, other surface combatants like frigates, corvettes, mine-sweepers, corvettes, unmanned aerial vehicles and naval utility helicopters have also been deemed in short supply.

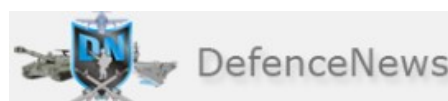
In recent years, the Indian Navy has also been the victim of falling budgets. For the 2020-21 fiscal year, Rs 26,688 crore was sanctioned for new weaponry, equipment and platforms – Rs 18,580 crore less than what the Navy had requested.

In 2019-20, The Navy budget stood at Rs 23,156 crores which was less than the Rs 25,461 crore the Navy owed to vendors for previous equipment and services. In light of the financial crunch, Navy Chief Admiral Singh has noted that the service has had to revise its objective of having 200 warships by 2027 to 175.

<https://www.timesnownews.com/india/article/does-indian-navy-need-a-third-aircraft-carrier-the-debate-explained/698848>



India's INS Vikramaditya aircraft carrier. | Photo Credit: PTI



Sun, 27 Dec 2020

Project 75I Submarines: How India can make the most out of the strategic partnership model in defence

The Project-75I conventional submarines' (SSKs) procurement is in the news again. The government and the Indian Navy are focussed on getting this project running as soon as possible to counter the increasing naval threat that the People's Liberation Army (PLA) Navy will pose in the coming decade and beyond.

In many ways, the P-75I line of submarines are very different from the P-75 Kalvari (Scorpene) class submarines that are coming out of the Mazagon Docks now.

Many, including myself, have suggested in the past of continuing the Scorpene line beyond the current six submarines. But it is important to note that more Scorpenes simply can't make up for the well-defined role that these long leg SSKs of P-75I project would take on in the Indo-Pacific.

Both with respect to the Shishumar (HDW Type 209) class built in the late 80s and the Kalvari class, India had failed to take advantage in terms of a substantial and serious transfer of technology (TOT) not just in terms of “know-how” but also “know-why”.

Part of the reason is because of Mazagon Dock being purely a shipbuilder and focussing on manufacturing without building a credible R&D arm that can absorb know-why and in future, design and develop surface and submarine ships independently with the Directorate of Naval Design (DND), Indian Navy.

It is important that such a grave mistake is not made again when it comes to P-75I.

From the Russians to the French, all serious bidders for the P-75I project have stated clearly that none of the existing available submarine designs can fully satisfy the Indian Navy’s requirements.

A substantial amount of design and development will be involved to come up with a sub that has both Air Independent Propulsion (AIP) and Vertical launching system (VLS) to launch BrahMos as stipulated by the Navy.

The MoD deciding to go for the Strategic Partnership (SP) model makes a lot of sense in more ways than one.

Currently, the consensus understanding of this SP model is that a foreign Original Equipment Manufacturer (OEM) with proven capabilities and a ready design closest to the Navy’s pending Request for Proposal (RFP) will be offered to be modified to completely satisfy the requirements.

But this stops well short of what we could achieve with this project. The SP model, in spirit, envisages the fostering of an Indian Strategic Partner (ISP) who would in future be fully capable of developing and delivering defence platforms in the segment for the Indian armed forces without the hand holding of a foreign OEM.

If so, wouldn’t it make sense for the new submarine design process and IP to be co-developed and owned with the ISP and DND in consultation with the winning OEM?

This was how HAL worked with Germany’s Messerschmitt-Bölkow-Blohm (MBB) to develop the ALH Dhruv back in the day and has led to a very successful Rotary Wing Research and Development Center (RWRDC) of HAL now churning out helicopters to the services for all needs in the light category.

The Indian Navy has prudently put forward the idea of a paid-up licensing mechanism, where the Navy gets to build unlimited number of subs as and when required without having to shell out royalties for individual subs.

The Navy too seems to be keen and specific about the kind of ToT including Design, Equipment, Manufacturing and Maintenance. This is good thinking, considering that the demand for these SSKs are going to be far bigger than the initial 6 submarines planned.

Considering this, it is better that the Indian Navy goes for a model similar to what Naval Group has signed up with Australia with regards to the Attack class submarines.

The strategic partnership signed between France’s Naval Group and Australia not only involves transfer of the Naval Group’s “know-how” but also “know-why” of the ShortFin Barracuda class submarines that was selected.

This ensures that any future upgrades to the subs too will happen in cooperation with the Australian defence industry in both development and manufacturing.

India must take a cue from this and go beyond in the terms for negotiating the P-75I deal. As stipulated under the SP model, the ISP is required to develop in-house R&D capabilities for future requirements in that platform segment.

The current SP model requires for the R&D capabilities of the ISP to be progressively developed by hand holding by the foreign OEM. India should go beyond and tie the ISP and DND



engineers to be embedded with the OEM's design team from start while modifying their winning design and share development load and IP generated from it.

This would give a leg up to the Indian partner in terms of "know-why", apart from the well defined "know-how" that the partner will anyway get.

Both MDL and L&T are known to have a good system of system integration capabilities. This is probably the first time that MoD has properly focussed on the R&D aspect of platforms rather than assembly and manufacturing alone.

We have seen how successive licence manufacturing of fighter jets over decades by HAL hasn't translated into a robust R&D capability within HAL. This has both to do with the way the deals were negotiated and HAL acting as a simple manufacturing rent seeker.

This cycle must be broken.

This would require that the Indian Navy pays and owns the full IP for that particular design and sub systems, even if not exclusively. The IP ownership will ensure that we can work on the future modifications and upgrades ourselves with or without the OEM every time and will also pave the way for future sub development indigenously.

This will also provide us insurance from incidents like the costly Scorpene leaks that happened, as we could work on mitigating the effects of such sensitive info leaks ourselves.

This will be a hard bargain to drive with the OEM, but is possible in a post Covid world.

But this also requires a national consensus on the path taken. A huge upfront cost is expected for such a project if we go down the lane of paid up licensing for R&D and IP ownership for building unlimited number of submarines in future without royalties.

The Opposition will have to stop crying 'SCAM' at the drop of a hat.

While auditing and accounting, the Comptroller and Auditor General of India (CAG) also must take into account the nature of such procurement and downstream intangible benefits like future expertise in domestic design, modification, repair and upgrade of submarines and the strategic and economic benefits that has to be had from such an effort.

On this aspect, there are lessons to be learnt with the way the Rafale Medium Multi-Role Combat Aircraft competition played out. Different ways of pricing and changes, as well as terms of the deal in such a complex negotiation could easily be misrepresented by vested interests.

The government is trying to put its best step forward with the strategic partnership model and being ambitious in actions as well as keeping aside narrow political objectives for national interests is absolutely necessary.

<https://www.defencenews.in/article/Project-75I-Submarines-How-India-Can-Make-The-Most-Out-Of-The-Strategic-Partnership-Model-In-Defence--1033231>

Southern Naval Command conducts sailing expedition from Kochi to Lakshadweep's Androth Island

Synopsis

The Indian Naval Sailing Vessel (INSV) Bulbul was flagged off from Naval Base, Kochi on December 23 by Rear Admiral Antony George. The expedition will culminate on 28 Dec 20 at Kochi, after covering a distance of 400 nautical miles.

Kochi: A sailing expedition from Kochi to Androth Island in Lakshadweep and Minicoy group of islands and back is being undertaken by Offshore Sailing Club, Kochi under the aegis of Southern Naval Command.

The Indian Naval Sailing Vessel (INSV) Bulbul was flagged off from Naval Base, Kochi on December 23 by Rear Admiral Antony George. The expedition will culminate on 28 Dec 20 at Kochi, after covering a distance of 400 nautical miles.

Team Bulbul comprises a mixed crew of six officers skippered by Captain Atool Sinha, an Asian Games medalist with over 22,000 nautical miles of ocean sailing experience.

The five-member crew includes two women officers, the senior-most being Rear Admiral Arti Sarin, Command Medical Officer of SNC. The officer has volunteered to participate in the expedition to encourage women officers to participate in adventure sports and ocean sailing.

Lieutenant Commander Tulika Kotnala, the second woman crew is an Air Traffic Control officer who is an ocean sailing expert. She recently participated in the Bay of Bengal Sailing Expedition covering over 4500 nm.

INSV Bulbul is a 40 foot, LC-40 design racing- cruiser capable of independent ocean voyages across the world. The vessel has been built in India under the 'Make in India' project by M/s Ultra Marine Yatch Pvt. Ltd, Puducherry.

The aim of the sailing expedition is to inculcate a spirit of adventure, hone nautical skills and foster ocean sailing amongst young Naval personnel.

<https://economictimes.indiatimes.com/news/defence/southern-naval-command-conducts-sailing-expedition-from-kochi-to-lakshadweeps-androth-island/articleshow/79940994.cms>



INSV Bulbul, which is a 40 foot, LC-40 design racing- cruiser

Spooked By Ladakh Standoff, India Signs \$200m Deal for Israeli SPICE Bombs

In its official announcement, Israeli company Rafael described customer as 'an Asian country', India remains mum

By Rahul Bedi

Chandigarh: India has signed a secretive \$200 million deal for assorted Israeli materiel, similar to innumerable defence-related procurements it has previously sourced from Tel Aviv following the establishment of formal bilateral diplomatic relations between the two countries in early 1992.

In an anodyne press note, Israel's Rafael Advanced Defense Systems declared on December 23 that it had concluded a contract with 'an Asian country' to provide it bomb guidance kits, anti-tank guided missiles (ATGMs) and software-enabled radios, but declined to identify its customer or further elaborate.

However, *Jane's Defence Weekly* in the UK, quoting official sources, has reported that Rafael's contract involved providing Smart, Precise, Impact, Cost-Effective (SPICE)-2000 bomb guidance kits to the Indian Air Force (IAF) and 300-odd Spike-Long Range (LR) ATGMs and BNET broadband Internet Protocol (IP) tactical radios to the Indian Army (IA).

Indian military officials had earlier claimed that IAF Mirage-2000Hs employed SPICE kits in their raid on an alleged Islamist group training camp at Balakot in Pakistan's northwestern Pakhtunkhwa province in February 2019 by converting 2000 lb Mk 84 and BLU-109 gravity bombs into standoff autonomous weapon systems to a 60km strike range.

According to *Jane's*, the latest SPICE and other procurements were executed under the Indian Ministry of Defence's (MoD's) specially instituted 'emergency' equipment acquisition provisions to meet urgent operational requirements impelled by the enduring military standoff with China, along the disputed Line of Actual Control (LAC) in eastern Ladakh. The delivery of all three items would be completed by early 2021, *Jane's* added.

Other than the radios, the bomb kits and the ATGMs were repeat orders from Rafael, executed equally surreptitiously in 2019. At the time India had acquired 260 Spike ATGMs and 12 launchers for the Army, alongside 100 Spice kits for fitment onto the IAF's upgraded Mirage-2000H fleet. These buys were also executed under similar 'emergency' procedures, aimed at bypassing cumbersome MoD procurement measures to summarily make good continuing critical equipment shortfalls in all three Indian services.

These pressing deficits include force multipliers like unmanned aerial vehicles (UAVs), assorted missile and air defence systems, varied advanced sensors and radars, avionics technology and precision guided munitions (PGMs), amongst other such niche equipment, all of which India has increasingly sourced from Israel in recent years.

Consequently, over the past three decades India has steadily emerged as Israel's largest military customer, having sold it diverse equipment, or entered into collaboration to indigenously manufacture it, worth an estimated at \$6-7 billion between 2009-18. This makes Israel the country's third largest armaments provider after Russia and the US. These weapon sales, however, have increased significantly after Prime Minister Narendra Modi's Bharatiya Janata Party (BJP)



An Israeli Rafael Spice guided bomb under the wing of an Israeli Air Force F-16I Soufa Fighter. Picture taken at Kecskeméti Repülónap 2010. Photo: KGYST/Wikimedia Commons CC BY 3.0

government assumed office in 2014, with Tel Aviv signing military contracts with India worth \$715 million alone in 2017, according to official sources. Modi was also the first Indian prime minister to visit Israel in July 2017.

But despite this rapidly proliferating strategic and military association that has emerged as Israel's most significant in Asia, it is one that remains deeply shrouded in secrecy, operating in an undefined smoke-and-mirrors environment. Israel instinctively goes to great lengths to play down this strategic freemasonry with India, while the latter responds similarly, for fear of straining ties with Arab states and Iran – upon whom Delhi depends for nearly 70% of its hydrocarbon imports.

And though the diplomatic, political and security environment has changed recently in West Asia, with states like the United Arab Emirates (UAE) establishing formal ties with Israel, and even Saudi Arabia making overtures to Tel Aviv, Delhi continues to pursue a cloak-and-dagger approach to all bilateral military, materiel procurement and intelligence issues with Israel. Reciprocal visits to Delhi and Tel Aviv by defence, security and intelligence officials, Defence Research and Development Organisation (DRDO) technicians and scientists and armament company executives too remain strictly under wraps as does all bilateral military commerce.

Before 1992, Israel reportedly assisted India stealthily, providing it limited military aid and weaponry during its brief, albeit disastrous war with China in 1962 with an Israeli general turned diplomat, David Shaltiel, visiting Delhi surreptitiously in 1963. Israel provided similar, albeit limited assistance during India's subsequent conflicts with Pakistan in 1965 and 1971, largely through ammunition supplies. Clandestine ties continued thereafter with senior Indian security officials travelling to Israel via Cyprus – as no direct air links between the two countries existed to ensure that their passports would have no record of their visit.

However, after Prime Minister Indira Gandhi's assassination in 1984, India is believed to have sought, and secured Israeli help in upgrading its VIP protection by training and arming its newly raised Special Protection Group and National Security Guard personnel. These commandos too reportedly utilised the Cyprus-route. Israeli specialists also seemingly devised Prime Minister Rajiv Gandhi's security architecture that broadly continues with minor alterations.

But the disintegration in the early 1990s of the Soviet Union, India's longstanding ally and principal weapons supplier was a turning point in Delhi's military ties with Israel. Crucial supplies of arms and spares for military equipment either ceased or were interminably delayed, as overnight numerous suppliers found themselves located in independent neighbouring republics that were inimical to Moscow. Consequently, India was compelled to consider alternate materiel sources at a critical period that coincided with the eruption of the Kashmiri insurgency in late 1989.

The establishment of official diplomatic ties with Israel in January 1992 under Prime Minister Narasimha Rao enabled both sides to fast track their strategic and defence relationship based on mutual security and commercial interests. Israel, for its part, rightly perceived a lucrative commercial opportunity, while India looked upon Tel Aviv as a reliable materiel provider, especially of varied ammunition and missile systems which India's military badly lacked and still does.

Nonetheless, it still took another six-odd years and the BJP's ascent to power under Prime Minister Atal Bihari Vajpayee for Israel's defence machinery to definitively establish itself in India, second only to the Russians and thereafter to the US and France. Being a 'closet' nuclear weapon state, Israel's decision not to condemn India's May 1998 Pokhran nuclear tests also helped considerably, further endearing Tel Aviv to Delhi.

However, it was India's 11-week long Kargil war with Pakistan in 1999 that catapulted Israel's defence industry to centre stage domestically. As the seriousness of the deadly conflict unfolded, commercially savvy Israel dug deep into its military reserves to supply India high-end hardware especially badly-needed 155 mm howitzer rounds for its Bofors guns, laser-guided munitions and other ordnance that contributed largely to the Pakistan Army vacating the mountainous regions siege and ending hostilities.

Soon after, Israel began claiming its dues in materiel sales and continues to do so, prospering greatly in the process.

Israeli expertise in upgrading Soviet-era fighters like the MiG-21, that formed the backbone of the IAFs combat fleet, and manufacturing a range of anti-tactical ballistic missile systems, electronic warfare (EW) and communication equipment, radars and sensors excited India, resulted in multiple contracts.

Israel has also provided avionics, radars, and missiles for a range of top-end IAF fighters like Russian Sukhoi Su-30MKI, French Mirage-2000Hs, Anglo-French SEPECAT Jaguars and even the indigenously developed Tejas Light Combat aircraft, amongst other platforms like helicopters and naval systems too exhaustive to tabulate.

Alongside, the Indian military exhibited interest in the Israel Defense Forces' successful warfare strategies and concepts, particularly with regard to countering armed insurgencies. Intelligence sharing on terrorism issues also proliferated as did Israeli military training assistance to India's Special Forces. The belief that Israel and India shared similar, but un-publicised security concerns over threats posed not only by a nuclear-weapon capable and increasingly radicalised Pakistan, further cemented bilateral security and military ties.

Israel is also believed to have provided India with counter-terrorism assistance to help it deal with the Kashmiri insurgency in the early 2000s. It made available over a dozen technical teams to assist India in augmenting its border intelligence gathering capabilities, in addition to anti-terrorism counter measures like upgraded border fencing, ground sensors and handheld thermal imagers for use by army and paramilitary border guards.

Senior military officers, since retired, who had interacted with their Israeli counterparts whilst in service said that Tel Aviv's argument was that Delhi, like Israel, was surrounded by hostile neighbours and hence needed desperately to strengthen and bolster its security apparatus via enhanced cooperation with Israel.

Furthermore, these officers said Israel marketed itself as a country offering a wide range of battle-tested, new and upgraded materiel, in many cases of US origin, the technology for which could easily be transferred to India as it was not subject to international arms control regimes. Over years, this reasoning had found an echo in Delhi's political, strategic and military circles and defence equipment contracts had progressively proliferated like the latest one with Rafael.

"Israel has always been a 'no-questions-asked supplier'; it transfers even its most advanced technology without placing limits to its use," said Harsh Pant and Ambuj Sahu in a detailed analysis, 'Israel's Arms Sales to India: Bedrock of a Strategic Partnership', for the Observer Research Foundation in September 2019.

Some of the Israeli technologies utilise US components because of which the US has veto powers over the sale of those technologies, the two authors point out. But with improving strategic understanding between Delhi and Washington more such technologies are likely to be transferable in the future they declared. Hence, these factors make Israel a potential 'all-weather' defence partner for India, they added.

In short the India-Israel symbiotic defence relationship grows, but between the lines.

<https://thewire.in/security/india-200-million-dollar-deal-israel-spice-bombs>

India has forced a stalemate in Ladakh. That's a defeat for China

China will seek to clinch a disengagement agreement to achieve its political aim. India shouldn't be in a hurry to agree to disengage or deescalate

By Lt Gen H S Panag (Retd)

On 18 December India and China resumed diplomatic talks to find a solution for the months-long crisis in eastern Ladakh. The Ministry of External Affairs said, “Both sides agreed to maintain close consultations at the diplomatic and military level. They agreed that the next (9th) round of Senior Commanders meeting should be held at an early date so that both sides can work towards early and complete disengagement of troops along the LAC in accordance with the existing bilateral agreements and protocols, and fully restore peace and tranquility.”

Recall how the Indian media on 11 November, five days after the eighth round of Senior Commanders' meeting, had reported that an 'agreement' for disengagement along the Kailash Range and north of Pangong Tso was on the cards. I highlighted the pitfalls of such an agreement in my column dated 12 November — “If India loses grip on Kailash Range, PLA will make sure we never get it back.”

The premature celebrations by our media to the extent of claiming victory had put the “agreement” in cold storage. It is my assessment that the next round of military talks will revive and refine this agreement before it gets the seal of both governments. Such an agreement enables China to achieve its political aim at India's cost. On the contrary, a stalemate is a defeat for China. I analyse why.

China's strategic aims

Towards the end of April and early May, the People's Liberation Army (PLA) carried out a surprise operational level manoeuvre by intruding at multiple points in Ladakh, deploying two mechanised divisions to secure its 1959 Claim Line. It sullied India's international, regional and military reputation, prevented any further development of border infrastructure and by virtue of its deployment, made large tracts of our territory militarily untenable to defend in the event of an escalation to limited war.

The question that has intrigued strategic analysts the most is, why did China, in the middle of the Covid pandemic, alter the status quo along the Line of Actual Control (LAC) and break five border agreements and 33 years of peace in vogue since the 1986-87 Sumdorong Chu crisis that lasted one year? On 8 December, Foreign Minister S. Jaishankar, without giving India's assessment, said that China has given five different explanations for amassing troops on the borders.

Overtly, the confrontation is focussed on the 1959 Claim Line and “areas of differing perceptions” — hardly a reason to break long-standing peace. More so, after the two “one to one” summits between PM Modi and Chinese President Xi Jinping, which were hailed as a giant leap forward in India-China relations. Indeed, territory is the core of the Westphalian state system, but China had secured all the strategic territory that it needed to in the 1950s and had further safeguarded this asset by securing more in the 1962 war.

Since then, an unsettled border is merely a tool for China to assert its hegemony, embarrass/humiliate India and undermine its regional, international, and military reputation. The



Indian Army soldiers atop a T-90 tank in Ladakh | Representational image | ANI

degree to which it precipitates the situation is dependent on the perceived military differential and India's response. In 1962, it led to a war, while in 1967 at Nathu La and 1986-87 at Sumdorong Chu, it ended in a stalemate.

China wants India to be a cooperative junior partner and not a political, economic and military competitor in the international/regional arena. So long as it perceives this situation, peace prevails on the borders. In terms of territory, China wants the 1959 Claim Line to prevail, which militarily ensures the security of the territory usurped by it. Any threat to this line, in the form of the development of border infrastructure, is considered crossing the red line.

That perception gradually changed from 2008 to 2020 for multiple reasons :

- India's alliance with the US.
- India challenging China's position in the South China Sea (SCS) and Indo-
- India's opposition to the Belt and Road Initiative (BRI), in general, and China-Pakistan Economic Corridor (CPEC), in particular, since it passes through Indian territory occupied by Pakistan.
- India's aggressive strategy in Doklam.
- Change in status of Jammu and Kashmir, and an aggressive statement by Union Home Minister Amit Shah that Aksai Chin and PoK/Gilgit-Baltistan are part of J&K/Ladakh.
- PM Modi's status as an international leader is seen as a challenge to President Xi Jinping.
- But the immediate trigger was India's rapidly developing border infrastructure in Depsang Plains, Galwan Valley, Gogra-Hot Springs-Kugrang River, north of Pangong Tso and Chumar, which poses a threat to Aksai Chin and other territories usurped by China.

And so, China set a strategic aim for itself to reassert its hegemony by precipitating a situation on the LAC to embarrass India and undermine India's international and regional status as an emerging power, cut Modi down to size, and ensure the status of the borders on its terms.

When it came to execution, China's strategic military aims were to:

- Neutralise the developing threat to Aksai Chin and other territories due to India's development of border infrastructure.
- Permanently secure territory up to 1959 Claim Line in areas left out in 1962 or not occupied later.
- Put the onus on India to escalate and in case it obliges, capture, through a limited war, Depsang Plains-DBO, area up to Galwan-Shyok river junction, all territory up to north bank of Pangong Tso, Kailash Range and Indus Valley up to the Ladakh Range.

Did China achieve its aim?

The PLA achieved strategic surprise and pre-emptively secured all its military objectives without firing a shot. India was unable to pre-empt the PLA and relied on denial, obfuscation and appeasement to wish the problem away or at least hope that the PLA would agree to status quo ante as in the past. At this juncture, China seemed to have achieved its political and military aims.

The shameful incident on the intervening night of 15-16 June, in which 20 Indian soldiers were killed in action, rudely woke India up to face the strategic reality. The Indian armed forces mobilised with nearly twice the force level that the PLA had used to prevent further loss of territory, and also positioned reserves for offensive action. The Modi government wisely decided not to escalate the situation, which would have given China *casus belli* to exploit the military differential to make strategic gains due to the positional advantage the PLA had secured through pre-emption. The government took a firm stand on restoration of status quo ante during diplomatic and military engagements.

The Indian Army's counter manoeuvre to seize the Kailash Range on the night of 29-30 August to a great extent neutralised the advantages gained by the PLA. At this juncture, the situation is that of a stalemate.

Stalemate is defeat for China

There should be no doubt that China has not been able to achieve the end state it desired — make India accept the 1959 Claim Line and stop further development of infrastructure. India has partially restored its international and military reputation. The onus is now on China to escalate the matter to a limited war and inflict a sharp defeat if it wants to impose its will in full. As a superior power, China does not want to be seen as an initiator of war and neither does India.

Moreover, the fear of a stalemate or a setback inhibits China. Unfavourable military differential and fear of a setback, the probability of which is high, prevents India from having any ambitious military aims beyond the current stalemate.

We should not be in a hurry to agree to disengage or deescalate. Any agreement, with or without buffer zones where no patrolling/deployment/infrastructure development will be carried out, should be all-encompassing, covering the entire LAC from Karakoram to Chumar and must include its demarcation.

The Sumdorong Chu standoff lasted over a year and the stalemate led to the 1993 border agreement. We have a similar opportunity now and we must persevere. With us sitting on the Kailash Range, even with limited loss of territory in the Depsang Plains and north of Pangong Tso, we have forced a stalemate on China. And a stalemate is a defeat for a superior power!

(Lt Gen H S Panag PVSM, AVSM (R) served in the Indian Army for 40 years. He was GOC in C Northern Command and Central Command. Post retirement, he was Member of Armed Forces Tribunal. Views are personal.)

<https://theprint.in/opinion/india-has-forced-a-stalemate-in-ladakh-thats-a-defeat-for-china/572798/>



Mon, 28 Dec 2020

India-Australia boost defence cooperation amid frosty relation with China

India and Australia unveiled a "shared vision for maritime cooperation in the Indo-Pacific", a region which has been witnessing growing Chinese military assertiveness

Melbourne: India-Australia relations touched a new level with both the countries elevating their ties to a "comprehensive strategic partnership", signing key agreements including a landmark pact for reciprocal access to military bases against the backdrop of their frosty relations with China.

Australian Prime Minister Scott Morrison, who had to cancel his trip to India in January, 2020 due to the devastating bushfire season in his country, complemented his Indian counterpart Narendra Modi for playing an "important part" in "stabilising" the strategic Indo-Pacific region during the difficult times when they held their first virtual bilateral summit in June.

India and Australia, against the backdrop of their frosty relations with China, unveiled a "shared vision for maritime cooperation in the Indo-Pacific", a region which has been witnessing growing Chinese military assertiveness triggering concerns among major players.

There has been strain in ties between Australia and China after Canberra pitched for an international probe into the origin of the coronavirus pandemic which is believed to have started in China's Wuhan city in December 2019.



The agreement will allow militaries both countries to use each other's bases.

India and Australia, during the virtual bilateral summit between PM Modi and Scott Morrison in June, decided to upgrade their 2+2 dialogue featuring their foreign and defence secretaries to the

ministerial level, sign the Mutual Logistics Support Agreement (MLSA) and another pact on cooperation in the field of mining and rare earth minerals.

The MLSA will allow militaries of the two countries to use each other's bases for repair and replenishment of supplies besides facilitating scaling up of overall defence cooperation. India has already signed similar agreements with the US, France and Singapore.

India has been relying heavily on China for critical minerals and the agreement will pave way to source them from Australia, which has one of the largest reserves of strategic minerals.

The two countries, which elevated their ties to a "comprehensive strategic partnership" also vowed to deepen navy-to-navy cooperation, noting that they have a shared interest in promoting maritime security and safety in the Indo-Pacific region.

They also called for an early adoption of the Comprehensive Convention on International Terrorism (CCIT). India proposed a draft document on the CCIT at the UN in 1986 but it has not been implemented as there is no unanimity on the definition of terrorism among the member states.

In another landmark in ties, India in October announced that Australia will join the Malabar exercise which effectively means that all the four member countries of the 'Quad' or Quadrilateral coalition will be participating in the mega drill.

The US and Japan are the other countries that participate in the annual exercise.

India's decision to heed to Australia's request to be part of the mega naval drill had come in the midst of growing strain in ties with China over the border row in eastern Ladakh.

China has been suspicious about the purpose of the Malabar exercise as it feels that the annual war game is an effort to contain its influence in the Indo-Pacific region.

The Malabar exercise started in 1992 as a bilateral drill between the Indian Navy and the US Navy in the Indian Ocean. Japan became a permanent participant in the exercise in 2015.

China claims sovereignty over all of the South China Sea. But Vietnam, Malaysia, the Philippines, Brunei and Taiwan have counter claims. In the East China Sea, Beijing has territorial disputes with Japan.

In November, in his video address to the Bengaluru Tech Summit, the Australian Prime Minister said his country plans to take bilateral ties with India to new heights by working together in frontier technologies.

According to Australia-India Business Council Victoria President Ravneet Pahwa, despite the coronavirus pandemic, Australia-India relations in 2020 continued to see an upward swing, even though a vast business potential still awaits them.

India is among Australia's top-tier trading partners with two-way trade worth 30 billion Australian dollars (\$22.8 billion) last year as compared to the two-way trade with China which sits at over 200 billion dollars.

Both the countries have failed to conclude a free trade agreement, first mooted almost a decade ago in 2011.

The Indian expatriates, who are around 700,000, emerged as one of the largest communities making a positive impact in the society with their contributions and services during the trying times.

Over 38,000 Indians became Australian citizens in 2019-2020, a 60 per cent increase, the largest number if expatriates to acquire the citizenship.

Indians have also earned a distinction of being Australia's fastest growing inbound tourists.

Nishant Kashikar, Country Manager - India & Gulf, Tourism Australia said, "Due to the mutual affinity for cricket shared by both India and Australia, as demonstrated during each tour undertaken by the Indian cricket team, we realised the tremendous opportunity that rested within the sporting event and the India market."

<https://www.ndtv.com/india-news/india-australia-boost-defence-cooperation-amid-frosty-relation-with-china-2344193>

Indian Navy ends jam-packed year with Vietnamese Navy in South China Sea

Indian Navy undertook a "passage exercise" with the Vietnamese Navy in the South China Sea from December 26 to 27 as part of efforts to boost maritime cooperation between the two countries

By Abhishek Bhalla

New Delhi: The navies of India and Vietnam carried out a passage exercise or PASSEX in the South China Sea on December 26 and 27 as Indian Navy Kiltan returned from Ho Chi Minh City delivering relief material to the country for its flood-affected areas.

Indian has been carrying out a series of exercises with friendly nations in the seas amid the increasing influence of the Chinese Navy in the Indian Ocean region.

PASSEX between Indian Navy and Vietnam People's Navy on December 26, 2020, is part of reinforcing maritime interoperability and jointness, the Indian Navy said.

Earlier this month, Indian and Russian navies carried out a two-day passage exercise (PASSEX) in the Eastern Indian Ocean Region (IOR) from December 4-5.

A similar exercise was carried out by the US Navy earlier and it is part of Indian Navy's outreach programme to work closely with friendly nations.

As part of Indian government's vision of SAGAR (Security And Growth for All in the Region), the Indian Navy has been proactively engaging with countries in the Indian Ocean region for coordinated patrols, cooperation in EEZ Surveillance, passage exercises and bilateral/multilateral exercises -- all towards enhancing regional maritime security

The 35th edition of the India-Indonesia Coordinated Patrol (IND-INDO CORPAT) between the Indian Navy and the Indonesian Navy was conducted from December 17-18, 2020. Indian Naval Ship (INS) Kulish, an indigenously built missile corvette along with P8I Maritime Patrol Aircraft (MPA) carried out a coordinated patrol with Indonesian Naval Ship KRI Cut Nyak Dien, a Kapitan Pattimura (Parchim I) class corvette and an MPA of the Indonesian Navy.



Indian has been carrying out a series of exercises with friendly nations in the seas amid the increasing influence of the Chinese Navy in the Indian Ocean region.

Recently, the four-nation Malabar Exercise was conducted in the Bay of Bengal and Arabian Sea where navies of the US, Japan, Australia and India participated. Australia's participation after 13 years was significant as the QUAD nations got together for war games in the seas.

Indian Navy participated in 13 bilateral and multilateral exercises, this year. As part of the Government of India's vision of 'Neighbourhood First', the Indian Navy undertook Joint EEZ surveillance with Maldives, Seychelles and Mauritius, as well as Coordinated Patrols (CORPATs) with Bangladesh, Thailand and Indonesia.

<https://www.indiatoday.in/india/story/indian-navy-ends-jam-packed-year-with-vietnamese-navy-in-south-china-sea-1753627-2020-12-27>

Myanmar Navy Commissions UMS Minye Theinkhathu, The Erstwhile INS Sindhuvir

Taking the maritime cooperation one step ahead with India, Myanmar formally commissioned Erstwhile INS Sindhuvir as UMS Minye Theinkhathu into its navy

By Shivani Sharma

Taking the maritime cooperation one step ahead with India, Myanmar formally commissioned Erstwhile INS Sindhuvir as UMS Minye Theinkhathu into its navy on Saturday. The Submarine was handed over by India to the country in October this year. UMS Minye Theinkhathu is the Kilo-class Submarine named after the ancient warrior of Myanmar. The Commissioning of the Submarine is a landmark in the relationship between India and Myanmar. Indian Envoy to Myanmar Saurabh Kumar also graced the occasion of maritime friendship between India and Myanmar taking a giant leap.

UMS Minye Theinkhathu has a displacement of 3000 tonnes, a maximum diving depth of 300 meters, a top speed of 20 knots, & is able to operate for 45 days. The Kilo Class Submarine presented to Myanmar by India is equipped with 40 km-range wire-guided UGST torpedoes and fitted with 3M-54Klub anti-ship cruise missiles. India had delivered the submarine to Myanmar Navy as part of growing defence cooperation between the two nations. While announcing the delivery of INS Sindhuvir to Myanmar Navy, the MEA has said that cooperation in the maritime domain is a part of India's diverse and enhanced engagement with Myanmar. I

The handling over of the Submarine is in accordance with India's vision of SAGAR – Security and Growth for All in the Region, and also in line with India's commitment to build capacities and self-reliance in all neighbouring countries.

A Kilo Class submarine has a displacement of 3,000 tonnes, a length of 74 metres and a beam of 10 metres. It is manned by a crew of 15 officers and 60 sailors and is equipped with an array of weapons and sensors which enables the submarine to participate in various fleet, tactical and theatre level exercises. Sindhuvir has been modernized by the Hindustan Shipyard Limited (HSL) in Vizag.



Both Navies have close cooperation and the Indian side has been training Myanmar Naval personnel. Last year, Indian and Myanmar naval undertook joint exercises IMNEX 2019 in the Bay of Bengal. Indian Navy is enhancing its power with several new projects and also contributing to the strengthening of diplomatic ties with friendly Navies of the world.

<https://www.republicworld.com/world-news/rest-of-the-world-news/myanmar-navy-commissions-ums-minye-theinkhathu-the-erstwhile-ins-sindhuvir.html>

Hints of Chinese Naval Ambitions in the 2020s

All military forces have a desired force requirement and a desired “critical mass” to aspire toward. What does the 14th five-year plan tell us about China’s?

By Rick Joe

This year has seen multiple major navies in the world establish their future long term procurement strategies, ranging from the U.S. Navy’s 500-ship plan for its fleet by the year 2045, to the U.K.’s plans for the Royal Navy post-2030, and the Indian Navy’s recent reinforcement for its aspirations for a third aircraft carrier. Indeed, ambitions for expansion appear to be in the cards worldwide for many major navies, both for the near future, and in the longer term beyond 2030 as well, despite the economic consequences of the COVID-19 pandemic.

Thus it is somewhat appropriate that in recent weeks rumors emerged surrounding some of the naval procurement goals set as part of China’s recently concluded Fifth Plenum in late October surrounding the 14th Five-Year Plan (to be abbreviated hereafter as 14-FYP), that produces goals and strategy for the entire nation across the next five years from 2021 to 2025. This article will review the details of those rumors (as well as omitted information), in context of some recent predictions written by myself on the subject of future PLA Navy (PLAN) procurement.



Credit: Chinese social media

An Impending Slowdown?

However, before reviewing the recent 14-FYP naval rumors, it is appropriate to address some recent research and articles revolving around the same topic of future PLAN procurement. One article published by the U.S. Naval War College’s China Maritime Studies Institute in November, thoroughly researched and produced by Capt. Chris Carlson (retired) of the U.S. Navy, examines what the trajectory of future PLAN procurement might look like from a perspective of operational, maintenance and overhaul costs in context of the overall Chinese economic, political, and industrial context going into the future. (This author also acknowledges and is flattered to have a past article referenced as an illustrative barometer in the paper. To address one of Carlson’s questions – 056 corvettes and older 051 and 052 family destroyers are included in that force makeup, but are included as “other ships to note” rather than the list of major battle force vessels that were chosen for being modern and blue water capable.)

Carlson rightly states that future force projection requires more than merely surveying shipyard capacity and drawing a straight line. Human labor demands, as well as future operational and maintenance demands, and accurate assessment of its costs could all serve as useful metrics for gauging production capacity. The projected growing costs of labor and the “slowing Chinese economy,” and cost of maintenance are hypothesized to suggest that the previously suggested future fleet of 2030 might be out of reach and unattainable. The article and its predictions have subsequently been referenced by some other defense journalists as well, suggesting an imminent slowdown in Chinese naval procurement going forwards.

However, it is difficult, if not impossible, to determine anything near accurate assessments of such statistics. Even for something as simple as procurement cost, an estimate for the cost of an 054A was put at \$280 million. But a naval insider had in the past stated an 054A costs about 1.5 billion yuan instead, just under \$230 million at current exchange rates. (Additionally, 052D was placed at 3.5 billion yuan, and 055 placed at 6 billion yuan – interestingly the latter is about an equivalent proportion of Chinese GDP as a Burke-class destroyer is to the U.S. GDP).

This is not to suggest that assessing industrial and economic trajectories and limitations are unimportant, but it does mean assessments of those input factors need to be accurate and appropriately weighed, especially in context of other assumptions including a nation's willingness and resolve to commit resources and labor for procurement as well. For a military and industry that is as opaque as China's, the role of unofficial credible rumors and official statements of intent (such as the goal to build a "world class military" which includes the navy), remain a vital part of gauging the threshold of ambition. Demonstrations of past procurement capacity and existing/new production capacity also remain vital in determining potential for the near future, including assessing the navy's track record for appropriately upgrading and maintaining ships as a proxy for their respect of maintenance and operational costs.

There is also the elephant in the room: it seems the majority of past foreign projections of Chinese military and Chinese navy procurement scale and speed have been underestimates. With no disrespect to Carlson, his own past theses surrounding the role of the newly built Bohai production facility have since been largely disproven, with more recent statements also suggesting agreement that the new facilities are indeed for nuclear submarine production.

Thus, the reasonable confidence interval for estimating future procurement is indeed wide, and it is in this context which the 14-FYP naval rumors will be discussed below.

The Indicators

The below rumors were conveyed by a well-respected insider in the Chinese-language PLA watching community holding an established track record notable for making past accurate predictions for procurement and being one of the first to convey information about the 055 destroyer back in the early-2010s.

Thus, the 14-FYP naval procurement lasting from 2021 to 2025, as conveyed by this individual, is said to include or incorporate:

- A current known order for 16 055 destroyers (implying up to another eight 055s to be launched and/or be in work by 2025, as eight are currently in existence).
- Further production of 052D destroyers and 071 LPDs.
- A current known order for eight 075 LHDs (implying up to another five 075s to be launched and/or be in work by 2025, as three are currently in existence – the third unit likely to be launched late December 2020 or early 2021).
- 054B frigate to "see movement" in 2021.
- A further order of 20 054A frigates to be produced (12 by Huangpu, eight by Hudong).
- A statement suggesting the 076 "assault carrier" will be in active advanced development, reconfirming its status.

The above predictions have since had elements depicted in computer generated graphics for a sense of scale by Chinese military watchers. Other commentators and individuals in the PLA watching community have also observed the naval shipbuilding plan in the 14-FYP being the largest in the PLAN's history.

The omissions of aircraft carrier and submarine procurement (both nuclear and conventional) are also noted, and these omissions are likely by design given their greater sensitivity and strategic consequence. Logistics and auxiliary ships are also, of course, not mentioned, per the norm.

However, even with the above limited information, there are some interesting consequences to ponder on.

Assessing the Predictions

The continued production of 055 destroyers was expected. It is unclear, however, whether the order of 16 055s (including the current eight 055s in the water) includes any ships of the anticipated improved 055A class, or if the 055A will follow at some point in the future after 16 baseline 055s. It's also not known if the 055s described are expected to be a maximum production goal for the 14-FYP's period, a minimum goal, or somewhere in between.

The continued production of 052D destroyers is not unanticipated either. While not as large or possessing the same scope of cutting-edge sensors or magazine size as the larger and more advanced 055s, the 052D class remains a globally competitive medium displacement, blue water capable destroyer and should be compatible with most of the weapons that an 055 could utilize by virtue of their common vertical launch system (VLS) and same family of primary multi-function radar. It's not entirely clear how many 052Ds will be produced, but anywhere from a further six to 12 ships could easily be envisioned.

The continued production of 054A frigates is a slight surprise, and an order of 20 hulls with the existing 30 054As in service today will expand the 054A fleet by two-thirds. The fact that the next generation 054B is explicitly expected to emerge in the same time period may also prompt some confusion – after all, if a next generation frigate is expected to enter service in this time period, why pursue a whopping 20 extra hulls of the older, existing type?

One possible answer is that the 054A hull has proven itself to be a cheap and sufficiently capable, and that the PLAN itself recognizes the need to be able to quite rapidly and smoothly induct a large number of hulls to achieve combat readiness quickly to maintain a satisfactory balance of hulls with other major navies that operate in the region which are also undergoing their own surface combatant expansion programs. With 30 ships under their belt, and both Huangpu and Hudong having demonstrated a launch rate of four ships per year, the order of 20 ships could potentially be completed within five years – indeed the first of these 20 054As has already been sighted at Huangpu, with the major hull modules nearly complete. On the other hand, if 054B is expected to offer significant technological advancements compared to 054A – or indeed, relative to some of the PLAN's current in-service subsystems, such as if 054B features the long rumored integrated electric propulsion – then the 054B will inevitably require a longer period of shipyard fitting out, trials, familiarization and induction before the ship class becomes fully combat capable.

It is unknown if these 20 restart 054As will feature any upgrades from the 30 existing ships. The 30 existing 054As did see some various upgrades between batches, but there were no upgrades to primary weapons systems or primary sensors (namely the Sea Eagle radar). It is unlikely these 20 restart 054As will be equipped with the universal VLS, but continue to adopt the H/AKJ-16 VLS. One possible modification speculated is a lengthened helipad and a redesigned hangar to accommodate the Z-20F helicopter, which the lengthened 052D hulls were redesigned to accommodate. Another possible modification is replacement of the Sea Eagle radar with a modern medium sized active electronically scanned (AESA) radar, given the age of the underlying technology of Sea Eagle and how commodified AESA technology now is for the Chinese military. Such an improvement wouldn't inherently alter the ship's fire control system but rather replace the role of the Sea Eagle with a more modern contemporary, while keeping the same terminal illuminators and HHQ-16 family of missiles for air defense, and might be the same upgrade that Pakistan's 054A/P is confirmed to enjoy. Given how quickly the first ship is coming together, it is these questions will be answered within a year or so.

Overall, barring the emergence of 054B, the continued production of 055, 052D and 054A all suggest that in the first part of this decade, the PLAN are more interested in building up capacity of some of the mature capabilities they already wield (many of which are formidable and world class in those three classes of ships). Maturation of newer technologies will likely follow into improved variants or new concept warships in the second half of the decade.

Continued production of 071 LPDs is not unexpected, though no number is given. Continued production of 075 LHDs with a requirement for eight LHDs is reasonable, though it's not clear if any of these will be perhaps a larger or improved class (tentatively referred to as 075A in the past), nor how quickly these will be procured. That said, given how fast the first three 075s have been built, a further five 075s could likely be built in two and a half years at Hudong at recently demonstrated rates.

The Notable Omissions

The omission of carrier procurement and submarine procurement is not surprising. However, one can reflect on the state of Chinese carrier and submarine production capacity that has been demonstrated and newly built.

Having built the CV-17 Shandong at Dalian, and currently building carrier 003 at Jiangnan, China is in the rather unique situation of being the only nation in the world that has demonstrated more than one shipyard capable of producing aircraft carriers. The pace of carrier construction between 2021-2025 is not known, but it is likely that a two carrier-yard will come into play in some form going forwards.

The aforementioned nuclear submarine production line at Bohai has largely reached completion, however recent high quality satellite photos irrefutably demonstrate that another new submarine assembly hall is being constructed in the southern part of the site. This new southern hall appears to be a similar length to the recently finished eastern hall, and will feature *four* sets of rail tracks of the 7.34m gauge – appropriate for nuclear attack submarines rather than ballistic missile submarines. Notably, the spacing between these four tracks is greater than the tracks at the eastern hall, lacking the secondary 13.55m gauge option, suggesting this new southern hall might be dedicated for more efficient attack submarine production. Nevertheless, in terms of new assembly floor area, this new southern hall represents an expansion of at least two-thirds compared to the existing eastern hall.

The rationale for such an expansion in nuclear submarine assembly space at this new facility, before the first submarine has even been launched from their line, can only be interpreted in a few limited ways.

Conventional submarine production is also omitted, as are auxiliaries and future potential vessel types such as unmanned underwater and unmanned surface vehicles.

The Nature of Future Projections

Of course, predictions for future procurement are never set in stone. Economic crises, national disaster, war or other unforeseen events can interfere with the best laid plans.

However, there is now a clearer expectation for naval procurement in the next five years – particularly for surface combatants – 054A production restart has already been sighted, and it's likely that the next year or so will see 055 and 052D production restart emerge as well, possibly alongside the first signs of 054B.

Ultimately, the medium and long term procurement for the PLAN are a reflection of the resolve and geopolitical requirements of China as a nation and the economy and industry that can be appropriately mobilized for it – the same reflections of any nation. Trying to estimate the future procurement of a nation on that basis is in many ways a reflection of one's assessment of a nation's future economic health, industrial capacity, and overall national health and trajectory. If one believes the Chinese economy is structurally flawed and shortly due for a significant slowdown – or if one even believes in an inevitable, coming collapse of the Chinese economy or perhaps China as a nation – then that would certainly color one's predictions in one specific direction versus another.

Of those factors, resolve is perhaps an underestimated dimension. Much of the PLA and PLAN's modernization over the last decade has been observed or explicitly described as fast or "breakneck." Relative to some other nations in the world that might only produce six destroyers as part of an entire production run, that certainly could appear to be the case. The salient question is whether the recent pace of procurement was a result of maximal effort and an intensive, non-sustainable peak, or if it was the result of years and decades of gradual accumulation of converging plans.

In other words, had a peak already been reached, or has it yet to arrive?

This observer is able to recall in the late-2000s when up to four 054A frigates were being launched per year that the community believed it surely represented a peak in naval procurement that could not be surpassed, then in the mid-2010s subsequent production of 052C/D destroyers

reached new highs, followed by immediate serial production of 055 large destroyers seeing eight ships launched within the space of three years, then followed again by three 075 LHDs that will shortly all be launched within the space of about a year and a half. All this of course being in context of some 70+ 056/A corvettes produced in the span of eight years and regular diesel submarine production and 071 LPD production as well.

With the demonstrated production and procurement capacity in corvette, frigate, destroyer, large destroyer, diesel submarines, and large amphibious ships, there are only a few domains of contemporary naval assets left to be seen. Whether the PLA Navy will see a similar large-scale procurement of nuclear submarines and aircraft carriers in future is not known, but the newly finished (and still expanding) nuclear submarine facility at Bohai, and the demonstrated two carrier-capable shipyards might be worth considering.

All military forces have a desired force requirement and a desired “critical mass” to aspire toward. Whether the Chinese navy is close to its desired force or not, is of no small consequence.

(Rick Joe is a longtime follower of Chinese military developments, with a focus on air and naval platforms.)

<https://thediplomat.com/2020/12/hints-of-chinese-naval-ambitions-in-the-2020s/>

The Tribune

Mon, 28 Dec 2020

The Chinese challenge

Need for fresh policy which reduces import dependence on Beijing

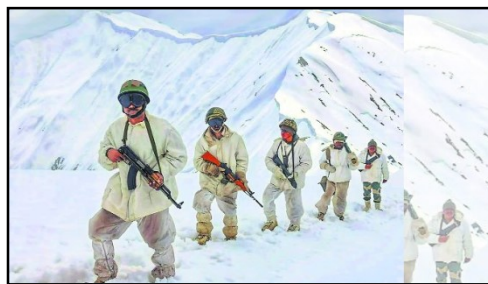
By Vivek Katju

India-China relations came to the forefront in this country’s external engagement this year. This is no doubt because of Chinese moves to change the status quo in some areas along the LAC in Ladakh. Otherwise, the real focus of public attention has always been India-Pakistan ties and not the country’s principal foreign policy and security challenge — China. All governments, past and present, and the Indian strategic community are aware that China is of greater significance than Pakistan to the country’s long-term interests but relations with the latter are embedded in a long and bitter history and easily excite emotions, and are therefore in constant popular focus unlike those with China.

It needs to be emphasised that Pakistan’s implacable animosity towards India and its pursuit of terrorism against this country cannot be underplayed, let alone overlooked. India has paid a heavy price in lives lost and in economic costs but Pakistan does not, and can never have, the resources to effectively thwart India's progress. On the other hand, China’s astonishing rise over the past four decades has led to its acquisition of an enormous advantage in capacities and resources over India. It is willing to use these to undermine India's regional and global standing and hobble its rise. Its aggressive posture and actions on the LAC this year were partly undertaken with this objective.

Defence Minister Rajnath Singh’s speech in the Lok Sabha on September 15 placed on record the bare bones of Chinese actions. It did not, however, clarify if Chinese troops were now actually physically present where they were not so, prior to their moves this year, because Singh’s different formulations about different Chinese actions and Indian military responses were ambiguous.

He noted that in April, a build-up of troops and ‘armaments’ was noticed on the Chinese side by India. In May, the Chinese hindered the ‘normal, traditional patrolling pattern of our troops in the Galwan Valley area’. Further, ‘in mid-May’, the Chinese made several attempts to transgress the



Uneasy calm: A peaceful LAC appears outmoded after the Chinese actions. PTI

LAC, including in 'Kongka La, Gogra and north bank of Pangong Lake'. He asserted that our troops responded 'appropriately' but did not clarify what 'appropriate' meant precisely. He went on to state that the Chinese violated the understanding reached between the military commanders on June 6 and this 'created a violent face-off on June 15 at Galwan. Our brave soldiers laid down their lives and also inflicted costs, including casualties, on the Chinese side'. Despite ongoing discussions, Singh stated, the Chinese 'again engaged in provocative military manoeuvres on the night of August 29 and 30, in an attempt to change the status quo in the South Bank area of Pangong Lake'. He went on to say, 'But yet again, timely and firm action by our armed forces along the LAC prevented such attempts from succeeding'.

Summing up the situation, he informed the Lok Sabha, 'as of now, the Chinese side has mobilised a large number of troops and armaments along the LAC as well as in the depth areas. There are several friction areas in eastern Ladakh, including Gogra, Kongka La and north and south banks of the Pangong Lake'. In response to Chinese actions, he said, 'Our armed forces have also made counter deployments in these areas' to protect our interests. He sought the Lok Sabha's understanding of not being able to go into further details because of 'sensitive operational issues'.

Talks have continued since the time he spoke to Parliament but there has been no recent authoritative statement on the ground situation or on what the Chinese are offering, but media reports lead to the conclusion that they are reluctant to adhere to the letter and spirit of the 1990s agreements which were designed to ensure peace along the LAC. The government seems willing to settle for protracted negotiations. It has pointed to previous LAC situations which took years to resolve, though this is hardly comforting.

An important aspect of the LAC situation is the unfortunate intrusion of domestic politics in what should be a purely national security and foreign policy issue. The Modi government is determined to show that unlike past Congress governments, it has fully safeguarded India's territories. On the other hand, the Congress sees an opportunity to show the government as weak on national security. This political point scoring by both parties is futile and harmful to national interest. There is an undoubted need for the entire political class to demonstrably come together to meet a very grave challenge to the country's interests. That will send the right signals to the region and beyond.

China's actions have made the earlier policy which relied on a peaceful LAC outmoded. There is need for a fresh China policy which reduces inter-alia import dependence on China. PM Modi's emphasis on Atmanirbhar Bharat is timely and a strategic necessity too. A new policy will also have to look at some of India's foreign relationships—in the Indo-Pacific, the immediate neighbourhood and with the major powers—at least partially through the prism of the Chinese challenge. Some useful steps were taken in this direction this year, including through the upgrade of India's engagement with the Quad but innovative mechanisms will have to be crafted to ensure that Chinese ingress in the neighbourhood does not adversely impact Indian interests.

That Indian and US interests coincide regarding the need to contain Chinese aggression is obvious, but there are uncertainties about the precise direction that the incoming Biden administration will adopt vis-à-vis China. There is a compelling need for the Modi government to have an honest interaction with the Biden administration on China, though ultimately, India has to rely on its own capabilities to meet the Chinese threat.

(The writer is Ex-secretary, Ministry of External Affairs)

<https://www.tribuneindia.com/news/comment/the-chinese-challenge-190341>

China sells 50 armed drones to Pakistan, begins psyops. It's a reminder | Analysis

The Chinese state media claimed Indian ground formations will be unable to parry an attack by large number of armed drones. But armed drones perform optimally in uncontested air spaces or where it has air dominance

By Shishir Gupta

New Delhi: This month, China's state media publicised its decision to supply 50 Wing Loong II armed drones to Pakistan, which it prophesied, would be a nightmare for Indian ground formations in high-altitude areas as India's military does not have the ability to respond to the new-age stand-off weapons.

Arguing that armed Chinese and Turkish drones had played a crucial role in Libya, Syria and Azerbaijan conflicts by decimating the enemy defences and conventional armour, the Chinese media said Indian ground formations would be unable to parry an attack by a large number of armed drones.

While the Chinese emphasis on the success of Wing Loong II in African and Asian theatre is a matter to be noted, Indian military officials point out that the armed drones perform optimally in uncontested air spaces or where it has air dominance. Like in Afghanistan and Iraq where the United States drones have been used to carry out strikes against insurgents or terrorists because the US was dominating the air space.



China's much-publicised decision to supply 50 armed drones to Pakistan is a reminder for India to move faster to purchase and develop weapons that it has deemed to be a necessity. (Getty Images)

This isn't going to be the case with China or Pakistan's border with India.

"Whether it is Line of Control in Jammu and Kashmir or the Line of Actual Control in Ladakh, the airspace is very closely monitored by radars and hotly contested with fighters. The armed drones will simply be shot down if they cross the lines," said a former Indian Air Force chief.

But Pakistan's acquisition of the armed drones from China does underscore the need for India to acquire weaponised drones and anti-drone systems since the unmanned aerial vehicles can be used to launch air-to-ground weapons without crossing the LoC or LAC. The drones can discharge the weapons beyond the engagement envelopes of the Indian guns or surface-to-air missiles on the ground.

As of now, India does not have any armed drone system.

The navy is acquiring two US Predators on lease for maritime domain awareness for friend or foe identification. And the Israeli weaponisation upgrade of the Heron drone will take time.

India had accepted the necessity for the armed forces to have Close-in weapon systems in 2015 and floated the tender for the system that detects and destroys incoming missiles or enemy aircraft three years later. The Russian S-400 system, which made the cut, is expected to be available next year.

The defence public sector company Bharat Electronics, meanwhile, has come up with an anti-drone radar-based system but it is still to be validated by the users.

While it suits the Chinese media and military to compare the Indian army with Armenian, Syrian or Government of National Accord (GNA) forces in the Africa-Asian theatre for its psychological warfare, the Bharat Electronics-manufactured medium-powered radar detects even birds in flight. Besides, it is cost-effective to shoot down an infiltrating drone by using L-70 or ZU-23 air defence guns.

After all, a Chinese Wing Loong II drone is one-tenth the cost of a fighter and it does not make sense to shoot them down using million-dollar US air-to-air missiles.

To ensure that the troops are protected from stand-off weapons, the Indian Army is using tunnel defences with huge concrete Hume pipes to provide the defence in case of the first strike on the front-line. But a lucky strike from an enemy drone can unravel the best of defence plans without a properly integrated air defence network in place.

<https://www.hindustantimes.com/india-news/chinese-pla-tries-to-psyche-indian-army-by-supplying-armed-drones-to-pak/story-tySb4UnKimFUyI:JdP3xGL.html>



Sat, 26 Dec 2020

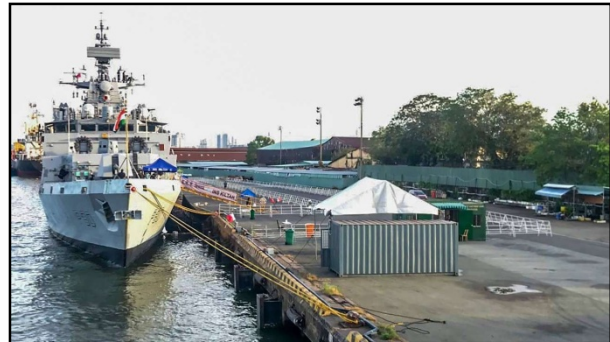
India should be wary of China's naval network and the String of Pearls strategy to encircle the nation: Experts

With a mix of employing 'debt-trap diplomacy' and 'wolf-warrior diplomacy', China has undertaken a strong 'colonial enterprise'

By Manish Shukla, Edited By Devadyuti Das

China's aggressive actions against India at the Line of Actual Control (LAC) earlier this year resulted in an ongoing standoff between the two Asian giants. At the same time, China's increasing belligerence towards the United States and Australia, and other neighbours, has led to global concern for China's ambitions for the World Order. With a mix of employing 'debt-trap diplomacy' and 'wolf-warrior diplomacy', China has undertaken a strong 'colonial enterprise'. In light of such actions, calls have been made in India across the aisle for it to decouple from China, with the government already having taken steps in that direction.

Participating in a webinar organized by Delhi based international affairs observer group Red Lantern Analytica (RLA) on the topic 'Why India Needs to Decouple from China: Understanding China's Colonial Enterprise' Member of Parliament from Biju Janata Dal Dr. Amar Patnaik stressed on the need for a 'quest for excellence' as India plans to decouple from China. He argued that even though decoupling is the need of the hour, the path is difficult – which requires a complete overhaul of the manufacturing ecosystem of the country. India needs to enlarge its GDP and tap into the large market to be able to produce cost-competitive products that can rival China's, and hence, develop its global supply chains. At present, most of the materials India requires for its major projects and initiatives must be sourced from China. That is why the economic decoupling with China cannot be like a turn-on and turn-off approach.



Indian naval ship INS Kiltan. (Photo: PTI)

“A few things India must be aware of in its efforts to establish end-to-end supply chains and it cannot run into the same problems plaguing China. It cannot have low wages for workers or mass produce non-essential goods that would later be dumped in other economies. Decoupling is, therefore, necessary but it is a difficult proposition. India needs to grow at 8% for the next few years to be able to successfully decouple from China. It's a tall order but India is heading in the right direction,” said Dr. Amar Patnaik.

China expert and activist Kyle Olbert, highlighted that the need for decoupling emerges due to the strategic concerns that India has against China. He observed that China is following Alfred Thayer's strategy of 'who controls the seas' and that India should be wary of China's naval network and the String of Pearls strategy to encircle India. He further noted that China being an authoritarian state has a disregard for human rights like the right to privacy and therefore, India should not allow Chinese companies to access its data at any cost.

"India's hopes until recently lied with the Port of Chabahar located in Iran. India had hoped that India, Afghanistan, and Iran would develop the Chabahar Port and built an economic corridor. But China intends to use the port of Gwadar in 'Occupied Balochistan' to project its military power across the Chabahar Port. China has also recently signed a major deal with Iran. This further dash India's hope for an economic corridor. In its attempts to box India, China has turned 'Occupied East Turkistan' into a 'Gulag' comprising multiple labour camps, prisons, and concentration camps. This process is likely to repeat itself wherever China goes because the Chinese Communist Party (CCP), by nature, is an authoritarian and totalitarian regime. There is not only a military imperative for India but also a human rights imperative to decouple from China," said Kyle Olbert.

Senior Fellow at Institute of Peace and Conflict Studies Abhijit Iyer Mitra argued that technically, the conversation of decoupling starts in the West. China only accounts for 0.9% of inwards investment into the US and 3% of inwards investment into the EU. China's trade with the US and EU combined equals the amount of trade carried out between the US and EU. In terms of trade flows, China is important to the West. But in terms of investment flows, it is not! This is the starting point for a Western decoupling from China. The West is the technology supplier to China, either it is legal technology transfer, like Apple setting up a factory in China, or it is stolen technology which China is extremely good at.

"India has to rapidly move into mid-level manufacturing if it wishes to replace China. The basic problems in India that make it unappealing for businesses are - an educational deficit (not spending enough on education), riots are very frequent and so are law and order situations. There is also a highly volatile law and order ecosystem, a volatile jurisprudence ecosystem, an enforcement deficit in past laws and atrocious regulations." said Abhijit Iyer Mitra.

Professor of Economics at Christ University Dr. Shalini Sharma, argued that even though the path of decoupling is a difficult one, India is well on its way to achieving success in it. She pointed out various successes of the government policies and projects like Make in India and Atma Nirbhar Bharat, which have given a huge impetus to startups in India. India is also attracting global value chains and that the Foreign Direct Investment (FDI) inflows have increased in recent times as a result of these policies.

<https://www.dnaindia.com/india/report-india-should-be-wary-of-china-s-naval-network-and-string-of-pearls-strategy-2864100>

MEA: India, China agree next round of military talks should be held soon

The eighth and last round of military talks had taken place on November 6 during which both sides broadly discussed disengagement of troops from specific friction points

New Delhi: India and China have agreed that the next round of military talks should be held soon for working towards an “early and complete” disengagement of troops along the Line of Actual Control (LAC) in eastern Ladakh in accordance with the existing bilateral agreements and protocols, the Ministry of External Affairs said on Thursday.

MEA spokesperson Anurag Srivastava said the diplomatic and military talks have helped both sides to enhance understanding of each other’s positions on the issue.

Last week, the countries held another round of diplomatic talks under the framework of Working Mechanism for Consultation and Coordination (WMCC) on India-China border affairs.

In the virtual meeting, both sides agreed to continue work towards ensuring complete disengagement of troops in all friction points along the LAC in eastern at the “earliest”.

“India and China continue to maintain communications through diplomatic and military channels. These discussions have helped both sides to enhance understanding of each other’s positions,” Srivastava said.

He was replying to questions on the over seven-month border standoff.

“As you are aware, a meeting of the WMCC on India China border affairs took place on December 18 and the two sides have agreed that the ninth round of senior commanders meeting should be held at an early date so that both sides can work towards an early and complete disengagement of troops along the LAC in accordance with the existing bilateral agreements and protocols and fully restore peace and tranquility,” he said.

The eighth and last round of military talks had taken place on November 6 during which both sides broadly discussed disengagement of troops from specific friction points.

Asked whether India cancelled all diplomatic events planned with China to celebrate the 70th anniversary of establishment of diplomatic relations between the two countries, Srivastava said the activities have not yet been launched. “This is the 70th year of establishment of diplomatic relations between India and China. However, the activities that have been agreed upon have not yet been launched,” he said.

<https://indianexpress.com/article/india/mea-india-china-agree-next-round-of-military-talks-should-be-held-soon-7119008/>



MEA spokesperson Anurag Srivastava said the diplomatic and military talks have helped both sides to enhance understanding of each other's positions on the issue.

Business Standard

Sun, 27 Dec 2020

ISRO developing green propulsion for human space mission: K Sivan

ISRO has made space grade lithium-ion batteries and this technology is useful for mass adoption of electric vehicle", he noted

Chennai: Indian Space Research Organisation Chairman K Sivan on Saturday said the space agency was developing 'green propulsion' for its ambitious human space flight mission, 'Gaganyaan'.

He also said it may be adopted for use in every stage of a rocket.

He was speaking at the 16th convocation of SRM Institute of Science and Technology, near here.

Sivan, also the Secretary, Department of Space, advised the new graduates to take up 'calculated risk' in their life as it may safeguard them from 'absolute failure'.

"As India continues to focus on economic growth, it needs to ensure that environmental damage is limited by adopting green technologies.

ISRO has made space grade lithium-ion batteries and this technology is useful for mass adoption of electric vehicle", he noted.

On the green propellant, Sivan said, "Even in the rocket propulsion, ISRO is developing green propulsion for its human space flight mission.

In future, all the propulsion stages may adopt green propulsion," he said.

According to ISRO, polar satellite launch vehicle (PSLV) a trusted workhorse of the space scientists -- is a four stage rocket filled with fuel which pushes the rocket to ensure that the satellite it carries is placed in the intended orbit.

GSLV or a geo-stationary launch vehicle (GSLV) is a three stage rocket with a cryogenic upper stage.

The Bengaluru-headquartered space agency had planned to launch its maiden human space flight mission 'Gaganyaan' by December 2021.

But early this month, ISRO indicated that it is likely to be delayed by one year due to the impact of COVID-19 pandemic.

Addressing students through virtual platform, the ISRO chief encouraged them to take up calculated risk as it would safeguard them from 'absolute failure.'

"You may fail, but each failure would provide a valuable lesson.

I can say with great confidence that India's space programme has been built on spectacular failures and each failure has resulted in improvements in our system", he said.

Asking the students to innovate, Sivan said, innovation was not just having great idea on paper.

"Innovation comes with a high risk of failure. You may be called crazy. Initial outcome of innovation may be imperfect.

You must realize that you are not failing means you are not trying anything hard", he said.



Photo: PTI

Referring to the space sector reforms announced by the Centre in June, he said, "the government has already announced space sector reforms for greater participation of non- governmental entities in space activity".

"Our next PSLV (polar satellite launch vehicle) launch will have satellite from start-up agencies which will be the first product of this reform." he said.

On the SRM Satellite 'SRMSAT' launched by ISRO in 2011, he said it was in 'healthy condition' and urged the university to come forward and make use of the space sector reform as announced by the government of India.

"ISRO is very much open to you all. I request SRM to come forward with their innovative idea of making space activities as required by the Government of India. I am sure that SRM will do this work", he said.

The Digital India initiative by the Centre was a key area to leverage and ISRO has already initiated reforms to make digital assets available easily to industry as well as for startups for making innovative applications in navigation, earth observation as well as disaster management, he said.

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

https://www.business-standard.com/article/current-affairs/isro-developing-green-propulsion-for-human-space-mission-k-sivan-120122600531_1.html



Fri, 25 Dec 2020

ISRO releases Chandrayaan-2 orbiter data: All you need to know

On completion of one year of the orbiter being in space, Isro had said that the spacecraft was 'healthy', performance of subsystems were normal, and there was adequate onboard fuel to remain operational for about seven years

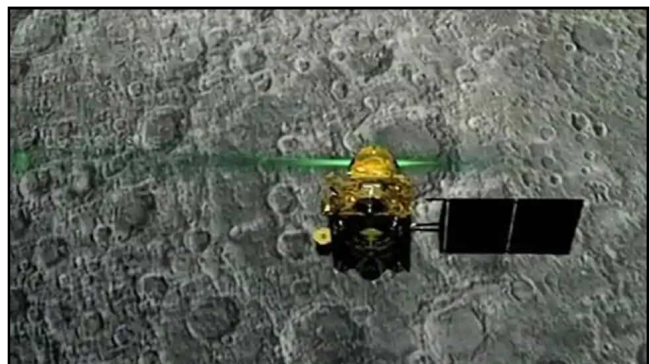
Edited By Prashasti Singh

New Delhi: The Indian Space Research Organisation (Isro) has released the first set of data from the eight instruments aboard India's second lunar mission Chandrayaan-2. The orbiter, which has completed sixteen months around the moon in lunar orbit, was launched on July 22, 2019 and inserted into the lunar orbit on August 20.

On completion of one year of the orbiter being in space, Isro had said that the spacecraft was 'healthy', performance of subsystems were normal, and there was adequate onboard fuel to remain operational for about seven years.

Here is all you need to know about the orbiter:

- Chandrayaan-2, described as the most complex mission ever undertaken by Isro, cost less than half the budget of Hollywood blockbuster 'Avengers Endgame'. The total cost of the mission is estimated at 124 million US dollars, while the movie has an estimated budget of close to 356 million US dollars.
- The mission made India the fourth nation after the United States, Russia and China to land a spacecraft on the Moon.



Chandrayaan-2 was launched on July 22, 2019 and inserted into the lunar orbit on August 20.(PTI photo)

- Chandrayaan-2 consisted of three missions clubbed together – the orbiter that would circle around the moon, the Vikram lander that was to make a soft landing near the south pole of the moon, and the Pragyan rover that was to explore the lunar surface and observe water ice. The lander and rover were destroyed during the attempted landing in September, 2019.
- The lander of Chandrayaan 2, ‘Vikram’, was named after the pioneer of India’s space programme, physicist Dr Vikram Sarabhai.
- The data from seven out of the eight instruments was collected by the Indian Space Science Data Centre at Karnataka’s Byalalu, where it was prepared in the Planetary Data System 4 (PDS4) format for public release before being peer-reviewed scientifically. It was then released through the PRADAN portal hosted by ISSDC at <https://pradan.issdc.gov.in>.

<https://www.hindustantimes.com/india-news/isro-releases-chandrayaan-2-orbiter-data-all-you-need-to-know/story-OQVOE3NrUklc6kyOtQTiAL.html>

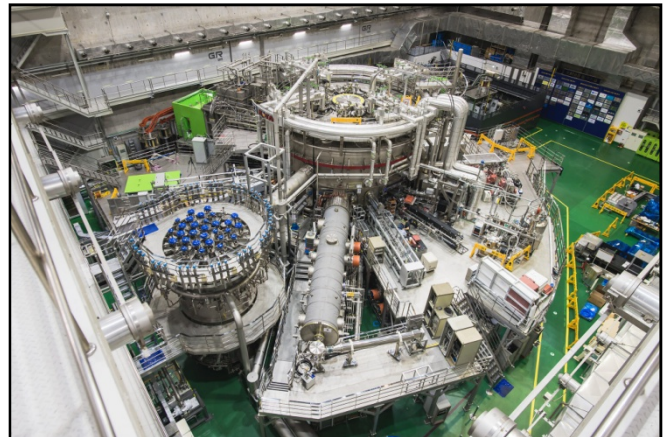


Fri, 25 Dec 2020

Korean artificial sun sets the new world record of 20-sec-long operation at 100 million degrees

The Korea Superconducting Tokamak Advanced Research(KSTAR), a superconducting fusion device also known as the Korean artificial sun, set the new world record as it succeeded in maintaining the high temperature plasma for 20 seconds with an ion temperature over 100 million degrees.

On November 24(Tuesday), the KSTAR Research Center at the Korea Institute of Fusion Energy (KEF) announced that in a joint research with the Seoul National University (SNU) and Columbia University of the United States, it succeeded in continuous operation of plasma for 20 seconds with an ion-temperature higher than 100 million degrees, which is one of the core conditions of nuclear fusion in the 2020 KSTAR Plasma Campaign



Credit: National Research Council of Science & Technology

It is an achievement to extend the 8 second plasma operation time during the 2019 KSTAR Plasma Campaign by more than 2 times. In its 2018 experiment, the KSTAR reached the plasma ion temperature of 100 million degrees for the first time (retention time: about 1.5 seconds)

To re-create fusion reactions that occur in the sun on Earth, hydrogen isotopes must be placed inside a fusion device like KSTAR to create a plasma state where ions and electrons are separated, and ions must be heated and maintained at high temperatures.

So far, there have been other fusion devices that have briefly managed plasma at temperatures of 100 million degrees or higher. None of them broke the barrier of maintaining the operation for 10 seconds or longer. It is the operational limit of normal-conducting device and it was difficult maintain a stable plasma state in the fusion device at such high temperatures for a long time.

In its 2020 experiment, the KSTAR improved the performance of the Internal Transport Barrier(ITB) mode, one of the next generation plasma operation modes developed last year and succeeded in maintaining the plasma state for a long period of time, overcoming the existing limits of the ultra-high-temperature plasma operation.

Director Si-Woo Yoon of the KSTAR Research Center at the KFE explained, "The technologies required for long operations of 100 million- plasma are the key to the realization of fusion energy, and the KSTAR's success in maintaining the high-temperature plasma for 20 seconds will be an important turning point in the race for securing the technologies for the long high-performance plasma operation, a critical component of a commercial nuclear fusion reactor in the future."

"The success of the KSTAR experiment in the long, high-temperature operation by overcoming some drawbacks of the ITB modes brings us a step closer to the development of technologies for realization of nuclear fusion energy," added Yong-Su Na, professor at the department of Nuclear Engineering, SNU, who has been jointly conducting the research on the KSTAR plasma operation.

Dr. Young-Seok Park of Columbia University who contributed to the creation of the high temperature plasma said "We are honored to be involved in such an important achievement made in KSTAR. The 100 million-degree ion temperature achieved by enabling efficient core plasma heating for such a long duration demonstrated the unique capability of the superconducting KSTAR device, and will be acknowledged as a compelling basis for high performance, steady state fusion plasmas."

The KSTAR began operating the device last August and plans to continue its plasma generation experiment until December 10, conducting a total of 110 plasma experiments that include high-performance plasma operation and plasma disruption mitigation experiments, which are joint research experiments with domestic and overseas research organizations.

In addition to the success in high temperature plasma operation, the KSTAR Research Center conducts experiments on a variety of topics, including ITER researches, designed to solve complex problems in fusion research during the remainder of the experiment period.

The KSTAR is going to share its key experiment outcomes in 2020 including this success with fusion researchers across the world in the IAEA Fusion Energy Conference which will be held in May.

The final goal of the KSTAR is to succeed in a continuous operation of 300 seconds with an ion temperature higher than 100 million degrees by 2025.

KFE President Suk Jae Yoo stated, "I am so glad to announce the new launch of the KFE as an independent research organization of Korea. The KFE will continue its tradition of under-taking challenging researches to achieve the goal of mankind: the realization of nuclear fusion energy," he continued.

As of November 20, 2020, the KFE, formerly the National Fusion Research Institute, an affiliated organization of the Korea Basic Science Institute, was re-launched as an independent research organization.

Provided by National Research Council of Science & Technology

<https://phys.org/news/2020-12-korean-artificial-sun-world-sec-long.html>

Atomic-scale nanowires can now be produced at scale

Researchers from Tokyo Metropolitan University have discovered a way to make self-assembled nanowires of transition metal chalcogenides at scale using chemical vapor deposition. By changing the substrate where the wires form, they can tune how these wires are arranged, from aligned configurations of atomically thin sheets to random networks of bundles. This paves the way to industrial deployment in next-gen industrial electronics, including energy harvesting, and transparent, efficient, even flexible devices.

Electronics is all about making things smaller—smaller features on a chip, for example, means more computing power in the same amount of space and better efficiency, essential to feeding the increasingly heavy demands of a modern IT infrastructure powered by machine learning and artificial intelligence. And as devices get smaller, the same demands are made of the intricate wiring that ties everything together. The ultimate goal would be a wire that is only an atom or two in thickness. Such nanowires would begin to leverage completely different physics as the electrons that travel through them behave more and more as if they live in a one-dimensional world, not a 3-D one.

In fact, scientists already have materials like carbon nanotubes and transition metal chalcogenides (TMCs), mixtures of transition metals and group 16 elements which can self-assemble into atomic-scale nanowires. The trouble is making them long enough, and at scale. A way to mass produce nanowires would be a game changer.

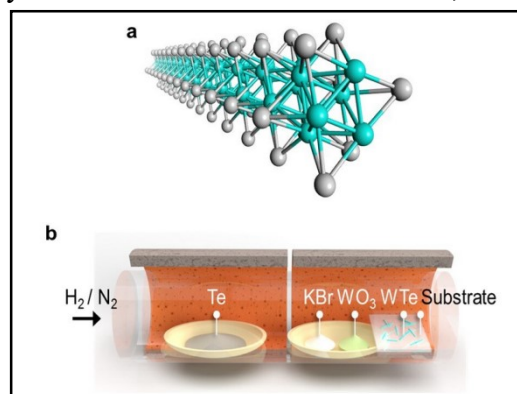
Now, a team led by Dr. Hong En Lim and Associate Professor Yasumitsu Miyata from Tokyo Metropolitan University has come up with a way of making long wires of transition metal telluride nanowires at unprecedentedly large scales. Using a process called chemical vapor deposition (CVD), they found that they could assemble TMC nanowires in different arrangements depending on the surface or substrate that they use as a template. Examples are shown in Figure 2; in (a), nanowires grown on a silicon/silica substrate form a random network of bundles; in (b), the wires assemble in a set direction on a sapphire substrate, following the structure of the underlying sapphire crystal. By simply changing where they are grown, the team now have access to centimeter-sized wafers covered in the arrangement they desired, including monolayers, bilayers and networks of bundles, all with different applications. They also found that the structure of the wires themselves were highly crystalline and ordered, and that their properties, including their excellent conductivity and 1D-like behavior, matched those found in theoretical predictions.

Having large amounts of long, highly crystalline nanowires is sure to help physicists characterize and study these exotic structures in more depth. Importantly, it's an exciting step towards seeing real-world applications of atomically-thin wires, in transparent and flexible electronics, ultra-efficient devices and energy harvesting applications.

More information: Hong En Lim et al, Wafer-Scale Growth of One-Dimensional Transition-Metal Telluride Nanowires, *Nano Letters* (2020). DOI: [10.1021/acs.nanolett.0c03456](https://doi.org/10.1021/acs.nanolett.0c03456)

Journal information: *Nano Letters*

<https://phys.org/news/2020-12-atomic-scale-nanowires-scale.html>



(a) Illustration of a TMC nanowire (b) Chemical vapor deposition. The ingredients are vaporized in a hydrogen/nitrogen atmosphere and allowed to deposit and self-assemble on a substrate. Reprinted with permission from Ref. 1 Credit: Copyright 2020 American Chemical Society (ACS)

Shapeshifting crystals: Varying stability in different forms of gallium selenide monolayers

The gallium selenide monolayer has been recently discovered to have an alternative crystal structure and has diverse potential applications in electronics. Understanding its properties is crucial to understand its functions. Now, scientists from the Japan Advanced Institute of Science and Technology and the University of Tokyo have explored its structural stability, electronic states and transformation of crystal phases.

Solid materials comprise a symmetric arrangement of atoms that confer properties like conductivity, strength and durability. Changes in size can change this arrangement, thereby changing the overall properties of the material. For instance, the electrical, chemical, optical and mechanical properties of certain materials can change as we move towards the nanoscale. Science now lets us study the differences in properties across various dimensions right from monolayer (atomic) level.

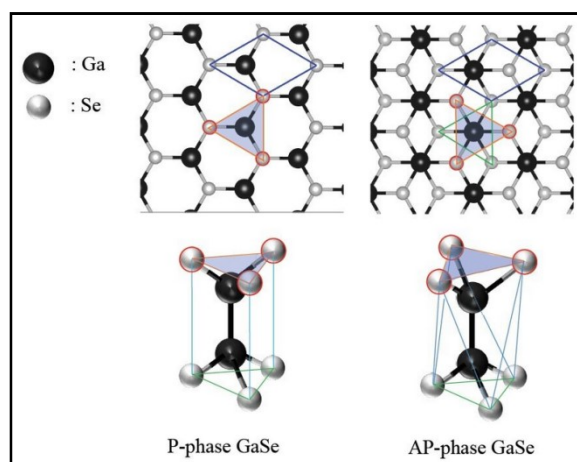
Gallium selenide (GaSe) is a layered metal-chalcogenide, which is known to have polytypes, which differ in their stacking sequence of layers, but not a polymorph, which has a different atomic arrangement inside the layer. GaSe has sparked a great deal of interest in areas of physical and chemical research, owing to its potential use in photoconduction, far-infrared conversion and optical applications. Conventionally, a GaSe monolayer is composed of gallium (Ga) and selenium (Se) atoms bonded covalently, with the Se atoms projecting outwards, forming a trigonal prism-like structure called the P phase. Part of the same research group had earlier reported a novel crystal phase of GaSe using transmission electron microscopy in *Surface and Interface Analysis*, wherein the Se atoms are arranged in a trigonal antiprismatic manner to the Ga atoms, referred to as AP phase, with a symmetry different from the conventional P phase (see Picture 1). Because of the novelty of this monolayer structure, very little is known about how it does its shape shifting. Moreover, how do variations in the intralayer structure of such compounds affect stability?

To answer this, Mr. Hirokazu Nitta and Prof. Yukiko Yamada-Takamura from the Japan Advanced Institute of Science and Technology (JAIST) explored the structural stability and electronic states of phases of GaSe monolayer using first-principles calculations, in their latest study in *Physical Review B*.

Hirokazu Nitta says, "We have found out through first-principles calculations that this new phase is metastable, and stability against the ground-state conventional phase reverses upon applying tensile strain, which we think is strongly related to the fact that we saw this phase formed only at the film-substrate interface."

To compare the structural stability of the P and AP phases of GaSe, the researchers first calculated the total energy at different in-plane lattice constants, which represent the size of a unit cell in the crystal, given that its structure comprises a lattice, an organized meshwork of atoms. The lowest energy that corresponds to the most stable state was computed and at this state, the P phase, was found to be more stable than the AP phase.

Then, to investigate if the AP and P phases can transform into each other, they determined the energy barriers that the material needs to cross to change, and additionally performed molecular



The P and AP phases of a GaSe monolayer. Credit: Japan Advanced Institute of Science and Technology

dynamics calculations using a supercomputer (see Picture 2). They found the energy barrier for phase transition of P-phase and AP-phase GaSe monolayers is large likely due to the need of breaking and making new bonds, which prohibits direct transition from P to AP phase. The calculations also revealed that the relative stability of P-phase and AP-phase GaSe monolayers can be reversed by applying tensile strain, or a stretching-type force.

Highlighting the importance and future prospects of their study, Prof. Yamada-Takamura says, "Layered chalcogenides are interesting 2-D materials after graphene, having wide variety and especially bandgap. We have just found out a new polymorph (not polytype) of a layered monochalcogenide. Its physical as well as chemical properties are yet to be discovered."

Together, the findings of this study describe the electronic structure of a less-known structure of GaSe that can provide insights into the behavior of similar epitaxially grown monolayers, revealing yet another secret about the unknown family members of GaSe and related monochalcogenides.

More information: Hirokazu Nitta et al. First-principles study on the stability and electronic structure of monolayer GaSe with trigonal-antiprismatic structure, *Physical Review B* (2020). [DOI: 10.1103/PhysRevB.102.235407](https://doi.org/10.1103/PhysRevB.102.235407)

Journal information: *Physical Review B*
<https://phys.org/news/2020-12-shapeshifting-crystals-varying-stability-gallium.html>



Fri, 25 Dec 2020

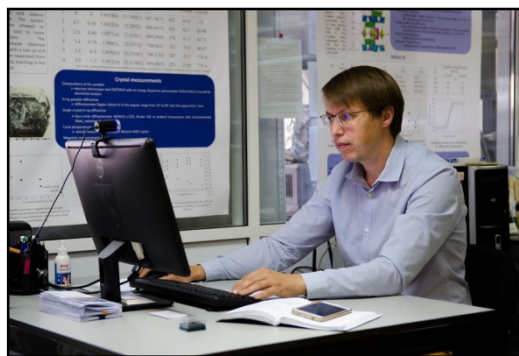
Controlling the magnetic properties of complex oxide systems

The study of complex oxides of iron to create new functional materials is one of the most intensely developing fields of investigation for SUSU scientists. The physical properties of complex iron oxide systems can be varied by changing the chemical composition. This makes it possible to trace the fundamental effects that arise when ions are replaced. In a new study, researchers chose to investigate spinel-structured ferrites, changing their magnetic properties through modification of their chemical composition by substituting iron ions. The results of their research were published in *Nanomaterials*.

The researchers, an international group including scientists from SUSU and their colleagues from Belarus, Saudi Arabia and India examined ferrites of the Co-Ni system with double substitution of iron ions by thulium and terbium ions. The chemists were interested in the magnetic properties of the investigated compounds that manifest themselves in ferrites during the transition to the nanoscale.

During the study, the scientists established the peculiarities of the distribution of substituted ions in the structure of ferrite spinel. The relevance of the study was due to the correlation between the distribution of the substituent ions in the ferrite spinel and its influence on the magnetic properties under conditions of double substitution of iron ions by Tm and Tb ions comparable in radius.

"The samples were synthesized via the sol-gel method, which allows for the creation of nanoscale complex oxides. However, ultrasonic assistance was applied during the synthesis, which allowed us to achieve a more homogeneous distribution of substituting ions and to reduce the average size of the crystallites," said SUSU chemist Dr. Denis Vinnik.



Denis Vinnik, Doctor of Sciences (Chemistry), Professor, Head of the Department of Material Science and Physical Chemistry of Materials, Director of the Research Institute for Advanced Materials and Resource-Saving Technologies at SUSU. Credit: SUSU

The synthesis was carried out by scientists from Saudi Arabia. The study of microstructural parameters and magnetic properties of nanosized ferrite spinels was carried out at the SUSU Nanotechnology Research and Education Centre. As a result, specialists identified an interesting feature of the oxides under study: With the increase in the degree of substitution of iron ions by ions with large radii, the unit cell parameter decreased, although theoretically, it should have increased.

"We suggested that this anomaly could be the result of the effect of surface compression of nanocrystallites. Thus, the decrease in the crystallite size resulting from substitution by Tm and Tb ions led to an increase in the surface layer fraction. This, as we know, can lead to the effect of surface compression in nanoscale crystallites, and as a consequence, the deformation of the unit cell," said Aleksey Trukhanov, senior researcher of the SUSU Nanotechnology Research and Education Centre.

For now, the studies are theoretical, but they can be used as a foundation to complete further studies on the synthesis of compounds of complex iron oxides and correction of their properties. The scientists' plans include studying the functional properties of ferrite spinels in absorbing electromagnetic radiation.

The scientists noted that the chemical compounds can be used in electronics for the creation of sensors as well as in biomedicine for targeted delivery of medicines or contrast visualization.

More information: Munirah A. Almessiere et al. Impact of Tm³⁺ and Tb³⁺ Rare Earth Cations Substitution on the Structure and Magnetic Parameters of Co-Ni Nanospinel Ferrite, *Nanomaterials* (2020).

[DOI: 10.3390/nano10122384](https://doi.org/10.3390/nano10122384)

<https://phys.org/news/2020-12-magnetic-properties-complex-oxide.html>

COVID-19 Research News

THE HINDU
BusinessLine

Mon, 28 Dec 2020

Researchers speculate PEG compound behind allergic reactions to Covid-19 vaccine: Report

By Prashasti Awasthi

Mumbai: After the cases of allergic reactions to the Covid-19 vaccine surfaced, researchers are trying to identify the compound that could be behind such reactions.

According to the scientists, the compound polyethylene glycol, also known as PEG may have caused allergic reactions. PEG is also found in other drugs and is known to trigger anaphylaxis on rare occasions.

This comes after the United States Center for Disease Control and Prevention (CDC) reported six severe allergic reactions to Pfizer Inc. and BioNTech's Covid-19 vaccine.

According to the CDC's official statement, out of 272,001 doses administered through December 19, at least two cases of anaphylaxis have reported in the United Kingdom.

Pfizer had also come with a statement saying that it "will closely monitor all reports suggestive of serious allergic reactions following vaccination."

The company said its prescribing information incorporates a caution that "appropriate medical treatment and supervision should always be readily available in case of a rare anaphylactic event following the administration of the vaccine."

“Although I think we’re just speculating here...it is known that one of the components that is present in both of the vaccines—polyethylene glycol—can be associated, uncommonly, with allergic reactions,” said Peter Marks, director of the Food and Drug Administration’s Center for Biologics Evaluation and Research, during a press conference, as cited in the WSJ report.

“What we’re learning now is that those allergic reactions could be somewhat more common than the highly uncommon that we thought they were because people do get exposed to polyethylene glycol in various pharmaceutical preparations,” he said.

He added that the FDA also plans to monitor the Moderna vaccine rollout “very closely” since both vaccines contain PEG.

Pfizer-BioNTech and Moderna vaccines have PEG as a part of the fatty envelope that surrounds the messenger RNA, the main ingredient in the vaccine.

According to scientists, allergies to PEG are the rarest of rare cases. This compound is also present in a varied range of products, including cosmetics, foods, and drugs. Some vaccines also contain PEG-like compounds.

<https://www.thehindubusinessline.com/news/science/researchers-speculate-peg-compound-behind-allergic-reactions-to-covid-19-vaccine-report/article33430045.ece>



Fri, 25 Dec 2020

Indian Covid-19 vaccine Covaxin has drawn global attention: ICMR

By Sangeeta Ojha

- ***The ICMR said: 'Encouraging phase-1 and phase-2 Covaxin trial results have paved the path for phase-3 clinical trial'***
- ***Indian Covid-19 vaccine Covaxin is now undergoing phase-3 trials***

New Delhi: The Indian Council of Medical Research (ICMR) has said that the Indian vaccine against the novel coronavirus, Covaxin, has drawn global attention.

In a tweet, the ICMR said, "India's indigenous vaccine against #COVID19 Covaxin—a product of ICMR-Bharat Biotech collaboration, achieves remarkable feat. Data generated from within India underlines impressive safety and immunogenicity profile of Covaxin and sparks Lancet's interest in publishing them."

The ICMR said, "Encouraging Phase I and Phase II COVAXIN trial results have paved the path for Phase III Clinical Trial in India, which is currently ongoing at 22 sites."

On Thursday, AIIMS Delhi invited volunteers for the Phase-3 clinical trial of Covaxin. "AIIMS, New Delhi is a site for COVAXIN Phase III clinical trial. This is a whole-virion inactivated vaccine co-sponsored by Indian Council of Medical Research (ICMR) and Bharat Biotech," AIIMS said in an advertisement.

The last date of enrolment is December 31, 2020.

Covaxin, Bharat Biotech’s coronavirus vaccine candidate, has shown antibody and T-cell response in trials among volunteers at three-month follow-ups as well as tolerable safety outcomes, the phase 1 and 2 clinical trial study released on Wednesday said.

Covaxin is being developed in collaboration with the Indian Council of Medical Research and the National Institute of Virology, is now undergoing phase-3 trials.



Covid-19 vaccine: Covaxin is now undergoing phase-3 trials.

The six vaccine candidates which are in various stages of the clinical trial are - Covishield, Covaxin, ZyCoV-D, Sputnik V, NVX-CoV2373 and recombinant protein antigen-based vaccine, according to the Health Ministry.

In addition to the above six which are in various trial stages, the following three are in pre-clinical trial stages - HGCO 19, inactivated rabies vector platform and Vesiculo Vax platform.

<https://www.livemint.com/science/health/indian-covid-19-vaccine-covaxin-has-drawn-global-attention-icmr-11608855811924.html>

