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समाचार पत्रों से चयित अंश Newspapers Clippings

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology

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Press Information Bureau
Government of India
Ministry of Defence

Tue, 11 Jan 2022 6:27PM

DRDO flight tests final deliverable configuration of MPATGM

Defence Research and Development Organisation (DRDO) successfully flight tested the final deliverable configuration of Man Portable Anti-Tank Guided Missile (MPATGM) on January 11, 2022. The indigenously developed anti-tank missile is a low weight, fire & forget missile and is launched from a man portable launcher, integrated with thermal sight. The missile impacted the designated target and destroyed it. The final impact event was captured on camera and the test has validated the minimum range successfully.

The present test was to prove the consistent performance for the minimum range. All the mission objectives were met. The missile has miniaturised infrared imaging seeker and advanced avionics for on-board control and guidance. The missile performance has been proven for the maximum range in earlier test trials.

Raksha Mantri Shri Rajnath Singh has congratulated DRDO for the consistent performance of the anti-tank missile and said that this is an important step towards Atmanirbhar Bharat in advanced technology-based defence system development. Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy congratulated the team for the excellent performance of the missile during the test.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1789153>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 11 Jan 2022 6:27PM

डीआरडीओ ने मानव संचालित एंटी टैंक गाइडेड

मिसाइल का अंतिम सफल परीक्षण किया

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने 11 जनवरी 2022 को मानव संचालित एंटी टैंक गाइडेड मिसाइल (एमपीएटीजीएम) का अंतिम सफल परीक्षण किया। स्वदेश में विकसित यह टैंक रोधी मिसाइल कम भार वाली, दागो और भूल जाओ मिसाइल है, क्योंकि इसे दागे जाने के बाद पुनः निर्देशित करने की आवश्यकता नहीं पड़ती और फिर धुआं भी नहीं निकलता। इस मिसाइल को थर्मल साइट के साथ एकीकृत मानव संचालित लॉन्चर से दागा गया। मिसाइल ने निर्धारित लक्ष्य पर हमला किया तथा उसे नष्ट

कर दिया। परीक्षण के दौरान अंतिम वृत्त को कैमरे में कैद किया गया और मिसाइल ने अपनी क्षमताओं को पुष्ट करते हुए सभी उद्देश्यों को सफलतापूर्वक पूरा किया है।

वर्तमान परीक्षण में इसको न्यूनतम सीमा तक सिलसिलेवार कार्य-प्रदर्शन में सिद्धस्त प्रदर्शित करना था। इस मिशन के दौरान सभी उद्देश्यों को पूरा किया गया। मिसाइल ने ऑन-बोर्ड नियंत्रण और मार्गदर्शन के लिए इन्फ्रारेड इमेजिंग सीकर तथा एडवांस्ड एवियोनिक्स को सीमित कर दिया है। मिसाइल के कार्य-निष्पादन को पहले की परीक्षण जांचों में अधिकतम सीमा तक के लिए प्रमाणित किया गया है।

रक्षा मंत्री श्री राजनाथ सिंह ने टैंक रोधी मिसाइल की निरंतर सफलताओं के लिए डीआरडीओ टीम को बधाई दी है। उन्होंने कहा है कि उन्नत प्रौद्योगिकी आधारित रक्षा प्रणाली विकास में आत्मनिर्भर भारत की दिशा में यह एक महत्वपूर्ण कदम है। रक्षा अनुसंधान एवं विकास विभाग के सचिव तथा डीआरडीओ के अध्यक्ष डॉ जी सतीश रेड्डी ने परीक्षण के दौरान मिसाइल के उत्कृष्ट प्रदर्शन के लिए टीम को बधाई दी।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1789248>

Business Standard

Wed, 12 Jan 2022

DRDO test-fires indigenous anti-tank missile

The present test was to prove the effectiveness of the anti-tank missile at a minimum range of 200-300 metres. It's Maximum range has already been tested at 4,000 metres

By Ajai Shukla

New Delhi: The Defence Research and Development Organisation (DRDO) successfully flight-tested the final deliverable configuration of an indigenous Man Portable Antitank Guided Missile (MPATGM) on Tuesday.

The anti-tank missile is a lightweight, fire-and-forget missile, which is launched from a man portable launcher, integrated with a thermal sight that allows it to be used in low-visibility conditions, even in complete darkness.

It was launched by a two-man crew at a target that was mimicking a moving tank.

“The missile impacted the designated target and destroyed it. The final impact event was captured on camera and the test has validated the minimum range successfully,” stated the DRDO in a press release.

The MPATGM will now be built in large numbers in India, eliminating the need to import large numbers of Spike ATGMs from Israel, or Javelin ATGMs from the US, which was the earlier plan.

Unusually, the test was carried out to validate whether the MPATGM is effective against tank targets at the lower end of its range spectrum, which is 200-300 metres. The MPATGM has already proven in earlier tests its ability to strike targets at its maximum range of 4,000 metres.

Seldom on a battlefield does an infantryman have occasion to fire a missile at a tank from as close as 200-300 metres. Usually, the infantryman would take advantage of the MPATGM's 4,000 metre range and destroy the tank from afar, before the tank's main gun — with a range of 2,000-2,500 metres — could accurately shoot at him.

The DRDO argued that ATGMs require about 400-500 metres of flight in order to stabilise and deploy their guidance mechanisms. However, the Army insisted on the MPATGM being effective and accurate at 200-300 metres.

“The present test was to prove the consistent performance for the minimum range... The missile performance has (already) been proven for the maximum range in earlier test trials,” stated the DRDO release.



Screengrab | Credit: @DRDO_India (Twitter)

On February 7, 2018, the MoD told Parliament that “on account of indigenous development of 3rd Generation MPATGM system by DRDO, the plan to build the Spike missile in India (321 launchers, 8,356 missiles) was scrapped on December 20, 2017.

The MoD had sanctioned the development of the MPATGM on January 27, 2015, and its probable date of completion (PDC) was put at July 26, 2018. The project was allocated a budget of Rs 73.46 crore.

The MoD’s first “import embargo list” of 101 items prohibits the import of “short range surface to surface missiles” from December 2020 onwards.

https://www.business-standard.com/article/current-affairs/drdo-test-fires-indigenous-anti-tank-missile-122011200053_1.html



Wed, 12 Jan 2022

Naval variant of BrahMos supersonic missile test-fired from INS Visakhapatnam

BrahMos, deployed by the Navy on its warships first in 2005, has the capability to hit sea-based targets beyond radar horizon.

By Sushant Kulkarni

Pune: An extended range sea-to-sea variant of the BrahMos supersonic cruise missile was successfully test-fired by India from the Indian Navy’s newly commissioned INS Visakhapatnam on Tuesday, the Defence Research and Development Organisation said.

“Advanced sea to sea variant of BrahMos Supersonic Cruise missile was tested from INS Visakhapatnam today. Missile hit the designated target ship precisely,” the agency wrote on Twitter.

The Navy too said the launch was an achievement. “Successful test-firing of the extended-range BrahMos Supersonic Cruise missile from INS Visakhapatnam, Indian Navy’s newest indigenously-built guided missile destroyer, represents a twin achievement: Certifies the accuracy of the ship’s combat system and armament complex. Validates a new capability the missile provides the Navy and the Nation,” it tweeted.

BrahMos, deployed by the Navy on its warships first in 2005, has the capability to hit sea-based targets beyond radar horizon.

The naval variant was originally tested in October and December 2020 from the Navy’s indigenously-built stealth destroyer INS Chennai and Rajput-class destroyer INS Ranvijay, respectively.

This version of the missile has been designed to launch either in a vertical or a horizontal mode from moving/stationary assets to target both land and sea targets. The missiles, fired at a speed of 2.8 Mach or nearly three times the speed of sound, significantly increase the capability of the ships in engaging long-range targets.

On Tuesday, Defence Minister Rajnath Singh congratulated the DRDO and other stakeholders for the launch.

“The robustness of Indian Navy’s mission readiness is reconfirmed today after successful launch of the advanced version of BrahMos Missile from INS Visakhapatnam. I congratulate the wonderful teamwork of the Indian Navy, DRDO and Brahmos Missile,” he said on Twitter.



An extended-range sea-to-sea variant of BrahMos Supersonic Cruise Missile was successfully test fired from Indian Navy’s newly commissioned INS Visakhapatnam on the Western seaboard, precisely hitting the target ship at the maximum range. (Twitter/DRDO)

BrahMos missiles are designed and developed by BrahMos Aerospace, a joint venture company set up by Defence Research and Development Organisation (DRDO) and Mashinostroyeniya of Russia.

Originally introduced in 2001, variations of these supersonic missiles can be launched from submarines, ships, aircraft, and land platforms.

<https://indianexpress.com/article/cities/pune/sea-to-sea-variant-of-brahmos-cruise-missile-successfully-tested-from-newly-commissioned-ins-visakhapatnam-7717819/>

R. REPUBLICWORLD.COM

Wed, 12 Jan 2022

Rajnath Singh lauds DRDO & Navy on triumphant launch of BrahMos Supersonic Missile

BrahMos supersonic cruise missile was successfully test-fired on Tuesday, January 11, by the Defence Research and Development Organisation

By Saptarshi Das

The BrahMos supersonic cruise missile was successfully test-fired on Tuesday by the Defence Research and Development Organisation. The test was a major success and was carried out from the Indian Navy Ship (INS) Vishakhapatnam. Union Defence Minister Rajnath Singh who has constantly been on the forefront for the same congratulated DRDO and the Indian Navy.

Speaking at the foundation stone laying ceremony of Defence Technologies & Test Centre and BrahMos Manufacturing Centre in Lucknow on December 26, Defence Minister Rajnath Singh had stressed that it was high time that the nation maintains and upholds its nuclear deterrence. On that he expressed, "The BrahMos missile and other weapons we are manufacturing are not to attack any other country. It has never been the character of India to attack any other country or grab even an inch of land of any country".



Image Credits - Twitter (DRDO/Rajnath Singh)

BrahMos supersonic cruise missile to bolster India's military strength

The development and creation of the same was carried out by NPOM of Russia under the joint venture BrahMos with active coordination of the DRDO. The missile has already been a major deterrent on modern-day battlefields. It is a multi-role and multi-platform weapons system and has already proven its mettle against a varying range of targets. It has been deployed in all three arms of the Indian armed forces.

How effective can the BrahMos prove to be?

The BrahMos supersonic cruise missile can cover a range of 290 km reaching the Mach 2.8 to 3 Mach speed. Meanwhile, the BrahMos - II Hypersonic cruise missile can be deployed to hit the target within a range of 450 – 600 km in a Mach 7 velocity. India has already deployed a sizeable number of the original BrahMos missiles and other key assets in several strategic locations along the de-facto border with China in Ladakh and Arunachal Pradesh. The IAF is also integrating the Brahmos supersonic cruise missile on over 40 Sukhoi fighter jets which are aimed at bolstering the overall combat capability of the force. The BrahMos supersonic cruise missile will be put to use by all three Indian forces.

<https://www.republicworld.com/india-news/general-news/rajnath-singh-lauds-drdo-and-navy-on-triumphant-launch-of-brahmos-supersonic-missile-articleshow.html>

भारतीय नौसेना ने किया ब्रह्मोस सुपरसोनिक मिसाइल का सफल परीक्षण, एकदम सटीक था निशाना

By Manish Negi

नई दिल्ली: भारत को मंगलवार के दिन बड़ी कामयाबी हाथ लगी है। भारतीय नौसेना ने सुपरसोनिक ब्रह्मोस मिसाइल का सफल परीक्षण किया है। पश्चिम तट पर तैनात नौसेना के लड़ाकू युद्धपोत आईएनएस विशाखापत्तनम से ब्रह्मोस मिसाइल का सफल परीक्षण किया गया है।

भारतीय नौसेना के सूत्रों ने बताया कि ये मिसाइल का समुद्र से समुद्र में मार करने वाला वैरिएंट था। इसने अधिकतम रेंज और सटीकता के साथ लक्ष्य वाले जहाज पर हमला किया।

डीआरडीओ ने बनाई है मिसाइल

बता दें कि ब्रह्मोस सुपरसोनिक क्रूज मिसाइल को डीआरडीओ ने विकसित किया है। इस मिसाइल की रेंज हाल ही में 298 किमी से बढ़ाकर 450 किमी की गई थी। कम दूरी की ये रैमजेट, सुपरसोनिक क्रूज मिसाइल विश्व में अपनी श्रेणी में सबसे तेज गति वाली है। इसे पनडुब्बी, पानी के जहाज, विमान से या जमीन से भी छोड़ा जा सकता है। यह रूस की पी-800 ऑकिस क्रूज मिसाइल की प्रौद्योगिकी पर आधारित है। इस मिसाइल को भारतीय सेना, वायुसेना और नौसेना को सौंपा जा चुका है।

क्या है खासियत?

- ब्रह्मोस मिसाइल को देश में ही विकसित किया गया है
- ब्रह्मोस मिसाइल रूस और भारत का संयुक्त प्रोजेक्ट है
- इसमें Brah का मतलब है 'ब्रह्मपुत्र' और Mos का मतलब 'मोस्कोवा'
- ब्रह्मोस एक सुपरसोनिक क्रूज मिसाइल है जिसकी गिनती 21वीं सदी की सबसे खतरनाक मिसाइलों में की जाती है
- ब्रह्मोस में रैमजेट इंजन लगा है, जो इसकी गति को बढ़ाती है और सटीकता और ज्यादा घातक बनाती है
- ब्रह्मोस मिसाइल मैक 3.5 यानी 4,300 किलोमीटर प्रतिघंटा की अधिकतम रफ्तार से उड़ सकती है
- इसको दुश्मन के राडार पकड़ नहीं सकते हैं
- इस मिसाइल को भविष्य में मिग-29, तेजस और राफेल में भी तैनात करने की है

'प्रलय' का किया था सफल परीक्षण

गौरतलब है कि इससे पहले, रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने छोटी दूरी की बैलिस्टिक मिसाइल प्रलय का सफल परीक्षण किया था। डीआरडीओ ने 22 और 23 दिसंबर को प्रलय का सफल परीक्षण किया था। 22 दिसंबर को ओडिशा के तट से एपीजे अब्दुल कलाम द्वीप से इसका पहला सफल परीक्षण किया गया था। दूसरी बार भी यही से फिर से उसका दोबारा परीक्षण किया गया।



भारतीय नौसेना ने मंगलवार को ब्रह्मोस सुपरसोनिक क्रूज मिसाइल का सफल परीक्षण किया है। लड़ाकू युद्धपोत आईएनएस विशाखापत्तनम से ये मिसाइल दागी गई। मिसाइल का निशाना बिल्कुल सटीक था। भारतीय नौसेना के सूत्रों ने ये जानकारी दी है।

<https://www.jagran.com/news/national-indian-navy-successfully-testfired-brahmos-supersonic-cruise-missile-from-destroyer-ins-vishakhapatnam-22372056.html>

Explained: As India conducts another BrahMos test, all you need to know about supersonic cruise missile

Reports say India carried out a successful test of the sea version of BrahMos on January 11 from the naval destroyer INS Visakhapatnam, further demonstrating the range and accuracy of the supersonic cruise missile. "The sea-to-sea variant of the missile was test-fired at the maximum range and hit the target ship with utmost accuracy," navy sources were cited as saying. Here's what you need to know.

WHAT IS THE BRAHMOS MISSILE?

BrahMos is a "short-range, supersonic anti-ship/land attack cruise missile" developed as part of a joint venture set up in 1998 between India's Defence Research and Development Organisation (DRDO) and the Russian NPO Mashinostroyeniya. The name 'BrahMos' is derived from India's Brahmaputra and the Moskva river in Russia.

The Washington DC-based think tank Centre for Strategic and International Studies (CSIS) says that BrahMos is "distinguished" by its supersonic speed, flying at up to three-times the speed of sound at Mach 2.0-2.8 which, "in addition to making it difficult to intercept... also imparts a greater strike power".

The makers of the **missile** say that the ability to travel at a speed of a "kilometre approximately in a second", BrahMos' combination of "supersonic speed and warhead mass provides high kinetic energy ensuring tremendous lethal effect". They add that BrahMos is the "only known versatile supersonic cruise missile which is in service".

BrahMos is also said to be equipped with stealth technology that makes it "less visible to radar and other detection methods", says CSIS.

HOW MANY VERSIONS ARE THERE OF BRAHMOS?

According to DRDO, BrahMos is a "universal, long-range supersonic cruise missile system that can be launched from land, sea and air". Its anti-ship, land-attack and air versions are already operational with the Indian Navy, Army and Air Force while a submarine-launch version was trialled in 2013 by way of a test carried out from a submerged barge.

CSIS says that, depending on the variant and the launch platform, BrahMos has a range of between 300-500 km. The payload size — ranging from 200-300kg — too, varies on the basis of the version as does the missile's launch weight, which can be anywhere between 2,200-3,000 kg.

Reports said that the export version of the BrahMos will have a range of 290km to stay under the 300km ceiling imposed by the Missile Technology Control Regime (MTCR). India recently agreed to sell the missile to the Philippines even as several other countries around the world are known to have expressed an interest in acquiring it.

A hypersonic version of the missile, BrahMos II, is also under development that would be able to hit speeds of over Mach 5. The defence ministry also recently said that BrahMos Aerospace has begun work BrahMos-NG, for 'next generation', which will be "a new, more advanced variant of the missile... having smaller, lighter and smarter dimensions", for deployment on a wider number of modern military platforms.

The BrahMos Integration Complex in Hyderabad is where the integration and assembly of mechanical systems and the electronics for the missile is undertaken along with the testing of the sub-systems fabricated in other centres in India and Russia.

In December 2021, a project to build a BrahMos Manufacturing Centre was inaugurated in Lucknow to produce the new BrahMos-NG. The defence ministry said that the new centre would be ready over the next two to three years and will produce between 80-100 BrahMos-NG missiles annually.

WHY IS THE LATEST TEST IMPORTANT?

An anti-ship version of the BrahMos missile had been tested in December 2020 against a decommissioned Indian Navy vessel with Defence Minister Rajnath Singh [tweeting](#) after the latest test that the Navy's "mission readiness is reconfirmed today after successful launch of the advanced version of BrahMos Missile from INS Vishakhapatnam..."

The Defence Research and Development Organisation (DRDO) said that the test of the "[advanced sea to sea variant](#)" of BrahMos saw the "missile hit the designated target ship precisely".

A Navy spokesperson added that the [successful test-firing](#) "of the extended-range" missile from the Navy's "newest indigenously-built guided missile destroyer, represents a twin achievement" as it "certifies the accuracy of the ship's combat system & armament complex [and] validates a new capability the missile provides the Navy & Nation (sic)". The spokesperson also said that the test is also a shot in the arm for the Navy and bodes well for the *aatmanirbhar* push in defence production.

On December 8 last year, the Defence Ministry said that it had stage a test of the [air version](#) of the air version of the missile from a supersonic Sukhoi 30 MK-I fighter jet. The "copybook flight" had seen the missile follow "the pre-planned trajectory meeting all mission objectives".

The ministry had said that the test was "a major milestone in BrahMos development" as it clears the decks for "serial production of air-version BrahMos missiles within the country". The December test of the BrahMos' air version had come on the heels of one held in July 2021.



<https://www.news18.com/news/explainers/explained-as-india-conducts-another-brahmos-test-all-you-need-to-know-about-supersonic-cruise-missile-4644650.html>

India's enhanced LCA Tejas Fighter Jets 'Roaring to Soar'; Aircraft Carrier Vikrant set to become 'action ready'

By Sakshi Tiwari

The year 2022 is expected to be eventful for India as the country's armed forces are set to induct the first indigenously developed aircraft carrier (IAC-I) while the MK-1A variant of the Tejas Light Combat Aircraft (LCA) will take to the skies by June.

The Navy said the IAC-I Vikrant has set sail for the third phase of sea trials, which will include complex maneuvers to establish detailed readings of how the ship performs in various conditions.

Since August 2021, the aircraft carrier has been undertaking sea trials.

Additionally, all LCA Tejas jets, which are in the Final Operational Clearance (FOC) stage, will be delivered to the Indian Air Force (IAF) in 2022, while the LCA MK-1A, with specific enhancements, will fly by the middle of this year, R. Madhavan, CMD of the state-run Hindustan Aeronautics Limited (HAL).

The Defense Ministry had struck a Rs 48,000 crore deal with HAL in February last year to provide 83 LCA MK-1A to the IAF. The first three aircraft will be delivered in 2024, followed by 16 aircraft per year for the next five years, according to the Ministry.

On the LCA MK-1A timetable, Madhavan said, "We will commence manufacturing activities parallel with the testing."

Both these developments indicate the alacrity with which India has been pursuing these two indigenous systems, one to protect its seas and another to guard its skies.



File Image: IAF Tejas Fighters

INS Vikrant Undergoing Complex Sea Trials

The IAC Vikrant which is to be rolled out this year is now undergoing its third and most complex sea trials to date. Vikrant's maiden trials took place over five days in August 2021. During those trials, the ship's performance was evaluated, including the hull, main propulsion, power generation and distribution (PGD), and auxiliary equipment.

The ship was put through its paces during the second sea trial, which took place in October and November 2021. "Various seamanship evolutions were also successfully cleared during the second sortie," according to the Defense Ministry.

Now, satisfied by its performance in the last two rounds, the IAC has sailed to perform complex movements to establish specific readings of how the ship performs in various conditions.

During the test, scientists from the Naval Science and Technological Laboratory, a DRDO laboratory based in Visakhapatnam, would be involved. In addition, the ship's different sensor suites would also be put to the test.

Additionally, the Indian Navy is in the process of testing the Rafale Marine fighter aircraft at the shore-based facility in Goa. Another advanced carrier-borne aircraft, Boeing's F/A-18 Super Hornet Block III will be tested at the same facility in March, as previously reported by the EurAsian Times. Indian Navy is committed to inducting a multi-role fighter for carrier operations. After the shore-based trials are complete, the fighter jets will be tested on an aircraft carrier.

However, both the Rafale-M and the F/A-18 were designed to launch from ships using a catapult launch system. According to officials, the carrier would only need modest adjustments to operate the plane, said a report of The Hindu.

The successful trial and induction of Vikrant will ensure India's entry into the elite club of a few nations — the US, the UK, Russia, France, and China — which have built and operated their own carriers. India's Vikrant is 40,000 ton, 262 meters long, 62 meters wide, and stands 59 meters tall. It has been under construction since 2009. Vikrant can reach a top speed of roughly 28 knots and cruise at 18 knots, with a range of about 7,500 nautical miles. It is an embodiment of India's domestic manufacturing capability with 76 percent indigenous content.

As of now, the Indian Navy operates just one Carrier, Vikramaditya, as compared to China's two – CV-16 Liaoning and CV-17 Shandong. A third Chinese aircraft carrier, called Type 003, is speculated to be launched this year.

With Chinese presence expanding in the IOR that the Indian Navy considers its backyard, India's Vikrant is expected to create meaningful deterrence in the region. India's ambitious role of net security provider in IOR as well as in the Indo-Pacific region also requires a modern fleet capable of protecting its seas.

The Chinese have also been arming the Pakistani Navy to create a balance of power in a region. Though Pakistan does not have an aircraft carrier, China's largest warship which has been renamed as PNS Tughril was inducted into its Navy last year. It has been touted as a 'Carrier killer'. In the face of this twin threat, the Indian Navy's Vikrant's entry would act as a force multiplier.

Tejas MK-1A

Last year, India's Ministry of Defence (MoD) granted HAL a contract of Rs 48,000 crore for 83 LCA Mk-1A fighter jets for the Indian Air Force. The first Mk-1A aircraft is set to be delivered to the IAF in March 2024, with the remainder entering service by 2029.

RKS Bhadauria, the then Chief of the Indian Air Force, had said. "Even the LCA FOC [Final Operational Clearance] version of the Tejas is ahead of the [Chinese-Pakistani] JF-17, as previously reported by the EurAsian Times.

The Mark-1A would have a significant advantage against the JF-17s. "In this comparison, we will be much ahead of them," the Air Chief Marshal had stated.

When asked about the specs, he had said, "It [LCA Tejas Mark-1A] will have top-of-the-line BVR, the indigenous ASTRA or better. We will have a version which will be ahead, and we plan other sensors and weapons which are top of the line." According to Madhavan, the LCA MK-1A will fly by June this year with specified modifications, said a report by The Hindu.

"By June this year, we should start flying the LCA MK-1A configuration. Once flying starts, we have about 20 to 24 months of testing. Once that is done, we will be ready for deliveries as expected."

The Mk-1A variant is expected to include digital radar warning receivers, external self-protection jammer pods, enhanced beyond-visual-range (BVR) missiles, in addition to the AESA radar. The indigenous component of the fighter is estimated to be around 60%, compared to 50% in earlier models. While the Tejas LCA is currently powered by an imported engine, reports have stated that the government informed Parliament that it plans to develop indigenous engines for LCA variants and the Advanced Medium Combat Aircraft (AMCA) in the future in collaboration with a global manufacturer. In August last year, HAL signed a contract with GE Aviation for 99 F404-GE IN20 Turbofan engines for the LCA Tejas MK1A variant.

The manufacturer of the fighter, HAL, and defense PSU Bharat Electronics Limited signed a deal on December 16 last year for the development and delivery of 20 types of equipment for the Tejas Mk1A light combat aircraft (LCA) program.

The five-year contract, which runs from 2023 to 2028, entails supplying critical avionics Line Replaceable Units (LRUs), Flight Control Computers, and Night Flying LRUs in what it calls the state-run company's biggest ever order on any Indian company, boosting the 'Atmanirbhar Bharat' campaign.

The work on LCA MK-2 is also on and the first flight is scheduled for 2023, as per reports.

<https://eurasianimes.com/indias-enhanced-lca-tejas-fighter-jets-roaring-to-soar-aircraft-carrier-vikrant-set-to-become-action-ready/>

DRDO on Twitter



Rajnath Singh ✓ @rajnathsingh · 6h

The robustness of @indiannavy mission readiness is reconfirmed today after successful launch of the advanced version of BrahMos Missile from INS Vishakhapatnam today. I congratulate the wonderful team work of @indiannavy @DRDO_India & @BrahMosMissile.

11 January 2022



A. Bharat Bhushan Babu ✓

@SpokespersonMoD

Final deliverable configuration of Man Portable Anti Tank Guided Missile #MPATGM flight tested successfully by @DRDO_India today. The indigenously developed anti tank missile is low weight, fire & forget missile launched from a man portable launcher integrated w/ thermal site.



5:33 PM · Jan 11, 2022



SpokespersonNavy ✓ @indiannavy · 39m

Successful test-firing of the extended-range #BrahMos supersonic cruise missile from #INSVisakhapatnam, #IndianNavy's newest indigenously-built guided missile destroyer, represents a twin achievement...(1/2)

11 January 2022



Press Trust of India ✓

@PTI_News

Defence Research and Development Organisation (DRDO) successfully flight tests Man-Portable Anti-Tank Guided Missile (MPATGM): Defence Ministry

9:21 PM · Jan 11, 2022

 ANI 
@ANI 

India today successfully testfired BrahMos supersonic cruise missile from Indian Navy destroyer INS Vishakhapatnam off the Western coast. The sea to sea variant of the missile was testfired at the maximum range & hit the target ship with pinpoint accuracy: Sources in Indian Navy

12:53 अपराह्न · 11 जन. 2022 

 DRDO 
@DRDO_India · 2h ...

Equipped with #IIRSeeker & advanced #Avionics #ManPortableATGM was flight tested for reliability & efficacy today. The missile hit the target with pin point accuracy. @DefenceMinIndia @SpokespersonMoD
#AmritMahotsav
#AtmaNirbharBharat



11 January 2022

 DRDO 
@DRDO_India · 7h ..

Advanced sea to sea variant of BrahMos Supersonic Cruise missile was tested from INS Visakhapatnam today. Missile hit the designated target ship precisely.
@indiannavy @BrahMosMissile
#SashaktBharat
#AtmaNirbharBharat



11 January 2022



Wed, 12 Jan 2022

India could axe pending defence buys from abroad as in-principle call to stop all imports triggers massive review

Plans are also being discussed to amend the Defence Acquisition Procedure in the future to ensure that foreign procurements are initiated only in the rarest of instances, that too after getting a special exemption from the Defence Acquisition Council.

By Amrita Nayak Dutta

The Defence Ministry has been carrying out a massive review since the last month of all its ongoing and planned global procurement cases, after an in-principle call to stop further import of defence equipment was taken in an internal meeting in December chaired by Defence Secretary Ajay Kumar, News18.com has learnt.

Highly placed sources in the government told News18.com that this directive comes ahead of a Defence Production and Export Promotion Policy drafted by the Defence Ministry, and after a meeting between the ministry and the Prime Minister's Office last month. The Defence Ministry's internal meeting was held subsequently.

Aside from these two meetings, multiple meetings have taken place within the ministry in the last few weeks to discuss all Buy-Global procurement cases, to identify which are mandatory and which could be shelved. One of the meetings is also scheduled on Wednesday to review ongoing and planned foreign procurements.

A top government source said that the review of all planned foreign procurements is being carried out by the ministry and will be discussed in a special meeting, which is yet to be scheduled, of the Defence Acquisition Council (DAC). The DAC is headed by Defence Minister Rajnath Singh.

"Additionally, all ongoing foreign procurement cases are also being reviewed and defence equipment which will mandatorily have to be imported will be placed before a DAC meeting this month," the source said.

Plans to Amend DAP Suited to Domestic Industry

A second source in the government told News18.com that there are also plans to amend the Defence Acquisition Procedure (DAP) in the future to ensure that foreign procurements are initiated only in the rarest of instances, that too after getting special exemption from the DAC.

The DAP is the manual governing all capital procurements for the armed forces. It was amended as early as November 2020.



The review of all planned foreign procurements will be discussed in a special meeting of the Defence Acquisition Council, which is headed by Defence Minister Rajnath Singh. (PTI/File)

“In fact, the PMO has also insisted on only indigenous items for emergency procurements. Only the Defence Minister can grant an exception to this,” the source said.

Sources in the government said that discussions are also on to ensure the domestic private defence industry gets a level-playing field.

This, the sources added, could be by way of devising qualitative requirements suited to domestic capabilities and giving larger orders to the Indian private defence industry as well as initiating procurement of items under the two positive indigenisation lists and a set of proposed reforms in the Defence Research and Development Organisation (DRDO).

Also on the cards in the aid of completely cutting off foreign defence imports, is reducing foreign procurements by Defence PSUs and reducing dependence on foreign Original Equipment Manufacturers (OEMs) for spares and other crucial components.

Several Planned Procurements Could Get Shelved

The Defence Ministry has taken a series of steps to boost the indigenisation of the defence sector with the aim of making it self-reliant in the last two years.

Efforts towards this include two positive indigenisation lists since August 2020, detailing more than 200 items which will have to be mandatorily procured from indigenous sources.

Moreover, under the capital acquisition budget for 2021-22, the Defence Ministry earmarked around 64% of its modernisation funds for only domestic procurements.

Similarly, a large number of Requests for Information and Requests for Proposals floated by the defence services in the last few months were directed to the domestic sector, including those for special winter clothing for troops and loitering munitions for the Army’s artillery units.

Many of the contracts for procurement of various drones have been signed with Indian firms.

However, the latest review in the ministry comes after the PMO gave an ultimatum of stopping foreign procurements in the immediate future, barring exceptions.

Senior defence officials said that while this directive will give further impetus to Atmanirbharta (self-reliance) in defence programme, a few planned acquisitions that were in the advanced stage face risk of being axed.

“For instance, the pending deals for the Igla-S Very Short Range Air Defence (VSHORAD) systems and the Kamov-226T Light Utility helicopters from Russia as well as a number of aircraft and guns which were planned to be procured from foreign vendors stand the risk of getting shelved post review,” an official said.

<https://www.news18.com/news/india/india-could-axe-pending-defence-buys-from-abroad-as-in-principle-call-to-stop-all-imports-triggers-massive-review-4644467.html>



Wed, 12 Jan 2022

Rafale-M (Marine) or F-18 Super Hornet: Indian Naval Commander decodes the ideal fighter aircraft for INS Vikrant

Rafale-M (Marine) vs F-18-Super Hornet: With the induction of INS Vikrant, the Indian Navy is looking to the future. With MiG-29Ks facing some issues, the Indian Navy is evaluating French Dassault Rafale-M fighters against Boeing’s F-18 Super Hornets.

By Vice Admiral Shekhar Sinha (Retired)

From the time the first indigenous aircraft carrier sailed out of Cochin Shipyard, it has been in the news. India has become one of the few countries in the world which has the ability to build a complex ship like an aircraft carrier.

It is not only the hull and propulsion but there are hundreds of components and equipment which go into the build. As they say, an aircraft carrier is a “ship” alright but it is a “town-ship”.

It is so-called because the crew lives on board and therefore home for them. A ship must be a good home to the crew for them to give their best to the country. It is in this context that many ancillary industries have to take up the challenge of manufacturing components that are required to make the ship a reasonably comfortable home and a good fighting platform.

Vikrant is now going through the paces of trials. These are long drawn and take quite some time. Each component and sub-component of the ship are operated at their maximum designed limit and thus boundaries of their performance are established.

The Shipyard Project team accompanies the Naval crew. Performance is jointly observed and made note of. On return to harbor, the shipyard attends to the unsatisfactory observations and re-offers the ship for trials to prove that the shortcomings observed during the previous trials have been liquidated.

The present outing of Vikrant is likely to concentrate on the operational aspects such as turning diameters at various angles of the rudder as also the diameters at various speeds.

Vital Tests

These have operational implications. The ship is also tested for stopping distances at various settings of power/speed (engines). The ship’s operations team must know how much distance will the ship travel due to its momentum after engines have been stopped. And this must be tested at various power settings.



File Image: INS Vikrant – Wikipedia

The performance data has to be recorded in the ship’s data book as the benchmark at the time of the first trials. In the future, whenever the ship undergoes refit, the operational data obtained during post refit trials are compared with the original data.

Any variations are recorded for subsequent reference. Ultimately, the ship is commissioned only after all designed parameters have been met.

How about the main combat asset of the aircraft carrier- the aircraft itself? Every type of aircraft and helicopter undergoes carrier compatibility trials to establish its envelope within which they can operate from the carrier. While rotary-wing aircraft can establish their operational boundaries soon, the fixed-wing fighters take much longer.

Now, in the case of Vikrant, the existing inventory of MiG 29 K will be tested first. Since the carrier has been designed as a ski-jump launch ship, the aircraft must be capable of launching (take off) safely with its weapon and fuel load for a typical mission.

The MiG 29 Ks are already proven to operate from ski jump on board the Vikramaditya and therefore, the test pilots and engineers will be in a familiar environment onboard Vikrant which has a similar design. However, for an aircraft to launch (take off) from a carrier, it has to recover (land) first.

For recovery, the ship is fitted with arrestor wires which are picked up by the hook fitted under the tail section of the landing aircraft. Once the aircraft hook picks a wire (trap), the pilot shuts the power and allows the arrestor wire to get pulled out against hydraulic pressure jacks fitted with the wire.

Decoded: Why China’s Route to ‘Super Power’ Status Is Highly Dependent On Maritime Supremacy & PLA Navy

The energy of the aircraft at the time of trap is required to be brought to zero to prevent it from falling overboard. In this process of arrestor wire pull out the aircraft traverses some distance forward. Adequate deck length must be available for wire pull-out on recovery. Wire pull-out varies with different types of aircraft subject to their landing speed and weight.

The degree of difficulty during trials of MiG 29 K should be less since the design of Vikrant would have factored the existing aircraft inventory (MiG 29 K) and possibly LCA Navy.

Eyes on the future – Rafale-M or Super Hornets

With the induction of Vikrant, the Navy is looking to the future. MiG 29 Ks have faced some difficulties during their operational service. There have been issues with airframes and other structures leading to less than desirable availability.

A report to this effect was put up by CAG to the parliament. Since the aircraft carriers have long service life (in the range of 30-40 years), the Navy must look beyond MiG 29 K option at this stage. There is also a proposal for building IAC II which will need fighter aircraft.

The decision on the type of aircraft for the carriers would be driven by the maritime security scenario in the Indo- Pacific, particularly in the IOR, in the coming decade.

There is no doubt that IOR is becoming more and more militarized while India is on the path of significant economic growth. This requires our trade and commerce to flow over oceans without any hindrance whereas in the last decade traditional and non-traditional threats have multiplied many folds.

It is expected to get worse not only by increased commercial traffic of non-IOR nations in our backyard but also their Navies. Some countries have significantly higher influence than us on our maritime neighbors who could facilitate the movement and berthing of ships and submarines of the countries adversarial to India. This adds to our security concerns.

Our 90% of our trade, by volume, traverses over oceans and it could become vulnerable to interdiction during the strained relationship with adversarial countries. The technological advancements made by our adversaries also need to be factored in for any future acquisition of our weapon platforms.

It is in this era of geopolitical turmoil that the Navy is examining its options. Navy had advertised RFI (Request for Information) for 56 Deck Based Fighter aircraft for Vikrant and IAC II, which has now been scaled down due to budgetary constraints.

Navy is in the process of evaluating two types of deck-based aircraft, Rafale M from France and F-18 Super Hornets from the US (Boeing stable) for its newly built aircraft carrier Vikrant. Presently Rafale M is under evaluation trials at Goa which has Shore Based Test Facility.

SBTF has a ski jump and arrestor wire recovery system with appropriate instrumentation. Very few countries in the world have such a facility. It was built for trials of LCA Navy since it was the first time ever that an Indian-built deck-based fighter needed evaluation testing for its maiden landing on a flight deck.

Navigating through methodical processes lead to LCA Navy's first recovery (landing) onboard Vikramaditya by a Naval Test Pilot Commodore Jaideep Maolankar. Now, the Rafale has to undergo those set of trials prior to proving its airworthiness from the Vikrant.

It will be a long drawn process. It is necessary to mention that Rafale was designed for operations from the French aircraft carrier Charles d' Gaul which participated in GWOT in Afghanistan in 2001-2. The writer had an opportunity to be on board the ship during her deployment (as the Fleet Operations Officer of the Western Fleet).

The French Air Force acquired the land-based Rafale 6-7 years down the line in 2007.

Similar trials will be carried out by F -18 Super Hornets in the month of March. The F 18 too is a catapult launch aircraft, just as the Rafale, therefore, the ski jump trial will be new for them both.

Both manufacturers would have done simulations in their own facilities before offering the aircraft for these trials at Goa. Optimistically it can be assumed that both aircraft would qualify the proving trials. As far as Rafale is concerned it was first built around the year 2000 and encompasses newer technologies compared to both F 18 and MiG 29k.

Battle-Ready

These shore-based trials should lead to proving trials onboard the Vikrant when the ship becomes operational. In all probability, the MiG 29K would be first to do its carrier compatibility

trials in order to get the ship operational with the existing inventory of MiGs first (one in hand is better than two in the bush is a famous saying).

Another important aspect of the trials would be the handling of these aircraft on the deck of Vikrant. How quickly and how many aircraft can be parked on the deck and how many in the hangar, the ability of these aircraft to fit into the deck edge lift for movement to and from hangar to the flight deck.

There have been reports of some issues with the wingspan of aircraft and its ability to fit onto the lift, particularly the Super Hornet. One assumes that these issues would have been addressed by the manufacturer. If selected Rafale would offer ease of maintenance considering that the Indian Air Force is operating a land-based version of the same aircraft, there would be a commonality of many equipment and components, better logistics, and engineering support.

The Indian Navy is at the cusp of transformation in all dimensions of maritime warfare. State of the art indigenous ships, Scorpene and soon to follow Project 75 I, Arihant class SSBNs, the likelihood of SSNs, cyber warfare & space warfare assets are being inducted.

And now Futuristic Fighter aircraft, additional P8i & Sikorsky ASW helicopters would be shaping the Indian Navy's ability to deter the adversaries and give confidence to IOR neighbors for an environment of peace and stability for prosperity.

(Vice Admiral Shekhar Sinha (retd) is the former Chief of Integrated Defence Staff & Commander in Chief, Western Naval Command.)

<https://eurasianimes.com/rafale-marines-or-super-hornets-indian-navys-decodes-the-ideal-aircraft/>



Wed, 12 Jan 2022

Six Indo-Pacific Nations begin Exercise Sea Dragon

Two U.S. Navy P-8A Poseidon aircraft from the “Golden Swordsmen” and “The Tridents” join Australia, Canada, India, Japan Maritime Self-Defense Force (JMSDF), and Republic of Korea (ROK) to begin multinational exercise Sea Dragon 22, Jan. 5.

The P-8 Poseidon Maritime Patrol and Reconnaissance Aircraft (MPRA) with Patrol Squadron (VP) Forty-Seven and Twenty-Six, traveled to Andersen Air Force Base in Guam to hone their skills with members of the Royal Australian Air Force, Royal Canadian Air Force, Indian Navy, Japanese Maritime Self Defense Force, and Republic of Korea Navy.

Sea Dragon 22, primarily centering on anti-submarine warfare (ASW) training and excellence, culminates in over 270 hours of in-flight training; ranging from tracking simulated targets to the final problem of tracking a live US Navy submarine. During classroom training sessions, pilots and flight officers from all countries build plans and discuss tactics incorporating the capabilities and equipment of their respective nations.

“As [officer-in-charge] OIC, I am eager for the opportunity to further develop our partnerships with Australia, Canada, India, Japan, and Korea while at Sea Dragon 2022. The continued growth and increasing complexity of this exercise affords an opportunity to practice ASW tactics, techniques, and procedures with allies and partners that we don’t often get a chance to work with,” said Lt. Cmdr. Braz Kennedy, OIC for the U.S. detachment from VP-47.



A CP-140 Aurora from RCAF 407 Sqn is seen in Guam during Exercise SeaDragon 2022. RCAF picture.

Each event will be graded, and the nation scoring the highest total points will receive the coveted Dragon Belt award. Last year, the Royal Canadian Air Force won last year's belt and will bring it back to Sea Dragon 2022 to defend the title.

"This exercise is an annual, multi-national high-end ASW training exercise," said JMSDF Cmdr. MICHİYAMA Tomoyuki, commanding officer of Flight Division 31, Air Patrol Squadron 3. "I believe that by conducting a wide range of training, from classroom training on the ground to actual training targeting submarine, we will be able to improve our tactical skills. In addition, through training, exchange of opinions, and various type of exchanges, we expect to strengthen cooperation and deepen mutual understanding among the participating navies and air forces."

The "Golden Swordsmen" of VP-47, part of Commander Task Force (CTF) 72, are stationed in Whidbey Island, Washington, and are currently deployed to Misawa Air Base in Aomori, Japan. Throughout the deployment, they will be conducting maritime patrol and reconnaissance and theater outreach operations within the 7th Fleet area of operations.

The "Tridents" of VP-26, part of Commander Task Force (CTF) 72, are stationed in Jacksonville, Florida, and are currently deployed to Kadena Air Base in Okinawa, Japan. Throughout the deployment, they will be conducting maritime patrol and reconnaissance and theater outreach operations within the 7th Fleet area of operations.

<https://www.navalnews.com/naval-news/2022/01/six-indo-pacific-nations-begin-exercise-sea-dragon/>

Science & Technology News



Wed, 12 Jan 2022

Semiconductor demonstrates elusive quantum physics model

By David Nutt

With a little twist and the turn of a voltage knob, Cornell researchers have shown that a single material system can toggle between two of the wildest states in condensed matter physics: The quantum anomalous Hall insulator and the two-dimensional topological insulator.

By doing so, they realized an elusive model that was first proposed more than a decade ago, but which scientists have never been able to demonstrate because a suitable material didn't seem to exist. Now that the researchers have created the right platform, their breakthrough could lead to advances in quantum devices.

The team's paper, "Quantum Anomalous Hall Effect from Intertwined Moiré Bands," published Dec. 22 in *Nature*. The co-lead authors are former postdoctoral researchers Tingxin Li and Shengwei Jiang, doctoral student Bowen Shen and Massachusetts Institute of Technology researcher Yang Zhang.

The project is the latest discovery from the shared lab of Kin Fai Mak, associate professor of physics in the College of Arts and Sciences, and Jie Shan, professor of applied and engineering physics in the College of Engineering, the paper's co-senior authors. Both researchers are members of the Kavli Institute at Cornell for Nanoscale Science; they came to Cornell through the provost's Nanoscale Science and Microsystems Engineering (NEXT Nano) initiative.

Their lab specializes in exploring the electronic properties of 2D quantum materials, often by stacking ultrathin monolayers of semiconductors so their slightly mismatched overlap creates a moiré lattice pattern. There, electrons can be deposited and interact with each other to exhibit a range of quantum behavior.

For the new project, the researchers paired molybdenum ditelluride (MoTe_2) with tungsten diselenide (WSe_2), twisting them at a 180-degree angle for a configuration that is known as an AB stack.

After applying a voltage, they observed what's known as a quantum anomalous Hall effect. This has its roots in a phenomenon called the Hall effect, first observed in the late 19th century, in which electrical current is flowed through a sample and then bent by a magnetic field that is applied at a perpendicular angle.



Credit: CC0 Public Domain

The quantum Hall effect, discovered in 1980, is the supersized version, in which a far greater magnetic field is applied, triggering even stranger phenomena: The interior of the bulk sample becomes an insulator, while an electrical current moves in a single direction along the outer edge, with resistances quantized to a value defined by the fundamental constants in the universe, regardless of the details of the material. The quantum anomalous Hall insulator, first discovered in 2013, achieves the same effect but without the intervention of any magnetic field, the electrons speeding along the edge as if on a highway, without dissipating energy, somewhat like a superconductor.

"For a long time people thought that a magnetic field is needed for the quantum Hall effect, but you actually don't need one," Mak said. "So what replaces the role of a magnetic field? It turns out that it is magnetism. You have to make the material magnetic."

The $\text{MoTe}_2/\text{WSe}_2$ stack now joins the ranks of only handful of materials that are known to be quantum anomalous Hall insulators. But that is only half of its appeal.

The researchers found that by simply tweaking the voltage, they could turn their semiconductor stack into a 2D topological insulator, which is a cousin of sorts to the quantum anomalous Hall insulator, except that it exists in duplicate. In one "copy," the electron highway flows clockwise around the edge, and in the other, it flows counterclockwise.

The two states of matter have never before been demonstrated in the same system.

After consulting with collaborators led by co-author Liang Fu at MIT, the Cornell team learned its experiment had realized a toy model for graphene first proposed by physics professors Charles Kane and Eugene Mele at the University of Pennsylvania in 2005. The Kane-Mele model was the first theoretical model for 2D topological insulators.

"That was a surprise to us," Mak said. "We just made this material and did the measurements. We saw the quantum anomalous Hall effect and the 2D topological insulator and said 'Oh, wow. That's great.' Then we talked to our theory friend, Liang Fu, at MIT. They did the calculations and figured out the material actually realized a long sought-after model in condensed matter. We never expected this."

Like graphene moiré materials, $\text{MoTe}_2/\text{WSe}_2$ can switch between a range of quantum states, including a transition from a metal to a Mott insulator, a discovery the team reported in *Nature* in September. Now Mak and Shan's lab is investigating the full potential of the material by coupling it with superconductors and using it to build quantum anomalous Hall interferometers, both of which in turn could generate qubits, the basic element for quantum computing. Mak is also hopeful they may find a way to significantly raise the temperature at which the quantum anomalous Hall effect occurs—which is at about 2 kelvin—resulting in a high-temperature dissipationless conductor. Co-authors include doctoral students Lihong Li and Zui Tao; and researchers from MIT and the National Institute for Materials Science in Tsukuba, Japan.

More information: Tingxin Li et al, Quantum anomalous Hall effect from intertwined moiré bands, *Nature* (2021). DOI: [10.1038/s41586-021-04171-1](https://doi.org/10.1038/s41586-021-04171-1) Tingxin Li et al,

Continuous Mott transition in semiconductor moiré superlattices, *Nature* (2021). DOI: [10.1038/s41586-021-03853-0](https://doi.org/10.1038/s41586-021-03853-0)

Journal information: *Nature*

<https://phys.org/news/2022-01-semiconductor-elusive-quantum-physics.html>

