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India successfully tests its 3,500km-range K-4 missile

The three-metre-tall missile carries a nuclear warhead of over one tonne with a circular error probability (CEP) far lower than that of Chinese ballistic missiles

By Shishir Gupta

New Delhi: The Indian strategic forces got a major boost on Sunday after the Defence Research and Development Organisation (DRDO) tested a 3,500-kilometre range submarine-launched K-4 ballistic missile off the Vizag coast, with the nuclear weapon meeting all its target objectives, officials with direct knowledge of the matter said.

The three-metre-tall missile carries a nuclear warhead of over one tonne with a circular error probability (CEP) far lower than that of Chinese ballistic missiles. Only the US, Russia and China have submarine-launched ballistic missiles of 3,500-kilometre range. The INS Arihant is already equipped with a 700-kilometre range B-02 nuclear missile, with the second nuclear submarine INS Arighat on way to becoming operational.



Top government officials told Hindustan Times that with this test India has moved one more step towards the induction of this ballistic missile on the INS Arihant class of nuclear submarines. The missile was fired off a pontoon between 12 noon and 1pm off the Vizag coast in Andhra Pradesh and the delivery platform was tracked over 1,500 kilometres before it shifted to ship-based radars.

“The full results of the missile test will be known in the days to come after the tracking ships return to base. It is only on that basis that we will decide whether to conduct more tests before making the missile operational. Even in the case of the Agni-5 ballistic missile, the nuclear weapon was made operational after conducting two tests,” said a top official.

While the K-4 was to be tested last November, the test was delayed due to Cyclone Bulbul that made the weather conditions in the Bay of Bengal not conducive to the launch and tracking of the missile. DRDO missile scientists led by Satheesh Reddy were waiting for a window to open for the test.

DRDO scientists were happy with how the K-4 test went as the CEP of the Indian strategic missile is less than 100 metres as compared to the 1-2 kilometre range of the Chinese equivalent. The submarine-launched ballistic missile is the most important part of the air, land and sea nuclear triad and is at the front of India’s second-strike capability. With the K-4 and the Agni-5 missiles in its nuclear arsenal, Indian strategic forces now have a deterrent against all adversaries to the north and south, besides capability of protecting the Indo-Pacific.

While DRDO officials were tight-lipped about the details of the missile, the K-4 test met all classified mission objectives. With the DRDO having the capability to conduct laboratory missile tests, India has the ability to build nuclear delivery platforms with far more than officially stated ranges.

<https://www.hindustantimes.com/india-news/india-successfully-tests-its-3-500km-range-k-4-missile/story-abXh4pn7RWK003MOTmhqIO.html>

India successfully test-fires 3,500-km range submarine-launched ballistic missile K-4

The missile ejecting from a submerged platform is a “technological breakthrough”

By Dinakar Peri

India on Sunday successfully test-fired the 3,500-km range submarine-launched ballistic missile, K-4, official sources confirmed. The test was carried out by the Defence Research and Development Organisation (DRDO) from a submerged pontoon off the Visakhapatnam coast around noon.

“The test was conducted from a submerged pontoon and has met the desired parameters. A pontoon simulates the situation of a launch from a submarine,” an official source said on condition on anonymity.

The missile has been tested several times earlier as part of developmental trials to validate different parameters, the source said. “The missile ejecting from a submerged platform to the surface [sea] is the toughest part.”

There are very few countries which have managed to achieve this technological breakthrough, a second official source said. “Our Circular Error Probability (CEP) is much more sophisticated than Chinese missiles,” the source said. The CEP determines the accuracy of a missile. The lower the CEP, the more accurate the missile is.

Once inducted, these missiles will be the mainstay of the Arihant class of indigenous ballistic missile nuclear submarines (SSBN) and will give India the stand off capability to launch nuclear weapons submerged in Indian waters. INS Arihant, the first and only operational SSBN, is armed with K-15 Sagarika missiles with a range of 750 km.

This means the submarine has to venture far way from the Indian waters and move closer to the adversary’s coast to launch the missile. The K-4 will do away with that need.

In November 2019, India formally declared its nuclear triad stated in its nuclear doctrine operational after INS Arihant completed its first deterrence patrol which means Arihant has begun prowling the deep seas carrying ballistic missiles equipped with nuclear warheads. As reported by *The Hindu* earlier, it was quietly commissioned into service in August 2016 and its induction was not officially acknowledged. It has a displacement of 6,000 tonnes and is powered by an 83 MW pressurised light-water reactor with enriched uranium.

Given India’s position of ‘No-First-Use’ (NFU) in launching nuclear weapons, the SSBN is the most dependable platform for a second-strike. Because they are powered by nuclear reactors, these submarines can stay underwater indefinitely without the adversary detecting it. The other two platforms — land based and air launched are far easier to detect.

The Advanced Technology Project (ATV) began in the 1980s and the first of them, Arihant, was launched in 2009 by then Prime Minister Manmohan Singh. Since then it underwent extensive sea trials and the reactor on board went critical in 2013.

In 1998, India conducted nuclear tests under Phokran-II and in 2003, declared its nuclear doctrine based on credible minimum deterrence and an NFU policy while reserving the right of massive retaliation if struck with nuclear weapons first.

<https://www.thehindu.com/news/national/india-successfully-test-fires-3500-km-k-4-slbm/article30601739.ece>

India tests nuclear-missile from undersea pad

By Rajat Pandit

New Delhi: India tested its nuclear-capable K-4 submarine-launched ballistic missile (SLBM), designed to have a strike range of 3,500 km, from an undersea platform in the shape of a submersible pontoon off the coast of Andhra Pradesh on Sunday.

Though there was no official word on the test of the ‘strategic missile’, which will equip the country’s nuclear-powered submarines, sources said the solid-fuelled K-4 was test-fired for a range of around 2,200 km “successfully” in the Bay of Bengal around noon on Sunday.

“Though K-4 has been tested a few times before, this was the first time it was fired for a long range. The problem of the missile tilting after emerging from under water has been resolved,” said a source.

India’s solitary nuclear-powered submarine with ballistic missiles (SSBN), INS Arihant, is currently armed with K-15 missiles with a strike range of 750 km. The Navy also operates another nuclear-powered submarine, INS Chakra, acquired on a 10-year lease from Russia, but it does not have nuclear-tipped missiles because of international treaties.

INS Arihant had become fully operational in November 2018 after completing its first ‘deterrence patrol’ to complete the country’s long-awaited nuclear triad or the capability to fire nuclear weapons from land, air and sea. India for long has had the land-based Agni missiles, with the over 5,000 km Agni-V inter-continental ballistic missile now in the process of being inducted, and fighter jets jury-rigged to deliver nuclear weapons.

But INS Arihant gives the country’s nuclear deterrence posture much more credibility since SSBNs are the most secure, survivable and potent platforms for retaliatory strikes. Though INS Arihant’s K-15 missiles are currently dwarfed by the well over 5,000 km range SLBMs present with the US, Russia and China, the K-4 missiles will add much more teeth to the follow-on submarines.

The K-4 missiles are to be followed by the K-5 and K-6 missiles in the 5,000 to 6,000 km range. The 6,000-tonne INS Arihant, which is propelled by an 83 MW pressurised light-water reactor at its core is to be followed by INS Arighat, which was launched in 2017. The next generation of nuclear submarines, currently called S-4 and S-4*, will be much larger in size.

<https://timesofindia.indiatimes.com/india/india-test-fires-nuclear-missile-from-undersea-pad/articleshow/73399878.cms>

परमाणु हमले में माहिर K-4 मिसाइल का सफल परीक्षण, पनडुब्बी से दुश्मन को मार गिराएगी

नई दिल्ली: भारत ने रविवार को परमाणु हमला करने में सक्षम बैलिस्टिक मिसाइल का सफल परीक्षण किया है। आंध्र प्रदेश के तट से 3500 किलोमीटर की मारक क्षमता वाली के-4 बैलिस्टिक मिसाइल से नौसेना की ताकत बढ़ेगी। मिसाइल को नौसेना की स्वदेशी आईएनएस अरिहंत-श्रेणी की परमाणु-संचालित पनडुब्बी पर तैनात किया जाएगा।

परमाणु हमला करने में सक्षम पनडुब्बियों पर तैनात करने से पूर्व इस मिसाइल के कई और परीक्षणों से गुजरने की संभावना है। फिलहाल नौसेना के पास आईएनएस अरिहंत ही एकमात्र ऐसी पनडुब्बी है, जो परमाणु क्षमता से लैस है।

समुद्र के अंदर परीक्षण : इस सबमरीन (पनडुब्बी से छोड़े जाने वाली) मिसाइल को रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने तैयार किया है। मिसाइल का परीक्षण दिन में समुद्र के अंदर मौजूद प्लेटफॉर्म से किया गया।

दो स्वदेशी मिसाइलों में से एक : के-4 पानी के नीचे चलने वाली उन दो स्वदेशी मिसाइल में से एक है, जिन्हें समुद्री ताकत बढ़ाने के लिए तैयार किया गया है। ऐसी ही अन्य पनडुब्बी बीओ-5 है, जो 700 किलोमीटर से अधिक की दूरी पर मौजूद अपने लक्ष्य पर हमला सकती है।

क्या होती है बैलिस्टिक मिसाइल : जब किसी मिसाइल के साथ दिशा बताने वाला यंत्र लगा दिया जाता है, तो वह बैलिस्टिक मिसाइल बन जाती है। इस मिसाइल को जब अपने स्थान से छोड़ा जाता है या दागा जाता है तो यह पृथ्वी के गुरुत्वाकर्षण नियम के अनुसार अपने पूर्व निर्धारित लक्ष्य पर जाकर गिरती है। ऐसी मिसाइलों में बहुत बड़ी मात्रा में विस्फोटकों को ले जाने की क्षमता होती है। भारत के पास पृथ्वी, अग्नि, और धनुष जैसी बैलिस्टिक मिसाइलें हैं।

सबसे पहली बैलिस्टिक मिसाइल थी ए4 : इतिहास में सबसे पहली बैलिस्टिक मिसाइल नाजी जर्मनी ने 1930 से 1940 के मध्य में विकसित की थी। यह कार्य रॉकेट वैज्ञानिक वेन्हेर वॉन ब्राउन की देखरेख में हुआ था। यह सबसे पहली बैलिस्टिक मिसाइल ए4 थी, जिसे दूसरे शब्दों में वी-2 रॉकेट के नाम से भी जाना जाता है। इसका परीक्षण तीन अक्टूबर 1942 को हुआ था।

के-4 की विशेषताएं

- 200 किलो वजनी परमाणु हथियार ले जाने में सक्षम।
- दुश्मन के रडार पर मिसाइल आसानी से नहीं आती।
- पनडुब्बी से छोड़ी जा सकती है के-4 मिसाइल।

<https://www.livehindustan.com/national/story-ballistic-missile-k4-nuclear-capable-submarine-successful-test-2971819.html>

भारत ने किया K-4 परमाणु बैलिस्टिक मिसाइल का सफल परीक्षण, 3,500 किलोमीटर है मारक क्षमता

भारत ने रविवार को आंध्र प्रदेश के तट पर 3500 किलोमीटर की मारक क्षमता वाली परमाणु हथियारों को ले जाने में सक्षम पनडुब्बी से K-4 बैलिस्टिक मिसाइल का सफल परीक्षण किया।

नई दिल्ली: भारत ने दुश्मन को हराने के लिए अपनी सामरिक क्षमता में विस्तार करते हुए रविवार को शक्तिशाली के-4 बैलिस्टिक मिसाइल का सफल परीक्षण किया है। आंध्र प्रदेश के समुद्री तट से दागी गई इस मिसाइल की रेंज 3,500 किलोमीटर है और यह पनडुब्बी से दुश्मन के ठिकानों को निशाना बनाने में सक्षम है।

सरकारी सूत्रों ने बताया कि मिसाइल का परीक्षण दिन के समय समुद्र में पानी के भीतर बने प्लेटफॉर्म से किया गया। इसका विकास रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने किया है। इसे अरिहंत श्रेणी की परमाणु क्षमता से संपन्न पनडुब्बियों में तैनात किया जाना है। परमाणु क्षमता से संपन्न पनडुब्बियों पर तैनाती से पहले भारत इस मिसाइल के अभी और परीक्षण करेगा।

भारतीय नौसेना के पास फिलहाल अरिहंत ही एक ऐसा परमाणु क्षमता वाला पोत है, जो परिचालन में है। के-4 उन दो अंडरवाटर मिसाइलों में से एक है, जिन्हें भारत नौसेना के लिए तैयार कर रहा है। दूसरी मिसाइल का नाम बीओ-5 है और उसकी रेंज 700 किलोमीटर है। परमाणु हमला करने में सक्षम इस मिसाइल की जद में पाकिस्तान, चीन एवं दक्षिण एशिया के कई देश आ गए हैं।



पिनाका मिसाइल का सफल परीक्षण

पिछले 20 दिसंबर को रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने पिनाका मिसाइल का फिर से ओडिशा तट से सफल परीक्षण किया था। मिसाइल की मारक क्षमता अब 90 किलोमीटर तक हो गई है। डीआरडीओ द्वारा विकसित पिनाका मिसाइल 90 किमी की सीमा तक दुश्मन के इलाके में हमला करने में सक्षम है।

अग्नि-2 का हुआ परीक्षण

पिछले 17 नवंबर को 2000 किमी की मारक क्षमता वाली बैलिस्टिक मिसाइल अग्नि-2 का रात्रिकालीन परीक्षण सफलतापूर्वक अंजाम दिया गया। देश में ही बनाई गई 21 मीटर लंबी, 1 मीटर चौड़ी, 17 टन वजन वाली यह मिसाइल 1000 किलोग्राम तक विस्फोटक ले जाने की क्षमता रखती है।

क्या होती है बैलिस्टिक मिसाइल

तकनीकी दृष्टिकोण से बैलिस्टिक मिसाइल उस प्रक्षेपास्त्र को कहते हैं जिसका प्रक्षेपण पथ सब ऑर्बिटल बैलिस्टिक पथ होता है। इसका उपयोग किसी हथियार (नाभिकीय अस्त्र) को किसी पूर्व निर्धारित लक्ष्य पर दागने

के लिए किया जाता है। यह मिसाइल प्रक्षेपण के प्रारंभिक स्तर पर ही गाड़ की जाती है। इसके बाद का पथ आर्बिटल मैकेनिक के सिद्धांतों पर एवं बैलेस्टिक सिद्धांतों से निर्धारित होता है। अभी तक इसे रासायनिक रॉकेट इंजन से छोड़ा जाता था।

डिफेंस मैनुफैक्चरिंग में भारत को आत्मनिर्भर बनाने में डीआरडीओ की महत्वपूर्ण भूमिका

पिछले दिनों बेंगलुरु में आयोजित डीआरडीओ के एक कार्यक्रम में पीएम मोदी ने कहा था कि डिफेंस मैनुफैक्चरिंग के क्षेत्र में भारत को आत्मनिर्भर बनाने के लिए डीआरडीओ को नए इनोवेशनस के साथ सामने आना होगा। देश में एक वाइब्रेंट डिफेंस सेक्टर (Vibrant Defense Sector) को बढ़ावा देने में मेक इन इंडिया को मजबूत करने में डीआरडीओ के इनोवेशंस की बहुत बड़ी भूमिका है।

<https://www.jagran.com/news/national-india-today-successfully-test-fired-3-500-km-strike-range-nuclear-capable-submarine-launched-k-4-ballistic-missile-19951314.html>



Sun, 19 Jan 2020

Russia, India to sign first contract with third state for export of BrahMos cruise missile in spring

The first contract to supply Russian-Indian BrahMos cruise missiles to a third nation is planned to be signed in spring, said Praveen Pathak, the chief general manager for marketing and export of the Russian-Indian joint venture BrahMos Aerospace.

"We expect [signing the agreement] sometime in April or May," he told reporters on Monday, without elaborating what country plans to acquire the Russian-Indian cruise missile.

According to Pathak, BrahMos Aerospace is currently discussing possible contracts with a number of other nations.

The BrahMos missile has been developed by Russia's Research and Production Association of Machine-Building (the town of Reutov near Moscow) and India's Defense Research and Development Organization (DRDO).

The missile's name comes from the names of two rivers: the Brahmaputra of India and the Moskva of Russia. The missile's first launch took place on June 12, 2001 from a coastal launcher. The missile's production has been arranged at enterprises in Russia and India. Its various versions are operational in the Indian Air Force, Army and Navy.

The OneIndia news portal earlier wrote citing own anonymous sources that the planned agreement on BrahMos is expected to be signed with the Philippines.

<https://www.defencenews.in/article/Russia,-India-to-sign-first-contract-with-third-state-for-export-of-BrahMos-cruise-missile-in-spring-808927>



Sat, 18 Jan 2020

CSIR-India, DRDO to join hands to develop Saras engine

The Council for Scientific and Industrial Research (CSIR) will collaborate with the Defence Research and Development Organisation (DRDO) to produce an indigenous engine for the Saras light passenger aircraft being developed by it.

“We will be taking up the project jointly. Designing and developing an aero-engine is a highly complex task,” Dr Shekhar C Mande, Director General, CSIR, said during his visit here. “Apart from the power plants, all major systems of the Saras are indigenous,” he added.

The DRDO has been developing the Kaveri engine that was initially meant for the Light Combat Aircraft since the mid-80s, but has not been successful. While some technologies and components were validated, there were problems with some. While various types of aero-engines have been produced under licence in India, an indigenous engine has not been developed. According to some experts, developing a turboprop for a transport aircraft is less complex than developing a jet engine for a fighter.



The prototype version of the Saras, being developed by the CSIR’s National Aeronautical Laboratory (NAL), is powered by two Canadian Pratt and Whitney PT6A turboprop engines, that are not only mounted on the rear of the fuselage instead of the wings, but also face rearwards.

“The 14-passenger Saras plane, which is undergoing flight trials, will also have the capability to taxi in reverse, a feature that is not very common in aircraft. In the IAF’s inventory, the American C-17 strategic freighter and the German Dornier Do-228 have this feature. Taxiing in reverse require the jet blast from the engines to be directed forwards but it has technical, environmental and safety concerns when operating in the vicinity of aerodrome terminals or structures.

The NAL would be conducting 20 test flights of the Saras before the design is frozen and production would be undertaken by state-owned Hindustan Aeronautics Limited. The IAF has committed to procure 15 aircraft.

Dr Mande, who is a member of Gaganyaan National Advisory Council, the steering body for ISRO’s manned space mission, said the NAL was also deeply involved in testing and devaluating many of the launch vehicle’s components.

<https://www.csir.res.in/slider/csir-india-drdo-join-hands-develop-saras-engine>

New Desi gel to fight frostbite

New Delhi: Soldiers posted in high-altitude sites like Siachen and Ladakh as also mountaineers and winter sports enthusiasts and those visiting or living in the snow-bound areas have a reason to cheer at an on-site treatment available for frostbite, a medical condition that damages skin and tissues due to extreme colds.

A 'nano spray gel' for immediate treatment of the frostbite injuries has been jointly developed by the Institute of Nano Science and Technology (INST), Mohali, an autonomous institution under the Department of Science and Technology, Defence Institute of High Altitude Research (DIAR), DRDO and the Punjab university.



The spray gel's details are published in the peer-reviewed journal "American Chemical Society Biomaterials Science & Engineering."

If frostbite is not treated promptly, it can lead to gangrene and amputation of the affected limbs. Frostbite occurs when the skin is exposed to a temperature of 0 degree Celsius and it used to be difficult to get treatment quickly in remote and snow-bound areas. This was also a serious medical problem for the armed forces operating in the high altitude areas but no longer, says Kalpesh Vaghasiya, the lead author of INST.

He said the new spray gel is a combination of NSAID, which is a painkiller and anti-inflammatory and clotbuster drug thrombolytic. He said the spray has been prepared using heparin, an anticoagulant that improves the blood flow by reducing clotting and aiding in blood vessel repairs.

The researchers packaged heparin into liposomes, lipid carriers, thus helping deliver the anticoagulant deep inside the skin. The heparin-loaded liposomes were embedded in a sprayable hydrogel that also contains ibuprofen and propylene glycol to prevent freezing of the spray at very low temperature.

The scientists say the gel developed by them is much better than the conventional treatment so far offered that includes immersing the body part in warm water, applying topical antibiotic creams or administering vasodilators and anti-inflammatory drugs, though these are not available in the isolated snowy areas like the mountain tops. Moreover, these medications could end up freezing themselves unlike the new gel under such circumstances.

<https://www.freepressjournal.in/india/new-desi-gel-to-fight-frostbite>

This desi gel can take a bite out of frostbite

By Archana Jyoti

New Delhi: Mountaineers, soldiers posted in extreme regions, winter sports enthusiasts, and those visiting/living in snow-bound area at high-altitudes like Siachen or Ladkha have now an on-site treatment available for frostbites — a medical condition involving damage to skin and tissues due to extreme cold.

Scientists from the Institute of Nano Science and Technology (INST) in Mohali, an autonomous institution under the Department of Science & Technology (DST), Defence Institute of High Altitude Research (DIAR), DRDO and Panjab University have developed a cold-stable spray gel “Nano-Spray Gel” that could be administered on-site for the immediate treatment of frostbite injuries. If frostbite is not treated promptly, it can lead to gangrene and amputation of the affected limbs.

The innovation of Nano-Spray Gel, which is a combination of NSAID (painkiller and anti-inflammatory) and clotbuster drugs (thrombolytic) for rapid relief and effective management of frostbite injury, has been published in the peer reviewed journal “American Chemical Society Biomaterials Science & Engineering”.

Frostbite can occur when the skin is exposed to a temperature of 0°C (32°F) or lower. It can be difficult to get treated quickly in remote, snowbound areas. This is also a serious medical problem for the armed forces operating in snow-bound areas at high altitudes like Siachen, Ladhak and so on, said lead author Kalpesh Vaghasiya from INST.

He said that the spray gel has been prepared using heparin, an anticoagulant that improves blood flow by reducing clotting and aiding in blood vessel repair. The researchers packaged heparin into liposomes — lipid carriers, thus helping deliver the anticoagulant deep inside the skin.

Then they embedded the heparin-loaded liposomes in a sprayable hydrogel that also contained ibuprofen (a painkiller and anti-inflammatory drug) and propylene glycol, which helped keep the spray from freezing at very low temperatures.

The researchers tested the spray gel on rats with frostbite, and found that the treatment completely healed the injuries within 14 days. In comparison, untreated injuries were only about 40 per cent healed, while wounds treated with an antibiotic cream were about 80 per cent healed.

The spray reduced levels of inflammatory cytokines at the wound site and in the blood circulation, which likely accelerated healing, the study ‘Heparin-Encapsulated Metered-Dose Topical “Nano-Spray Gel” Liposomal Formulation Ensures Rapid On-Site Management of Frostbite Injury by Inflammatory Cytokines Scavenging’ said.

Frostbite causes fluids in the skin and underlying tissues to freeze and crystallize, resulting in inflammation, decreased blood flow, and cell death. Extremities are the most affected areas because they are farther away from the body’s core and already have reduced blood flow, said the researchers.

Conventional treatments include immersing the body part in warm water, applying topical antibiotic creams or administering vasodilators, and anti-inflammatory drugs, but many of these are unavailable in isolated snowy areas, like mountaintops. Others, such as topical medications, could end up freezing themselves. The new gel can be of great help under such conditions, as per the researchers.

The other scientists involved in the innovation included Rahul Verma, Ankur Sharma, Eupa Ray, Suneera Adlakha from INST, Kushal Kumar and Sunil Kumar Hota from DIAR and Om Prakash Katara from University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.

<https://www.dailypioneer.com/2020/page1/this-desi-gel-can-take-a-bite-out-of-frostbite.html>

कई पड़ावों के बाद 2026 में नेवी को मिलेगा पहला स्वदेशी लाइट कॉम्बेट एयरक्राफ्ट !

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■ नई दिल्ली : पिछले हफ्ते डीआरडीओ ने लाइट कॉम्बेट एयरक्राफ्ट की आईएनएस विक्रमादित्य पर सफल लैंडिंग की। यह एक अहम पड़ाव है, लेकिन 2026 तक डीआरडीओ को कई पड़ाव पार करने हैं। अगर इंडियन नेवी की जरूरतों के मुताबिक यह लाइट कॉम्बेट एयरक्राफ्ट 2026 तक तैयार हो जाता है तो नेवी को पहला स्वदेशी लाइट कॉम्बेट एयरक्राफ्ट मिल जाएगा।

ये टेक्नॉलजी डेमोस्ट्रेटर(टेक्नॉलजी प्रदर्शित करने वाला) है। डीआरडीओ इंडियन नेवी की जरूरतों के हिसाब से लाइट कॉम्बेट एयरक्राफ्ट तैयार कर रहा है। नेवी के लिए LCA की पहली बेसिक जरूरत है कि वह एयरक्राफ्ट कैरियर से उड़ान भर सके और उसमें लैंड



कर सके। यानी लंबे रनवे के बगैर यह कर सके। डीआरडीओ के LCA(N) Mk1 ने फिलहाल यह बेसिक टेस्ट पास किया है। एक इंजन के इस LCA ने आईएनएस विक्रमादित्य से पहले उड़ान भरी और पिछले हफ्ते इसमें लैंडिंग का सफल टेस्ट हुआ। नेवी की जरूरत दो इंजन वाले लाइट कॉम्बेट एयरक्राफ्ट की है। साथ ही नेवी की तरफ से कई और स्पेसिफिकेशन भी बताई गई हैं, जो LCA में होना जरूरी है। डीआरडीओ अगर 2026 तक ये सारी जरूरतों पर खरा उतरने वाला एयरक्राफ्ट बना लेता है तो नेवी को पहला स्वदेशी लाइट कॉम्बेट एयरक्राफ्ट मिल जाएगा। अभी नेवी के पास 45 मिग-29K हैं।

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2026 क्यों है अहम

नेवी के एक सीनियर अधिकारी के

मुताबिक अगर नेवी को 2026 तक स्वदेशी लाइट कॉम्बेट एयरक्राफ्ट मिल गया तो उसे लिया जाएगा, लेकिन अगर तब तक यह तैयार नहीं हुआ तो फिर विदेशी एयरक्राफ्ट ही लेना होगा। क्योंकि तब नेवी के पास मौजूद मिग-29K में से कई को रिप्लेस करने की जरूरत होगी। साथ ही नेवी के पास दूसरा एयरक्राफ्ट कैरियर आईएसी-1 भी हो जाएगा। तब दूसरे एयरक्राफ्ट कैरियर से ऑपरेट करने के लिए भी कॉम्बेट एयरक्राफ्ट की जरूरत होगी। नेवी को 56 नए लाइट कॉम्बेट एयरक्राफ्ट की जरूरत है। फिलहाल नेवी के पास एक ही एयरक्राफ्ट कैरियर है। नेवी की तरफ से कई बार तीन एयरक्राफ्ट कैरियर की जरूरत बताई गई है ताकि हर वक्त कम से कम दो एयरक्राफ्ट कैरियर तैयार रहें।

India's Tejas fighter just performed its first carrier landing—Does a twin-engine model have a future in the Indian Navy?

Or not...

By Sebastien Roblin

At 10:02 A.M. over the Arabian Sea on January 11, 2020, Commodore Jaideep Maolankar extended the arrestor hook on his delta-wing Tejas single-engine jet fighter and powered towards INS *Vikramaditya*, a former Soviet aircraft carrier refitted at great expense and commissioned into Indian Navy service in 2013.

The thirteen-ton jet's reinforced landing gear absorbed the shock as it hit the flight deck, and its arrestor hook snagged the first of three wire cables.

The cable stretched forward, arresting the Tejas's momentum and then yanked back the first domestically-built Indian aircraft to land on an aircraft carrier. You can see pictures and a recording of the moment here.

The following day, the same jet performed its first launch off the *Vikramaditya*'s curved "ski jump" ramp.

The Tejas Naval-Light Combat Aircraft prototype piloted by Maolankar was developed by India's Defense Research and Development Organization and the company Hindustan Aeronautics Limited.

But don't expect to see the Tejas Mark I enter service with the Indian Navy. After Tejas undergoing three decades of development, the Indian Navy rejected it in 2016, finding its performance mediocre due to its F404 turbofan engine lacking adequate thrust to propel the light jet off the deck of a carrier with a full fuel and weapon load.

Here's where things get complicated. Despite its own misgivings, the Indian Air Force did order 123 land-based Tejas Mark I jets and is looking forward to a major avionics upgrade variant, the Mark 1A.

HAL wanted to next develop a more powerful Tejas Mark 2 Medium Weight Fighter with F414 turbofans, boosting thrust by 20 percent. The hope was that the resulting performance improvement would rope in interest from both Navy and Air Force.

But in November 2019, Indian Navy made clear any single-engine fighter simply wouldn't be satisfactory. The service wants a more powerful twin-engine fighter that can still make it back to the carrier even after losing an engine. This notional aircraft is designated the Twin Engine Deck-Based Fighter (TE-DBF), and would eventually replace the forty-four twin-engine MiG-29Ks currently in Indian Navy service.

TE-DFB would be separate from the current competition to procure an additional fifty-seven new carrier-based fighters, likely either Boeing Super Hornets or Dassault Rafale-Ms. India will also commission its first domestically built aircraft carrier, the ski-jump deck *INS Vikrant*, around 2022, and plans to begin the construction of a new flat-deck carrier with electromagnetic catapults.

Enter the Twin-Engine Tejas?

The Indian Navy's requirement for a twin-engine fighter seemingly closed the book on the carrier-based Tejas. But on New Year's Eve in 2019, Indian test pilot Harsh Thakur posted concept art of a

twin F414 engine Tejas with large canards (a pair of small additional wings closer to the nose) overlapping above the wings.

This was actually one of several concepts under consideration, and several experts have already commented that the spacing between the engines seems inadequate. Nonetheless, it revealed that HAL was seriously looking to draft a twin-engine spinoff of the Tejas.

This “Super” Tejas would both be offered for the Navy’s TED-BF requirement and marketed to the Air Force as the “Omni-Role Combat Aircraft” (ORCA). As it would not require carrier-landing gear and folding wings, ORCA would be a ton lighter and slightly cheaper than the naval variant.

An article by Vishnu Som on *NDTV* outlines the proposed aircraft’s characteristics: weight would increase from the Mark 1’s 13.5 tons to 23 tons and maximum payload boosted from 4 tons on seven hardpoints to 11 tons on 13 hardpoints, while maximum speed would be Mach 1.6 (possibly a bit slower than the Tejas Mark 1.) This would put the design in the medium weight class of a Eurofighter Typhoon or Dassault Rafale. Avionics would include multi-mode AESA radar and sensors designed for networking with other Indian military platforms.

The DRDO has optimistically estimated that it could have a flying Tejas Mark 2 prototype by 2026 and begin production in the early 2030s at an estimated price of rupees 538 crore (\$75 million) per aircraft, in addition to 13,000 crore (\$1.8 billion) in development costs.

However, restructuring an airframe to accommodate an additional engine will effectively require a near-total redesign, with the accompanying risk of technical delays and cost overruns. Thus, the Indian military may be skeptical that the twin-engine Tejas can be completed on schedule, or perform up to expectations given its past experiences with the single-engine Tejas.

Indian defense journalist Shiv Aroor appraised the project thusly to *Hushkit.net*:

“I don’t think Indian Navy requirements have ever compelled major aircraft design decisions in the country — and they’re not about to start... The Indian Air Force might be more inclined towards a lower-risk [single-engine] LCA Mark 2/Medium Weight Fighter that was revealed in concept form a year ago. The IAF has only just begun warming to the Tejas Mk.1 and looks forward to the Mk.1A. I doubt it’ll be looking to see another development path towards a fourth-gen fighter.”

Indeed, the window of relevance for developing of a brand-new 4.5-generation (non-stealth) fighter designs may be closing in the 2020s. That would leave the twin-engine Tejas without much leeway for the kinds of tremendous delays that have bedeviled most major Indian aircraft programs in the last few decades.

The under-funded Indian Air Force may therefore prefer to concentrate research on the HAL AMCA domestic stealth fighter program. And the Indian Navy probably can’t foot the bill to develop a whole new twin-engine Tejas without IAF buy-in.

If the twin-engine Tejas is to ever takeoff, it must not only to overcome skepticism that the project can be executed on time and to specification, but also the steep financial, bureaucratic and technical challenges which give rise to that skepticism in the first place.

For now, however, Indians rest proud to be numbered amongst the handful of countries to have developed a supersonic jet fighter capable of landing on the short deck of a carrier at sea.

<https://nationalinterest.org/blog/buzz/india%E2%80%99s-tejas-fighter-just-performed-its-first-carrier-landing%E2%80%94does-twin-engine-model-have>

Eye on China, South gets 1st Sukhoi squad with BrahMos

By Rajat Pandit

New Delhi: India now has a new lethal weapons platform to keep a ‘strategic eye’ over the Indian Ocean Region (IOR), especially the Bay of Bengal, as well as carry out ‘long-range precision strikes’ against hostile aircraft carriers or other high-value targets by day and night in all-weather conditions in the region.

The IAF will commission a squadron of Sukhoi-30MKI fighter jets, especially modified to carry the 2.5-tonne air-launched supersonic BrahMos cruise missiles, at its Thanjavur airbase in Tamil Nadu on Monday. Primarily tasked with a maritime strike role, these Sukhois will be “a huge addition to IAF’s operational capabilities”, Air Chief Marshal Rakesh Kumar Singh Bhadauria said.

BrahMos director-general Sudhir Mishra told TOI, “It’s the realisation of our dream to provide IAF with a formidable and muchdesired capability to strike from long standoff distances on any target at sea or on land with pinpoint accuracy.”


The new Sukhoi squadron, nicknamed ‘Tiger Sharks’ , will be commissioned with four to six fighters at Thanjavur on Monday, and will induct its full complement of 18 fighters by the end of the year. With a combat radius of almost 1,500 km without mid-air refuelling, the Sukhoi will combine with the 290-km range BrahMos missile to constitute a formidable weapons package.

Tiger Sharks is the 12th squadron of the fourth-generation ‘air dominance’ Sukhois but the first one to be based in south India after the first 11 were deployed on the western and eastern fronts, from Halwara, Pune, Jodhpur and Sirsa to Bareilly, Tezpur and Chabua, to cater for Pakistan and China.

The deployment at Thanjavur is clearly in response to China’s fast-expanding strategic footprint in the IOR, with Beijing now also looking to establish additional logistics facilities in the IOR after setting up its first overseas military base in Djibouti on the Horn of Africa in August 2017, while also using Karachi as a regular naval turnaround facility.

Just last month, Navy chief Admiral Karambir Singh had confirmed that Indian warships recently drove away a Chinese oceanic research vessel+ , Shi Yan-1, after it was found acting suspiciously near the strategically-located Andaman and Nicobar archipelago. There are seven to eight Chinese warships, including submarines, present in the IOR at any given time, he said.

DEEP SURGICAL STRIKE WEAPON



The Fighter

- Sukhoi-30MKIs are 4th generation ‘air dominance’ fighters
- Sukhois, along with Mirage-2000s, will be the most potent jets in India’s air combat fleet till the 36 Rafales are inducted from France
- IAF has so far inducted 260 of 272 Sukhois contracted from Russia (222 being ‘licensed-produced’ by HAL) at overall cost of \$15 billion
- Sukhois have a combat radius of almost 1,500-km without midair refueling
- Plan to procure 12 more Sukhois to make up for 9 jets lost in crashes over the years
- Serviceability of Sukhois has been a problem due to engine glitches, poor availability & management of spares
- IAF also going for major upgrade of Sukhois with more advanced avionics, radars & weapons

The Missile

<ul style="list-style-type: none"> ➤ 290-km BrahMos cruise missile jointly produced by India & Russia. First tested in 2001 ➤ Supersonic air-breathing missile flies at Mach 2.8 speed ➤ Capable of being launched from multiple platforms based on land, sea & air 	<ul style="list-style-type: none"> ➤ Army, Navy & IAF have all inducted BrahMos missiles in orders worth around ₹ 30,000 crore ➤ Over 450-km BrahMos to be developed after India joined 34-nation MTCR in June 2016 ➤ Hypersonic version (Mach 5-7) also being discussed
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The Navy already operates its Poseidon-8I long-range maritime patrol aircraft, which are packed with sensors and weapons to detect, track and destroy enemy submarines, from its INS Rajali base at Arakkonam in Tamil Nadu.

Armed with the BrahMos missiles, which fly almost three times the speed of sound at Mach 2.8, the Sukhois will further add to this deterrence over the high seas right up to the Malacca Strait. “The capability of the missile, coupled with the high performance of the Sukhois, will give IAF strategic reach and allow it to dominate over land and sea. The Sukhoi-BrahMos package can also be used in surgical strikes to destroy terror camps across the Line of Control with Pakistan,” said an official.

With IAF having inducted 260 of the 272 twin-seat Sukhois contracted from Russia for around \$15 billion, 42 of the fighters are to be eventually armed with BrahMos missiles. With India joining the 34-nation Missile Technology Control Regime (MTCR) in June 2016, which “removed the caps” on the range of the missile developed jointly with Russia, plans are also afoot to develop an extended range BrahMos with a 450-500 km range. The MTCR basically prevents the proliferation of missiles and drones over the range of 300 km.

The IAF also plans to upgrade its entire Sukhoi fleet with more advanced avionics, radars and weapons to further bolster their combat capabilities. Detailed talks are currently underway with Russia and HAL for the mega project, as was earlier reported by TOI.

<https://timesofindia.indiatimes.com/india/eye-on-china-south-gets-1st-sukhoi-squad-with-brahmos/articleshow/73400569.cms>

Business Standard

Sun, 19 Jan 2020

IAF squadron strength set to increase

By Ajai Shukla

New Delhi: There is finally light at the end of the tunnel for the Indian Air Force (IAF), which is at its lowest point since the 1970s, with just 28 fighter squadrons operational against its authorized 42 squadrons. A senior IAF planner has told Business Standard that the squadron strength will not fall any lower. Starting from 2020, numbers will gradually rise. Three squadrons will be inducted this year, while only two squadrons would be withdrawn from operational service.

One new squadron, which will be raised in Thanjavur, Tamil Nadu in the coming months, will be equipped with new Sukhoi-30MKI fighters, built by Hindustan Aeronautics Ltd (HAL) in Nashik. These fighters will mount the air-launched version of the BrahMos cruise missile, and will be earmarked to carry out maritime strikes against enemy warships in the Bay of Bengal, Arabian Sea and Indian Ocean.

The squadron will be Number 222 Squadron (called Tigersharks), which was initially equipped with the Sukhoi-7 fighter in the 1960s. It then converted to MiG-27 and was retired (or “numberplated”) in 2011, when the MiG-27 fleet was being retired.

In addition, the second squadron of Tejas Mark 1 light combat aircraft (LCA) will be raised in April. The first squadron of Tejas Mark 1 – Number 45 Squadron, called the Flying Daggers – is already operational in Sulur, Tamil Nadu. Now the second will begin receiving its fighters from HAL.

The third squadron to be raised this year will be equipped with the Rafale. Slated to be based in Ambala, Number 17 squadron (called Golden Arrows) will received its first batch of fighters in India by May and is likely to achieve full strength by March 2021.

Meanwhile, on the negative side, the IAF’s last MiG-27 squadron was phased out of service in December; and another MiG-21 squadron is currently being retired.

With HAL Nashik likely to complete delivery in the coming year of all 222 Sukhoi-30MKI contracted by the IAF, the IAF is processing an additional order for 12 more fighters, to replace the fighters lost over the years in accidents. In addition, a significant number of Sukhoi-30MKIs have begun coming up for overhaul each year, in HAL Nashik. The additional fighters now being ordered will function as “replacement fighters” for the ones being overhauled.

Also in the pipeline is a squadron of MiG-29 fighters that Russia has offered India. The IAF is going ahead with the procurement, but officials say the fighters would first have to be fitted out with new avionics and weaponry. This is likely to take 2-3 years.

There is also a global procurement under way for 114 medium fighters. However, this is at a preliminary stage and, given the budgetary constraints, the IAF is not banking on these aircraft joining the fleet any time soon.

In the medium term, the IAF is looking to the Tejas Mark 1A to stabilise, and then raise its squadron numbers. A contract for 83 Tejas Mark 1A will be signed by April, which will add up to four squadrons. The senior official says the IAF has stressed to HAL that it must reach its planned production level of 16 fighters per year. An investment of Rs 1,200 crore has been made to expand HAL’s production capacity.

At present, the IAF’s fleet includes 12 Sukhoi-30MKI squadrons, three MiG-29UPG squadrons, six Jaguar squadrons, three Mirage 2000 squadrons, one Tejas squadron and the last three MiG-21 squadrons.

hindustantimes

Sun, 19 Jan 2020

Chief of Defence Staff to oversee border disputes, deployments

Supply of arms and ammunition to friendly neighbouring countries such as Sri Lanka, Nepal and the Maldives will also come under the purview of the DMA, said the order published on Friday

By Rahul Singh

New Delhi: The newly created department of military affairs (DMA), headed by chief of defence staff General Bipin Rawat, will oversee key matters related to India’s neighbouring countries including border disputes and incidents, development of infrastructure in forward areas and deployment of forces, according to a new defence ministry order.

These countries include China, Pakistan and Bhutan.

Supply of arms and ammunition to friendly neighbouring countries such as Sri Lanka, Nepal and the Maldives will also come under the purview of the DMA, said the order published on Friday. It gave out details of work transferred from the ministry’s department of defence (DoD) to the DMA.

The new department is an addition to the four existing verticals in the defence ministry — those of defence, defence production, defence research, and development and ex-service welfare.

The DMA will be staffed with two joint secretaries, 13 deputy secretaries, 25 under secretaries and 22 section officers.

Monitoring developments in the Indian Ocean region, Afghanistan, West Asia and South East Asia will also be the responsibility of the DMA, according to the order. It clarified that notwithstanding the distribution of work, “any matter that has an import on the defence policy” will be dealt with by the DoD, headed by the defence secretary.

Rawat, who took over as India's first CDS on December 31, is the principal military adviser to the defence minister on all matters related to the tri-services.

Issues related to counter-insurgency operations and Siachen glacier will be dealt with by the DMA.

Some of the other significant responsibilities assigned to the DMA include restructuring of the army, operational matters of the Indian Air Force, overseas deployment of warships, coastal security, revenue procurements and war wastage reserves (WWR) of the three services.

The armed forces are authorised to stockpile ammunition for a specified period of intense fighting, known as WWR in military parlance.

Experts said the vast mandate of the DMA will bring about greater jointmanship in the military, accelerate decision-making and avoid duplication of efforts. Jointmanship refers to a degree of coordination and integration in terms of strategy, capabilities and execution across the three services.

“Until now, the DoD was shouldering large responsibilities without having military officers in key positions. The DMA will foster better integration as it will be staffed with experts from the three services and also bureaucrats,” said Lieutenant General Satish Dua (retd), a leading expert of tri-services matters.

The secretariat of the defence acquisition council (DAC), the ministry's apex capital procurement body, will function under the DoD. “The secretariat for DAC presently under the HQs Integrated Defence Staff will be shifted to the Director General, Acquisition Wing of DoD,” the order said.

The DMA will, however, deal with procurement of air-to-air missiles and air-to-air guided weapons. It will also oversee the postings of senior officers (two stars and above), matters relating to India's military attachés posted abroad and humanitarian aid to foreign countries.

The DMA will work towards promoting the use of indigenous equipment by the services at a time when the armed forces are heavily dependent on imported military hardware.

The government expects the CDS to bring about jointness among the three services within three years. One of the key objectives behind jointmanship is the setting up of joint/theatre commands for the best use of military resources to fight future battles. While the army and the navy have been open to the idea, the IAF has concerns about theaterisation.

The appointment of a CDS was one of the most significant recommendations made by the K Subrahmanyam-led Kargil Review Committee (KRC) that was constituted in the immediate aftermath of the 1999 Kargil war to examine lapses that allowed Pakistani soldiers to occupy strategic heights, the initial sluggish Indian response, and suggest measures to strengthen national security.

<https://www.hindustantimes.com/india-news/cds-to-oversee-border-disputes-deployments/story-43rLCZtvUfrOUPKbk7jspI.html>



Sun, 19 Jan 2020

Sea Ceptor supersonic missile defence system offered to Indian Navy

L&T MBDA Missile Systems Ltd has submitted its first bid to the Indian Armed Forces- offering the latest generation Sea Ceptor naval air defence system, in its RFP response for the Indian Navy's Short-Range Surface to Air Missile (SRSAM) requirement.

The Sea Ceptor, that made its debut at DefExpo-2018, will be built in India. It provides complete protection against multiple air targets simultaneously. Sea Ceptor utilises the Common Anti-air

Modular Missile (CAMM) that features a fully active RF-seeker, two-way datalink and soft-vertical launch system.

A new functional simulator for ATGM5 anti-tank guided missile will make its debut at DefExpo-2020, the joint venture between Larsen & Toubro (L&T) and European MBDA said in a statement.

In addition, the company has offered Exocet MM40 Block 3 short-range anti-ship cruise missiles in response to India's RFI for the Medium Range Anti-Ship Missile.

Presently, MBDA is delivering MICA air-to-air missile systems, and METEOR ramjet powered and network-enabled beyond visual range air-to-air missiles, and SCALP missiles for Indian Air Force (IAF) Rafale fighters.

According to the company, the MICA is the only missile in the world featuring two interoperable seekers (active radar and imaging infrared) to cover the spectrum from close-in dogfight to long beyond visual range. Its ability to fly out to BVR in passive mode before the seeker locks on in the final stages of the end game has earned it the nickname "silent killer" as the target has little time to react or to deploy effective countermeasures.

The METEOR missile has a throttleable ramjet engine, active radar seeker and datalink that combine to provide unmatched end-game speed and manoeuvrability at greatly extended ranges, resulting in its all-important 'No-Escape Zone' being several times greater than any other existing or planned BVR weapons, the company claims.

The SCALP missile has the ability to deliver precision strike against high value targets such as well protected control bunkers/centres, key infrastructures and military installations from a safe stand-off distance, MBDA said.

The IAF is also taking the delivery of ASRAAM fire-and-forget missiles for India's fleet of upgraded Jaguar jets, bought under New Generation Close Combat Missile programme.

India's indigenously-built Advanced Light Helicopter (ALH) Dhruv and Light Combat Helicopter (LCH) have been armed with MBDA Mistral ATAM air-to-air missile launchers. "MBDA will exhibit at DEFEXPO 2020 this very high-performing man portable air defence system (MANPADS) that has already performed exceptionally well in firing evaluation trials for India, more than meeting India's operational requirements and what was demanded of the missile system in mountain, desert and maritime conditions. As well as the operational advantages of the Mistral missile, there are major industrial advantages being offered if Mistral is selected for India's VSHORAD requirement, with the missile to be fully manufactured under license in India. As Mistral has already been selected and integrated into the ATAM helicopter launch system for India's helicopters (namely ALH and LCH), operating Mistral as a MANPADS system will offer major logistics and stock management advantages," the statement read.

The JV will exhibit Exocet anti-ship missiles, MARTE ER anti-ship missile weapon systems, long-range Naval Cruise Missile (NCM), Mistrals, and SCALP missiles at DefExpo-2020 to be held in Lucknow, Uttar Pradesh state, between 5-8 February.

<https://www.defencenews.in/article/Sea-Ceptor-Supersonic-Missile-Defence-System-Offered-To-Indian-Navy-808923>

रूस ने शुरू किया भारत के लिए एस-400 मिसाइल प्रणालियों का निर्माण

नई दिल्ली, (भाषा): रूस ने शुक्रवार को कहा कि उसने भारत के लिए सतह से हवा में मार करने वाली लंबी दूरी की एस-400 मिसाइल का निर्माण शुरू कर दिया है और सभी पांच मिसाइलें 2025 तक भारत को सौंप दी जाएंगी। रूसी मिशन के उपप्रमुख रोमन बाबुशकिन ने यह भी कहा कि भारत के लिए हल्के वजन वाले बहुउद्देशीय कामोव सैन्य हेलीकॉप्टरों के संयुक्त निर्माण के लिए जल्द ही एक अनुबंध को अंतिम रूप दिया जाएगा। रूसी राजदूत निकोलई कुदाशेव के साथ संयुक्त संवाददाता सम्मेलन में उन्होंने यह भी कहा कि भारतीय सशस्त्र बलों को इस साल 5,000 कलाशिनकोव राइफलों की पहली खेप मिल जाएगी जो संयुक्त उपक्रम के तहत भारत में बनाई जाएंगी। बाबुशकिन ने कहा कि



रूस और भारत ने भुगतान मुद्दों का "सफल समाधान" खोज लिया है और इस साल रक्षा क्षेत्र में बड़े सौदों के क्रियान्वयन पर ध्यान दिया जाएगा। उन्होंने विस्तार से जानकारी दिए बिना कहा, "पांच एस-400 वायु रक्षा प्रणालियों की आपूर्ति 2025 तक पूरी कर ली जाएगी। उनका निर्माण पहले से शुरू हो चुका है।" अक्टूबर 2018

में, भारत ने वायु रक्षा प्रणाली खरीदने के पांच अरब डॉलर के सौदे पर हस्ताक्षर किए। उसने ट्रेड प्रशासन की उस चेतावनी को नजरअंदाज करते हुए इस सौदे पर हस्ताक्षर किए थे कि यह करार करने पर उस पर अमेरिकी प्रतिबंध लगाए जा सकते हैं। पिछले साल भारत ने मिसाइल प्रणालियों के लिए रूस को 80 करोड़ डॉलर

● भारत के लिए बहुत जल्दी हेलीकॉप्टरों को लेकर भी रूस संयुक्त रूप से निर्माण को राजी है और जल्द ही समझौता फाइनल हो जाएगा

की पहली किस्त का भुगतान किया था। बाबुशकिन ने इस बात पर जोर देते हुए कि एस-400 वायु रक्षा प्रणालियां विश्व में सबसे बेहतरीन हैं, कहा कि वे भारत की वायु रक्षा प्रणाली को बहुत हद तक मजबूती देंगी। एस-400 रूस की सबसे उन्नत लंबी दूरी की सतह से मार करने वाली मिसाइल रक्षा प्रणाली के तौर पर जानी जाती है।

Russia says it will deliver S-400 systems in 5 years

At a briefing at the Russian embassy, ambassador Nikolay Kudashev described New Delhi's actions in Jammu and Kashmir as an internal matter, and said the Kashmir issue should be handled bilaterally by India and Pakistan instead of being taken up at the UN Security Council

By Rezaul H Laskar

New Delhi: Russia will deliver the five S-400 air defence systems ordered by India under a \$5.4-billion deal by 2025 and the two sides are creating a comprehensive system of payments insulated from US sanctions, Russian diplomats said on Friday.

At a briefing at the Russian embassy, ambassador Nikolay Kudashev described New Delhi's actions in Jammu and Kashmir as an internal matter, and said the Kashmir issue should be handled bilaterally by India and Pakistan instead of being taken up at the UN Security Council.

Roman Babushkin, the deputy chief of mission, said production of the S-400 systems for India has started. "We are expecting the deliveries to be completed by 2025," he said.

India's armed forces will soon receive the first batch of 5,000 Kalashnikov assault rifles made in India, and the two sides are close to signing a contract for 200 Kamov Ka-226 helicopters, under which 60 will be supplied by Russia and the rest made in India, Babushkin added.

As reported by HT, India last year made the first payment of \$850 million for the S-400 systems through a special mechanism aimed at averting sanctions under the Countering America's Adversaries Through Sanctions Act (CAATSA) of the US.

A senior US State Department official said on January 8 that India won't receive a blanket waiver for the S-400 deal signed in 2018. Under CAATSA, countries making purchases worth more than \$15 million from Russia's state-owned defence firm could be subject to sanctions, though the US president has the authority to issue a waiver.

Kudashev described the system created by Russia and India to protect deals from US sanctions as a "work in progress". The sanctions triggered by payments have complicated trade and investment, he said.

"[The two sides] are developing inter-bank cooperation, and enhancing and strengthening the position of national currencies in their trade and investment cooperation. They are developing and testing the means of payments that are an alternative to the SWIFT system, which became one of the instruments for sanctions," he said.

The two sides are considering other ways to "clear the way for growing cooperation in many spheres, be it military, energy and space", he added.

Asked about China's move to discuss the Kashmir issue at the UN Security Council, Kudashev said: "We've never been in favour of bringing this issue into the UN agenda because, in our take, this is strictly a bilateral matter for India and Pakistan to discuss on the basis of the Simla Agreement and Lahore Declaration. This is our continuous position and it's well known."

Replying to another question on whether he wished to visit Kashmir to assess the ground situation, Kudashev said he hadn't joined other envoys on a recent trip to the region as he hadn't been invited.

"Quite frankly, I do not feel there is a reason for me to travel [to Kashmir]. Your decisions, as far as Jammu and Kashmir is concerned, this is your internal matter, belonging to the constitutional space of India," he said.

Kudashev echoed Russian foreign minister Sergey Lavrov's criticism of the US-backed concept of the Indo-Pacific, saying it was divisive and omitted China and Russia. He acknowledged India's position on the Indo-Pacific wasn't aimed at containing anybody.

"I would say quite frankly that we expressed to India, time and again, our concern about the American strategies [and] the Quad. As far as I understand, our concerns are taken into consideration and our dialogue on these issues is continuing," he said.

Kudashev also said external affairs minister S Jaishankar will visit Russia from March 22-23 to attend a meeting of the Russia-Indian-China trilateral.

<https://www.hindustantimes.com/india-news/russia-says-it-will-deliver-s-400-systems-in-5-years/story-TucCcAeCve8Dn7JI7KIFZK.html>



Mon, 20 Jan 2020

India, Russia conclude price talks for 200 Kamov copters

By Ajay Banerjee

New Delhi: More than four years after India and Russia signed an inter-governmental pact allowing Russia to supply 200 Kamov Ka-226T helicopters, the price negotiations have been concluded. A formal contract may be signed in the next few months.

The price for the 200 copters would be around \$4 billion (Rs 28,000 crore approximately), sources said. This would also include transfer of 50% technology, including structure of the copter, its blades and landing gear, all important for metallurgy and transfer of technology.

The Kamov 226T uses an engine made by French major Safran. India's Hindustan Aeronautics Limited (HAL) and Safran already have an existing joint venture to produce engines for the advanced light helicopter made by the HAL. A facility

to manufacture KA-226T helicopters in India has been created at HAL's newly set up plant at Tumkuru, near Bengaluru. A new created entity called Indo Russian Helicopter Pvt. Ltd. (IRHL) will produce these copters. Once the domestic demand is met, India and Russia also intend to export Kamov-226Ts to other countries.

The Kamov is a replacement for the obsolete Cheetah and Chetak fleets of the Indian armed forces. The three services need 495 light-utility helicopters (LUH) to replace Cheetah/Chetak fleet of helicopters. The Army requires 259, IAF 125 and Navy around 111 such helicopters equipped with anti-submarine warfare (ASW) capabilities.

Cheetah/Chetak helicopters are based on the 1950s' designed Alouette Aérospatiale 315B Lama of France.

While the Naval tender is separate from this contract, the demand for some 384 light copters will be met by the Kamov and the ALH. The HAL is producing 24-26 helicopters per year and the Ministry of Defence wants it to produce at least 80 per annum.

India and Russia concluded an inter-governmental agreement (IGA) for 200 helicopters in October 2015. As per the original tender, 60 helicopters will be imported from Russia and the rest will be built in India. A joint venture (JV) has already been set up between HAL and Russia's Rostec – JSC Rosoboronexport and Russian Helicopters.

To cost \$4 billion

The price for the 200 copters would be around \$4 billion (Rs 28,000 crore approximately), sources said. This would also include transfer of 50% technology, including structure of the copter, its blades and landing gear

<https://www.tribuneindia.com/news/india-russia-conclude-price-talks-for-200-kamov-copters-28588>



Sat, 18 Jan 2020

U.K. working on government-to-government format for defence deals

Decision taken due to India's preference for such an arrangement, said Brig. Gavin Thompson, U.K. Defence Adviser

By Dinakar Peri

New Delhi: The UK government is working on a government-to-government framework for defence deals in future given India's preference for such an arrangement, Brig. Gavin Thompson, U.K. Defence Adviser in India said on Friday.

"We have worked very hard since April last year to get all departments in U.K. to get this mechanism. We are at a point where we can send this proposal to the Indian government," Brig. Thompson said. The mechanism needs to be agreed to by both sides, he stated.

However, unlike the Foreign Military Sales (FMS) route of the U.S. government where the government levies a small service charge, Brig. Thompson said there are no overheads built into the contract.

"It is a lighter model," he stated, adding U.K. presently does not have such a mechanism.

In the last few years, India has concluded multi-billion dollar deals through the Inter-Governmental route for Rafale jets, S-400 air defence systems and stealth frigates, among others.

During Aero India at Bengaluru last year, U.K. made a pitch to India for collaboration in the areas of aircraft carriers and development of 6th generation fighter aircraft technologies. In this regard, Brig. Thompson said the Queen Elizabeth class aircraft carriers are 30% of the cost of the U.S. carriers, provide 60% of the sortie rate, and require only 25% of the manning compared to US aircraft carriers.

There is also interest in the Indian Navy on the U.K.'s progress in integrated electric-propulsion and have exchanged subject matter experts. Recently, HMS Defender, a Type 45 destroyer, was in Goa and 27 Indian Navy officers went onboard for interactions, the Defence Adviser stated.

There are three Memorandums of Understanding (MoU) between the U.K. and India lined up, said Dominic Beales of Defence and Security Organisation in India. While a Defence Equipment Memorandum (DEM) was signed in April last year renewing an earlier agreement, the Logistics MoU has been discussed with Indian officials and "is about to formally enter the Indian system, and the Training MoU is in progress," he stated.

"We are looking at collaboration, for co-development and co-IP sharing and exports," Mr. Beales added.

<https://www.thehindu.com/news/national/uk-working-on-government-to-government-format-for-defence-deals/article30588418.ece>

India's GSAT-30 satellite successfully launched from French Guiana

After a flight lasting 38 minutes 25 seconds, GSAT-30 separated from Ariane 5 upper stage in an elliptical Geosynchronous Transfer Orbit

By T E Narasimhan

Chennai: India early Friday launched a communication satellite called GSAT-30 from French Guiana on the northeast coast of South America, aiming to use the space device to improve broadcasting and connectivity in the country.

European space consortium Arianespace's Ariane 5 VA-251 rocket lifted off from Kourou, the launch base, at 2:35 am IST to carry GSAT-30 for the Indian Space Research Organization (ISRO) and the Eutelsat Konnect satellite for the French telecommunications company Eutelsat.

After a flight lasting 38 minutes 25 seconds, GSAT-30 separated from Ariane 5 upper stage in an elliptical Geosynchronous Transfer Orbit.

“The satellite will provide communication services to Indian mainland and islands through Ku-band and wide coverage covering Gulf countries, a large number of Asian countries and Australia through C-band,” said ISRO chairman K Sivan in a statement.

“GSAT-30 will provide DTH Television Services, connectivity to VSATs for ATM, Stock-exchange, television uplinking and Teleport Services, Digital Satellite News Gathering (DSNG) and e-governance applications.

ISRO's Master Control Facility (MCF) at Hassan in Karnataka took over the command and control of GSAT-30 immediately after its separation from the launch vehicle. Preliminary health checks of the satellite revealed its normal health.

In the days ahead, orbit-raising manoeuvres will be performed to place the satellite in Geostationary Orbit (36,000 km above the equator) by using its on-board propulsion system.

During the final stages of its orbit raising operations, the two solar arrays and the antenna reflectors of GSAT-30 will be deployed. Following this, the satellite will be put in its final orbital configuration. The satellite will be operational after the successful completion of all in-orbit tests.

https://www.business-standard.com/article/current-affairs/india-s-gsat-30-satellite-successfully-launched-from-french-guiana-120011700139_1.html

India's first mega science caravan to land in Delhi tomorrow

New Delhi: India's first-of-its-kind science caravan showcasing the country's contribution to the world's big-ticket scientific projects like LIGO and CERN is going to halt in the national capital from Tuesday for two months after making stoppages in Mumbai, Bengaluru and Kolkata for the last nearly one year.

The last leg of 'Vigyan Samagam', which will be inaugurated in the city's National Science Centre by Union minister Jitendra Singh to showcase replicas of multi-country projects, provides a common platform for all mega-science programmes of the world.

Talking to TOI, Atomic Energy Commission (AEC) secretary Arun Srivastava said, "The idea to organise Vigyan Samagam was conceived in August 2018 to showcase India's contribution to the CERN project, which is the world's largest accelerator laboratory located between France and Switzerland. Later, members of other global projects like LIGO (gravitational-wave observatory), FAIR (proton and ion research facility in Germany), INO (neutrino observatory in Tamil Nadu), ITER (thermonuclear experimental reactor in France), TMT (upcoming Thirty Meter Telescope to probe cosmos), Square Kilometer Array (hundreds of telescopes spread over two continents in Africa and Australia being set up for monitoring the sky in different radio frequencies) and MACE (world's second-largest gamma ray telescope being set up in Ladakh) also chipped in."

The AEC secretary added, "Development of spinoff technologies is the outcome of such big science projects. The birth of internet started from CERN, when project scientists wanted to communicate and transfer a huge amount of data to their counterparts in 140 countries. Today, nobody can live without internet. These mega projects may look expensive now, but in future, when our natural resources get depleted, these projects will provide an answer to other sources of energy in the universe."

On target audience, Srivastava said, "The objective is to target students, academia and the industry so that students know what is there in science for them in future and for the industry, a hybrid of all those projects where they can participate. And the response for the event is huge. In Mumbai, the footfall was 1.4 lakh, 1.3 lakh in Bengaluru, 3 lakh in Kolkata and in Delhi, we are expecting 2-3 lakh people."

All top scientists like LIGO-US associate director (operations) Fred Raab and director general of FAIR, nuclear scientist Anil Kakodkar, former ISRO Chief K Kasturirangan, former DRDO chief V K Saraswat, are participating in the project.

<https://timesofindia.indiatimes.com/city/delhi/indias-first-mega-science-caravan-to-land-in-delhi-tomorrow/articleshow/73396774.cms>

India takes big leap in gamma ray study

By Archana Jyoti

New Delhi: Conceived in 2008, the much-awaited world's second largest and indigenously-made MACE (Major Atmospheric Cherenkov Experiment) gamma ray telescope is all set to function from 2020 year-end. Once the MACE system is operational, India will find its place in the elite scientific community working in field of gamma ray study.

The telescope is next to the upcoming High Altitude Energy Gamma Ray (HAGAR) observatory at 14,000 feet at Hanle in Ladakh. It has a 21-metre diameter reflector and 45-metre height with 356 mirror panels.

The first and the biggest gamma ray telescope is in La Palma in Canary Islands set up jointly by Switzerland and Germany in 2011.

Scientists involved with the project said here that an array of seven telescopes for monitoring spectacular celestial events like explosion of stars, falling of matters into black holes and collision of extraterrestrial objects have already been installed. It will detect very high energy gamma rays in the energy range of 20GeV to 10 TeV using the earth's atmosphere as part of its detection system.

“Commissioning trials of the MACE are being conducted presently,” said Nilay Bhatt from Bhabha Atomic Research Centre (BARC), which has played a lead role in setting up the project. He was sharing the details of the project at a curtain raiser for Vigyan Samagam to be held in the national Capital at National Science Centre where the MACE, one among various mega science projects being undertaken in India and abroad in collaboration with other countries, will be showcased.

Bhatt said, “Equipped with a large light collector consisting of 356 mirror panels of area 1 sqm each and 1,088 channel photomultiplier tube based imaging camera, MACE will detect extremely short (few nanoseconds) Cherenkov flashes generated by cosmic gamma rays.

“It is expected to start observations by the end of the year. To begin with it will observe a Supernova remnant called Crab to validate its performance and then it is open for explorations in space. We welcome Indian universities and institutes to make use of the facility,” he added.

MACE, which will be operated in the dark nights only, will also help understand the nature of cosmic accelerators and the radiation emission processes in extreme environments.

The telescope will help the scientific community enhance its understanding in the fields of astrophysics, fundamental physics, and particle acceleration mechanisms, explained Bhatt.

Fully designed and manufactured in India, the project is a collaboration of Tata Institute of Fundamental Research (TIFR) from Mumbai and Indian Institute of Astrophysics (IIA), Bengaluru besides Bhabha Atomic Research Centre (BARC). It was manufactured by industrial partner Electronics Corporation of India Ltd (ECIL).

<https://www.dailypioneer.com/2020/pioneer-exclusive/india-takes-big-leap-in-gamma-ray-study.html>

SpaceX ready for astronaut mission now

SpaceX completed the last big test of its crew capsule before launching astronauts to ISS in as little as two months, mimicking an emergency escape shortly after liftoff on Sunday.

No one was aboard for the wild ride in the skies above Cape Canaveral, just two mannequins. A Falcon 9 rocket blasted off as normal, but just over a minute into its supersonic flight, the Dragon crew capsule catapulted off the top 20 km above the Atlantic.

Powerful thrusters on the capsule propelled it up and out of harm's way, as the rocket engines deliberately shut down and the booster tumbled out of control in a fiery flash.

The capsule reached an altitude of about 44 km before parachuting into the ocean just offshore to bring the 9-minute test flight to a close and pave the way for Nasa astronauts to climb aboard next time. Nasa administrator Jim Bridenstine wrote on Twitter, 'This critical test puts us on the cusp of once again launching American astronauts on American rockets from American soil.'

<https://timesofindia.indiatimes.com/home/science/spacex-ready-for-astronaut-mission-now/articleshow/73412167.cms>