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India test-fires locally developed K-4 SLBM

By Rahul Bedi

New Delhi: India's government-run Defence Research and Development Organisation (DRDO) successfully test-fired on 19 January its locally developed, nuclear-capable K-4 intermediate-range submarine-launched ballistic missile (SLBM) off the country's east coast to its longest range so far, military sources revealed on 20 January.

Although no official confirmation has yet been provided by the DRDO of the 19 January day-time firing of the SLBM, the sources told *Jane's* on condition of anonymity that the 12 m-long K-4 was launched from an underwater pontoon near Visakhapatnam out to a distance of about 2,200 km.

This was 1,300 km short of the maximum 3,500 km range claimed by the DRDO, but reportedly "far in excess" of the range the missile had achieved in its previous test-firing from a similarly submerged platform in March 2016, the sources stated. The test also demonstrated that the DRDO has resolved the missile's earlier problem of 'tilting' after emerging from the water, they added.

The K-4 was first test-fired from an underwater pontoon in January 2010 but both the Ministry of Defense and the DRDO have refused to confirm any of the ranges attained by the SLBM in trials.

Weighing 17 tonnes and capable of carrying a 2.2 tonne warhead, the K-4's flight-path was tracked by DRDO radars, electro-optical systems, and coastal telemetry stations for about 1,500 km and thereafter by radar on Indian Navy (IN) ships deployed in the Bay of Bengal.

The military sources said further details of the latest test-firing will only be known to the DRDO once the IN platforms involved in the trials return to base, which will also determine the number of additional tests required before the SLBM is declared operational.

The K-4, which has suffered several technical setbacks over the past decade, is being developed to arm the indigenously designed Arihant-class nuclear-powered ballistic missile submarines (SSBNs), one of which is in service, with at least two more being built locally.

These SSBNs, each of which has been designed to carry four K-4s, are expected to bolster the IN's nuclear strike capability as part of India's three-tier retaliatory nuclear deterrence strategy.

<https://janes.ihs.com/Janes/Display/1964499>

समुद्र से 3500 किमी एटमी हमले की रेंज हासिल करके भारत ने अपना रक्षा घेरा संपूर्ण कर लिया है के-4 मिसाइल ने दी जवाबी हमले की शक्ति



रंजीत कुमार

समुद्र से छोड़ी जाने वाली बैलिस्टिक मिसाइलों की दुनिया में भारत ने एक अहम छलांग लगाई है। 19 जनवरी को भारतीय रक्षा वैज्ञानिकों ने 3500 किलोमीटर तक मार करने वाली के-4 मिसाइल का सफल परीक्षण किया। इस तरह भारत ने सही मायने में त्रिआयामी परमाणु ताकत हासिल कर ली है। इसे हम आम शब्दों में न्यूक्लियर डिटरेंस यानी दुश्मन में परमाणु खौफ पैदा करने की ताकत भी कह सकते हैं। दुश्मन के परमाणु हमले का जवाब देने के लिए सेकंड स्ट्राइक कैपेबिलिटी यानी दुश्मन पर जवाबी हमले की ताकत को इस परीक्षण के जरिये हासिल किया जा सका है। हालांकि भारतीय वैज्ञानिकों ने सागरिका (के-15) नाम की सबमरीन लांच्ड बैलिस्टिक मिसाइल (एसएलबीएम) का परीक्षण करीब 12 साल पहले ही कर लिया था लेकिन इसकी मारक दूरी केवल 750 किलोमीटर थी।

■ ब्लैकमेल का दौर गया

पिछले एक दशक से विकसित की जा रही इस मिसाइल के परीक्षण पहले भी हो चुके हैं लेकिन अब भारतीय मिसाइल वैज्ञानिकों का दावा है कि इसके ताजा परीक्षण सभी पैमानों पर खरे उतरे हैं और यह अरिहंत परमाणु पनडुब्बी पर तैनात करने लायक हो चुकी है। भारतीय रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने जमीन से छोड़ी जाने वाली अग्नि श्रृंखला की इंटरकॉन्टिनेंटल बैलिस्टिक मिसाइलों का विकास किया है जिनमें अधिकतम 5000 किलोमीटर तक

मार करने वाली अग्नि-5 मिसाइल भारतीय शस्त्र भंडार में शामिल हो चुकी हैं। लेकिन जमीन की तुलना में समुद्री बैलिस्टिक मिसाइल का विकास तकनीकी रूप से काफी जटिल होता है। जाहिर है, भारतीय मिसाइल वैज्ञानिकों ने समुद्री मिसाइलों की दुनिया में अपनी क्षमता दिखा कर दुनिया की अन्य मिसाइल ताकतों को आगाह किया है कि भारत को कोई भी सैन्य ताकत अपनी परमाणु मिसाइलें दिखाकर ब्लैकमेल नहीं कर सकती।

के-4 मिसाइल की कामयाबी से भारत की जवाबी परमाणु क्षमता सिद्ध हो चुकी है। इस मिसाइल की बढौलत भारत जमीन, आसमान और समुद्र के भीतर से परमाणु हथियार छोड़ने की ताकत यानी त्रिआयामी परमाणु क्षमता (न्यूक्लियर ट्रायड) को भी साबित करने में कामयाब हुआ है। आज की दुनिया में त्रिकोणीय परमाणु प्रतिरोधक क्षमता की अहमियत इसलिए है कि कोई देश यदि भारत पर पहले परमाणु हमला कर देता है तो उसका समुचित जवाब देने के लिए

जमीन पर अग्नि श्रृंखला की मिसाइलें और आकाश में सुखोई-30 व मिराज-2000 जैसे लड़ाकू विमानों से परमाणु हमले की क्षमता भारत के पास पहले से मौजूद है

भारत को तैयार रहना होगा। त्रिकोणीय परमाणु प्रतिरोधक क्षमता समुद्री बैलिस्टिक मिसाइलों की बढौलत ही हासिल की जा सकती है क्योंकि इसे सुदूर महासागर में कहीं भी किसी परमाणु पनडुब्बी में छिपाकर रखा जा सकता है, जिसकी भनक दुश्मन देश को नहीं लग सकती।

750 किलोमीटर मारक दूरी वाली के-15

मिसाइल K-4	12 mt लंबाई
3500 km रेंज	1.3 mt चौड़ाई
2000 kg वॉरहेड	17 tn वजन

**प्रतीकात्मक तस्वीर, आंकड़े 2016 के*



सागरिका बैलिस्टिक मिसाइलें भारत ने पहले ही अपनी पनडुब्बियों पर तैनात रखी हैं लेकिन इनकी अपनी सीमा है। दुश्मन देश पर गिराने के लिए इसे दुश्मन के समुद्र तट से काफी नजदीक ले जाना होगा, जहां वह राडार की पकड़ में आ सकती है। आज की सामरिक जरूरत लंबी दूरी वाली समुद्री बैलिस्टिक मिसाइलों को तैनात करने की है क्योंकि चीन के पास 8000 किलोमीटर और अमेरिका तथा रूस के पास इससे भी अधिक मारक दूरी वाली समुद्री परमाणु बैलिस्टिक मिसाइलें भारी संख्या में जमा हो चुकी हैं। इनके मुकाबले भारत की पनडुब्बी से छोड़ी जाने वाली बैलिस्टिक मिसाइल (एसएलबीएम) के-4 कम मारक दूरी वाली है, लेकिन इससे इस मिसाइल की अहमियत कम नहीं हो जाती है। इतनी मारक दूरी वाली

मिसाइल भारत की सामरिक आवश्यकताएं पूरी करेगी, हालांकि भारत के-4 से भी अधिक मारक दूरी वाली के-5 और के-6 श्रृंखला की समुद्री बैलिस्टिक मिसाइलों की महत्वाकांक्षी योजना पर भी काम कर रहा है जो पांच और छह हजार किलोमीटर दूर तक मार कर सकती हैं।

के-4 मिसाइलों की 3500 किलोमीटर की मारक दूरी खासकर चीन के लिए चिंता पैदा करने वाली साबित होगी। इससे लैस अरिहंत परमाणु पनडुब्बी को बंगाल की खाड़ी या फिर सुदूर दक्षिण चीन सागर के इलाके में भी छुपा कर तैनात रखा जा सकता है, जहां से जरूरी होने पर चीन के किसी बड़े शहर को आसानी से निशाना बनाया जा सकता है। हालांकि परमाणु बमों से लैस लंबी दूरी की बैलिस्टिक मिसाइलें किसी देश पर गिराने के लिए

नहीं तैनात की जातीं। इन्हें हासिल कर लेने से ही एक देश को इतनी ताकत हासिल हो जाती है कि दुश्मन देश डर कर पहले परमाणु हमला करने की जुरत ही नहीं कर पाता। आज जब अमेरिका और रूस ने बैलिस्टिक मिसाइलों के विकास और तैनाती को रोकने वाली स्टार्ट संधि को निरस्त करके नई किस्मों की बैलिस्टिक मिसाइलें तैनात करनी शुरू कर दी हैं, तब दुनिया की एक बड़ी ताकत के तौर पर उभरते भारत के लिए भी अपनी मांसपेशियां दिखाते रहना जरूरी है।

■ त्रिकोणीय परमाणु क्षमता

के-4 मिसाइल का ताजा परीक्षण भारत की परमाणु अवधारणा के अनुरूप है। भारत का परमाणु सिद्धांत यानी न्यूक्लियर डॉक्ट्रीन कहता है कि वह किसी भी देश पर पहले परमाणु हमला नहीं करेगा लेकिन यदि भारत पर कोई देश पहला परमाणु हमला करने में कामयाब हो जाता है तो उसका जवाब फौरन दिया जाएगा। इसीलिए त्रिकोणीय परमाणु क्षमता हासिल करना भारत के लिए जरूरी है। इस क्षमता का अर्थ है कि परमाणु बमों से लैस भारत की बैलिस्टिक मिसाइलें जमीन, आसमान और समुद्र में निरंतर तैनात हों। जमीन पर अग्नि श्रृंखला की मिसाइलें और आसमान पर सुखोई-30 और मिराज-2000 जैसे लड़ाकू विमानों से परमाणु हमला करने की क्षमता भारत के पास पहले से है। केवल समुद्री मिसाइल क्षमता की कमी रह गई थी। के-4 एसएलबीएम की बंदौलत भारत ने इस खाई को भरा है। चूंकि ये मिसाइलें किसी परमाणु पनडुब्बी पर ही तैनात की जा सकती हैं इसलिए भारत ने अरिहंत परमाणु पनडुब्बी को अपने नौसैनिक वेड़े में सक्रिय कर दुनिया को संदेश दिया है कि कोई भी देश उसपर अपनी सैन्य शक्ति की धौंस नहीं जमा सकती।

Key components of K-4 missile designed, developed in Pune

The K-4, which is an intermediate-range missile with maximum range of 3,500 kilometres, has been designed to arm the Arihant Class submarines of the Indian Navy

By Sushant Kulkarni

The nuclear capable submarine-launched ballistic missile, K-4, which was successfully test-fired Sunday, had some of its key components designed and developed at the three facilities of Pune-headquartered Armament and Combat Engineering (ACE) cluster of the Defence Research and Development Organisation (DRDO).

The K-4, which is an intermediate-range missile with maximum range of 3,500 kilometres, has been designed to arm the Arihant Class submarines of the Indian Navy. On Sunday, the test was conducted off the coast of Andhra Pradesh from an underwater platform in the Bay of Bengal during daytime, news agency ANI reported. The missile is part of the K series of the missile, which are Submarine Launched Ballistic Missiles (SLBMs) named after Dr APJ Abdul Kalam.



The testing of various stages of development of the missile started in 2010 and the developed missile has been test-fired successfully in 2014 and 2016. Sources said that the test Sunday further validated the capabilities of the missile to carry nuclear warheads.

The three facilities of the ACE cluster of the DRDO that contributed to the development of the missile are High Energy Material Research Laboratory (HEMRL) and Research and Development Establishment (Engineers), also known as R&DE (Engrs) in Pune, and Advanced Centre for Energetic Materials (ACEM) in Nashik.

The high energy and motor systems of the missile have been designed, developed and made by HEMRL and ACEM. The launch system of the missile has been developed by the R&DE (Engrs).

The HEMRL, which works in technologies relating to high explosives, propellants and pyrotechnics, has developed propellants and motor systems for almost all the missiles, including Prithvi, versions of the Agni, Akash, and Nag, all developed by the DRDO till now. For K-4, the facility has contributed in design and development of the stage separators, the three motors powering various stages of the missile, the gas generator, the low thrust boosters and some more systems.

Some of these systems have been produced by ACEM, which is a facility that processes composite propellants for various DRDO programmes.

The R&DE (Engrs) not only develops engineering systems for three defence forces, but also ground support mechanisms for various weapons programmes.

The Naval Systems Group of the facility has developed the launch system of the K-4 missile.

“The capability of the hypersonic missile of being able to be launched from a submarine platform will certainly be a key strategic addition to the naval might. But what makes the system even more effective is its high accuracy and the maneuverability. The development of K series missiles is one of the ways DRDO pays tribute to Dr Kalam,” said a DRDO official.

<https://indianexpress.com/article/cities/pune/key-components-of-k-4-missile-designed-developed-in-pune-6226854/lite/>

How K-4 submarine-launched nuclear ballistic missile boosts India's second-strike capability

With a range of 3,500 km and a nuclear or conventional payload capacity of 2-tonnes, the K-4 gives you India unprecedented nuclear deterrent capabilities

KEY HIGHLIGHTS

- *The test, is the latest development in the integration of the K-4 SLBM, reported to have a range of 3,500 km, and capable of carrying a 2-tonne nuclear payload*
- *The 3,500km range of the K-4 will also ensure that India's nuclear submarines can vastly reduce the likelihood of detection during a mission*
- *As of reports from 2017, Pakistan had claimed second-strike capability having successfully launched a SLBM of their own known as Babur III, with an alleged range of 450 km*

On Sunday, the Defence Research and Development Organisation (DRDO) successfully carried out a test launch of the K-4 intermediate-range, nuclear-capable, submarine-launched ballistic missile (SLBM) off a submerged terminal near Andhra Pradesh's coastal line. Although no formal statement has been made by the DRDO or the Ministry of Defence, a Notice to Airmen (NOTAM) was issued at the start of January over a 3,400 km stretch of the Bay of Bengal between 19 and 21 January.

The test, is the latest development in the integration of the K-4 SLBM, reported to have a range of 3,500 km, and capable of carrying a 2-tonne nuclear payload. The missile also features a Ringer Laser Gyro Inertial Navigation System, allowing it to move in three-dimensions when approaching a target at hypersonic speeds.

Testing on the ballistic missile began approximately a decade ago, with the last successful test being carried out in "full operational configuration" from the INS Arihant, India's indigenously built nuclear-powered ballistic missile submarine (SSBN). Along with the K-15 Sagarika SLBM, that is believed to have a range of 750 km, the K-4 will now equip India's Arihant-class of submarines with upgraded nuclear "second-strike" capabilities, providing the Indian Navy with unprecedented deterrence power.

The 3,500km range of the K-4 will also ensure that India's nuclear submarines can vastly reduce the likelihood of detection during a mission. Prior to its development, India's submarines would have had to move within 750 km off enemy shores before being able to carry out an attack. As such, the development of the K-4 will go a long way towards enabling India's INS-Arihant class of nuclear submarines to fulfil their tactical roles of acting as potent nuclear deterrents, especially against China and Pakistan.

As of reports from 2017, Pakistan had claimed second-strike capability having successfully launched an SLBM of their own known as Babur III, with an alleged range of 450 km. It had also struck an agreement with China in 2015 for the purchase of eight Type 41 Yuan-class diesel-electric submarines. China's Jin-class of nuclear-capable submarines though are, reportedly, already armed with SLNMs with a range of 7,200 km.

India is also currently working on the K-5, which is expected to have an estimated range of 5,000 km. However, the S-5 and any further upgrades are being developed for India's second-generation class of ballistic missile submarines (SSBN). It has also been reported that the DRDO has been given approvals to develop the K-6 SLBM as well, expected to have a range of 6,000 km.

<https://www.timesnownews.com/india/article/indias-successful-missile-test-how-the-k-4-missile-gives-india-unprecedented-deterrence-capabilities/542348>

Air Force's LCA to get Astra firepower, not Rafale's Meteor

Sources said after the missile is inducted into the Su30MKI fighter jets from which it has been tested, the system would be integrated on other foreign-origin combat aircraft. The performance of the Astra, sources said, is regarded to be better than similar Russian systems currently in service

By Manu Pubby

New Delhi: The Air Force is keen to make the indigenous Astra missile its standard long-range weapon for fighter aircraft and is promoting its integration on board the Light Combat Aircraft (LCA) as well as other platforms, top officials have told ET.

The LCA will not bear Meteor — beyond visual range air-to-air missile (BVRAAM) — that is standard on the Rafale fighter jets, with the French side expressing its reluctance to integrate the weapon with an aircraft equipped with an Israeli-origin radar and the Air Force determined to bring down the heavy imports bill by selecting a home-grown option.

“We are not even looking at the French option. We want to promote the indigenous system and have it equipped across all our platforms. The Astra development programme has been satisfactory,” a top official said.

Sources said after the missile is inducted into the Su30MKI fighter jets from which it has been tested, the system would be integrated on other foreign-origin combat aircraft. The performance of the Astra, sources said, is regarded to be better than similar Russian systems currently in service.

User trials for Astra have been completed and the next stage, DRDO officials say, is for the first production order for the missile system. On board the LCA, integration tests are being carried out and the missile is likely to be part of the weapons package for 83 of the Mk1A version that is set to be ordered shortly.

Currently, the missile has a range of over 100 km and has been successfully test-fired against Banshee target aircraft simulating all possible threat scenarios. In the most recent user trials last September, the missile was launched with a warhead against manoeuvring targets that were neutralised, including a direct hit of the target at maximum range.

As reported by ET, DRDO is looking to nearly doubling the range of the missile to make it the most lethal weapon in India's air-to-air arsenal. “Astra initially had some technological challenges, which have been overcome successfully. With our persistent effort and with active IAF support, all the user evaluation has been completed and Astra is now ready for induction,” DRDO Chief G Sateesh Reddy had told ET.

Hindustan Aeronautics Ltd (HAL) has played a significant role in modifying the aircraft for weapon integration and over 50 public and private industries are involved in building the Astra weapon system.

<https://economictimes.indiatimes.com/news/defence/air-forces-lca-to-get-astra-firepower-not-rafales-meteor/articleshow/73466978.cms>