

To counter mines, Navy explores unmanned, underwater options

The Navy is looking for ‘man out of the loop’ solutions that could involve autonomous systems that are being developed by the Defence Research and Development Organisation (DRDO) as well as foreign vendors, sources said

By Manu Pubby

New Delhi: The Navy is exploring alternative methods to protect its warships and ports as plans to procure a new class of mine hunting warships — in the works since 2005 — have seen limited movement.

Sources told ET that innovative solutions are being considered, including procurement of unmanned vessels and underwater systems to protect warships, besides the induction of ‘clip on’ suites that can be used by individual vessels.

The Navy is looking for ‘man out of the loop’ solutions that could involve autonomous systems that are being developed by the Defence Research and Development Organisation (DRDO) as well as foreign vendors, sources said.

Left without a single mine counter measure vessel in its fleet after the retirement of the INS Kozhikode in April, the Navy has ordered special suites for some of its warships – sensors that can be fitted to provide limited mine detection capability. These ‘solo suites’ could also be increased in the future.

The Navy’s experience with adding mine hunting vessels has been bitter, with several rounds of setbacks. The government has nominated Goa Shipyard Limited (GSL) for the Rs 32,000-crore project to construct 12 mine hunters but the yard has been unable to decide on a foreign technology partner.

Minesweepers are specialised warships that are used to clear harbours and other critical areas of mines laid by enemy submarines or vessels. As reported by ET, India has been trying unsuccessfully since 2005 to find replacements, with its dealings with South Korean firm Kangnam hitting controversy at least twice.

In the first instance, the Korean firm was dropped by the UPA government after allegations surfaced that it had appointed ‘consultants’ for the contract, in a violation of Indian procurement norms. A second round of negotiations broke down in 2017 after talks failed on technology transfer.

GSL made another attempt in 2018 to rope in a foreign collaborator, with responses received from Italy and Russia but a final choice has not been made. Sources said that some technical requirements that were seen as being too restrictive are now being eased up to ensure a more competitive process with multiple bidders.

<https://economictimes.indiatimes.com/news/defence/to-counter-mines-navy-explores-unmanned-underwater-options/articleshow/72302589.cms?from=mdr>

Innovative Solutions

Unmanned vessels, underwater systems to protect warships, ports

‘Clip on’ suites that can be used by individual vessels

‘Man out of the loop’ solutions with autonomous systems developed by DRDO, foreign vendors

THE PROBLEM

NO MINE COUNTER measure vessel in Navy’s fleet after INS Kozhikode retired in Apr



Naval Tejas gets ready to operate from aircraft carrier by March

AJAI SHUKLA

New Delhi, 29 November

In Goa on Friday, the naval version of Tejas light combat aircraft (LCA) set a landmark by taking off with the added weight of weapons on board — two long range and two close combat air-to-air missiles.

The Tejas prototype took off from the Navy's Shore Based Test Facility (SBTF), but exactly as it would have from an aircraft carrier. Restraining gear locked the fighter's wheels as the engine revved up to maximum power. Then, as the restraining gear disengaged, the unleashed fighter rocketed forward. Exactly 204 metres later — the length of an aircraft carrier deck — the fighter sped over a ski-jump and was airborne.

Girish Deodhare, chief of the Aeronautical Development Agency (ADA), the Defence R&D Organisation (DRDO) agency in charge of the Tejas programme, said the Naval Tejas had completed over 50 take-offs from SBTF, with increasing weight and decreasing take-off distance. In addition, the fighter has carried out 28 arrested landings.

"We are confident the Naval Tejas is ready for an actual carrier deck landing. In the first quarter of 2020, we will land the prototype on INS Vikramaditya and take off from the aircraft carrier as well," Deodhare told *Business Standard*.

This requires the navy's only aircraft carrier, INS Vikramaditya, to be freed from operational duties and made available for testing. Before the first landing, it will first make a few approaches for the test pilots to see how the fighter reacts to the warships "wake" — the wind turbulence created by structures on the warship, which buffets the approaching fighter. Once the pilots are comfortable with that, they will actually land the fighter on the carrier's deck.

A carrier deck landing is described as a "controlled crash". The fighter's tail hook must engage with wires laid across the landing deck, which unspool, dragging the fighter to a halt quickly. To achieve the extreme precision this requires, the



The Tejas prototype took off from the Navy's SBTF, but exactly as it would have from an aircraft carrier. Restraining gear locked the fighter's wheels as the engine revved up to maximum power

fighter must descend more sharply than in a regular landing, with the impact absorbed by the heavy landing gear that characterises naval fighters.

If the first landing and take-off goes off uneventfully, it will be followed by more, as the test pilots generate inputs to fine-tune the software that controls carrier landings and take-offs, which are largely controlled by flight computers.

At the same time, ADA and the Navy would fine-tune the drills for operating a fighter from a carrier. This includes maintaining an aircraft on board, preparing it for flight, taking it on a lift from the hangers below decks to the flight deck and the drills for getting airborne and landing.

ADA sources say about 200 technicians have lived on aircraft carriers, to fine-tune maintenance and operating drills on board.

The Navy, however, does not intend to induct the single-engine Naval Tejas Mark I into service — it is merely a test-bed for the aviation systems that will equip the twin-engine Naval Tejas Mark 2. The Navy wants the safety back up of a second engine, the power to get airborne with

more fuel and weapons, and a longer operating range.

"Using navy-specified technologies matured with the current Mark I, we are developing a twin-engine Mark 2 version, which we are calling the Twin Engine Deck Based Fighter (TED-BF)," said Deodhare.

With the current Tejas' single General Electric (GE) F-404 engine replaced by two, more powerful, GE F-414 engines, the TED-BF will be a far bigger and heavily armed fighter.

The current Tejas Mark 1 gets airborne with a total "all-up weight" (AUW) of 14 tonnes. The air force version of the Tejas Mark 2, which will have a single GE F-414 engine, will have an AUW of 17 tonnes. And the navy's Tejas Mark 2 (or the TED-BF), powered by two GE F-414 engines, will have a beefy AUW of 24 tonnes, says Deodhare.

ADA is targeting 2025-26 for the first flight of the TED-BF. The Navy wants the fighter to be inducted into service by 2031, to replace the MiG-29K/KUB that flies off INS Vikramaditya and will serve on board the first indigenous aircraft carrier, INS Vikrant, when it is commissioned in 2021.

DRDO equips naval version of LCA with BVR, CCM missiles

ANI | Updated: Nov 29, 2019 22:57 IST

New Delhi [India], Nov 29 (ANI): In a major boost for its capability expansion, the Defence Research and Development Organisation (DRDO) has successfully equipped the naval version of the light combat aircraft (LCA) with two Beyond Visual Range (BVR) missiles and two Counter Counter Measures (CCM) missiles.

"One more step in launch capability expansion for LCA Navy. Two BVR plus Two CCM missiles," tweeted the DRDO on Friday.

The LCA Navy had recently carried out a successful arrested landing at the Shore Based Test Facility (SBTF) in Goa.

A light combat aircraft is a light multi-role jet military aircraft mostly coming from advanced trainers that have been modified or designed for engaging in light combat missions, either in the light strike or attack missions, reconnaissance or interdiction roles while some keeping its trainer role.

HAL has developed LCA Tejas for the Indian Air Force (IAF) and the Indian Navy. (ANI)



<https://www.aninews.in/news/national/general-news/drdo-equips-naval-version-of-lca-with-bvr-ccm-missiles20191129225727/>

DRDO launches Naval Tejas fighter with Israeli, Russian missiles

In November, the naval Tejas achieved its first night-time arrested landing

The Defence Research and Development Organisation on Friday announced it had achieved another step in expanding the capabilities of the naval variant of the indigenous Tejas fighter, which is under development.

In a tweet, the DRDO announced it had launched the aircraft with two beyond-visual-range air-to-air missiles and two close-combat missiles from its land-based testing facility. The DRDO's official Twitter handle informed, "One more step in launch capability expansion for LCA Navy. Two BVR plus Two CCM missiles."

The beyond-visual-range missile is the Derby, a radar-guided missile from Israel, and the close-combat missile is the R-73 from Russia, a weapon that uses infra-red guidance.

DRDO also tweeted an image of the naval Tejas aircraft taking off from a 'ski-jump' at the shore-based test facility in Goa. Ski-jumps help an aircraft take off on their own power, while improving their climb rate. Ski-jumps are the only option to launch aircraft at higher weights for aircraft carriers lacking catapults for assisted take-offs. The shore-based facility simulates the launch of aircraft from aircraft carriers such as the INS Vikramaditya and the under-construction INS Viraat, both of which use ski-jumps.

The Derby missile was first purchased by the Indian Navy nearly a decade ago for its Sea Harrier fighters, which are now retired. The missile is also in service with the Indian Air Force in its ground-launched SpyDer air defence system. The Derby missile can shoot down a target nearly 60km away. Interestingly, Israel's Rafael, the company building the Derby, has offered to sell India an upgraded variant of the weapon called the I-Derby ER, which has a range of 100km.

In April last year, a Tejas fighter successfully tested a Derby missile.

The R-73 has been in service with the Indian Air Force and Navy for several years on their Russian-origin fighter jets. The R-73, a highly manoeuvrable missile, can hit a target about 25-30km by homing in on its heat emissions. Interestingly, Wing Commander Abhinandan Varthaman claimed to have shot down a Pakistani F-16 with an R-73 missile fired from his MiG-21 fighter during the February aerial skirmish over the LoC.

The test flight with the Derby and R-73 missiles marks another milestone for the naval Tejas programme, which was almost staring at an abyss in 2017, when the Indian Navy sought to disassociate itself from the initiative on the grounds the aircraft was 'underpowered'. Since then, the Indian Navy has sought to obtain a 'Mk2' variant equipped with a higher-thrust engine.

In November, the naval Tejas achieved its first night-time arrested landing at the shore-based test facility, two months after the first successful arrested landing. Arrested landings are an essential part of aircraft carrier operations.

<https://www.theweek.in/news/india/2019/11/29/drdo-launches-naval-tejas-fighter-with-israeli-russian-missiles.html>

DRDO defends Nag missiles

A statement on the recent test-firing of Israeli missile Spike raises questions on the indigenous initiative

By Dinakar Peri

New Delhi: The state-of-the-art indigenous Anti-Tank Guided Missile (ATGM) Nag is in advanced stages of development, the Defence Research and Development Organisation (DRDO) has said in a sharp response to statements that raised questions on the programme. A new Man Portable ATGM (MPATGM) was also in advanced stages of trials, it noted.

Early this week, the Army fired two newly inducted Spike-LR (Long Range) ATGM at the Infantry School at Mhow in Madhya Pradesh. It recently procured a small lot of 12 launchers and around 250 missiles from Israel under the new financial powers for emergency procurements sanctioned by the Defence Ministry a few months back.

A statement on the test-firing, issued by a public relations firm on behalf of Spike manufacturer Rafael Advanced Defense Systems, said that with the confidence in the missile established, the Indian Army may need to “revisit” their plans for third generation missiles.

“Both the DRDO ATGM programme, as well as the invitation to Indian industry to develop a 3rd Gen missile will need a rethink, as having a 4th Gen missile will put the plan for the development of a 3rd Gen missile questionable,” the statement said.

It further stated that Rafael had established a joint venture with the Kalyani Group, which was “capable of manufacturing Spike missiles in India, and will also look at export opportunities from India.”

A DRDO statement on Twitter said the statement was circulating “incorrect facts.”

‘Best in its class’

Nag, the 3rd gen ATGM, was in the process of being inducted after extensive tests. The MPATGM, in an advanced stage of development, defence sources said, was a fourth generation ATGM. Six tests had been conducted so far and all developmental trials were over, a defence source said. “In a year it will be ready for production.” The Nag missile, the best in its class, was built for Indian conditions, officials said.

During summers, in desert conditions the temperature of a battle tank and the sand were the same, the source said and added that “identifying that and firing is a challenge.”

Another official termed the statement on Spike test-firing “unacceptable”. He said it questioned the entire Indian capability. “We now have the capability to build complex systems as per specifications. Our private industry has also come a long way and can support the development,” he added.

Earlier, the Army tried to procure a large number of ATGMs and for this, trials were held and the Spike was short-listed. However, the tender was cancelled during the cost negotiation phase and attempts to procure some systems through an Inter-Governmental Agreement (IGA) did not fructify either. The government then decided to fill the requirement through the indigenous MPATGM.

The Spike-LR being procured is a different variant from the one tested and short-listed as part of the earlier procurement for over 8,000 missiles and 300 launchers along with technology transfer.



The 200-2000 Nag missile test, fired from NAMICA (Nag Missile Carrier) from the Army's Field Firing Range at Shamirpet on the outskirts of Hyderabad. Photo: Special Arrangement.

Earlier, before the IGA was concluded, Army sources stated that some validity trials of the Infrared Seeker (IR) of the missile would be held during Indian summers, as the missile “did not perform as desired in the previous trials during peak summer temperatures in the desert.” The validity trials were not conducted as the IGA fell through.

<https://www.thehindu.com/news/national/drdo-defends-nag-missiles/article30118567.ece>

hindustantimes

Sat, 30 Nov 2019

DRDO refutes report saying Israeli missile superior to India’s

Public relations consultancy Adfactors PR issued the statement on Thursday to announce the successful firing by the army of two newly acquired Spike long-range anti-tank missiles at the Infantry School at MHOW in Madhya Pradesh

New Delhi: Defence Research and Development Organisation on Friday trashed reports based on a statement released by Israeli defence firm Rafael Advanced Defense Systems Ltd stating that its Spike anti-tank guided missile (ATGM) was superior to an under-development DRDO weapon and the indigenous programme needed a rethink.

Reacting to the development, the DRDO tweeted, “A News item relating to Spike Missile testing at the Infantry school MHOW purportedly based on a press release is circulating incorrect facts. The DRDO ATGM is a state of art missile in advanced stages of development.” MHOW is short for the military headquarters of war. Public relations consultancy Adfactors PR issued the statement on Thursday to announce the successful firing by the army of two newly acquired Spike long-range anti-tank missiles at the Infantry School at MHOW in Madhya Pradesh.

Two years ago, India was in advanced stages of negotiating the purchase of 321 launchers and 8,356 fire-and-forget missiles from the Israeli firm in a deal worth \$500 million, but it abandoned the plan in favour of indigenous manufacturing.

A limited quantity of Spike missiles was ordered as a stopgap arrangement and the DRDO was asked to develop the ATGMs for the army’s infantry and mechanised infantry units to provide impetus to the ‘Make in India’ initiative, two army officials said.

The statement said that the Indian Army had been using outdated second-generation missiles for three decades and the Spike missile was the only one to qualify as a replacement for the existing inventory with the negotiations completed in 2016.

“...the Indian Army may need to revisit their plans for 3rd Gen missiles. Both the DRDO ATGM programme, and the invitation to Indian industry to develop a 3rd Gen missile will need a rethink, as having a 4th Gen missile will make the plan for development of a 3rd Gen missile questionable,” it said. A defence ministry spokesperson refused comment on the development.

Rafael Advanced Defense Systems has established a joint venture with the Kalyani Group in India to manufacture Spike missiles. It will look at export opportunities, the statement added.

Former northern army commander Lt Gen BS Jaswal (retd) said there was nothing wrong with Rafael’s claims as Spike is a proven and highly manoeuvrable weapon system. He said the DRDO was entitled to its own view but Spike and the indigenous ATGM don’t match weapon to weapon in terms of capability.

<https://www.hindustantimes.com/india-news/drdo-refutes-report-saying-israeli-missile-superior-to-india-s/story-HhPFTni6xhdZHRpMv89oaK.html>

आर्मी को चाहिए मिसाइल, भिड़े DRDO और इस्त्राइली कंपनी

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■ नई दिल्ली : इंडियन आर्मी मिसाइल की भारी कमी से जूझ रही है। एक तरफ डीआरडीओ फोर्थ जेनरेशन मिसाइल विकसित रहा है, वहीं इस्त्राइली कंपनी राफेल एडवॉंस डिफेंस सिस्टम से आर्मी ने इमरजेंसी खरीद के तहत 210 मिसाइलें ली हैं। अब तक डिफेंस सिस्टम बनाने वाली कंपनियों और डीआरडीओ के बीच की खींचतान की चर्चा डिफेंस कॉरिडोर में ही होती रही है लेकिन शायद पहली बार यह खींचतान खुलेआम सामने आई है।

दो दिन पहले इंडियन आर्मी ने स्पाइक मिसाइल की ट्रेनिंग फायरिंग की। स्पाइक मिसाइल फोर्थ जेनरेशन एंटी टैंक गाइडेड मिसाइल (एटीजोएम) है। इंडियन आर्मी ने यह मिसाइल इस्त्राइली कंपनी राफेल एडवॉंस डिफेंस सिस्टम से ली है। इसकी



विदेशी कंपनी ने DRDO की क्षमता पर उठाए सवाल

- इस्त्राइली कंपनी राफेल एडवॉंस डिफेंस सिस्टम से आर्मी ने इमरजेंसी खरीद के तहत 210 मिसाइलें ली हैं
- स्पाइक मिसाइल की तारीफ के साथ ही अप्रत्यक्ष रूप से डीआरडीओ की काबिलियत पर भी सवाल खड़े किए गए
- डीआरडीओ ने ट्वीट कर लिखा कि एक प्रेस रिलीज गलत फैक्ट्स दे रही है

सफलता पूर्वक फायरिंग के बाद गुरुवार को एक जानी मानी पीआर फर्म की तफ से प्रेस रिलीज जारी की गई। पीआर फर्म के मुताबिक वह राफेल के लिए पीआर का काम देख रही है। रिलीज में स्पाइक मिसाइल की तारीफ के साथ ही अप्रत्यक्ष

रूप से डीआरडीओ की काबिलियत पर भी सवाल खड़े किए गए। रिलीज में लिखा है कि 'डीआरडीओ के डिवेलपमेंट प्रोग्राम (मिसाइल बनाने) में कुछ प्रगति तो हुई है लेकिन इसे यूजर (आर्मी) तक पहुंचने में बहुत वक्त लगेगा।' साथ ही लिखा कि डीआरडीओ से मिसाइल लेने के इंडियन आर्मी के प्लान पर फिर से सोचने की जरूरत पड़ सकती है।

शुक्रवार को डिफेंस सर्किल में इसकी चर्चा होती रही है और डीआरडीओ ने ट्वीट कर इसका जवाब दिया। डीआरडीओ ने ट्वीट कर लिखा कि एक प्रेस रिलीज गलत फैक्ट्स दे रही है। डीआरडीओ की एंटीजोएम स्टेट ऑफ आर्ट मिसाइल है और यह डिवेलपमेंट के अडवॉंस स्टेज में है। दरअसल इंडियन आर्मी को 8000 से ज्यादा मिसाइल की जरूरत है और यह संख्या 'विवाद' के लिए काफी है।

War of words breaks out between Israeli firm and DRDO over anti-tank missiles

Rafael conducted successful test of Spike missiles in Mhow, and asked Army to reconsider decision to take away a huge order & give it to DRDO

By Snehash Alex Philip

New Delhi: An unseemly war has broken out between India's Defence Research and Development Organisation (DRDO) and an Israeli firm over man-portable "tank-killers", or Anti-Tank Guided Missiles (ATGM).

The first salvo was fired by Rafael Advanced Systems Thursday, to which a furious DRDO responded on Twitter.

The reason for this spat is that Rafael had won a Rs 3,200 crore Army tender for 8,356 Spike missiles, 321 launchers and 15 simulators. But in 2017, the order was scrapped after DRDO said it could deliver an indigenous equivalent. The Army, which has been seeking the next generation of 'fire-and-forget' ATGMs for over a decade, instead only ordered just 210 Spike missiles with about a dozen launchers, worth Rs 280 crore, from Rafael.

Rafael's attack

Rafael released a statement, through its public relations agency, announcing the test firing of two newly-acquired Spike LR anti-tank missiles at the Infantry School in Mhow, Madhya Pradesh, which was witnessed by Army chief General Bipin Rawat.

In the statement, Rafael also hit out at the DRDO's ATGM programme, saying "while there seems to have been some progress on the DRDO development programme, it will take a long time for it to reach the user in the field".

The firm added that the Army needed to rethink its order for third-generation missiles, while its system is fourth-generation.

[DRDO @DRDO India](#)

"A News item relating to Spike Missile testing at the Infantry school MHOW purportedly based on a press release is circulating incorrect facts. The DRDO ATGM is a state of art missile in advanced stages of development."

DRDO, which conducted three successful trials of the weapon system at the Kurnool range in Andhra Pradesh in September, is confident that its MP-ATGM, with a range of 2.5 kilometres, will be available for "user trials" by 2020.

What is a fourth-generation missile?

Explaining why its ATGM was better, Rafael said the fourth-generation Spike LR has fire and forget capability, as well as the ability to fire, observe and update, providing substantial flexibility to the firer to pinpoint the impact point. It also has the ability to switch to a different target mid-flight, should the firer want to do so.

“The missile has an inbuilt seeker, which gives the firer the flexibility to use any of two modes: Day (CCD) and Night (IIR). The dual seeker adds to the missile’s reliability, already established at more than 90 per cent during the field evaluation by the Indian Army in 2011,” the firm stated.

India is the 33rd country to have the Spike missile as part of its inventory, and Rafael claimed it has a high success rate.

“More than 5,000 Spike missiles have been fired so far worldwide, with the overall hit percentage being more than 95 per cent. The firer also has the option to fire from either low or high trajectory,” it said.

The Army currently operates second-generation Milan-2T (2-km range) and Konkurs (4-km) ATGMs. Produced by Bharat Dynamics under licence from French and Russian companies, these do not have night-fighting capabilities.

(This report has been updated to clarify that the statement was issued by Israeli firm Rafael and not by the joint venture Kalyani-Rafael Advanced Systems, following a statement from the spokesperson of Kalyani Group)

<https://theprint.in/defence/war-of-words-breaks-out-between-israeli-firm-and-drdo-over-anti-tank-missiles/328098/>