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## Missile programme comes to aid of delay-plagued DRDO

By Chethan Kumar

Bengaluru: The Defence Research and Development Organisation (DRDO)-often described as a 'White Elephant'- has been under constant criticism for delays and technologies that are not up to mark, but its missile programme, even which has had some critical issues has come to its aid time and again.

While multiple DRDO missiles have been tested successfully this year, the Anti-Satellite (A-SAT) missile technology that was tested Wednesday not only put India in an elite club, but has also given DRDO some ammunition to deal with its critics.

VK Saraswat, former DRDO chief and a Niti Aayog member now, says: "It is not that the DRDO has no room for improvement, but the missile programme has done really well over the years, and in the last decade or so there has been significant improvement even in the fields of electronics, radars, life sciences and now with Dhanush (Indian version of Bofors), the agency has done well even in armaments. "

However, the DRDO, as multiple CAG and Parliamentary Standing Committees have pointed out, continues to struggle with delays and cost overruns. Projects like the Arjun main-battle tank, spydrones, radars, even the Light Combat Aircraft (LCA) Tejas continue to remain pain points for the organisation.

### Long way to go

"The demonstration of ASAT is a major milestone, and the DRDO's missile programme, in terms of technology has been good, but if you actually look closely there have been delays even there as in the case of induction of Agni-IV and V ballistic missiles or development of Nirbhay and Astra missiles, " an army officer pointed out.

The agency's top brass is on a high with the success of A-SAT, which came close on the heels of successful tests of NGARM (new-generation anti-radiation missile) and guided Pinaka rocket launcher. Multiple DRDO officials TOI spoke with said that the agency's issues notwithstanding, it has always managed to deliver when it mattered.

But the A-SAT itself is still in its infancy with several critical technologies needed to be proved. A senior DRDO scientist, said: "We'll talk about this a year later, as of today, it is a small step, but a very important one. "

Lt Gen (retd) VK Bhat, former DGQA, says: "There is a very apparent problem of quality and lack of accountability. No doubt that there have been glimpses of excellence within the DRDO but that system needs an overhauling. It cannot function as this monolith that keeps getting funds without accountability. There are several examples like the replacement of INSAS rifles to many more that haven't been delivered till date. "

### Leadership

Ravi Kumar Gupta, who retired as a Scientist-G from DRDO, says: "From the time of DEVIL missile in the 1960s to Agni and ASAT you will see that the missile programme has been the most successful stream in DRDO. There are good scientists across the agency and with a proper system all branches will achieve the same success. It, however, cannot happen in the absence of good leadership. "

The missile programme's success within the organisation is widely credited to people like VSR Arunachalam and APJ Abdul Kalam in the initial days and to those like Saraswat and Avinash Chander in recent years. That this particular stream is wellrespected within the agency too is reflected by the number of chiefs it has produced. Sateesh Reddy, the present DG, Avinash Chander and Saraswat, two past DGs, have all been from this stream. Among those who made it to the top from another stream, VK Aatre stands out.

Senior aerospace scientist Prof Roddam Narasimha, says: "As someone who has seen the system from close quarters, one cannot squarely blame the DRDO. There is a systemic problem that affects decision making, which in turn hurts research and development. One classic example is that of Tejas that suffered because of this issue. Of course there's a lot desired from DRDO, but I think we need to look at the issue holistically. "

<https://timesofindia.indiatimes.com/india/missile-programme-comes-to-aid-of-delay-plagued-drdo/articleshow/68662506.cms>

## The Tribune

Mon, 01 Apr 2019

# ASAT test space debris to vanish in 45 days: DRDO Decoding the anti-satellite weapon test

*The idea of an ASAT programme seems to have originated around 2008 soon after the first missile defence tests, when AK Antony was the Defence Minister. Apparently, following a preliminary meeting, a projection of around Rs 8,000 crore was made. The DRDO was then told that it should focus its efforts on moving from Agni-3 to Agni-5 rather than embarking on an altogether new and complex project especially when it did not have the essential seeker technology*

*By R Ramachandran*

Securing the country's space assets is certainly important, and possessing anti-satellite (ASAT) capability may be arguably necessary for the purpose, but there is no immediate threat perception scenario, either by the Department of Space/ Indian Space Research Organisation (ISRO) or the Services, which would warrant such an urgent test overriding all other priorities for the nation's defence and space sectors.

One of the critical technologies needed for acquiring ASAT capability is a 'kinetic kill vehicle' with a target homing device using an imaging infrared (IIR) seeker. In a recent interview, VK Saraswat, former chief of the Defence Research and Development Organisation (DRDO), said though DRDO had the technical capability to develop this in 2012 itself, the then government had not given the go-ahead for the same.

Infrared seekers use what is called Focal Plane Array (FPA) of IR-sensitive sensors. And the choice material for IR sensors covering the entire spectrum — long-wavelength IR (LWIR) to short-wavelength IR (SWIR) — is the ternary compound, mercury-cadmium-telluride (MCT). Binary compounds such as indium-antimonide, which are sensitive only to IR signatures in the limited middle-wavelength (MWIR) range, are sometimes considered good enough, but the signatures from the thermal environment around a spacecraft would peak in LWIR.

India's quest for technologies for FPA and pure MCT is over two decades old, and till date the country does not have these technologies. This was stated by Saraswat himself in a lecture addressing a Pugwash gathering on February 3, 2017, at the Institute for Defence Studies and Analysis (IDSA).

"As far as IR seekers is [sic] concerned," he said, "the FPA [technology] which was denied to us [due to MTCR] is now not denied... We are not producing FPAs in the country... we are buying those FPAs and the rest of the optics and everything is being done in the country. That is why the possibility of NAG IIR seeker being manufactured in the country [exists] today. But we still have to go a long way... we need many more seekers, we need... LWIR and MWIR [seekers]..."

"The fact remains that, even today," he said answering a question from the audience, "the capability to make FPAs for thermal imaging and also for IR seekers... despite a lot of attempts by our country [is not there]... Like most of the cases when the country wants to venture into very highly complex technologies, you need to invest a huge amount... We had spent not even 10 per cent and as a result MCT, which is the basic element needed for making the FPA, could not be developed... [w]hen in 1995-96 there was a proposal after there was a little relaxation of MTCR (Missile Technology Control Regime), Sofradir of France was ready to give the FPA technology... Rs 95 crore at that time, the government was not willing to spend... Today it may be Rs 1,000 crore... In 2006, when I was chief controller [of R&D], we realised that with the kind of infrastructure and knowledge that we had even within the DRDO and academic institutions and others, we do not make MCT of that purity which is needed as the raw material for this... not even a gram of that material is available to us." This runs counter to the 'DRDO's capability' in 2012 itself that Saraswat claimed in his interview.

The idea of an ASAT programme seems to have originated around 2008 soon after the first missile defence tests, when AK Antony was the Defence Minister. Apparently, following a preliminary meeting piloted by Saraswat at the Research Centre Imarat, Hyderabad, in which former President APJ Abdul Kalam was also present, a projection of around Rs 8,000 crore was made. The DRDO was then told that it should focus its efforts on moving from Agni-3 to Agni-5 rather than embarking on an altogether new and complex project especially when it did not have the essential seeker technology.

When it was suggested that Sofradir or Israeli companies, such as Israel Aerospace Industries (IAI) and SemiConductor Devices (SCD), might supply the technology, a move to first acquire it before a full-fledged ASAT programme, with emphasis on collaborative development under the ambit of the Indo-Israel Management Council (I2MC), was mooted. Then DRDO chief M Natarajan had also got a sanction for about Rs 1,700 crore for that. Apparently, Sofradir, while willing to sell, was not even prepared to give FPA units for testing, let alone sharing the technology.

But nothing tangible seems to have resulted in terms of technology acquisition from Israel or France, especially on the MCT front, since then, either during Saraswat's tenure or during those of his successors till February 2017 at least. According to DRDO sources, apparently towards the end of Saraswat's immediate successor Avinash Chander's term in 2015, a move was made to acquire a 1kx1k FPA, not of MCT but indium-antimonide sensors, from SCD. And this was pursued by Chander's successor Satheesh Reddy as well, but the idea was apparently finally dropped. Around the same time, off-the-shelf entire MCT-based seekers with 320x256 array — not FPAs alone that you integrate domestically with other elements — were apparently bought from Sofradir for Helina, the helicopter-version of the anti-tank missile NAG (similar units have been purchased by ISRO also for its hyperspectral imagers). These events beg the question: How could a full-fledged ASAT project proposal have been made to then UPA government in 2012 for it to decline sanction when the DRDO did not have the technology for IR seekers?

It may be argued that, after the 2016 sanction for the project, within just two years of the Pugwash talk in February 2017, these technologies could have been developed as an Indo-Israeli project. But that would be a near impossibility, given the complexities involved in perfecting the weapon: integrating the other elements with the bought-out FPA, developing the complex image read-out algorithms, calibration of the device, simulation tests with the imager and final integration with the kill vehicle.

As sources within DRDO and ISRO conjecture, the likely scenario is that these off-the-shelf Sofradir seekers, in combination with the active radar seeker which DRDO makes, may have been

used in the ASAT test. Alternatively, under the ambit of I2MC, an entire off-the-shelf MCT-based seeker may have been supplied by IAI. Of course, given that the test was conducted in the morning (11 am), a simple optical imager coupled with radar seeker could have also been used for homing.

<https://www.tribuneindia.com/news/comment/decoding-the-anti-satellite-weapon-test/751313.html>

# The Tribune

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## The March 31 syndrome

*There's rush to meet target, even by defence public sector undertakings*

*By Air Vice Marshal Manmohan Bahadur (retd)*

Securing the country's space assets is certainly important, and possessing anti-satellite (ASAT) capability may be arguably necessary for the purpose, but there is no immediate threat perception scenario, either by the Department of Space/ Indian Space Research Organisation (ISRO) or the Services, which would warrant such an urgent test overriding all other priorities for the nation's defence and space sectors.

The 31st of March has great significance for any manufacturing company. If a civil commercial company meets its sales target by this last day of the financial year, it is a feather in the cap of its head, who gets a good evaluation from his boss. This pressure of meeting the deadline percolates down, as he evaluates the second tier of officers who, in turn, do this for the next level, and so on. If it is a question of a company making soaps and shampoos or any commercial product, a sales shortfall affects its revenues — and people lose their jobs. This is true of the private industry, but unheard of in the public sector — certainly not in defence public sector undertakings (DPSUs), because here it is the production target that is set! And, there

is a big difference between sales and production.

Let us take Hindustan Aeronautics Limited (HAL) — the only aviation company of India in which the IAF has great stakes. On March 25 this year, a tweet from HAL announced that 'HAL has produced 16th LCA of IOC Contract as per the target till March 31, 2019. The customer flights are expected soon (emphasis added).' The tweet was marked to people in the Ministry of Defence (MoD), conveying to the bosses that the company's target had been met.

The Secretary of Defence Production would surely inform the Defence Minister and earn her accolade. As an old fogey, who has dealt with tricks that DPSUs play with the gullible public at large, may I request her to hold back her appreciation till HAL confirms when the 16th aircraft is accepted by the IAF for squadron service?

That event, which corresponds to a sale, should be the yardstick by which the efficiency of every DPSU should be judged. The Defence Minister should also ask for comparative figures of overtime paid to employees per quarter. Why? Please read on.

Media reports have highlighted how the IAF has repeatedly pointed out to the MoD the below-par work of HAL many a time in servicing of aircraft to meet production targets. Ask any IAF pilot who has gone to HAL to accept an aircraft rolled out by it, and the litany of unserviceabilities and snags necessitating repeated air tests before final acceptance will flow; and this is true not only for overhauled aircraft, but also brand-new ones. The delay in acceptance sometimes extends eight to nine months, necessitating many more flights (sometimes 10 plus) than only two or three, which should suffice if the workmanship is as per standards.

There are three reasons for this. First, a lack of accountability in the first three quarters to meet quarterly production figures. No one is punished for the delay. Second, the resultant increased

workload in the last quarter, especially as March 31 approaches, coupled with flexible work ethics results in overtime work — and payment of course!

So, substandard work ensues, else why the repeated and enhanced number of acceptance flights? And last, but more importantly, a degradation in ethics and morals to claim kudos for a job not well done and not on time; when such scruples are scuppered in an aviation company, we are asking for trouble. An example should explain this.

As the Assistant Chief of Air Staff looking after helicopters, I was to accept the first three Cheetal helicopters on behalf of the IAF — it was the month of March 2009! On reaching Barrackpore a day prior to the handing over, I saw tents, streamers, banners et al, all set for a festive official handing-over ceremony to the IAF, with the media invited for sure. A casual question on how the three helicopters were performing drew an answer that none were serviceable, and ‘Sir, after your acceptance they would be rectified.’

This was blasphemous to a service officer’s ethics and on my threat to take the next day’s morning flight back to Delhi, HAL worked late hours to bring one aircraft on line. Remember, all was set for a publicity blitz, and the management would have had to face the flak. So, one aircraft was taken over amidst much clapping and photographs; the second one took a few more months and the first ferry to Leh happened in August, a delay of five months! Par for the course, one can say, and would continue to be so if the MoD does not demand and check honesty in work ethics.

So, in the case of the Tejas claim (of the production target of 16 aircraft having been met), the Raksha Mantri may please reserve her kudos, as also change the yearly output efficiency benchmark of every DPSU from production to acceptance by the Services. Else, it would be overtime, as usual, every 31st March.

*(Air Vice Marshal Manmohan Bahadur (retd) is ADDL Director General, Centre for air power studies, New Delhi)*

<https://www.tribuneindia.com/news/comment/the-march-31-syndrome/751319.html>

**hindustantimes**

*Mon, 01 Apr 2019*

## **Now, SP-rank officers to lead CRPF convoys in Jammu and Kashmir under new rules**

*There were as many as 78 buses carrying nearly 2,500 troops  
to Kashmir when it was attacked in Pulwama*

New Delhi: A superintendent of police (SP) rank officer would lead convoys carrying the Central Reserve Police Force (CRPF) personnel in Jammu and Kashmir, according to an official.

A convoy will not have more than 40 vehicles and the number of armed, bulletproof vehicles escorting convoys will also increase as part of the new Standard-Operating Procedure (SOP) for the troop movement, the official added.

The change in the procedure comes over a month after the February 14 car bomb attack on a CRPF convoy left 40 personnel dead.

There were as many as 78 buses carrying nearly 2,500 troops to Kashmir when it was attacked in Pulwama.

The attack prompted India to carry out an air strike on a Jaish-e-Muhammad (JeI) terrorist camp in Pakistan’s Balakot.

The JeI claimed responsibility for the attack that escalated tensions between India and Pakistan. The two countries were involved in a dogfight over the skies of Kashmir after the air strike.

The CRPF is the lead counter-insurgency force in Jammu and Kashmir. It has over 50 battalions with each having about 1,000 troopers in the state.

Troops have also been asked to maintain the “passenger manifest discipline” for each vehicle in a convoy strictly. A convoy commander will be directly in touch with one of the three CRPF deputy inspectors general (operations) based in Kashmir.

Earlier junior officers led convoys moving troops from Jammu to Srinagar and back.

“We are trying things out differently to prevent any lapses, and you will see more changes in the future,” said a second CRPF officer, who did not want to be named.

The officer said the logic behind having a senior officer lead a convoy and reducing the number of vehicles in convoys was to ensure better command and control as well as coordination. The change in the SOP for troop movement in Jammu and Kashmir is likely to bring more synergy, but unlikely to prevent attacks altogether, the officials said.

A convoy of 30 vehicles carrying CRPF men to Srinagar from Jammu narrowly escaped another attack on Saturday.

A vehicle parked along the Jammu-Srinagar highway blew-up as the CPRF convoy carrying soldiers moved towards the Banihal tunnel and damaged a bus in the convoy.

Investigations have found that the car was packed with urea – an easily available dual-use chemical that can also be used to trigger an explosion – and liquid petroleum gas cylinders.

The car was charred even as there were no casualties. Fresh leads emerging from the investigation suggest that the driver of the vehicle could have jumped out of the moving car after having navigated it to the proximity of the convoy.

“There has no major breakthrough although we are following some very strong leads. We are also looking at how the stationary vehicle was not detected by the layers of security that were deployed,” said an official in the security establishment, who did not want to be named.

<https://www.thehindu.com/news/national/other-states/sp-rank-officer-to-lead-crpf-convoys-in-kashmir/article26693798.ece>

**hindustantimes**

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## **Lone Pak submarine on patrol as 4 undergo repair**

*Indian Navy officials say the maritime force was very clear about deployment of Pakistani naval assets after the Balakot strikes*

*By Shishir Gupta & Rahul Singh*

New Delhi: Pakistan’s current submarine force levels are low with four of its navy’s five operational units undergoing major refit and repairs, three top intelligence officials in India have independently confirmed.

“We have inputs that indicate that only one Pakistan Navy submarine is partially operational. And this is the reason why they were frantically seeking help of the Chinese Navy to secure their maritime interests post-Pulwama,” said one of the three personnel cited above, a senior intelligence official. None of the three wished to be identified.

On February 14, a suicide bomber of the Pakistan-based Jaish-e-Mohammed attacked an Indian paramilitary force convoy in Jammu and Kashmir, killing 40. India responded by bombing a Jaish terror facility in Pakistan on February 26.

After that air strike, a Pakistan Navy submarine was detected in the international waters off India's west coast on February 27, the day when an intrusion by a Pakistan Air Force (PAF) fighter was effectively repelled in the Nowshera sector.

Indian Navy officials say the maritime force was very clear about deployment of Pakistani naval assets after the Balakot strikes.

"Maritime domain awareness was very high. We are still deployed and in full control of the situation," a senior navy official said on condition of anonymity.

According to the intelligence officials, the lone submarine on patrol in high seas off the coast of India was part of the deception mission adopted by the Pakistan Navy. The submarine, which was identified by its radar signature, moved back to its base shortly, with the Pakistan Navy de-escalating its forward posture.

Indian Navy officials declined to comment on the state of Pakistan's submarines. According to Vice Admiral (Retd) Madanjit Singh, former Commander-in-Chief, Western Navy, a partially operational submarine means that there are restrictions over diving to a certain level.

Pakistan has five French-made submarines, of which three belong to Augusta 90B class or Khalid class and two, with a nearly 40-year vintage, belong to the Augusta 70 or Hashmat class. While PNS Khalid is nearly 20 years old, PNS Saad is 18 years old and PNS Hamza was commissioned 11 years ago. HT learns that all three are under major repairs being done by a Turkish company and are expected to join active service only in 2020. The Khalid-class subs can fire cruise missiles.

While the Indian Navy remain tight-lipped, intelligence reports indicate that only PNS Hurmat, commissioned in 1980, is partially operational, with lead class boat PNS Hashmat, commissioned in 1979, undergoing a major overhaul. Submarines are a huge deterrent in times of hostility as they are used to prevent forward deployment of surface naval assets of the adversary and also to wreak economic damage by hampering harbour operations of the enemy.

<https://www.hindustantimes.com/india-news/lone-pak-submarine-on-patrol-as-4-undergo-repair/story-oBr1gGXTZODCVtdHsDBAPI.html>