

समाचार पत्रों से चयित अंश Newspapers Clippings

दैनिक सामयिक अभिज्ञता सेवा
A daily Current Awareness Service

Vol. 43 No. 28 28 January 2018



रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केन्द्र
Defence Scientific Information & Documentation Centre
मैटकॉफ हाऊस, दिल्ली 110054
Metcalf House, Delhi- 110054

Critically short of anti-tank missiles, Army sounds alarm

Rajat Pandit/

New Delhi: The Army has once again sounded the alarm about its critical operational deficiency in the field of anti-tank guided missiles (ATGMs), asking the government for the emergency induction of at least some of these "tank killers" till the indigenous man-portable systems being developed by the Defence Research and Development Organisation (DRDO) become a reality.

The Army, after all, has an alarming shortage of around 68,000 ATGMs and 850 launchers of different types, which are crucial for the infantry to halt advancing enemy tanks in the plains as well as guard the "active" line of control with Pakistan.

TANK KILLERS

- Anti-tank guided missiles (ATGMs) are meant to **destroy advancing enemy armoured units**
- Range from shoulder-launched to larger tripod-mounted systems for infantry soldiers
- Army has a shocking **60% shortage** in its 'authorised holding' of ATGMs
- **Big operational gap**, especially on the western front with Pakistan
- Army demanding **3rd-generation ATGMs** with

night-fighting capabilities & higher range for a decade

- Defence Acquisitions Council in June 2009 gave nod for **8,356 ATGMs, 321 launchers & 15 simulators** for ₹3,200 crore
- This included transfer of

technology to Bharat Dynamics for mass production

- Israeli company Rafael's **Spike ATGM** underwent trials in a single-vendor situation. **Tender scrapped** in late-2017
- Separate process to acquire **Javelin ATGMs** from US also didn't materialise

Infantry battalions making do with **2nd-Generation Milan (2 km) & Konkurs (4 km) ATGMs**

Sources say the Army is now even ready for the fast-track procurement of 2,500 shoulder-fired ATGMs and 96 launchers, with no transfer of technology (ToT), as an "interim measure" through a government-to-government contract. "It has been left to the government whether it should be the Israeli Spike ATGM or the FGM-148 Javelin ATGM from the US," said a source.

This comes in the backdrop of the government, late last year, cancelling the proposed Rs 3,200 crore deal with Israel for 8,356 medium-range Spike ATGMs, 321 launchers and 15 simulators, a procurement project first accorded "acceptance of necessity" by the defence ministry way back in June 2009.

The main reason for the scrapping of the Spike project, which had also envisaged ToT from Israeli firm Rafael to defence PSU Bharat Dynamics Limited (BDL) for large-scale production, was the DRDO's contention that it could deliver a more technologically advanced man-portable ATGM within two years.

Consequently, though Israel PM Benjamin Netanyahu may have held that the "Spike deal was back on track" after talks with PM Modi this month, it will not be easy going. "There is stiff resistance from the DRDO. If the government places an order for ATGMs from abroad, it can be accused of promoting foreign suppliers at the cost of the DRDO," said another source.

The Army, however, is worried. With a shocking 60% shortage in its "authorised holding" of ATGMs, the force has "nil" war wastage reserves (stockpiles held in reserve for war) as of now. Moreover, the existing second-generation Milan-2T (two-km range) and Konkurs (four-km) ATGMs, produced by BDL under licence from French and Russian companies, do not have night-fighting capabilities.

The Army wants to upgrade from these wire-guided ATGMs to third-generation ones that are top-attack, fire-and-forget, and night-capable. "But the DRDO has been seeking extensions since 2013 to successfully demonstrate the performance of its man-portable ATGM," said one of the sources. Army chief General Bipin Rawat has himself declared that the "operational gap" between now and 2021-2022, when the deliveries of the indigenous ATGMs are likely to begin if the trials slated for mid-2018 are indeed successful, needs to be bridged as a matter of top priority. In the long run, the Army wants to equip all its 382 infantry battalions and 44 mechanised infantry units with third- and fourth-generation ATGMs.



Sun, 28 Jan, 2018

Satellite imagery shows build-up near Doklam

Only a matter of time before a new flashpoint emerges, warns Stratfor, as both sides are upgrading their airbases along LAC

India and China are pursuing a "wide-ranging strategic build-up" in airbases close to the Doklam Plateau, according to the latest analysis of satellite imagery acquired by Stratfor, an American geopolitical intelligence company. The analysis looked at four critical airbases, two each on both sides, to study the air and air-defence aspects of the two countries.

"The imagery shows that the Chinese and Indian build-ups have only accelerated in the aftermath of the Doklam crisis. Now it is only a question of time until a new flashpoint along the LAC emerges, and as the increased activity shows, both sides will have greater capabilities to bring to bear next time," the report warns.

India and China had been engaged in an almost two-month standoff at Doklam in the summer of 2017. "Though the impasse was temporarily resolved in late August through a negotiated drawdown, it has been clear all along that the LAC will remain a contentious border because both countries will continue to seek an advantage in this difficult terrain," Stratfor says.

Supremacy on air

The company looked at imageries from two Indian airbases — Siliguri Bagdogra air base and the Hasimara Air Force Station. Both depict "how India has moved to reinforce its air power close to the Doklam Plateau," it says. "Siliguri Bagdogra normally hosts a transport helicopter unit, while Hasimara was the base for the MiG-27ML ground attack aircraft until they were retired at the end of 2017.

Since the Doklam crisis of mid-2017, however, the Indian Air Force has greatly increased the deployment of Su-30MKI warplanes to these air bases as can be seen from the imagery," the analysis pointed out. "An even greater level of activity is visible from imagery of the Chinese airbases near Lhasa and Shigatse," the report says. "This expansion may indicate a greater build-up by the Chinese, but it could also reflect the more advanced facilities at these bases. Furthermore, unlike India, China's lack of airbases close to the LAC forces it to concentrate more of its air power at these airports," the report says.

Increased deployments

Imagery of the two airbases shows a significant presence of fighter aircraft, which peaked in October, and a notable increase in helicopters and deployments of the KJ-500 airborne early warning and command aircraft, components of the HQ-9 long-range surface-to-air missile system and the Soar Dragon UAVs at Shigatse Peace Airport.

“The Chinese made a number of major airfield upgrades at Shigatse immediately after the end of the crisis. A new runway was constructed by mid-December, nine aircraft aprons measuring 41 metres by 70 metres were built along the main taxiway and eight helipads were set up in the northeast corner of the airfield,” the report says. “This construction, along with the deployment of new equipment in greater numbers, highlights how China has undertaken a serious effort to improve capabilities close to the LAC,” it says



Sun, 28 Jan, 2018

India-Cambodia sign four agreements

Both countries pledge to deepen defence ties and combat terrorism

India and Cambodia on Saturday signed four agreements, including one on mutual legal assistance in criminal matters and another on a \$ 36.92 million line of credit for a water resource development project, as the two countries resolved to enhance defence ties and combat terrorism.

India was committed to continuing development partnership with Cambodia in priority areas. It would increase the number of Quick Impact Projects (QIP) from five to ten annually in Cambodia, Prime Minister Narendra Modi announced at a joint press conference with Cambodian Prime Minister Hun Sen.

India would also help in setting up a Centre of Excellence in IT and IT-enabled services in Cambodia. The two sides also agreed on a \$ 20 million concessional line of credit by India for construction of transmission line in Cambodia and agreed to work towards its signing in the near future, a joint statement issued at the end of wide-ranging talks between the two leaders said.

The Cambodian leader, who was in India as ‘Guest of Honour’ for the Republic Day along with other ASEAN leaders, was on a State visit to India on Saturday. He thanked India for its continued support for narrowing the development gaps within and between ASEAN member-states by enhancing capacity building and sharing technical expertise through utilisation of the Project Development Fund.

The joint statement said the two sides agreed on an early signing of a Bilateral Investment Treaty. They noted with satisfaction the progress in regional connectivity efforts such as the India-Myanmar-Thailand Trilateral Highway and agreed to explore the possibility of extending this highway further to Cambodia and beyond. On defence cooperation, the two leaders expressed satisfaction at the current state of ties, including ship visits and training programmes. They agreed to further enhance defence ties, including through exchanges of senior-level defence personnel and capacity building projects.

They expressed keen interest in enhancing cooperation in maritime domain, including sustainable marine development and protection and preservation of marine and coastal environment, anti-piracy cooperation, security of sea lanes of communication to maintain peace and ensure safety and security of navigation in the Indo-Pacific Region. The two leaders agreed that terrorism was a curse on human-kind and posed a grave threat to global peace, security and stability. They unequivocally condemned terrorism in all its forms and manifestations and underscored that there was no justification whatsoever for acts of terrorism and recognised that terrorism could not be and should not be associated with any religion, nationality, civilisation or ethnic groups.

GRAND PLANS



- China is developing a new surveillance plane designed to be launched from its aircraft carrier
- The plane will be fitted with a radar system to spot enemy stealth jets.
- News of KJ-600, China's first carrier-borne early-warning plane, comes as the US has deployed F-35 stealth jets to bases in Japan and other parts of the Asia-Pacific
- KJ-600 would be fitted with an advanced active electronically scanned array, to spot stealth aircraft such as F-22s and F-35s of the US.
- It will fill a critical gap with the US and improve the effectiveness of Chinese carrier groups.
- The KJ-600 would likely be used on China's third aircraft carrier under construction in Shanghai, *South China Morning Post* reported.

Star molecule from IIT-M

Designer molecules can help drug delivery

It is a marvel of synthetic chemistry that today we can build molecules pretty much like we make up structures with building blocks. Using this method for their science at Dillip Kumar Chand's lab at the Department of Chemistry, Indian Institute of Technology Madras, researchers have made a molecule that looks like a five-pointed star with its tips truncated.

All you have to do to build the molecule is to get together the component molecules and ligands and shake them with a solvent in a "one-pot." Of course, the hard work is in knowing what components you will add to the solvent and in what measure. Prof. Chand's team calculated the structures using the density functional theory, to work out the architecture of the molecule they were building.

Designer molecules Such designer molecules with cavities in them can be used for drug delivery. Prof. Chand explains: “Molecules having a cavity are used for binding the guest [molecule] and transporting the guest to another site.” For example, binding a drug and delivering the drug. In building this molecule, the researchers introduce more than one cavity in a single molecule. This makes it more interesting.

In order to build the desired molecule, the team uses three components: One is palladium (II) which can bind to molecules at four places 90 degrees apart. The second is the molecule 4-4'-bipyridine which is like a rod that can bind at its two ends. And the last is the molecule 1,4-phenylenebis(methylene) diisonicotinate which is like a stick bent twice along its length and can bind to two molecules at its two ends. By throwing in five measures each of the three components, the team comes up with a star-shaped resultant molecule as shown in the picture.

The use of palladium(II) itself is unusual and new. Further, binding it to two different ligands has never been done before. Normally, using a rigid rod-like ligand would usually yield a square arrangement but in this case it yields a pentagonal star-like arrangement. “Since we anticipated a pentagonal architecture, it excited us to put our full effort on the project. In nature there are many pentagonal structures whereas among chemicals, the pentagonal structure is very rare,” says Prof. Chand.

The team now aims to make different variations of this design and use the cavity for binding drug molecules and transport them to required sites. “Also, we want to utilise the related molecules in catalysis,” he adds.



Sun, 28 Jan, 2018

IIT Kanpur team finds possible cause of Neurodevelopmental disorders

BMP signalling plays an important role in cerebral cortex development

Bone morphogenetic proteins (BMP) are secreted signalling molecules which are already known to regulate the production of neurons from neural stem cells. Now, using mice models, a team of researchers led by Prof. Jonaki Sen from the Indian Institute of Technology (IIT) Kanpur has found that BMP signalling is active in the cerebral cortex during embryonic development as well as during later stages of development after birth, too.

They found that BMP signalling regulates three processes — the migration of newborn neurons from stem cell niche to their destined place in the cortex, polarity (the axon forming the base and the dendrites forming the apical or top side) of neuronal cells, and branching of dendrites in the upper layer neurons of the cerebral cortex.

The cerebral cortex has six neuronal layers formed in an inside-out manner. The early-born neurons form the inner cortical layers while the late-born neurons form the outermost layers. So any perturbation or delay in the migration of newborn neurons results in disturbed layer formation and lack of proper connectivity between neurons.

Similarly, when polarity (alignment) or branching of dendrites is affected, the neurons will not be able to form proper electrical connections. Though there are other factors that determine migration and polarity, the role of BMP signalling in these two processes was not known till now.

BMP signalling

“BMP signalling was previously known to play an important role in the early development of the brain. Our study is the first to show that BMP signalling plays an important role in cortex development by regulating the migration of newborn cortical neurons and the establishment of polarity in the upper layer of cerebral

cortex,” says Dr. Monika Saxena from the Department of Biological Sciences and Bioengineering at IIT Kanpur and first author of the paper published in the journal *Development*.

“There are many neurodevelopmental disorders linked to aberrant migration of neurons such as lissencephaly, autism, epilepsy and schizophrenia,” says Prof. Sen who is with the Department of Biological Sciences and Bioengineering. “We now know that inhibition of BMP signalling leads to delayed migration and this may be one of the causes for such disorders. Thus, it might be possible to prevent or treat these diseases if further research is carried out.”

Two pathways

BMP signalling can be through two pathways — phosphor -SMAD or LIM kinases. When BMP signalling was totally inhibited, both the pathways were affected. As a result, all the three processes — migration, polarity and neurons not making enough branches — was affected.

To understand the role of each pathway in affecting any of the three stages of neuronal development, the researchers selectively blocked one pathway at a time.

“Both pathways have a role in the migration of neurons. When only one of the pathways was blocked, migration was affected but to a lesser extent than when both pathways were inhibited,” Prof. Sen says.

In the case of polarity, inhibiting the LIM kinase pathway seemed to be less effective than inhibiting the phospho-SMAD pathway. “Using mice models we determined that the phospho-SMAD pathway was more important than LIM kinase pathway for polarity establishment,” Prof. Sen says.

But the reverse was true in the case of the branching of dendrites. Inhibiting the LIM kinase pathway had a greater effect on dendrites branching than inhibiting the phospho-SMAD pathway.

The researchers found that BMP signalling seems to selectively regulate migration of upper-layer neurons. The migration of neurons to form the lower layers, which are the first to be formed, is not affected even when BMP signalling is blocked.

Even when both the pathways of BMP signalling were blocked, migration was only delayed and not completely stopped. But the delay in migration causes problems. “When neurons finally reach the upper layers (layer II/III), they don’t have proper polarity,” Prof. Sen says.

Evidence in mice

He gestation period in the case of mice is 20 days. The migration delay was seen two days after BMP signalling was blocked on gestation day 15.5 and continued till at least the day of birth. Disturbed polarity was manifested on the sixth day after birth. Defects in dendrite branching was first seen 15 days after birth and fully manifested 21 days after birth.

“BMP signalling is involved in regulating multiple phenomena at different stages of cortex development,” says Prof. Sen.