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Modernisation of Surveillance and Precision Weapon Systems for Infantry in the Indian Army

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Operational Necessity

The Infantry is a predominant arm which operates in multifarious terrain and weather conditions. In the current milieu, it needs the capability to face a two-front war against both China and Pakistan. Currently, there are capability gaps which exist in the field of Surveillance and Precision Weapon systems. This would be the method for fighting New Generation Wars, which would be dealing with greater levels of technology and which would gradually encompass Artificial Intelligence and Quantum Computing. The capability, in the Defence 14 th Five Year Plan, which starts from 2023, must ensure that every soldier of the Infantry has a **Battle Field Management System** which would provide a Common Operating Picture, enabling quick response and destruction of the target. The Infantry ultimately must be prepared for 'No Contact Warfare' which is likely to take place in the short term. In such an environment, there would be need for a real time Battle Field transparency and Instantaneous Engagement. The

Key Points

- The capability, in the Defence 14th Five Year Plan, which starts from 2023, , must ensure that every soldier of the Infantry has a Battle Field Management System which would provide a Common Operating Picture, enabling quick response and destruction of the target.
- The surveillance equipment needed by the Infantry Battalion includes the Tactical Unmanned Aerial Vehicle (UAV), Battle Field Surveillance Radars and state of the art Thermal Devices.
- In this era of warfare, night fighting capabilities are extremely important and most of the infantry battalions prefer HHTI for the combatant soldiers.
- The Indian Infantry needs modern weapons for effective functioning in the current battle space.
- There is therefore, a need for surveillance devices, PALM and MPATGM, both of which would be indigenous products boosting our *Atma Nirbhar Bharat* capability.

article focuses on the present requirement which would gradually lead us to weapon systems of the future.

The stand-off between the People's Liberation Army and the Indian Army in Eastern Ladakh continues and the Indian Army, in a pre-emptive action on the intervening night of August 29-30, occupied heights dominating the Spanggur Gap, along the Southern bank of the Pangong Tso lake, as actionable intelligence was available that a large number of Chinese troops were to transgress into this region.[1] Presently, in a mirror deployment, there are around three additional Indian Army Divisions of around 60,000-70,000 personnel to supplement troops of 3 Infantry Divisions.[2] During this crisis, which began in the first week of April 2020, the importance of actionable intelligence and 'state of art weaponry' has been felt on all occasions. Issues are happening at the spur of the moment, and therefore troops in direct contact must have the wherewithal for prevention and pre-emption. Surveillance devices and state of the art weaponry with precision are the need of the moment for troops in direct contact.

With regard to modernisation, Israel has been at the forefront with respect to surveillance and precision warfare. During a visit to their industrial complex, almost 16 years ago, one was briefed on a weapon which had zero Circular Error of Probability.[3] In their circumstances, where fighting was often confined to Built-Up Areas and often had to win against numerical superiority, the need to destroy a target effectively was paramount and inevitable. This was only possible if there was accurate information about the target and in case of movement of the target the ammunition would pursue the target. Indeed this is currently required by our infantry battalions across the board in all types of terrain. This article will cover Surveillance Equipment, two weapon systems– the Precision Attack Loitering Munitions (PALM) and the "Fire and Forget" Man Portable Anti-Tank Guided Munition (MPATGM) besides other Small Arms which are in the procurement process.The Operating Environment would become more dynamic and in future, inputs available from various sensors would provide near real time intelligence to the infantry soldier, thereby enabling him to respond with speed and accuracy.

Surveillance Equipment

Surveillance equipment is provided.at the national, theatre and formation level which provides intelligence inputs to the units. It is of utmost importance that there is constant interaction between all stakeholders, to ensure that information received is timely and

actionable. The equipment at higher levels often provides the valuable inputs which must be disseminated to the infantry battalions. Deployed in a defensive mode, an infantry battalion is often dispersed and gaps in such deployments must be covered with regards to surveillance. Isolated positions must receive inputs which would be necessary for suitable action.

The surveillance equipment needed by the Infantry Battalion includes the Tactical Unmanned Aerial Vehicle (UAV), Battle Field Surveillance Radars and state of the art Thermal Devices. There is a dire requirement of UAVs at the tactical level which needs to be provided for, in order to achieve force multiplication at the ground level, for undertaking missions with accurate intelligence.[4] The Tactical UAVs are being procured on a Fast Track Basis to bolster intelligence, surveillance and reconnaissance (ISR). It is reported that 200 Tactical UAVs are being procured expeditiously. These will be deployed along the India-China border to provide battalion commanders with the ability to obtain real time intelligence on PLA activities close to the Line of Actual Control (LAC). These UAVs are likely to have two hours endurance and priority will be given to Eastern Ladakh. The areas which need UAVs are as under:-

- **Mutually Agreed Disputed Spots.** Samar Lunpa, Trig Heights and Demchok.
- **Areas of differing perceptions.** Depsang, Point 6556, Changlung Nala, Kongka La, Spanggur, Mount Sajjun, Dumchelle.
- **Relatively New Spots.** North bank of Pangong Tso, Chumur, Galwan.[5]

As of now, using the Special Financial Powers at the theatre level, the Command Headquarters have gone in for SpyLite mini UAVs which are manufactured by Cyient Solutions and Systems (CSS). This is a Hyderabad based joint venture with Israeli BlueBird Aero Systems. This was inducted in the Northern theatre in September 2018. The mini UAV weighs 9.5 kg and its rail launcher is carried between two soldiers. The device can be launched within minutes and its electric motor carries it to 3000 feet above the surrounding terrain. The payload is a video camera and infrared sensors which beam back high definition images at altitudes above 5000 metres. A mission could last up to four hours controlled by a launch unit. The SpyLite flies back and lands using a parachute.[6] The indigenous content of the UAV is about 40 per cent and there is a dire needto increase its numbers.The Short range Battle Field Surveillance Radar (BFSR) is currently used by the Infantry Battalions. About 1100 radars are currently with the Indian Army. These are manufactured by Bharat

Electronics Limited (BEL). The radar was trial evaluated in 2002 and accepted after evaluating for 24 months. It is a state of the art lightweight, man portable battery powered radar which are being developed by the DRDO to provide all weather surveillance against intrusion. The radar is capable of searching a specified sector and perform track while scanning for multiple targets. The radar detects tracks and aids in classifying the moving targets. It has sophistically built- in software algorithms to detect, track and classify targets like a crawling man, a group of walking men, light and combat vehicles and low flying helicopters. It also has a built in interface for automatic transfer of target data to remote locations and is capable of integration with imaging sensors. The radar, if required, can be mounted on a mast on any light vehicle. The entire radar is compact and weighs about 27 kg. It is carried by two combatants and generally operated on a tripod. It can be set up in six minutes and operates with a peak power of 5 watts, if provided by secondary batteries. It can also be operated on AC power supply. A third generation thermal imager has also been configured on the radar, providing day and night viewing capability. The Indian Army is currently operating the system. It can detect a crawling man at 700 metres, a walking man at 3 km, a group of platoon strength moving at 7 km, a Light Vehicle at 10 km and an Armoured Personnel Carrier (APC) at 14 km.[7] However, the radar functions on Line of Sight and this must not be ignored by the operator.

Apart from this, night fighting capabilities are extremely important and most of the infantry battalions prefer Hand Held Thermal Imagers (HHTI) for the combatant soldier. These are extremely effective and enable a clear vision by night. Their numbers need to be increased. HHTI provides view up to long distances based on the line of sight. However, the noise and the picture quality need improvement.[8] Apart from this, there are two Observation Post Officers, each one of them possessing a Thermal Imaging Intensification Observation Equipment (TIIOE).[9] These are excellent Night Vision Devices (NVDs) which provide excellent surveillance and engagement of targets by night. They are particularly efficient when deployed on ground with good domination. One such example is the Mukhpari feature dominating Spanggur Gap in Eastern Ladakh. Currently, the number of NVDs needs to be beefed up to improve our night viewing capability. Let us now enter the arena of a few force multipliers important for the Infantry. These would make the Infantry versatile.

Precision Attack Loitering Ammunition (PALM)

At the outset we must understand as to what loitering ammunition exactly is This is a system in which the device ‘loiters’ around the target area for some time, locating targets and

attacks once a target is located. In case a target is not visible, then the munition is returned to the launcher. Even the United States is considering to use the Israeli made Hero 120 loitering ammunition for American Special Operations.[10] These munitions fits in the category of something between the cruise missiles and the Unmanned Combat Aerial Vehicles (UCAVs). They first emerged about 40 years ago primarily for 'suppression of enemy air defences'. They were easily able to locate surface to air missiles and therefore, were being used by many Armed Forces. About two decades ago, their roles were modified and employed for tactical roles of short ranges and capable of being man- packed. The Israeli Aircraft Industry's 'Harpy' is considered to be the first loitering ammunition.

Loitering ammunition is similar to an Unmanned Aerial Vehicle (UAV) but with a sensor and attached explosives. Some loitering munitions use a human operator to locate targets, but there are some that can search and launch attacks autonomously. As stated earlier, many loitering ammunition, if unused, have a recovery option which enables the munition to be returned to the operator. It may be pertinent to note that, cruise missiles like Block IV Tomahawk, have the ability to loiter through way points and also have some sensory capabilities, but their primary mission pertains to the strike role. The mission of a loitering munition is to reach the designated area, acquire targets and launch an attack in a self-destructive role.

In the first week of March 2020, the Ministry of Defence of the Government of India, had issued a Request for Information to procure 100 loitering munition systems for the Indian Army– it wanted a weapon system that is portable, weighs less than 20 kg, has a flight endurance of at least 30 minutes, a Line of Sight Range of 15 km and an ability to operate up to an altitude of 4500 metres (above mean sea level) and not less than 300 m (above ground level); it should also be capable of anti-jamming and anti-spoofing. Further, it should be able to carry warhead to destroy personnel and soft-skinned targets which have little or no armour. It should be controlled by a ground controller with a data link established with PALM Computer.

The vendor is to provide one weapon system with sensors mounted, which would have 'day and night capability'. It should also include a Ground Control Station comprised of 'ruggedised' hand held display, communication system, antenna and tripod. The Ground Control System should be able to control multiple loiter munitions. It should be capable of being air dropped, being placed on a platform and flexible enough to slither down 'man-

packed' from helicopters. The Ministry expects the delivery of almost all of the loitering munition systems within 18 months from the date of signing of the contract.[11] However, it is interesting to note that during the Defence Expo held from 05 to 08 February 2020, a Joint Venture was announced. This Joint Venture was between UVision of Israel and Aditya Precitech of India; named as AVision, the venture would be confined to the manufacture of Loitering Munitions. They would be involved in the designing, manufacturing, sales, maintenance and life cycle management.[12] During the Defence Expo, the manufacturers displayed the PALM Hero Series of Loitering Munition. There were three systems which were displayed viz the 'Hero 30' for precision strikes, 'Hero 400 EC' for long range strikes, 'Hero 120', a customised loitering munition, for a variety of missions. Further, a simulator was also displayed allowing the forces to be trained for utilising the weapon systems. This would be a potent system for the infantry battalion and its procurement must be expedited.

Man Portable Anti-Tank Guided Missile (MPATGM)

Currently, the Indian Army is equipped with the Spike-LR missile which has a "Fire and Forget Capability" and is capable of engaging targets up to 4 km. A total of 210 missiles along with 12 launchers were delivered to the Indian Army costing Rs 280 cr, as part of its emergency purchase mechanism.[13] They were inducted in the second week of October 2019 in the Northern theatre and have the capability of destroying tanks and bunkers. The missile weighs approximately 13 kg and the ground launcher weighs 12 kg. If reports are to be believed, then a repeat order is being placed on Rafael (Israel) for 12 launchers and around 250 missiles. Under the new emergency powers, armed forces were given a free hand to procure equipment worth approximately Rs 300 crores on a priority basis with deliveries stipulated to be completed in three months but extendable up to six months.[14] However, the Army has a greater requirement which will be procured through the indigenous MPATGM, under development by the Defence Research and Development Organisation (DRDO).

The MPATGM is a "Fire and Forget" Anti-Tank Guided Missile being developed by the DRDO in collaboration with VEM Technologies Private Limited. It is a low weight long cylindrical missile with a group of four fins around its mid-section. The missile weighs 14.5 kg and a Command Launch Unit, weighing 14.25 kg, which combines a laser designator with digital all-weather sight. The missile has a range of about 2.5 km. It has an advanced Imaging Infrared (IIR) sensor and integrated avionics. The missile has top attack capability and has many similarities with the Javelin and Spike ATGM. MPATGM is the 'man portable' variant of the Nag, which was last tested in July 2019. The missile has undergone three

developmental test firings– the third test was conducted at a firing range in Kurnool (Andhra Pradesh) on 11 September 2019.The missile was launched from a man portable tripod launcher and the target was responding like a functional tank. The authorities reported that the missile hit the target in 'top attack mode' and destroyed it. Incidentally, DRDO had promised to hand over the first MPATGM prototype to the Indian Army by the end of 2018. However, it has got delayed being a complex system.[15] There would be time taken for user validation and production can be expected to begin possibly by 2021, if all goes well. However, in the interregnum we may have to do with the limited number of Spike ATGM.

Conclusion

The Indian Infantry needs modern weapons for effective functioning in the current battle space. While a lot of effort is being made to provide SIG SAUER (Sig 716) Assault Rifles from the United States, the Negev 7.62x 51 mm Light Machine Gun from Israeli Weapon Industries; there is a need for surveillance devices, PALM and the MPATGM, both of which would be indigenous products boosting our *Atma Nirbhar Bharat* capability. This is a requirement to fight land warfare operations with guile and precision, leading to success. Further, efforts must be made to manufacture 770,000 AK-203 rifles at Korwa near Amethi by Indo- Russian Rifles Private Limited at the earliest.

End Notes

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