
Shielding of Strategic Security Interests and Its Implications

P K Chakravorty

Recent Issues which Merit Importance

Drones have the capability of causing disruption and damage to military and economic assets. They are capable of effectively engaging strategic security interests. While they have been used frequently in Afghanistan and decimated a few leaders what shook the world was the events of September 14, 2019. During the early hours as many as 18 drones and seven cruise missiles attacked two Saudi Arabian oil plants destroying nearly 50 percent of the country's global supply crude. The Houthi rebel group in neighbouring Yemen allegedly claimed responsibility for 10 drone attacks. However, the United States and the Arab countries led by Saudi Arabia speculated a major role was played by Iran in it. Iran has denied the charge.¹ Reports state that almost 25 drones were used which points more to Iran than Houthi. The attacks decimated Saudi Arabia's oil facilities and cut the country's oil output by 5 million barrels every day. This led to a surge in oil prices as Saudi Arabia is the world's leading oil exporter.

In a similar fashion on January 3, 2020, armed with a tip from informants at Damascus, the CIA knew exactly when a jet carrying Iranian Major General Qasem Soleimani took off for Baghdad. This

Major General **P K Chakravorty**, VSM (Retd) is a Senior Fellow (Veteran) at Centre for Land Warfare Studies (CLAWS), New Delhi.

was possibly corroborated by intelligence from Baghdad. Once the aircraft landed at Baghdad, three drones of the United States moved into position overhead, each armed with four Hellfire missiles. It was past one in the morning and the General got into the vehicles. As the vehicles moved out of the airport they were engaged by four Hellfire missiles. The entire operation was being controlled from Qatar and the Iranian General was killed. This was done with a high degree of human intelligence.²

A response was bound to take place. On January 8, 2020 Iran struck back early in the morning at two American bases. The two bases were the Ain Al Asad base 60 km West of Baghdad and the other at Irbil. The Iranians fired a total of 15 ballistic missiles, 10 hit Al Asad and one the base at Irbil. Initial attacks reported there were no casualties.³ However a *New York Times* report of February 12, 2020 states that many soldiers have been treated for traumatic brain injuries. The symptoms of mild traumatic brain injuries can be subtle and diagnosis takes time and it is creditable on the part of the United States Armed Forces to examine personnel for these aspects.⁴

Apart from this, Information Warfare has taken an important place in day-to-day activities. Practically every country is impacted by this non-contact warfare. At least 12 of the world's 15 largest military powers are reported to be engaged in building cyberwarfare programmes indicating a Cyber-Cold War is in progress. Important strategic security interests of the country are severely impaired by this aspect. Over the years information about the way we connect with each other has become extremely important. As a digital infrastructure the Internet has broken all barriers. With the ever increasing availability of Wireless Fidelity (Wi-Fi) Internet has entered all aspects of human activity.

As per *Vivekananda International Foundation (VIF) Task FORCE Report* India country has been a target of Cyberwarfare.⁵ The Stuxnet malware attack in 2010 affected about 10,000 computers in India, a large

proportion of which belonged to Power Grid and offshore oil rigs* of the Natural Gas Commission. The Nuclear Power Corporation of India by its own efforts blocks at least 10 targeted Cyberattacks per day. Cyber capability is used to cause consternation, espionage, damage to weapons and equipment as also domination of electromagnetic spectrum.

Indian security forces regularly confront cyber-radicalism from extremist groups who use the web to incite violence, spread propaganda and execute violent attacks. India has been targeted on a number of occasions, a few of which are listed below:

- National Informatics Centre was reportedly breached in 2009.
- Defence Research and Development Organisation, Prime Minister's Office and Bharat Sanchar Nigam Limited were hacked in 2013-14.
- Indian Space Research Organisation was defaced in 2015.
- Sporadic incidents of passage of incorrect information and fake news through social media have occurred.⁶

The other aspects are the usage of Direct Energy Weapons from the air against Strategic targets, as also non-state actors. Direct Energy Weapons are currently under development and would be used with a drone carrying a laser or a Boeing aircraft carrying the Champs missile which has the capability to degrade electronic equipment over which it flies. With respect to non-state actors, they are organisations that have significant political influence but are not allied to any particular country or state. Violent non-state actors or non-state armed actors are those which use violence to achieve their goals. Non-state actors have to operate through a particular country and need covert state support. They pose grave asymmetric threats against strategic targets.

Having viewed the threat to strategic targets it is essential to list the Strategic Targets and thereafter work out suitable measures to shield them.

* *Offshore oil rig* is a large structure which has facilities for well *drilling* to explore, extract, store, and process *petroleum* and natural gas that lies in rock formations beneath the seabed.

What Are Our Strategic Security Interests?

National Security involves protecting our land, air and maritime space from external and internal conflicts. Any nation would have to take measures to protect these critical aspects. Our strategic interests encompass a wide canvas but we can broadly assess areas which are vulnerable and need protection. Geographically they would include the following. It is pertinent to note there are numerous vulnerable areas and vulnerable Points. Critical Areas for our analysis are enumerated below:

- **Nuclear Power plants.** These are important areas which are vulnerable and need to be defended.
- **Oil refineries and storage dumps.** The recent attack by drones on Saudi Arabian oil facilities clearly brings out the importance of these facilities and their impact on global trade.
- **Offshore oil platforms.** Offshore installation concerns offshore platforms, oil platforms or offshore drilling rigs and is a general term for mobile and fixed maritime structures. This includes facilities which are intended for exploration, drilling, production, processing or storage of hydrocarbons or other related activities or fluids lying beneath the seabed.
- **Water storage areas.** Water storage supply areas to big cities which are located far away and can cause no collateral damage when the catchment area is affected.
- **Important railway marshalling yards.**
- **All areas which are occupied by security establishments and forces.**
- **Government installations in sensitive areas.**

The next point to be considered is how the attack is to be undertaken. The attack could be undertaken by ground-based militants, militants who land by Sea and from the Air. Let us analyse how we shield them from these three dimensions.

Shielding Our Strategic Security Interests and Its Implications

The preceding portion covers the targets which are critical and they cover a wide canvas. Needless to state, surveillance of air, sea and land on a 24x7 basis is an absolute necessity. There is also a need for warning which would need human intelligence. Human intelligence has to provide inputs of likely targets and modes to be used for the engagement of strategic targets. These inputs must be corroborated before action is taken to act on the inputs. It is normal for these areas to be guarded by a skeleton for physical security. However, in the event of a terrorist attack additional personnel would be needed. An attack by sea would need surveillance by satellites and radars which can direct ships and reconnaissance aircraft to track and engage these targets. It is important to now discuss the most important threat which would be from the air. This we will tackle in two parts. The first would deal with air defence for our Establishments in built-up areas and the second is dealing with drones.

Air Defence for Our Strategic Interests⁷

Air defence of establishments has assumed great importance after the 9/11 attack on cities of the United States. Air Defence of establishments of various countries has often been discussed in the print and electronic media, as also during seminars. The overall responsibility for air defence in our country lies with the Indian Air Force, and in the Tactical Battle Area the Army Air Defence has a critical role to play. Air defence is based on Air threat which could be from aircraft, armed helicopters, missiles, Unmanned Combat Aerial Vehicles (UCAVs) and in the modern context long-range naval guns which have a range of 200 km or more. The defence against these could be provided by a variety of systems which could be aircraft, missiles, guns, the Israeli system of the Iron Dome, David Sling and the Arrow system. Currently India has numerous Air Defence Systems to guard our vulnerable areas and vulnerable points.

For the purpose of this article we will focus primarily on strategic areas in urban areas and avoid the Tactical Battle Areas. The focus would be primarily on systems other than Air Defence fighters. Our main areas of discussion would be the Anti-Ballistic Missile Systems and other systems.

To begin with, India has successfully tested its two types of Anti-Ballistic Missile Systems. These systems provide India with a two-layered shield exo and endo. Exo relates to outside the atmosphere and endo relates to inside the atmosphere. The high-altitude interception is known as the Prithvi Air Defence System (PAD) and the Advance Air Defence (AAD) system for lower altitude interception. The Prithvi air defence missile named Pradyumna Ballistic Missile Interceptor has a maximum interception altitude of 80 km and is capable of engaging ballistic missiles that range between 300 km and 2,000 km at a speed of Mach 5.0. Further work is on for a missile for intercepting weapon systems which range more than 5,000 km and fly at altitudes up to 150 km. The Advance Air Defence (AAD) known as the Ashwin Ballistic Missile Interceptor is designed to intercept incoming ballistic missiles at an altitude of 30 km. Both these interceptors were successfully tested by the Defence Research and Development Organisation (DRDO). Prithvi intercepted a hostile missile above 50 km on February 11, 2017 and Ashwin intercepted a missile on March 1, 2017 at an altitude less than 30 km. Both the missiles are automatically fired on instructions from the Swordfish Long Range Tracking Radar. This is Active Electronically Scanned Array (AESA) radar which is a derivative of the Israeli Green Pine Long Range Radar used in the Arrow Missile System. The radar has a range of 600 km currently which DRDO is upgrading to 1,500 km. Both systems could gradually be deployed to counter Air Defence threats. The system is yet to be inducted and correctly fine-tuned for its task.

The next missile to be considered is Akash which is a medium-range mobile Surface-to-Air missile defence system developed by DRDO. The missile can target aircraft up to 30 km at a height of 18,000 m. The system

is deployed in sub-units of four launchers and one Rajendra 3D passive electronically scanned array radar. Each sub-unit can track 64 targets and attack up to 12 of them. The Akash Mk-II will have an intercept range of 30 to 35 km and increased accuracy of guidance and fire control. The Akash forms a part of the Indian Air Force and Indian Army. *Comptroller and Auditor General Report* released in 2017 stated that 30 per cent of the missiles have failed when test fired. Being an indigenous system it is possible to rectify the defects and have the missile perform effectively. In any case, Akash would be first used to protect our forward Air Fields and other installations. Once the system stabilises it would be optimised in Air Defence of our cities.

The next equipment to be discussed would be the S-400 Triumf which India will soon acquire from Russia. The system uses four missiles to undertake its task: The very long range at 400 km, the long range at 250 km, the medium range at 120 km and the short range at 40 km. It has been described as state-of-the-art Air Defence weapon system. Eight missile launchers form a part of one regiment. It can engage targets flying at a speed of Mach 14. The target can be engaged at a maximum range of 400 km and a minimum range of 2 km. The maximum altitude for engagement is 185 km and minimum is .01 km. The targets that can be engaged are as under:

- Fighter jets and bombers including stealth jets.
- Electronic warfare planes.
- Cruise missiles such as the Tomahawk.
- Ballistic missiles up to ranges of 3,500 km.
- Drones up to a range of 400 km.

India has signed an Inter-Government Agreement for the acquisition of five S-400 systems from Russia.⁸ The deployment of the systems would be decided once the system is inducted.

Apart from these, there are reports that the Air Force and the Navy are going for Surface-to-Air Missile with a range of 70 km. These are

being co-developed by DRDO and Israel.⁹ Further the Spyder Missile system with a range of 15 km is being inducted for the Indian Air Force and the Indian Army is also possibly interested in the same. DRDO is also co-developing a Quick Reaction Surface-to-Air Missile with MBDA from Europe with a range of 15 km; this could be used on land and naval ships. The Army Air Defence is doing its utmost to procure the state-of-the-art Swedish SAAB RBS 70 NG which has a capability to destroy targets at a maximum distance of 8,000 metres and altitude of 5,000 metres. It is capable of engaging targets in cluttered environments and is a laser beam riding missile with all-weather day and night capability. Apart from this we have Gun systems which have been suitably upgraded.

Other Systems

While we are in the process of evolving how our Air Defence assets are to be deployed to protect our cities, it is interesting to note details of National Advanced Surface-to-Air-Missile System (NASAMS). The NASAMS, as elucidated by Raytheon Defence Industry, is a highly adaptable mid-range solution for Air Defence. The system can quickly identify, engage and destroy aircraft, UAVs and Cruise Missiles. It is produced by Raytheon of United States with Kongsberg Defence and Aerospace of Norway. It guards the National Capital Region of the United States and is currently in service in Norway, Finland, Spain, the Netherlands, Oman and Chile.

The NASAMS is based primarily on the AIM-120 AMRAAM missile integrated to a United States built AN/MPQ-64 F1 Sentinel Air Defence Radar and a C4I system called the Fire Distribution Centre. The range of the missile depends on the version of missile used. The various types are as under:

- AIM-120 A/B: 55-75 km.
- AIM-120 C-5: >105 km.

- AIM-120 D (C-8): >180 km.
- Extended range being developed would increase the range by an additional 40 km.

Each NASAMS battery has three to four Fire Distribution Centres, three to four radar systems, nine truck mounted missile launchers each carrying six missiles. Each launcher can be deployed at a distance of 25 km from the Fire Direction Centre and can engage 54 targets simultaneously within a few seconds.

The Missile system NASAMS is comparable to the Israeli David Sling and Arrow system. Of course both these systems, including the Iron Dome, have been developed by Raytheon of the United States with Rafael of Israel. Arrow flies at hypersonic speed of Mach 9 which enables destruction of any known Ballistic missiles. As regards David Sling, the range is a little more than NASAMS. It is interesting to note that Raytheon Industries in the United States is the primary industry involved in Air Defence products in Israel.¹⁰

Killing a Drone

A Drone has peculiar characteristics and destroying it is a difficult task. The methods being used are enumerated below:

- A new technology allows you to move at close proximity and hijack drones controls thereafter neutralising it.
- Radio jamming could paralyse a drone if intelligently executed.¹¹
- Blighter Anti-UAV Defence Systems is a part of the radio jamming apparatus for decimating a drone.
- Another set-up could use a modern Active Electronically Scanned Array Radar, detect and then shoot it with a missile.
- Overall technology is in the nascent stage and needs to improve in this area.

Our Approach

There is an urgent need to defend our strategic areas. We have been able to list our priorities and focus on equipment. India has an indigenous Anti-Ballistic Missiles Programme which is supported by foreign assistance particularly with regard to its detection systems. Further the Akash Missile is an indigenous product. The Long Range Surface-to-Air Missile, the Medium Range Surface Missile and the Quick Reaction Surface-to-Air Missile are being co-developed by DRDO with foreign assistance. The Spyder and the S-400 Triumf and the VSHORAD are equipment which are being made abroad and if need be, there is scope to Make in India. The moot question is, “Do we need to induct NASAMS for Air Defence of our strategic areas?” The answer is simple. The equipment we are in the process of procuring are capable and systems like S-400 Triumf would in its current state appear to be superior to NASAMS. However, if the United States offers to undertake future development with a private partner in India, it would need to be negotiated as it would open a new technology for design, development and manufacture of Air Defence Missiles in India. Of late, the United States has made good offers for the manufacture of fighters in India in collaboration with the private sector. This means that two of the great US Defence manufacturers, Lockheed Martin and Boeing, would be expanding the Defence Industrial Base in India. Similarly, if Raytheon were to collaborate with one of our private partners to design, develop and manufacture missiles in India, it would be a great opportunity which India must seriously consider as it would lead to greater indigenisation.

How Do We Shield Areas of Strategic Interest?

Air Defence is based on the air threat. Currently our areas are threatened by missiles, aircraft, UAVs and UCAVs. Based on the importance of the installations there would be a need to deploy systems suitably to counter this threat. There are strategic installations in some cities and based on

the priorities the authorities would do the needful. It is indeed creditable that a wide variety of equipment is being procured presenting an array of capabilities to protect against Air threats.

While we have spoken about Kinetic weaponry to meet the threat, it is important to note that detection systems play an important part. Further, Fire Direction Centres ensure that the hostile target is effectively dealt with by optimising the correct weapon-to-target matching and undertaking effective Post Strike Damage Assessment. To undertake Surveillance would entail the use of Satellites, Aerostats, Radars and other devices. For ensuring quick engagement Fire Direction Centres need to provide a real-time automated response to these targets. All this requires Alacrity and Speed. Considering the developments taking place, it is heartening to witness that all these issues are under consideration. However, we need to expedite the speed with which the procurement is being undertaken. In addition, we continue to hone our skills with regard to our protection from Land and Sea.

Conclusion

Shielding of Areas of Strategic Interest in the current environment requires state-of-the-art weaponry which would be capable of detecting, engaging and destroying a wide array of targets. The Indian Armed Forces are in the process of developing and acquiring a wide variety of systems to counter the broad spectrum of threat in these areas. As the areas are numerous, it is essential to dynamically prioritise them. Further we must be prepared for retaliation in defending these areas, thereby needing periodic review of plans.

Notes

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7. This section is predominantly republished from author's article published in *Defence ProAc*. The original article can be reached at: P. K. Chakravorty (n.d.), "Air Defence Systems to Protect Important Cities in India," *Defence ProAc*. www.defproac.com. Accessed on February 20, 2020.
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