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APPLICATION OF ADVANCED TECHNOLOGY – WAY AHEAD FOR INDIA'S COASTAL SECURITY MANAGEMENT

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Abstract

India being a maritime nation is largely dependent on maritime trade for her development and prosperity. Having vast coastline and large number of island territories has certainly been boon for the nation in entitling her a vast exclusive economic zone (EEZ) but at the same time changing maritime threat scenario has made the task of ensuring security of vital coastal installations, economic activities, coastal population etc a big challenge for the nation. Sheer size of maritime domain, presence of numerous stakeholders and increasing trend of using sea by the non-state actors for their evil/ nefarious activities make the task of coastal security difficult. Physical guarding of vast coastline like the land border is not viable. Innovative use of advanced technology would only be the practical option for management of India's Coastal Security.

***Keywords**: Maritime Nation, Maritime trade, Exclusive Economic Zone, Maritime Domain, Maritime threat, Coastal Security, Technology*

Introduction

India is a grand maritime nation, surrounded by seas on her three sides and has vast coastline of 7516 km. Besides nine coastal states and two Union Territories located along the coast, there are 1197 islands forming two Union Territories - Lakshadweep Islands in the Arabian Sea and Andaman & Nicobar Islands in the Bay of Bengal. Under the provisions of UNCLOS III (United Nations Convention on the Laws of the Sea), India has claim over huge adjacent sea space in multiple maritime zones with enforcement rights. It has sovereign jurisdiction over territorial waters that extends up to 12 nautical miles from the coast, criminal jurisdiction in matters like smuggling, immigration, pollution, etc. over contiguous zone which extends to 24 nautical miles from the coast and jurisdiction over vast Exclusive Economic Zone (EEZ) for economic exploitation which extends up to 200 nautical miles from the coast and continental shelf beyond it. The EEZ is spread over 3.1 million sq km which can be used for the purpose of exploring and exploiting, conserving and managing ocean resources like fishing, ocean mining, drilling for oil and gas etc. Thus the vast coastal sea area is the reservoir of natural resources like sea-food items and petroleum and natural gases.

Coastal Environment

India's coastal region inhabits about 25 % of the population within the 50 km of the coastline. Fishing remains primary source of livelihood for the coastal population. India is the 7th largest fishing nation in the world and Indian coasts accounts for approximately 4 million fishermen settled along the coast in 3288 marine fishing villages.

Besides fishing, other major industrial activities such as shipbuilding, manufacturing, oil exploration and refining, etc. is also concentrated in the coastal areas. Indian coasts also house number of urban centres which are hub for the industrial and economic activities. There are number of scientific research centres, nuclear power stations, defence installations, energy infrastructure, Shipyards, refineries, etc located in the coastal regions of India which are so vital for the country.

Indian coasts house 13 major ports and 147 intermediate/minor ports facilitating large scale sea trade which are the cheapest means of transportation and have helped the country in flourishing international trade. The seas around India are one of the busiest shipping lanes in the world and known for transportation of 75% of world's maritime trade and half the world's daily oil

consumption. About 90% of our foreign trade by volume and nearly 70% by value of external trade are through seas.

India has large number offshore infrastructure in the coastal waters/EEZ. Such infrastructures include manned and unmanned platforms, oil wells, oil rigs, large number of different types of support vessels, etc. Such structures become very attractive targets for terrorists.

Thus, India's development and prosperity is closely linked to the maritime environment and therefore it is only logical to ensure security and sea governance of coastal areas.

Coastal Security Threat

1993 Mumbai blasts for which RDX used was smuggled through the sea to Indian coast has given clear indication of the vulnerability of the Indian coastline. The 26/11 terrorist attacks on Mumbai has left a deep and permanent impact on the Indian security psyche. Both incidents have exposed ill preparedness of the country to tackle coastal threats from the seas.

Terrorism has been the main threat for a long time. The nation's focus being primarily land based, numerous measures taken to seal the land borders have seen non-state actors and terrorists using sea as the alternate route primarily because it has been unregulated and facilitates free run for them. The 26/11 terrorist attacks on Mumbai is a classic example of maritime terrorism. Incidents of terrorists attack on warships, oil tankers, passenger liners etc are other dangerous trends which have emerged in the maritime environment. Piracy has been another threat which has taken precedence recently in waters around us and if terrorists align with pirates would be a deadly combination and would affect our maritime interests very badly.

Further, there has also been significant change in tactics employed by terrorists. Emphasis has shifted to target common people on the streets to create fear psychosis. Crowded places like sub-urban railway stations, economic centres, industrial installations, commercial ships, warships in harbour, tourists, malls, and hotels etc. which are highly vulnerable and undefended has become primary target for terrorists. 26/11 attack at Mumbai is clear indication of non-state actors' intention of threatening human security as well as economic security by targeting innocent civilians in the economic capital of the country.

Thus the emerging security environment and recent events have given rise to new type of challenges for the national security in the form of mainly non-traditional or sub-conventional threats particularly in the maritime domain considering the fact that seas have largely been unregulated.

Coastal Security Challenges and its Management

Security of seas in and around the Indian sub-continent is of utmost importance to ensure free conduct of maritime trade in the region. There is a need to protect human capital, economic capital as well as infrastructure capital located in the coastal areas whether on land or at sea. To protect a nation against contemporary maritime threats one needs a comprehensive security strategies and solutions that adapt to and respond in real time. However, the management of maritime environment is a very complex scenario because of its dynamic nature and large number of stakeholders. The major challenge in dealing with the dynamic nature of maritime environment is to detect, identify and react as soon as possible whenever a threat is detected. Dense and unregulated fishing activities in our waters make the task of identifying unwanted elements that have merged amongst them very difficult. Identity documents carried by fishermen are varied and suspect and thus advantageous for non-state actors or terrorist. Another important challenge is in integration of large number of stakeholders of coastal security architecture like Navy, Coast Guard, Marine Police, State Administration, DG Shipping, Customs, Fisheries, Ports, Immigration authorities, merchant ships, fishing vessels, Dhows, trawlers, etc.

The typical security management process would thus involve collection of information, analysis of information, identification of threat, dissemination of

information to concerned agencies, directing security forces to nuetralise the threat envisaged and its constant monitoring till the threat has been nuetralised. Today, all these activities can be easily facilitated in quick time with the help of advanced surveillance and communication technology.

Technology on the Coastal Security Fronts

A typical Coastal Security Management System required to address security concerns would be through a mix of technology facilitating surveillance, identification, command and control applications. Towards this there are large array of technologies with potential applications to coastal security management system and most of these technologies fit into one of the three categories i.e. surveillance, identification and command & control.

Surveillance System

The surveillance sensor network serves as the eyes and ears of the system. A combination of sensors can track individuals and objects over varying distances, providing higher resolution as the target gets closer to the coastline. Sensor network can include combination of the various types of technologies such as radar, Automated Identification System (AIS), Electro Optical/ Infra Red (EO/IR System, Identification system, Command and Control system, etc.

Radar

Radar is the most commonly used device for active detection of targets at sea. Advancement in radar technology today facilitates detection of even smaller targets in bad weather and at longer ranges. Modern radar is also capable of showing silhouette of the object along with its dimensions which can aid in identification.

Automated Identification System (AIS)

Identification at sea remains one of the key concerns of security personnel. AIS is one of the new technologies which were developed to avoid collisions at sea has also proved very useful in identification of dubious targets by elimination of targets giving out their information.

Electro-Optical (EO)/ Infra Red (IR) System

An EO/IR system provides the ability to distinguish land terrain, sea and waterway features and contacts, such as small boats and patrol craft in the coastal environment where surface radar performance is limited. These devices also enable 24x7 day and night surveillance.

X-Ray Systems

Today there are number of promising x-ray systems which can create image of any object, detect chemical, biological and radioactive substances which can be used in enhancing Port security.

Sonar

A sonar network (generally passive) can be deployed along the contour of the coastline for detection of intrusion being attempted either underwater or on the surface.

Identification System

Identity cards remain key tool of identification of individual in coastal security environment. There has been advancement in identification technologies and some of the latest technologies commonly used for security purposes hold promise in identification of terrorists at sea if trying to infiltrate amidst fishermen are: -

Radio Frequency Identification (RFID)

RFID is one such technology being increasingly used where the cards is attached with tag which contain required information which can be read by RFID card reader.

Biometric

Biometrics technologies facilitates measuring and analysis of human body characteristics, such as DNA, fingerprints, eye retinas and irises, voice patterns,

facial patterns and hand measurements, for authentication purposes. Such technologies are being extensively used in identification of individuals', access control, attendance system, banks, schools, etc.

Aadhar Card

Aadhar Card scheme in India is being used for identification of individuals in a big way.

Command and Control System

A command and control system takes the inputs from the sensors and carries out data fusion of different types of sensors, analyses and generates operating procedures for responding to potential threats. Such systems are mainly computer based and today advancement in the field of computer technology has made such tasks easier and faster. Such systems basically consist of the following: -

Data Storage Devices

Modern technology facilitate large number advanced data storage devices which are bigger and more efficient for storing vast information collected every second from radar, sonar, optical devices, cameras, intelligence inputs, stored information and data mining software etc.

Communication Devices

Communication technologies have gone many fold advancement in terms of clarity, security, efficiency etc. And provide seamless communication. Such technologies are associated with networks, network management, and advanced radio communication systems.

India's Coastal Security

Post Kargil war, the Coastal Security Scheme (CSS) was formulated for strengthening infrastructure for patrolling and surveillance of the coastal areas, particularly shallow water areas close to coast to check and counter illegal cross border activities and criminal activities using sea. It has envisaged layered patrolling of our coastal waters. Accordingly, High Seas patrol by the Navy, EEZ patrol by the Coast Guard, Close coast patrol by marine police and seafront area patrolling by respective authorities having sea frontage has been implemented. Immediately after 26/11 number of additional measures have also been instituted like vulnerability/ gap analysis of the coasts by the Coast Guard; streamlining of the process of registration of all types of vessels; ensuring fitment of navigational and communication equipment on fishing boats; issue of identity cards to all fishermen; deployment of Interceptor boats by the navy, coast guard and the marine police; setting up of coastal police stations; establishment of additional Coast Guard Stations; etc.

Similarly, efforts are in hand to also enhance coastal surveillance by using modern technologies and towards this the following are implemented or in the process of being implemented: -.

a. Setting up Coastal Radar and AIS chain all along the coast and on the island territories for 24x7 surveillance.
b. Installation of Vessel Traffic Management System (VTMS) in all important Ports and Channels to ensure safety and security of Ports/ harbours and shipping in the channels.
c. Vessel Air Traffic Management System (VATMS) has been installed in Offshore Development Areas for enhancing surveillance of the offshore installations.
d. Joint Operations Centres (JOCs) have been set up as Command and Control hubs for better sea governance. It is being facilitated to receive 24x7 information from the sea and intelligence inputs and have communication facilities to control coastal security operations.
e. Establishment the National Command Control Communication and Intelligence network (NC^3I) at Gurgaon as a part of an effort to enhance maritime domain awareness is an over-arching coastal security network capable of collating data about ships, dhows, fishing boats, and all other vessels operating near the coast.

Limitations of Coastal Security Measures

Coastal Security measures implemented post 26/11 has enhanced surveillance and patrolling of coastal areas. However, there are still some challenges which need to be taken care of and they are: -

a. Detection of small boats which are being increasingly used by the non-state actors for their operations remains a daunting task especially so in dark and bad weather conditions.
b. Physical Guarding of Coast is not feasible by positioning security men all along the coast and at the sea like a typical 'bandobast' undertaken on land by the Police to nab criminal or terrorist.
c. Identification at sea continues to remain a challenge as coastal waters are highly crowded. Identification of a target boat midst large number of our own fishing boat and dense shipping traffic is very difficult. Unregulated fishing further complicates identification of friendly or foe. Further, identification of personnel manning boats is equally difficult in the absence suitable identity cards.
d. Identification problem is not only for small boats like the one used by Kasab for 26/11 attacks, but it also includes identification of thousands of containers and cargo vessels that call at our Ports or pass close to our coasts to prevent smuggling of arms, ammunition, explosives and human trafficking.
e. Availability of information with the help of surveillance technologies in itself is of no great advantage unless the available information is analysed, actionable information is generated and used appropriately. Thus use of technology holds the key.
f. Major ports are generally secured and it is the other dense traffic areas which have still not got the required attention from the coastal security planners and are most likely to be exploited by the terrorists/non-state actors.
g. Integration of Maritime Stakeholders continues to remain a key concern. There is a requirement of sharing information among all the agencies for coordinated action against the common threat. Regular communication and flow of information between the stakeholders can only be facilitated with the help of modern technology.

Recommendations

Whilst number of steps are being taken to overcome above limitations, it is imperative that innovative use of advanced technology be resorted to aid detection and identification of targets, integration of all stakeholders, generation of actionable information and directing own security forces to nuetralise the threat. Towards this following steps are recommended: -

a. To develop our own AIS type which can be easily fitted on smaller craft which operate in our coastal waters to aid detection and identification. Presently, fitment of AIS is mandated only for vessels greater than 300 Tonnage.
b. Distress Alert Transmitter (DAT) is provided by Coast Guard to transmit emergency condition and position location to central hub station via UHF transponder of INSAT for rescue operation. This technology could be innovatively used to indicate likely threat observed by our own fishermen while at sea.
c. Use of Aadhar card is being propagated as the main identity document for all important purposes including financial transactions. Proving of identity of fishermen at sea has been one of the key concerns. The option of making Aadhar as the identity document needs to be explored.
d. Regulation of fishing has been key concern area. Fisheries often cite inadequate staff and infrastructure to regulate fishing activities. Use of modern data handling devices which can provide instant information on fishing boats, their whereabouts and other relevant information also need to be explored.
e. Port and container terminal security can be enhanced by making use of high speed X-ray machine, CCTV surveillance, VTMS, biometrics; etc.
f. Use of Nanosatellite for higher level security could be considered. Canada has been using Nanosatellites Tracking of ships (NTS) successfully

in tracking of ships/ fishing crafts using space based AIS technology.

g. Use of sonar for underwater surveillance off the important harbour needs to be considered as the terrorists are known to exploit any weak front.

Conclusion

The peninsular nature of our country and its strategic location in the Indian Ocean region provides exceptional advantages. However, vast coastline also makes the country vulnerable due to lack of adequate surveillance infrastructure. Surveillance of such a vast coastline and coastal waters has been a big challenge and is likely to remain so even in the future. Whilst a large number of measures and initiatives are under implementation, especially after 26/11 Mumbai attacks, there is urgent need to constantly undertake coastal surveillance, gap analysis and innovatively use various technologies available to plug the gap and also institute proper management of data gathered through various technologies incorporated in the field of surveillance for generating actionable information which can facilitate security forces in taking swift action.

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