

Securing India's Littorals

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Threats to Littoral

The term *littoral* has its origins in oceanographic literature and is described as coastal or shore region. In geographic terms, it is understood as a space where sea meets the land. In 1954, Samuel Huntington argued that major battles on the high seas was a thing of the past and the 'new locale' of naval combat had shifted from the high seas to the coastal areas which are also referred to as 'rimland, the periphery, or the littoral.'¹ Further, the littorals would be the new strategic space where 'decisive battles of the Cold War and of any future hot war will be fought'. The contemporary maritime strategic literature notes that littorals are congested and thus chaotic due to dense shipping activity, intense fishing by a variety of small craft² and other recreational activities. Besides, the underwater topography in the littorals is complex due to murky waters resulting from drainage from land.

Littoral can also be understood in the context of demography. Littorals are home to urban centres and nearly 60 per cent of the world's population lives within 100 kilometers of the waterfront. If one moves further towards the hinterland, about 70 per cent of the global populace lives within 320 kilometers of the shoreline.³ Also, a large number of cities with population exceeding one million are located in the littorals. In the context of infrastructure, littorals are hubs of maritime shipping that carries nearly 90 per cent of global trade and rely on a complex network of ports, harbours, jetties, oil and gas loading/unloading terminals, and the associated transportation network.

While littorals provide the muscle for economic growth and development, these centres are focal points of illegal activity. Lack of governance and ineffective security apparatus in the littorals, results in favourable conditions for growth of terrorism, piracy, and other illegal activities.⁴ In essence, littoral spaces present immense security related demographic and topographical challenges to states yet offer a promise for economic development.

There are several distinct challenges to littoral security.⁵ The *first* challenge appears in the form of the vulnerability of large littoral-Exclusive Economic Zone that is under surveillance in varying degrees depending on the capability and capacity of

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the littoral state. Inadequate monitoring of these spaces provides ambient conditions for disorder which manifests in the form of piracy, terrorism, contraband trade, drug smuggling, gunrunning or human smuggling and carried out by both local and foreign actors.

The *second* challenge relates to the security of sea lanes that crisscross the littoral and are traversed by a variety of vessels, both large and small, including super tankers, container vessels, bulk cargo ships, cruise liners and fishing craft. These have the potential to engage in illegal activities including dumping of waste that has adversarial impacts on the marine environment.

The *third* littoral challenge emerges due to illegal fishing and poaching by foreign trawlers in others' littorals that are rich in diversified marine life and resources. These activities have the potential to generate tensions among states and at times could result in sabre rattling. It can also result in local fishermen engaging in piracy or even taking up arms and act as police to protect their legitimate interests as is the case in Somalia.

The *fourth* challenge and threat is the nexus between organized crime networks and terror groups with trans-national capability. In this case, the actors are able to synergise their operations to smuggle arms and ammunition in different littoral to conduct their operations and these pose major challenges for security forces.

The *fifth* peril is the trafficking of weapons of mass destructions, components and dual use subassemblies by both state and non-state actors. The proliferation of chemical, biological and nuclear materials and devices have been an issue of grave concern to international community particularly in the context of the former Soviet Union where unknown amounts of highly enriched uranium and plutonium has remained unaccounted. There is also the fear of radioactivity resulting from nuclear waste falling in hands of non-state actors.

The *sixth* is the colossal challenge of balancing the critical needs of 24x7 surveillance and monitoring of the littoral-Exclusive Economic Zones and unimpeded growth of maritime enterprise. The security architecture should not be 'an over kill' that prevents free flow of commerce, yet robust enough to deter, detect and defeat the attacker.

The *seventh* challenge relates to governance issues in the coastal cities and areas with dense population. With the complicity of the local population, these serve as sanctuaries, hideouts and sources of material supply chain for terrorism purposes. Besides, they are important nodes for illegal procurement and smuggling. In this

context, efficient intelligence system and close coordination among security and civil agencies is critical for an effective response. It also calls for a proactive strategy to educate the public at large of the dangers emanating from radical groups or subversive elements that can disturb public safety and economic security. Public participation in upholding littoral security is thus critical.

The *eighth* challenge is the critical need of Maritime Domain Awareness (MDA) for gaining maritime control through a credible and comprehensive picture of the littorals. MDA entails collection, compilation, analysis and dissemination of information obtained from a variety of sensor and integrating it with response mechanisms. No one sensor or a platform is endowed with requisite systems information adequate enough to develop complete MDA. Besides, states may not possess significant capabilities for MDA, a weakness that can be exploited by asymmetric actors with great success.

The *ninth* challenge is of force structuring. In fact littoral is the new geography of operations for most of the navies including the United States navy. This is so because asymmetric threats lurk closer to the shore and cannot be discounted. Although the existing force structures of most navies are designed for sea control or sea denial,⁶ several navies are restructuring to contend with the challenges arising from the littorals thus emphasizing the duality of both high seas and littorals.

Organised Chaos in South Asian Littorals

In the South Asian context, the littorals have witnessed significant domination by asymmetric actors. Terrorism related incidents in Karachi in Pakistan have taken place on regular basis.⁷ This is so because there are a variety of groups and banned outfits operate out of Karachi.⁸ Also, the city is home to syndicates and cartels that are known to engage in drug smuggling with origins in the Golden Crescent,⁹ built around Afghanistan-Pakistan. The UNODC's Opium Survey 2007 notes that nearly 70 per cent of opium poppy is cultivated in five provinces of Afghanistan that border Pakistan.¹⁰ A significant quantity finds its way into Pakistan and Karachi serves as a major air and sea transshipment point for drugs smuggled into Europe, Africa and Southeast Asia.

Maldives with a high Sunni Muslims population has been successful in keeping at bay radical groups and terrorists. However, in November 1988, Maldivian dissidents in Colombo and Tamil mercenaries of People's Liberation Organisation of Tamil Eelam (PLOTE) had attempted to overthrow the Gayoom regime. A quick air and sea response from India resulted in the capture of mercenaries who were fleeing with hostages.

The LTTE in Sri Lanka is perhaps the only non-state actor that has conducted maritime operations at a large scale and has been successful in controlling the waters off Jaffna in the north east of Sri Lanka. The LTTE owns and operates a fleet of deep sea going ships that have facilitated logistic support by way of regular supply of arms, ammunition and other materials. It has a rudimentary air force that has made some spectacular forays and attacked military infrastructure. It is perhaps the only terror group to possess mini submarines for underwater and surface attacks, as also to transport weapons. In January 2009, the Sri Lankan military stumbled upon four unfinished mini submarines in a LTTE boatyard in Mullaitivu. However, in the recent past, the LTTE has suffered major setbacks against the Sri Lankan military and lost some of its maritime capability.

Political chaos, lack of stable government, poor economic growth and poverty appear to concentrate in Bangladesh. This has resulted in poor governance and created ripe conditions for the rise of illegal activities as also fundamentalism. The Islamist Harkatul Jihad al Islamia (HuJi), a militant organisation is suspected to have strong links with Al Qaeda¹¹ and separatist groups in Northeast India.¹² Chittagong and Cox's Bazar in Bangladesh are major transit point for arms for the insurgent groups in India's Northeast.¹³ Besides, Chittagong and Mongla ports are highly piracy prone and labelled 'vulnerable and insecure' by foreign ships.¹⁴

At home, Mumbai too has had its share of domination by asymmetric actors. It has been a den for smugglers, mafia, and underworld community and illegal activities such as smuggling of contraband goods, gold, and narcotics have flourished.¹⁵ It also has been an unloading destination for arms and explosives.¹⁶

It is evident that South Asian littorals are vulnerable to asymmetric domination by groups, state sponsored or otherwise, and possess significant capabilities for perpetrating terrorism, engaging in contraband trade, gun running and human smuggling. In the Indian context, the maritime security environment is further complicated with the movement of drugs from the Golden Crescent and the Golden Triangle, and bulk drug consignments are moved over the seas. The Indian Narcotics Control Bureau (NCB) has observed that Pakistan's state agencies such as the Inter-Services Intelligence (ISI) and Pak Rangers are actively engaged in supporting cartels smuggle narcotic into India and, "more than 55 per cent of the heroin trafficked into India originates from Afghanistan. There is definitely the hand of the ISI in trafficking. We have statements from arrested traffickers which confirm this information."¹⁷

Besides, there also exist gangs and syndicates that have transnational capability to

carry out crime and political assassinations. Ironically, the rise of non-state actors is one of the manifestations of the political breakdown among South Asian countries. The capability of the non-state actors is also enhanced by the absence of a powerful political authority, which makes them less vulnerable to political, diplomatic, and economic pressures.

Mumbai Terror Attacks

Pakistan's Federal Investigation Agency enquiry, pieces of evidence supplied by Indian investigating agencies through the 'Mumbai Dossier', and interrogations of the only surviving terrorist corroborate the fact that Lashkar-e-Taiba (LeT), a terrorist group based in Pakistan, to be the mastermind behind the terror attacks in Mumbai. The ten terrorists¹⁸ entered south Mumbai by the sea route, landed on unsecured waterfronts at fish landing centres and carried out attack on two prestigious hotels, railway station and a local Jewish congregation place.

Earlier, the terrorists left Thatta coast in Karachi onboard three vessels i.e. Al-Husseini (capsized after offloading the terrorist), Al Fauz (renamed 'Masha Allah' and returned to Karachi) and the third boat of which no details have been released by Pakistan investigating agencies.¹⁹ The crew of Al-Husseini hijacked an Indian fishing craft 'Kuber' off Porbandar, Gujarat coast, killed some of the crew and threw the bodies overboard. The available evidence suggests that the terrorist were in constant communication with their masters in Pakistan through satellite telephones. Also, the terrorists were proficient in the operations of Global Positioning System (GPS) for navigation, had good knowledge of the landing points in south Mumbai obtained through open source digital maps, well trained in operating fast speed inflatable craft and a highly motivated group.

Apparently, the Indian Navy, Coast Guard and the Maharashtra state police had been warned through intelligence inputs by the Research and Analysis Wing (RAW), India's premiere foreign intelligence agency, on the plans by terror outfits in Pakistan to land terrorists using ships or fishing trawlers and attack hotels and other soft targets.²⁰ In the past too, these agencies were warned of such attacks. Significantly, such intelligence warning have been disseminated on regular basis and the maritime security forces had stepped up surveillance and patrolling along the west coast of India particularly in the context of the reports of possible LeT plans to attack nuclear facilities like BARC in Mumbai and Kalpakkam in Tamil Nadu. Maritime security agencies have contended that there was no 'actionable intelligence' that resulted in terrorists emerging successful in conducting their operations, is a debatable issue. This is so due to the complexity of the maritime

operations such as time difference between detection and arrival of the force, and the ability of the target to make a quick getaway into the wide ocean before it can be prosecuted.

Organizational Restructuring

The Mumbai terror attacks have exposed the porous nature of India's coastline as also the ability of terrorist groups, hitherto engaged in land based terrorism, to use the maritime medium to carry out attacks 'from the sea'. In the past, some terrorist groups have successfully used the air and surface medium to make forays into maritime military infrastructure to carry out attacks. Mini submarines and other submersible platforms are also being explored by some groups and could soon be popular tools among the terrorist groups much to the surprise of the security forces.

The attacks have also demonstrated that terrorism 'from the sea' is a reality. Significantly, the sea serves as an easy highway and acts as a catalyst for conducting terrorism activities on land. Authorities appear so optimistic of the notional barrier provided by seas and argue that it is too vast and open to be penetrated and as a result remain oblivious of the opaqueness and dangers inherent in the medium. They fail to appreciate that water acts as a means of intrusion that finds no parallel in land security. Swimmers, divers, fast motor boats, subsurface vessels and floating wreckage offer an excellent means of intrusion and to conduct attacks against the littoral based critical infrastructure such as ports, oil and gas terminals, nuclear power plants, and a host of soft targets such as hotels, hospitals, rail and air networks and public works.

Littoral security has been an issue among Indian national security planners and the government established the Indian Coast Guard in 1976. According to the charter, the agency is responsible for a host of tasks including surveillance of 2.1 million sq. kilometers of Exclusive Economic Zone (EEZ), protection of offshore installations, assistance to fishermen during distress, protection of the maritime environment including prevention and control of maritime pollution, coordination with custom authorities in anti-smuggling operations, enforcement of MZI Acts and protection of safety of life and property at sea.²¹ The force has made significant contribution to enhance security in the littorals including the capture of the pirate vessel M. V. Alondra Rainbow and interception of smugglers engaged in illicit trafficking of gold and narcotics. The government has supported expansion of the Coast Guard and equipped it with modern systems to meet the overwhelming responsibility of continuous and persistent surveillance and provide a seamless observation of littoral maritime spaces that remain chaotic and contentious.

Post-Mumbai terror attacks, the Indian government announced setting up the National Investigative Agency (NIA) to fight terrorism-related crimes.²² At the organizational-operational level it is planned to constitute a Maritime Security Advisory Board (MSAB) that will comprise of personnel drawn from the navy, coast guard, security agencies and other associated ministries.²³ The MSAB would be headed by a Maritime Security Advisor (MSA) and responsible for coordination among various agencies. A Coastal Command (CC) would also be setup for the management of security of India's littorals. The plans envision establishment of Maritime Defence Zones (MDZ) along India's coastline and offshore territories in Andaman and Nicobar and Lakshadweep group of islands.

Further, the waterfront security envisages a layered responsibility and the innermost layer would be under the operational control of the Director General, Coast Guard who would function as Commander-in-Chief, Coastal Command. The navy would be responsible for coordinating the security on the high seas and offshore installations. Other initiatives include setting up of Joint Operation Centres (JoC) at Mumbai, Kochi, Port Blair and Vishakhapatnam. According to the Indian navy Chief, the new organizations would "bring about a greater coordination; there will be Joint Operation Centres (JoC) on both the eastern and western coasts. This will ensure we have a composite picture and comprehensive control over all maritime assets and matters."²⁴ Also, "The Western Naval Command chief will head it on the western coast. On the eastern coast, it will be the Eastern Naval Command chief, and in New Delhi, the CC head will be the Coast Guard Director General."²⁵

The plans also include establishment of nine additional Coast Guard stations and Sagar Prahari Bal, a specialized force of about thousand personnel equipped with fast attack craft. The Indian navy has also prepared an exhaustive list of platforms and materials it needs to augment littoral security²⁶ with concurrent national command control communication and intelligence network to link the Indian navy and the Coast Guard. This would result in upgrading of the existing hotline between the two agencies.

On their part, the Ministry of Shipping, Road Transport and Highways have proposed a Bureau for Maritime Security (BMS), an apex body involving all stakeholders, including the Navy, Coast Guard, CISF and port agencies.²⁷ It has been argued that such an organization would develop 'uniform standards and procedures on security in the maritime sector similar to the Bureau of Civil Aviation Security'.

At another level, the Indian security agencies have proposed to implement 'Pre Arrival Notification' (PAN) regime that seeks 24-hour notification of ships entering Indian ports, similar to the '96 hours' regime in operation in the US. It is hoped that

this would facilitate early warning of 'suspect ships' and enhance security of the ports. It is interesting to note that such a provision is already in operation with the Port control authorities in which ships agents are already informing the authorities of the impending port call and planning berthing and logistic arrangements with port authorities.

While these are significant developments to enhance littoral security, they lack a coordinated approach. Interestingly, maritime security falls, in varying measures, under the jurisdiction of a plethora of central and state agencies. In that context, at least sixteen ministries, some with multiple departments of the same ministry, including an Ocean Commission under the Ministry of Earth Sciences handle maritime affairs. Additionally, coastal states have their own maritime police supported by the central custom and excise. These agencies have pursued their mandate independently and lacked synergy, coordination and common operational tasking and have thus remained plagued with turf wars and departmental interests²⁸ resulting in an inefficient and disorganized collection of information and dissemination that can frustrate a credible response capability.

The Indian government has addressed the issue of lack of coordination among maritime security agencies by designating the Indian navy as the nodal agency for maritime security.²⁹ The Indian Coast Guard, the state marine police and other state agencies would work in close coordination with the Indian navy and it would now be possible to share intelligence and coordinate operations among agencies more efficiently.

Technological Solutions

There has been complacency in providing the requisite ware to the security agencies. For instance, in 2006, under the Coastal Security Scheme (CSS),³⁰ the government had allocated Rs. 400 crores for improving waterfront security and a recurring expenditure of Rs. 151 crores to be implemented over five years. It sanctioned 73 police stations, 97 check posts, 58 outposts, 204 boats, 149 jeeps and 312 motorcycles.³¹ In 2005, the Union Home Ministry had decided to acquire 194 high-powered speedboats and 15 interceptor boats³² but reports suggest that these have yet to be procured. Also, only little over half new police stations are operational.

The political leadership has observed that it is essential to acquire cutting edge technologies to enhance littoral security. These are critical to fill the void created by the conspicuous absence of sophisticated technological solutions for surveillance and reconnaissance. Reports suggest that the Defence Minister has "cleared the proposal for global acquisition of cutting-edge equipment and interceptor boats on a

fast-track basis, so that arrangements for increasing security of Indian waters can be done as early as possible."³³

Surface and Air Surveillance and Reconnaissance

It is planned to build a chain of shore based radar stations to enhance maritime domain awareness in the littorals and related air space.³⁴ While that is a positive step, it will be useful to examine the fast emerging low cost solutions for maritime domain awareness systems. The cost is a significant factor keeping in mind that a long coastline would necessitate seamless surveillance of large sea areas in the littoral spaces.

Among the proven systems, UAVs have emerged as valuable force multipliers for maritime domain awareness and possess significant capabilities to relay real or near-real time tactical picture at sea, detect irregular maritime activity, and also prosecute the suspected targets. However, these are expensive platforms and may not fit into the budgetary limitations particularly for developing countries like India.

In that context, an aerostat fits the bill. It is helium filled balloon and can carry a variety of payloads including radar, communication systems and other sensors. It can be launched from both fixed positions and mobile platforms and thus provide great manoeuvrability. It is also possible to deploy these from stationery platforms or moving ships at sea and carry out surveillance of offshore oil and gas platforms.

As far as its operational exploitation, the platform is a low cost solution for surveillance, reconnaissance, domain awareness of the littorals, coastal areas, choke points, harbours and ports. In the littorals, aerostats can monitor sea-lane traffic and act as communication relay station for shipping; in coastal areas these platforms perform several civilian and military tasks including monitoring fishing, environmental pollution and countering human trafficking, drug smuggling and gun running. When deployed in ports and harbours, these platforms assist monitoring port activity, disposition of ships in harbour and outer anchorage. In fact, the aerostat can extend the surveillance envelop if deployed from offshore platforms. In the Indian context, a variety of offshore oil and gas production platforms dot the seas along the east and the west coast and are suitable for staging or deploying aerostats and expand the surveillance cover for littoral security.

The biggest advantage of an aerostat is its capacity to keep aloft bulky electronic systems and when positioned strategically, it can provide an all-weather, continuous and seamless coverage up to 500 kilometers in any direction. The operational concepts are based on the assumption that over-the-horizon radar onboard an

aerostat would perform much like a low altitude satellite that would provide real time picture of activity on the earth. A chain of aerostats, strategically located, can monitor the entire coast including ports and harbours. Given its flexibility and manoeuvrability, it is easy to network aerostats with other platforms and sensors for obtaining a more credible maritime domain picture. Importantly, these platforms can emerge as significant force multipliers to support maritime domain awareness, if deployed and exploited creatively.

Automatic Identification System

The need for robust littoral security is high on Indian Navy's agenda who have argued that "Much more needs to be done for coastal security, especially shallow water surveillance. We have been pressing states, including Maharashtra, to set up coastal police stations, issue fishermen identity cards and get some kind of a transponder like the AIS (Automatic Identification System) to track ships but to no avail."³⁵ Automatic Identification System (AIS) is a device fitted onboard a ship for monitoring its position, course and speed. An AIS fitted ship would transmit the above data continuously to stations ashore or at sea who should be able to identify and track the vessel. International regulations make it mandatory for all vessels:

- 300 GRT and above engaged in international voyage,
- cargo vessels above 500 GRT not engaged in international voyage, and
- all passenger ships, irrespective of size, are to be equipped with the AIS.

The Indian government has instituted enhanced security measures at sea. Some of the initiatives being put into operation include:

- compulsory Automatic Identification System (AIS) on vessels below 300 tones DWT,
- mandatory registration of all fishing vessels, and
- biometric identification cards for the crew.

States and other maritime agencies too have responded and have drawn plans to augment waterfront security.

However, it is worth noting that a proposal was mooted in 2007 wherein the Director General Lighthouses and Light vessels (DGLL) had proposed a National AIS Network. It was envisaged that such a network would provide MDA for about 40 nautical miles into the sea.³⁶ Similarly, an integrated Vessel Traffic System comprising of nine radar stations, AIS and radio, for the Gulf of Kachchh is yet to be completed.

Interestingly, new systems and architectures for security of the littorals are being conceptualized and also approved. For instance, there were plans to set up a 'vessel tracking and warning system' based on GPS and Geographic Information System (GIS) that would eventually create a virtual 'geo-fence' along the international maritime boundary between India and Pakistan.³⁷ The Gujarat Maritime Board and Gujarat State Fisheries Department plan to issue fishermen with biometric cards. The initiative would help better accounting of the fishing boats out at sea both for reconnaissance and surveillance purposes as also during cyclones.

Likewise the Kolkata Port Trust has upgraded its Vessel traffic Management System (VTMS) and now has the capability to track ships as far as Paradip and the Andaman Islands.³⁸ The AIS is expensive equipment and it may not be possible for smaller mechanized boats to meet the new regulations for fishing. In that context, the Indian Space Research Organisation (ISRO) is in the process of developing a 'low-cost model' of AIS for the Indian fishermen to serve as security devices.³⁹ Apparently the cost of such a device would less than Rs. 2500.00 (US\$ 50).

Digital Maps of the Littorals

Investigations have revealed that the LeT terrorists had used GPS to reach Mumbai shores and were in possession of compact discs that contained digital maps of Mumbai apparently obtained free of cost from Google Earth, an online satellite image provider. Digital maps offer a very high level of accuracy and can provide sensitive information of strategic targets in the littorals. Fearing that open source information on the location of sensitive military infrastructure would be of immense value to terrorists, South Korea and Thailand had complained that the location of the military airfields had been compromised and Australia had asked Google Earth to censor the pictures of its nuclear reactor at Lucas Heights.⁴⁰ Likewise, China reacted sharply to the webcast of pictures of its new nuclear base at Sanya in Hainan obtained from DigitalGlobe that provides Google with imagery.⁴¹

India has plans to develop digital maps of the country by using its own satellites under an ISRO project called '*Bhuvan*'. The system is based on a network of satellites that would provide high-resolution pictures ten times more precise and at a much lesser cost when compared with Google Earth.⁴² It will be useful to integrate the AIS, '*Bhuvan*' and the command centers of the Indian Navy, Coast Guard and shore based security agencies to respond to incidents in the littorals.

Education of Coastal Communities

At another level, it is critical for educating the coastal communities including

fishermen of the dangers lurking in the littorals and promoting the idea of them being important stakeholders in the surveillance network. For instance, the Indian Navy, Andhra Pradesh State Police and the Indian Coast Guard undertook a joint motorcycle expedition to educate coastal communities on the problem of terrorism. They planned to bring about greater security consciousness among the population through interactions, lectures, movies, presentations, and pamphlet distribution. This awareness can be adopted by all coastal states to enhance littoral security.⁴³

Conclusion

In essence, Mumbai terror attacks have highlighted the level of asymmetric domination of India's littorals and that 'terrorism at sea' and 'terrorism from the sea' is a reality. Also, good order and governance in the littorals has been eroded due to unregulated fishing activity and heavy commercial shipping creating ambient conditions for illegal activities. Poor governance in these areas has also resulted in mafias and militias controlling the activity that has further aggravated the issue of security. It is beyond doubt that littoral security is a vital dimension of national security of the state and raises several issues and challenges to the state that thus far was viewing these threats from a hinterland perspective.

Maritime asymmetric challenges and threats require a sophisticated strategy that pivots on domain awareness and effective translation of intelligence into credible response action. Likewise, 24x7 is an overwhelming responsibility particularly in the maritime domain that has its own peculiarities and complexities. The aim should be to extend the defence perimeter further out into the sea and secure the littorals. This can be best achieved through cross cutting technologies that enhance maritime domain awareness as also support integration of various sources of information.

At the operational level, the need to reduce uncertainty is critical. This can be best addressed through effective doctrines and innovative force structure. Critical areas that should receive more attention include shallow water anti submarine warfare platforms, mine countermeasures systems, and coastal craft fitted with detection and tracking equipment with a very high level of target identification and classification. These platforms and the associated systems are most suitable for littoral operations since the area has high density of traffic and is inherently a high-clutter environment. Building sufficient platforms is important, but equally important would be to build the right platforms that possess unique capabilities to defeat emerging threats.

It will be prudent to exploit robot, detectors and sensing devices to prevent human exposure. These could include remotely-operated vehicles (RoVs) that can perform a

variety of operations including underwater surveillance and monitoring in the murky waters in the littorals. RoVs possess a unique capability to being small and highly manoeuvrable and can enter cramped spaces. These are most suitable for inspection of piers, and jetties and when deployed aboard channel buoys can provide prevent intrusion by underwater saboteurs.

Given the Indian prowess in space and information technology, there is a critical need to map the littorals including integrating it with security systems and provide the security agencies a common picture for an effective response mechanism to maximize competencies. Also needed is a sophisticated data collection of littoral infrastructure, monitoring of maritime activity be it shipping or fishing, and also the land holding along the coastal areas. The aim should be to build necessary capabilities to monitor change in the infrastructure, movements of vessels to facilitate correct evaluation and timely response. The systems should be able to provide data integration tools that can seamlessly collate dissimilar datasets for a common operating picture thus enhancing littoral security and efficiently manage threats from the sea.

Coordinated operations and sharing of intelligence among the maritime security agencies would help shape an efficient response mechanism to counter threats to littoral security. In essence, proactive systemic-organisational-operational initiatives hold the key to enhanced domain awareness and credible response to maritime threats. Finally, the Indian maritime security forces would have to develop newer strategies and reexamine seriously the changing nature of threats emanating from the sea as also the tactics and the *modus operandi* of its actors. 

Notes

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2. "The Future Maritime Operational Concept (FMOC) 2007", The Development, Concepts and Doctrine Centre, Ministry of Defence, United Kingdom, pp.1-3.
3. For more details see, "The Landscape: Chaos in the Littorals", Chap.1 MCDP 3: Expeditionary Warfare, available at http://www.dtic.mil/doctrine/jel/service_pubs/mcdp3.pdf accessed on December 28, 2008.
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6. Geoffrey Till, "Seapower: A Guide for the Twenty First Century", Frank Cass, London, p.161,2004
7. Wilson John, "Karachi: A Terror Capital in the Making", Rupa, New Delhi, p.1, 2003. For instance, Wall Street Journal reporter Daniel Pearl was killed in Karachi. In May 2002, 11 French naval engineers were killed and several injured in a suicide attack on a Pakistan Navy and soon thereafter, a suicide bomber blew up a truck at the U.S. consulate in Karachi, killing 14 Pakistanis. In 2005, there were 34 terrorism related incidents in Karachi,

- declining in 2006 to 21 and 11 incidents in 2007. However, in 2008, there were 30 recorded incidents in the city. For more details see “*Terrorism Related Incidents in Karachi*”, available at http://satp.org/satporgtp/countries/pakistan/sindh/datasheet/karachi_incident.html accessed on February 11, 2009.
8. These include Jaish-e-Mohammed (JeM), Harkat-ul-Mujahideen (HuM), Hizbut Tehrir, Sunni group Sipah-e-Sahaba Pakistan (SSP), Al Amin Trust (AAT), and Tehrik-i-Islami Lashkar-i-Muhammadi that had ties with Mullah Dadullah, Taliban commander Tahir and Sirajul Haq Haqqani.
 9. “*Action Oriented Paper to Combat the Production of Drugs in and Trafficking from Afghanistan and along the Heroin Routes*”, Council of the European Union, Brussels, May 15, 2006.
 10. “*Illicit Drug Trends in Pakistan*”, The Paris Pact Illicit Drug Trends Report for Pakistan, United Nations Office on Drugs and Crime, April 2008.
 11. Reportedly, some 150 Taliban and Al-Qaeda operatives were suspected to have left Karachi onboard M. V. Mecca and entered Bangladesh through Chittagong.
 12. HuJI has contacts with the United Liberation Front of Assam (ULFA) and Manipur outfits like PREPAK and is attempting contacts with PLA, UNLF and All Tripura Tiger Force in Tripura. For more details see Prabin Kalita, Manas Paul and Nirmalya Banerjee, “*Govt Suspects HuJI-Ulfa Set off Assam Blasts*”, Times of India, October 31, 2008.
 13. Bharat Bhushan, “*Engaging North-East Militants*”, The Telegraph, October 11, 2004.
 14. ICC International Maritime Bureau, “*Piracy and Armed Robbery against Ships*”, Report for the Period January 1-December 31, 2008, p.23.
 15. Sumita Sarkar & Arvind Tiwari “*Combating Organised Crime: A Case Study of Mumbai City*”, Faultlines, Vol. 12, pp.143-146.
 16. In March 1993, the Mumbai police recovered huge quantities of RDX from the Vasai coast, Thane Creek and Mumbai. These had been smuggled into the city through the sea route to conduct bomb blasts that resulted in nearly 250 killed and 700 injured.
 17. Kavita Chowdhury, “*ISI aiding narcotics smuggling into India*”, Mail Today, February 20, 2009.
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