

LEX SCRIPTA MAGAZINE OF LAW AND POLICY, VOL-1, ISSUE-4
ISSN-2583-8725

LEX SCRIPTA MAGAZINE OF LAW AND POLICY
ISSN- 2583-8725

VOLUME-1 ISSUE-4
YEAR: 2023

EDITED BY:
LEX SCRIPTA MAGAZINE OF LAW AND
POLICY

LEX SCRIPTA MAGAZINE OF LAW AND POLICY, VOLUME-1: ISSUE-4

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COASTAL MONITORING, SURVEILLANCE AND RESPONSE

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Abstract:

The text discusses coastal monitoring and surveillance in India. It examines the importance of securing the 7516.6 km coastline after the 26/11 Mumbai attacks. Initiatives taken by the Government for coastal development and security are outlined, including the SAGARMALA project and the expansion of NCC in border areas.^[1] The technical aspects of coastal surveillance are detailed, such as the 46 radar Coastal Surveillance Network, electro-optic sensors, AIS, and DATS. SOPs, community interaction programs, biometric ID cards, and vessel tracking further bolster security.^[2] Challenges remain, but mapping, infrastructure upgrades, and ecological protection demonstrate the priority accorded to integrated coastal monitoring.

Keywords: Coastal security, Surveillance, SAGARMALA, Radar, Sensors, Community interaction

Introduction

India has a Coastline of 7516.6 km, and to ensure the security and safety of the coastline, it must be continuously monitored and scrutinised. If any activity seems fishy, a response is taken on a priority basis. So, after the 26/11 Mumbai attack, a need was felt for all this. So, several initiatives were taken by the Government from both development and security perspectives. During the speech, the Prime Minister emphasised the significance of India's coastal region's role in global trade. He also mentioned that the Government will prioritise the development of the SAGARMALA project. Additionally, he highlighted the importance of border and coastal infrastructure in national security.^[3] Further, it was also stated that NCC is to be expanded in border coastal areas. Coastal monitoring and surveillance are carried out through a chain of

static sensors comprising 46 radar stations. Apart from the natural climate changes, other factors impact our weather. Monitoring and assessing these changes is crucial to keep our coastal communities, economies, and ecosystems healthy. The National Ocean Service (NOS) conducts various physical, chemical, and biological observations, such as tracking contaminants in the water, assessing environmental changes, monitoring sea-level rise, and surveying the coastline and coastal sea floor. These observations help coastal communities make informed decisions for the environment. Therefore, it can be seen that monitoring coastal areas is essential. It is necessary for environmental as well as security purposes.^[4] Maritime surveillance is done on several spectra. These are:

- 1) On the beat.
- 2) EEZ surveillance.
- 3) Aerial Surveillance.
- 4) Extended EEZ Surveillance.
- 5) Coastal Security.
- 6) Offshore Security.
- 7) Boarding Operations

It has been observed how much importance is given to coastal surveillance. Indian Coast Guard conducts daily surveillance along India's coastline using 46 radar stations. It has been established under a coastal surveillance network.^[5] Now, when discussing coastal surveillance networks, I want to explain their use. So basically, the Coastal Surveillance Network is a chain of radars and other sensors that provide 24*7 surveillance along the Indian coastline territorial waters. CSN also included exclusive gadgets.

The following are the different tools and systems used for surveillance and monitoring:

1. Frequency Diversity Radar
2. Distress Alert Transmission System (DATS)
3. Electro-optic sensors equipped with Charge Coupled Device (CCD) day camera

4. Long-Range thermal imagers
5. Low Light TV (LLTV) night camera
6. Automatic Identification System (AIS)
7. Meteorological sensors.

Forty-six coastal surveillance radars and electro-optic sensors were installed during the first phase of the CSN project. Thirty-six were stationed in the Andaman and Nicobar Islands, six in Lakshadweep Island, and thirty-six on the mainland. Furthermore, as part of CSN Phase II, 38 radar stations and eight distinct mobile surveillance systems, valued at almost Rs. 800 crore, would be installed.^[6] It will be integrated with two vessel traffic management system (VTMS) centres at the Gulf of Kutch and Gulf of Khamhat in CSN Phase-II.^[7]

Though CSN has proved to be an effective method to keep surveillance in the coastal area, another essential element of the CSN project is the AIS system, which receives signals from VHF transponders on ships and transmits data to authorised control via communication satellites.^[8] During a security check, AIS aids ICGs in finding boats or other potential vessels. All boats weighing more than 300 tonnes must have the system installed.^[9] The system utilises VHF transponder transmissions to support naval radar as well. The ocean traffic management was greatly enhanced, and the stress on maritime security organisations was reduced by integrating the AIS network with critical radar systems.

The system is connected to NC3I, which operates under the Information Management & Analysis Centre (IMAC) in Gurugram.^[10] The BEC's advanced "data fusion" method will help integrate all information sources.^[11] The information is collected by sensors that pass through a robust hierarchical network architecture that connects district and regional headquarters to the main headquarters in New Delhi.^[12] The information received from these networks is supplemented with AIS data and VTMS of major ports, which includes fishing vessel monitoring systems, long-range identification and tracking (LRIT), and N3I of the Indian Navy.^[13]

Coastal surveillance radars operate in X-band and S-band. For precise and good target resolution, an X-band is used. CSR can quickly adapt to the S-band instead of the X-band during unfavourable weather conditions. In hostile situations, it also features a DATS, which ISRO developed. Emergency buttons including cyclone warning, hostage alert, fire alert, and

terrorist movement alert are among the distress signal communication systems that allow boat crew to communicate.

ICG has promulgated Standard Operating Procedures for ensuring cohesion among various agencies for coastal security. From time to time, regular exercises and evaluations are done to validate these SOPs. The ICG also conducts programs like CIP with the fishers and coastal people.^[14] To build the capacity of the Marine Police Personnel, ICG has been imparting training since 2006.^[15] Coastal surveillance radars operate in X-band and S-band. For precise and good target resolution, an X-band is used. CSR can quickly adapt to the S-band rather than the X-band during unfavourable weather conditions. In hostile situations, it also features a DATS, which ISRO developed. Emergency buttons including cyclone warning, hostage alert, fire alert, and terrorist movement alert are among the distress signal communication systems that allow boat crews to communicate. ICG has promulgated Standard Operating Procedures for ensuring cohesion among various agencies for coastal security. From time to time, regular exercises and evaluations are done to validate these SOPs. The ICG also conducts programs like CIP with the fishers and coastal people. To build the capacity of the Marine Police.^[16]

Further, an Integrated Coastal Surveillance System is also carried out. This technology was created to protect India's coastline to detect, track, and quickly deceive suspicious dhows, motorised, and traditional watercraft inside a designated controlled region, all year round, without requiring any personal presence. In addition, the Coastal Surveillance Network, a Coastal surveillance system, also came into existence. The program was created to enhance the security of nine coastal states and four Union Territories (UTs).^[12] Phase I of the program was approved in January 2005, with a five-year implementation period from 2005-2006 and a one-year extension until March 31, 2011.^[17] The plan included the construction of 73 coastal police stations, acquiring 120 12-tonne ships, 84 5-tonne ships, and 10 rubber-inflated boats specifically for Goa.^[18] These administrative tools were aimed at improving housing and boosting overall coastal security. The plan was finished on March 31, 2011.

Radars have been installed at Nabhadra, Dwarka, Porbandar, Mangrol, Jafrabad, Gopnath, Hazira, and the Union Territory of Daman.^[19] At the Porbandar station of the Indian Coast Guard, the main control room has been installed. Even at night, these radars could spot large ships 50 nautical miles offshore and fishing boats at a distance of 20 nautical miles.^[20] Importantly, they would also be able to see low-flying aircraft. The optical systems on the

radars will be able to photograph the ships at 10 nautical miles from the coast. Installing a comprehensive coastal radar network is a significant step towards enhancing India's coastal security. The project covers the Indian coastline and the neighbouring countries of Bangladesh and the Maldives.

An all-encompassing plan for establishing a coastal surveillance and radar network over the Indian peninsula has been developed by a team of experts. The primary objective of this initiative is to enhance the safety and security of the Indian coast. A network of electro-optic sensors, comprising radars and both daylight and nighttime cameras, will make up the coastal monitoring system. These sensors will be installed atop towers and lighthouses that provide views of the Bay of Bengal and the Arabian Sea. The data collected by these sensors will be transmitted to internal surveillance centres, where it will be combined using advanced techniques like "data fusion" to give a clear operational picture of the coastal region.^[21]

Conclusion:

Coastal security can be provided through a system of high-definition surface warning radars placed along the coast. No environmental harm has been reported since the installation of these radars in 2011. The Government has implemented several measures to improve coastal security and protect the fragile coastal ecosystem from further climate change impacts, which include:

1. Daily deployment of ships and planes for surveillance, maritime law enforcement, coastal security, response to pollution, search and rescue, and other public functions.
2. Coordination between patrolling and monitoring ships through Coastal Security and major and minor ports.
3. Implementation of Standard Operating Procedures (SOPs) for Coastal Security by the Indian Coast Guard (ICG) in all Coastal States/UTs to facilitate stakeholder communication.
4. Regular implementation of coastal security operations and drills.
5. Integration with the coastal population through Community Interaction Programmes (CIPs) to raise awareness among fishermen and bolster coastal security mechanisms.

6. Efforts by the Indian Coast Guard to increase the capabilities of the Marine Police and Joint Coastal Patrol (JCP).

7. Launching of 'Puneet Sagar Abhiyan' and 'Swachh Sagar Abhiyan' drives to collect trash that enters the ocean from land sources in partnership with NGOs and the NCC.

8. Deployment of pollution response teams and vessels to respond to oil spills and protect the marine ecosystem.

Other Coastal Security Initiatives:

1) Community Interaction Programmes (CIP): ICG conducted CIPs with threefold objectives:

a) fisherman to be "Eyes and EARS" intelligence collection.

b) raise awareness among fishermen about safety hazards at sea.

c) Sensitise the fishing community about the current security situation.

2) Fishermen biometric ID cards: The Department of Animal Husbandry Dairying & Fisheries has issued Fisherman Biometric ID cards to the fishermen.

3) Tracking of vessels/boats: The vessels over 20m long, as per law, must be equipped with Automatic Identification System (AIS) equipment.

4) As per the guidelines of the National Committee on Strengthening Maritimes & Coastal Security (NCSMCS), the Indian Space Research Organization (ISRO) was requested to supply 500 transponders each to the coastal states of Gujarat and Tamil Nadu.

5) Coastal Mapping is a crucial step towards enhancing coastal security. The mapping process involves identifying and locating essential establishments such as coastal police stations, local police stations, intelligence centres, fisheries, fishing communities, harbours, customs check posts, hospitals, train stations, bus stations, bomb disposal services, and more. The coastal mapping process^[22] in Indian states, including Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Odisha, West Bengal, and Union Territories such as Dadra and Nagar Haveli and Daman and Diu, Puducherry, and the Andaman and Nicobar Islands, is nearing completion.

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6) Upgradation of coastal security infrastructure with the latest equipment and gadgets.

Hence, coastal monitoring and surveillance are way too crucial in every aspect. Be it the security aspect, development and ecological aspect. The Government is taking all the relevant initiatives to strengthen the coastal security of India so that the massive attack in 2011 doesn't happen at present or in future. To date, no such criminal activity has taken place, including armed robbery. But still, maritime vigilance and security are done on a timely basis.

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