Review Paper On To Study and Enhance Coastal Security System Using GIS/GPS Tool

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Abstract

GPS (Global Positioning System) is increasingly being used for a wide range of applications. It provides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth. GPS is made up of three segments: Space, Control and User. GPS has become a widely used aid to navigation worldwide, and a useful tool for map-making, land surveying, commerce, scientific uses, tracking and surveillance, and hobbies such as geocaching and way marking. None of the present GPS systems satisfy the requirements for the safety of civilian navigation in the sea as the maritime boundary of a country cannot be marked.This is review paper is make use of GPS device for Gujarati Fishermen in the Sea. The main objective of this review paper to help Gujarati Fishermen by providing alert when they cross other country's border and alert generate in their regional language this application also works in gps enable mobile device and specific gps instrument.

***Index Terms* — GPS, Gujarati Fishermen, DAT, VTMS, SSAS, AIS, Coastal Department, international maritime border, PMSA**

I. INTRODUCTION

On November 2008 terrorist attacks on Mumbai—the commercial capital of an economically resurgent India left a deep and indelible impact on the Indian security psyche. The attacks exposed the lackadaisical attitude of the Government, at both the Central and state level, towards coastal security and the sheer ill preparedness of the country to combat such terror threats from the seas.Unfortunately, prior to the Mumbai attacks, coastal security and any related debate on the subject had been the exclusive preserve of the Indian Navy, the Coast Guard and some maritime specialists.

The susceptibility of the Gujarat coasts is primarily because of their topography and location. Added to this is the issue of straying of Indian fishermen into Pakistani territorial waters. The existence of vital strategic installations along these coasts further compounds the problem.Who suffered from varying degrees of "sea blindness", securing the country's land borders remained the dominant discourse and priority on the national security agenda.

It is difficult to guard the entire coastline in a fool-proof manner. Hence, the realization by the authorities for the urgent need to subscribe to capacity and infrastructure enhancement of the maritime agencies involved in oastal security and, more importantly, creating seamless interaction between them . The main objective of this paper is to help to the Guajarati fishermen communities by generating alert in their regional language when they beyond other country's border means whan they cross the international boundary.

This application works using GSP application, now a day GPS application is used in many sector like as map-making, land surveying, commerce, scientific uses, tracking and surveillance. Recreationally, GPS is used for providing accurate locations and as a navigation tool for hikers, hunters and also in fishing for Fishermen for many purpose like as tracing or monitoring specific boat, get position of their current location and using some type of instrument fishermen also send some type of emergency message at Coastal Department from fishing boat in sea. From fishing many people get Employment in many state of India. Among other state Gujarat has largest coastline.

II. TOPOGRAPHY AND LOCATION

Gujarat is located on the Western coast of India and has the longest coastline of 1,600 km in the country. The state shares its border with Rajasthan, Madhya Pradesh, Maharashtra and the Union Territories of Daman & Diu and Dadra & Nagar Haveli. The Arabian Sea borders the state both to the West and the South-West. This coastline is characterized by numerous creeks, small bays and rivulets.The northern Gujarat coast has several large creeks, some of which lie astride the international border with Pakistan. These creeks are all inter-connected by smaller water bodies and together they create an intricate maze of shallow and deep channels.However, the Kutch and Saurashtra regions of Gujarat, in particular, are fast emerging as an industrial and energy hub. Jakhau of Kutch district, Porbandar, Mangrol, and Veraval which are those cities immigrated at the Arabic Sea.

So, fishing business grows near at coastline area of those cities. All type of fish grows in those area but fishermen don't get good price from that type of fish for good price they should catch some specific type of fish like as lalpari (red snapper).This type of fish and more fish grows at near India – Pakistan border area. It called as international maritime boundary (international maritime border). For Solicitation fishing of more fish and lalpari type of fish, fisherman straying at India – Pakistan border and some time they cross India – Pakistan border. Most of time they don't know when they cross India – Pakistan border. It is not legal to stray into other country territorial water.

III. FISHERMEN STRAYING INTO TERRITORIAL WATER

Government has defined that if fishermen found in straying in other country territorial water then they should pay find to Government. If Indian fishermen are straying into territorial water then Pakistan Marine Security Agency (PMSA) arrest them because it is not legal. like this both Indian and Pakistani fishermen straying into each other's territorial waters and arrest

by each other Marine Security Agency.

This problem is primarily concentrated along the Gujarat coastline because number of arrested fishermen is more in Gujarat then other state of Gujarat. Most of Gujarati fishermen are arrest along with their boats. So, it remains a serious security problem.

Hundreds of fishermen are arrested by the Coast Guards of both nations, but obtaining their release is difficult and long-winded owing to the hostile relations between the two nations. This type of violations occurs due to the absence of a physical boundary and lack of navigational tools for small fishermen. In addition, there is the difficulty of keeping a vigil on fishermen who gather in their thousands at small harbours. For instance, Jakhau is a small harbour in the Kutch coast, where tens of thousands of fishermen gather during the fishing season. The place has a small Coast Guard station as well as a Customs station.

The cities those at Coastal line area are Jakhau of Kutch district and other city of saurashtra region, including vanakbori, diu, porbander, veraval and mangrol. The issue of arrest to Gujarati Fishermen raise every time when they cross the international border. So, I have also mentioned some of news from the times of India.The Pakistani Marine Security agency has arrested ten Gujarat fishermen and have seized four fishing boats from Jakhau on the west coast of Kutch district, a National Fish Forum official said. "The Pakistani agency arrested the fishermen on Friday and seized four fishing boats belonging to Porbandar," National Fish Forum secretary Manish Lodhari said. The four fishing boats -- Raj Rajeshwari, Hari Prasad, Raj Mukat and Vinayak -- seized by the agency have been taken away to Karachi , he claimed.(News: The times of India. Date: January 9, 2002 http://articles.timesofindia.indiatimes.com/2002-01-09/ahmedabad/27140048_1_demolition-drive-talala-larri-galla)

IV. Instruments of Coastal Security

To prevent Indian fishermen from crossing over the notional internal maritime boundary with Pakistan, state government and central government has define some technology for different type of work. That technologies used by coastal security and fishermen to prevent from Calamity and check their current location and navigate their boat. Such technology is there

A. Distress Alert Transmitters *(*DAT*)*

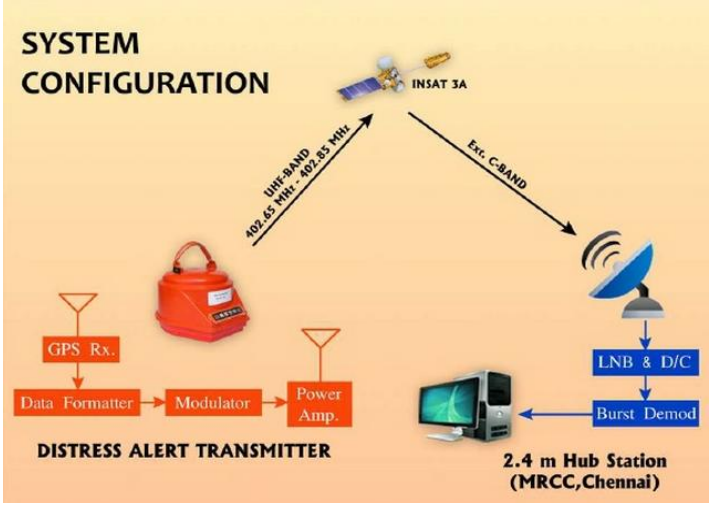
This device was jointly developed by the Indian Coast Guard and the Indian Space Research Organization (ISRO) for fishermen. INSAT based Distress Alert Transmitter (DAT) is used to transmit Emergency conditions and position location to a central HUB station via UHF transponder of INSAT for rescue operation.

It can be easily installed in boats or other vehicles. In case of emergency, user just needs to switch on the DAT unit. User is required to select a message (e.g.: fire in boat / boat sinking / medical help / other emergency) by pressing the corresponding switch provided in the system. The crew has to press the appropriate switch for the DAT emits a signal, which is transmitted through a satellite to the coast guard. The DAT combines the message with position of the boat obtained through GPS, and transmits the same to a central HUB station. The DAT will repeat the message every minute for first five minutes and then every five minutes till it is switched off manually or until the battery life gets over.

Situations like medical emergency, fire on board, sinking or capture of boats can be reported to authorities on shore for immediate action. The transmitter operates through a DRT transponder and can send continuous alerts for 24 hours once every five minutes on an average, while staff at the rescue centers track the boat as it appears on a GIS map on their computer screens.

FEATURES

- Low cost and therefore affordable to fishing community.
- In-built GPS to give position and time information.
- Transmits emergency signal on manual activation.
- Test transmission facility.
- Continuous transmission on activation for 24 hrs at 5 minutes intervals.
- Omni directional antenna suitable for fishing fleet
- Available with bracket suitable for pole/canopy mounting.
- Receives time of activation, type of emergency, vessel ID and position along with audio alarm at Maritime Rescue Coordination Centre (MRCC) of Indian Coast Guard.
- Light weight & floatable.



B. Vessel Traffic Management System (VTMS)

The VTMS system is spread across entire coastal area of the Gulf of Khambhat, where in Ghogha, Sartanpur, Mahuva, Jafrabad, Dahej, Magdalla, Hazira and Sultanabad installations for Radar, AIS, DF, VHF, MET have & Hydro etc. All the stations are connected to the Master Control Station (MCS) at Hazira through microwave link, using repeater stations at Alang and Bhagwa. The system provides complete surface water surveillance with two Emergency Response Centers, one at Coast Guard and one at GMB H.O., Gandhinagar that covering the entire Gulf of Khambhat.

The VTMS system is operated in accordance with IALA guidelines. The VTMS operators are fully trained according to the IALA V-103 standards for VTS operation by highly qualified professions from U.K., which include master mariners.

The system includes integrated RADAR, Automatic Identification System (AIS), and Radio Direction Finders (RDF), Metrological and Hydrological sensors, Microwave links as well as VOIP based Very High Frequency (VHF) radio system. All maritime traffic is recorded, and movements are stored in a database.

VTMS software is ready to integrate the Diver Detection System, Long range day & night optical (camera) detection system and long range underwater sonar based submarine detection system. Moreover, any port user can avail the service of VTMS Remote Monitoring Consol (RMC) to monitor their own ship as well as entire traffic of the Gulf of Khambhat, without having installed their own RADAR and AIS system.

Apart from monitoring, Gulf of Khambhat VTPMS is also one and only VTMS in India which provides all three important services like Information Service (IS), Navigational Assistance Service (NAS) and Traffic Organizing Service (TOS), as per IALA guidelines.

VTMS system consists of:

VTMS system is an integrated system for safety of ships in the sea. It consist one or more of the following depending upon requirement of the customer.

- Radars
- Display software
- Automatic Identification System (AIS)
- Weather Station
- CCTV surveillance camera
- VHF communication system
- VTMS simulator software
- Display system
- RF communications

C. Ship Security Alert Systems (SSAS)

The Ship Security Alert System (SSAS) is one safety measure for strengthening ship security and subduing acts of piracy and/or terrorism against shipping. Widely acknowledged as a part of the International Ship and Port Facility Security Code (ISPS code), the Ship Security Alert System (SSAS) complements the International Maritime Organization (IMO)'s attempts to increase maritime vessel security. When your ship is under attack an SSAS report, which contains your ships name, MMSI No., position, etc. is sent to up to five locations, specified by the ship's captain or authorized personnel. No audible or visible alarm is generated while the SSAS report is being transmitted, to prevent discovery of the report by the intruders.

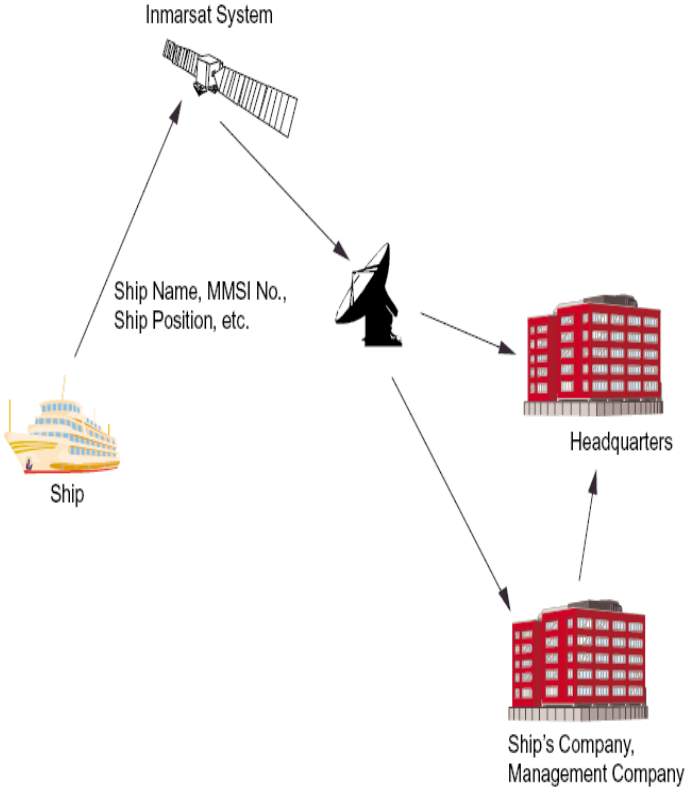
The SSAS is protected with a password to prevent unauthorized setting or testing of it by other than the ship's captain or authorized personnel.

How SSAS works?

When the maritime security staffs comprehend probable danger from pirates or terrorists a Ship Security Alert System (SSAS) alert is triggered.

The beacon transmits a specific country code, reacting to which the Rescue Coordination Centres (RCCs) or SAR Points of Contact (SPOCs) of that particular region is notified discreetly.

Once receiving the signal the national authorities of the area notified dispatch appropriate military or law-enforcement forces to deal with the terrorist or pirate menace.



D. Automatic Identification System(AIS)

Automatic Identification System is a system of transponders installed on vessels which transmit over two dedicated digital marine VHF channels. The data is sent from each vessel every few seconds and contains position and movement information such as course, speed, latitude, longitude, and rate of turn. Static information about the vessel is sent every few minutes and includes the name, type of ship, length, beam, draft, etc.

Nearly all commercial ships are mandated to carry AIS transponders and each year more yachts, launches and work boats are fitting AIS transponders. You can receive this data with an AIS receiver which translates the digital radio signals or you can receive as well as send your own information with a transponder.

V. How to solve the problem of Gujarati fishermen

The Arabian Sea around the Gulf of Kutch and across Kori Creek and Sir Creek – the mouth of the Indus Delta - is where a large number of fishermen from Pakistan and India congregate to earn their livelihood. This is also the region from where most of the fishermen are arrested. These fishermen are arrested for alleged violation of maritime boundaries and also territorial waters, in some cases. A

numbers of arrested Pakistani and Indian fishermen have told a South Asian Labour Forum (SALF) Fact Finding Team in May 1997 that, in the absence of a visible demarcation line, they are unable to understand whether they have actually

crossed the maritime boundary or not. Many of these fishermen also said that they were probably picked up from their own waters.

K. C. Pande, the Commandant of the Coast Guard, Porbandar, told the Fact Finding Team, "There are no signs on the sea which demarcate the sea border. Above all,

there is no agreed boundary on the Arabian Sea between India and Pakistan. For their mutual convenience, the patrolling agencies have worked out an imaginary line along the Sir Creek Region off the coast of Kutch."

This research is base on GPS application. We can use GPS in many applications and Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS was originally intended for military applications, but in the 1980s, the government made the system available for civilian use. GPS works in any weather conditions, anywhere in the world, 24 hours a day. There are no subscription fees or setup charges to use GPS. As GPS units are becoming smaller and less expensive, there are an expanding number of applications for GPS.

In transportation applications, GPS assists pilots and drivers in pinpointing their locations and avoiding collisions. Farmers can use GPS to guide equipment and control accurate distribution of fertilizers and other chemicals.GPS application is used in many sector like as map-making, land surveying, commerce, scientific uses, tracking and surveillance. Recreationally, GPS is used for providing accurate locations and as a navigation tool for hikers, hunters and boaters. GPS application is also used for Fishermen for navigating , checking position of their boat and etc. but today this is major issue that many Guajarati fishermen is arrest when they are fishing in territorial waters of other nation.

GPS based border alert system gives a best solution for this problem, whenever the fisherman was about to reach the boundary they can have a voice based alert in their native language itself. So that they can go back from that point onwards.

This GPS receiver is capable of identifying the location in which it was present in the form of latitude and longitudes. This information is very useful and can be processed for alerting the boat drivers. The GPS gives the data received from the satellites. For this information the GPS communicates with at least three satellites in the space.

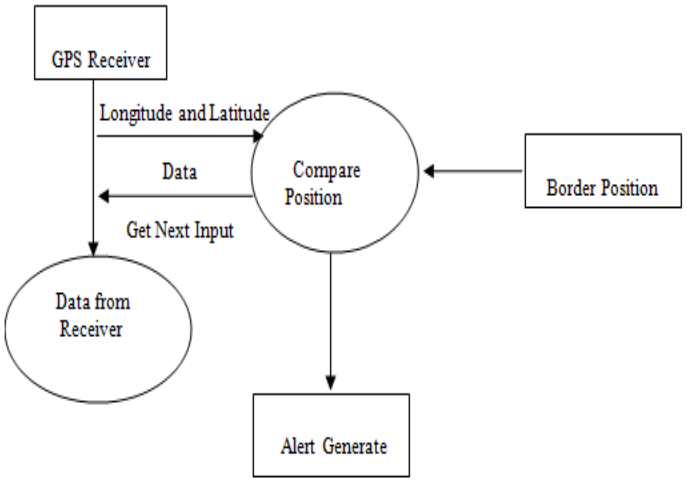
The functioning of the device is achieved by employing a micro controller. The micro controller forms the controlling unit of the project. The micro controller is interfaced with a GPS receiver so that it can receive the information about the location in which the boat is present. The controller compares with the stored boundary latitude and longitude positions of the boat with the territory location. If the boat is found beyond the border, then an alarm is generated with a message in their regional language.

To alert the driver it is interfaced with a voice circuitry which designed with a voice based IC to produce a voice alert to the fisher man. It is also interfaced with few LED indicators to alert the boat driver. My Research is for Gujarati Fishermen Communities So, Most of this problem raise in the area of Gujarat coastal towns of Porbandar, Mangrol, Jakhau and Veraval in Arabian Sea.

Many Guajarati fishermen arrested by Pakistan Marine Security Agency (PMSA) in the Arabian Sea of the Gujarat coast on charges of having crossed into Pakistani waters.

So, it is better that if there is any type of instrument that gives alert in their regional language to Gujarati fishermen when they cross the international border of other nation.

So, This type of application that run on specific instrument that give alert to fishermen in their regional language when they cross the international border of other national and after that application is also installed GPRS supported or GPS enabled mobile device because now a day mobile is regularly used by every person and Gujarati fishermen no need to purchase this GPS instrument if they have specific GPS enabled mobile device then they can installed this application in their mobile.



FLOW DIAGRAM OF COASTAL SECURITY FOR GUJARATI FISHERMEN COMMUNITIES

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