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GPS IMPLEMENTATION OF TRACKING AND WARNING SYSTEM ON INDIAN MARITIME BOUNDARY

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ABSTRACT- Global Positioning System (GPS) is used for navigation purpose which provides location based positioning. Communication between user unit and control unit through space makes it more popular which has used technology for tracking and surveillance applications and time and location sensitive navigation. The marine GPS navigation system and packages became a safety tool for fisherman boats from border crossing issues. In order to guide the fisherman along the maritime border and alert them from border crossing and to inform the Indian coast guard immediately about the border crossing of fishermen into the Sri Lankan maritime boundary. The proposed system aims at all the possible ways of alert system to fisherman when they about to reach the border line. GPS continuously tracking and alerting the fishermen from the control section station located on the shore. When the problem occurs, from the control room the coast guard can trace out the ship/boat which

has crossed the border. If so the fisherman is alerted and the message is transmitted to nearby coast guard ships through the zigbee transponder

INDEX TERMS:-Global Positioning System, GPS Receiver, ATMEGA microcontroller, Zigbee module.

I. INTRODUCTION

On the basis of census 2014, there are 3,288 marine fishing villages. The total Marine fisher folk population was about 4 million comprising in 864,550 families in Tamilnadu. Those which 38% marine fisher folk were engaged in active fishing with 85% of them having full time engagement and 63.6% of the fisher folk were engaged in fishing activities. The problem lies in the fact that India and Sri Lanka share a 400 km maritime border. The Tamil Nadu factor in India-Sri Lanka maritime border issue has been for past few years. Incidents happen frequently whenever the fishermen from

Tamil Nadu are getting shot dead at the Sri Lankan's maritime boundary. About 25,000 boats from Tamilnadu has involved in conducting fishing along the India - Sri Lanka maritime border. Since then the fishing activity is not being done peaceful. Tamil Nadu fishermen are arrested, or shot, by the Sri Lankan Navy. Hence this border crossing issue leads to loss in the both humans as well as their economic incomes. To develop the effective tool to provide the safe navigation system for commercial vessels through waterways is vital thing global. The branch of autonomous deals with the navigation technology thus provide the information about exact position of vessels in open sea, there by the fisher men can identify whether they are inside the border or not.

This paper in specific presents a progress to guide the fishermen to be safe border crossing issue. This proposed paper entitled "GPS IMPLEMENTATION OF TRACKING AND WARNING SYSTEM ON INDIAN MARITIME BOUNDARY" is useful to fishermen to help them in not to cross the border. Few existing system based on GPS was only provide the location of the vessels. This system provides the exact location of the travelling boat and alerts the boat when it nears the boundary line and also alerts the coast guards by passing information to control section.

II. OBJECTIVE

The objective of this project is to guide the fisherman and navy guards with proper navigation. And also prevent them path misleading. Probably the border crossing issue between India and Srilankanmaritime boundary will comes to an end.

III. EXISTING SYSTEM

Presently there are few existing systems with GPS system which helps to provide the information of current location of the

boats/ships and display it in anelectronic map ^[3]. GPS systems provide the current location and thereby fastest and accurate method for mariners for navigation purpose, calculating speed, and location determination. Hence this system leads to increased levels of efficiency for seaways transport worldwide and position accuracy, speed and heading are needed to ensure the boats/ships to reach the destination safely. The vessels available with GPS system and the satellite observe the latitude and longitude of the boat's position. So, the mariners with the GPS equipped boat has the advantage of navigate in the right direction and reach the destination. Navigation is not almost impossible in ocean as it spread widely. So this system is the most convenient to the mariners for navigation^[1].

A. DISADVANTAGES OF EXISTING SYSTEM

1. Lack of awareness – There is no such system to warn the fishermen when they are about to cross the maritime boundary. These leads to loss in the both humans as well as their economic incomes.
2. No security system –lack of security alert from coast guard can also be the reason for this maritime boundary crossing issue. The coastal guards must save the fishermen when they are in danger^[4].

IV. PROPOSED SYSTEM

This proposed method gives an idea to detect the maritime boundary of the country, where the border crossing issue that happens over long time in-between India and SriLanka. The reason is that unawareness to the Indian fishermen whether they are inside the country border or not. In this proposed system, GPS used to navigate the vessels and provide the location where the boat exactly in the overspread ocean. The database of stored longitude and latitude of the Indian SriLankan border will be compared by the microcontroller with the current position of the boat and alerts the fisherman that he has

crossed the boundary by an alarm system. With the use of long range communication that transmits the boat details if it crossed the boundary line to the coast guard. By this method, indication to both fisher man and coast guard is provided. Thereby the system can save both the life span of fishermen and their economic incomes.

A. Flow process of the proposed model

Figure 1.shows flow process of the proposed method in which the GPS receives the latitudeand longitude values of the location and converting it into required data. The data is feed into theMC (ATMEGA microcontroller) and it compares the stored values of border line data. Then the microcontroller alerts the fishermen if the boat found beyond the border limit. And the message has been transmitted to the nearby coast guards.

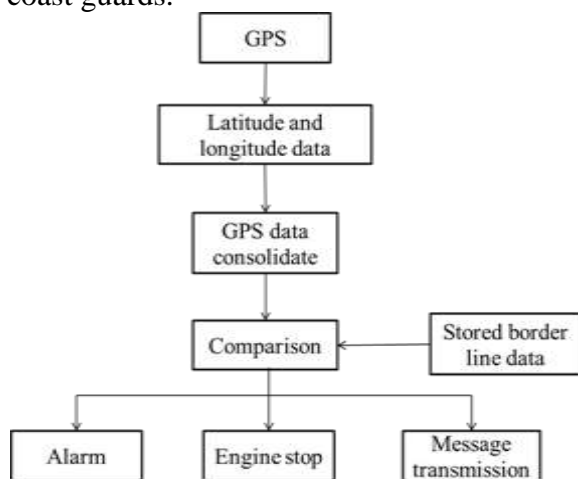


Figure.1 Flow process of the proposed model

The Controlling unit [2] has the components required for alert. With the GPS module the continuous tracking details of boat is monitoring by the coast guards. The threshold values for boundary limit is stored in the controlling unit, which gives the alarm when the boat is about to reach the border limit. And it sends signal to stop the engine, when the vessels crossed second level of threshold value.

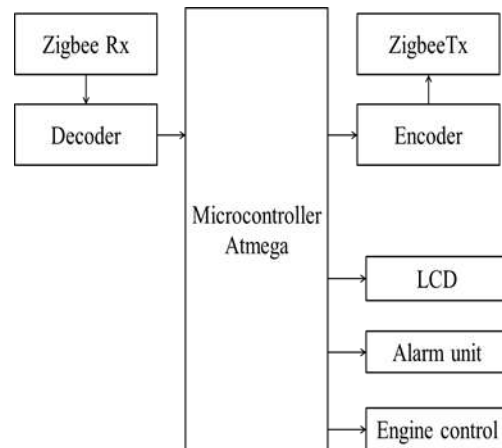


Figure.2 Controller section

Equipment involved

A. GPS

GPS device is a simple hand tool for navigation purpose, which provides clear latitude and longitude data of the vessels current location. The continuous tracking and information provided by the GPS device is feed into the microcontroller.The GPS unit does not have accuracy due to rotation of earth and satellite. In this proposed model, SEP (spherical error probable) has been employed to achieve the accuracy of GPS.

B. MICROCONTROLLER

The latitude and longitude data information from GPS is compared to India-SriLanka maritime border line data. Thus the continuous comparison data represents whether the boat is inside the country limit or not. When the vessel is about to cross the border line, the microcontroller send the alert to fishermen with alarm system. Moreover activator used to stop the fuel system, thereby controls the boat engine. Since because of the multiple devices are connected with the microcontroller, activating all devices are limited. So activator must be used to control the motor.

C. ALARM SYSTEM:

When the fishermen crossed the border line which is at first threshold level, the alarm turned on by the activator. The

transistor act as a switch is connected between the supply voltages and buzzer unit. Under normal condition, i.e. when the fisherman boat is located inside the border, buzzer will not be activated. When the boat crosses the border limit, closed circuit by turning on the transistor makes the buzzer on, and the alarm is generated^[4].



Figure 3. Maritime boundary line between India-Srilanka

Three levels of border can be applied for safety precaution to fishermen before reaching the extract border line. Consecutive alerting system will be switched on as per the levels of border 1, 2 and 3 as alarm unit, engine control and message transmission respectively.

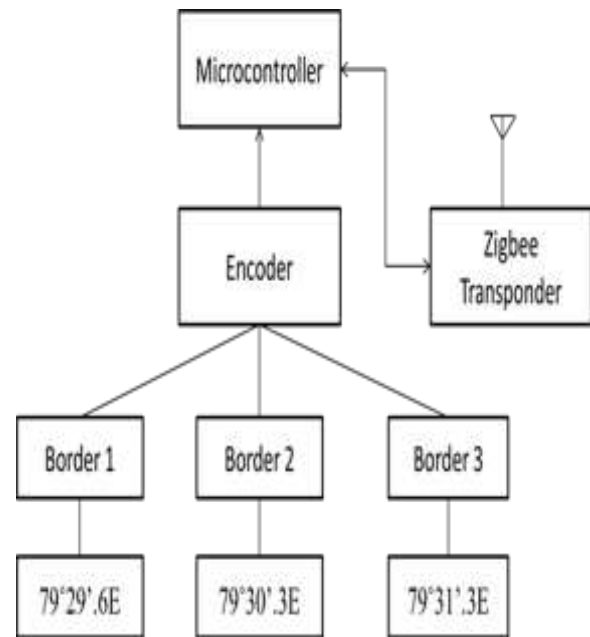


Figure 4.Threshold border levels control

D. ZIGBEE TRANSPONDER

The ZIGBEE can transmit the signal over the range of 2km when it placed above 30m from the ground level. Advanced ZIGBEE transmitter with double relay can cover range of maximum distance up to 80km (in EUROPE) and it send the signal and GPS details about the vessels which crossed the borderline to the nearest coast guard. So that the fisherman life span will save by the coast guard before other country navy reached them. Control over the engine of boat held by guards ones it stopped by microcontroller.

Table 1. Sample Maritime Boundary Line Data at Bay of Bengal

Position	Latitude	Longitude
P1	9°0'N	79°31'.3E
P2	8°53'.8N	79°29'.3E
P3	8°40'N	79°18'.2E

V. RESULT

Figure 5 shows the graphical user interface of the control section at coast guard unit, which provides the detailed latitude and longitude data of the boat along with the speed and velocity of boat. So it is possible

for the coast guards to prevent the fishermen from border crossing.



Figure 5. Simulated output with location of boat

VI. CONCLUSION

Risk of fishermen in India Sri Lanka border line due to unknowingly crossed the border could be reduced by this system. It is not easily to find the border range as in land for anyone in marine region. When they crossed the border limit they have to pay penalty or got arrested by neighbour country navy guards. This project helps the fishermen to guide by navigation and alerting them when reached the border limit. This concept of vessels tracking may enlarge to individual's vehicle security, with the GSM transmitter. Forecasting images which helps the fishermen by providing the information where the more number of fishes had been locating. Accuracy and more range of transmission will be achieved in future.

VII. REFERENCE

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