



A LOW POWER WAN FOR REAL TIME MONITORING AND ALERT MARINE OBJECTS - USING LORA

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Abstract- This paper describes about the off and send through the message. **Keywords-** border alerting and monitoring for fishermen using GPS, Arduino and LoRa. In day-to-day life, we hear about the many problems confronted by the Indian fishermen, were captured by the neighboring countries because of crossing the border. The main problem is fisherman can't know the exact maritime boundary. So the maritime boundaries should be fixed and there will be a communication must exist between a coastal guard office and the fisherman boats. The target of this system is utilized to encourage the fishermen to explore inside our sea nation border using GPS (Global Positioning System) and LoRa (Long Range). If the boat nearer to the restricted zone the alarm will turn on and the sound keep on increasing and sends the message to the coastal guard office. If the fishermen fails to ignore the warning and they move to reach the restricted zone automatically engine gets

I. INTRODUCTION
Sri Lanka and India seaside nations are isolated by their sea borders. In Tamilnadu about 20,000 vessels makespinning in the Bay of Bengal. The main aim is to give a well equitable user friendly environment for Indian Fisherman to handle hazardous situation with the help of engine control. This paper comes with a consistent solution for this problem and protects the Indian fisherman from dangerous situation and being crossing the maritime boundary and save their life and improve the safety of fisherman. The system is designed by using GPS and lora. A GPS route device is a device that precisely discovers natural area by getting data from GPS satellites. This device can track the GPS data every single time at whatever point the fisher



man's cross the Indian border. It is a significant depression issue and encourages trouble in both people and also their economic expenditures.

II. LITERATURE SURVEY

D. Jim Isaac et al [1] the paper titled as "Advanced border alert system using GPS and intelligent Engine control unit" "In our system using GPS and GSM, where GPS is used to find the location of the boat. If the boat nearer to the boundary primarily it warning the fishermen with the alarm and emits the location of the boat to the nearest coast office via GSM communication. When it further nears the maritime boundary an interferer is sent to the Engine Control Unit which controls the speed of the engine with the help of the electronic fuel injector. And its low cost maritime. By this method, we can alert the fishermen and also monitor them thereby avoiding banned activities such as smuggling, intruders, etc

III. METHODOLOGY

The GPS device will repetitively give the signal which determines the latitude and longitude and indicates the position of the fishermen and which gets read and displayed in the LCD. The hardware which interfaces with microcontroller, LCD display, Iora Transceiver and GPS Receiver. GPS provides consistent positioning, navigation,

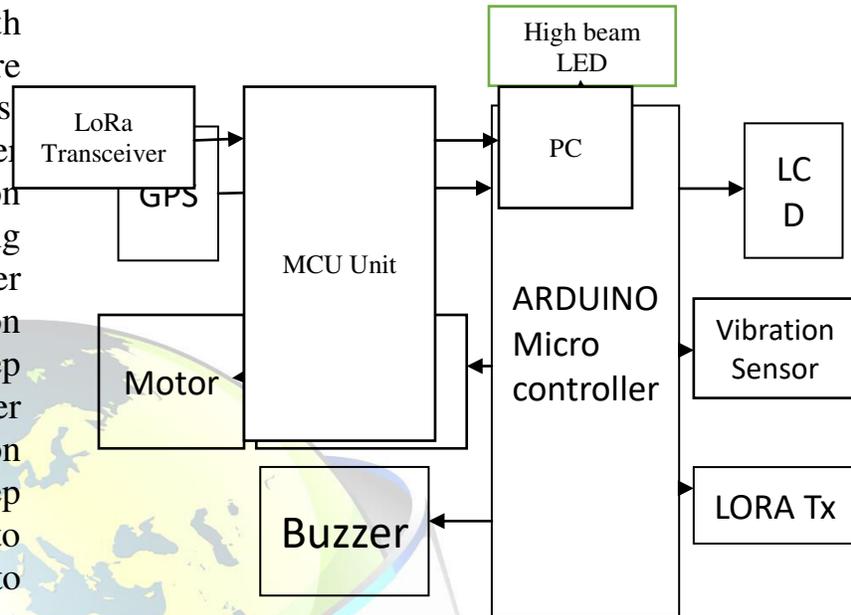
mechanism to mariners using GSM technology "In our system using only GPS to receive the information from the satellite and stored border locations to detect whether the boat has crossed the border or not. If so the mariner is alerted and the message is transmitted to nearby coast office through RF signals at VHF (30-300 mhz) range which covers wide area.

Naveen Kumar.M et al [3] the paper titled as "Border alert and smart tracking system with a alarm uses DGPS and GSM" and this system uses DGPS to track the location of the boat and to activate an alarm which consists of a Piezo-buzzer, when the border is move toward or crossed. Also, in addition, the DGPS information is sent to control office, and also the information is sent to the family at regular time intervals that are in expectation about their family member's safety.

and timing services to users on a continuous basis in everyday and night. Then GPS store the storage of the maritime position. While comparing the previous maritime restricted position (set manually in our project) and current position and result will be the latitude and longitudinal degree of the boat's location is determined. If the boat nearer to the restricted zone the alarm will turn on and the sound keep on



increasing and also speed of the engine will get reduced by using pulse width modulation. In its simplest pulse width modulation output signals are constructed by comparing two signals. The signals are restricted position (carrier signal) and current position (modulation signal) pulse width modulation operating at low power frequency. While carrier frequency higher than the modulation frequency, the alarm will keep on increasing, if the other case carrier frequency lowers than the modulation frequency, the alarm will keep on decreasing. Then the fishermen fails to ignore the warning and they move to reach the restricted zone automatically engine gets off by means of relay and send through the message to the coastal guard. A microcontroller is interfaced serially to a GSM modem and LoRa Transceiver. The block diagram of the entire system is given.



Block diagram of Receiver

border and it is connected to micro controller through serial port. Here we are using an RF 24L01 module as a transceiver.



B) GPS

Block diagram of Transmitter

A) LoRA

LoRa is a low power WAN Using 2.4 GHz frequency. Sends emergency messages, when the boat nearing the border or crossing the

The **Global Positioning System (GPS)** is a spacebased navigation system that provides location and time information in all weather conditions.. The GPS detects the latitude and longitude of the boat's position and sends the data to the microcontroller. This capability allows finding out whether the boat has crossed



the restricted area or not. This gives the electronic fuel injector with a solenoid valve current position of the boat to the control the fuel supply in the engine. When ATMEGA328 Microcontroller in the alarm is generated it is necessary to stop the Engine Control Unit. It compares the engine from moving forward. The fuel injector current position and stored restricted values fitted with a solenoid valve which is positioned if the boat is at a distance of electromagnetically controlled mechanical Three kilometers from the restricted area valve. When the GPS position matches the and then processor to generate an alarm stored restricted value, the result of the value keeps on increasing and also reduced the give to the fuel injector. So this in turn speed of the engine, The latitudes and reduced the fuel supply which stops the engine longitudes received from the from moving forward. microcontroller is compared with the stored restricted area values and reaches the restricted area, the engine will get off.

$$A = \sin^2(\Delta\phi/2) + \cos\phi_1 \cdot \cos\phi_2 \cdot \sin^2(\Delta\lambda/2)$$

$$c = 2 \cdot \text{atan2}(\sqrt{a}, \sqrt{1-a})$$

$$d = R \cdot c$$

$$\text{dist} = \sin(\text{deg2rad}(\text{lat1})) \cdot \sin(\text{deg2rad}(\text{lat2})) + \cos(\text{deg2rad}(\text{lat1})) \cdot \cos(\text{deg2rad}(\text{lat2})) \cdot \cos(\text{deg2rad}(\theta))$$

ϕ is latitude, λ is longitude, R is earth's radius (mean radius = 6,371km)

D) POWER SUPPLY

The power supply is provided DC motor and microcontroller. The DC power supply with both positive and negative output voltages, a center-tapped transformer is used and Arduino operates at low power.

E) RELAY

A relay is an electrically operated switch. Where many relays are used to an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid state relays. Relays are used where it is necessary to control a circuit by a low-power signal where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers they repeated the signal coming from one circuit and re-transmitted it on another circuit.

C) ENGINE CONTROL UNIT

The ECU consists of an AT mega 238, random access memory (RAM), read only memory (ROM), and an input/output interface. This unit is used to stop motor when it reaches the restricted area. If it is nearer the restricted area, the motor speed reduced by using pulse width modulation. The Electronic Control Unit (ECU) can control almost every operation in an engine together with explosion systems. In electronic control unit operate



FF)BUZZER:

If the boat nearer to the restricted area the alarm will keep on increasing by means of pulse width modulation. It ranges from (0-255).

CONCLUSION:

In the recent times the capture of Indian fishermen across Sri Lanka border has been increased. It is difficult for the fishermen to discover the borders and lost into other country' borders. Our objective is to give wireless support to those fishermen and aside from to go out after them if they are found missing. This project is a low cost efficient method of wireless tracking. It also gives sufficient information to both ship and coastal guardians of anyone crossing the border.

FUTURE SCOPE:

The process of directing the fishermen can be enhanced by placing the engine control unit system in the coastal office. They remotely control the engine to restart the boat for the safety of fishermen.

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