

Border Alert and Safety System

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ABSTRACT – In day-to- day life we hear about many Tamil fishermen being caught and put under Sri Lankan custody and even killed. The sea border between the countries is not easily identifiable, which is the main reason for this cross border cruelty. Here we have designed a system using embedded system which protects the fishermen by notifying the country border to them by using Global Positioning System (GPS) and Global system for mobile communication (GSM). We use GPS receiver to find the current location of the fishing boat or vessel. Using GPS, we can find the current latitude and longitude values and is sent to the microcontroller unit. Then the controller unit finds the current location by comparing the present latitude and longitudinal values with the predefined value. Then from the result of the comparison, this system aware the fishermen that they are about to reach the nautical border.

Index Terms– LORA, LCD, Zigbee, Emergency key, GPS (Global Positioning System).

I. INTRODUCTION

In this modern, fast moving and insecure world, it has become a basic necessity to be aware of one's safety. Maximum risks occur for fishermen in situations where they travel on a boat for fishing. In some situations, they should not move after some point and they should not enter into other countries area. There is a real necessity in designing a system that can track the vehicle and send the information about the vehicle to the concerned person and alert the fishermen also

The emotional and burning rigid question which has been sprung up at present is trespassing of maritime boundary line among Sri Lanka and India. As a result of maritime infringe and trespassing fishermen in both countries were arrested by costal guards and naval officers in two

countries. Fishing with small traditional vessels and crafts was a customary practiced tradition and important economic activity for the costal population on both sides of the Palk Strait which effected for arresting. According to the current clamorous situation among two states the traditional livelihood, political affinity, security coalition and goodwill became scandal.d IOT which is based on cloud server.



Source: Sri Lanka Survey Department
Maritime Boundary of Sri Lanka

Fig1. Boundary of Sri Lanka

II. LITERATURE SURVEY

Intelligent Boundary Alert System (IBAS) using GPS had been proposed by C. Sheeba thangapushpam. This system helps the fishermen in maritime navigation. The system uses a GPS which continuously receiving signals from the satellite and provide the current position of the boat based on the latitude and longitude data. ARM processor is already fetched details of the latitude and longitude of the maritime boundary. Comparison is done by the processor with stored data and current position of the boat, and it generates the alarm signal whenever the boat crosses the border. They

used wireless sensor network to transmit the message to the base station, there they monitors the boat in the sea. This system provides an indication to both fisherman and to coastal guard.

Implementation of GPS Based Security System for Safe Navigation Of Fisherman Auto Boat is proposed by C.Vinothkumar and B.Arunkumaran, that also uses GPS BORDER ALERT AND SAFETY SYSTEM Dept of EEE, VVIET,Mysore Page 3 technology for navigation and vessel tracking purposes. Using microcontroller, the stored border data between India and Srilanka is being compared with the current location details of the boat, and then alarm signal is being generated when the vessels crosses the border. Simply the message will be transmitted to the base station. In addition, some sensor is used to detect the natural calamities for sea way travel. The ultrasonic sensor is used for the detection of the iceberg, and sensor is used for tsunami detection. In addition to this weather forecasting report can also be obtained with the help of temperature and humidity sensor .

III. PROPOSED SYSTEM

In this work, we propose a wireless network, which provides an efficient positioning service and restores the lost sea-to-land link from small fishing boats which help to our fishermen from border crossing problem by getting alert sound and message in display before crossing the border. We adopted wireless network using zigbee (operating frequency 2.405Ghz~2.480Ghz) for sending and receiving the information between fishermen boat and control room.

The proposed networks combine global positioning system (GPS) and wireless sensor network communication system. The proposed concept approach provides continuous reporting and monitoring of all boats and its exact locations for search and rescue process during emergency situations by mistake the fishermen try to cross the border first they will get audio announcement with special voice chip and another few minutes the boat will shutdown automatically. For any emergency situation the fishermen get help from control room by pressing SOS switch in boat , and also by using seismic sensor they get prior whether alert like tsunami etc.

IV. OBJECTIVE

The main objective of this project is to providing a possible solution to the various hardships faced by the fishermen.

Guide the fisherman and navy guards with proper navigation. And also prevent them from climatic

conditions like storm, cyclone and path misleading. Probably the communication problem and border crossing issue between India and Sri-lanka maritime boundary will comes to an end.

V. METHODOLOGY

In the boat module microcontroller is used to control all the activities at the boat. This microcontroller is programmed in such a way that it continuously tracks the boat and sends GPS signals to the system at coastal guards. So, once the boat crosses the safe zone the microcontroller sends a signal to stop engine of the boat and engine will be stopped. It also helps to display various messages on LCD and voice module based on signals.

GPS module with antenna is used to track the location of the boat at every instance of time. This location is sent to the base station with the help of microcontroller. LCD is used to display various alert messages for the boat at various situations and along with the LCD a voice module is also used which alert the people at the boats. Zigbee transceiver is used to communicate between the boat and the base station.

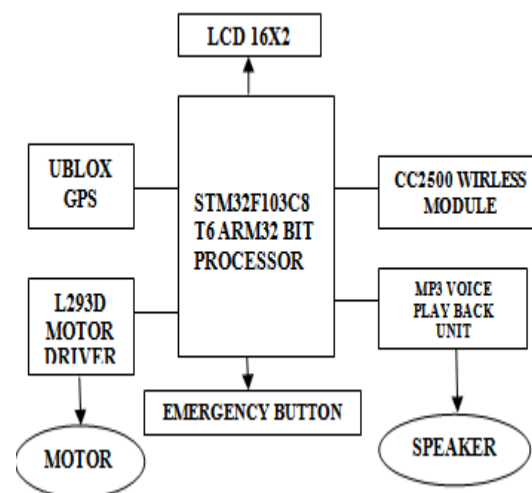


Fig2. Block diagram of boat unit

VI. HARDWARE COMPONENTS

5.1 STM32F103C8PROCESSOR



The STM32F103xx medium-density performance line family incorporates the high-performance ARMCortex-M3 32-bit RISC core operating at a 72 MHz frequency, high-speed embedded memories (Flash memory up to 128 Kbytes and SRAM up to 20 Kbytes), and an extensive range of enhanced I/Os and peripherals connected to two APB buses. All devices offer two 12-bit ADCs, three general purpose 16-bit timers plus one PWM timer, as well as standard and advanced communication interfaces: up to two I2Cs and SPIs, three USARTs, an USB and a CAN

The devices operate from a 2.0 to 3.6 V power supply. They are available in both the -40 to +85 °C temperature range and the -40 to +105 °C extended temperature range. A comprehensive set of power-saving mode allows the design of low-power applications.

5.2 LCD 16x2 MODULES



A 16x2 is a display of fundamental module for providing visible information. Here it is used to display frequency and proximity warning. A 16x2 LCD can display 20 characters in each line and has 4 such lines. Figure 5.5 shows physical appearance of LCD. In LCD, each character will be of size 5x7 matrix. This has two specific registers for data and command.

LCDs are more energy efficient and offer safer disposal than CRTs. Its low electrical power consumption enables it to be used in battery powered electronic equipment. It is an

electronically modulated optical device made up of any number of segments filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in colour or monochrome CC2500 RF Module is a trans-receiver module which provides easy to use RF communication at 2.4 GHz. It can be used to transmit and receive data at 9600 baud rates from any standard CMOS/TTL source. This module is a direct line in replacement for your serial communication it requires no extra hardware and no extra coding to It works in Half Duplex mode i.e. it provides communication in both directions, but only one direction at same time.

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5.4 MP3 PLAYER

DFP Layer Mini module is a serial MP3 module provides the perfect integrated MP3, WMV hardware decoding. While the software supports TF card driver, supports FAT16, FAT32 file system. Through simple serial commands to specify music playing, as well as how to play music and other functions, without the cumbersome underlying operating, easy to use, stable and reliable are the most important features of this module



5.5 EMERGENCY KEY



An emergency is a situation that poses an immediate risk to health, life, property, or environment. By pressing emergency key the default message is send to the NAVY, it intimate the emergency situation of Fishermen. This button is mostly used during cyclone, storm and etc When the fishermen crossed the border line which is at first threshold level, the alarm turned on by the activator

VII. CONCLUSION

The "Border Alert System for Fishermen" is a system that implements GPS and Embedded system together to create a security system for fishermen boats. The fisherman, while navigating crosses the maritime boundary, unknowingly as they are unable to visualize it in the ocean. It is a useful device for safer navigation, especially for fishermen. Since Sri Lanka and India have got lots of problems regarding the maritime boundary of the country, this device is made to identify the maritime boundary and to provide assistance if needed

VIII. ADVANTAGES

1. It saves the life of the fisher man who is unaware about the territorial border.
2. It avoids the conflicts between the countries because of crossing the border by the Fisherman.
3. It can also be used for other vehicles for location purpose.
4. It does not require any manual operation.

IX. APPLICATION

1. SMS based Remote Control & Alerts
2. Security Applications

3. Sensor Monitoring
4. We can use this device also as bomb detector

X. FUTURE SCOPE

1. We can use the EEPROM to store the previous Navigating Positions up to 256 locations.
2. We can reduce the size of the kit by using GPS and GSM on the same module of GPS navigator.
3. we can increase the accuracy up to 3m by increasing the cost of the GPS receiver.

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