

# GPS BASED BORDER ALERT SYSTEM FOR FISHERMAN

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**Abstract:** In this modern world, it is become a basic necessity to be aware of one's safety. Often the Indian fisherman will be caught at the India-Srilanka border for crossing the Srilanka border. Maximum risks can occur for fishermen in situations where they travel on a boat for fishing. In some situations they should not cross some point and they should not enter into other countries area There is a way to avoid the crossing point and at what distance they are from border. It can be easily located by a small device. 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 system that a function as a tracking and a security system has been designed that uses main underlying concept which is GPS (Global Positioning System). This system can deal with both place and security. The VMSS (Vehicle Monitoring and Security System) is a GPS based vehicle tracking system that is used for security applications as well.

**Keywords:** GPS, 89S52, FFMA

## I. INTRODUCTION

Fom Tamil Nadu about 18,000 boats of different kinds conduct fishing along the India-Sri Lanka maritime border. But by accidentally crossing the border without knowledge, they get shot by the Lankan navy. This leads to loss in the both humans as well as their economic incomes. Theissueoffishermenstrayingintoeachother'sterritorialwatersh ascomeasapotentialirritant,ofwhichtheIndianfishermenareusu allychargedoftrespassingthemaritimeboundary. We have developed a system which eliminates such problems and saves the lives of the fishermen.

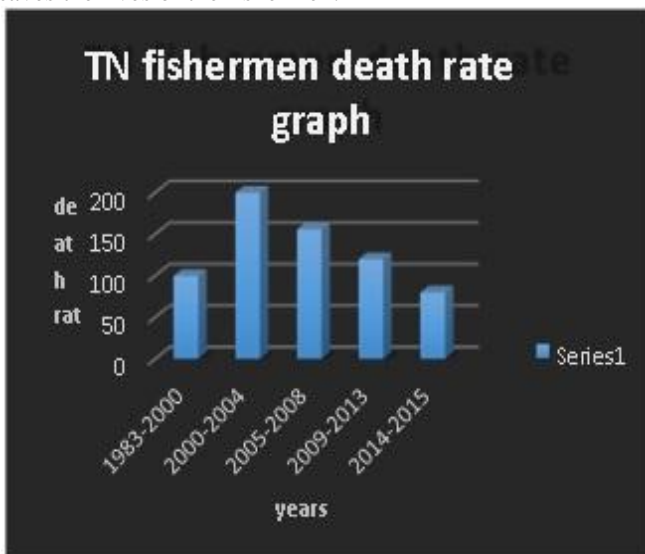


Fig 1: Fishermen death rate graph

## II. WORKING PRINCIPLE

The GPS Modem will continuously give the signal. The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit. The GPS antenna present in the GPS module receives the information from the GPS satellite and it reveals the position information. This information received from the GPS antenna is sent to the controlling station where it is decoded. Thus, the complete data related to the vehicle is available at the controlling unit. This information is sent to the owner or to the concerned person continuously using a GPS modem. This GPS modem has an antenna too. The information about the vehicle can also be displayed on LCD. If the person crosses the border then he checks the data coming from GPS and he alerted. By comparing the arrival time of the satellite signal with the on board clock time, at which the signal was emitted, the latitude and longitude in al degree of the boat's location is determined. The current design is an embedded application, which will continuously monitor a moving Boat and once the boat goes beyond the level of the defined layer the particular operation will be done. For doing so an AT89c51 micro controller is interfaced serially to a GSM MODEM AND GPS receiver.



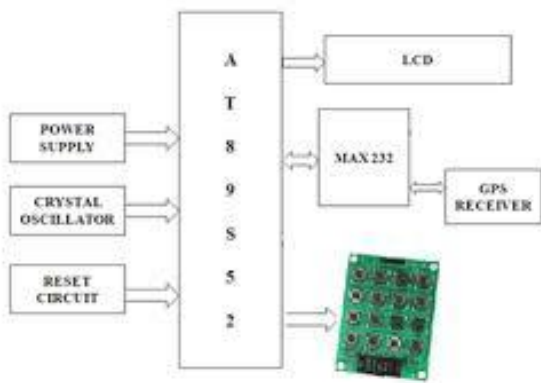
## III. EXISTING SYSTEM

At the present time there are few existing systems which help to identify the current position of the boats/ships using an android app named FISHER FRIEND MOBILE APPLICATION (FFMA). But most of the fisherman does not have android mobile to download the app. 60-70% of the farmers having an android mobile. Those fisherman who is having the mobile can escape from the Srilanka border using FFMA app.



IV. ARCHITECTURE

The architecture or block diagram for system is given below



The crystal oscillator used here is to generate a electric pulse of precise frequency. The use of 4\*4 keypad is used to set latitude and longitude for border alert.

V. GLOBAL POSITIONING SYSTEM

The GPS satellites transmit signals to a GPS receiver. These receivers passively receive satellite signals; they do not transmit and require an unobstructed view of the sky, so they can only be used effectively outdoors. Early receivers did not perform well within forested areas or near tall buildings but later receiver designs such as SiRFStarIII, MTK etc have overcome this and improved performance and sensitivity markedly. GPS operations depend on a very accurate time reference, which is provided by atomic clocks on board the satellites.



Each GPS satellite transmits data that indicates its location and the current time. All GPS satellites synchronize operations so that these repeating signals are transmitted at

the same instant. The signals, moving at the speed of light, arrive at a GPS receiver at slightly different times because some satellites are further away than others. The distance to the GPS satellites can be determined by estimating the amount of time it takes for their signals to reach the receiver. When the receiver estimates the distance to at least four GPS satellites, it can calculate its position in three dimensions.



VI. 89S52 MICROCONTROLLER

89S52 Microcontroller receives the data from the GPS .The data received contains latitude and longitude of the current location from the GPS satellite. The current location is compared with the stored co-ordinates of latitude and longitude. If the current location is far away from the boundary, it shows green light. If the current location is nearer to boundary, for example, say about 100meters, it gives a warning. If the current position is at 50meters away from the boundary, the engine will automatically stop. Immediately, the message will be sent to the coastal area unit.

VII. POSITION CALCULATION

Current position received from GPS is stored as S1 (latitude), S2 (longitude). The latitude S1 is compared with stored latitudes.

Position	Latitude	Longitude
<b>Position 1</b>	12°01'.0N	81°03'.0E
<b>Position 2</b>	12°05'.0N	81°09'.0E
<b>Position 3</b>	12°08'.0N	81°15'.0E
<b>Position 4</b>	12° 33'.0N	81°46'.0E

If latitude S1 is compared with stored latitude, adjacent latitudes (X1, X2, Y1, Y2) are retrieved from the above table and substituted in the equation given below

$$(Y-Y1) / (Y2-Y1) = (X-X1) / (X2-X1)$$

Solving the above equation, we get the below equation

$$Ax + By = C$$

In the above equation, S1, S2 values are submitted. Based on substituting these values, there are three cases.

Case 1: If LHS < RHS, then

When the boat is inside the boundary, microcontroller gets input from gets input from GPS. Latitude and Longitude are

extracted from the table and calculations are done in milliseconds

Case 2: If  $LHS > RHS$ , then

When the boat crossed the boundary, alarm will be raised indicating that the boat crossed the boundary. Immediately the message will be sent to the coastal area unit via GSM. The alarm will be continuously alarming until the boat returned to boundary.

#### VIII. BOUNDARY BETWEEN INDIA – SRILANKA



#### IX. INDICATION SYSTEM

Based on the boat position system and the border, alarm shows different kind of lights based upon the measurement of latitude and longitude

*ALARM 1: Green LED light*

When the boat is 400m away from the border, an alarm is indicated in green light.

*ALARM 2: Red LED light*

When the boat is 100m away from the border, an alarm is indicated in red light.

*WARNING 1: Alarm indication and speed control.*

*WARNING 2: Engine OFF.*

#### X. GSM MODULE

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection. A GSM modem duly interfaced to the MC through the level shifter IC Max232. The SIM card mounted GSM modem upon receiving digit command by SMS from any cell phone send that data to the MC through serial communication. While the program is executed, the GSM modem receives command 'STOP' to develop an output at the MC, the contact point of which are used to disable the ignition switch. The command so sent by the user is based on an intimation received by him through the GSM modem 'ALERT' a programmed message only if the input is driven low. The complete operation is displayed over 16x2 LCD display.

#### XI. POWER SUPPLY

The power supply is provided by DC motor and microcontroller. The DC power supply with both positive and negative output voltages, a centre – tapped transformer is used and microcontroller operates with low power.

#### XII. BUZZER

If the boat reaches the border or it is nearer to the border, an alarm is indicated by buzzer. It will keep on increasing by pulse width modulation. It ranges from 0 – 255.



#### XIII. CONCLUSION

Thus the fisherman can able to identify the international border and they can be prevented from capturing of Sri Lanka coastal border unit. This project is a low cost efficient method of wireless tracking. It also gives sufficient information to both ship and coastal guardians of any one crossing the border. This project is a low cost efficient method of wireless tracking.

#### REFERENCE

- [1]. GPS based border alert system  
[www.thesis123.com/gps-based-border-alert-system-fishermen-boat-speedometer-2/](http://www.thesis123.com/gps-based-border-alert-system-fishermen-boat-speedometer-2/)
- [2]. Design of border alert system  
[www.giapjournals.org/uploads/2/6/6/2/.../design\\_of\\_border\\_alert\\_system](http://www.giapjournals.org/uploads/2/6/6/2/.../design_of_border_alert_system).
- [3]. Border alert system for fisherman International Journal of Students Research in Technology & Management Vol 2 (02), March-April 2014, ISSN 2321-2543,
- [4]. GPS based vessel position monitoring and display system. Aerospace and Electronic Systems Magazine, IEEE, Jul 1990.
- [5]. Google Maps <http://code.google.com/apis/maps>