International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.(02), March 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

# A NOVAL APPROACH TO ALERT FISHERMEN IN OCEAN BORDERS USING FLOATABLE TRANSMITTING STATIONS

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**ABSTRACT**

The problems of Indian and Sri Lankan fishermen in the Palk Bay appear everlasting. The attributable causes are the instances of Indian fishermen being prevented from fishing, facing harassment and arrest by the Sri Lankan Navy (SLN), and also number of deaths is increased over the past decades for crossing the border. However, nothing substantive has emerged till date. In order to give a cheaper and better solution for this problem in the border ( palk bay) of Tamilnadu and Sri lanka this floatable transmitting station is designed and this will give the alert messages if any boat is about to cross the border and it also intimate the authority if there is any trespassing.This could be a better solution for the Tamilnadu and Srilankan fishermen controversies. This can also be implemented in Indian navy for security purposes.

## I.INTRODUCTION

The people who all are living in coastal areas purely depends on fishing occupation in the sea. Crossing the border is being treated as a serious offence by the neighbouring countries (e.g.Sri Lanka). Due to unawareness about the boundary limit, the fishermen used to cross the ocean borders. Once they cross the border, they are arrested or killed by the relevant navy and even their boats are being captured by the neighbourhood countries coastal guards. Under such situation the lives of fishermen continues to be in danger. And it has become one of the major factors for loss in humans as well as their country's economic. The sea borders between countries are not easily identifiable which is the main reason behind this problem. To eliminate such difficulties a system has been developed which helps the fishermen to be aware of crossing the ocean border.

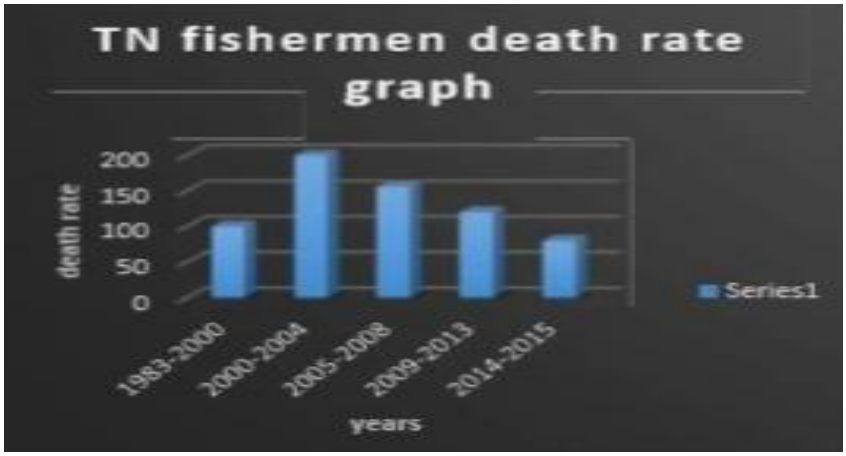


Figure 1.

A floatable transmitting station is one such system which alerts the fishermen in ocean borders and prevent them from trespassing. The number of stations will be floating along the border on ocean water placed 1 km apart.These stations will be sending the alerting messages through the transmitting antenna and also these stations are connected to neighbouring stations through Infrared radiations.This is to detect the trespassing of the boats.

A GPS module is used to locate each stations in the ocean border and the motors are used to relocate the stations if the moved away from their home position. These two motors are controlled by the arduino microcontroller. The buzzer, LED and LCD displays are used to alert the fishermen in border.

## II.OBJECTIVE

To produce transmitter that shall have features as follows:

- The transmitter should be floating on the marine water and the material should not be corroded easily.
- The transmitter should be connected to the GPS and the transmitter should maintain its position.
- The transmitter should give alert messages to the boats which comes nearer to the border.
- It also intimates the authorities about the boats that are crossing the border.
- It has to be less expensive to make the transmitter affordable to the fishermen.
- Production, commissioning and calibration of the transmitter shall be easy.
- Power consumption by this transmitter has to be very low.

## III.METHODOLOGY

- The transmitter is designed in spherical shape in order to float in marine water and it is coated with copper nickel alloy (highly resistive to corrosion) for long life time.

- The transmitter is connected with GPS module in order to maintain its position. The location of the transmitter is monitored continuously, if the location is changed the controller will move the transmitter to its home position by using two motors.
- A loop antenna is used here to send alert messages to the vessels that are closer to the border (we considered 2km).
- An IR transmitter and receiver is placed in this system. Always all the floating transmitters are connected to the next one by means of this IR rays. If any vessel (boat) crosses the border this IR connection will be lost. Then the buzzer will be turned on along with the indicator and also alert message will send to both the vessel& the base station located on the shore indicating that a vessel has crossed the border. Thus guards in the shore can assist and provide additional help to those fishermen if needed.
- An Arduino microcontroller is used to control the overall operations of this floating transmitter.
- Along the border these floating transmitter has to be positioned by 1km apart. So that it gives alert message to the fishermen that they are nearing the border and it can also helpful to the navy for the security purposes.

## IV.BLOCK DIAGRAM

**Floatable station:**

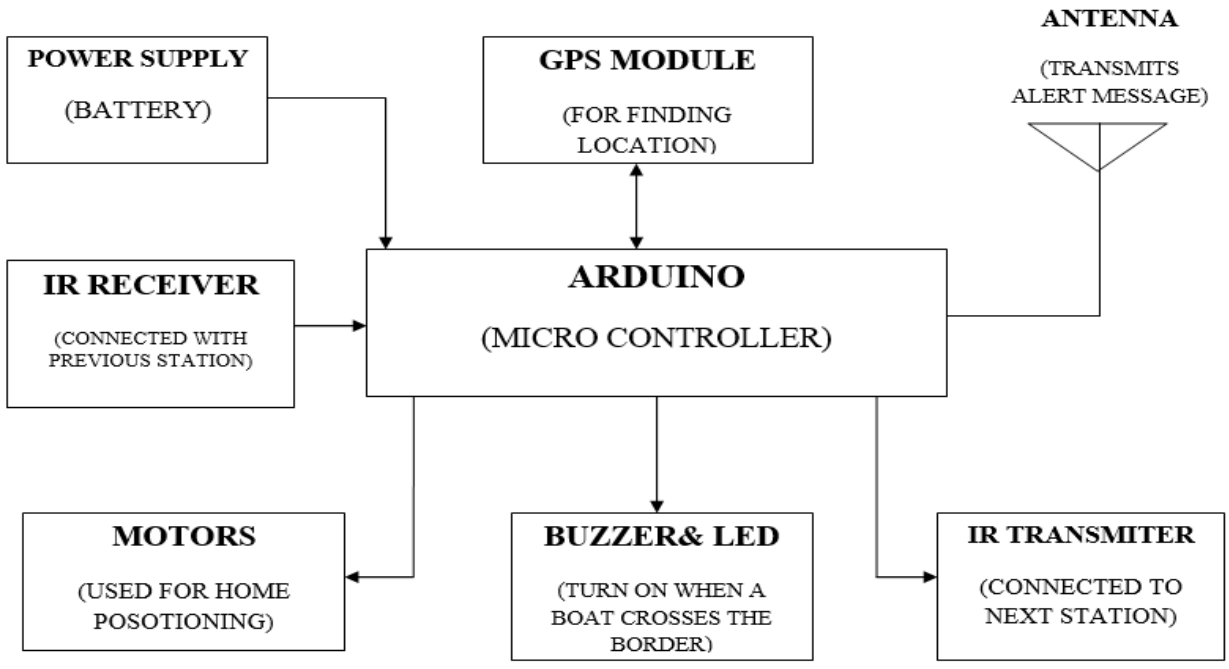


Figure 2.

**BOAT:**

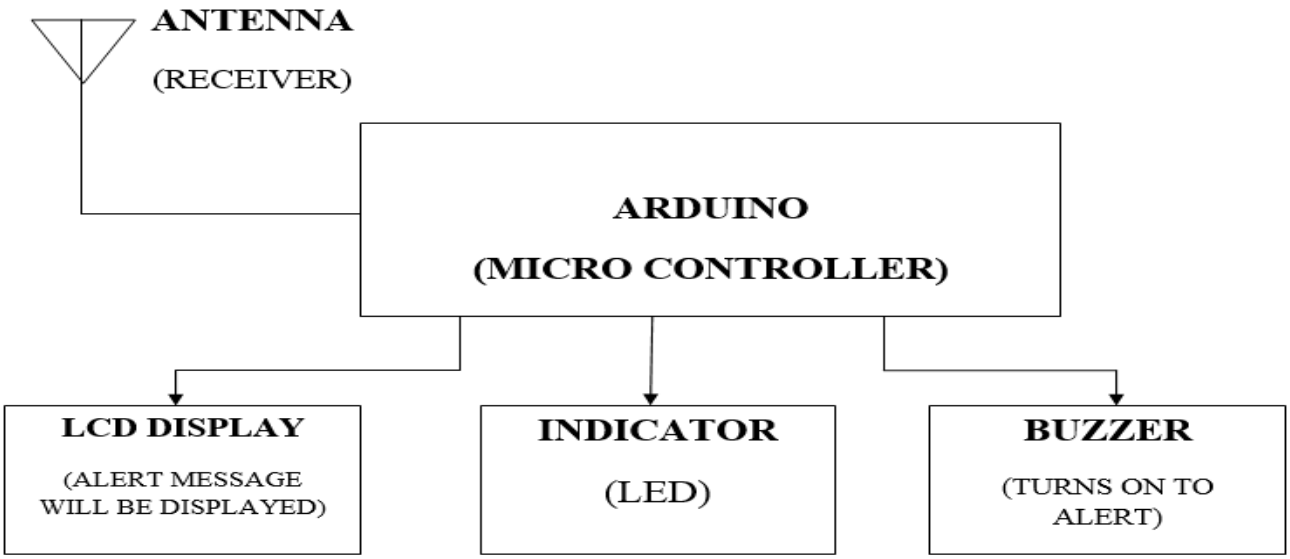


Figure 3.

**4.1.Arduino:**

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself (DIY) kits.

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or Breadboards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

**4.2.GPS Module:**

The Global Positioning System (GPS), originally Navstar GPS, is a satellite-based radionavigation system owned by the United States government and operated by the United States Air Force.It is a global navigation satellite system that provides geolocation and time information to a GPS receiver anywhere on or near the Earth

where there is an unobstructed line of sight to four or more GPS satellites.Obstacles such as mountains and buildings block the relatively weak GPS signals.

The GPS does not require the user to transmit any data, and it operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. The GPS provides critical positioning capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.

**4.3.IR transmitter:**

IR Transmitter and receiver are used to control any device wirelessly, means remotely. TV remote and TV are the best example of IR transmitter and receiver. TV generally consist TSOP1738 as the IR receiver, which senses modulated IR pulses and convert them into electrical signal. IR LED emits infrared light, means it emits light in the range of Infrared frequency. We cannot see Infrared light through our eyes, they are invisible to human eyes. The wavelength of Infrared (700nm – 1mm) is just beyond the normal visible light. Everything which produce heat, emits infrared like our human body. Infrared have the same properties as visible light, like it can be focused, reflected and polarised like visible light.

Other than emitting invisible infrared light, IR LED looks like a normal LED and also operates like a normal LED, means it consumes 20mA current and 3vots power. IR LEDs have light emitting angle of approx. 20-60 degree and range of approx. few centimetres to several feets, it depends upon the type of IR transmitter and the manufacturer. Some transmitters have the range in kilometres.

**4.4.IR receiver:**

TSOP17XX receives the modulated Infrared waves and changes its output. TSOP is available in many frequency ranges like TSOP1730, TSOP1738, TSOP1740 etc. Last two digits represent the frequency (in Khz) of modulated IR rays, on which TSOP responds. Like for example TSOP1738 reacts when it receives the IR radiation modulated at 38Khz. Means it detects the IR which is switching On and Off at the rate of 38Khz. TSOP's output is active low, means its output is remains HIGH when there is no IR, and becomes low when it detects IR radiation. TSOP operates on particular frequency so that other IRs in the environment can't interfere, except the modulated IR of particular frequency. It has three pins, Ground, Vs (power), and OUTPUT PIN.

**4.5.Stepper motor:**

A stepper motor or step motor or stepping motor is a brushless DC electric motor that divides a full rotation into a number of equal steps. The motor's position can then be commanded to move and hold at one of these steps without any position sensor for feedback (an open-loop controller), as long as the motor is carefully sized to the application in respect to torque and speed.

**4.6.LED:**

A light-emitting diode (LED) is a two-leadsemiconductorlight source. It is a p–n junctiondiode that emits light when activated. When a suitable current is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. LEDs are typically small (less than 1 $mm^2$) and integrated optical components may be used to shape the radiation pattern.

**4.7.Buzzer:**

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (*piezo* for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke

**4.8.LCD Display:**

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome.[1] LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

**V.EXPERIMENTAL SETUP & RESULT**

Our designed floatable transmitting station is placed along the ocean borders and the boat section is placed inside a boat.The Buzzer, LEDs and LCD display are placed inside the boat.The antenna placed in the transmitting station sends the alert messages to the boat.Here, we considered four different cases. They are illustrated below.The following shows the leds placed in the boat.

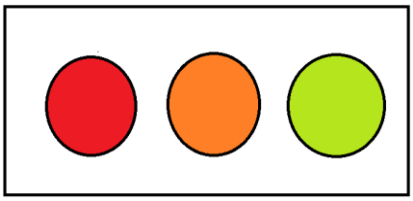

Figure 4.

**CASE i:**When the boat is at the distance of 10Km away from the ocean border, We assume that our boat is in safer zone. Thus the green led glows and the message “Safer zone” is displayed in the LCD display. The buzzer will be in its off state.

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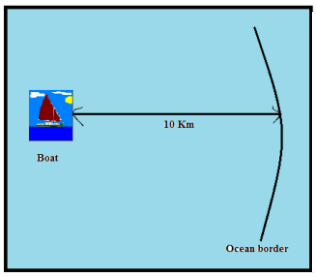


Figure 5.

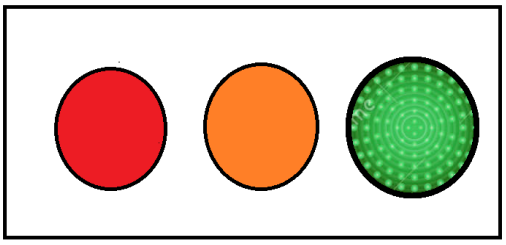

Figure 6.

**CASE ii:**

When the boat is at the distance of 5Km away from the border, We assume that our boat had entered into the warning zone. Thus the orange led glows along with the message "Warning zone" in the LCD display and there will be short beeps from the buzzer.

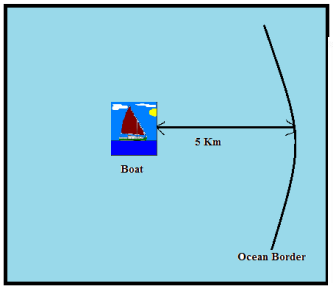


Figure 7.

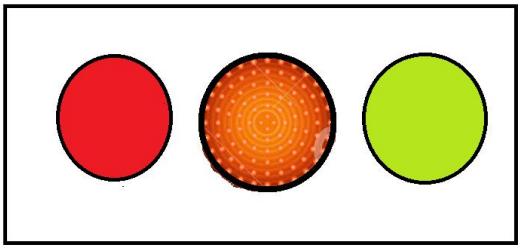

Figure 8.

**CASE iii:**

When the boat is at the distance of 2Km away from the border, we assume that our boat had entered into the danger zone. Thus the red led glows along with the message "Danger zone" in the LCD display and there will be longer beeps from the buzzer.

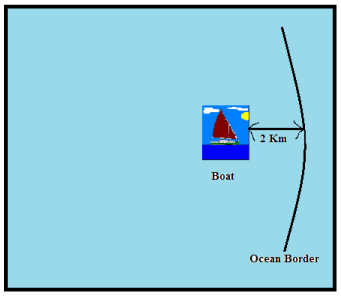


Figure 9.

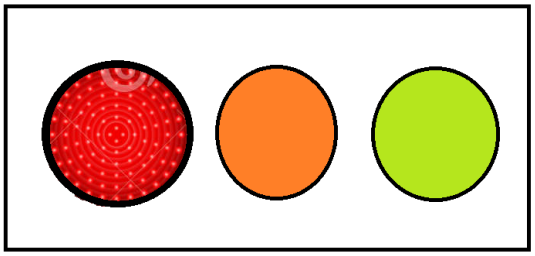

Figure 10.

**CASE iv:**When the boat crosses the border , the red led starts to blink continuously along with the message "Border crossed" and the buzzer beeps continuously. And also the message about the trespassing is sent to the authorities in the border.

## VI.CONCLUSION

Thus this floatable transmitting station is very useful for the fishermens in ocean borders.. It is reliable, flexible and of low cost. The alert system which we have developed will provide an effective solution for fishermen's problem and prevent them from crossing other country border. The system can save the lives of many fishermen. This project works as an automatic alert system that intimates the fishermen as well as authorities if there is any border crossing occurs.In future this can can be enhanced and implemented in Navy for security purposes.

## VIII.ACKNOWLEDGEMENT

This paper proposal has been recognised by Tamilnadu State Council for Science and Technology (TNSCST) under student project scheme 2017-2018 in engineering stream(www.tanscst.nic.in/pdf/spsr18P2.pdf).

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