THIAGARAJAR COLLEGE OF ENGINEERING

(A Government Aided IS0 9009:2008 certified Autonomous Institution affiliated to Anna University)

INFORMATION TECHNOLOGY DEPARTMENT

PROFESSIONAL COMMUNICATION – 14IT470

REPORT ON

MARITIME BOUNDARY ALERT SYSTEM

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BONAFIDE CERTIFICATE

Certified that this technical report **"MARITIME BOUNDARY ALERT SYSTEM"** is the bona-fide work of**" R. GOPINATH (16IT030), K.T.L. KALAIVANI (16IT041), K. MEENADEVI (16IT052), S. MUKILA (16IT056), M. PRADEEPAN LALA (16IT068), R. SRIVIDHYA (16IT105), S. SWETHA (16IT109), P.MAGESHWARI(16IT128)"**

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Examiner – I Examiner – II Examiner III

ABSTRACT

One of the difficult jobs in the world is **Fishing**. But, there is no safety measures and proper guidance for fishermen regarding maritime boundary. Till now there is no proper implementation to track the location of the fishermen in mid-sea. Therefore, Our intention is to do a project on **Maritime Boundary Alert System**. A GPS receiver is connected to device in which maritime latitude and longitude values are already defined. When the fishermen reach the warning zone, an alarm sound will be given. Still, if the fishermen continue to cross the warning zone and reach near the restricted zone, a red light will be emitted. During distress condition, manually the location of fishermen will be sent as signals to satellite which in turn sends signals to central hub station. From this project, We have decided to build a device for the welfare of the fishermen.

Key Words : GPS, Signal, Boundary, Device, Alert, Latitude, Longitude.

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CHAPTER – I

1. INTRODUCTION

The aim of our engineering project is to alert the fishermen while crossing the Indian maritime boundary and to save the fishermen who got stuck in mid – sea during cyclones, storms, boat malfunctioning etc.

1.1. HISTORY

The issue of fishermen straying in each other's territorial waters has come as potential irritant in the bilateral relations between the neighbouring states. Indian fishermen are usually arrested on charges of trespassing. Many fishermen from India all from Tamil Nadu were arrested by the Sri Lankan Navy , a sharp increase compared to the last few years.

Also, there is no remedial measures to rescue the fishermen during distress conditions such as cyclones, storms, boat malfunctioning etc.

1.2.OBJECTIVE

There is no well defined boundary line between the two nations. **"Fishermen are often treated and exchanged like prisoner of the war"**. Most of these prisoners are poor Indian fishermen who were arrested and brought for trespassing into other country boundary. While the Cyclone may have brought out several brave rescue stories in the past , the fact that till date there is no set mechanism to track fishermen stranded in the sea is what needs to be addressed. Since there is no proper way to track the location of the fishermen who got struck in mid-sea, it is very difficult to rescue them.

- The main objective of this project is to track the exact location of the fishermen in mid – sea.
- So that fishermen can be alerted when they are about to enter the border of the neighboring country.
- It also ensures the safety of fishermen.

1.3.SCOPE

The system works on the Indo – Sri Lankan maritime boundary.

1.3.1 ASSUMPTIONS

- The system can work/detect the border in the presence of GPS[Global Positioning System].

- Though GPS does not require internet connection map navigation requires internet connection.

1.4.PROBLEM DESCRIPTION

One of the major social problems we face in our daily life is the dispute between the fishermen and the naval forces of the neighbourhood countries. In order to resolve this problem, the fishermen must be properly guided by getting educated on the sea border level which they lack still.

This problem seriously affect the personal life of the fishermen who are imprisoned for a long time. This also greatly affects the economic condition of the country.

"Peace among the neighbouring countries is very essential for the world peace".

There is a continuous dispute between India and Sri Lanka for the past 20 years. This is mainly due to sea border issues. Fishermen will be mainly benefitted by the solution. But the implementation lies on the government side.

1.4.1. VOICE OF THE END USER

"The sea border between the countries is not easily identifiable, which is the main reason for this cross border cruelty".

- "We can't identify the boundary since there is no cheap device to indicate the boundary."
- "There is no one to help us in mid-sea during any distress. The rescue team could not track our location."

In the modern, fast moving and insecure world, it is the 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 boat and send the information about the boat to the concerned person and alert the fisherman also.

CHAPTER - II

2. METHODOLOGY

2.1. PROPOSED SOLUTIONS

At present, there are few existing systems which help to identify the current position of the boats/ships using GPS System. There is a device called Distress Alert Transmitter which helps the rescue team member to identify the location of fishermen who got stuck in mid – sea during distress conditions. We have proposed three ideas to combine the functionalities of both these devices which are listed below:

2.1.1. IDEA – 1

A GPS receiver is attached in boat's engine. Whenever the fishermen reaches the restricted zone, the boat engine stops. Also, if the boat gets immersed in water, signals will be transmitted to coastal guard office.

WORKFLOW OF IDEA – 1

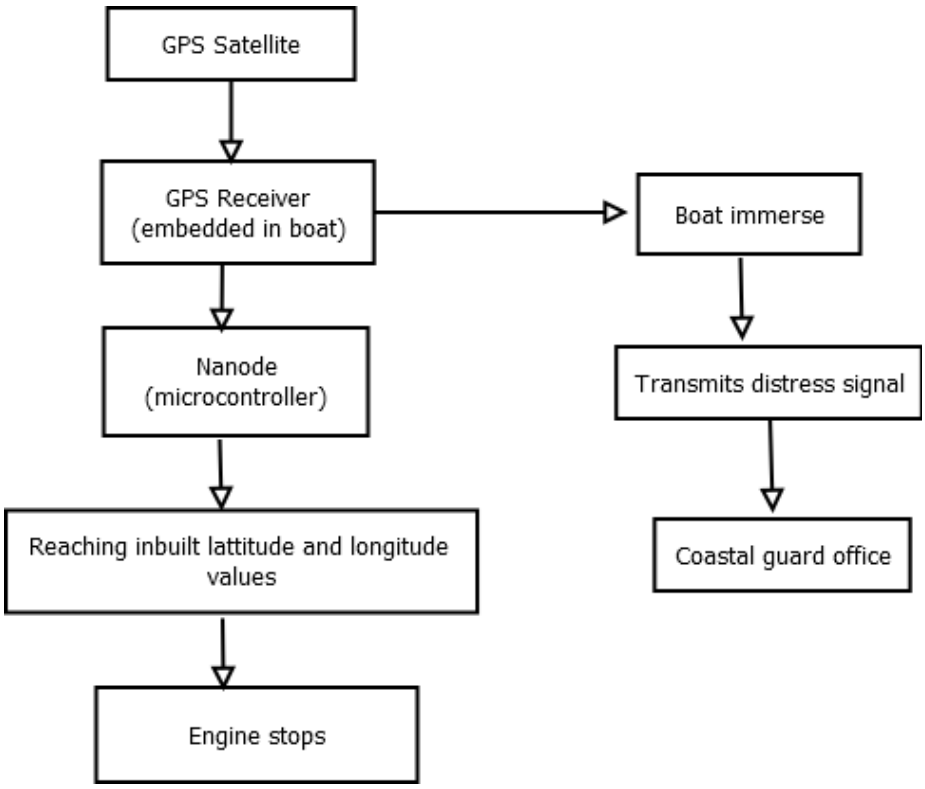

Figure 1

2.1.2. IDEA – 2

A device with GSM is to be used in this method. Whenever the boat reaches the restricted zone, a warning message will be displayed in the device. During emergency situation, the fishermen should manually activate to send SMS to nearby coastal station.

WORKFLOW OF IDEA -2

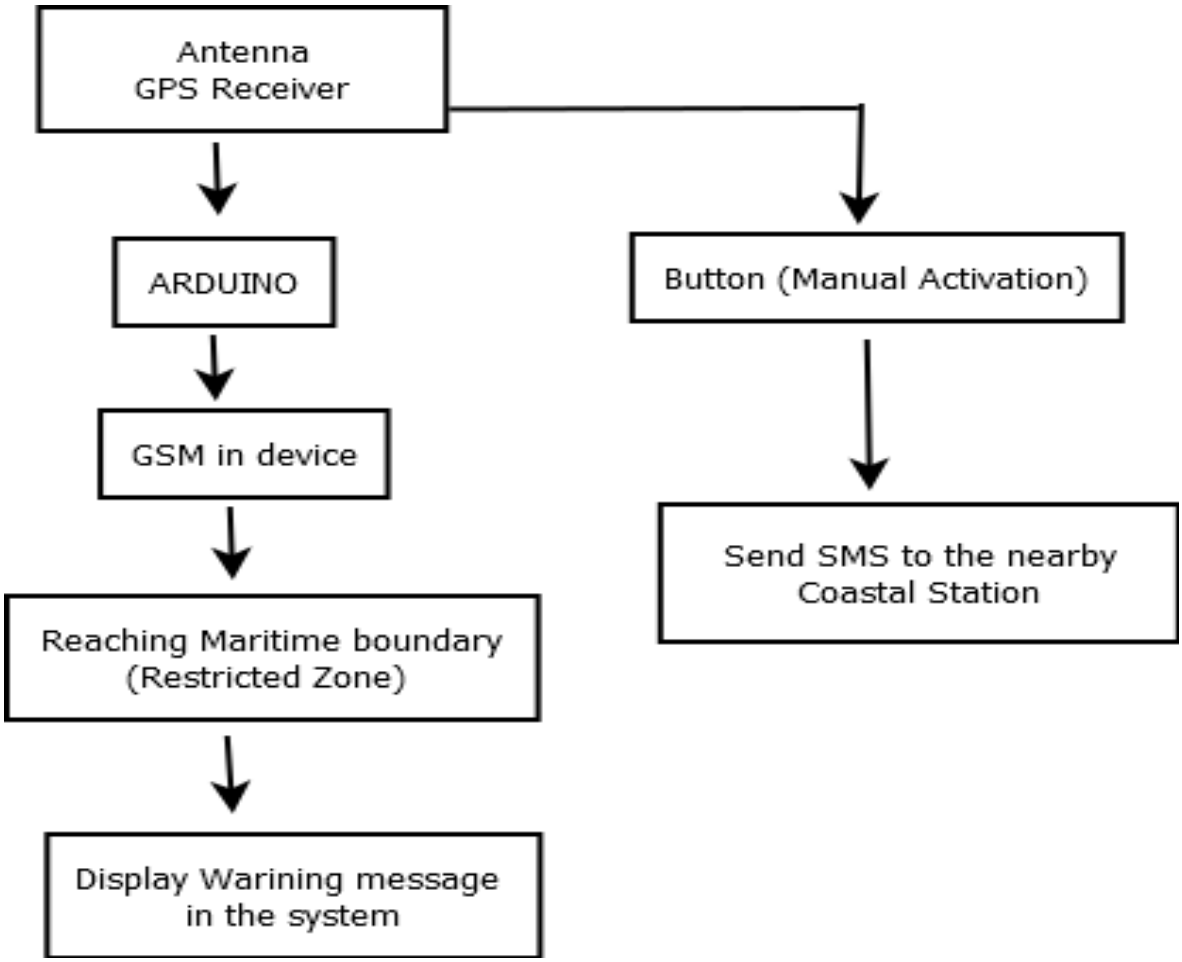

Figure 2

2.1.3. IDEA – 3

A GPS receiver is connected to device in which the maritime latitude and longitude values are already defined. When the fishermen reaches the warning zone, an alarm sound will be given. Still if the fishermen continue to cross the warning zone and reaches near the

restricted zone, a red light will be emitted. During distress condition, manually the location of fishermen will be sent as signals to satellite which in turn sends signals to central hub station.

WORK FLOW OF IDEA – 3

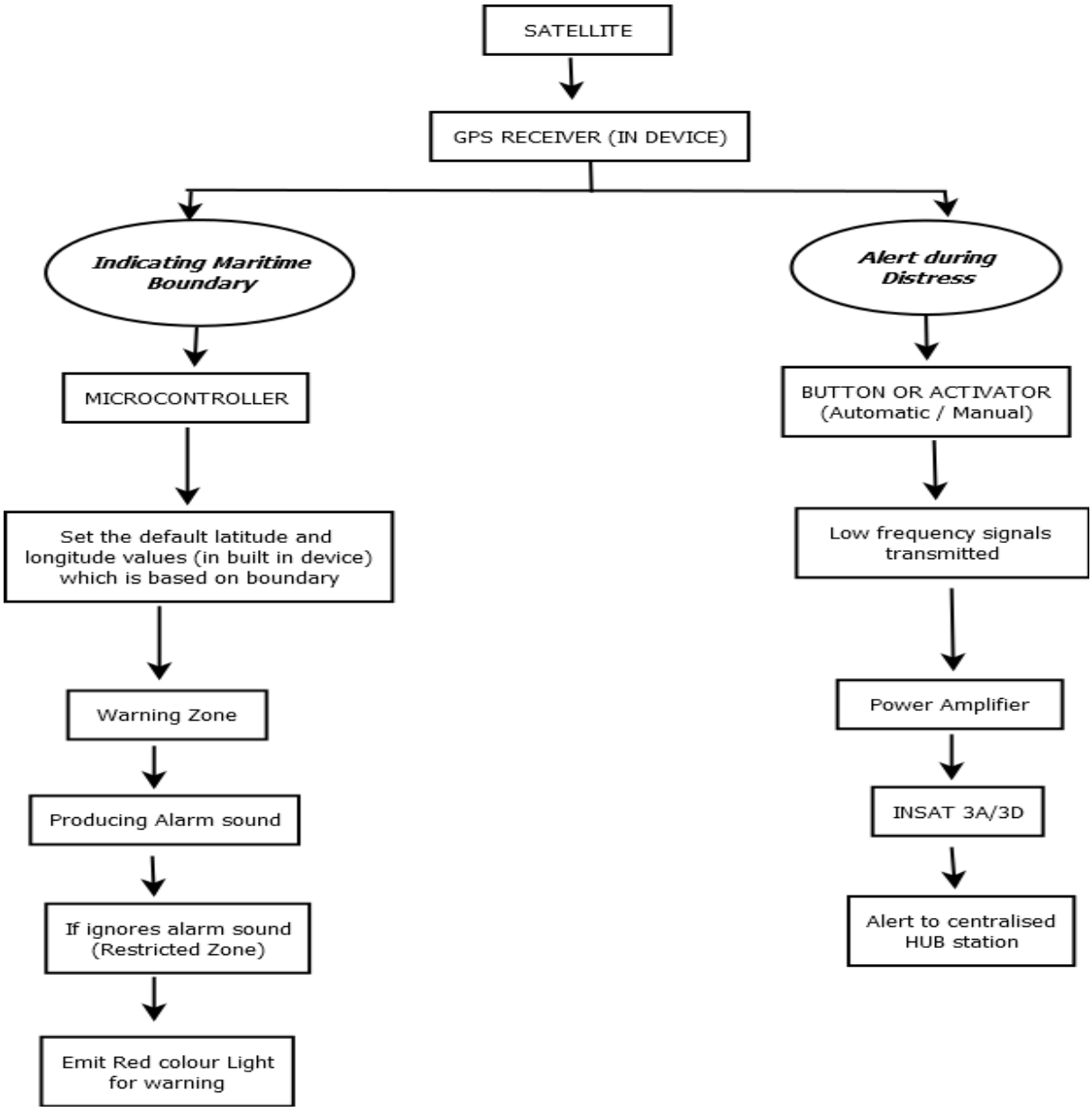

Figure 3

2.2. BEST SOLUTION

- From the three ideas, we have chosen the third idea because it is very accurate in indicating the maritime boundary and very efficient in transmitting the location of fishermen who stuck in mid-sea.
- The disadvantage in 1st idea is the signals will be transmitted only if the ship gets immersed in sea . Also, it requires more engine efficiency.
- The disadvantage in 2nd idea is it is very costly since it uses both GPS and GSM technology.

HIGH LEVEL DESIGN FOR THE BEST SOLUTION

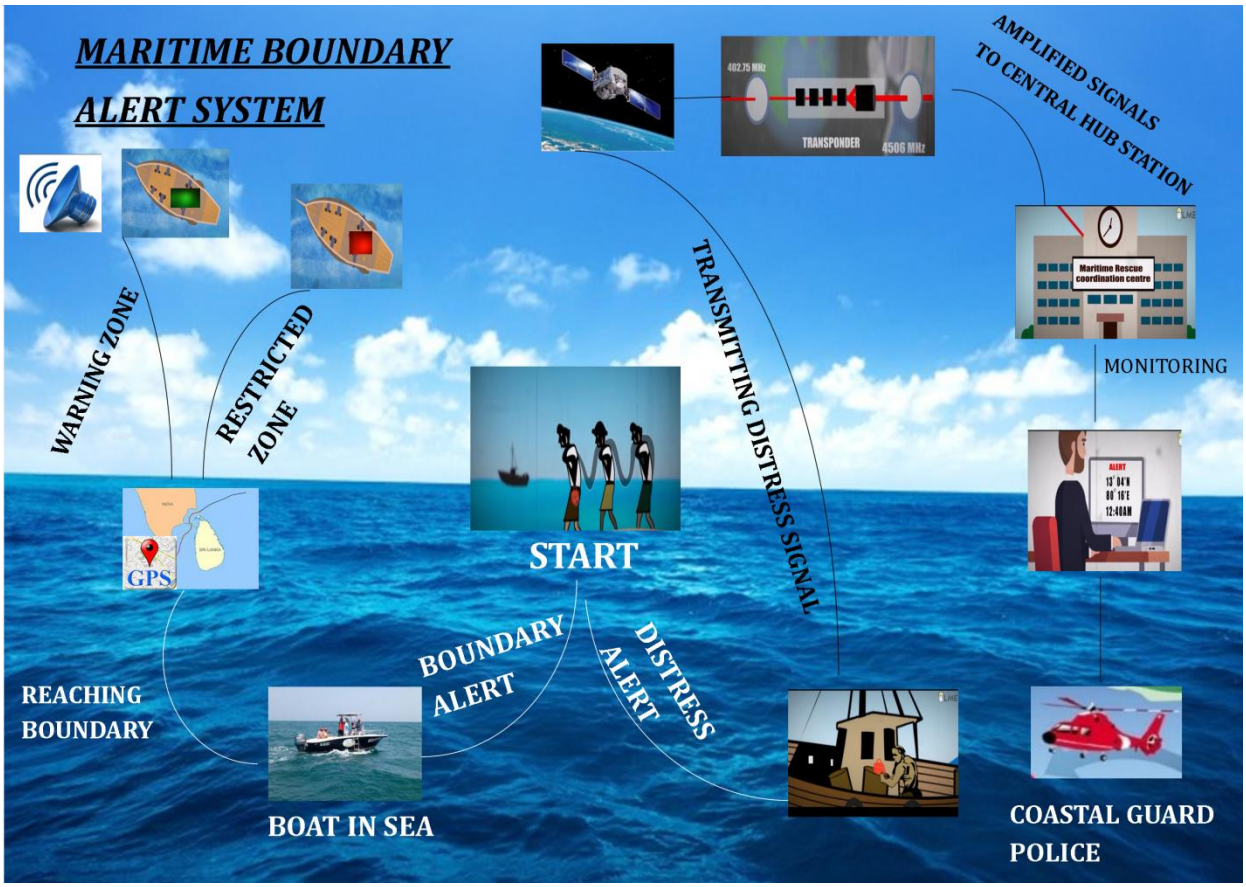

Figure 4

2.3. COMPONENTS USED

The following are the list of components that we have used in our device.

- **GPS(Global Positioning System)**
- **Micro-controller**
- **Activator(Button)**
- **Transponder**
- **LED Display**
- **LCD Display**
- **Biometric Sensor**
- **Buzzer(Alarm)**
- **Battery**

GPS

A GPS receiver is used to provide information about the location of boat.

MICROCONTROLLER

The data achieved from the GPS receiver is processed by the microcontroller to take out its values in the form of latitude and longitude.

TRANSPONDER

The signals transmitted from the device will be of low frequency. To increase it's frequency, power amplifier is used.

BATTERY

- The device requires a energy source to do it's operation.
- A solar cell is used as the energy source since it can reserve energy for a long period of time than normal batteries.

BUZZER

It is used to alert when they reach the warning zone.

LED DISPLAY

LED light is required to alert the fishermen when they enter the restricted zone.

BIOMETRIC SENSOR

It will scan the finger print of fishermen and it compares the details of the fishermen which is already stored in the database and sends the result to the central hub station

LCD Display

LCD (Liquid Crystal Display) is the technology used for display the warning message in the screen and alert the fishermen at right time.

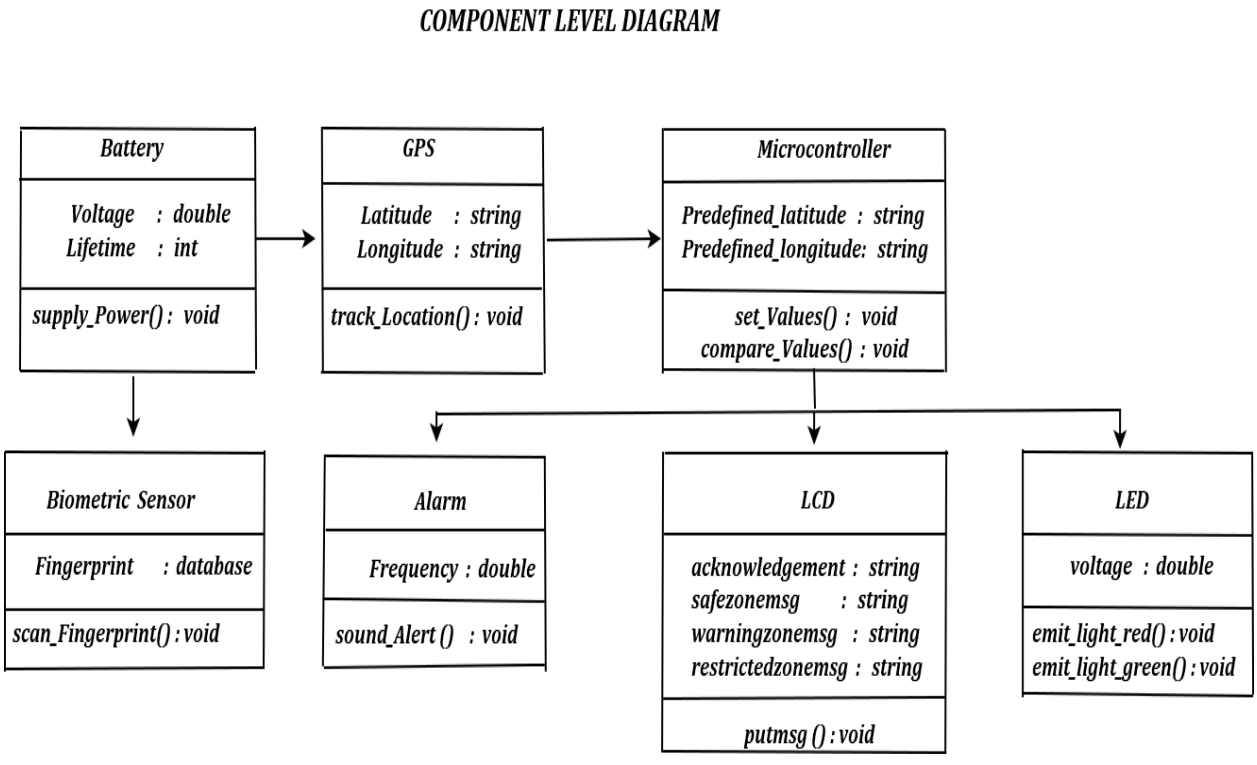

Figure 5

2.4. WORKING

It is a device which the fishermen has to carry while Fishing. It is having a charged battery. When the fishermen goes into the sea for fishing, the device GPS turns on. It continuously monitors the location of the boat. If the fishermen reaches the warning zone, Alarm Sound will alert the fishermen. If he ignores the Alarm sound and still goes nearer to the restricted zone ,the warning light in the LED display will be seen.

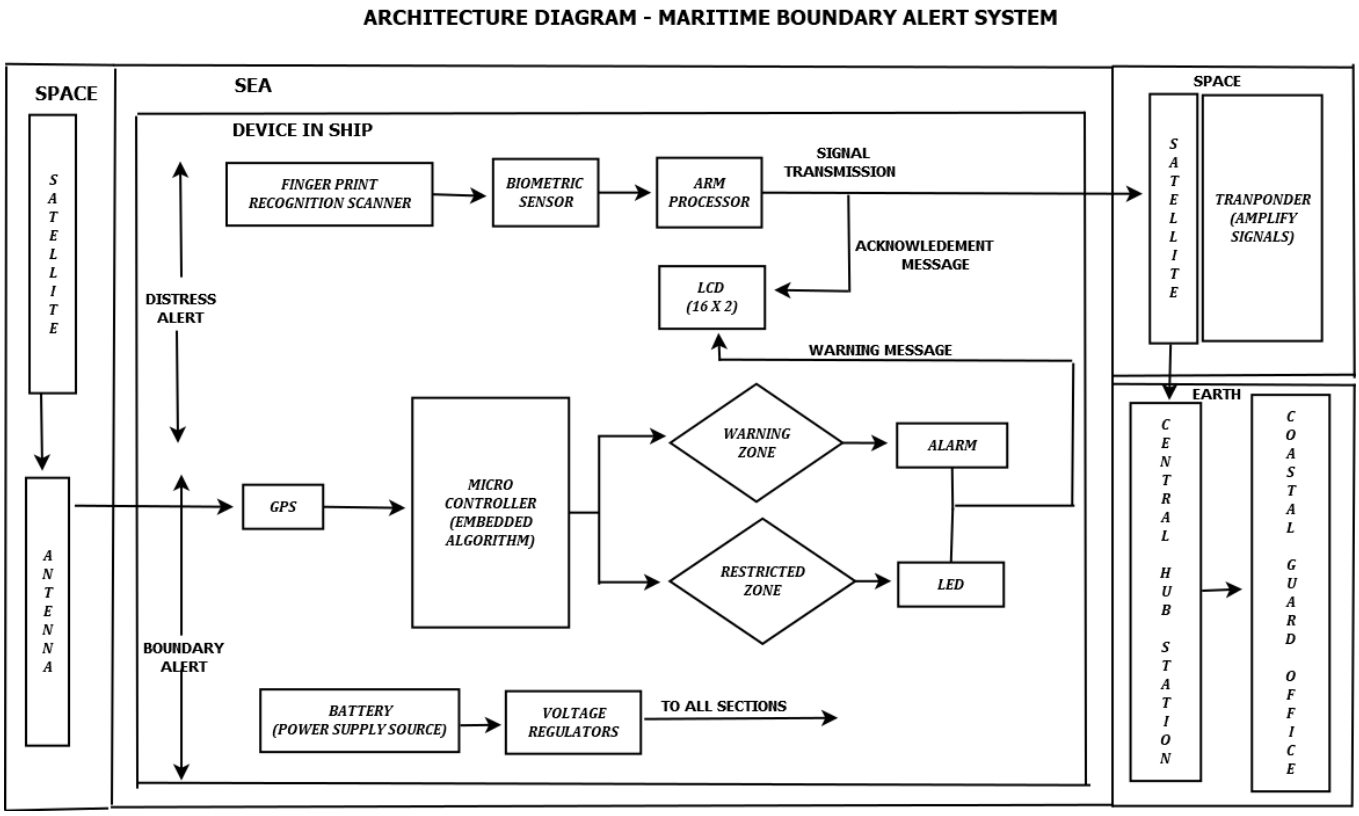

Figure 6

2.4.1. JAVA PROGRAM FOR EMBEDDED ALGORITHM

```
import java.io.*;

import java.util.*;

import java.awt.*;
```

```
public class Boundary_Alert
{
   private String name;
   private double longitude;
   private double latitude;

   // create and initialize a point with given name and
   // (latitude, longitude) specified in degrees
   public Location(String name, double latitude, double longitude)
  {
      this.name = name;
      this.latitude  = latitude;
      this.longitude = longitude;
   }

   // return distance between this location and that location
   // measured in statute miles
   public double distanceTo(Boundary_Alert that)
   {
      double STATUTE_MILES_PER_NAUTICAL_MILE = 1.15077945;
      double lat1 = Math.toRadians(this.latitude);
      double lon1 = Math.toRadians(this.longitude);
      double lat2 = Math.toRadians(that.latitude);
```

```
    double lon2 = Math.toRadians(that.longitude);

    // great circle distance in radians, using law of cosines formula
    double angle = Math.acos(Math.sin(lat1) * Math.sin(lat2)
                    + Math.cos(lat1) * Math.cos(lat2) * Math.cos(lon1 - lon2));

    // each degree on a great circle of Earth is 60 nautical miles
    double nauticalMiles = 60 * Math.toDegrees(angle);
    double statuteMiles = STATUTE_MILES_PER_NAUTICAL_MILE * nauticalMiles;
    return statuteMiles;
 }

 // return string representation of this point
 public String toString()
{
    return name + " (" + latitude + ", " + longitude + ")";
 }
// test client
 public static void main(String[] args)
{
    Location loc1 = new Location("INDIA", 40.366633, 74.640832);
    Location loc2 = new Location("SRILANKA", 42.443087, 76.488707);
```

```
double distance = loc1.distanceTo(loc2);

        System.out.println("\n\n\n\t\t\t\t\t\tMARITIME BOUNDARY ALERT
    SYSTEM\n");

        System.out.println("\t\t\t\t\t\t------------------------------");

        System.out.print ("\n\nYou are now in Indian Maritime Boundary which is the
WARNING ZONE [Latitude and Longitude values of Indian Boundary : " + loc1+"]");

        System.out.print ("\n\nNow It alerts the fishermen by displaying wARNING
MESSAGE in LCD screen and also emit GREEN LED");

        Toolkit.getDefaultToolkit().beep();

        Toolkit.getDefaultToolkit().beep();

        System.out.println("\n\nFishermen can further travel upto the distance of  " +
distance);

        System.out.println("\n\nBeyond this distance if they travel further, they will
reach restricted zone [Latitude and Longitude values of SriLankan Boundary : " + loc2+"]");

        System.out.println("\nNow It alerts the fishermen by  emitting RED LED");

   }

}
```

ALGORITHM

1. Begin
2. Import the required built in packages for running the embedded algorithm.
3. Create a class Boundary_Alert.

    Begin Class

        Declare variables name, latitude, longitude

        Create a parameterized constructor

        - Attributes such as boundary name, latitude, longitude are passed.
        - Initialize the above declared variables within the constructor.

Create a member function named distanceTo

Begin function

- Initialize nautical mile value.
- Calculate the distance (in radians) upto which the fishermen can travel in the sea using law of cosines formula.
- Evaluate nauticalMiles = 60 * Math.toDegrees(angle);

End function

Create the Main method

Begin Main

- Create instances for the class Boundary_Alert.
- When the fishermen reach the warning zone, a warning message will be displayed in the LCD screen, green light will be emitted and an alarm sound will be produced to intimate them.
- When the fishermen reach the restricted zone, red light will be emitted.

End Main

End Class

4. End

OUTPUT SCREENSHOTS

COMPILATION PART

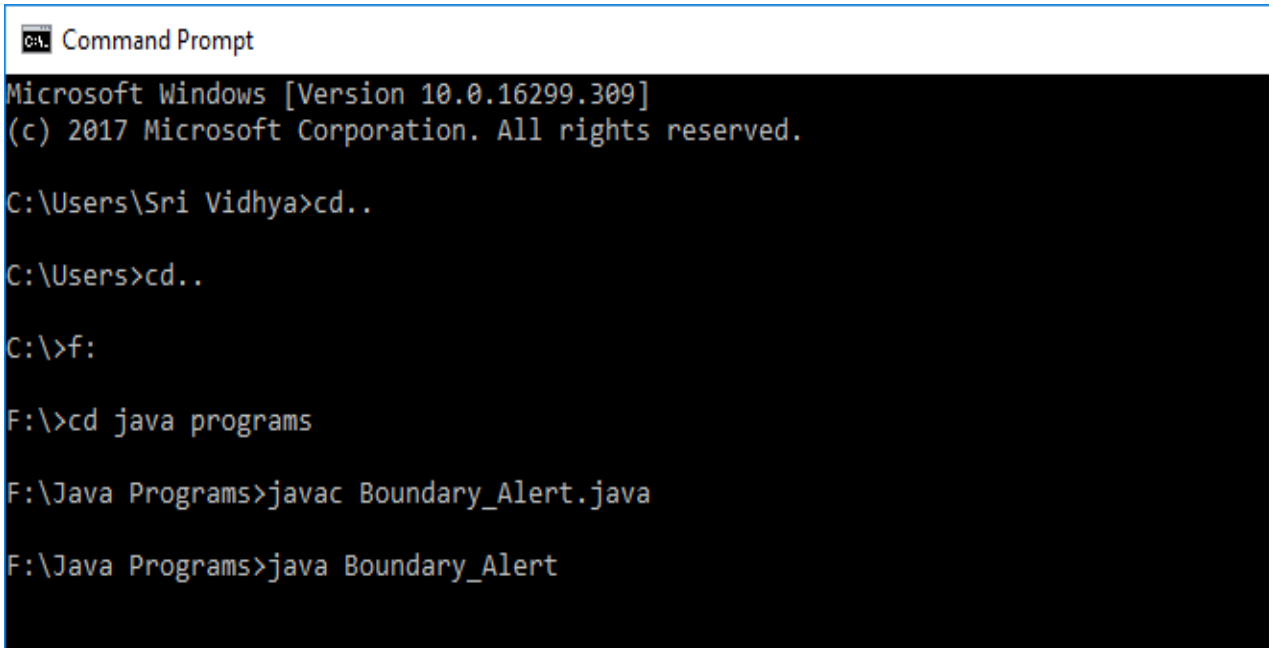

Figure 7

EXECUTION PART

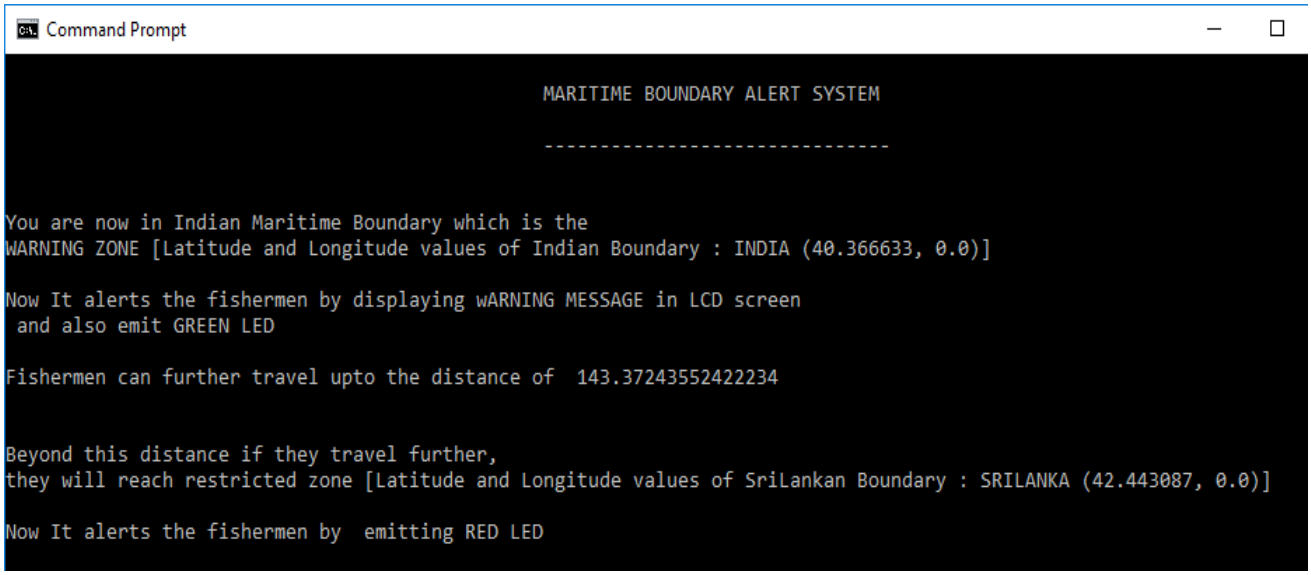

Figure 8

CHAPTER – III

3. PESTEL ANALYSIS

3.1. POLITICAL FACTORS

- Since the fishermen didn't know the maritime border between two countries, they are entering the neighbouring country's coastal area. This is a huge problem which involves the government of two countries.
- The device is used to indicate maritime boundary and send distress signals during any disaster. The implementation(approval) of this project entirely depends on the government. The government should provide enough subsidy to support fishermen to help them buy this device.
- During any disaster, the fishermen should activate the device to transmit signals to track their location. Those signals will be sent to satellite (INSAT) and then it will be sent to coastal guard office. So the central government support is needed to use our Indian satellites in signals transmission.
- The device abides by the laws of import and export followed in our country.
- The device can be practically implemented only if the government provides legal permission.
- The device follows the taxation policies followed in our country.
- The price of the device will be economically viable to the fishermen.
- The government should provide support on implementing the product in the country for ensuring better safety of the fisherman.The government must sell the device at minimum price so that every fisherman shall be able to afford to buy this device.

3.2. ECONOMICAL FACTORS:

- Economic and competition pressure which compel fishermen to take more risks, such as cutting crews and increasing working hours, leading to accident to extreme fatigue.
- This device uses GPS technology instead of using GSM technology, so cost is minimized.
- The major components used here are micro-controller and power amplifier or transponder which costs high , but it is unavoidable in this device to work.

- This device has to give multiple indications or notifications for warning and alert purpose which makes it as costlier one.
- In the view of cost/benefit factors, this device construction is feasible as well as very useful to fishermen.
- In the view of cost/effectiveness factors, Although this device is the more expensive alternative, it is found to be the most effective one.
- In the view of cost/minimization factors, the components are chosen that costs low and gives good performance.
- Many industries will be build and more people will get job.
- This leads to the economy growth and security of the nation.
- The security of the fisherman gets increased.

3.3. SOCIAL FACTORS

- The different payment systems used in the fishing industry lead workers to take risks in order to obtain adequate payment.
- The fisherman who can't afford to have a safety and well built ship when they set sail to the sea they will face the problems caused by both man and natural disaster
- The punishment for border crossing sometimes even death or put in jail for many months
- The fisherman who got caught by the neighbour countries are not treated well in order to over come this problem the fisherman needs the technology.
- The manufacturing of the device's design should be perfect(with no sharp edges which may be harmful for those who crosses the Bins).
- The produced device should undergo all the necessary standard quality tests.
- If the system gets handled by the X(who have no knowledge in working of the system),then the system may get failure.
- There will be a high demand in the device if it leads to success many foreign countries will also need this technology.
- Many new job opportunities will be created which leads to social benefits including aspects relating to safety and working conditions

3.4. TECHNOLOGICAL FACTORS

- The fishermen welfare is seeing good changes in the society because of advanced technology. GPS and alerting devices give fishermen better awareness.
- For example, GPS device providing exact location of the fishermen in the mid-sea and detect the border .
- INSAT satellites are used to capture the values. Micro-controller to take its latitude and longitude values. Power Amplifier used to increase its frequency. Central hub station get the details of the location of the fishermen. Location of the fishermen is monitored by coastal officers and they help the fishermen in the mid-sea.
- Our device is fully wireless, this factor increases the lifetime of the product.
- Usage of database helps to store the data about the location of the fisherman.
- Many built in options are given in the application for better understanding of the device which leads to provide user friendly features.
- Technology will be created based on the requirements that will provide efficiency at low cost.
- Another example, Alerting devices provide clear sound while entering the restricted zone and so that they can be alerted when they enter the border of neighbouring country. LED display used to alert the fishermen. Mostly the technological advancements are used here.

3.5. ENVIRONMENT FACTORS:

- Natural disasters like heavy storm or cyclone may affect the device.
- If the boat get immersed into the sea, water may enter into the device which causes the device to stop working.
- Very bad weather may cause loss of signal connection
- The device is eco-friendly because it is recyclable.
- The device should not affect the user's health by releasing too much of CO2 emissions.
- This device does not pollute the environment.
- The estimated lifetime of this device may be 5 years.
- The device is not water proof when immersed in water the device may fail.
- This device should not place in a high temperature place which leads to decrease in the efficiency of the device.

- The device should behave in a pre-defined manner rather than behaving according to seasonal / weather changes.
- The batteries inside the device should reduce the Carbon footprint level.
- The materials are mostly recyclable and can be reused efficiently.
- The electronic equipment's present inside the device can be replaced so whenever any fault occurs in the device, we need not throw the device in the garbage.
- The device is pollution free it does not emit any harmful substance or gas.

3.6. LEGAL FACTORS

- Legal environment of business means all factors relating to laws and legal orders which affect business and its working.
- The United Nations convention on laws of sea is the international legal document which all states, whether coastal or land locked state, use as a fundamental basis in creating of national laws and regulations for governing their maritime zones.
- The agreement of delimitation of maritime boundary is the first step that the states are concerned are encourage to make before their cases shall be brought to the international courts or arbitrations. Under the contemporary international law, the coastal states are given a suitable period of time to negotiation of the maritime boundary delimitation. In practice there are certain agreements have been made between the opposite or adjacent states, in which some are inform of maritime boundary delimitation and the others at joint development agreement.
- The State Government of Tamil Nadu claims that it has pursued proactive policies for the "retrieval" and the restoration of traditional fishing rights of Indian fishermen since May 2011. On June 9, 2011 the Tamil Nadu Legislative Assembly passed a unanimous restriction to revenue department based on the writ petition filled by chief minister Jayalalitha in 2008 challenging the maritime boundary agreement, The case is still pending before Supreme Court.
- The device should follow the standards of safety and security.
- The production industry should meet the necessary Regulatory compliances.
- The components of this device should be disposed in a proper manner.
- The components used in this system for the entire manufacturing of the device should meet ISO standards.

- The device strictly follows the consumer laws of the country.
- It follows the labours law and does not violate the labour laws.

CHAPTER – IV

4. PRODUCT DESIGN SPECIFICATIONS

4.1. PRODUCT IDENTIFICATION

The island like Sri Lanka, peninsula like India and the coastal countries are separated by their maritime borders. The people livelihood in coastal area of those countries purely depends on fishing occupation in the sea. Crossing the border is being a serious offence. Especially, In Tamil Nadu nearly 20,000 boats perform fishing in the Bay of Bengal .

Due to carelessness or unknowing the boundary limit, the fisherman used to rude the maritime borders. Once they rude the border, they arrested or killed by the relevant navy and they are being abducted and their boats are being captured by the neighbourhood countries coastal guards. In such situation the lives of fishermen continue to be difficult. It is a major threatening issue and leads to loss in the both humans as well as their economic incomes.

Global Positioning System (GPS) and Wireless Networks can be the best choice for addressing the maritime border crossing issue. The proposed system is used to devise a low cost alert system for fisherman that gives an alert when the boat/ship crossed beyond other country's border. It helps the fishermen not to go afar of border. If the fishermen violate the border agreement, an alarm (danger signal) is generated indicating that the fisherman has violated the rule. Thus guards in the shore can assist and provide additional help to those fishermen if needed. Keeping in mind about lives of Indian fishermen, this device has been created to help them not to move beyond Indian border.

The system can work/detect the border in the presence of GPS[Global Positioning System]. Though GPS does not require internet connection map navigation requires internet connection. The main objective of this project is to track the exact location of the fishermen in mid – sea. So that fishermen can be alerted when they are about to enter the border of the neighbouring country.

It also ensures the safety of fishermen. So the product identified is Maritime boundary alert system.

4.2. MARKET IDENTIFICATION

Intelligent Boundary Alert System Using GPS

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 between India and Srilanka. 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. Thereby fishermen lifespan will be saved.

Implementation of GPS Based Security System for Safe Navigation Of Fisherman Auto Boat

This system also uses GPS 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 MEMS is used for tsunami detection. In addition to this weather forecasting report can also be obtained with the help of temperature and humidity sensor.

Implementation of GPS Based Surveillance Navigation System For Fishermen

With the help of GPS the current position of boats/vessels with latitude and longitude data is continuously being extracted. The microcontroller compares the stored value and current value and alert the fishermen when crosses the border line. Then the message is transmitted to coast guards through the signals.

Implementation of Maritime Border Alert System

Data collection unit consists of GPS thus provided the information of location based on the position of the boat and transmitter. The processing unit fetched with already known details of border between the countries, and comparison is being done with known data and current

position data. The controlling unit will make decision in order to alert the fishermen and coast guards.

Arm Based Fishing Boat Security System

When the fishermen boat crosses the border limit, the controller units generates the alarm signal. ARM processor is used in controller unit. In addition to it, voice alert is also generated. ZIGBEE module is used instead of GSM module for continuous signal transmission. If so the boat is further moving towards the border, DC motors will be turned off. Thus the system provides the maritime security for fishermen.

4.3. PHYSICAL DESCRIPTION

The proposed architectural design consists which is interfaced to the Microcontroller which in turn is connected to the alarm circuit.

The proposed system consist of DGPS device 8051 Microcontroller which in turn DGPS information tracked in the control room is sent to family members through and the information is immediately sent to the taken.

4.4. FINANCIAL REQUIREMENTS

The processes and procedures used by an organisation's management to exercise financial control and accountability. The measures include recording, verification, and timely reporting of transactions that affect revenues, expenditure, assets and liabilities. GPS cost at the range of minimum 5000 rupees to maximum 30,000.

Micro controller cost at the range of minimum 500 rupees to maximum 1000.

Amplifier cost at the range of minimum 700 rupees to maximum 11,000.

Battery cost at the range of minimum 250 rupees to maximum 14,000.

Buzzer cost at the range of minimum 300 rupees to maximum 4000.

LED Display cost at the range of minimum 50 rupees to maximum 900.

4.5. SOCIAL POLITICAL LEGAL REQUIREMENTS

The international law of the sea has always been characterised by the attempts of states to assert their control and jurisdiction over the maritime space adjacent to their coasts. Despite the fact that the Law of the Sea Convention (LOSC) has prescribed, though not always with clarity, the rights and jurisdictions enjoyed by coastal states in the various maritime zones, creeping jurisdiction is a common phenomenon nowadays. This paper addresses this issue by focusing on the current regime of the Exclusive Economic Zone (EEZ). The EEZ is a resource-oriented multifunctional zone where the coastal state enjoys sovereign rights and related jurisdiction as provided for in article 56 of the Convention and where third states enjoy specific rights and freedoms. Sovereign rights are not rights deriving from sovereignty but rights of specific functional purpose. Whereas states, with few exceptions, reconsidered their claims to a territorial sea of 200 n.m. after the adoption of the EEZ by the LOSC, international state practice has shown a trend towards the 'territorialisation' of the EEZ, term which denotes the attempts of states to exercise sovereign jurisdiction in this maritime zone. States have attempted to restrict navigational and other rights (particularly related to military activities) exercised by third states and to expand their jurisdiction in relation to security and environmental protection.

This paper presents the various facets of this trend with a view to demonstrating that states' desire to exercise sovereignty over the maritime zones adjacent to their coasts has not changed in comparison to the past. Finally this paper discusses the challenges and implications arising from this trend for state policy and for the future of the law of the sea.

4.6. MANUFACTURING SPECIFICATIONS

The proposed system is a low cost maritime border crossing alert system mainly focused the small scale fisherman who lives just near to the poverty line. This system includes data collection unit, Processing unit, Controlling unit and Transmission unit as shown in fig 2. The data collection unit consists of location detection components like GPS, transmitter and other components attached in the boat that accomplish the vessel localization by collecting the geographical positions. The processing unit holds the set of latitude and longitude values of the sea in the form of databases that can be used for comparing the present boat position with legal border limits. The controlling unit resides in the sea shore (remote station) from where the decision has been made if the vessel crossed the maritime border. All the communication among these three units is handled by transmission unit. The proposed system's detailed work flow is discussed in the following sections.

The simulation of this project has done with the help of PROTEUS simulation tool. Printed circuit board layout now offering automation of both component track routing and, placement getting the design into the computer can often be the most time consuming element of the exercise.

In the conventional, the fishermen have to keep watch the maritime border, which cannot be easily separated as land region. If they crossed certain limit on the sea. They have to pay the penalty or got arrested by the naval guards of the neighbour country. The project generates alarm if they cross the border by mistake. With the simple circuitry and the use of sensors (low cost sensors) makes the project a low cost product, which can be purchased even by a poor fisherman. This project is best suited for places where the fishermen continuously monitor the boundary limit. This project also aims at solving relevant social problems with the appropriate use of satellite geographical location data for through wireless networking. Our goal is to confront wireless networking with a concrete problem of worldwide dimensions, the sustainability of fishermen community are taken care by the simulation experiments. The simulation result shows the circuit level work is outperformed well that can be extended to circuit fabrication in future. This paper will be used for advancement of coastal border averment. This also will give sufficient process to both ship and coastal guardians, if anyone crossing the border. The process of routing the fishermen will make more efficient. The process of increasing the accuracy will be achieved greater in future.

CHAPTER – V

5. CONCLUSION

The “Maritime Boundary Alert System” is a system that implements GPS and Embedded system together to create a security alert system for fishermen boats. The proposed system's architecture is reliable and robust. The proposed project based boat monitoring and border alert system by using GPS and embedded components has proven to be a low-cost project. Many illicit activities happen via sea and oceans which include organized crimes, smuggling of drugs and illicit materials, human trafficking etc. So, every nation ensures a rigid organized border security system for maintaining the peace inside the nation as well as between the neighboring countries .

Fishermen bring a major portion of income to our economy. In India, there are many cases where fisher men from Tamil Nadu lost their lives while they crossed the maritime border and sailed into the Sri Lankan premise unaware of the maritime border fact. This unawareness grabbed their lives and it also affected both the country's economic status. Fishermen bring a major portion of income to our economy.

A Valuable quote about our fisherman,

“THE FISHERMAN KNOW THAT THE SEA IS DANGEROUS AND THE STORM IS TERRIBLE BUT THEY HAVE NEVER FOUND THESE DANGERS SUFFICIENT REASON FOR REMAINING ASHORE –VINCENT VAN GOGH”

The fisherman, while navigating crosses the maritime boundary, unknowingly as they are unable to visualize it in the ocean which causes loss to its life. The system will provide high accuracy and high precision values of the Latitude and Longitude of the location, so that they can find out when they are in danger. Therefore the fishermen can easily identify the national sea borders and therefore prevents them from entering their area. Thus, both the fishermen and base station officials are alerted.

The project aims at providing peace at the borders , saving their lives and reduces tensions and providing good relationship with the neighboring countries.

The hijack of the ship by the pirates can be eradicated by using the tool.

By keeping the kits in the entire boats and by knowing the locations of all the boats we can use our kit to assist the traffic. Location based by using GPS alert system seems to have much more advantages such as tsunami forecasting ,weather tracking, emergency SMS system etc. The lost ship wrecks due to natural calamities can be identified . The piracy of ship can be easily brought under control. In case of any accident on the sea, it can be detected by the system and the accident location of the boat is sent to the rescue team.

This system is an implication of security system for safe navigation of mariner's boat. In addition, This system is user friendly as well as easily implement-able. It is a helpful step in saving lives of fisherman and a useful contribution to the society .

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ANNEXURE

LITERATURE REVIEW

S. No	Title (Paper, Article, etc)	Source with Date (Journal, Magazine, Website	Inference (Problems addressed, Solution discussed, Pros & Cons of solution)
1	ALERT SYSTEM FOR FISHERMEN BORDER CROSSING USING ANDROID	Asian Journal of Applied Science and Technology (AJAST) Volume 1, Issue 4, Pages 43-47, May 2017	It is an android application to indicate and alert the fishermen while reaching near the boundary. The application will notify the information of where the devices are being located and intimate them about the issues that occur due to opponent forces in ships to server. This is processed mainly for Tamil fishermen's who are involved in fishing. The application uses the Global Positioning System (GPS) to provide the latitude and longitude information and its being used for tracking devices. The system entirely uses the device based tracking which avoids failure in the system due to network problems. **Pros :** Easy to implement because it uses only GPS technology. **Cons:** The cost is high
2	DISTRESS ALERT TRANSMITTER	KDAT – 02 DS REV 4.3 – July 26, 2013	The DAT technology was originally developed by Space Application Centre (SAC) of ISRO for fishermen going to deep sea. Transmitting the signals during emergency situations to central HUB station via UHF transponder of INSAT rescue operation. Situations like medical emergency, fire on board, sinking or capture

			of boats can be reported to authorities on shore for immediate action. The transmitter operated through DRT transponder and can send continuous alerts for 24 hours once every five minutes on an average, while staff at rescue centers track the boat as it appears on GIS map on their computer screes. **Pros :** Light weight, easy to carry, battery life (48 hours) **Cons :** Only works with manual activation
3	EMERGENCY POSITION INDICATING RADIO BEACON SYSTEM	https://en.wikipedia.org/wiki/International_CospasSarsat_Programme The definitive agreement of the system was signed on 1 July 1988.	It is a COSPAS – SARSAT 406 MHz tracking transmitters in the mobile radio communication service which aid search and rescue operations in the detection and location of boats and people in distress. When manually or automatically(upon immersion / impact) activated, such beacons send out a distress signal. The signals are monitored world wide and location of the distress is detected by non – geo stationary satellites using the doppler effect. The recent EPIRBs also use GPS. **Pros :** All modern EPIRBs provide both methods of activation and deployment, and thus are labelled "Manual and Automatic Deployment and Activation" **Cons** : Must acquire satellites before transmitting position which could result in a delay of up to 2 hour Shorter battery life limits effective rescue time

4	PREVENT FISHERMEN FROM CROSSING INTERNATIONAL MARITIME BOUNDARY LINE USING GPS AND SENSORS	Magazine : Times of India city(TOI) JUN 7, 2015	sea localization of border marking This application is mainly to prevent the Indian Fishermen from Sri Lankan navy for crossing the border. The application is used to find the location of the border marking for fishermen. It uses the GPS(Global Positioning System) fitted in boats could be used for IMBL(International Maritime Boundary Line) marking, according to them. This application have conceptualized three ranges from the IMBL R1(Range 1),R2,R3 between 2 to 1 nautical miles. It is totally based on the location of the borders. **Pros :** This system has the unique feature that is synchronizing the movement of the boats with fixing the boundary. **Cons :** Movements of the boat depends on a sea currents.so the propulsion and reverse tracking are complicated procedure