SEA BORDER SECURITY SYSTEM FOR BOATS

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Abstract—This project is developed for the boat users to find out their border in the sea area. The main modules in this project are RF transducer, microcontroller unit and LCD display. The Zigbee transmitter is connected at the border area. It transmits RF signals within the particular limit. The Zigbee receiver with the micro controller unit is connected at the boat. When the boat reaches the particular area, the RF signals are received by the receiver and given to the micro controller unit. The micro controller analyses the signal and calculates the distance and sends corresponding message to the LCD display. If it crosses the limit, the micro controller operates the warning buzzer for 1st level as small buzzer, if boater neglects and moves further at 2nd level again horn will blow. And for third level of border microcontroller will switches off the running motor of the boat. Thus the boat may be automatically off and the boater may easily understand the situation. The micro controller program is written in embedded c language and the controller used is Arduino.

IndexTerms -**Zigbee,LCD Arduino**

I. INTRODUCTION

An Wireless Integrated Network Sensors (WINS) combine sensing, signal processing, decision capability, and wireless networking capability called zigbee which is a compact, low power system. On a local, wide-area scale, battlefield situational awareness will provide personnel health monitoring and enhance security and efficiency. Also, on a metropolitan scale, new traffic, security, emergency and disaster recovery services will be enabled by WINS. Here first it identifies the node where the harmonic signals are produced by the strange objects and the intensity of the signal will be collected. Based on intensity signals and nodes are changed. The result is sent to satellite communication system.

The GPS Modem will continuously give the signal which determines the latitude and longitude and indicates the position of the fishermen to them. Then it gives the output which gets read and displayed in the LCD. The same data is sent to the mobile of the fisherman and simultaneously the same data is sent to the Sea border security. An EEPROM is used to store the data, received by GPS receiver. The hardware which interfaces with microcontroller are LCD display, GSM modem and GPS Receiver.GPS (Global Positioning System) is increasingly being used for a wide range of applications. It provides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth. 28 satellites inclined at 55° to the equator orbit the Earth every 11 hours and 58minutes at a height of 20,180 km on 6 different orbital Lanes and each one of these satellites has up to four atomic clocks on board. All we require is an accurate clock. By comparing the arrival time of the satellite signal with the onboard clock time, at which the signal was emitted, the latitude and longitudinal 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 Arduino microcontroller is interfaced serially to a GSM MODEM AND GPS receiver.
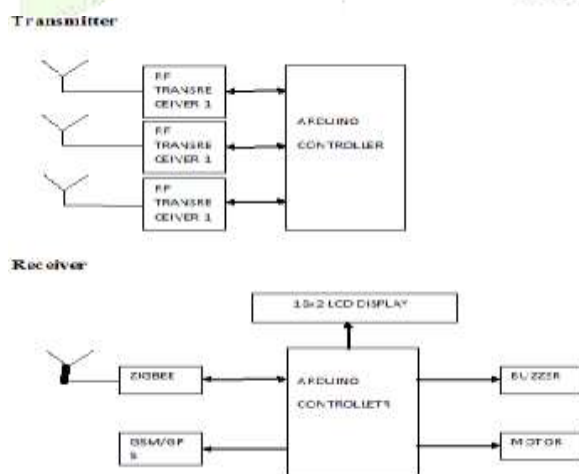
II. BLOCK DIAGRAM

Fig.1 Block Diagram of Transmitter and Receiver

Block diagram of Border security System consists the components used are as follows:

Arduino ,ZIGBEE CC2500,GSM 900,buzzer,LCD display

A. Arduino

Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments. All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it is growing through the contributions of users worldwide. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Teachers and students use it to build low cost scientific instruments, to prove chemistry and physics principles, or to get started with programming and robotics.the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package. Arduino board has six ADC channels, among those any one or all of them can be used as inputs for analog voltage.

B.Zigbee

This RF Transceiver module is built with Texas instrument's Chipcon IC (CC2500) . It can be used to transmit and receive data at multiple baud rates from any standard CMOS source. The RF module is built with on board PCB trace antenna and it used SMD module as well as Through h module. It works in half duplex mode ,ie, It provides communication in both directions, but only one direction at same time (not simultaneously). This switching from receiver to transmitter mode is done automatically.It provides extensive hardware support for packet handling,data buffering, burst transmissions, clear channel assessment, link quality indication and wake on radio. It can be used in 2400-2483.5 MHz ISM/SRD band systems. (eg. RKE-two way Remote Keyless Entry, wireless alarm and security systems, AMR-automatic Meter Reading,Consumer Electronics. Industrial monitoring and control, Wireless Game Controllers.

Fig.2: ZIGBEE CC25 module

C.GSM900

There are different kinds of GSM modules available in market. We are using the most popular module based on **Simcom SIM900** and **Arduino Uno for** Interfacing a GSM module to Arduino is pretty simple. You only need to make 3 connections between the gsm module and arduino there are two ways of connecting GSM module to arduino. In any case, the communication between Arduino and GSM module is serial. So we are supposed to use serial pins of Arduino (Rx and Tx). you may connect the Tx pin of GSM module to Rx pin of Arduino and Rx pin of GSM module to Tx pin of Arduino.
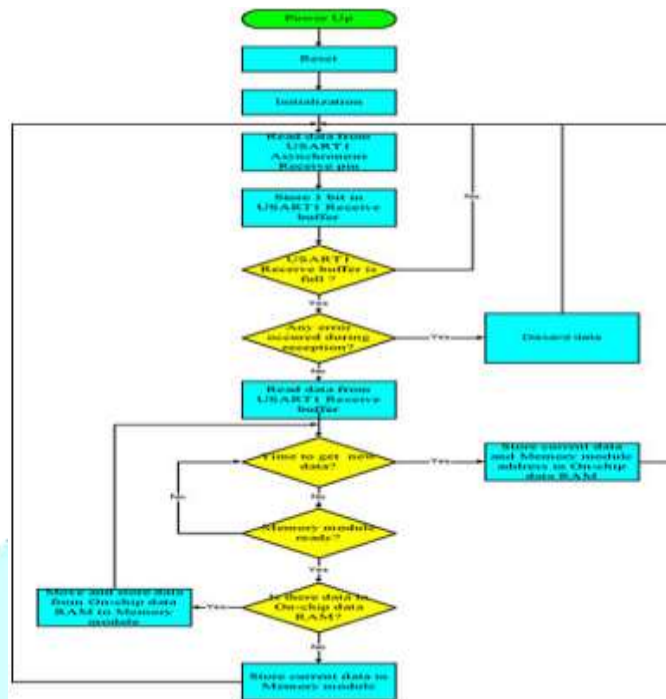

Fig.3 SIM 900 Module

III. FLOW CHART

Fig.4 Flowchart

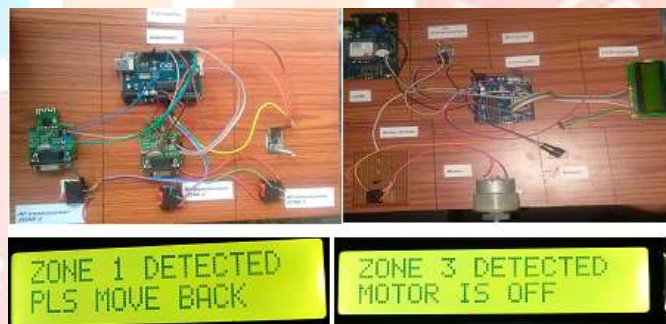### IV. Experimental setup and results

Fig. 5 Result

V. Conclusion

This paper is to design a system for Border alert system the boats using wireless sensor networks, results and discussions proved that this system works well and can be put forward to practical applications. The main feature of this paper is when someone crosses the border line. The client module shows indication of warning message. If no response from the client, then it controls the boat from the server side module by using system control unit.

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