# *Secured Alert System for Maritime-Using RSSI Localization System*

[1]S.Kavitha , [2]S.RathikaKannan and [3]B.Chinthamani
[1,2]*Assistant Professor/Saveetha Engineering College*
*Chennai Tamil Nadu*
[1]kavitha@saveetha.ac.in
[2]Rathikakannan@saveetha.ac.in
[3]*Assistant Professor/Easwari Engineering College*
*Chennai Tamil Nadu*
[3]Chinthuvishal@gmail.com

***Abstract*** -In the proposed system a solution is given to the problem of "Fishermen Tracking their location in the sea". For this the sea area is divided into three zones namely; safe, intermediate and danger. The boat is allowed to roam anywhere within the safety zone. If the boat reaches the intermediate zone, a buzzer alert is given to the fisherman. If the boat reaches the danger zone, intimation is given to the fisherman where he is supposed to reach the intermediate zone within the specified time. Else the engine gets stopped automatically and the control of the boat goes to the control room. The boat will be released only after inspection by the coast guard or after the emergency help is given. The different Ranges are identified using Received Signal Strength Indicator (RSSI).

***Keywords*— *zones; buzzer alert; RSSI.***

## INTRODUCTION

Fishing is one of the chief sources of food and income for almost all coastal lands irrespective of its geological location in the earth. Since it has an important role to play in the economy of a country, there is no doubt that neighboring countries sharing the same oceans frequently engage in disputes in regards to ownership of the area. This has resulted in deep problems to the fishermen community residing in the coastal regions of these countries. Often, we hear in the news and see in the papers, one article or the other describing the issues faced by these fishermen in their day to day commute to the oceans.

In order to solve this issue, the governments of these countries decided to have a common territory of ocean as international waters and that it would act as the region common as well as a separation between the two lands. But even this did not prevent the fishermen from unknowingly wandering off into the other country's waters. Hence, there is a strong need to device methods to prevent this from happening and save the fishermen from severe punishments and border disputes. Our model helps to ensure the location of the fishing boats through a new technology using radio waves.

There have been a number of efforts in creating a method to aid fishermen keep track of their location in sea. Some of the significant ones include using global positioning system (GPS), using general packet radio service (GPRS), using weather balloons, and using radio detection and ranging (RADAR). But most of these methods proved to be inefficient because of the amount of power, time, and cost incurred in developing and using them. All this meant that there are still improvements needed in this area. The model proposed in this paper aims at reducing the amount of power and cost incurred and at the same time easily deployable on a large scale. Some of the notable advantages of the proposed model are that the fishermen can easily buy these devices, it is fault-tolerant, it is highly portable and it is easy to implement.

## PROPOSED SYSTEM

### *A. Embedded Hardware Kit*

Received Signal Strength Indicator (RSSI) is a measurement of the power present in a received radio signal. RSSI is usually invisible to a user of a receiving device. However, because signal strength can vary greatly and affect functionality in wireless networking, IEEE 802.11 devices often make the measurement available to users. It is a measure of the power level that a RF client device is receiving from an access point, for example. RSSI is the relative signal strength in a wireless environment and can be measured in any unit of power. It is often expressed in decibels (db), or as percentage values between1-100, and can be either a negative, or a positive value. The fabricated hardware kit is placed on the boat. The Received Signal Strength Indicator (RSSI) is similar to the Signal strength indicators on mobile phones. The Received signal strength indicator will find the strength of the signal of Radio Frequency. Depending on the strength of the signal, the

area is divided into safe, intermediate and danger zones in sea. When the received signal strength is at its maximum, then the boat is in the safe region and is allowed to roam freely.

### *B. Tri-zonal Implementation*

Based on the Geographical and the Maritime Boundary, the sea is divided into three zones namely safe, intermediate and danger zone using RSSI as shown in the Figure-2. There is a RF transceiver placed both on the boat and at the boundary port .The RF transceiver at the nearest boundary port constantly monitors the boats on the zones by sending alerts to the boats on the intermediate zone and sending warnings to those on the danger zone. When the Signal strength identified by the Received Signal Strength Indicator is high, then no problem. When the received signal strength begins to deteriorate, then an alert message is sent to the fishermen saying that the boat has reached the intermediate region. When the received signal is low, then it means that the boat is in danger zone and the fishermen is advised to get back to the safe and intermediate region before the specified time. The specified time is calculated by the distance and time taken from the region where the boat is present to reach the safe region. All the monitored information are constantly reported to the control room too. Based on these reports, the controller and the coast guards can take necessary measures promptly. The RF signals are used because they can be tuned up to the Maritime border distance and is free from attenuation.

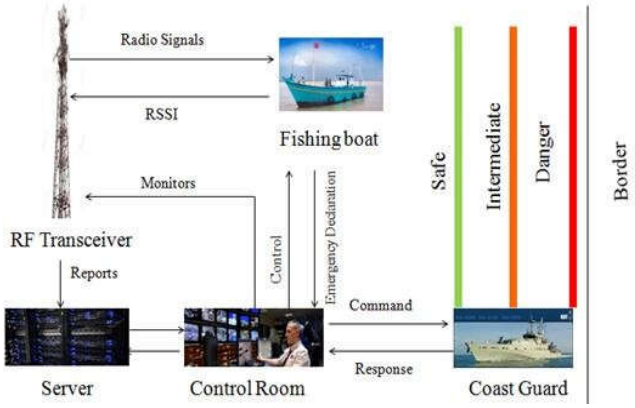


Figure-2 Overall Flow Diagram

### *C. Warning System using Buzzer Alert*

In the module represented in Figure-3 , a buzzer alert will be given to the fishermen if the boat crosses the intermediate zone and danger zone. If the boat crosses the danger zone, the fisherman will be intimated about it so that he reaches the intermediate zone within specified time; else the motor automatically stops and the control goes to the control room. The control room the intimates the coast guard about the stopped boat; which only after inspection is released. This helps prevent from illegal and unauthorized activities. The control room will thus have the entire control of all the boats whenever required. The control room can also have control of all the incoming and outgoing boats in the port. They can monitor and manage all of them from one place. A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric.

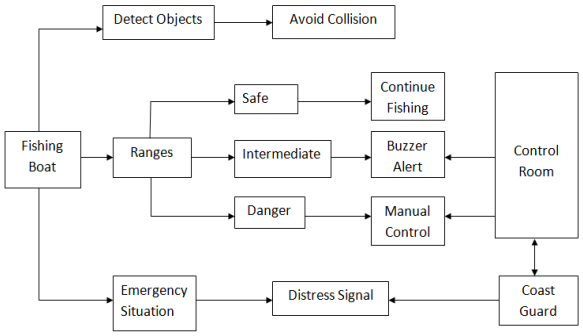


Figure-3 Overall Architecture

### *D. Manual Control of Fishing Boat*

In this module, if they didn't respond to alert and move their boats back to the safe zone, the boat's control comes under control room of foreign port or the nearest national port through ZigBee. The fishermen's manual control is disabled and the boat is stopped. Through ZigBee, the boat shall be operated by control room. Using this control technique, we can enquire if any illegal transportation is carried out. This technique helps fishermen to sail in safe zone without getting into trouble. If in case of any problem, the fisherman can also send an emergency message to the control room and so that the coast guard can reach out for them. For example, in case of any hijack any other emergency situation, the fishermen through the fabricated device can sent a distress signal to the nearest control room for help. The control room will thus identify the situation and can send the coast guard to the location to help them.

### *E. Detection using Ultrasonic Sensors*

In this module , we design and implement a method to detect the obstacles. Ultrasonic sensors are based on measuring the properties of sound waves with frequency above the human audible range. They are based on three physical principles: time of flight, the Doppler Effect, and the attenuation of sound waves. Ultrasonic sensors are non- intrusive in that they do not require physical contact with their target, and can detect certain clear or shiny targets otherwise obscured to some vision-based sensors. On the other hand, their measurements are very sensitive to temperature and to the angle of the target. Detection using Ultrasonic Sensors are very helpful to identify and detect the obstacles on the way of the boat. Especially in cold regions, it is very helpful to detect the icebergs that are very dangerous and may cost lives. The detection is basically done by generating the Ultrasonic waves and waiting until it returns back which is called signal echoing. When the signal hits the obstacle and is returned back to the source, it means that an obstacle has been identified, else there is no obstacle. The signal is sources at regular intervals. The time between the source and the echo signal gives the distance between the boat and the obstacle. Thus the obstacle can be ignored easily as shown in Figure-4

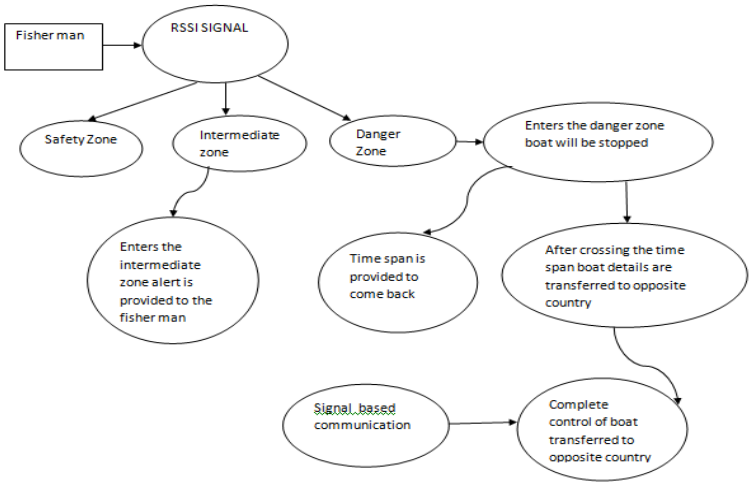


Figure-4 Dataflow Diagram

The proposed model was developed with the intention of providing a flawless end product to the fishermen, the hardware model is shown in Figure-5 . However, the aim of making the prototype with less power and cost efficient has lead to depreciation in accuracy of detecting the location of the boat. Further the whole model is based on Radio frequencies, there is bound to the signal attenuation from time to time.

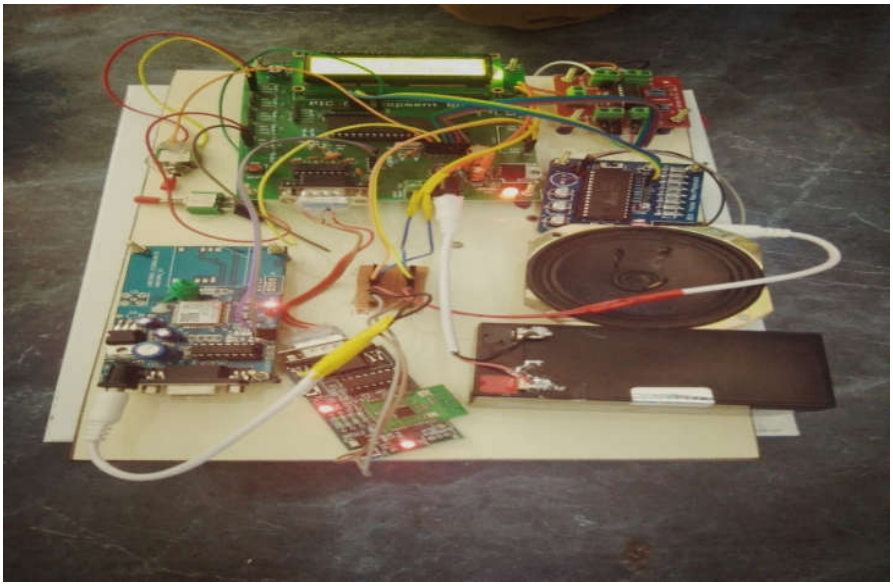

Figure-5 Proposed Hardware

## Conclusion

The proposed system aims at preserving fishermen safety by using the tri-zonal implementation, thereby preventing them from crossing the International Maritime boundary in sea. The system also helps identify the boats in the sea zone wise- safe, intermediate and danger zone from one location. The control room can thus have control over all the boats till a specified region. This can also help prevent illegal and unauthorized transactions, etc. The proposed system also helps detect obstacles in the path of the boat. It can also monitor and manage the sea traffic from one place. Overall the proposed system would centralize the core

jobs of the control port thereby ensuring fishermen safety.

## References


[1] D. Petrovic and R. Kanan, "Extremely low power indoor localization system," in IEEE 8th International Conference on Mobile Adhoc and Sensor Systems (MASS), pp. 801–806, Oct. 2011.

[2] N. Simon et al., "Indoor localization system for emergency responders with ultralow-power radio landmarks," in Instrumentation and Measurement Technology Conference (I2MTC), pp. 309–314, May 2015.

[3] T.C. Karalar et al., "An integrated, low power localization system for sensor networks," in The First Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services, pp. 24–30, Aug. 2004.

[4] D.F. Larios et al., "Localization method for low power consumption systems," in Proceedings of the International Conference on Data Communication Networking (DCNET), pp. 1– 10, July 2011.

[5] S. Mani Sundar, M. Hariharan, "Deep Sea Fishermen Patrol System for Coastal Intruder Positioning", International Journal of Scientific Engineering and Technology, Volume 2 Issue 3, PP : 129-1321 April 2013.

[6] C. Sheeba Thangapushpam ,"Intelligent boundary alert system using GPS IOSR" ,'Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661, p-ISSN: 2278-8727 PP 19-23.

[7] L. Zhu, F. R. Yu, B. Ning, and T. Tang, "Cross layer handoff design in mimo-enabled wlans for communication-based train control (cbtc) systems," IEEE J. Sel. Areas Commun., vol. 30, no. 4, pp. 719– 728, May 2012

[8] K. K. Yoo and R. Y. Kim, "Hinet: Radio frequency communication based train control (rfcbtc) system jointly using hierarchical modulation and network coding," in Proc. Convergence Hybrid Inf. Technol., Lecture Notes Comput. Sci., 2012, pp. 130–137

[9] C. Bantin and J. Siu, "Radio cbtc for the lasvegas monorail," in Proc. Urban Transp. XI: Urban Transp. Environ. 21st Century, 2005, no. 3, pp. 95–103.

[10] H. Velayos and G. Karlsson, "Techniques to reduce ieee 802.11 b mac layer handover time," in Proc. IEEE Int. Conf. Commun., Siena, Italia, Jun. 20–24, 2004, pp. 3844– 3848.

[11] C.-S. Li, Y.-C. Tseng, and H.-C. Chao, "A neighbor caching mechanism for handoff in IEEE 802.11 wireless networks," in Proc. Int. Conf. MUE, Seoul, Korea, Apr. 26–28, 2007, pp.

[12] Lynceus2Market - An innovative people localization system for safe evacuation of large passenger ships." [Online]. Available: http://www.lynceus-project.eu/


.