

Multipurpose Marine Wireless Network

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Abstract— The fishing is among the most dangerous professions in the world over because once out on the sea, the fishermen are subject to various oceanographic and climatic conditions. Especially, so in the developing countries of South-East Asia, where fishing is a integral part of the economy, but there are no proper established systems for the safety of fishermen. This project aims at providing a possible solution to the various hardships faced by the fishermen because they are cut off from any form of communication. In this project a device will be made, which uses trans-receiver module for wireless communication. The device also has a small LCD display and a button which acts as a multi purpose signaling switch. Each of the fishing boats is provided with this device. Using the trans-receivers on each of the units, all the boats can form a AD Hoc network within themselves. Once this AD Hoc network is established, then many applications will become possible. If there is any accident or emergency situation on a boat, the button can be pressed on the unit, and an automatic emergency message will be broadcasted on the AD Hoc network, thus enabling rescue operations. Information about weather conditions and natural calamities can be provided. It will prevent fishermen from crossing international areas. If two boats want to communicate with each other then it will be possible through AD Hoc Network.

I. INTRODUCTION

A marine AD Hoc network once created can serve multiple purposes, and this project aims at demonstrating these possibilities using a prototype of the portable unit and using a simple multi hop communication demonstration. This project can be extended to accommodate text communication like that in mobile phones, between various fishing boats within a certain area, if the portable unit is provided with a additional keypad.

II. PROBLEM STATEMENT

The fishing is among the most dangerous of professions in the world over because once out on the sea, the fishermen are subject to various oceanographic and climatic conditions. Especially, so in the developing countries of South-East Asia, where fishing is a integral part of the economy, there are no proper established systems for the safety of fishermen. This project aims at providing a possible solution to the various hardships faced by the fishermen which are as follows:

- Lack of communication between shipping boat.
- Inability to identify the border.
- Fishermen suffering in emergency cases.

Could not carry heavy antenna in small fishing boat.

III. PROPOSED SOLUTION

A marine AD Hoc network once created can serve multiple purposes, and this project aims at demonstrating these possibilities using a prototype of the portable unit, and using a simple multi hop communication demonstration. This project can be extended to accommodate text communication like that in mobile phones, between various fishing boats within a certain area, if the portable unit is provided with a additional keypad.

1. **Distress management:** If there is any accident or emergency situation on a boat, the button can be pressed on the unit, and an automatic emergency message will be broadcasted on the AD Hoc network, thus enabling rescue operations.
2. **Information about weather conditions:** Using the AD Hoc network, an weather warning can be provided to the fishermen from a base station.
3. **Natural Calamity Warning:** Once a network like that is in place, it can also be used for applications like Tsunami Warning using sensors that are planted on the ocean bed, and connected to a surface wireless transmitter.
4. **Prevention of fishermen from crossing into international areas:**
Each of the portable units will be programmed for boundary detection . With this, every time a boat comes close to or crosses over into international waters, an alarm will be raised and a message will be transmitted over the network about the cross over.
5. **Boat to Boat communication:** If two boats want to communicate with each other then it may not be possible directly due to range limitation of trans-receiver module. AD Hoc network can be used for this purpose.

IV. DESIGN OF SYSTEM

The entire system is divided into following modules:

1. Ocean Module
2. Boat Module
3. Base Station

1) Ocean Module:

Ocean module is used for following purposes:

i) Detection of vibration of ocean bed:

Seismic sensors are used for detection of vibration of ocean bed. However it is not possible to create high intensity vibrations for demonstration purpose. Hence prototype of IR sensors is used in demonstration.

ii) For AD Hoc Network(Boat to Boat communication):

Ocean module can also be used as node in forming AD Hoc network. If two boats want to communicate with each other then it may not be possible directly due to range limitation of trans-receiver module. Hence boat will transmit required data with ID number of nearby ocean module on same channel. This ocean module will retransmit the data to another boat by altering the ID.

iii) For Boundary Detection:

Boundary of particular geographical area can be detected in practical application by programming GPS module with boundary co-ordinates. However it is not possible to show it in laboratory since boundary co-ordinates change significantly over distance of kilometres. To show detection of boundary, same ocean module will be used. The module consist of switch which will be kept at position 1 when it will be used for this purpose. Else the switch will be placed at position 0. When switch is at position 1, ocean module will start transmitting symbol 'B' for boundary for all IDs on same channel. If boat is nearby such ocean module i.e. near the boundary it will receive 'B' on LCD display in boat and alarm will be raised through buzzer in boat.

2) Boat Module:

Boat module will be used for following purposes:

Trans-receiver module CC2500 can transmit and receive data from ocean module or from base station. This module consist of 16*2 LCD display which displays Tsunami alert in case of medium and high intensity, messages from base station and other boats. It will also display 'B' in case of crossing boundary and alarm will be raised through buzzer in boat.

Trans-receiver module CC2500 can transmit and receive data from ocean module or from base station.

3) Base Station:

Base Station will be used for following purposes: Trans-receiver module CC2500 can transmit location of the particular boat to provide proper direction. Base station can also receive information about tsunami from ocean module through AD Hoc network. Base station can also transmit natural calamity warnings to all the boats in AD Hoc network. PC will consist of user interface created in Visual Basic(V.B) consisting of admin login, boat number drop down list, field to type corresponding message, phone numbers of relatives of fishermen. Thus in case of emergency, message will be sent to relatives using GSM module.

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