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Integrated Source-Wind, Solar, Power to Floating Station for Maritime Boundary Detection

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Abstract— *Nowadays many fishermen in Tamilnadu are caught by the srilankan navy. This system helps them to identify the sea limit by detecting the boat coming near to the border with the help of floating station .The power provided for floating station is done with the help of both solar and wind power. The transmitter is placed in the boat while the receiver is placed in the floating station. This system is more helpful in identifying the sea border and Navigating the Route.*

Keywords— PIC. Transmitting Base Station, RF Signal, Message, Receiver.

I. INTRODUCTION

This paper tells about the prevention of fisherman from going outside the border by placing a floating module in the respective sea border. The floating module consists of hybrid power generation section and receiver section. The hybrid Section uses both solar and wind sources for power generation. It is given to the PIC Controller. It senses the amount voltage produced by the solar and wind turbine. The transmitter is placed in respective boat. Each Boat is having Different Frequencies i.e. Modulation Frequency. The transmitter encodes the modulation signal to the carrier signal (433.92MHz). In the receiver side, the modulation signal is separated from the carrier signal and it is given to the PIC Controller. In this System when the boat is nearing the border, the module alerts the boat by a voice message. This activity is monitored by the coast guard in helicopter. When the fisherman is near to the border, he will be alerted by the coast guard.

Environmentally safe solutions are very essential to meet the demands of the deteriorating planet, earth. The use of renewable energy sources is of greater concern to meet the existing power demands. A common practice to combine two energy sources to power the systems is called hybrid renewable systems. Due to the long distance, and difficult access the overall system used in these applications must be reliable. This paper shows the results of using renewable hybrid systems specially used to design a monitoring system to control the ships over the international borders across the seas. Nowadays many fishermen in Tamilnadu are caught by the srilankan navy. This system helps them to identify the sea limit by detecting the boat coming near to the border with the help of floating station. The power provided for floating station is done with the help of solar, wind and vibration power. The transmitter is placed in the boat while the receiver is placed in the floating station. This system is more helpful in identifying the sea border and Navigating the Route with the help of DIRECTIONAL RSSI (Received Signal Strength Indicator) and IOT.

II. LITERATURE SURVEY

[1] The main theme of this paper is to save the lives of poor fishermen which is achieved with the help of GPS and embedded system. GPS (Global Positioning System) is increasingly being used for a wide range of applications. The main objective of the paper is to help the fishermen not to navigate beyond other country's border. If a fisherman navigates beyond the country's border, an alarm is generated indicating that the fisherman has crossed the border. Additionally, a GSM transmitter interface will send a message to base station located on the sea shore indicating that a boat has crossed the border. The main drawback of this system is that GPS can only be used for a certain range.

[5] Hence an effective scheme is designed to overcome this threat with Global positioning system (GPS) which provides dynamic location of fishing vessel in water and microcontroller which competes on GPS and predefined boundary locations to determine whether the boat have crossed the border or not. If so the fisherman is alerted and the message is transmitted to nearby coast guard ships through RF signals at VHF (30-300MHz) range which covers wide area.

[3] Location-based services (LBSs) are often based on an area or place as opposed to an accurate determination of the precise location. However, current mobile software frameworks are geared towards using specific hardware devices (e.g., GPS or 3G or Wi-Fi interfaces) for as precise localization as possible using that device, often at the cost of a significant energy drain. The framework is coordinated with available communication chips and sensors based on their energy usage and accuracy provided. The results show that Geo-fencing provides an effective framework for use with LBSs with a significant energy saving for mobile devices.

2.1 Existing System

The Existing system works on Radio Frequency. This system is a Standalone device with a Solar Panel and a flat Micro Turbine. RSSI is present and hence identification becomes easier.

III. PROPOSED SYSTEM

The use of renewable resource for the global concern of threat to international shipping is the main objective behind this project. This project mainly deals with providing a secure mode for the fishermen travelling across the ocean. The proposed system provides a solution to the threat in critical regions across borders along Indian Ocean. Our system incorporates a mobile sea station across border which is provided by a dynamic roof of solar cell. The SWAB is used as a backup during night due to seasonal availability of solar power. The RFID is attached to help identify the ships that are crossing the borders. Wireless communication is used to communicate to the control room PC. The sources, RFID, battery and the wireless transmitters are placed on board. The wireless receiver is placed at the receiving station at the control room.

3.1 hardware Description

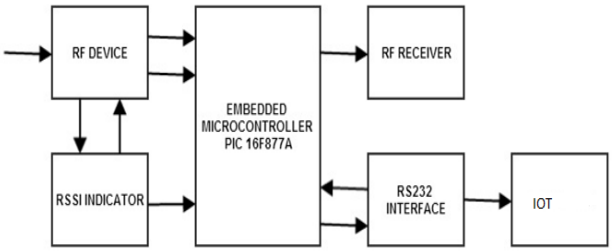


FIG.1. BLOCK DIAGRAM OF PROPOSED SYSTEM

Solar Panel- Solar cell is a p-n junction diode of large area (1-100 cm2), which converts energy of the incident photons into electrical energy. A typical construction of a p-n junction solar cell, which consists of a shallow p-n junction formed on the surface of a substrate, front ohmic contact grids and a back ohmic contact, and an antireflection coating on the front surface. When a solar cell is exposed to solar spectrum, photons having energy equal to or greater than the band gap (Eg) of the solar cell material, get absorbed and hole and electron pairs are generated, which are collected by the respective terminals.

Wind Turbine-Wind mills that produce electricity are very eco-friendly. For one thing, they produce no harmful waste products. Also, they do not require consumption of a limited amount of natural resources nor do they endanger the environment through mining or drilling. Here turbine used is rotated at 60rpm and produces the output of 230v. This output is given to the Stepdown transformer. It will produce 12v output. Then it is given to the Power supply unit.

3.2 Polarity Controller

A diode is a specialized electronic component with two electrodes called the anode and the cathode. Most diodes are made with semiconductor materials such as silicon, germanium, or selenium. Diodes can be used as rectifiers, signal limiters, voltage regulators, switches, signal modulators, signal mixers, signal demodulators, and oscillators. The fundamental property of a diode is its tendency to conduct electric current in only one direction. This is a simplistic view, but is true for diodes operating as

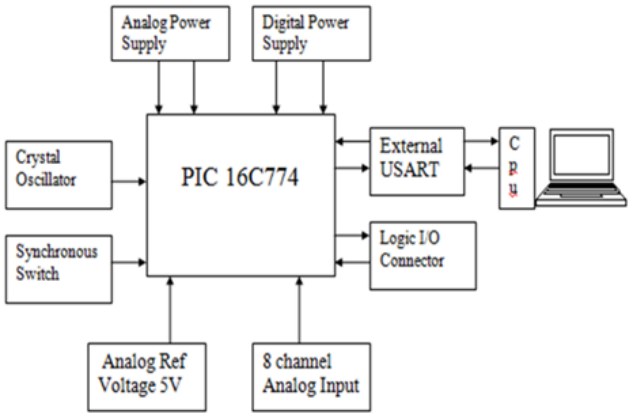
rectifiers, switches, and limiters. The forward break over voltage is approximately six tenths of a volt (0.6 V) for silicon devices, 0.3 V for germanium devices, and 1 V for selenium devices.

3.3 High Frequency Switching Circuit

The technique used by the high Frequency circuit is the pulse charging technique. This is Trickle method in boost charging system. A high end high frequency charging technique will be employed to charge the battery without loading the turbine and photo-voltaic cell. This method reduces the charging time. For example, if cell phones are charged using this way, then the cell phones will not get heated up. The switching circuit consists of the 555 timer and a MOSFET. The 555 timer works as the astable multi vibrator which produces pulses of required frequency.

3.4 PIC

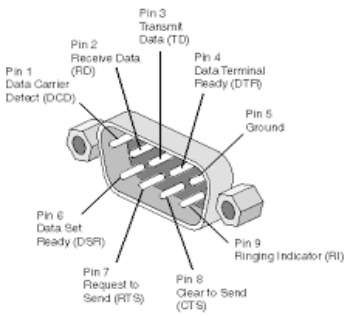
In this project an embedded controller has been preferred because of its industrial advantages in power electronics like built in ADC, RAM, ROM, ports, USART, DAC. This leads to lesser space occupation by the circuit and also the speed of embedded controllers is more compared to other processors. The embedded controller selected for this project is PIC16F877A due to its various features.



3.5 General Features

High performance RISC (Reduced Instruction Set Controller)CPU. Only 35 single word instructions to learn. All single cycle instructions except for program branches which are two cycle. Operating speed: DC - 20 MHz clock input and DC - 200 ns instruction cycle4K x 14 words of Program Memory (EPROM). 256 x 8 bytes of Data Memory (RAM).Interrupt capability (up to 14 internal/external interrupt sources).Eight level deep hardware stack. Direct, indirect, and relative addressing modes 12-bit multi-channel Analog-to-Digital Converter On-chip absolute band gap voltage reference generator. Universal Synchronous Asynchronous Receiver Transmitter supports high/low speeds and 9-bit address mode (USART/SCI).

3.6 Pin Details



3.7 RS-232

The most common communication interface for short distance is RS-232. RS-232 defines a serial communication for one device to one computer communication port, with speeds up to 19,200 bauds. Typically, 7 or 8 bits (on/off) signal are transmitted to represent a character or digit.The9 pin connector is used.

3.8 MAX 232 IC

The Max 232 is a dual RS-232 receiver / transmitter that meets all EIA RS232C specifications while using only a +5V power supply. It has 2 onboard charge pump voltage converters which generate +10V and –10V power supplies from a single 5V power supply. It has four level translators, two of which are RS232 transmitters that convert TTL\ CMOS input levels into + 9V RS232 outputs. The other two level translators are RS232 receivers that convert RS232 inputs to 5V.

IV. RESULTS AND DISCUSSIONS

Visual Basic is a third-generation event-driven programming language and integrated development environment (IDE) from Microsoft for its COM programming model first released in 1991.Microsoft intends Visual basic to be relatively easy to learn and use. Visual Basic was derived from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using data Access Objects, Remote data Objects, or ActiveX Data Objects, and creation of ActiveX controls and Objects. A programmer can create an application using the components provided by the Visual Basic program itself. Program written in Visual basic can also use the Windows API, but doing so requires external function declarations. Though the program has received critics' for iots perceived faults, version 3 of Visual Basic was a commercial success, and many companies offered third party controls greatly extending its functionality.

The system has been implemented as a prototype and has been tested successfully. The sources, RFID and the wireless module are placed on the inflation system that is placed at the borders. This requires PC to view the output. The receiver station uses one PC to receive the information and communicate to the ship personnel. The RS232 is used for serial communication and to interface with the computer

V. CONCLUSION

This Project can find the sea limits about the boundary before some kilometers of distance if the fishermen are going to reach the boundary it alerts the fishermen automatically by sending voice message. So, we say that the crossing of sea border by the fisherman is prevented. This Paper is enhanced by placing a transceiver in the boat. So that the coast guard will change the direction of the boat while crossing the border by the help of Auto steering mode i.e. a stepper motor and Driver IC is placed.

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