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Automated Wind and Solar Powered Water Drone Monitoring and Controlling System

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Abstract - *From many years many countries face terrorist attacks because of some security problems. Sometimes many innocent people and citizens lost their life. Many countries try to build higher security and also design some military applications for security. Some terrorist enter in country by sea route and destroy piece in country. We proposed automated wind and solar power system which is move on water which is using natural resources. In the proposed system the boat is moving on the water with the help of solar and wind turbine in which the energy is converted into electricity. This system effectively work on minimization of pollution and fuel cost in emergency condition we provided back system to the boat. The system is useful in all seasons. The Radio Frequency (RF) module system is used to monitor and control the boat. RF module is wireless controller which controls movements of boat in the water. With the help of android phone a camera captures images and videos which is then store in computer system for security purpose.*

***Key Words*: Solar Panel, Wind Turbine, Programmable Integrated Circuit (PIC) microcontroller, RF Module.**

1. INTRODUCTION

Now a day's security system in Navy application is very critical problem. So many applications are designed to solve this problem. Existing security applications in Navy are based on fuel energy. As compare to the increasing population primary sources of fuel are limited. So the scientists are looking for sustainable energy sources like sun wind, water, etc [1]. Of them solar and wind are renewable energy sources. Solar and wind can be obtained easily. From 1889 until just before the First World War the boating season and regattas saw the silent electric boats plying their way up and downstream. Early electric launch on the River Thames, built by William Sergeant [2].

As the energy saving point of view we can use this system for tourism application. This system will give very good impact in various fields like fishing, tourism, security, whether monitoring [3]. We are going to design a Boat without fuel and with natural resources for security purpose.

We use a solar panel which is used for energy generation. Which is mounted on top side of our boat? Solar panels that can be transform the solar energy into the electrical energy which is stored in the battery. In our system we use another natural resource wind. Wind energy is the world's fastest growing energy sources expanding globally at a rate of 25%-35% annually [5]. We can also store the power in battery which is generated from the wind turbine. Wind turbine generates the power in term of Alternating Current (AC) and converted it into Direct Current (DC) by using the rectifiers.

By these references we created the combination of solar and wind resources to controlling as well as monitoring the system with the RF module. Here we used PIC microcontroller. On that microcontroller we run 2 DC motors. DC motors are connected to the driver circuit. Boat is moved using that DC motor. DC motor is controlled by using the RF module. RF module is used controlling the boat. Using the RF module we can move the boat at left, right, forward and reverse direction.

We use one android phone equipped with camera and IP WebCam android application. By combining the software and camera catch the live image as well as video and send it to the Computer and view in the MATLAB software [8]. We used the object detection technology. This technology detects the colour code wise object and sends it to the controlling section. Advantage of our system is less man power requirement, full system is handled by only single person.

1.1 LITERATURE SURVEY

The practical new technologies rational design and engineering approach, safety and reliability methods used in solar boats. In this project, the boat is powered by lithium-ion batteries that can be charged at any time by the photovoltaic generator placed on a flat top structure. The project is designed for brief trip around coast, where the public transport becomes very polluting during summer. Starting from the consideration that this boat is used during sunny weather, it is possible to know the boat's energy demand and proceed with the design of a suitable electric boat and of the energy storage/management system. It is

also proposed an innovative management of charge/discharge of the batteries[2].

The proposed measurement system provides a valuable contribution to the on-going development of tracking systems in the solar energy technology field[3].

2. SYSTEM ARCHITECTURE

In our project we are going to demonstrate the automated wind and solar powered water drone monitoring and controlling system. Also we are going to use the Radio Frequency (RF) module technique as an additional feature to the system. The blocks shown in the diagram are described as below:

By using charge controller we can control and monitoring the input as per the controlling signal coming from microcontroller. Charge controller is used to collect the power from solar and wind to store in the battery and DC motor as per the micro-controller signal. By using camera the footage of the sea and radar image is given to the micro-controller and micro-controller passes to monitor and collect all data. By using the Mobile camera and capturing the video and image, we can operate it through the android application. This camera device is connected to the PC via android mobile Address and We see all the view of the field. The Camera gives only the Picture Snapshots and continues Video in the screen.

DC motor is used to run the boat and speed is controlled by using racing module or controlling signal coming from micro-controller and dc driver control the supply of motor. In our project, there are two DC motors. They are used to

1) Left and right.
2) Forward and reverse.

This motor is controlled by PIC18F Microcontroller and RF module. The DC motor is controlled and operated by using the remote in all the directions. The wheels are connected to the motor in the water to rotate the boat. This wheel is operated in the direction of motor and controlled by the remote controller. In our project we use the RF Module RB-Ite-108 for transmitter and receiver, popularly used for remote control. The frequency range of the RF module is 433MHz to operate the system. The Remote is handled by the direction of DC motor connected to the wheels. The Features of RF Module is,

- Frequency: 433Mhz
- Modulation: ASK
- Receiver Data Output: High - 1/2 VCC, Low - 0.7v
- Transmitter Input Voltage: 3-12V (high voltage = more transmitting power).

The Solar panel is used to power the resource in our project. This is very important part in our project which supply the power to system. The Solar panel refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. Solar panel size is 6×10.This DC output power under standard test conditions, and typically ranges from 100 to 365 watts. The power is stored in the 9volt battery and being operated by this power in the device. This part is use in the project on the top of the Boat. The Wind Turbine is used to power the resource used in this project to provide the power .This system is totally based on the Air flow in the nature. By the air the wind turbine is move and stores the power in 9volt battery. The huge rotor blades on the front of a wind turbine are the "turbine" part. As wind passes by, the kinetic energy (energy of movement) it contains makes the blades spin around. The second part is a gearbox whose gears convert the slow speed of the spinning blades into higher-speed rotary motion turning the drive shaft quickly enough to power the electricity generator.

The solar and wind power is stored in the two 9 volt battery. The battery section is very important to handle the two power sections i.e. combination of two power generation techniques. And also we use the AC power supply to operate the boat on the small water tank. In future we increases the storage capacity of battery according to the applications. The battery is connected to the device and handles all these parts on boat. This block is monitoring the image which is captured by the camera. The Program of project is developed in to the mplab software. By using this system the footage of the sea and radar image is controlled through micro-controller and micro-controller is pass to the monitoring section. The LCD display is used to display the messages to users. LCD is used in a project to visualize the output of the application. We have used 16x2 LCD which indicates 16 columns and 2 rows. So, we can write 16 characters in each line. So, total 32 characters we can display on 16x2 LCD.

2.1 Hardware Requirement

- PIC microcontroller.
- RF Module.
- Camera.
- Solar panel.
- Dc wind turbine.
- Dc motor driver circuit.
- Charge controller circuits.

2.2 Software Requirement

- Proteus
- Mat lab
- MPLAB
- PIC Flash Programmer

2.3 System Architecture

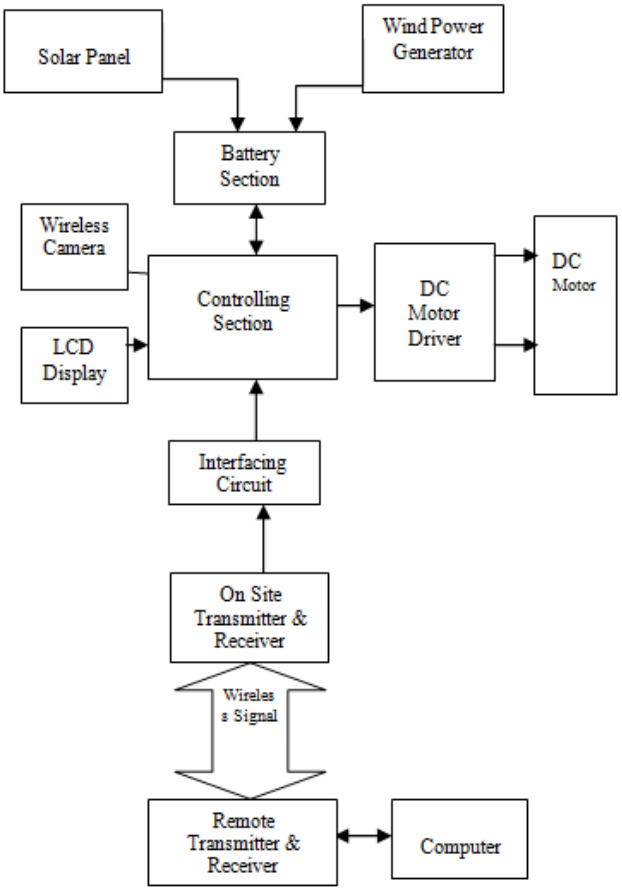

Fig -1: System architecture diagram

2.4 Flow of the System

Step1: Firstly we stored the power which is generated from solar panel and stored in battery.
Step2: Another resource is wind turbine is generated power and stored in battery.
Step3: Battery supply that power to the controlling section.
Step4: Driver circuit is connected to controlling section on that driver circuit 2 DC motors are connected.
Step5: The working of DC motor left, right, forward and reverse are displayed on the LCD display.
Step6: DC motor is controlled by using RF module.
Step7: In that RF module receive section is placed on boat and transmitter is with us for controlling of boat.
Step8: We used android phone camera for capture the continuous image as well as video and send it to the PC through wireless connection.
Step9: So we see that image on the PC.

3. CONCLUSIONS

This boat run on the solar and wind power instead of any fossil fuel. The fabrication and installation of this solar boat is very simple and reliable. Fuel consumption, capacity, complexity and reliability solar energy driven boat is an innovative invention. The boat will be conducted by the energy processed from solar by minimizing environmental pollution and fuel cost.

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