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# SEA WATER MONOPOLE ANTENNA FOR MARITIME WIRELESS COMMUNICATION

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***Abstract*** **--- A new transparent and reconfigurable Sea-water Monopole antenna operating at VHF band is proposed, which is well suited for maritime wireless communications. In comparison to the dynamic-type seawater monopole antenna in, our structure is relatively simple, mainly consists of a transparent plastic tube filled with sea-water and a top-loaded feeding probe Furthermore, our proposed antenna as higher efficiency due to an efficient feeding structure and the thick sea-water cylinder used. The concept of our project is to save the fuel, time and life of submarine and water bound vehicles. By using Seawater Monopole Antenna is very efficient and it could be the reliable concept of sending data through salt water using tubular antenna.**

***Index Terms***--- **Monopole antenna, Radiation Efficiency, Sea Water, Transparent Antenna**

## I. I INTRODUCTION

The main objective of our project is to design a data acquisition system that is simple in architecture and also incorporating the concepts of sensors, DAQ measurement hardware, and a computer with programmable software.

For a liquid antenna, the fluid that carries charged particles in the form of ions is used as the radiating medium. Due to the fluidity, the fluid can be pumped into a plastic tube and thereby “deployed” when the antenna is activated. In this project, a new transparent and reconfigurable sea water monopole antenna operating at VHF band is proposed, which is well suited for maritime wireless communications. When deactivated, the fluid can be pumped out or drained and the tube can also be removed, resulting in very small occupation space and radar cross section (RCS). In this project, a new transparent and reconfigurable sea-water monopole antenna operating at VHF band is proposed, which is well suited for maritime wireless communications. In comparison to the dynamic-type sea-water monopole antenna, our structure is

relatively simple, mainly consists of a transparent plastic tube filled with sea-water and a top-loaded feeding probe.

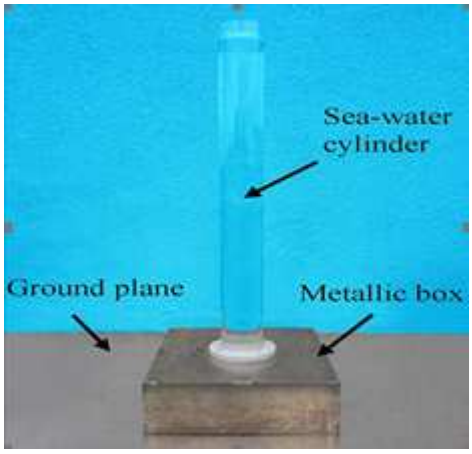
## II. II DESIGN OF SEAWATER MONOPOLE ANTENNA

Liquid antenna was becoming an interesting topic. For a liquid antenna, the fluid that carries charged particles in the form of ions is used as the radiating medium. Due to the fluidity, the fluid can be pumped into a plastic tube and thereby “deployed” when the antenna is activated. When deactivated, the fluid can be pumped out or drained and the tube can also be removed .In project, a new transparent and reconfigurable seawater monopole antenna operating at VHF band is proposed, which is well suited for maritime wireless communications. In comparison to the dynamic-type sea-water monopole antenna , our structure is relatively simple, mainly consists of a transparent plastic tube filled with sea-water and a top-loaded feeding probe. Furthermore, our proposed antenna has a higher efficiency due to an efficient feeding structure and the thick sea-water cylinder used**.**

## III. III GEOMETRY OF SEAWATER MONOPOLE ANTENNA

The geometry of the sea-water monopole antenna mounted on a ground plane. In order to hold the sea-water cylinder, a clear acrylic tube is chosen to be vertically fixed on a Teflon base and sealed with silicone gasket. Its transmittance is nearly perfect;therefore it can be used to design an optically transparent antenna. The feeding probe is loaded with an aluminium disk on the top before being inserted into the sea water. The clear acrylic tube and the feed probe are concentric to maintain its structural symmetry. It is clear that the sea-water monopole antenna can be reconfigurable which means that its centre frequency and bandwidth can be adjusted by changing the height and radius of the sea-water cylinder.The dielectric constant of sea water is 81, and the conductivity is 4 S/m. However, it is worth mentioning that the electrical properties of sea water depend on its chemical composition which varies from place to place and from time to time. In addition, electrical properties of sea water vary with the temperature, pressure, and frequency.The electrical properties of sea water used here are characterized by using a coaxial line reflection method to obtain an accurate design. It is found that the dielectric constant of the available sea water varies between 77.6 and 79.8

over the frequency range of 30–300 MHz, while the conductivity varies between 3.9 and 4.2 S/m.




**Geometrical structure of the sea water monopole antenna**

## IV. IV WORKING

The submarine variables are sent through this antenna to the base station.The variables are as follows:

1.EngineTemperatrure
2.Turbine Exhaust Temperature
3.Smoke
4.Fire Level

The above characteristics are calculated by using different sensors.Thermocouple and thermistor arre used to calcul;ate the engine temperature and turbine exhaust temperature.LDR and IR sensors are used to detect the any abnormalities such as fire level and smoke in the machine.

## V. MODULES

The design and implentation of "Sea water monopole antenna for maritime wireless communication" consists of five hardware modules/They are as follows:

1.Data Acquiring module
2.Data Processing module
3.Data Manipulation module
4.Design of wireless module
5.Design of receiver module

## VI. POWER SUPPLY

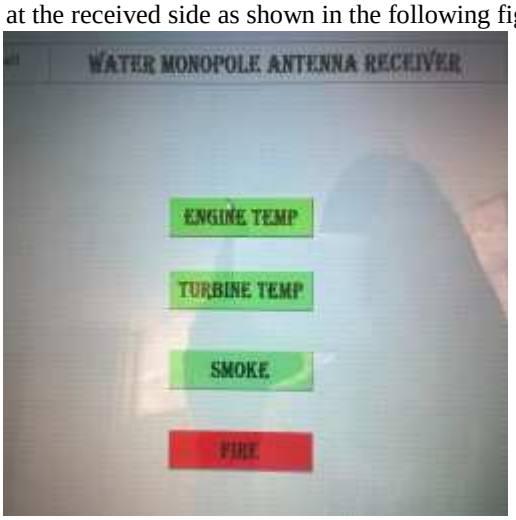
ll the electronic components starting from diode to Intel IC's only work with a DC supply ranging from -+5v to -+12v. We are utilizing the same by cheaply and commonly available energy source of 230v50Hz and stepping down, rectifying, filtering and regulating the voltage.

## VII. RESULTS

These are the snapshots of the actual output given by the project.The figure1shows that the output of the transmitter section.These are the values sensed by the project at the transmitter side.

Sensed values displayed in the Transmitter Section

he change in the transmitter side shows that there is problem with fire level in tha chamber and same that was shown at the received side as shown in the following figure.




Showing Abnormal status at the Receiver section

## VIII. ADVANTAGES

[1] In the project sea water monopole antenna is used for submarine data transmission from under water.

[2] Transparent and reconfigurable sea water monopole antenna operating at VHF band.Higher efficiency due to an efficient feeding structure and the thick sea water cylinder used.

[3] The concept is to save the fuel, time and life of submarine and water bound vehicles.

[4] Efficient and reliable concept of sending data through salt water using tubular antenna.

[5] Low cost and can be implemented easily.

[6] Can send variables of submarine to the external world. Virtual instrumentation on the receiving side will be possible.

## IX. CONCLUSION

Thus this project provides an efficient and reliable concept of sending data through salt water using tubular antenna. The concept is to save the fuel, time and life of submarine and water bound vehicles.It can be implemented easily and comparatively the result is obtained in low cost. The system can send variables of submarine to the external world and Virtual instrumentation on the receiving side will be possible. Also, by the use of serial communication using RS-232, the concept is enveloped.In this project four sensors are used to sense various submarine parameters such as engine temperature, turbine temperature smoke ,fire The values that are sensed are displayed at the transmitter side for monitoring purpose of the submarine. If needed, they are sent to another receiver who is supervising the parameters regularly. Instead of providing the set of sensed values to the receiver ,we are providing only the status (normal or abnormal) and there is no further analysis required by the supervisor to distinguish the values within the acceptable range and out of range. We are using a simple software tool to represent the data.

## IX. REFERENCES

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