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STRATO SAT 19

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ABSTRACT:

This technical paper deals about development of IOT based cube satellite using available VPN based infrastructure & IOT devices. Cube satellite can be developed to make future purpose much simple and faster & cost effective with VPN & IOT interface the system is platform independent which overcomes the disadvantages of existing satellite system. Interface of system gives access to both VPN based as well as cellular based network devices to provide input to the system. This prototype developed can be used to eliminate the need of huge satellite thus it is also a better method of going green

Index Terms: IOT; VPN.

I. INTRODUCTION

Cube satellite has limitations. It is limited in aspect of space, weigh, and power. So, ADCS installed on Cube satellite has to be the best designed one. To develop this ADCS, a simulation platform can be developed. The main difference is that developing the ADCS and platform for a specific size of Cube satellite instead of planar satellite platform.

II. BACKGROUND OVERVIEW

A. Existing System

Existing System Cube Satellite are deployed using the Poly-Pico satellite Orbital Deployed, P-POD, Six CubeSats and their respective P-POD launcher, also developed by California Polytechnic and State University. As stated previously, the standard size for a Cube Sat is a 10 cm cube (referred to as 1U). This can actually be increased to a maximum size of 10 cm by 10 cm by 30 cm and 3 kilograms (3U). Obviously this is a larger, more expensive endeavor than a standard 1U Cube Sat; however it is an option.

B. Drawbacks of Existing System

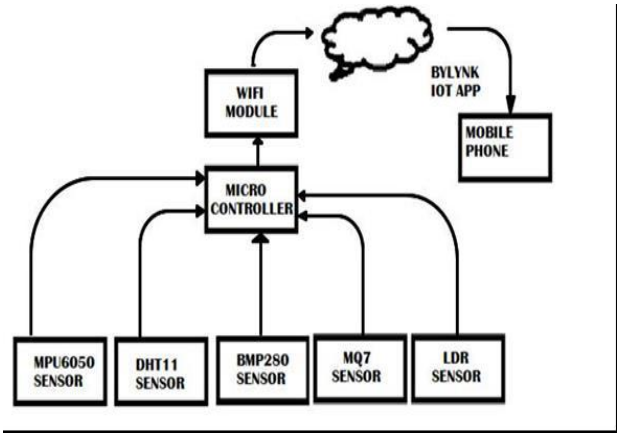
Following are the drawbacks of existing systems

It requires high development cost and high maintenance cost. It also requires more time and the process is very tedious.

III.SYSTEM COMPONETS

This proposed system is simple to design. Here, five different sensors are used which are temperature & humidity sensor (DHT11), pressure sensor (BMP180),light sensor (LDR), carbon monoxide sensor (MQ7), accelerometer (MPU6050). The data processing unit is an Arduino Uno which is a low cost embedded system platform. The data can be recorded and analyzed in a personal computer or in a simple android based mobile phone with Arduino application installed. To transmit the data from the cube-sat to the monitoring device, a transmitter and receiver module is used. An RF module of 433MHz is used for this data transmission. A gas balloon has been used to hold & carry the Cube satellite.

III. PROPOSAL METHOD

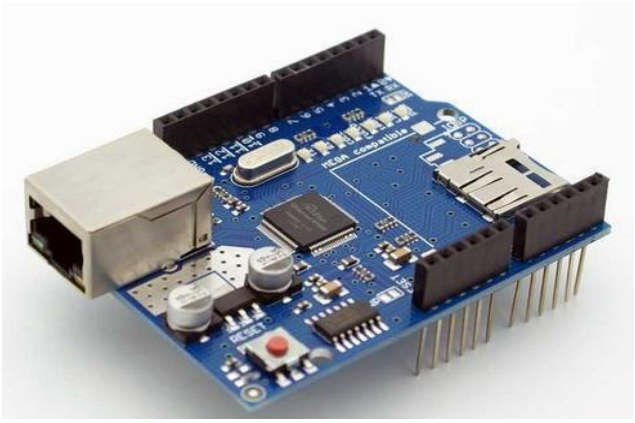


IV. ARDUINO

Arduino is an open source computer hardware and software company, project and user community that designs and manufactures single-board microcontroller and microcontroller kits for building digital devices, and interactive objects that can sense and control objects in physical world. The Arduino board is shown in Figure 3.6. Arduino may be written in any programming language with compilers that produce binary machine code for the target processor. The Arduino project provides the Arduino Integrated Development Environment (IDE), which is a cross- platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple one-click mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus.

V. **ETHERNET**

Ethernet is a family of computer networking technologies commonly used in Local Area Networks (LAN),Metropolitan Area Networks (MAN) and Wide Area Networks (WAN). Each frame contains source and destination addresses, and error checking data so that damaged frames can be detected and discarded most often, higher layer protocols trigger retransmission of lost frames.



As per the Open Systems Interconnection (OSI) model provides services up to and including the data link layer. In arduino, Ethernet shield shown in Figure 3.7 is used to provide Ethernet services.

VI. NODEMCU

It is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Express if Systems, and hardware which is based on the ESP-12 module.

Fig..NodeMcu

VII. CONCLUSION

Thus designed and implemented a cube-sat based weather monitoring system. The system is simple to construct, portable, cost efficient, less power consuming and reliable. The hardware and the data acquisition system are designed. As the system does not use internet network, data transmission has low cost which in terms provide large applications. It will have a positive impact on agriculture and production. There are some limitations such as the device may not communicate to a long distance without powerful transceivers section, the record of data in higher altitude with the help of gas balloon may be a problem. The components may be damaged by rain or long time use.

VIII. METHODOLOGY

The proposed model of the cube satellite is cost efficient, reliable and simplest design ever. The graphical analysis of data taken for 4 months consecutively in Kolkata with the help of gas balloon has shown that this system is working properly. The statistical data obtained from the device for different altitudes and in different times is a unique feature of the de vice which provides about 90% and above accurate and similar data compared with network based existing system.

IX. FUTURE SCOPE

The testing and research conducted thus far has yielded a great deal of knowledge about the actual construction of a working diorite device. The next step is to complete the preparation necessary to test the deployment of the balloon in a low pressure environment. The low pressure environment will help to verify the design chosen thus far. The folding technique and the membrane rupture are key items which will need to be addressed in the low pressure environment.

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