FLIGHT LOCATION RECORDING USING FLOATABLE OBJECT IN OCEAN FOR RESCUE OPERATION

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ABSTRACT

The goal of our project is to rescue the plane which gets lost during distress situations while flying above oceans specially, because the search and rescue teams that require to locate the flight and its passengers are huge and involves high cost. And there are planes still not recovered. In the existing system , there are facilities to alert the rescue team using a location transmitting beacon called ELT(Emergency Locator Transmitter) that transmits distress signal at 406MHz frequency. The main disadvantage that we are concerned is that the transmitting beacon does not transmit signals under water leading to a great difficulty in locating the missing flight . Therefore to locate the plane and save human lives immediately, we proposed a system that ejects a floatable object that transmits the GPS location of the plane continuously when it senses the water during landing gear is off which means the flight is in distress condition. By doing so, we can locate the flight much easier without requiring huge search teams in a more cost efficient way. And we also utilised solar energy resource to recharge the battery in the floatable object until the rescue team reaches. Thus the rescue team receives the GPS value continuously using wireless communication device (ZigBee) under high frequency 2.4GHz. This ejection mechanism is placed in the tail section of the plane where the black box is located, which contains all the information and cockpit conversations.

Keywords: - *ELT(Emergency Locator Transmitter),ZigBee,GPS(Global Positioning System)*

1. INTRODUCTION

Our project is based on locating the flight and its black box during distress conditions with an ejection mechanism. The ejected object would be equipped with an airbag system so it could float on the surface of the water in the event of a crash at sea. It would also help to indicate the exact location of the plane at the time of the crash and to find the wreckage. An implementation of solar charging mechanism will helps in avoiding death of the battery for signal transmission. The Floating black box will keeps on transmitting the GPS location for the rescue flight. With any airplane crash, there are many unanswered questions about

how and why the crash has been happened. The answers are hidden inside the black box and teams are dispatched at a considerable cost to find it. In the proposed flight tracker project, the black box is made up to find at low cost. Instead of waiting for a prolonged time for locating the black box, the valuable information can be retrieved with a help of a rescue section containing a signal receiver section for receiving he GPS location of the black box and the place of flight crash. The proposed system overcomes all disadvantages of existing system, such as time delay in getting the black box, cost of dispatching search teams etc. We believe and hope that, this flight tracker project will contribute towards saving human lives and improving the safety and reliability of aircrafts.

2. RELATED WORK

1) Fault tolerant aviation data tracker design

Zubairi, J.A. ; Dept. of Comput. & Inf. Sci., State Univ. of New York at Fredonia, Fredonia, NY, USA ; Er, A. stated that when a plane crash occurs, the black box is lost and teams are dispatched at a considerable cost to find it. In the flight-tracker project, the feasibility of transmitting data to ground servers in real time is investigated. There is a great need for tracking flight data in real-time. There are obvious advantages in finding the data instantly after a plane crash instead of waiting for several days until the black box is found. Earlier, this idea has been highlighted in the literature but no software scheme has been presented for its implementation. The flight tracker project includes a distributed handshaking and data transmission protocol and header formats for communication between plane and ground servers. A set of algorithms is developed to packetize the flight data, transmit it to the ground to an array of servers and integrate the transmitted data to recover the flight information. We hope this work will contribute towards saving human lives and improving the safety and reliability of aircrafts. Instead of waiting for a prolonged time for locating the black box, the valuable information can be recovered instantly via stations

2) Using Process-Level Redundancy to Exploit Multiple Cores for Transient Fault Tolerance

Shye, A; U.of Colorado, Boulder; Moseley, T.; Reddi, V.J.; Blomstedt.J stated that transient faults are emerging as a critical concern in the reliability of general-purpose microprocessors. As architectural trends

point towards multi-threaded multi-core designs, there is substantial interest in adapting such parallel hardware resources for transient fault tolerance. This paper proposes a software-based multi-core alternative for transient fault tolerance using process-level redundancy (PLR). PLR creates a set of redundant processes per application process and systematically compares the processes to guarantee correct execution. As a result, PLR ignores many benign faults that do not propagate to affect program correctness. A real PLR prototype for running single-threaded applications is presented and evaluated for fault coverage and performance. On a 4-way SMP machine, PLR

provides improved performance over existing software transient fault tolerance techniques with 16.9% overhead for fault detection on a set of optimized SPEC2000 binaries.

3. EXISTING METHODOLOGY

To capture the properties of hookworms, the multi scale dual matched filter is first applied to detect the location of tubular structure. Piecewise parallel region detection method is then proposed to identify the potential regions having hookworm bodies. To discriminate the unique visual features for different components of gastrointestinal, the histogram of average intensity is proposed to represent their properties. In order to deal with the problem of imbalance data, Rusboost is deployed to classify WCE images.

4. PROBLEMS IN THE EXISTING SYSTEM

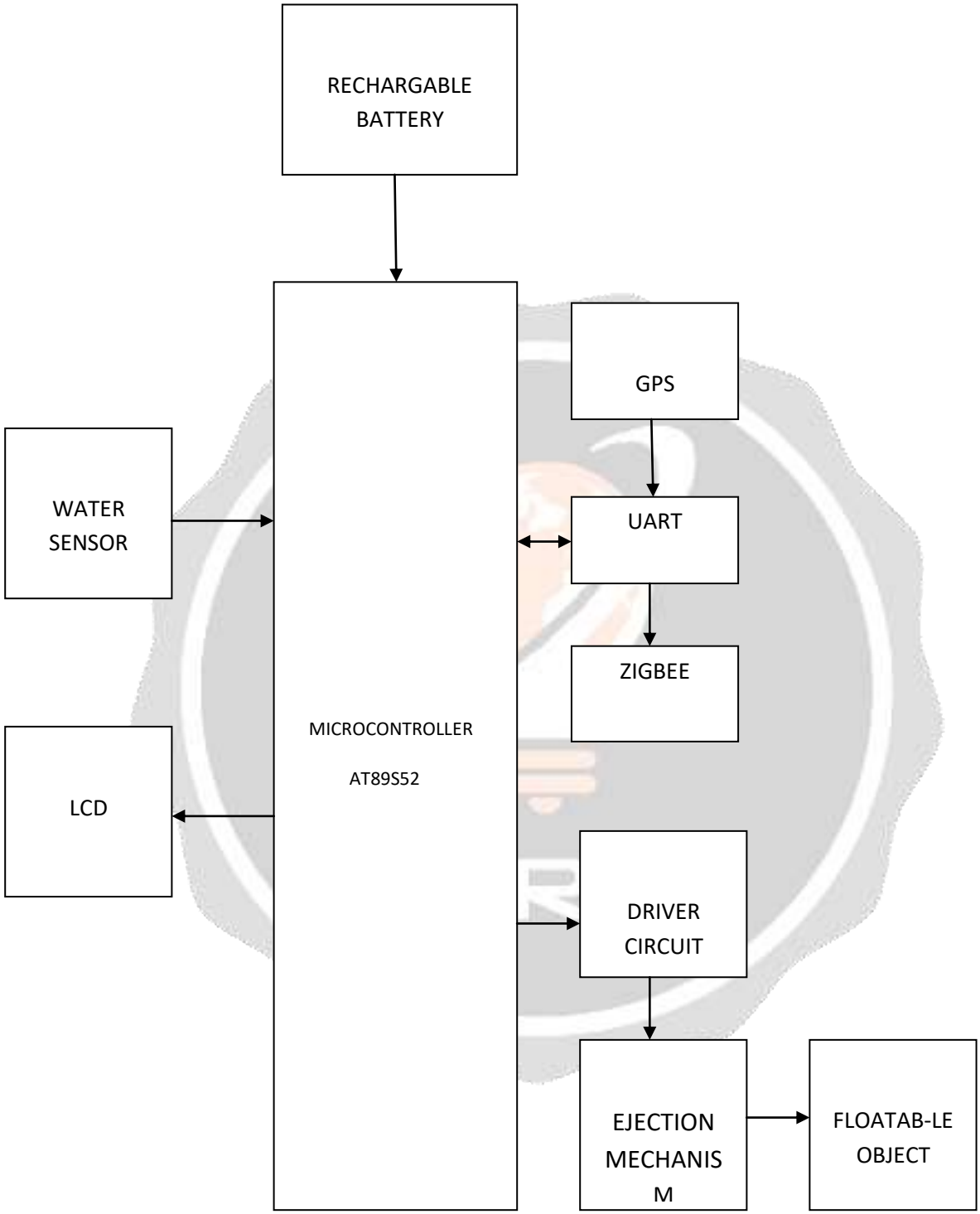
The problem identified in the above system (real time fight tracking by sending flight data to the ground server) is that it requires far more bandwidth than most advanced satellite infrastructure. Also there are 3700 and more commercial flights that fly each day, too many flights makes streaming data to the server difficult causing data traffic. Huge volume of data generated by the flight data recorders on all those planes will overwhelm our existing satellite communication infrastructure. The cost required to implement the above system is very high. The main disadvantage is that the need for transmitting real time data is very less because of the rarity of such accidents. Spending huge amount for such rare accidents leads to waste of money.

Flights nowadays does not stream data in real time instead it transmits distress signal (406MHz) to the rescue team at the time of distress situation with the help of ELT (Emergency Locator Transmitter). This device either activated manually or automatically at the time of emergency. Automatic activation is by the impact that is created on the ELT by the crash. Sometimes the device does not get enough impact that the device remains inactive. And at times the impact may be very strong that it may damage the device. Also the device does not send distress signal under water. Thus Emergency Locator Transmitter is useless if the flight lands in sea in case of distress conditions. To overcome the above disadvantages, we proposed a system that transmits distress signal with GPS location to the rescue team using floatable if the flight lands at sea.

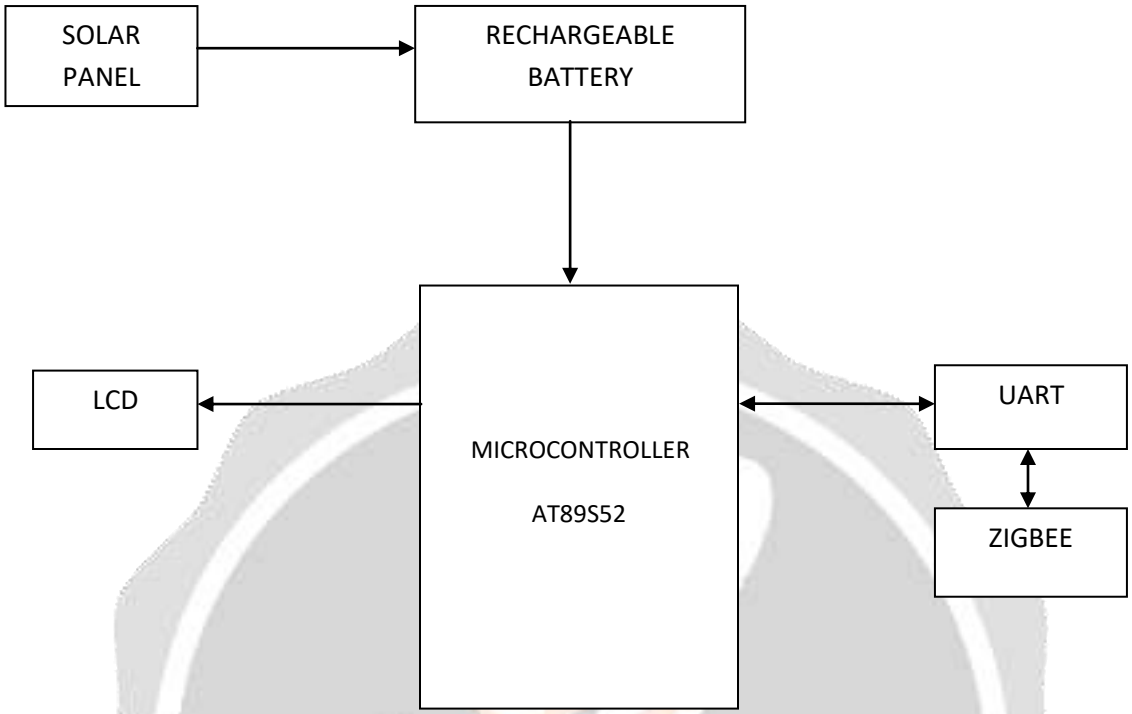
5. PROPOSED WORK

In our proposed system, we introduced a floatable object which is been ejected from the flight section when the flight falls in ocean during the crash. Once the water level sensor in the flight section senses water, the microcontroller copies the GPS value of the flight to the floatable object and starts the driver circuit to inflate the floatable object. After inflating, the compressor is made off and the microcontroller starts the ejection mechanism to eject the floatable object. Now it floats on water continuously broadcasting the flight location to the rescue section.

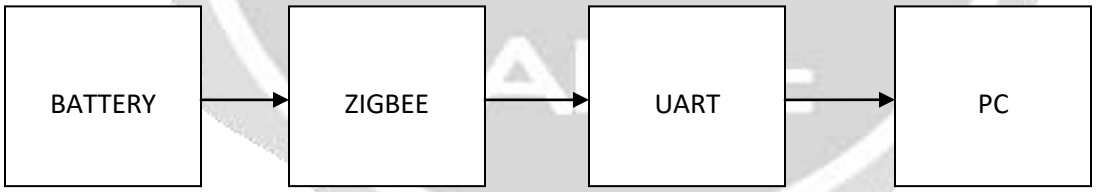
5.1 BLOCK DIAGRAM:



5.1.1 Block diagram of flight section



5.1.2 Block diagram of floatable object section



5.1.3 Block diagram of Rescue section

5.2 BLOCK DIAGRAM EXPLANATION:

5.2.1 Flight Section

In our flight section has microcontroller, rechargeable battery, water sensor, lcd, gps, zigbee and ejection mechanism. GPS is used to track the location of flight. Whenever the flight falls into the sea, water sensor will start sensing and give command signal to microcontroller to eject the floatable object from flight. And also current GPS value will be transmit into the object section via wireless data transfer device (ZIGBEE)

5.2.2 Floatable Object Section

Our object section has wireless device to receive the GPS value from flight. And also received GPS value will be transfer into the rescue section to take necessary actions. LCD is used to display the various statuses. A Solar Panel is attached with floatable object section to generate power to recharge the battery for continuous transmission of signal to base station or to rescue section.

5.5.3 Rescue Section

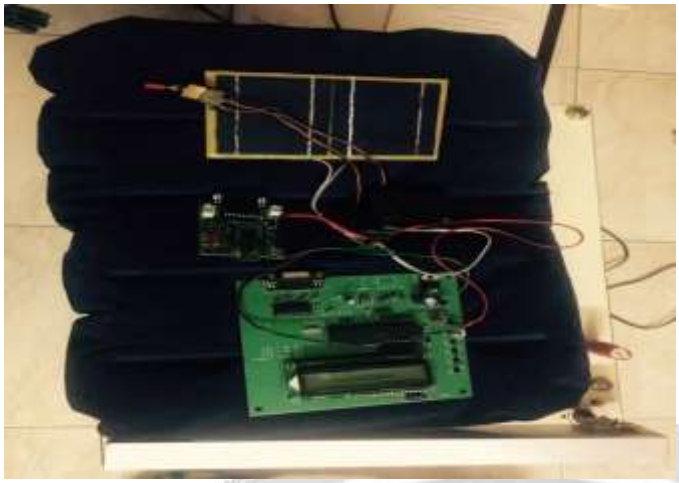
In rescue section, ZigBee receives GPS value from floatable object section and it will be seen using PC. The GPS value which is transmitted by the floatable object is broadcasted to the rescue section in the form of latitude and longitude. This information isshown to the user in the user-interface visual studio. It shows the user about the missing flight number and its location.

6.RESULT:

Thus the overall set up consists of the water sensor after sensing the water level iniates the process by checking the landing gear. If the landing gear is off, the microcontroller copies the GPS value to the floatable section through wireless communication device such as ZigBee and simultaneously starts the driver circuit to inflate the air bag (Floatable object).

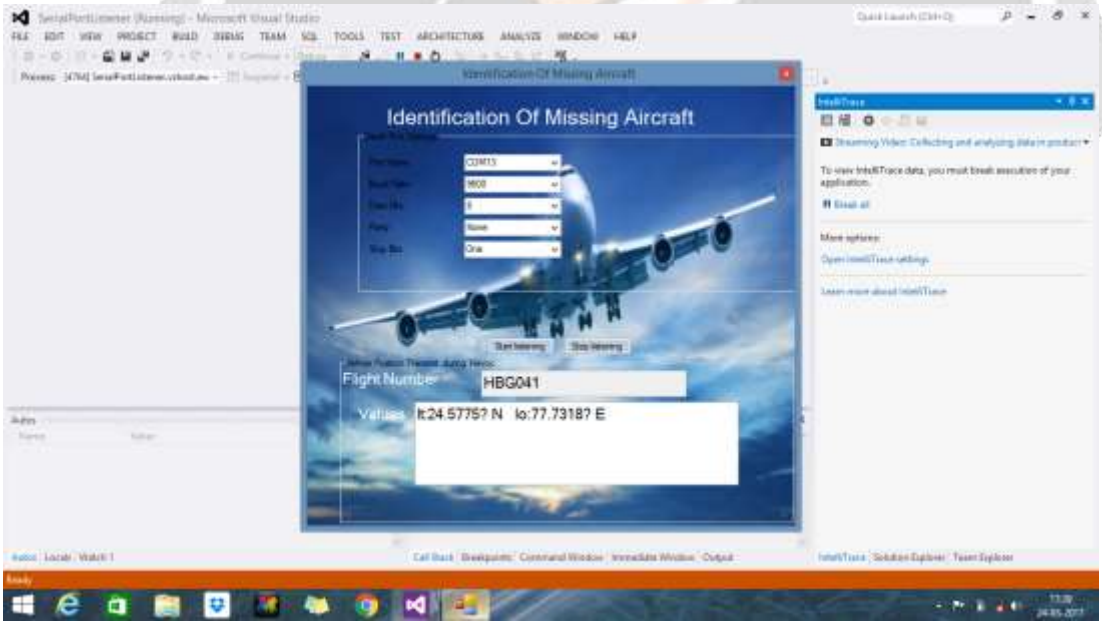
Overall setup

The floatable object which is ejected by the ejection mechanism floats on the surface of the water.This floatable is equipped with the wireless transmitting device (ZigBee) which transmits the location of the flight to the rescue section. Also we used solar panel to recharge the battery incase of death of the battery.



Floatable object with ejection mechanism

The signal transmitted by the floatable object under 2.4MHz frequency is received by the rescue section which is equipped with ZigBee, UART and PC. Thus the missing flight is identified by the rescue team using Visual Studio software which shows its latitude and longitude values.



Locating missing flight using visual studio

6.CONCLUSION:

. In this project, we are using ejection methodology of black box with the help of microcontroller. We are having three sections flight section, floatable object section, rescue section. The black box is kept inside the floatable object section, it has wireless device to receive the GPS value from flight section. In our flight section we are using microcontroller, rechargeable battery, water sensor, LCD, GPS, Zigbee.

When flight falls into the sea, the water level sensor will start sensing and give command signal to microcontroller to eject the floatable object from flight. The GPS will transmit the recorded values of longitude and latitude to floatable section and rescue section will receive the values from floatable section. Solar panel is attached with floatable object section to generate power to recharge the battery for continuous transmission of signal to rescue section. In the rescue section the GPS value will be seen through PC.

We believe and hope that, this flight tracker project will contribute towards saving human lives and improving the safety and reliability of aircrafts.

Today they are accepted as a vital tool in the investigation of accidents and incidents. In fact, in some accidents, the recorders are the only wreckage that needs to be recovered. The challenge for the aviation safety community is to promote the installation of suitable - lighter and less expensive - flight recorders in smaller aircraft such as the very light jets whose numbers will soon be rapidly expanding. The challenge for flight data analysts is to ensure that flight data is validated, analysed and presented objectively and accurately.

7. FUTURE WORKS:

In this project, we have proposed a solution for a crisis that can occur when the flight falls in sea since it is difficult to transmit signals using the device ELT (Emergency Locator Transmitter) when it falls in sea. Based on this disadvantage of ELT we have proposed a system that floats on the surface of water so that it can easily transmit signals about the location of the flight.

The device does not last in the fire accidents as it is not protected. By making the device fire and damage resistant, we can prevent the damage that can be caused to the device. Therefore we can enhance the material that we used to cover the setup by making it damage resistant and more advanced controller to increase the efficiency and the speed.

8. REFERENCES

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