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# Emergency Assist Device for Locating Double B In Air Plane System

Dr.C.Amali[1],Abdul. K[2], Aravindan.K[3], Arjun.R[4],Goutham.A[5]
[1]Assistant Professor, Department of ECE, Valliammai Engineering College, Tamilnadu, India
2,3,4,5 UG Student, Department of ECE, Valliammai Engineering College, Tamilnadu, India
amali.vec@gmail.com abdulkhader094@gmail.com, johnaravind82@gmail.com,arjunraman95@gmail.com, gouthamanbu96@gmail.com

**ABSTRACT**
The aim of this proposal is to collect flight data from the black box when the flight crash happens. In every airplane crash, there are so many unanswered questions about how and why the airplane crash has happened. The hidden answers are inside the black box and the teams can search at a considerable cost to find the black box. Our Designed proposal that will rectify the above problem, i.e. when the flight met with an accident or a crash, the communication starts between flights to ground station through satellite. The exact location is marked with the help of latitude and longitude. The marked location is transmitted to the ground stations which help in finding the black box at exact location instead of searching in the vast area.

**KEYWORDS-** Black box, Crash, Data, Flight, Satellite.

## I. INTRODUCTION

From the past database reporting that 1,117 accidents from 1/1/1960 to 12/31/2016, 22 of them were occurred in last year 2016, for which a definite cause was not known. The accident planes include those with 10 or more passengers and one or more fatalities. Military and private aircraft and helicopters were also included in those crashes. Even though the technologies have been developed, we are not able to identify the reason behind every crash. The most curious aspect of the black box flight recorder was the widespread resistance to its adoption, as it encapsulated the most fundamental tenet of scientific inquiry gathering the reliable data to draw conclusions. The black box is a more general term for the Flight Data Recorder and the Cockpit Voice recorder of an Aircraft.

The Black Box was first invented by a young Australian scientist named Dr. David Warren. While Warren was working at the Aeronautical Research Laboratory in Melbourne in the mid-1950s he was involved in the accident investigation surrounding the mysterious crash of the world's first jet-powered commercial aircraft, the Comet. Realizing that it would have been useful for investigators if there had been a recording of what had happened on the plane just before the crash, he got to work on a basic flight data recorder. The first demonstration unit was produced in 1957, but it was not until 1960, after an unexplained plane crash in Queensland, that Australia became the first country in the world to make the Black Box mandatory for all commercial aircraft.

In many cases after the crash of airplane the black box was impossible to find. To overcome this we are using the new technique to save the recorded black box data. Our device works at the time of crash, the black box data can be transferred to the available satellite link through Satellite communication from this process we can survive the loss of black box recorded data.

## II. RELATED WORKS

The collection flight data from various sensors as various parameters from the flight is the first step to design the proposed model. For the collection of data we are using operational flight data monitoring (OFDM) and Flight Operations Quality Assurance (FOQA). For the controlling action like error identification, status checking of data monitoring, transmission and operations of data, etc., we are providing the condition based controller. If any error occurs the controller will indicate the error signal and notify it. The transmitter section is used to signal conditioning, signal amplification, signal Modulation, packing of data as signals in this section we can achieve this by having various device inside the transmitter. The problem in collection of data is the number of parameters and data present in the flight. So we can collect the data from various places in the flight

through sensors and it can be easily pocketed or covered as a one signal by OFDM, FOQA and Transmitter section.

Taking into account the current system parameters like Altitude, Pressure, Direction, G-force are obtained by means of Global Positioning System (GPS) installed in aircraft but due to signalling fault and transmission delay in signal these parameters lags and sometimes fake parameters are recorded so we are developing an embedded system which is independent of Global Positioning System. Methodology used for project is cycle scan method in which working is split into several parts. First microcontrollers calibrate the sensor then gather data from all sensors and process it as per program (ex. Find altitude by measuring pressure). Then this data gets stored in inside EEPROM of microcontroller and show on LCD, then at the end transmitted over 2.4GHz ISM band with the help of CC2500 Trans-Receiver in the direction of the base station. This process is in cycle.

## II. FORMULATION OF THE PROPOSED SYSTEM:

Explanation:

**Collection of Data From Flight:** The collection flight data from various sensors as various parameters from the flight is the first step to design the proposed model. For the collection of data we are using operational flight data monitoring (OFDM) and Flight Operations Quality Assurance (FOQA). For the controlling action like error identification, status checking of data monitoring, transmission and operations of data, etc., we are providing the condition based controller. If any error occurs the controller will indicate the error signal and notify it. The transmitter section is used to signal conditioning, signal amplification, signal Modulation, packing of data as signals in this section we can achieve this by having various device inside the transmitter.The problem in collection of data is the number of parameters and data present in the flight. So we can collect the data from various places in the flight through sensors and it can be easily pocketed or covered as a one signal by OFDM, FOQA and Transmitter section.

*Transmitting the data to satellite:*

The transmitting of data to satellite is important to achieve the proposed design. Because existing system is providing the flight data directly by sending it to ground station from the flight. There is more difficulty to receive and do the processing of data due to signal clarity, lack of signal, lack of communication, etc., so we can provide the communication between the flight and ground station through the satellite, because it can be reduce the traffic between the more number of flight communications and also lack of signal clarity. Not only for this but also we can continuously monitor the flight data without compressing the signal is shown in (fig.1).

*Receiving and storage of data in ground server:*

The receiving of signal from the flight through the satellite is continuously provided by the communication system. We are not compressing the signal when transmitting the data as signal, because there is a possibility of time delay during compression of data before transmission and also retrieving in the receiver side. And also during the compression of data before transmission there are possibilities of having error in the data during the data retrieving. But we have to save the memory location to avoid large number of storage to provide for one flight. So to avoid taking large number of storage for one flight we can compress the data when we are going to save in separate server. It can reduce the time delay of retrieving the data and also reduce the large space required for storage of the data.

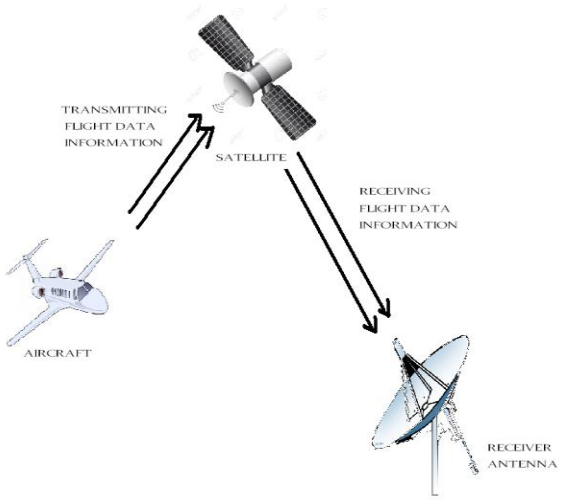


Figure 1: SYSTEM FLOW DIAGRAM

System Model:

In satellite communication, we can continuously monitor the data of flight. So we can know the conditions present in the flight. By providing of an alternative control system in the ground station we can achieve the possibilities of avoiding and reducing the aircraft crash due to system failure. So this is the first step in moving forward to reduce the flight crash indirectly. (Fig.2)

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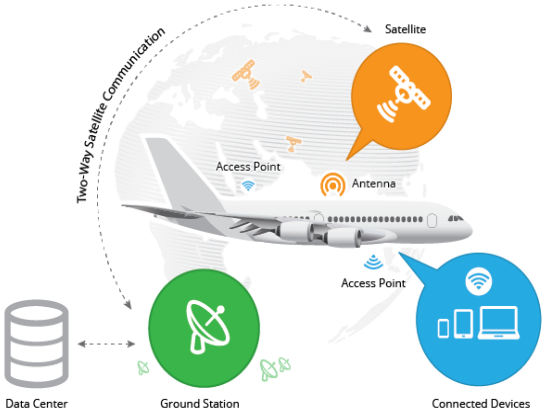


Figure 2: Working of system model

## III. BLOCK DIAGRAM

The block diagram consists of various sensors which are constantly sensing various parameters and providing input to inbuilt ADC of PIC micro-controller.The Transmitter and receiver part of the system is shown in fig.3&4.

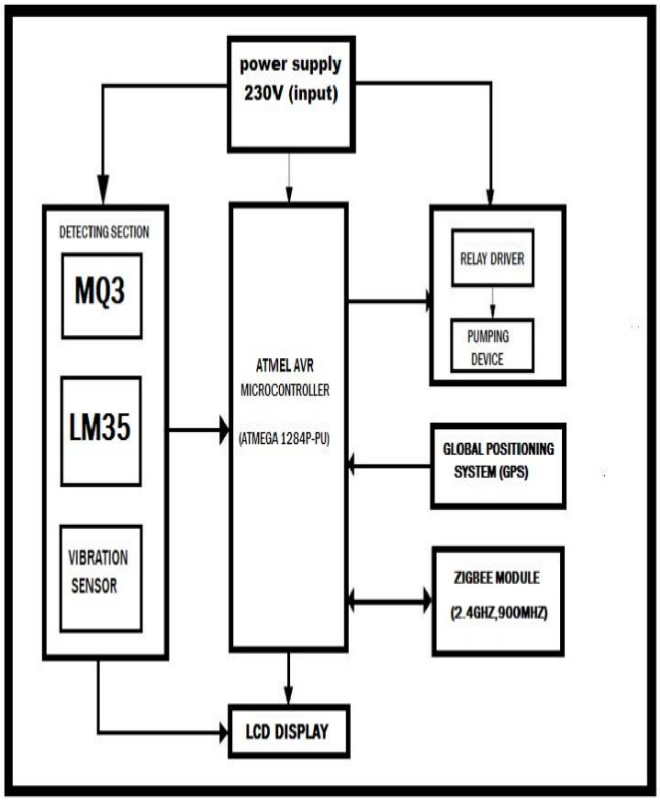


**Figure 3 : Transmitter part**

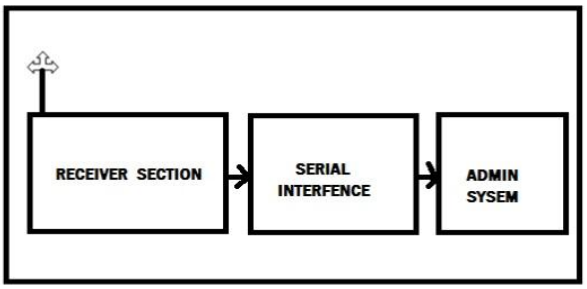


**Figure 4: System architecture and working**

## IV. FLOW GRAPH

The receiving of signal from the satellite is continuously provided by the communication system. By using the system check the status of the aero plane, check the three operations which is gas, temperature, vibrations. If any problem deducted, immediately the information will send to server station, after the information received by the server station, the server station will on the relay and send the parachute to the location, finally the aero plane will land safely.

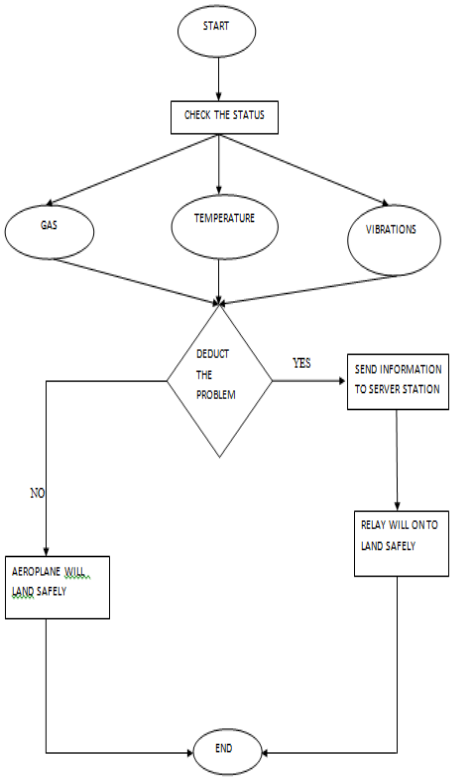


**Figure 5: Flow graph model**

## v.HARDWARE RESOURCES

*a. Micro Controller:*

(ATMEGA32A-PU – AT Mega 8-bit AVR)

Microcontroller with 128 Bytes FLASH Program Memory

The AVR core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers (Fig.6).

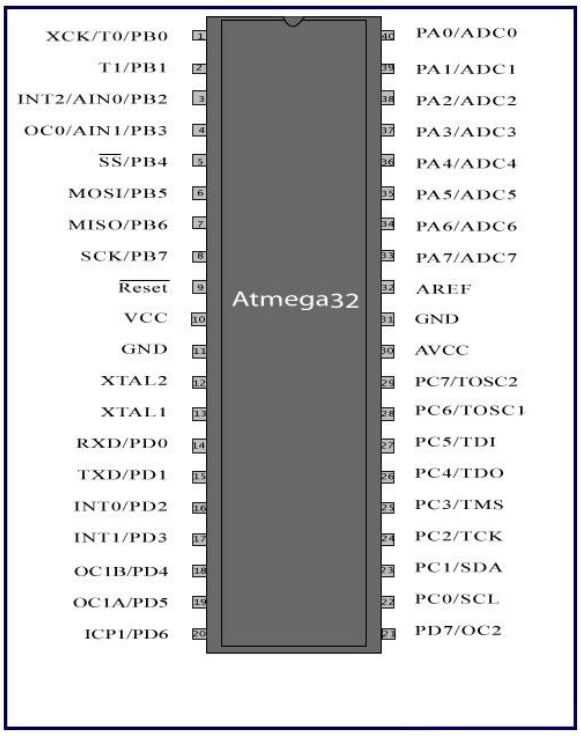


**Figure 6: Pin Diagram**

It is heart of our project. This is used different application such as automatically controlled products, remote controls, printer, office equipment, appliances, toys and other embedded systems. In the early hours models of PIC had read-only memory (ROM) or field programmable EEPROM for program storage, some with provision for erasing memory .All existing models use Flash memory for program storage .Program memory and data memory is separated. It is 8-bit, 16-bit and in newest models, 32-bit wide. Program instructions vary in bit count by family of PIC. PIC18FX52 devices have two times the Flash program memory and data RAM of PIC18F452 device (32 Kbytes and 1536 bytes). The PIC18F458 devices include characteristic that allows the system clock source to be switched from the central oscillator to an alternating low-frequency clock source. Only PIC18F4X8 devices implement the improved CCP module, analog comparators as well as the Parallel Slave Port. It is having a capacity of High current sink/source 25 mA/25mA, There are three external interrupt pins, Low-power, high speed Enhanced Flash technology, There are Four Timer modules (Timer0 to Timer3), 10-bit, up to 13-channel Analog-to-Digital Converter module (A/D) with Programmable Acquisition Time, Two External Clock modes, up to 48 MHz, Programmable Brown-out Reset (BOR) and Wide operating voltage range (2.0V to 5.5V).

*b. Transceiver:*

A wireless communicating device that transmits and receives data using RF waves at 2.4GHZ.
ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2003 standard for Low-Rate Wireless Personal Area Networks (LR-WPANs), such as wireless light switches with lamps, electrical meters with in-home-displays, consumer electronics equipment via short-range radio needing low rates of data transfer.

The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs , such as Bluetooth . ZigBee is targeted at radio-frequency (RF) applications that require a low data rate, long battery life, and secure networking.

*c .GPS Receivers and NMEA Standards*

GPS receivers receive almanac data from the satellite and also calculate their position by calculating its distance from then visible satellites and then by using triangulation method to calculate its position. After the data has been received and position has been calculated, the data is configured according to standards set up by **NMEA** (**National Marine Electronics Association**) and is serially transmitted at a baud rate of 4800 bps.(Fig.

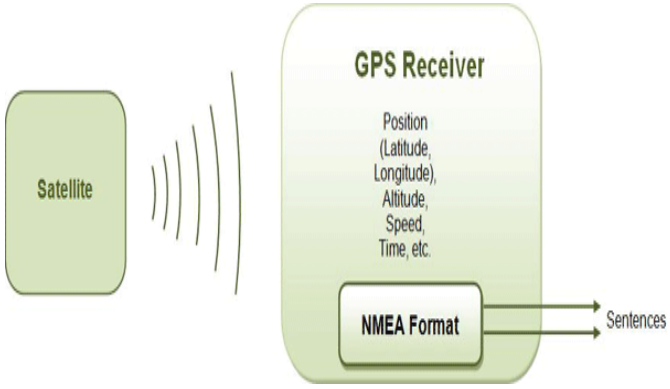


**Figure 7**

RELAY:

Relay is one of the most important electromechanical devices highly used in industrial applications specifically in automation. A relay is used for electronic to electrical interfacing i.e. it is used to switch on or off electrical circuits operating at high AC voltage using a low DC control voltage. A relay generally has two parts, a coil which operates at the rated DC voltage and a mechanically movable switch. The electronic and electrical circuits are electrically isolated but magnetically connected to each other, hence any fault on either side does not affects the other side. Two terminals are used to give the input DC voltage also known as the operating voltage of the relay. Relays are available in different operating voltages like 6V, 12V, 24V etc. The rest of the three terminals are used to connect the high voltage AC circuit. The terminals are called Common, Normally Open (NO) and Normally Closed (NC). Relays are available in various types & categories and in order to identify the correct configuration of the output terminals, it is best to see the data sheet or manual. You can also identify the terminals using a multimeter and at times it is printed on the relay itself.

## VI.OUTPUT

When there is a smoke, gas, or high temperature is detected then the location will be tracked using GPS, and then the data will be sent to the ground station.by using the latitude and longitude values the exact location can be tracked. The display of the output is shown in (Fig.8&9).

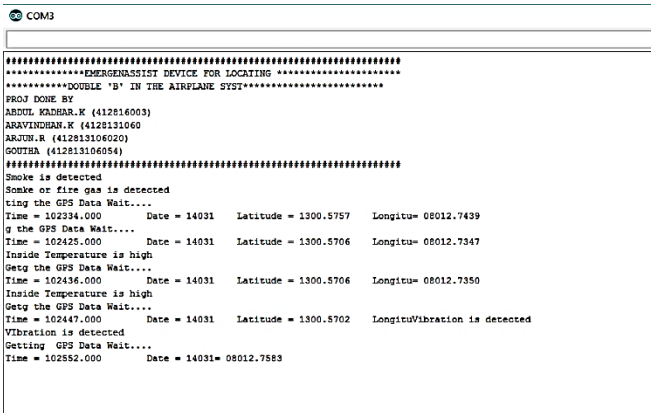


**Figure 8**

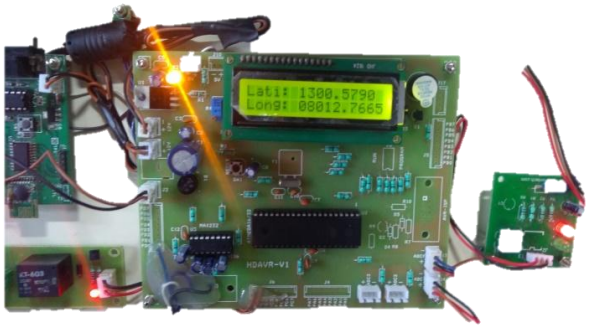


**Figure 9**

## VII.CONCLUSION

Even though the technologies has been developed , we are not able to maintain the proper communication in some situation in order overcome these problems we are implementing this proposed which can reduce the risk of searching This proposed system eliminates the time delay in searching of black box, eliminates the black box system by providing data from the ground station, and mark the exact location of the black box. Several mystery and theories can be solved by using this proposed system. While transporting the armed weapons and explosives it will provide an additional security to the aircraft thereby the deadly weapons can be saved from the hands of dangerous enemy, instead of searching over a vast area we can find the device within a smaller area.

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**AUTHOR BIOGRAPHY**

Dr. AMALI.C is working as a Assistant Professor in the Electronics department at Valliammai Engineering College. Her Research Interest includes vertical handover and network selection mechanism in heterogeneous wireless networks resources and mobility management in wireless networks.

Abdul Kadhar.K is a Final Year Student of BE ECE Program at Valliammai Engineering College. His area of interest is Embedded system.

Aravindhan.K is a Final Year Student of BE ECE Program at Valliammai Engineering College. His area of interest is Digital electronics.

Arjun.R is a Final Year Student of BE ECE at Valliammai Engineering College. His area of interest is Control system.

Goutham.A is a Final Year Student of B.E ECE at Valliammai Engineering College. His area of interest are Signals and Systems.