Real Time Design to Circumvent Air traffic control Based on WSN and IOT

JYOTHI .A.P
IEEE Student Member and research Scholar RRCE research Centre Bangalore, Karnataka, India
Bangalore VTU, Belgum, India
Assistant Professor ECE Dept, RRCE, Bangalore, India
jyothiarcotprashant@gmail.com

USHA. S
Professor & HOD, Dept of CSE
RRCE, Bangalore, India
sakthivelusha@gmail.com

JYOTI
Dept of ECE, RRCE
Bangalore, Karnataka, India
jyothirkallur@gmail.com

MEENAKSHI . K
Dept of ECE, RRCE
Bangalore, Karnataka, India
meenameenakshi368@gmail.com

SUSHMA. V
Dept of ECE, RRCE
Bangalore, Karnataka, India
sushmareddyv1@gmail.com

AISHWARYA.N.S
Dept of ECE, RRCE
Bangalore, Karnataka, India
ushatejusis98@gmail.com

Abstract: In order to avoid airplanes related accident based on" Embedded Electronics Systems" display and installed cockpit. This technique provides the optimum guidance information's to the pilots and easily can control capabilities for safety landing. The reason for accidents are may be bad weather condition, inaccuracy of runway distance information and speed of the airplanes. And also some times the accidents are occurs due to "obstacle (like birds)".This can be avoided with the help of EES. With the help of EES all the information's are displayed. Microcontrollers will get information from sensor sources and its give the landing related parameters information to pilot through cockpit display. RF(Radio Frequency) signal used to identify the airplanes "altitude and longitude" will be detected and displays the aircraft movement .ESS display will show exact distance from one end of runway to another end of runway information and status of the runway. If this system is implemented.ESS based cockpit display; pilots can easily land the airplane at any environmental conditions.

KEY WORDS: Mobile sink, cluster head, Internet of things (IOT), Wireless Sensor (WSN), Base Station.

I. INTRODUCTION

Generally, airplanes are always diverted from current airport to another airport, if the visibility level is below the allowable limit or when pilots cannot see the runway. At Low visibility operations, increase the workload on the pilot to scan several instruments and form a mental picture of the aircraft situation. As it approach runway more accuracy is required

since the limit for mismatching the touch point should not exceed meter level. Airplanes approach and landing are of the most hazardous portions of flight. Accidents records indicate that approximately 50 percent of the accidents occur during airplanes landing.

The aviation industry is developing rapidly to occupy the increasing needs for faster, comfortable and safe transportation. Aircraft landing is a critical phase and high accuracy in required especially when flying under bad weather and low visibility conditions. The zero accident policy announced by Federal Aviation Authority (FAA) requires airliners to have essentially perfect navigation from take-off to landing. International Civil Aviation Organization (ICAO) has divided landing systems into three categories according to decision height, visibility and runway visual range. Also Category III C in ICAO Standard is not in operation yet anywhere in the world because of systematic limitations of landing systems in service. It requires landing with no visibility or runway visual range. Currently, the limits of integrity and accuracy of ground equipments have not been able to match ICAO standards and recommended practices.

Nevertheless, they are still in use due to the lack of better alternatives. The main current equipments limitations are: inaccuracy, unreliability, vulnerability to multipath, obstruction in signal broadcasting, cause ground service cognition, lack of integrity and high cost. In this presents a new approach about to meet ICAO standards i.e. avoiding landing related accident and safety landing.

II. RELATED WORK

Short-range wireless communication based on AVR microcontroller: Remote control system of aircraft model [1].Role of avionics full duplex Ethernet protocol in an aircraft data communication network[2]. Aircraft electromagnetic field estimation for wireless avionics intra-communication band using large-scale FDTD analysis Field estimation of A320 class passenger aircraft at 4 GHz band[3]. CFCLP-A Novel clustering Framework based on combinatorial Approach and Linear Programming in wireless Sensor Network [4]. Multi scale optimized clustering for energy preservation in wireless sensor network. [5].

III. METHODOLOGY

Here we form a wireless sensor network. Wireless sensor network (WSN) is a low-powered network formed by the sensor nodes that finds application in civilian, military, visual sense models and many others. Improved network lifetime is an important task to be achieved by these sensor networks. The conservative routing protocols cannot be applied here due to its battery powered nodes. To provision energy efficiency, nodes are frequently clustered in to non-overlapping clusters. Proposed project gives a brief overview on clustering process in wireless sensor network.

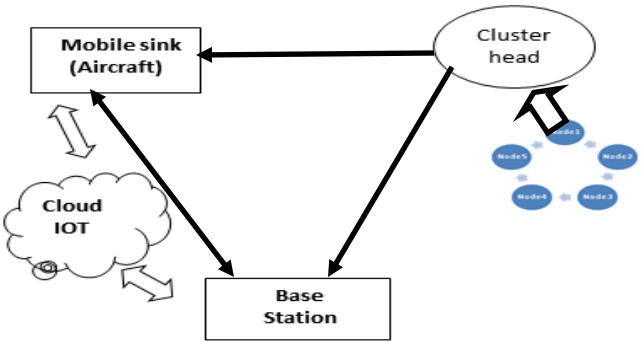

Figure 1: Proposed System.

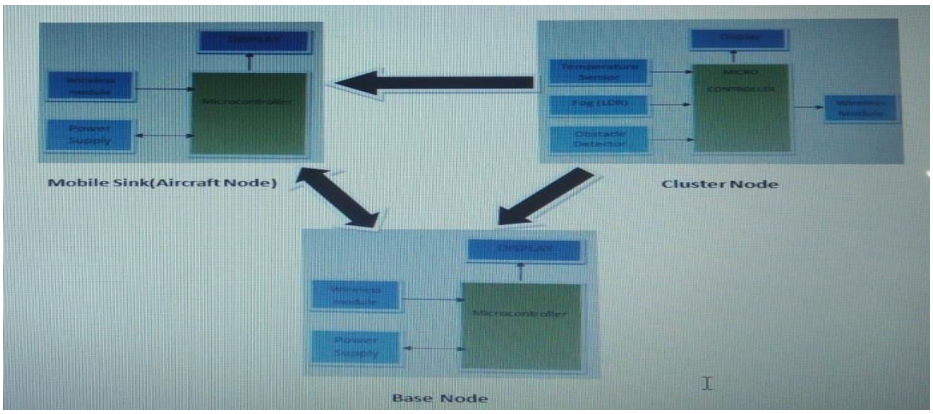

Figure2: Block Diagram.

In **Cluster Node** LDR is used to detect fog, LM35 Sensor is used to detect temperature .IR Sensor is used to detect objects (like birds). It requires 5v power supply. Microcontroller (ARDUINO UNO ATmega328) is used to process the instruction.LCD (16x2) is used to display the output. Wireless module (Zig Bee) is used to communicate with other nodes. Data

may be ring topology, star topology and mesh topology. But we are using Ring topology in our project. Cluster head will collect the data in the form of ring topology through cluster head data will send to the mobile sink (aircraft) and also to the base station.

IV. FLOW CHART:

As every process needs sequential flow, the controlling of the proposed system is explained in the following flow chart. The inter communication between hardware components is explained.

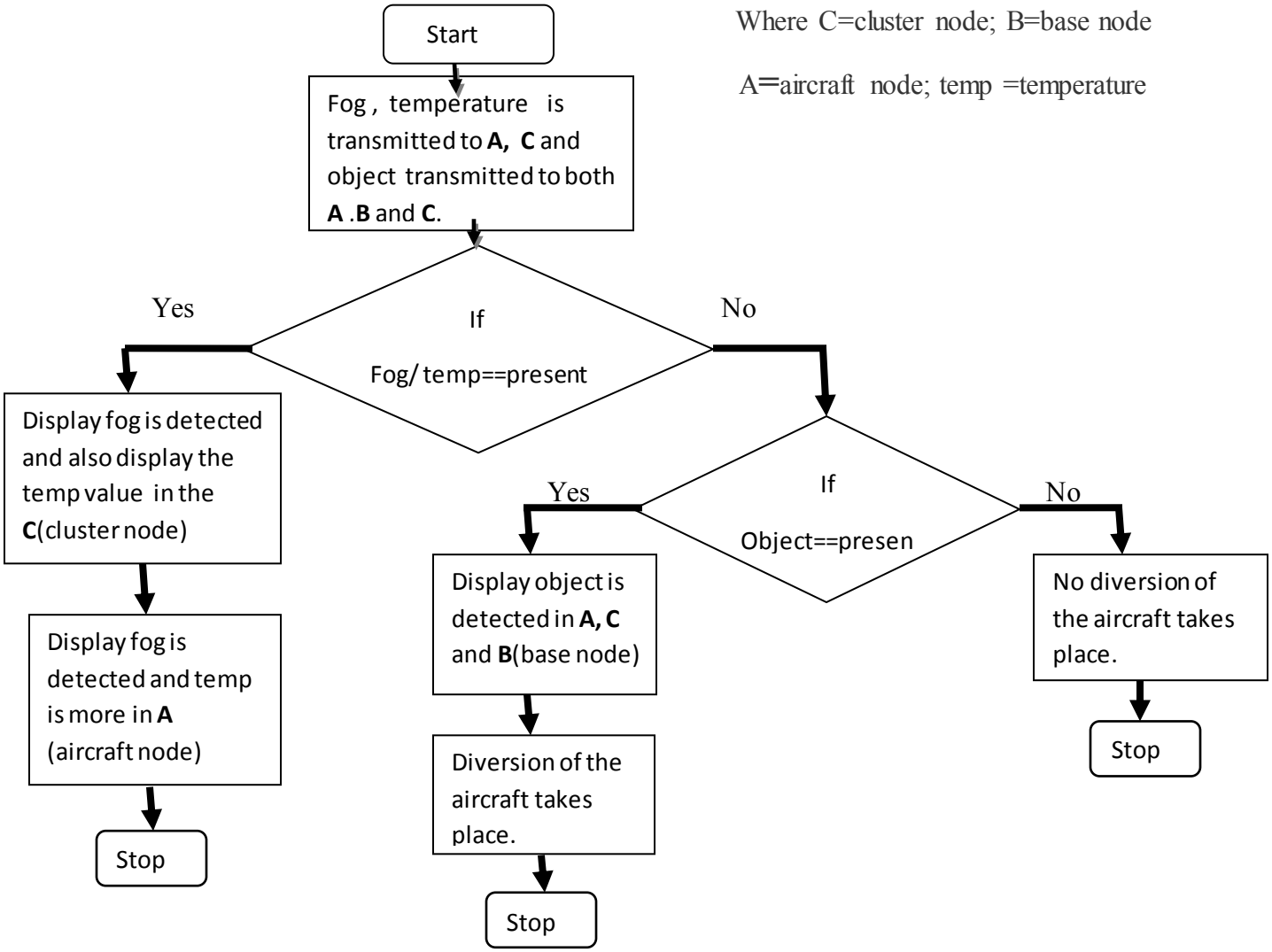

Figure 3: Flow chart

Cluster head will collect the data in the form of ring topology through cluster head data will send to the mobile sink (aircraft) and also to the base station. Cluster node will send the data, if it detects the data has fog, object, temperature.

It detects the fog ,send the data to the mobile sink (aircraft) and display the data in LCD as "FOG IS DETECTED" .If it detects the object send the data to the base station .Through the base station data is send to the mobile sink (aircraft) as "OBJECT IS DETECTED" and Change the direction. Finally if it detects temperature send the data to the Mobile sink and display the output as temperature value in (Celsius).

V.RESULTS

In the cluster node, object is detected using IR Sensor and information will be send through Zig Bee model in order to communicate with the other nodes and displayed in LCD. In base node information will be collected through Zig Bee and displayed in the LCD. And send the information to the mobile sink to change it's direction.

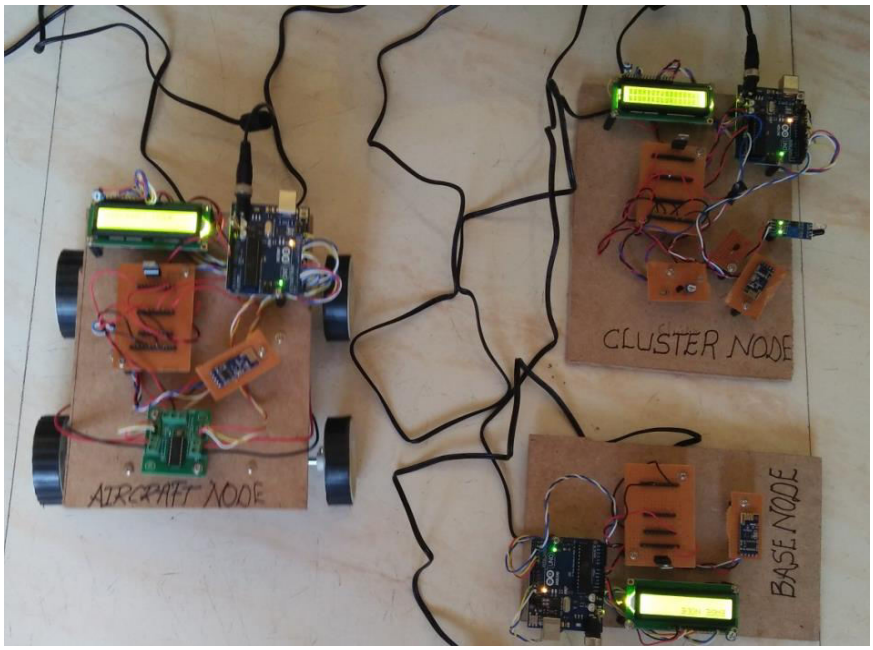

Figure 4: Hardware Output

The mobile sink is developed using Arduino Uno model, Which is connected to cloud through Zig Bee module and collects the information and changes it's direction and displayed in the LCD as "Object is detected".

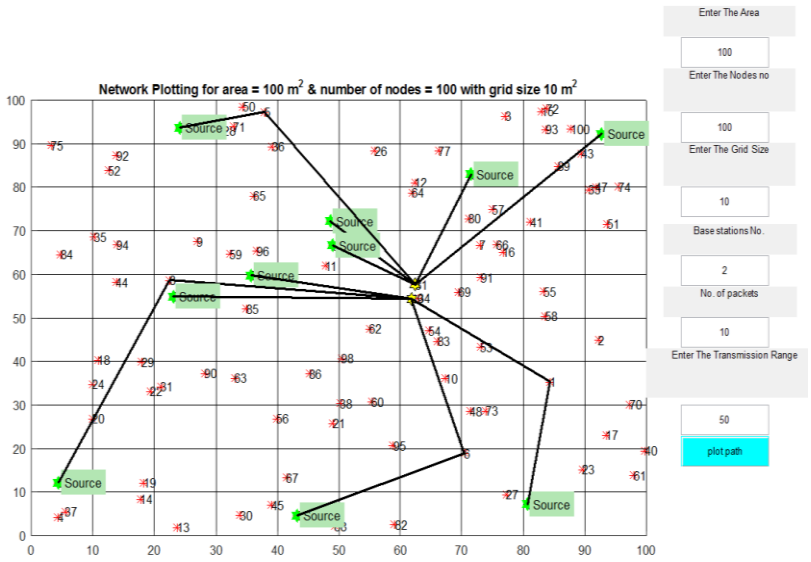

Figure 5: Software output

Simulation for determining the shortest path between the source and destination is computed using MATLAB Code .The distance and orientation between nodes are pre-defined. The number of nodes can be varied, as it is user defined. Initially source and destination nodes are fed as inputs, accordingly the shortest path between the nodes is obtained as output.

V. CONCLUSION

Repudiating the mishap related to fighter. Animate the pneuma of passengers and also the birds from the harm /dangerous.WSN is an emerging paradigm of computing and networking where a node may be self powered, and have sensing, computing & communication capacities. For that reason we can easily identify is there any issues related to aircraft. Detection of birds in the cluster node. Transmitting cluster node data to base node. Transmitting base node data to airplane node. Detection of fog. Measuring temperature in cluster node. Our proposed project avoiding the accident related to aircraft landing. Hence, aims to reduce the Vulnerability. With the effective integration of hardware & software, a powerful & secured system can be developed. Our project also demonstrates more efficient method for air traffic control [ATC], when compare to traditional techniques. This system is a novel idea for avoiding accidents & air traffic control (ATC) when an aircrafts are landing. And also escape from vulnerability.

VI. REFERENCE

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