

AIR CRAFT ANTI COLLISION SYSTEM USING ARDUINO

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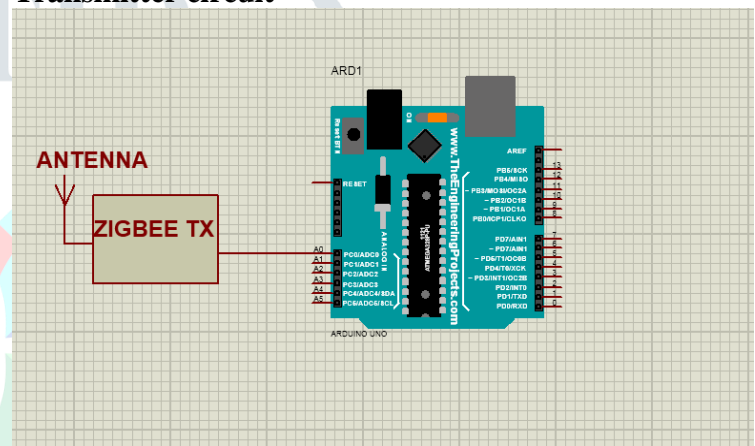
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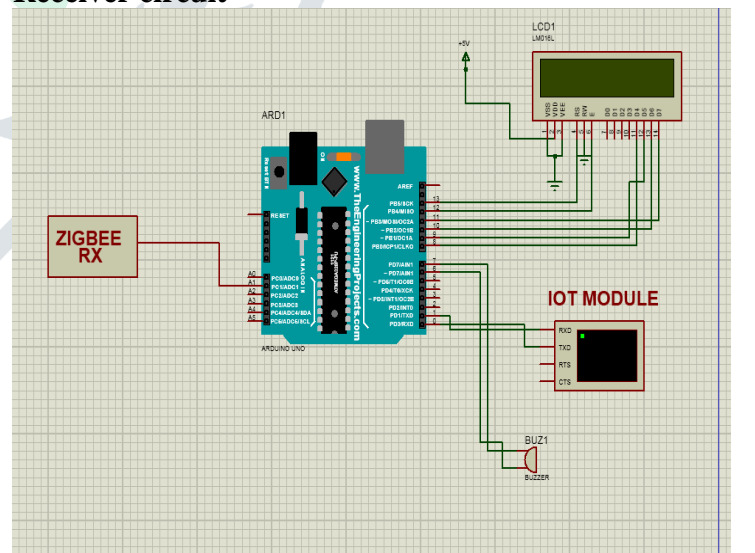
Abstract. —Recent incident in aircraft navigation in air and on ground, resulted in loss of lives of high profile citizens .so there is a need for anti collision system .Air traffic collision avoidance systems are based on using data supplied by external sources and internal sources, but the pilot has ultimate responsibility for air collision prevention. This project aims on the use of zigbee module which is connected to the Arduino uno board and the signal from the zigbee sends to the receiver if any aircraft is detected by the transmitter. Then the “aircraft is detected” message will displayed on the LCD screen ,buzzer will activated, by this pilot can take certain measurements when aircraft moves away from aircraft“ normal mode” message will displayed on the LCD screen, buzzer sound turned off. All these conditions are reported to the ground station over IOT .

Index Terms—Arduino UNO , IOT, LCD screen, Zigbee..

A.CIRCUIT DIAGRAM Transmitter circuit



Receiver circuit



C. Block diagram

I. INTRODUCTION

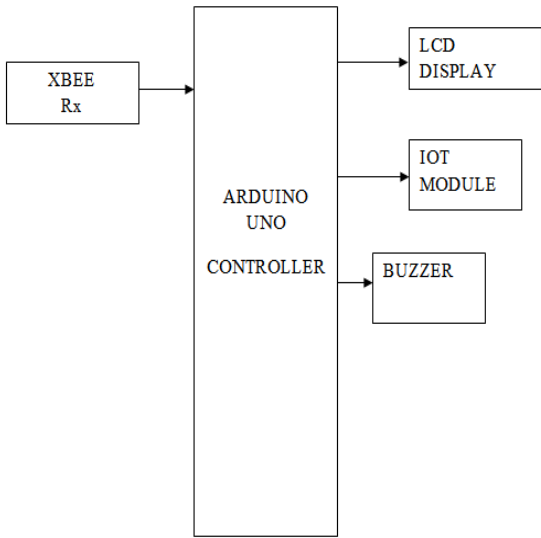
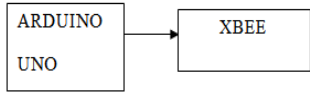
The rapidly increasing density of air traffic has created a demand for instrumentation to reduce the possibility of air disasters due to collision. In the United states, incidence reported near-collisions is now estimated to be over 2000 per year , and represents a serious warning to the future growth of air navigation.

Actual aircraft traffic data have been obtained by the Federal Avition Association from the RADAR system at the Atlanta Airport. This data has been analyzed to determine encounter statistics which would result with various form of warning criteria. Probabilities of encounter, encounter rates, and average encounter durations are determined for various definitions of the encounter.

Collision avoidance is emerging as a key issue for UAS access to civil airspace.Numerous technologies are being explored in the community, including research sponsored by the Space Administration and National Aeronautics, the United States Air Force.The Embedded systems could not possibly have appeared before 1971 .In 1971 Intel introduced the world's first microprocessor.

II. METHODOLOGY

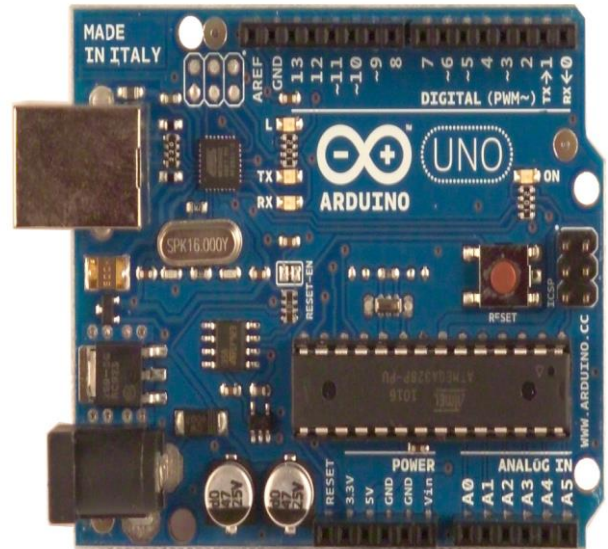
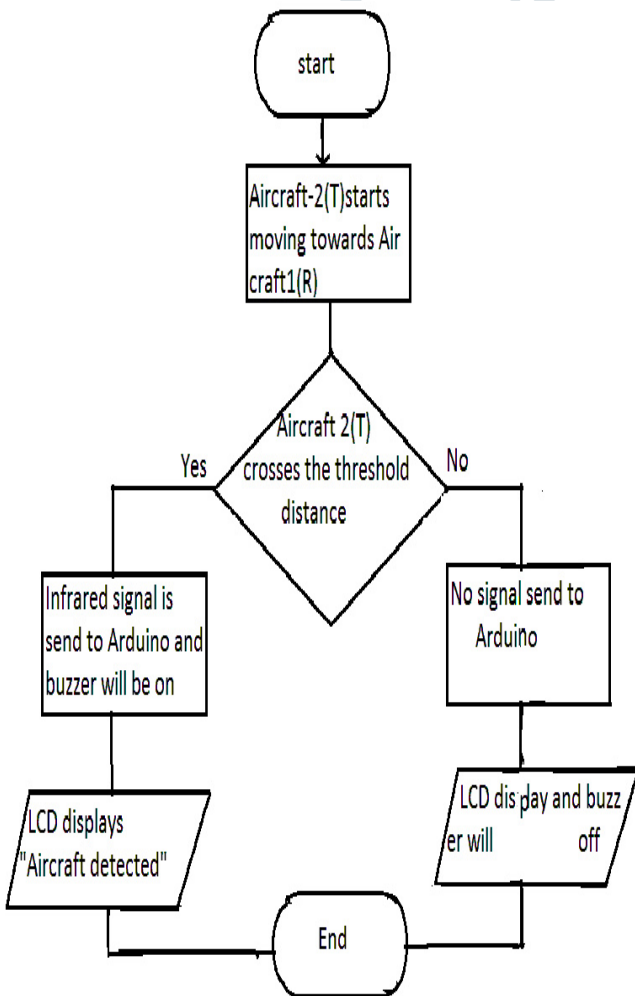
In this project, we are using Arduino UNO, LCD, Zigbee, Led array, Buzzer. In this project, we can identify the aircraft1(receiver) coming towards the other aircraft2(transmitter). By this the pilot can take certain measurements .There is a Zigbee which is used for the communication between two aircrafts. This Zigbee is connected to the microcontroller. Whenever the aircraft1 is approaching aircraft 2 then a signal will be sent to the microcontroller and a buzzer will be activated, led array is in on condition and “aircraft detected and sending data” message will be displayed on the LCD screen of Aircraft1(receiver) When ever both the aircrafts are out of range then LCD displays as “NORMAL” and buzzer goes turn off.



FIG(a):Zigbee technology

ZigBee standard consists of a whole suite of specifications designed specifically for wireless networked sensors and controllers. The physical (PHY) and medium access control (MAC) layers are standardized by the IEEE 802.15 wireless personal area network (WPAN) working group under the designation of 802.15.4. The standard mainly aims at low cost, low data rate and low power wireless network. Compared to other wireless communication technologies, Zigbee is designed specifically for providing wireless networking capability for battery-powered, low-cost, low capability sensor and controller nodes, typically powered only by an eight-bit microcontroller. The Zigbee technology is designed to provide a simple and low-cost wireless communication and networking solution for low-data rate and low power consumption applications, such as home monitoring and automation, environmental monitoring, industry controls, and emerging low-rate wireless sensor applications[1]

Flowchart



FIG(b):Arduino UNO

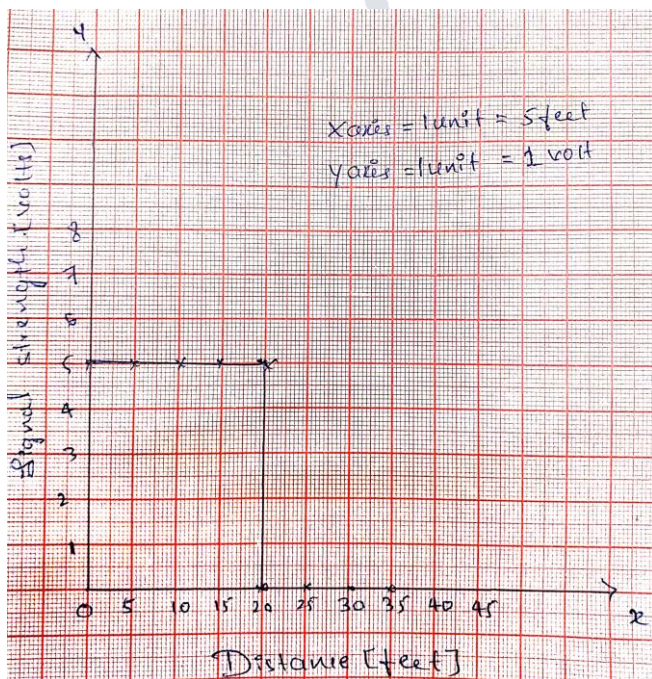
The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC

adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter[2].

Working Principle

- To detect the objects that are far away with accuracy.
- To remove any potential threats that the object has to offer by knowing the nature of it in advance
- Here we are using arduino uno as a controller which controls all the operations.
- If in between aircraft any collision occurs then send data using zigebee.
- Iot module used to update collision related data on web server
- Whenever collision get occurs buzzer will beep automatically.

PROJECT OUTCOME



Fig(c) :Graph

Distance versus Signal strength Graph has been plotted. signal strength is constant (5volts).As the distance varies the buzzer sound also varies .buzzer sound is activated before 20feet,after the 20feet buzzer sound will turned off.

APPLICATION

- In airforce
- In army
- In meteorological applications
- In naval applications

CONCLUSION:

The project “Advanced Aircraft anti-collision system and reporting to ground station over internet of thing (IoT)” has been successfully designed and tested. Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly ,using highly advanced IC’s ,using of zigbee instead of heavy radar system reduce the complexity and with the help of growing technology the project has been successfully implemented.

REFERENCE:

- [1].IEEE Std 802.15.4 2003
- [2].Research Paper –IJERSS
- [3].Sugano, Masashi, et al. "Indoor localization system using RSSI measurement of wireless sensor network based on Zigbee standard." Target 538