Airspeed Indicator for R/C Airplane

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Introduction

Many people in their spare time try to find interesting activities to do to keep them occupied. One of these activities is a remote controlled hobby. This involves many vehicles including; cars, boats, helicopters, and airplanes. I myself am an introductory hobbyist in the remote control airplane field. As technology increases so does the ability to add new movement and new technologies to the remote controlled vehicles. When I was thinking about my senior project, I looked at my plane and brainstormed ideas that would add to the fun of my hobby experience. For this project, I propose to build an airspeed indicator for my R/C airplane. The system will monitor the planes’ airspeed and display the speed to the pilot on a liquid crystal display (LCD).

Description

The functional block diagram is shown in Figure 1 on Page 5, and a sketch of the system on Page 6. The components of the system will include an airspeed sensor, radio transmitter, radio receiver, microcontroller, power supplies, and a display. Here is how the system will work. The airspeed sensor will be mounted on the top of the fuselage of the airplane. The airspeed sensor will send a signal to the transmitter inside the fuselage of the airplane. The transmitter will send the airspeed sensor signal to the receiver, which will be next to the pilot on the ground. The receiver will then send that information to the microcontroller, which will calculate the airplanes speed, and display the speed on the LCD in mph.
Benefits

The benefits of this project are twofold. One, simply the excitement of being able to see just how fast your airplane is going while in the air, and the other is knowing your airplanes speed for the safety of the airplane. R/C planes can be very expensive. In addition they are difficult to fly. By knowing the speed of the plane when coming in for a landing, you can greatly reduce your risk of crashing and ruining your aircraft. After just a few landings you will know the safest speed to bring your airplane down with.

Other Products

I have spent hours searching the web for a product similar to the one I am proposing. Many of the airspeed sensors on the market are designed specifically for commercial aircraft. They are designed with a pitot tube that measures the difference between static and dynamic pressure. These sensors may work well, but they are extremely high in cost. After searching many hobby websites and R/C manufacturer sites, I could not find one that had an airspeed sensor. The sensor I propose to build will be much simpler in design and cheaper than the pitot tube design. It will be a fan on top of the aircraft that will send out an electrical signal proportional to the fan’s turning rate. The microcontroller will use that signal to calculate the speed of the airplane. In addition, I am not concerned with outside wind distorting the reading because model aircraft are not suppose to be flown in windy conditions because of their light weights.
Development and Demonstration

Research of information and components will be done in two ways. I will use my home PC and PC’s in the ETEC 340 lab for information on the web. Additional information and resources will be found through instructors at school and courses in progress at WWU. For components of the project: 1) The airspeed sensor will be built by me in the 340 lab unless I find something manufactured before that time, 2) I am going to consult with Professor Harris about where I should order the transmitter and receiver from, 3) Professor Morton can assist in making the correct decision for a microcontroller and LCD for the project, and 4) the power supplies will be found after I know what the other components require. The project itself will be constructed primarily in the ETEC 340 lab because the lab has all the necessary tools for a successful completion (software, hardware testing equipment). The plane cannot be flown at school for demonstration purposes, but the demonstration may still be shown in the ETEC 340 lab without flying the plane. I propose to simply bring in a fan and use that as an artificial simulation atmosphere for the airplane.

Conclusion

This project will be exciting for me to develop and I will learn a great deal in the process. It will be very interesting to see the final product.
Block diagram

Airspeed Sensor

RF Transmitter

RF Receiver

Microcontroller

LCD Display

Figure 1