R. c. air plane

Business, Industries

DESIGN AND FABRICATION OF RADIO CONTROLLED AIRPLANE

Acknowledgments: Apart from the efforts from us, the success of this project depends largely on the encouragement and guidelines of many others. We take this opportunity to express our gratitude to the people who have been instrumental in the successful completion of this project.

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Chapter #1 Introduction:

1. Basic Introduction Radio Controlled (RC) plane is basically a smaller prototype of an actual aircraft and its dynamics are relatively difficult to understand. For RC Plane there is a 3-degree of freedom. Important parameters are roll, pitch, and yaw. To achieve control of these parameters, there are three control surfaces ailerons, elevators, and rudder.

2. Transmitter/Receiver • A Transmitter is an electronic device that generates and amplifies a carrier wave, modulates it with a meaningful signal derived from speech or other sources, and radiates the resulting signal from an antenna. The transmitter used for the project has 6 channels and is programmable for both airplanes and helicopters. It has a 3-way flap switch, aileron and elevator dual rate switches, a rudder mix switch, gear, and aux2 switch. A preset memory makes it possible to set up several different models on the same radio.
3. A Receiver converts signals from a radio antenna to a usable form. It uses electronic filters to separate a wanted radio frequency signal from all other signals, the electronic amplifier increases the level suitable for further processing, and finally recovers the desired information through demodulation and decoding. Information carried on a radio signal may represent sound, images, or data. We are using a 6 channel tiny 4 grams receiver with signal path diversity.
4. Microcontroller We will be using Arduino AT-Mega 328 Microcontroller and it has a dedicated PWM pin. It has built-in ADC therefore no external ADC is required and it is very much faster than Atmel Microcontrollers.
5. Digital Gyroscope How Gyroscopes Work: Gyroscope can balance on almost any surface with single contact: It can be a finger or even a string. They can resist motion about the spin axis in very odd ways, but the most interesting effect is that gravity-defying part which is called Precession. We will be using the Eclectic Gyroscope in our RC Plane to provide it with a stable Flight. We are using Gyro ITG 3200.

Chapter # 2 Literature Review 2:

1. History The earliest examples of electronically guided model aircraft were hydrogen-filled model airships of the late 19th century. They were flown as amusichall act around theater auditoriums using a basic form of the spark-emitted radio signal. In the 1920s, the Royal Aircraft Establishment of Britain built and tested the Larynx, a monoplane with a 100-mile (160 km) range powered by a Lynx engine. It was not until the 1930s that the British came up with the Queen Bee, a modified de Havilland Tiger Moth, and similar target aircraft. Radio controltechnologyhas been in use since 1893 when Nikola Tesla created a boat that was controlled by transmitted radio waves. In 1917, the first radio-controlled airplane was successful. During World War II, Germany tried a variety of weapons that were operated by radio control. Radio-controlled model airplanes have evolved over the years and seen improvements since that first flight in 1917.

Chapter # 3 Modeling & Design^

1. Modeling of DC Servo Motors.
2. Design of RC Plane.
3. Major Parts Of RC Plane Rudder Flex the rudder back and forth to loosen up the foam hinge. The less force needed to move the rudder the lessstressis put on the servo during flight. Alternatively cut them off and use clear packing tape to re-attach them, one slice on each side. Adjust the travel adjust the value to the maximum allowed before the servo begins to bind. Wings Help the Plane in gliding and to increase the surface area of the plane. Aileron For maximum throw, the

aileron wing servo has to be swapped around vertically. The servo head should be pointing toward the back instead of the leading wing edge.

4. Mechanical Analysis All dimensions of the Plane are From the National Advisory Committee for Aeronautics (NACA), we selected the NACA series of 0015 as it was cheaper to fabricate. The Analysis of the Aerofoil was performed on Gambit & Fluent as this software is used for fluid analysis. We calculated the Coefficient of Drag & Lift using this software to determine whether the plane will fly or not. The coordinates of the NACA series 0015 was taken from the NACA site.

Theoretical Calculations

- Length of Aerofoil (chord)= 19 cm.
- Max Thickness of Aerofoil= 2. 85 cm (2. 85/19)*100= 15. We Know that our Aerofoil is Symmetrical, therefore The NACA Series number of our Foil is 0015.
- The NACA 0015 airfoil is symmetrical, the 00 indicating that it has no camber. The 15 indicates that the airfoil has a 15% thickness to chord length ratio: it is 15% as thick as it is long.

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