PROJECT REPORT

Bluetooth Controlled RC Plane

Submitted in Partial fulfillment of the award of the

Bachelor of
Science IN
AERONAUTICS

(AVIONICS)

Affiliated to University of Mumbai

By

Ku. Payal C. Sasane

PRN NO: 2018016400828003

Under the guidance

of Dr.M Suresh

Kumar & Prof.

Rajguru K

WINGSSS COLLEGE OF AVIATION TECHNOLOGY

Approved by Director General of Civil Aviation, Government of India

affiliated to University of Mumbai

S.No. 85 Shastri Campus near Prestige public School road, NDA Road, Shivane,

Pune, Maharashtra

411023 Website:

www.wcat.in/

BONAFIDE CERTIFICATE

This is to certify that project report titled ***"BLUETOOTH CONTROLLED RC PLANE"***, is a bonafide record of work carried out by **Miss.Payal C. Sasane** during the final semester from **February 2021** to **May 2021** under my guidance, in partial fulfillment of the requirements for the award of **Bachelor of Science** in **Aeronautics** (**Avionics).**

Prof. Dr. M Suresh Kumar

Principal

DECLARATION

I hereby declare that the project entitled —'Bluetooth controlled RC plane". Which is being submitted Project of 6th semester in avionics to wingsss college of aviation and technology, Pune is an authentic record of our genuine done under the guidance of prof. Dr. Suresh Kumar and prof. Rajguru K.

Date- 12/06/2021
Place- pune

Payal C. Sasane
Roll No- 2018-A-040

ACKNOWLEDGEMENT

It is my pleasure to be indebted to various people, who directly or indirectly contributed in the development of this work and who influenced my thinking, behavior, and acts during the course of study.

I express my sincere gratitude to my Project Guide **Dr.M Suresh Kumar** for providing us an opportunity to work under him. I are thankful to him for his support, co-operation and motivation provided to me during the project for constant inspiration, presence and blessings.

I also extend my sincere appreciation to **Prof. Rajguru K** who provided his valuable suggestions and precious time in accomplishing my project.

Lastly, I would like to thank my parents for their moral support and my friends with whom I shared our experience and received lots of suggestions that improved my quality.

Payal Sasane(2018-A-040)

PROJECT NAME

BLUETOOTH CONTROLLED RC PLANE

PROJECT RECORD

BOOK

Name of the Students:

SNEHA L. NANDARDHANE - (ROLL NO.-2018-A-031)

Class & Branch :

- *B.Sc. Aeronautics 3rd Year*

Semester :

- *6th Semester*

Stream:-

- *Avionics*

INDEX

ABSTRACT AND FIGURES

A radio-controlled (mode aircraft (often called RC aircraft or RC plane) is controlled remotely by hand- held transmitter and a receiver within the craft. The RC aircraft has been made up of various high temperatures light weight composite materials. The design of the RC aircraft is done by using solid works software. And the designed RC model is fabricated by using light weighted Dipton form material. At flying condition, the receiver controls the corresponding servo motors that move the control surfaces based on the position of joysticks on the transmitter, which in turn affect the orientation of the plane. The project was to show the design,

Fig 1 : Construction, modification and performance test of the crafted aircraft.

INTRODUCTION

A radio-controlled aircraft (often called RC aircraft or RC plane) is a small flying machine that is controlled remotely by an operator on the ground using a hand-held radio transmitter. The transmitter communicates with a receiver within the craft that sends signals to servomechanisms (servos) which move the control surfaces based on the position of joysticks on the transmitter. The control surfaces, in turn, affect the orientation of the plane.

Flying RC aircraft as a hobby grew substantially from the 2000s with improvements In the cost, weight, performance and capabilities of motors, batteries and electronics, A wide variety of models and styles is available.Scientific,government and military organizations arc also using RC aircraft for experiments,

gathering weather readings, aerodynamic modeling.and testing. Distinct from recreational civilian aeromodelling activities, unmanned aerialvehicle (drones) or spy planes add video or autonomous capabilities, are used for public service (firefighting, disaster recovery, etc.) or commercial purposes, and if in the service of a nation's military, may be armed. A radio-controlled aircraft (often called as RC aircraft or RC plane) is a small flying machine that is controlled by a remote through an operator the ground using a hand-held radio transmitter. The transmitter communicates with a receiver within the craft that sends signals to servomechanism nisin {servos) which move the control surfaces based on the position of joysticks on the transmitter. The control surfaces In turn affect the orientation electronics, of mechanics, theplane.

Small The motors design of drafting.RC plane Artist involves . And aerodynamics, club activities practically woodworking, all at composite the same materials, time, the model is a real aircraft which flies and operates by a same principles as its full- scale counterpart. The only difference is size and weight.

1. PROJECT OVERVIEW

- **Project Scope**

The system of interest for this systems engineering analysis is a remote controlled (RC) plane and the transmitter to control the movement of the RC plane. The term RC plane system will be used in this paper when discussing both the RC plane and the transmitter controller. In this report, all of the components, functionalities, operational scenarios and details will be defined. Concepts

And principles discussed in the systems engineering course will be applied to describe RC plane from a systems point of view.

interact by sending and receiving signals to and from

each other by which the controller

2. Operational Concept

- **Project Concept**

The motivation for this project is to analyze and apply systems engineering concepts to a technology or concept of choice. Our team has decided to analyze the remote-controlled airplane from a system engineering point of view. Remotely- controlled airplanes have a variety of uses which includes recreational activity, education of heavier- than-air flight principles, and serves as applications in the national defense field, to name a Few. In the latter sense, human operators flying a plane through transmitted signals allows them to utilize the benefits of air travel without risking the safety of the operator.

The transmitter controller and the RC plane interact by sending and receiving signals to and from

each other by which the controller

determines the airplane's altitude, speed, and direction. Thesystem's essentialfunctionsare to accept inputs from the transmitter operated

by a user and convert the inputs into signals that will then be transmitted to the airplane. The airplane will then receive the airborne signals that will play the primary role in manipulating the airplane control features, which include the elevator, rudder, and throttle. This project will examine the relationship and interaction between the operator, who controls the system, the transmitter and the airplane.

- ## Systems Definition

Our defined system is comprised of two subsystems which are the transmitter (controller) and the airplane. External systems

That interact with the two subsystems include

The operator and the operational environment, such as the weather conditions and the terrain surrounding the airplane. The user interface for the system is the control panel of the transmitter through which the user can provide inputs to the system that determines the

movement of the plane. Controls are processed in both the transmitter and the airplane. Microcontrollers are used for most of the outputfunctions. Forexample, theoperator's requesttoincreasetheairplane'sthrottlewill be requested using the transmitter interface in which the transmitter's microcontroller will interpret the signal and transmit it is the airplane. On the contrary, the airplane's microcontroller support several functions such as the ability to receive information, interpret the information, and to actively sense and react to fail-safe mode in an occurrence of a failure mode, such engine overheating or electrical short in the circuit
.

Physical inputs from the user are converted into signals usable by the airplane component of the system through an appropriate formatting mechanism. These physical inputs from the user, which can be an activatedswitch or the movement of a joystick, will cause certain electrical contacts in the controller to touch, thereby completing a circuit. The completed circuit is connected to a specific pin of an integrated circuit (IC) that is part of the microcontroller that will generate a pattern of electrical impulses that describe the user's input. These generated electrical pulses will be transmitted in the form of radio waves at a particular frequency.

Meanwhile, the RC plane is constantly monitoring any incoming radio waves at the same frequency the transmitter is operating under. Once the RC plane receives the radio wave signals, it converts the radio waves into Electrical pulses and is sent to the IC chip that is installed on the RC plane to decode the electrical pulse pattern. Once decoded, this will activate a motor as defined by the pulse pattern and provide movement. The outputs delivered by the microcontroller aboard the airplane are formatted into actual changes in such things as throttle valve position and elevator and rudder angles. The user finds these outputs to be useful and can make changes to her inputs based on her satisfaction with the observed effects of previous inputs.
For instance, if an input that signals the controller to pulse the elevator motor such that the

elevator angle tips up, causing the plane to descend, the operator may input the opposite signal to repeat the cycle in order to incite corrective (climbing) output action.

- **Operating Scenarios**

There are eight operating scenarios

Interaction between the operator, the

Transmitter, and the aircraft. The operating scenarios include normal operation, maintenance Required to recharge the batteries of the airplane or transmitter, an electrical shorting of a circuit, the engine overheating, transmitter failure, midflight malfunction, and alignment correction of the airplane.

2..1. Normaloperation.

The operator flips the transmitter switch into the“on”positionandflipsthepowerswitchof the plane to the “on” position. The operator
flips a second switch on the plane to initiatethe engine. The operator Uses the transmitter to send signals to the plane tocontrolthe plane’s throttle, the elevator, and the Rudder. As a result, the plane will adjust its speed for take- off or in while in flight, the roll, the pitch and the yaw angle accordingly. To end the operation mode, the operator will use the
transmitter to land the RC plane. Once the RC plane has landed, the operator turns off the plane’sengineandpowerandthetransmitter’s power.

- **OBJECTIVES :**

1.Design the RC aircraft 2.Construction of RC aircraft
3.Performance test of the RC aircraft.

DESIGN THE RC AIRCRAFT :

A. WING

Initially the parameters were chosen using the basic formulae of aspect ratio, taper ratio and then analyzed and validated using ansys15.

The aspect ratio was chosen to Be in the range of 6-6.5, the wing loading .46 - .55g/cm2, Surface area of the wing 1250 – 1350cm2

And weight of the Wing to be 500g.The all up weight, lift and drag forces, lift and coefficients etc. Were optimized on the basis of these design parameters. The aim was to maximize lift. The free stream velocity of operation was chosen to be 1500cm/s. Based on this the stall speed was also determined.

Since it was chosen to make it an aerobatic Plane a symmetric airfoil had to be chosen. Also in the region of the ailerons and wingtip a symmetric airfoil would help increase the range of angles of attack to avoid spin and stall. Thus relatively a large range of angles Can be used without boundary layer separation. Hence NACA0016 wing configuration was considered.

Here, the Number16 indicates that the airfoil has a 16% thickness to Chord length ratio. With this, the wing length was fixed at 90cm having a fixed chord length of 15cm.

B. FUSELAGE

Next the fuselage design and related parameters were to be determined. designs were done. The elevator and rudder dimensions were determined subsequently and the plane was modeled with the exact values in Catia to determine the Centre of gravity i.e. at which the entire mass is Assumed to be concentrated.

The concept used in determining the fuselage, elevator and rudder dimensions. i.e Conventions to be followed for a balanced plane. Also the Stall angle was obtained from the graph of CL versus alpha And was found to be at 150 And hence the safe angle of Operation was taken to be 100 to 120

. The following were

The additional parameters considered.

a. Horizontal Stab: 20% - 25% of the wing area

b. Elevator: 20% - 25% of the horizontalstab chord

c. Vertical Stab: 7% -12% of the wing area

d. Rudder: 30% - 50% of the vertical stab chord

e. Fuse Length: 70% of wing span (measured from Nose/thrust washer to rudder hinge line).

f. From this analysis the following dimensions were Obtained. The length of the fuselage was optimized to be 65cm. The breadth of the fuselage was 7cm. From front till 40 cm along the length of the fuselage, the cross section is Rectangular and then it converges to a trapezoidal cross Section. The wing was mounted at 21cm from the tip of the Motor mount. The battery was placed at the center of

Gravity which was required for stability and
balancing of Forces of the plane. At the aft part of the fuselage the Elevator and rudder were attached, dimensions of which Were as follows.

C. ELEVATOR

The total length of the elevator was 25cm and width 4.5. The V shaped portions were foundto be 14cm on both Side and the last side of the trapezium to be 9.3cm.It was Mounted in such a way that its Centre coincided with Fuselage Centre line.

D. TAIL SIZING

For tail sizing the concept of longitudinal stability was Used. From this the dimensions were obtained. The moving Part of the rudder was found to be 12cm in length and 4cm in width. 0.5cm was cut in order to allow its movement by the servo mechanism. The hinged part was of length 15cm and width
varying from 7 cm at the bottom to 2 cm at the Top. The attaching part was joined at a distance of 3cm from the base.

AILERONS

The ailerons were 6cm in width and 23cm in length. They were attached to the wing as per conventions in figure 1 i.e. at a distance of 8cm from the tip of the wing.

CONSTRUCTION OF RC AIRPLANE

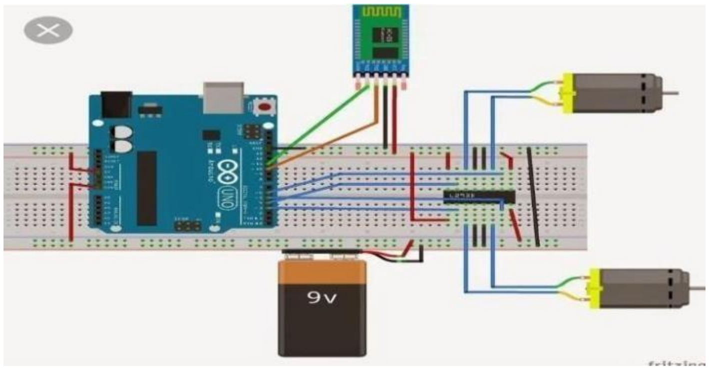


Fig.2 CONSTRUCTION OF RC PLANE

Step 1: Transfer all your ideas and designs of the model onto a foam board. This will make

functions smooth and easy for you. Besides,you would also find it easier to work with glue on such a surface.

Step 2: The next step involves making the fuselage. This can be done in three parts. First up, you would have to make the portion of the tail. Then, you need to make the central part, which is just a box. Finally, you make the nose of the plane. All of these can be glued together to form the fuselage.

Step 3: Next up is one of the most important parts in this process. This involves attaching the electronic components around the fuselage.
For starters, the ESCs and BEC are attached on the outside of the fuselage so that when the planefliesintheair,thesedon’tgettooheated up and can be kept cool. The receiver goes inside the fuselage and it is followed by the battery.
Finally, the rudder servo is glued to the stabilizer which in turn is attached to the fuselage.

Step 4: It is imperative to build a motor mount, one that is strong enough to stayintact even when the plane is flying at high speeds. This can be done by taking two pieces of insulation foam which are then attached the sides and bottom V f 4 fuselage. You need to wait until the glue becomes absolutely dry, after which you can attach the motor and be ready with it.

Step 5: Choosing and attaching the wing is probably the most difficult step of the lot. This is especially true for large RC planes where the wings need to be strong and stable so as tr hold its ground eve 4 conditions. The servos are Glued onto the wing so that the wires stay withinthewinganddon’t runoutsideofit.

Step 6: Next, some other attachments are required to be done. The wing is mounted keeping in mind the center of gravity of the fuselage. The batteries should be stored in a place from where you can move them a few inches in front or backward so as to make some adjustments. For the dowels, it would be best to use a pointed tool like a screwdriver for making the initial holes.

Step 7: Next, for inserting the control horn pushrod, you would be required to unscrew the servo arm. After that, you can attach the pushrod through the servo arm and then insert the control horn. Thereafter, the servo rod can be screwed back onto the servo.

Step 8: The landing gear is indeed an optional component of the RC plane, but can Attached if you like. Some users prefer using the gear, while some others tend to opt for a lighter device with no landing gear. If you choose to use this gear, a taildragger style would suit o the best. With a taildragger, you would have a set of two wheels in the front and a tail wheel towards the end.

PERFORMANCE TEST OF THE RC AIRCRAFT

The number of flight tests required to define the performance of modern aircraft and the associated costs of the tests are Increasing at an alarming rate. Larger flight envelopes. the multitude of geometric variables (for example. wing sweep or Inlet geometry, or both). and the variability of externalstore configurations to modern high performance aircraft create a matrix of conditions that is nearly Impossible to encompage with conventional testing techniques. For this reason, studies are being conducted by NASA to develop a mathematical *'romance model from flight-test data so that the performance for the entire flight envelope of an aircraft can be from a limited number of night tests. An aircraft performance model determined from night-test data can be denned In terms of either excess thrust (thrust minus drag) or the Specific values of thrust and drag over the Mach operating region. The use of execsthrust that to define an accurate model Is limited . ln &2pcndently known; therefore. excess thrust must be determined for each geometric configuration and power setting under consideration. Thus many Il {get tests are necessary to obtain data over the operating envelope of noaircraft. Furthermore, once a motel Is &'fined in terms of excess thrust, it IE difficult to adjust it to variations from atmospheric conditions, again because the thrust and drag arc combined in one term. Making it difficult to separate individual variations of the two parameters. This problem could be eliminated. It a performance Mo & were defined in terms of absolute values of thrust and drag. The determination of thrustand drag in flight is u complex. difficult. and edicos process. however. that requires concludable more flight-test time and Instrumentation than the of excess thrust.

One way to solve this problem would be to develop a technique of defining a perform— once model for the night envelope of particular aircraft confarreation from limited flight-test data Md the aerodynamic and prolusion system characteristics of the aircraft. Once coffined.

such a model could be used to predict the night performance of the aircraft not every paint in the flight envelope without additional flight testing. if this mild be done. It would reduce the time required for performance flight testing and pro a clear definition of the thrust and drag characteristics of an aircraft. This report presents the results of a study made at the NASA Flight Research Center to develop such a technique. The technique Is appalled to an F - 104G airplane. The measured per-romance of the airplane Is compared with the commuted performance of the model.

TYPES OF RC AIRCRAFT

There are many types of radio-controlled aircraft. For beginning hobbyists, there are park flyers and trainers. For more experienced pilots there are glow plug engine, electric powered and sailplane aircraft. For expert flyers, jets, pylon racers, helicopters, autogiros, 3D aircraft, and other high-end competition aircraft provide adequate challenge. Some models are made to look and operate like a bird instead. Replicating historic and little known types and makes of full- sizeaircraft as“flyingscale”models,whichare

also possible with control line and free flight types of model aircraft, actually reach their maximum realism and behavior when built for radio-control flying.

Radio-control scale aircraft modeling

FIG.3 RADIO CONTROL SCALE AIRCRAFT MODELLING

A large(~40 inchwingspan) scaleremotecontrol P-51 Mustang.

Perhaps the most realistic form of aeromodelling, in its main purpose to replicate full-scale aircraft designs from aviation history, for testing of future aviation designs, or even to realize never-built“proposed”aircraft,isthatof radio-control scale aeromodelling, as the most practical way to re-create “vintage” full-scale aircraft designs for flight once more, from long ago. RC Scale model aircraft can be of any type of steerable airship lighter-than-air (LTA) aviation craft, or more normally, of the heavier- than-air fixed wing glider/sailplane, fixed-wing single or multi-engine aircraft, or rotary-wing aircraft such as autogiros or helicopters.

Full-scale aircraft designs from every era of aviation, fromthe“PioneerEra”andWorldWar I’s start, through to the 21st century, have been modeled as radio-control scale model aircraft. Builders of RC Scale aircraft can enjoy the challenge of creating a controllable, miniature aircraft that merely “looks” like the full scale original in the air with no “fine details”, such as a detailed cockpit, or seriously replicate many operable features of a selected full scaleaircraft design, even down to having operable cable-connected flight control surfaces, illuminated navigation lighting on the aircraft’s exterior, realistically retracting landing gear, etc. if the full-sized aircraft possessed such features as part of its design.

Various scale sizes of RC scale aircraft have been built in the decades since modern digital- proportional, miniaturized RC gear came on the market in the 1960s, and everything from indoor-flyable electric poweredRC Scale models, to “giant scale” RC Scale models, in scale size ranges that usually run from 20% to 25%, and upwards to 30 to 50% size of some smaller full scale aircraft designs, that can replicate some ofthe actual flight characteristics of the full scale aircraft they are based on, have been enjoyed, and continue to be built and flown, in sanctioned competition an for personal pleasure,as part of the RC scale aeromodelling hobby.

Sailplanes and gliders

FIG.4 SALEPLANE AND GLIDERS

Gliders are planes that do not typically haveany type of propulsion. Unpowered glider flight must be sustained through exploitation of the natural lift produced from thermals or wind hitting a slope. Dynamic soaring is another popular way of providing energy to gliders that is becoming more and more common. However, even conventional slope soaring gliders are capable of achieving speeds comparable with similar sized powered craft. Gliders are typically partial to slow flying and have high aspect ratio, as well as very low wing loading (weight to wing area ratio). Two and three-channel gliders which use only rudder control for steering and dihedral or polyhedral wing shape to automatically counteract rolling are popular as training craft, due to their ability to fly very slowly and high tolerance to error.

Powered gliders have recently seen an increase in popularity. By combining the efficient wing size and wide speed envelope of a glider airframe with an electric motor, it is possible to achieve long flight times and high carrying capacity, as well as glide in any suitable location regardless of thermals or lift. A common method of maximizing flight duration is to quickly fly a powered glider upwards to a chosen altitude and descending in an unpowered glide. Folding propellers which reduce drag (as well as the risk of breaking the propellor) are standard. Powered gliders built with stability in mind and capable of aerobatics, high speed flight and sustained vertical flight are classified as 'Hot-liners'. 'Warm-liners' are powered craft with similar abilities but less extreme thrust capability.

Toy-class R

FIG.5 TOY CLASS RC

Since about 2004, new, more sophisticated toy RC airplanes, helicopters, and ornithoptershave been appearing on toy store shelves. This new category of toy RC distinguishes itself by:

Proportional (vs. "on-off") throttle control which is critical for preventing the excitation of phugoid oscillation ("proposing") whenever a throttle change is made. It also allows for manageable and steady altitude control and reduction of altitude loss in turns. LiPo batteries for light weight and long flight time. EPP (Expanded Polypropylene) foam construction making them virtually indestructible in normal use.

Low flying speed and typically rear-mounted propeller(s) make them less harmful when crashing into people and property.

Stable spiral mode resulting in simple turning control where "rudder" input results in a steady bank angle rather than a steady roll rate.

As of 2013, the toy class RC airplane typically has no elevator control. This is to manage costs, but it also allows for simplicity of control by unsophisticated users of all ages. The downside of lack of elevator control is a tendency for the airplane to phugoid. To damp the phugoid oscillation naturally, the planes are designed with high drag which reduces flight performance and flying time. The lack of elevator control also prevents the ability to "pull back" during turns to prevent altitude loss and speed increase.

Costs range from 20 to US$40. Crashes are common and inconsequential. Throttle control and turning reversal (when flying toward the pilot) rapidly become second-nature, giving a significant advantage when learning to fly a more costly hobby class RC aircraft.

Working Principle

Planes fly by virtue of Bernoulli’s principle on their wings. Air being pushed under the wings only accounts for a small portion of the lift forces that make an airplane fly. The real lift forces results from the partial vacuum created above the wings (Bernoulli’s principle). In effect, a plane rises on account that it wings are being “sucked up” from above. To get the Bernoulli effect (and to lift the plane), the wings must expose a larger surface on top than below the wing. A curvedwingdoesjustthat. Theproposed RC airplane will be controlled by primary flight controls.

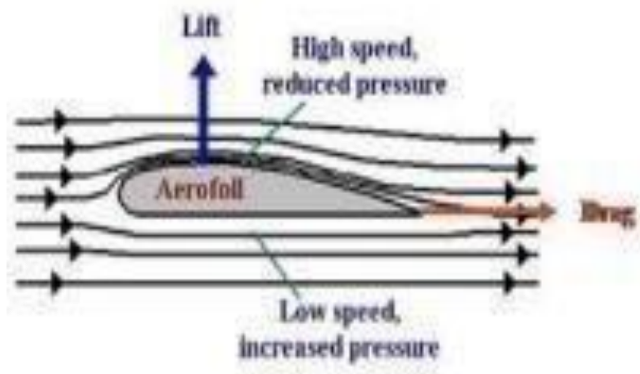


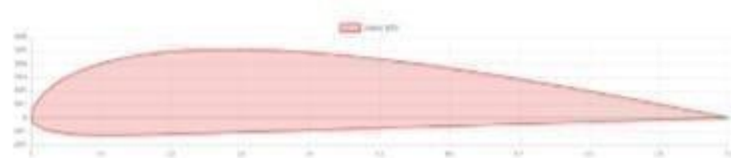
FIG 8 FLIGHT CONTROLS

AIRFOIL SPECIFICATIONS

The selected airfoil for constructing the trainer RC aircraft is AG03. This airfoil is specially used for HLG (high lift gliders) aircraft

AG03

Airfoil(s)	AG03
Mode	analyze
Alpha	0
Mach	0.45
Reynolds	3000000



Maintenance required: recharge battery.

Theplane’ssensorsdetectthatthebatterylevel is low. It sends these signals to the transmitter

Indicating low battery on the plane. The operator will end the operation mode and removes the battery Pack from the plane and recharges the battery. Once the batteries are fully charged, the operator will Install the charged batteries into the plane and the plane will send signals to the transmitter indicating

That the battery is fully charged [22/04, 12:35 AM] 123345: 2.3.3.

Maintenance required: refuel plane.

The plane’s sensors detect that the plane’s fuel tank is low. It sends these signals to the transmitter Indicating the plane’s fuel tank needs to be refilled. The operator will end the operation mode and Provides more fuel intothe plane’s fuel tank. Once the fuel tank is filled, the Plane will send signals to. The transmitter indicating that the tank is full.

EXTERNAL SYSTEM DIAGRAM

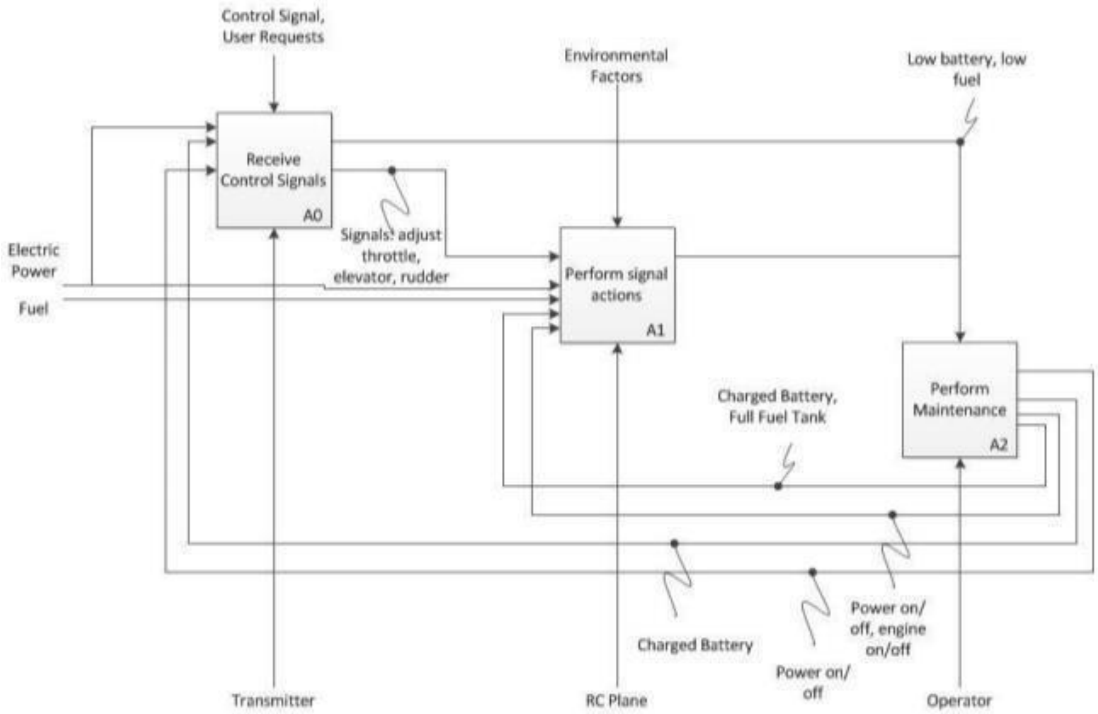


Figure 1: External Systems Diagram for the overall RC Plane system.

FIG.8 EXTERNAL SYSTEM DIAGRAM

Requirements

1. Input Requirements

- The airplane shall accept signals fromthe transmitter.
- The transmitter shall accept signalsfrom the airplane.
- The airplane shall accept fuel.
- The airplane shall accept electrical power.
- The transmitter shall accept electrical power.
- The airplane shall accept conditions from the surrounding environment.
- The system shall accept maintenancefrom the operator.

2. **Output Requirements**

- The airplane shall provide signals to transmitter.
- The transmitter shall provide signals to airplane
- The airplane shall provide feedback to the transmitterthattheairplane'sbatteriesare low.
- The airplane shall provide feedback tothe transmitterthattheairplane's fueltankis Low.
- The airplane shall provide flight.
- The airplane shall provide

TESTING EQUIPMENT AND RESOURCE FLIGHT TEST

The flight test is more like your own test to check if all your designs and calculations hold ground. Make a range test to check how far you can take the device. Once that is done, take the plane out and let it hover around about a foot above your head. This will give you good insight on the flight characteristics. This is an important test, but be sure not to push your plane too far and risk a crash!

WRAP UP

An RC plane can be an exciting device foralmost anyone. From beginner flyers, to experienced DIYers, there is truly something for everyone in this highly adaptable device. While there is always the option to buy a premade RC plane or a build-it- yourself kit, we think you will find the ultimate satisfaction by building a plane yourself from scratch. While it is a complicated, and very specific process, those who do it find the end result to be more than worth it.

CONCLUSION:

Conclusion An attempt has been made to systematically design, analyze, build and fly a model RC plane. This project provides an insight into basics of aircraft design, engineering, building and testing on a small scale. Aircraft technology fundamentals are also known and use of design and analysis tools. The project also provided an opportunity for multi- disciplinary terms to work together.

FIG.9 RC PLANE

REFERENCES:

[1] D. M. Buede. The Engineering Design of Systems. Hoboken, NJ: John Wiley & Sons, Inc., 2009.

[2] B. Kannan, M. Schulze, A. Sowers. ”Robotic Vacuum Cleaner,”SystemsEngineering,2008.

[3] J.Tyson.“How Radio Controlled Toys Work,”How Stuff Works.

DOWNLOAD THIS APP HERE

https://drive.google.com/file/d/1Pj7j4gs2zfP2HM84SSqF6x7Q52sitEjH/view?usp=sharing