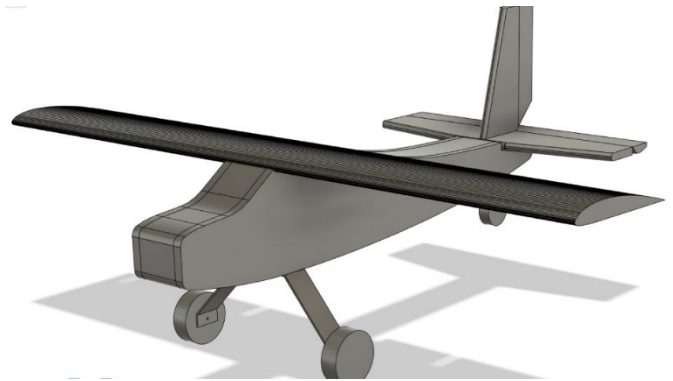


## Bachelor's Thesis, Term Project

# A Radio Controlled (RC) Airplane: Control, Design and Fabrication

**Supervisor (s):** (Assist. Prof. Dr. Eng. Amir Roushdy)

This project proposed the developed of a fixed wings model Radio Controller (RC) Airplane. It is an Unmanned Aerial Vehicle (UAV). The proposed design is capable to fly easily because of strong modeling it can fly using a runway. The airplane is entirely made out of Styrofoam and the controller will be relying on an Arduino based RC Airplane, and also, we will show how to control it using the custom build Arduino transmitter. **There is a Lab Engineer from the ARATRONICS Laboratory, guiding and directing the student with Assist. Prof. Dr. Eng. Amir Roushdy.**



**Fig.:** A Radio Controlled (RC) Airplane

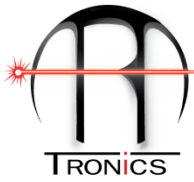
### Project description and objective:

The main features of this project is to design the airplane using a 3D modeling software, Fusion 360. Also, the design should be looking similar to some commercial RC airplanes, following some basic guidelines or rule of thumbs for model airplane parameters. The starting point is the wingspan, and will chose to be 80cm. From there we will get the fuselage length, which is generally 75% of the wingspan. As for the

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airfoil, or the wing cross section you will chose the CLARK Y Airfoil, which a popular choice for RC airplanes.

#### Research focus of this project:

- Literature review on the project should be studied properly.
- Not only, creating a software control system for the project but also the hardware.
- Experiments using the gadget and control system should be built properly.
- The outcomes must be documented.

#### Requirements:

- Passionate to learn more about Aerodynamics, Design, and control.
- Prior mechatronic design expertise is desired like "SolidWork" or "Fusion 360".
- Enthusiasm for completing actual practical work with 3D printing staff (design fabrication and construction).
- A method of working that is both structured and self-contained.

#### General tasks of the project:

- The complete design for the RC Airplane is already exist in the ARATronics Lab and the ARATronics Lab Engineer will hand it to you from the first day.
- ARATronics will support you with the CAD Rover design on Solidwork or Fusion 360. You, will adjust some parts on the design to fit with the motors and actuators in the local market.
- Fabricate the RC Airplane using Styrofoam.
- Assembly all parts of the RC Airplane.
- Flight Motion control study for the RC Airplane.

#### Other notes:

- A weekly meeting with the advisors will be required for this project, as well as weekly progress updates (*The meeting could be more than once during the week based on your progress and based on your achievements*).
- You should to be in the Lab two days per week (*It could be more than two days based on your progress and based on your achievements*).
- All reports must be prepared in the style of a research paper.
- The outcome of this research will be published in one of the coming international Conferences and , or Journal