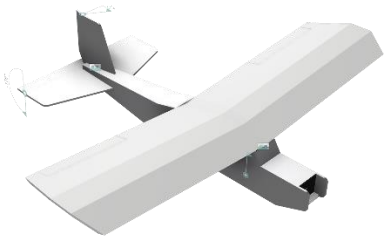
FLIGHTFURY ABSTRACT



TEAM INFORMATION:

a. Team Name: **Team Farzi**

b. Team Members:

S. No.	Name	Branch	Institute	City	Email	Phone No.
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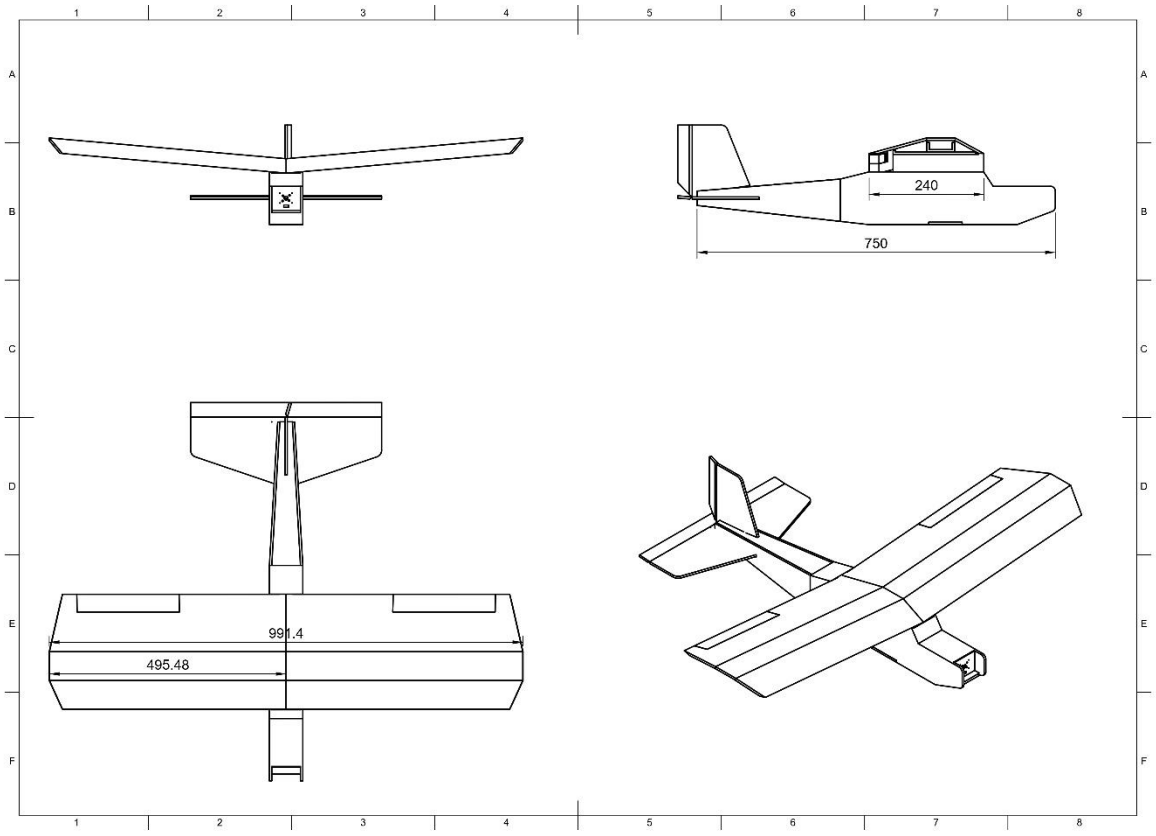
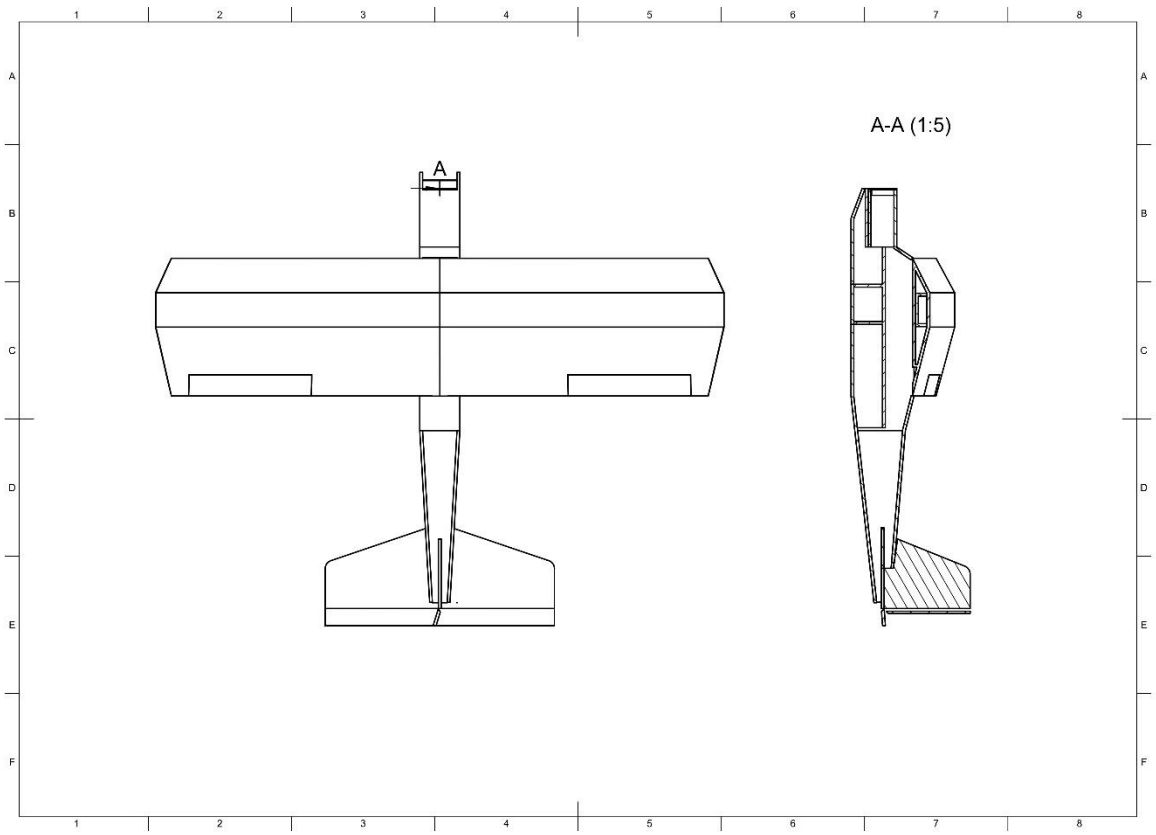
SPECIFICATIONS OF THE RC PLANE:

- **Wingspan:** 100cm (99.1cm projected)
- **Wing Chord:** 24cm
- **Fuselage length:** 75cm
- **Motor:** Emax XA2212 980Kv
- **Propellor:** APC 1047 SF
- **ESC:** Readytosky 30A
- **Tx/Rx:** Avionic RCB6i Transmitter/ RZ6 Receiver
- **Battery:** 3S 1300 mAH
- **Servo:** 5x 9g Servo
- **Construction Material:** 5mm Paper-laminated XPS Foamboard
- **Estimated weight:** 735g

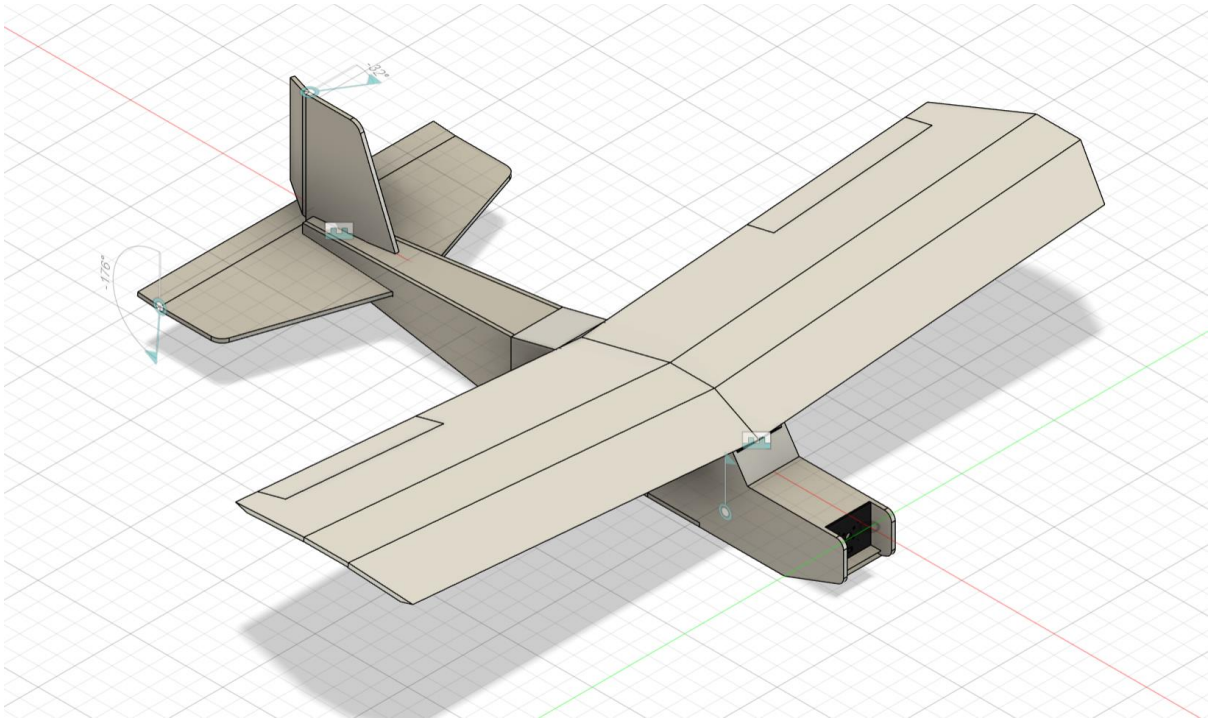




DESIGN OF THE RC PLANE:

a. Introduction

The RC Plane is mainly inspired by Blu-Baby Primary Trainer (original design by RCGroups user Tony65x55; link) and is constructed using a 5mm Paper-laminated XPS Foamboard, generally following the construction style used by *Flight Test* to simplify some of the dimensions and features. 3D-printed hardware is used wherever necessary (such as the firewall and control horn). Piano wires of different diameters are used to make the servo pushrods and landing gear. The CAD model and drawings for the RC Plane were made using Fusion360.



b. Wing Cube Loading

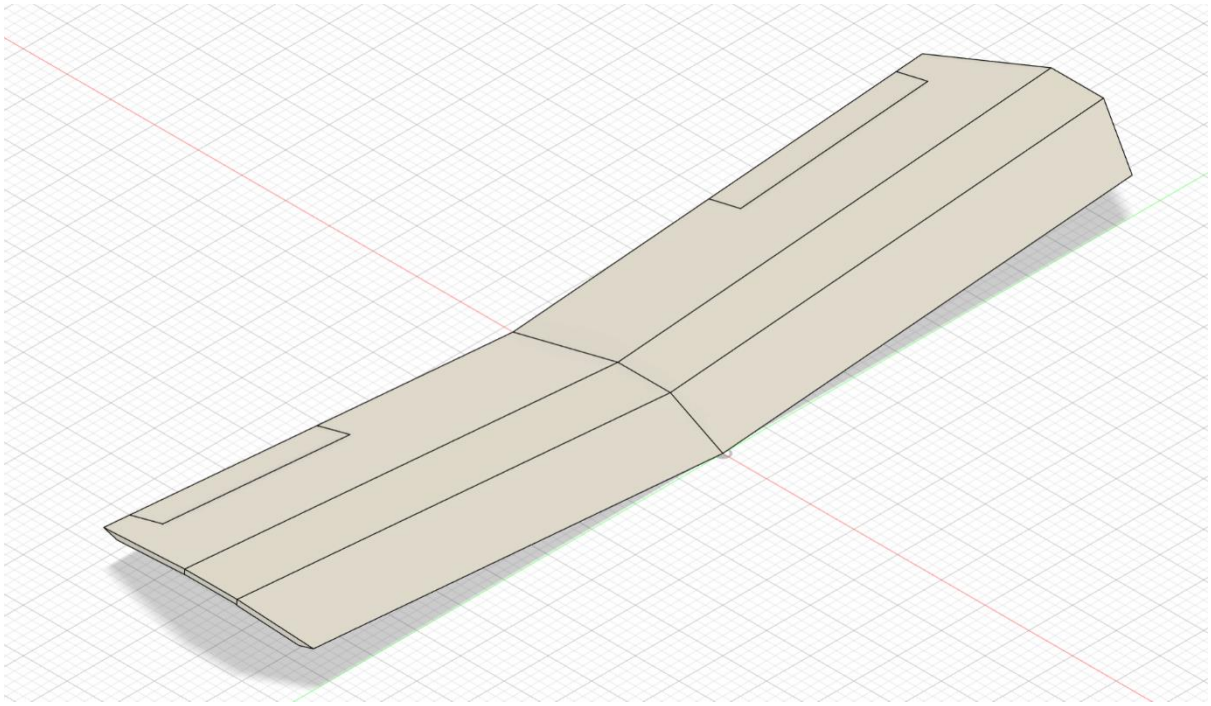
The design of the RC Plane started by choosing an appropriate Wing Cube Loading (WCL) and estimating the weight of the plane.

We had chosen an initial WCL of 6, keeping in mind that the WCL of the final aircraft generally is slightly higher than the designed value, thus having an expected WCL of 6.2-6.5. This gives us a semi-trainer aircraft with a good balance between acrobatics maneuverability and gliding efficiency.

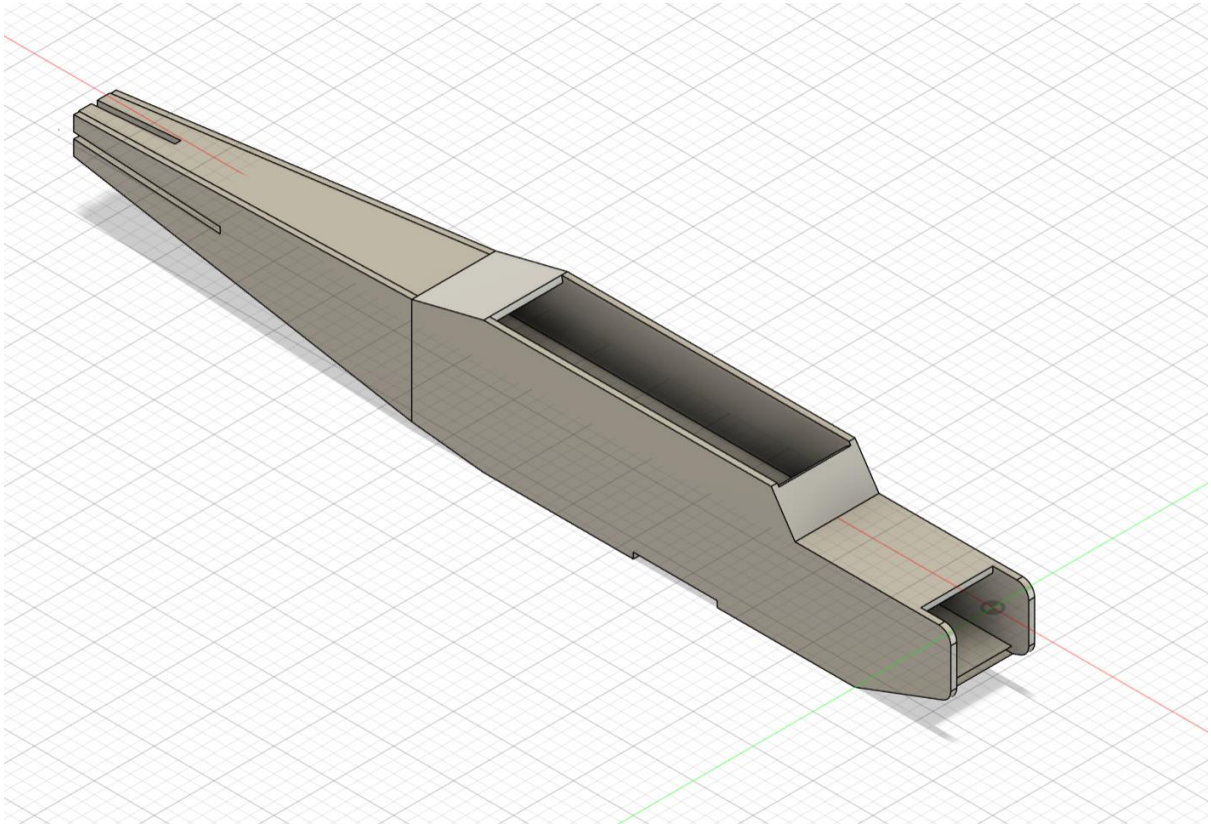
c. The Wing design and the Fuselage

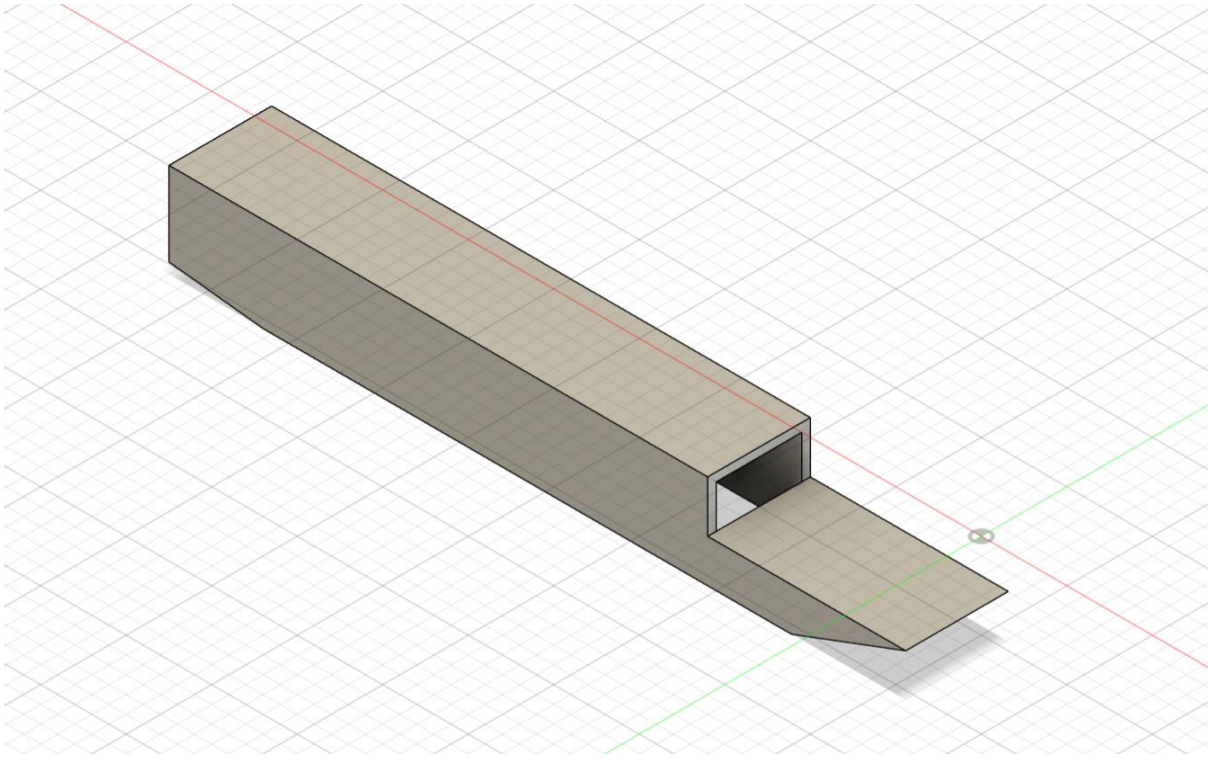
The estimated weight of the aircraft was calculated to be 735g (including the load to be dropped). This gave us a 2400 cm2 wing area. Choosing a 100cm wingspan, this gave us a 24cm wing chord.

The airfoil is inspired by the standard clarky-ii (11.7%) airfoil, being modified to 12.5% to get a round 3cm wing thickness, with the airfoil made to be more geometric to make construction easier. After giving the dihedral, the projected wingspan is 99.1cm.



The fuselage is 75cm long, with an appropriate tail section, built around an internal forming structure (made with the same foamboard) to have enough strength to withstand a few crashes and also form a chamber for the drop mechanism.

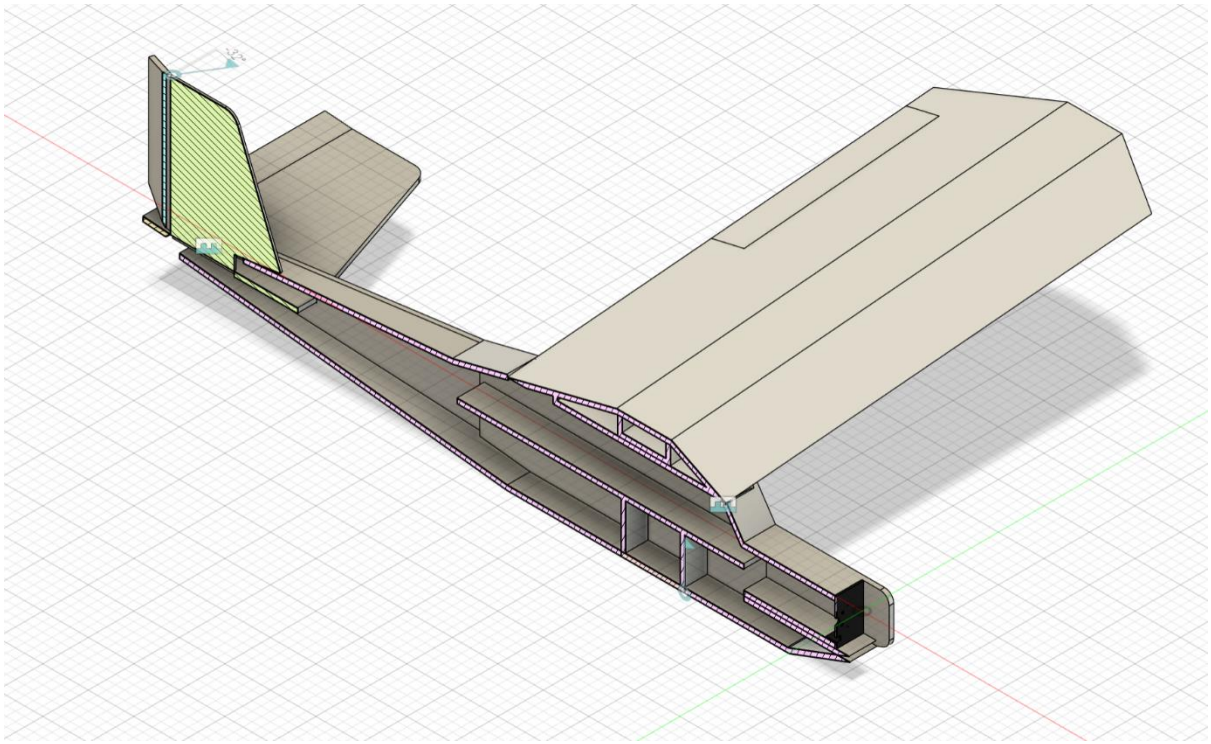


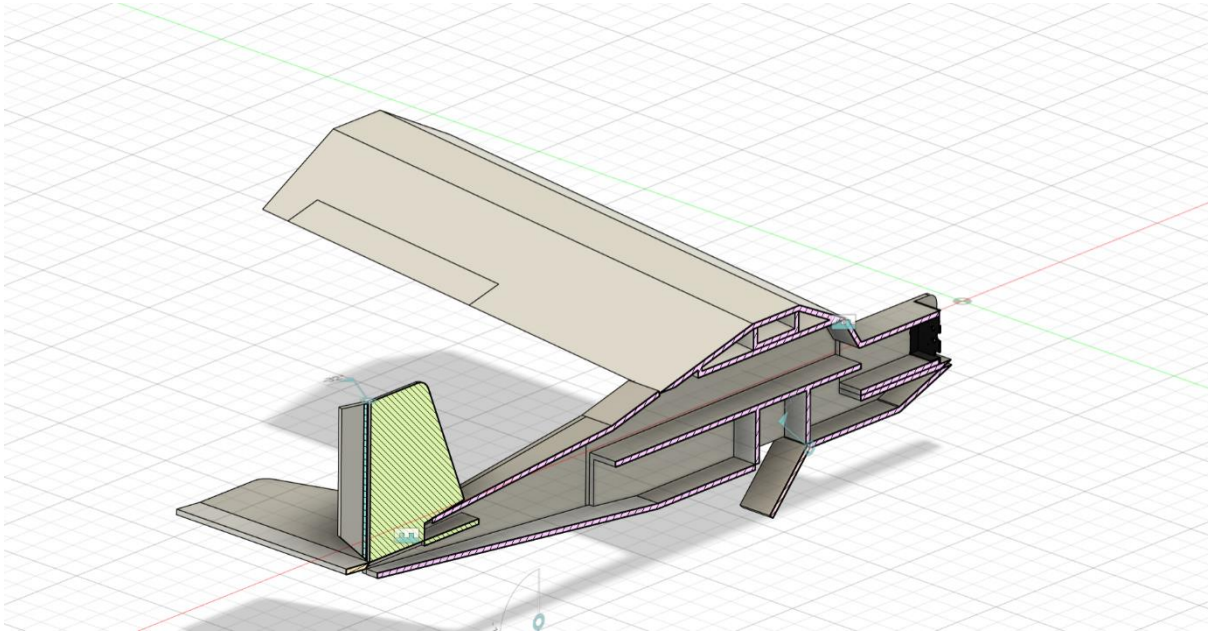


The plane is still being tested with 3 channels to find whether the plane needs standard ailerons or a flaperons mix.

d. The Drop Mechanism

The drop mechanism is located right below the Centre of Gravity so that that load does not affect the balancing of the aircraft. The drop mechanism consists of a 6 x 6 x 5 cm^3 chamber built into the fuselage former. A hinged cover is held in place with a servo arm over this chamber. Flicking a switch on the radio transmitter unengages the servo arm holding over the cover. The cover thus opens up the chamber and the load inside drops.



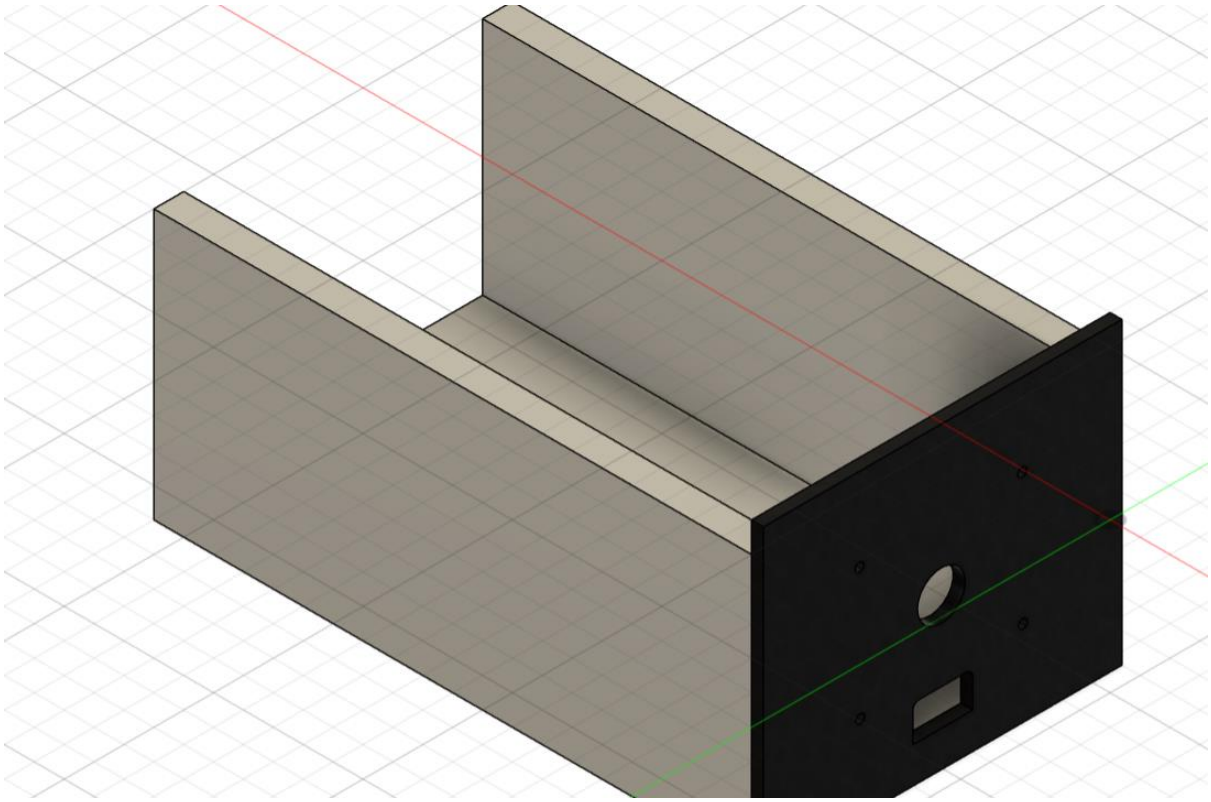


The cover in the actual plane is hinged on the back edge so that there is no problem with the cover blocking the load from dropping due to the incoming airflow. The incoming airflow assists the servo in opening up the cover. The drop mechanism has been tested with up to 70g load, and no binding or jamming has been found so far.

e. The Electronics

The motor was chosen to provide at least 100 Watts/lb, thus requiring around

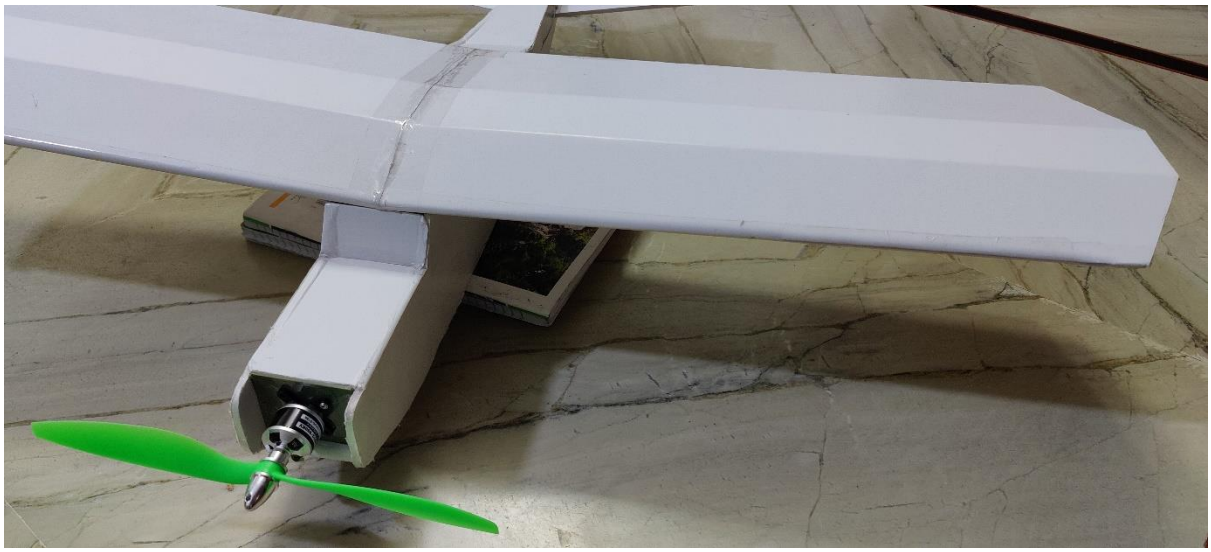
140-150 Watts overall. The motor chosen is specified to provide 180-190 Watts with APC 1047 SF propellor and 3S battery. This 100 Watts/lb is more than the general requirement of 80 Watts/lb used for trainer aircraft so that it has enough power for acrobatics. The motor is mounted on a replaceable power pod with a 3D-printed firewall, thus giving the ability to easily change the motor if the need arises.

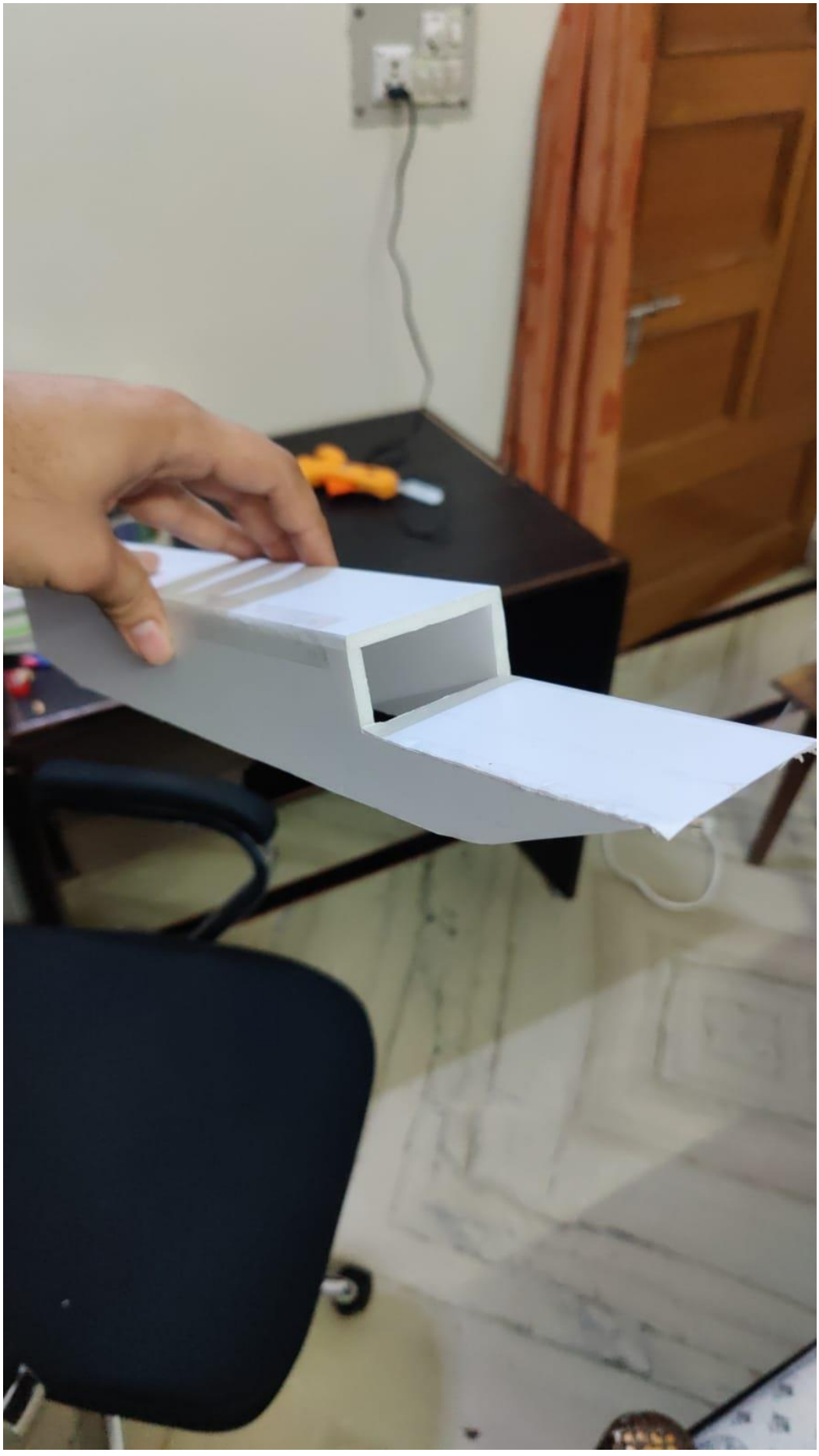


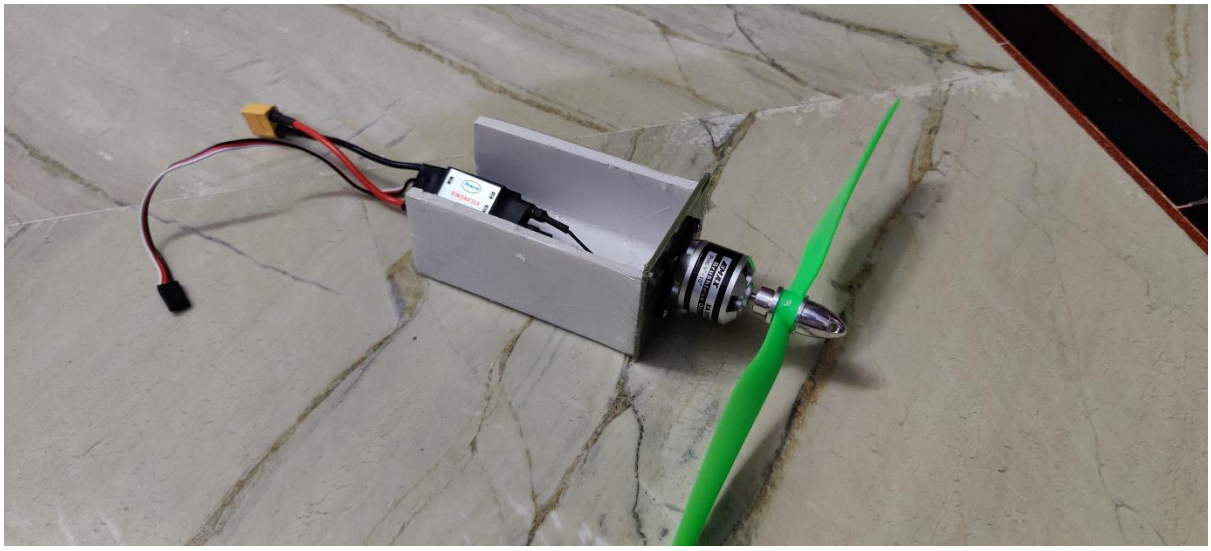
Using a 30A ESC gives enough leeway to avoid overheating and bursting. Different battery sizes are being tested, but currently, 3S 1300mAH is preferred. The battery is to be mounted in the upper chamber of the fuselage, on top of the fuselage former

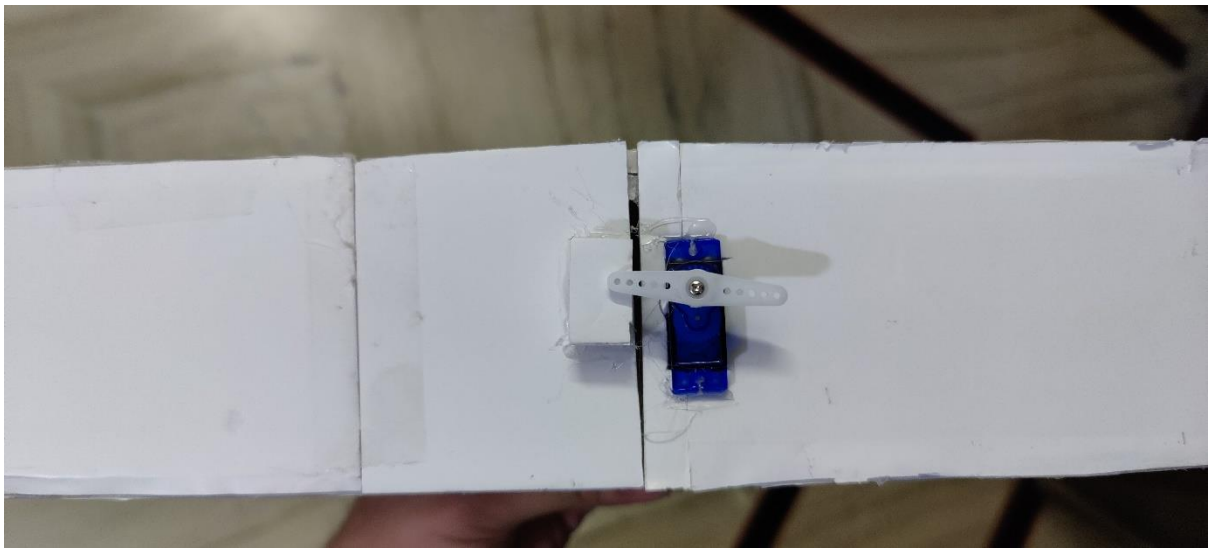
9g servo are used as they have a good balance between torque and weight. 4 are used for the control surfaces, 1 each for the rudder and elevator, 2 for ailerons/flaperons, and 1 for the drop mechanism.

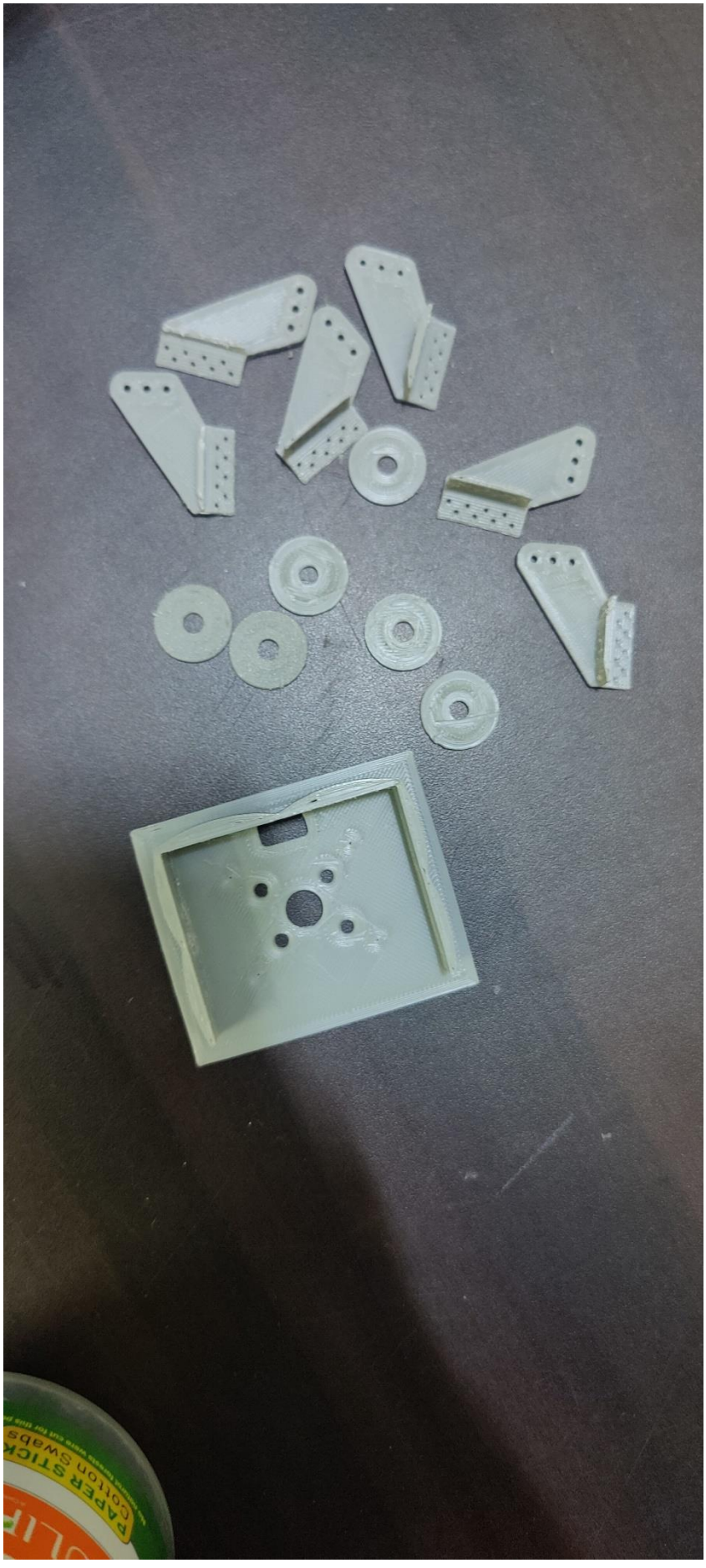
IMAGES OF THE RC PLANE:

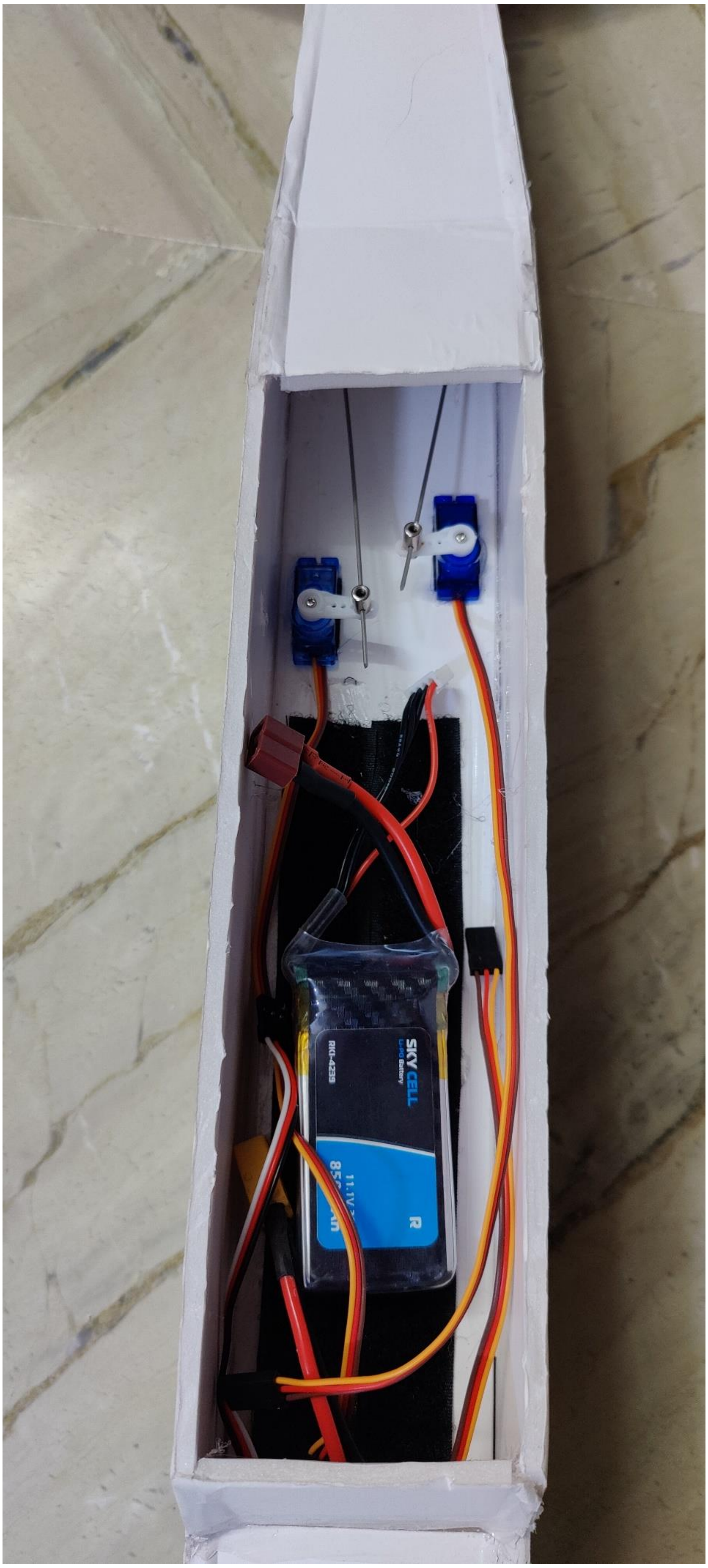









PAPER STICK
Cotton Swabs


SKY CELL