

To: Dr. David Trevas

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Subject: Hardware Review

Introduction

Team final approach has made significant progress in the construction of the design presented last semester in ME 476C. After multiple meetings to construct the plane, all major design components have been built and the plane is only missing small components needed to perform a first test flight. Presented below is a brief discussion of the current state of design, as well as a mention of the plans for continued construction in the near future.

Current State of Design

The team has finished nearly all the physical construction required before a test flight occurs with a few exceptions. Figure 1 below shows the current state of the design.



Figure 1 - Current state of physical model

This design was broken up into two subsections that required major construction times: the wing section and the fuselage section. The wing section, shown in Figure 2, was the first item constructed, as it was less likely to require any design changes during the prototyping phase.



Figure 2 - Removable wing using Clark Y airfoil

Next, the fuselage, shown in Figure 3, was constructed for which to attach the wings, house the electrical components, and to secure the cargo.



Figure 3 - Fuselage

After the completion of the major components, the final components such as the tail (Figure 4), arming plug (Figure 5), and delivery box (Figure 6) were constructed and/or added to the design. Each of these components are shown in the figures listed below, along with a short description or clarifying statement.

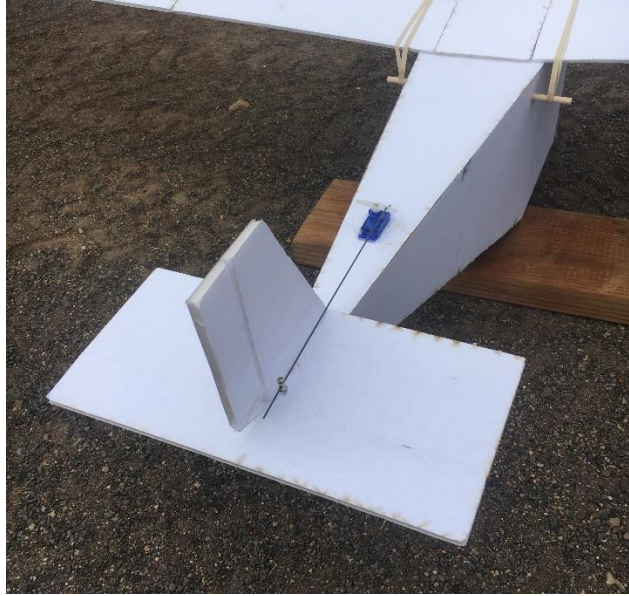


Figure 4 - Tail construction

The conventional tail configuration utilizes two 9-gram micro servos to control the elevator and rudder control surfaces. The design couples both the rudder servo and the front landing gear servo to the same receiver channel, allowing for control of the aircraft both in the air and on the runway.



Figure 5 - Red arming plug

The red arming plug is located more than 6 inches behind the plane of the aircraft propeller to allow the operator a safety buffer when installing or removing the red-arming plug. The red arming plug is required to power the aircraft as the SBEC circuit will not be completed without it and no current can flow.



Figure 6 – Delivery box at 2.04 ounces

Figure 6 displays the team's prototype of the SAE provided delivery box adhering to the given specifications. The delivery box will be 6" x 6" x 4" with a +/- 0.25" tolerance, and be 2.5 +/- 0.5 oz.

Figure 7 shows each of these components in a second view of the team's current physical model.



Figure 7 - Current state of physical model (2)

Plans for Continued Construction

It is clear from the figures above that the entire design demonstrated in ME 476C has yet to come to fruition. The final components of design needing to be completed are the attachment of the rear landing gear and the addition of payload plate mounting hardware. With the installation of the remaining hardware, the team should be able to successfully fly the plane, with the hope that the design decisions made serve their purpose and allow for a smooth and successful flight.

Conclusion

As demonstrated above, the team is nearly finished with the construction of the first rendition of the airplane. The team should be able to perform test flights in the coming weekend, given appropriate flying conditions, as well as the final components properly and easily being attached. The team is currently in a state of limbo, balancing a possible competition report with the desire to finish and fly the airplane, and the goals of creating test benches for future teams. As more information is released, the team hopes to continue the construction and improvement of the plane specified in the plans for continued construction, and hopes that a refund for the competition allows them to spend more time constructing test benches rather than writing reports. Overall, the team is satisfied with the construction that has occurred and hopes that more progress on physical builds will happen in the near future.