



# AAE 451 L3: Hoyer's Angels Presents



## THE BANANA SPLIT

### Flight Testing Results (Nick)

- Flew Two Successful Test Flights.
- Flight 1: 6 payloads and Flight 2: 29 Payloads.
- Successfully flown with a 432.6g payload (~3.666 medium bananas).
- Flight 1: 0.156 oz/sec score.
- Flight 2: 0.854 oz/sec score.

### Lessons Learned (Nick)

- Fast-paced design, build, and test program.
- Iterative testing and validation.
- Pre-flight preparations and procedures.
- Real-world performance versus theory.
- Quickly adapting to setbacks and improving.
- Balancing innovation and practicality.

## Aircraft Description & Post-CDR Modifications



### Control Surface Mechanisms (Sid)

*As-Built:* Foam control surfaces are pulled by a control horn attached to control rods. Rods were sized based on desired deflection.

*Post-CDR Changes:* Hinges are plastic inserts rather than dowel rods. Control rod lengths were modified slightly. Control horn dimensions are different than the CAD (due to supplier not providing dimensions).

### Nacelles and Propulsion (Megan)

*As-Built:* 3D Printed PLA mounted on the main wing spar

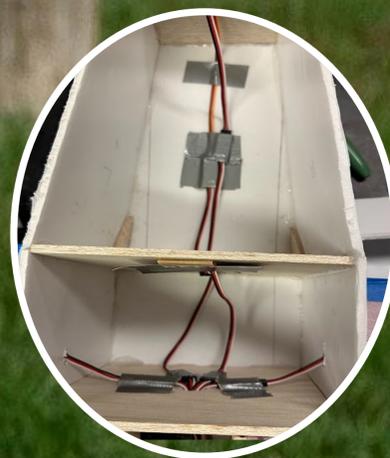
*Post-CDR Changes:* N/A.



### Wing Box (Leean)

*As-Built:* 4 pieces of balsa support the dihedral spars and are reinforced with additional balsa + foam.

*Post-CDR Changes:* Balsa dimensions modified (to reinforce fuselage joint). XPS reinforcements were added and the balsa was machined rather than laser-cut. Zip Ties used to secure wing spars instead of pins.



### Fuselage Internals (Thalia)

*As-Built:* Foam board folded into a rectangular fuselage, with holes cut for spars and wiring.

*Post-CDR Changes:* It was necessary to make the fuselage from 2 discontinuous foam board pieces due to exceeding the dimensions of one sheet.

### Rudder and Vertical Stabilizer (Thalia)

*As-Built:* Foamular XPS 150. Includes two wooden dowels within the vertical tail for attachment and two dowels externally for stability.

*Post-CDR Changes:* Added diagonal dowel rods to counteract unwanted range of motion. Also added a new structure within the fuselage to retain to vertical stabilizer.

### Elevator and Horiz Stabilizer (Alex)

*As-Built:* Wire-cut XPS 150 foam to the desired airfoil. Additionally cut a flat surface on the bottom of the airfoil to set the horiz stabilizer angle of attack.

*Post-CDR Changes:* N/A.

### Wings (Alex)

*As-Built:* Left manually cut on the wire-cutter and right wing auto cut XPS 150

*Post-CDR Changes:* Wing spars are lesser length due to material delivery delays. Also wingbox spar retention method uses a single zip tie instead of bolts.

### ESCs (Dylan)

*As-Built:* Located on the outside of the fuselage, to allow for cooling.

*Post-CDR Changes:* N/A.



### Nose and Payload Bay (Leean + Thalia)

*As-Built:* 3x Payload Sleds fitting upto 25 payloads total. 1x Y-splitter to each ESC from the battery.

*Post-CDR Changes:* Removed the BEC power from 1 ESC to prevent back-current/ground loop issues.