UAV Forge

(Unmanned Aerial Vehicle: Forge)

Yen Tu

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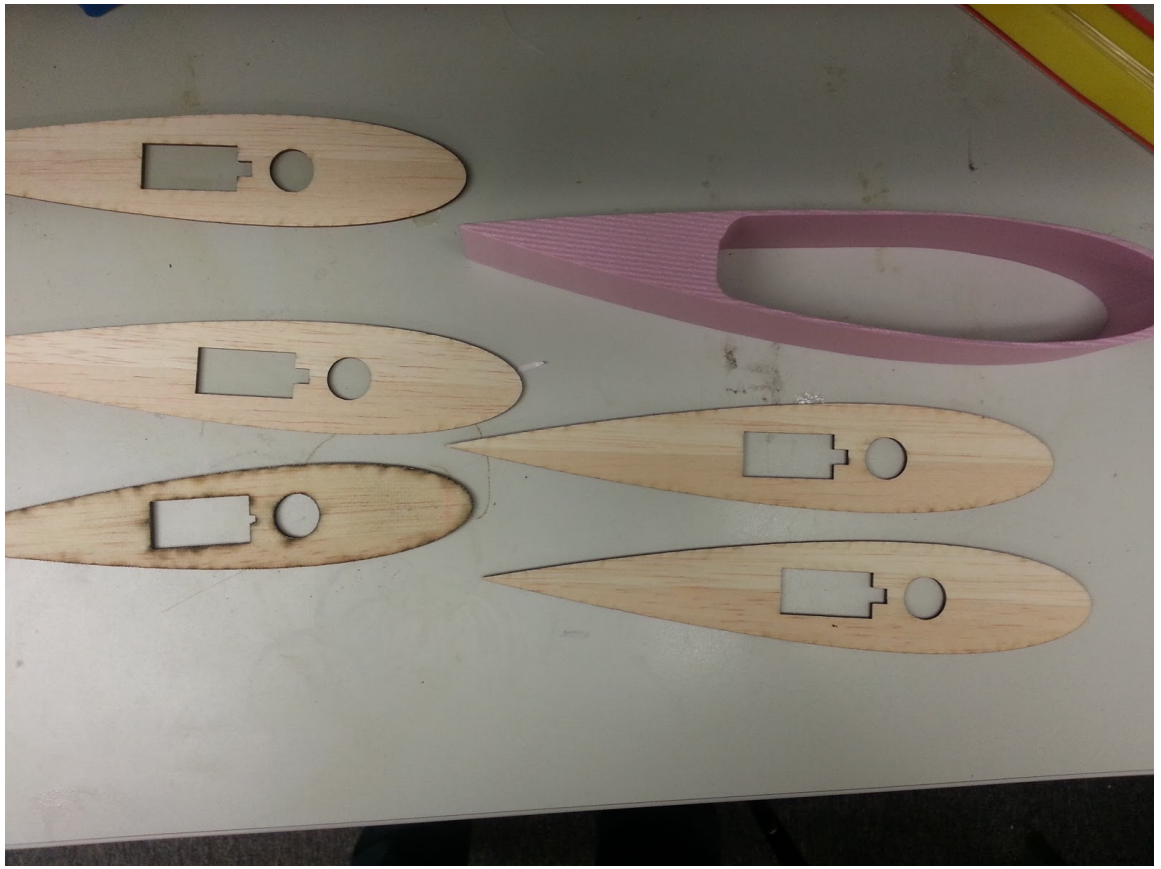
Spring 2015

Week 1: RC airfoil

Description: Exported the wing rib file as an .STL and imported into a laser cutter to cut the balsa and shell for lay-ups and curing.

Programs: SolidWorks, CorelDraw

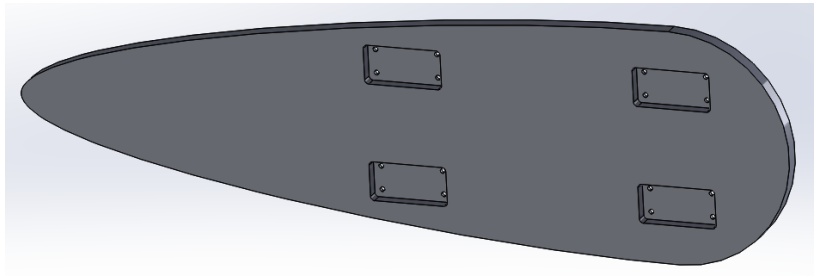
Documents: Photos



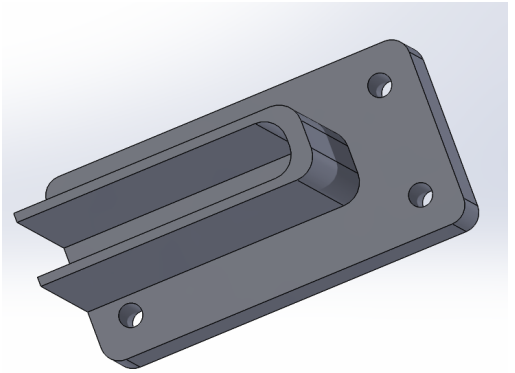
Balsa ribs and foam shell

Week 2: RC Fuselage

Description: Designed the side panels of the fuselage and its corresponding platform mounts for our RC plane. The mounts must be able to withstand torsional and centripetal forces while maintaining rigidity.



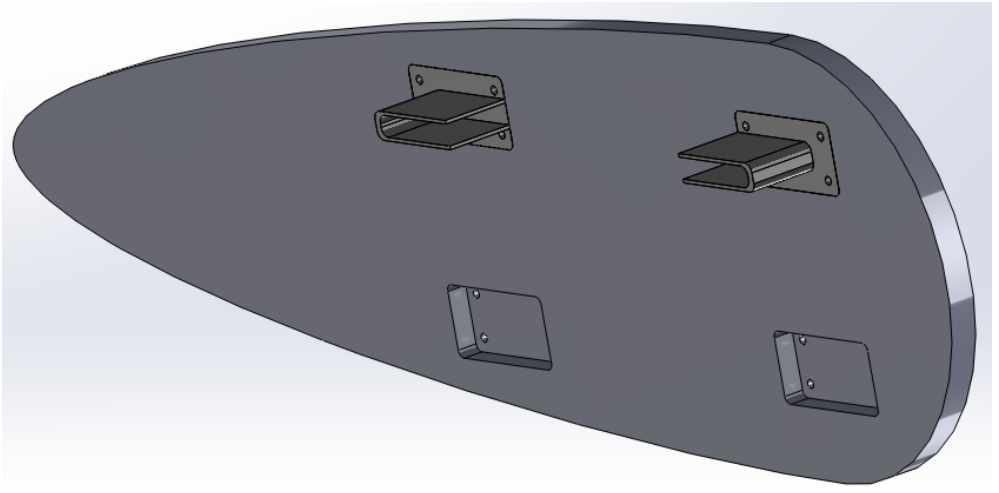
Fuselage Side Panel



Platform Mount

Programs: SolidWorks, On-Shape

Documents: Photos



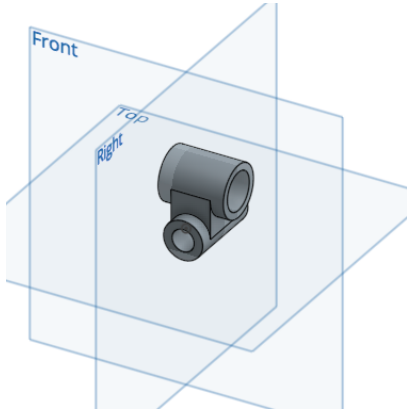
Mount and Panel Assembly

Week 3: RC Crosslinks

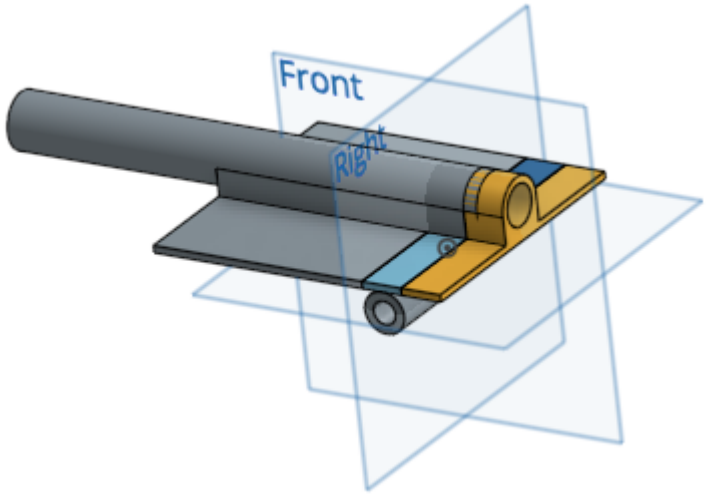
Description: Designed two crosslinks that would integrate intersecting spars within the fuselage. Design 1 is a simple crosslink, allowing design variation. Design 2 integrates the components platform into the crosslink.

Programs: On-Shape

Documents: Photos



Design 1



Design 2

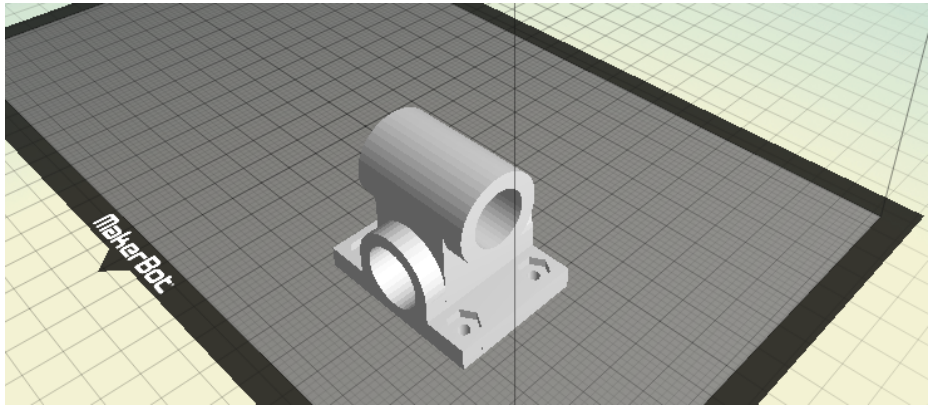
Week 4: RC Crosslinks

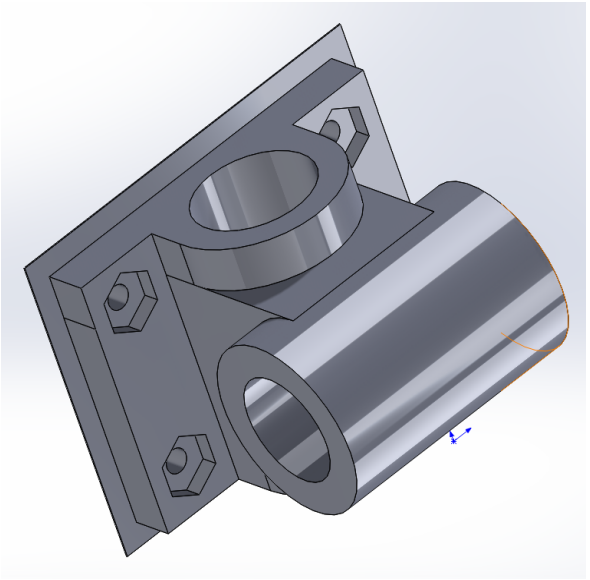
Description: Using Design 1, I integrated a small, mountable platform with designated screw sockets. This will be further assembled with the platform that holds the RC components. Finalized the design, imported to 3DP program and began production.

Programs: SolidWorks, MakerWare

Documents: Photos

Final Design in MakerWare





Final Design

Week 5: RC Motor Mount

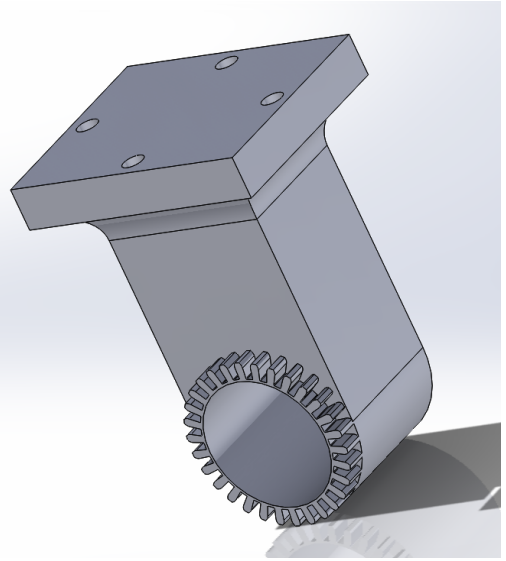
Description: Expanding on Design 1, altercations were made into a mount for the RC motors. These adjustments include exterior teeth for tilt-rotor mechanism.

This will allow our RC plane to have VTOL capabilities.

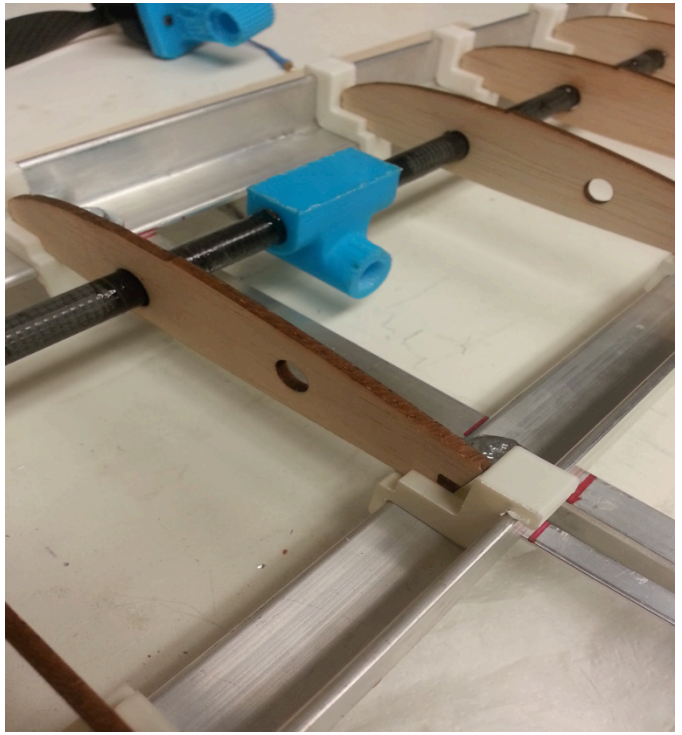
Programs: SolidWorks, Makerware

Documents: Photos

Assisted Colleagues: Rio Menchaca, Jose Ortega



Motor mount Design 1



Sample Crosslink

Week 6: RC Motor Mount

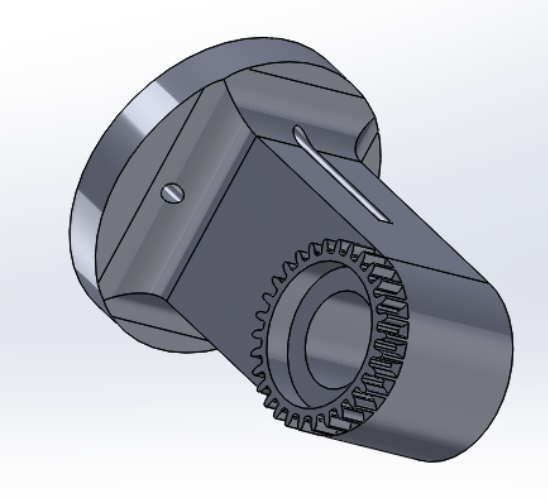
Description: The design required improvement. The motors arrived in the mail and the design was adjusted to be form fitting with the motor. Teeth were re-adjusted to fit new servos. Now incorporates metal bearing socket to reduce slippage.

Reverted to square platform.

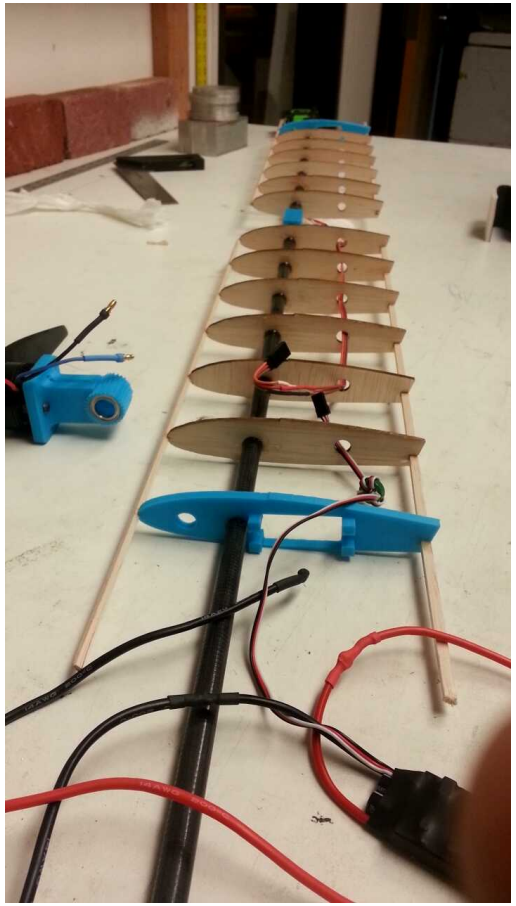
Programs: SolidWorks

Documents: Photos

Assisted Colleagues: Rio Menchaca, Jose Ortega



Motor Mount Design 2



Wing and ribs

Week 7: RC Crosslinks

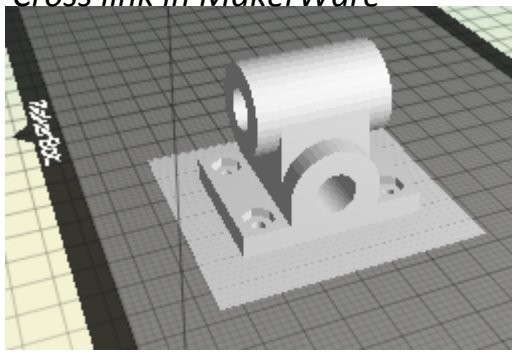
Description: The team desired to pursue a smaller scale RC plane. I re-adjusted the dimensions of the spar holes to reflect new spar dimensions.

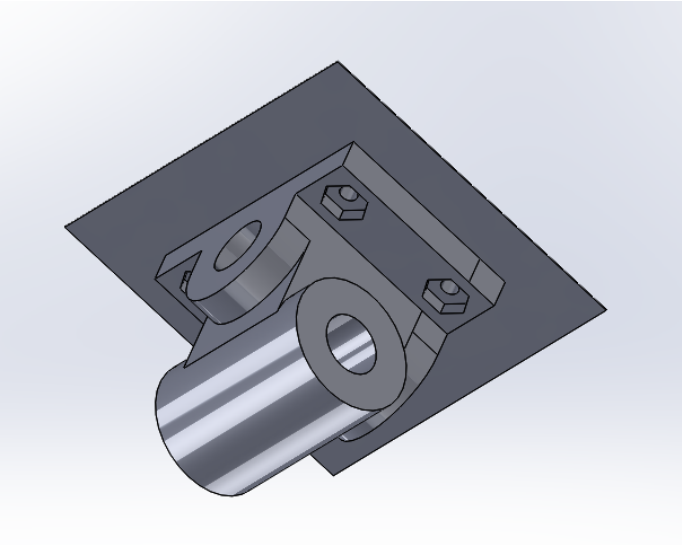
Programs: SolidWorks, MakerWare

Documents: Photos

Assisted Colleagues: Jose Ortega

Cross link in MakerWare





Adjusted crosslink

Weeks 2-8: RC Plane Lay-up

Description: Throughout the quarter we, the fabrication team, would mix epoxy and resin on _____ a fiber composite mesh over foam to create the wings, fuselage, and tail.

Programs: N/A

Documents: Photos

Assisted Colleagues: Stacey Augustin, Santiago Barrera, Daniel Huynh, Rio Menchaca, Quan Ngo, Jose Ortega, David Pham, Raynard Ramos

Cured Wing

Curing the fuselage

Cured Fuselage

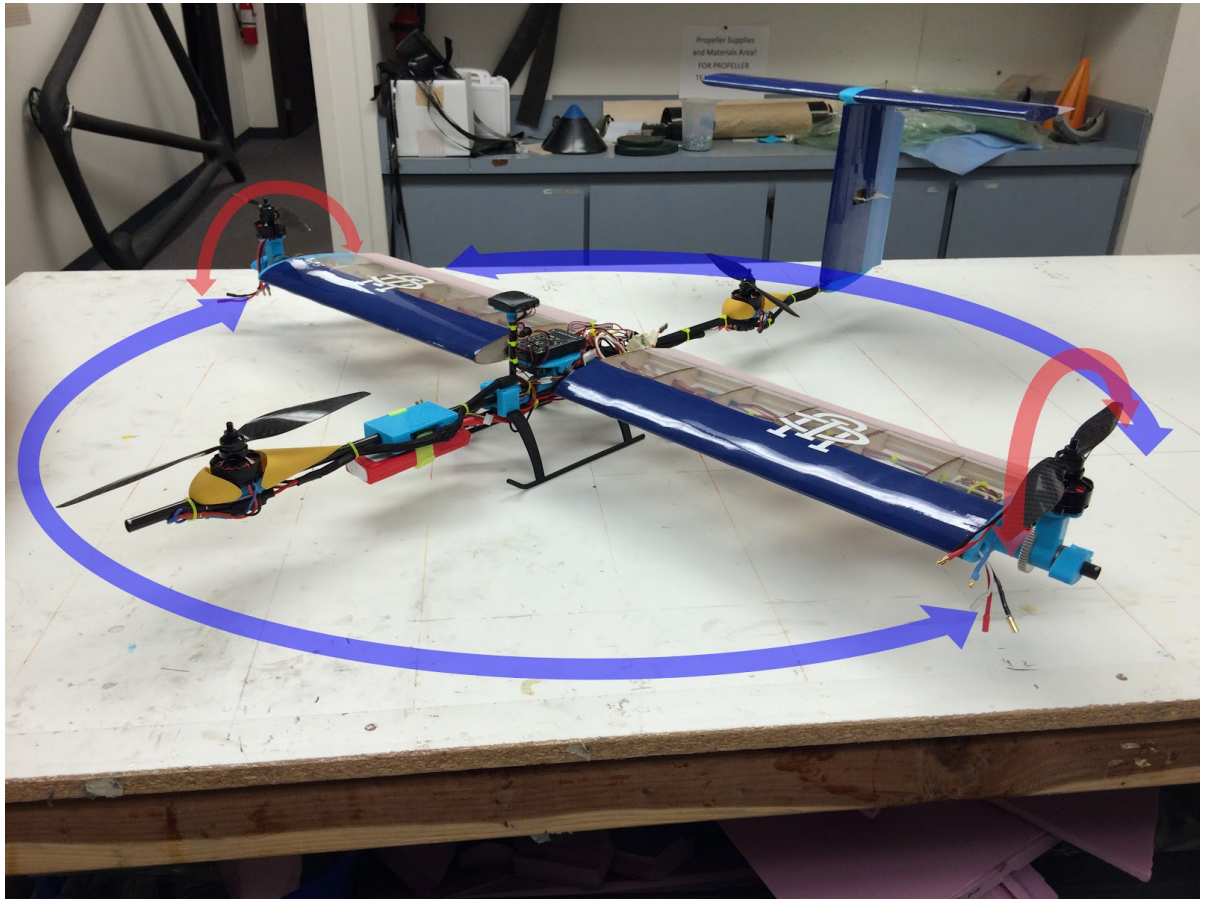
Week 9: Assembly and testing

Description: In conjunction with the other teams of UAV Forge (CV/AI, electrical, Embedded Systems, Controls), we assembled our prototype RC plane and began testing using a pre-programmed Helicopter controller.

Programs: N/A

Documents: Photos

Assisted Colleagues: Jose Ortega



Final Product!

THE SLEDGEHAMMER!