



GYROPLANE FUEL SYSTEM - PHASE 2



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DESIGN ADVANTAGES

KIT-READY	Our system is designed to be placed within RAF kits, featuring easily manufactured components with a straightforward installation process.
STABLE	Our system is designed to exhibit superior stability, achieving an FAA-specified safety factor of 1.5 in various flight scenarios.
MODULAR	Our system is designed to be modular and adaptable to different RAF-2000 styles. The auxiliary system can be adjusted to fit various RAF configurations.

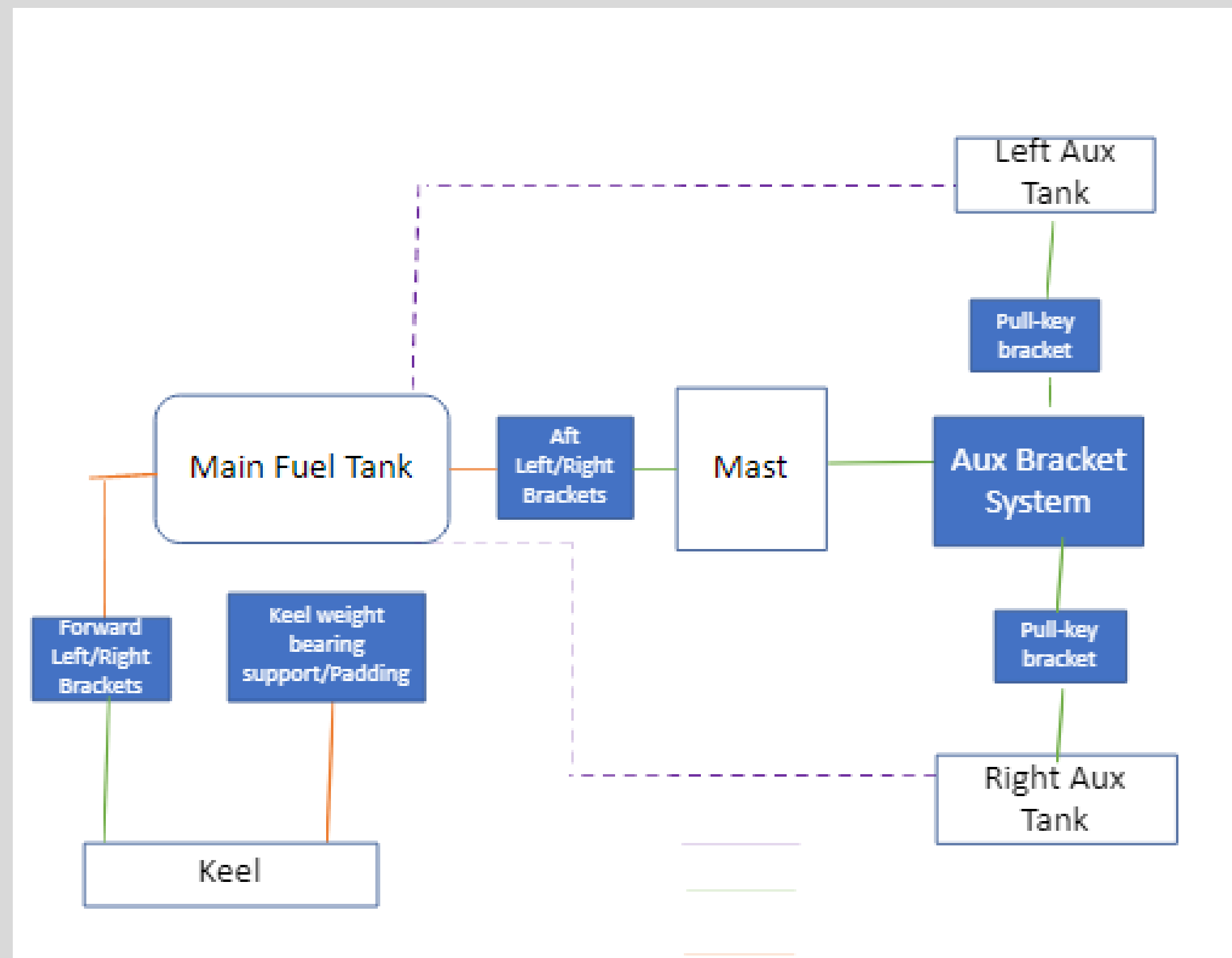
PROBLEM STATEMENT

This project encompasses designing, fabricating, and installing a mounting system for a fuel tank redesign. This solution will be available as a kit package and components were designed to be modular. The main tank will be mounted via an adhesive-bracket system which will be attached to the keel of the vessel, with vibration dampening pads interfacing between the tank and keel. The auxiliary tanks will be mounted to the mast using a clamp and an adjustable extruded aluminum cradle with a pin bracket fastening system.

FINAL PRODUCT



Isometric view of the installed main tank.



System Level Diagram



CAD model of the full system.



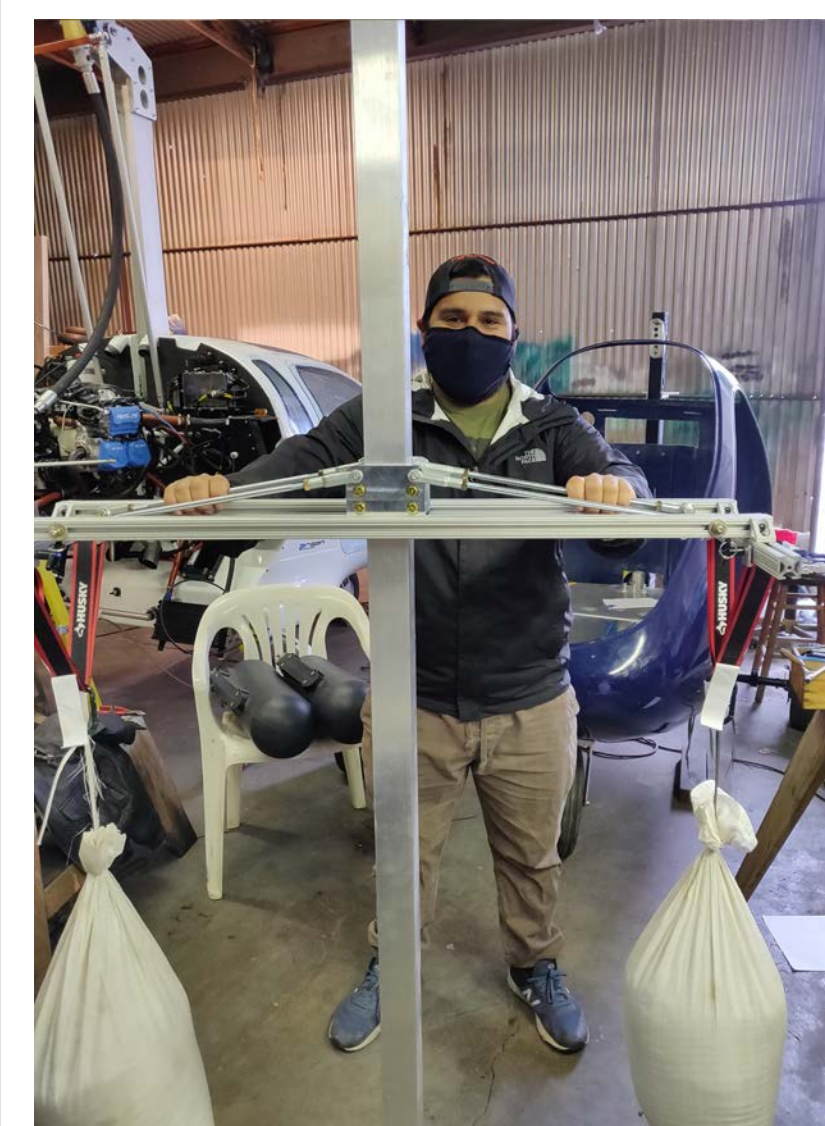
Close-up of the auxiliary fastening mount.

TESTS AND RESULTS



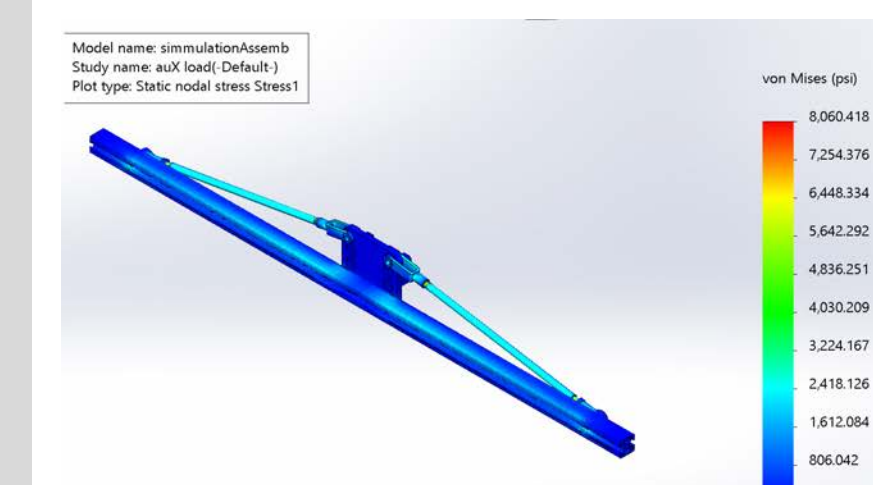
A load test was conducted at Gillespie Field to verify that our epoxy selection can support a maximum shear load of 150lbf.

A load test was conducted on our auxiliary mount to verify the integrity and strength of our mast clamping bracket.



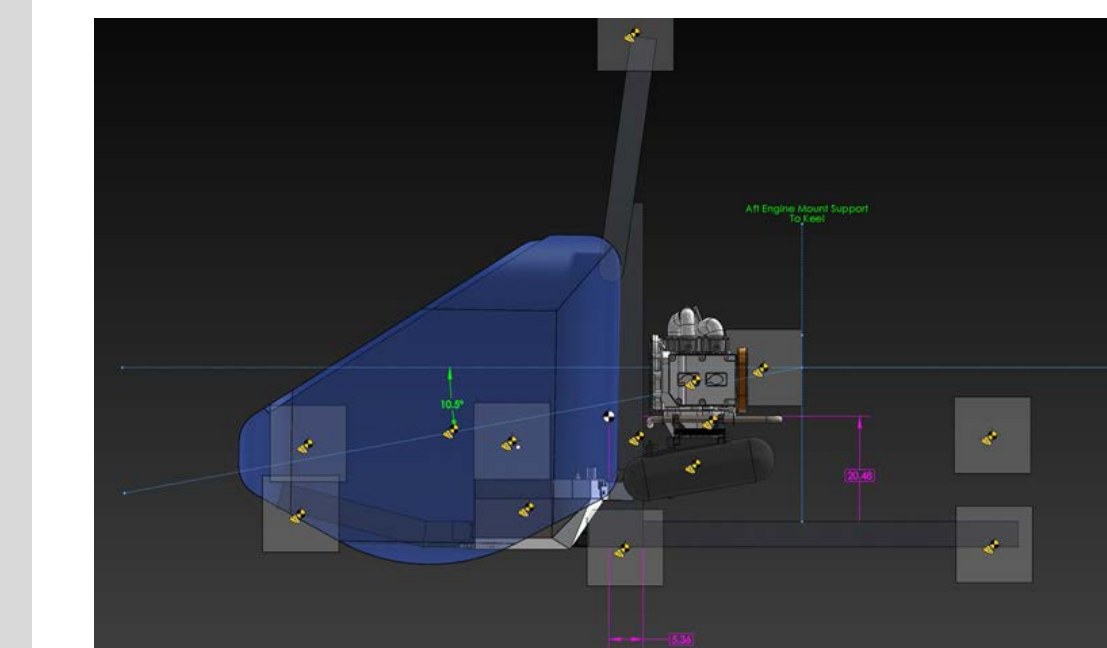
A load test was conducted on our auxiliary mount to determine how far the aluminum extrusions deflect under extreme flight conditions.

DESIGN ANALYSIS



Finite element analysis was conducted on various components within the design to verify the strength of components before physical testing occurred.

Bolt Check:	OK
Calculated FOS:	24.6901
Desired FOS:	2



Mock components were simulated in SolidWorks to determine the aircraft's center of gravity after the system is fully installed.

Connector Forces	X-Component	Y-Component	Z-Component	Resultant
Axial Force (lbf)	0	0	0	0
Shear Force (lbf)	86.846	26.905	104.16	138.26
Bending moment (lbf.in)	0.61766	-15.531	0.74084	15.561

The shear forces and bending moments were analyzed using SolidWorks to determine the maximum shear forces the fastening nuts would experience.

