Apollo Glider

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Introduction

During the Summer of 2024, I conducted an Aspire Program Research Project here at the University of Maryland under Dr. Bowden's mentorship. I worked on a payload that aimed to drop a propulsionless glider with deployable wings attached to a weather balloon flight line through the Nearspace Program.

Activities:

- Conducted research on previous applications of origami within gliders
- Created and presented a design review to the Nearspace Program for feedback
- Iterated through multiple methods of deployment
- Soldered, wired, coded, and constructed the payload
- Launched the payload to determine how wind flow interacts with both wings

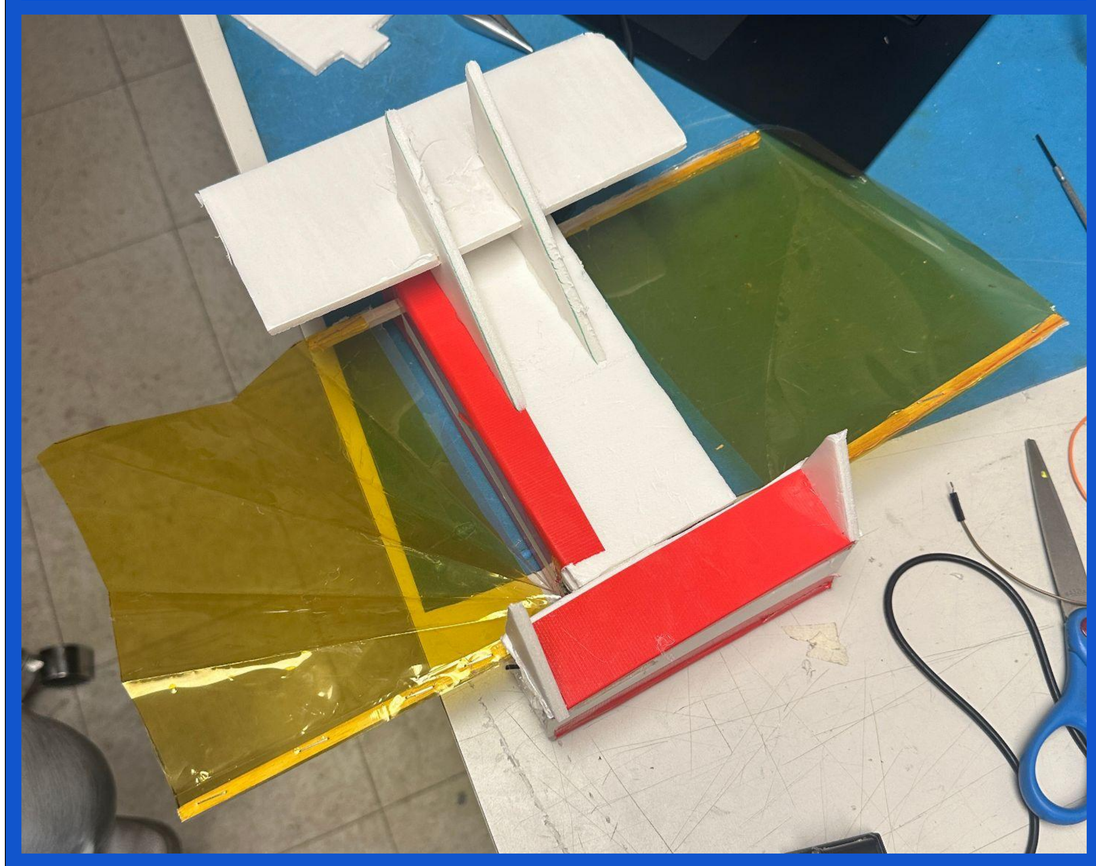

Figure 1
Payload with deployed wing on left and static wing on right.

Methods:

Initially I used an air pump to try to deploy the wings using air flow. However, this was too weak, and if I wanted to continue developing this method I would have a very expensive and heavy payload. Thus, I used a motor to unfold the wing by having the initial position be parallel to the fuselage and rotate to be perpendicular.

Issues Confronting Site:

Upon completing my design review, I received feedback about the safety and legality of intentionally dropping a payload form a flight line. Thus, I reduced the scope of my project from dropping a glider with deployable wings, to comparing deployable foldable wings to static wings.

Future Work:

I have continued working on a glider that will drop from the flight line. To ensure the safety of this glider I designed and constructed a reliable parachute deployment mechanism.

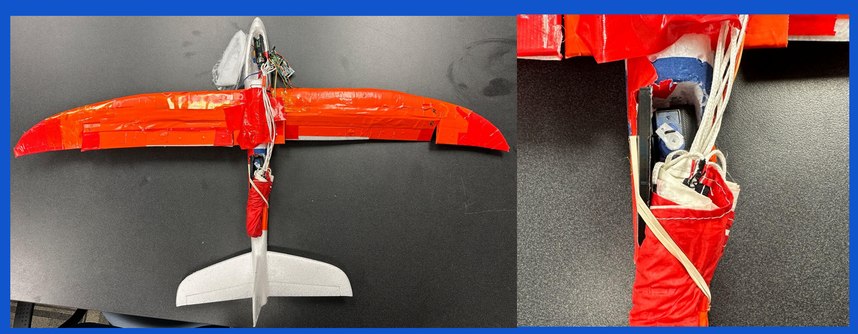

Figure 2 and 3
Glider and parachute deployment mechanism.

Figure 4
Flight line

Site Information:

Dr. Mary Bowden
UMD Nearspace Program
Manufacturing Bldg, 8197 Regents Dr, College Park, MD 20742

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