The Effect of Porous Wings On Small Aircraft
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Introduction

Current hand-launch reconnaissance drone
- Small scale flight vehicles are susceptible to aerodynamic instabilities
- Yohanna Hanna’s Ph.D. work, under advisement from Dr. Geoffrey Spedding, looks to see if porosity has any effect on these instabilities
- Project was preliminary research to see if a porous wing alters flight on small, 55 cm wingspan gliders

Experimental Setup

- Bungee cord attached to vice 132 cm from start of tape measure on ground
- Drilled 1 mm, 1.5 mm, 2 mm holes in gliders (number of columns varied from plane to plane) after testing each as a control

Skills Learned

- Basic properties of lift and drag on an airfoil
- Dryden Wind Tunnel and it’s force balance
- Problem-solving to successfully launch gliders with consistency

Results

- On average, gliders with holes glided a shorter distance than without holes, however all measurements were within uncertainty

Conclusions

- Due to inconsistency in resulting launch distances despite consistent force of launch, deemed inconclusive whether or not porous wings made an impact
- Deviation from tape measure did decrease with porous surface, but further research would need to be conducted to explore the conclusion that planes had increased stability in flight

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Relationship With STEM Coursework

Bird wings are the basis for testing porosity in flight vehicle wings
- Previous Physics and Calculus knowledge was required to understand lessons in aerodynamics and lift