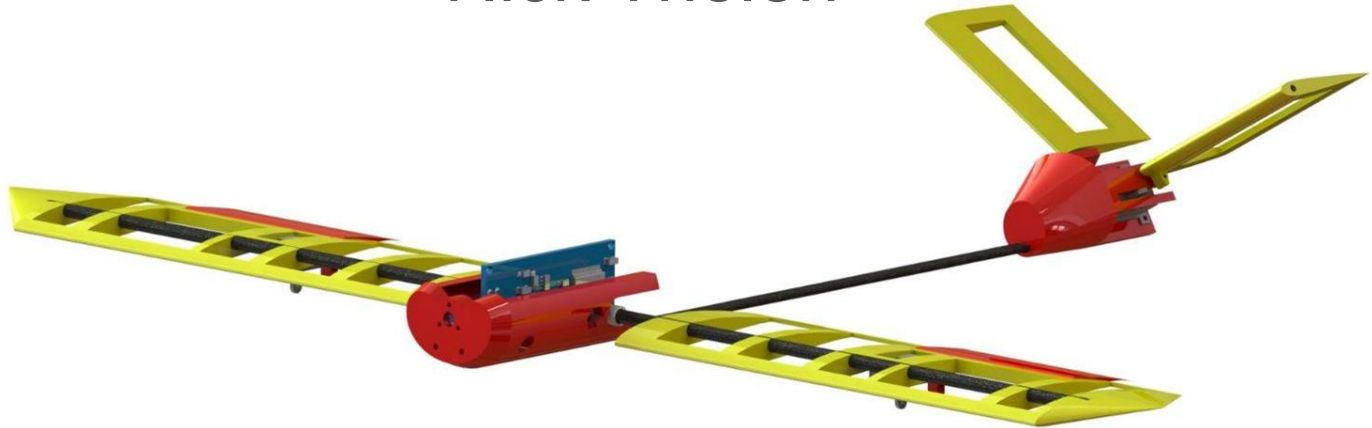


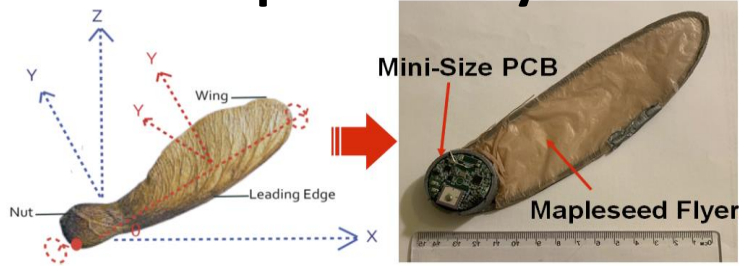
MDP Mapleseed

Nick Tholen



What is Mapleseed?

Mapleseed Flyer



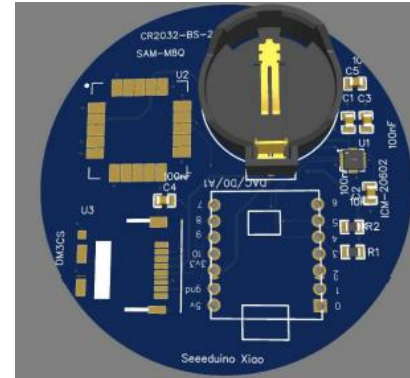
Micro-Airplane Sensor Carrier



Drone-Based Optical Microscope



3D-Printed PCB



Micro-Airplane Sensor Carriers

Project Motivation

- Micro-Airplanes allow for directed flight over large distances faster and with better power efficiency than drones and other alternatives
- Atmospheric data can be collected for longer than the Mapleseed flyer but in a more efficient way than a drone



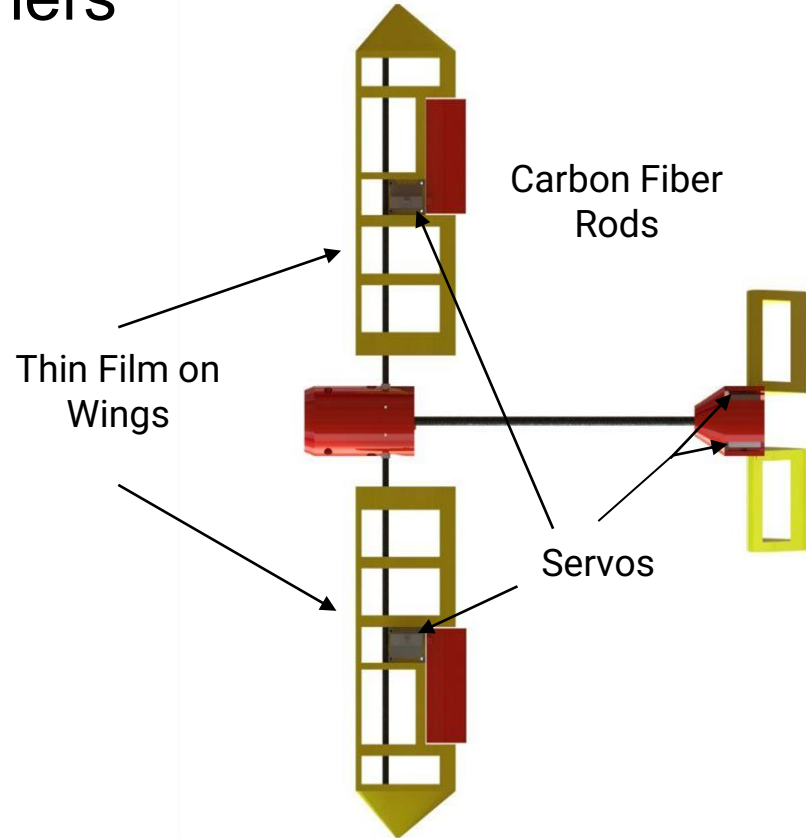
Francois Nascimbeni / AFP-Getty Images



Micro-Airplane Sensor Carriers

Overall Design

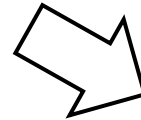
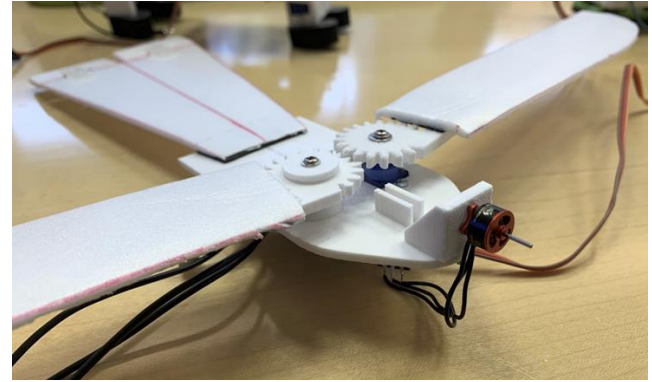
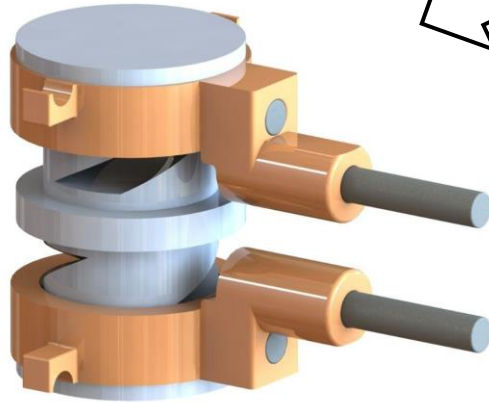
- Arduino Nano controller
- Manual remote control
- Lightweight 2S Battery
- Prioritizes weight
- 4 control surfaces
- Carbon fiber structure



Micro-Airplane Sensor Carriers

Folding Mechanism

- Original Design
 - Motor controlled
 - Doesn't overlap
- 1st Redesign
 - 3 Major iterations
 - Too heavy/difficult to integrate with body
- Latest Redesign
 - Lightest/Simplest
 - Less robust

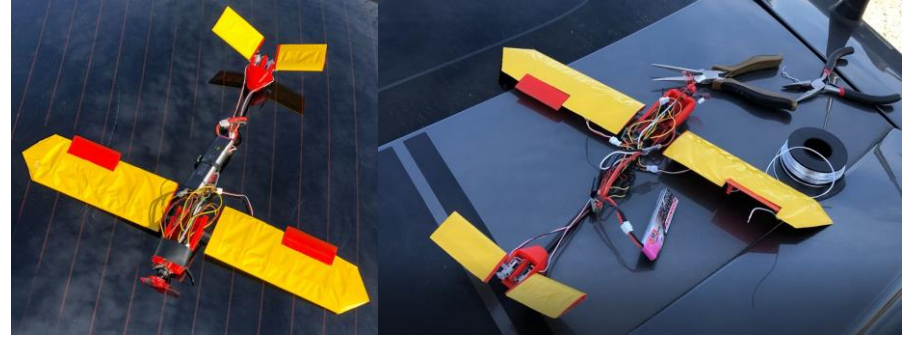


Micro-Airplane Sensor Carriers

Prototype Assembly and Testing

- Control surfaces operating
- Need to make servo connection more robust in rear
- Unsuccessful first flight
- Retest without high winds
- Started to pitch upward

Control Surface Test



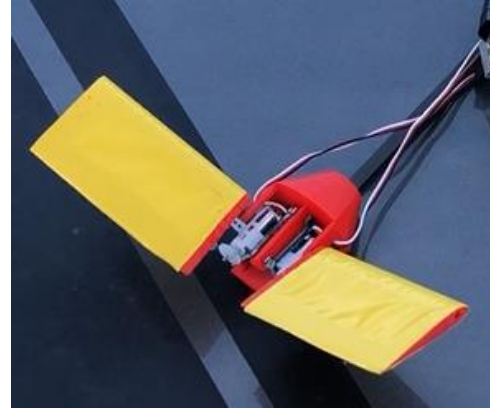
First Flight Test



Micro-Airplane Sensor Carriers

Future Work

- Better control of rear wing
- More testing
- Wire management
- Integration of sensors
- Autonomous flight



Acknowledgments

Professor. Xiaogan Liang

Xintong Deng

Maxwell Bederman

Larissa Wermer