# P10232 – UAV Airframe C

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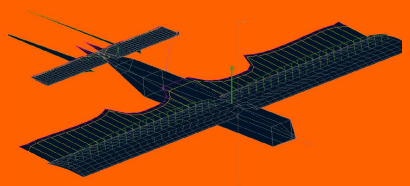
IMAGINE RIT
INNOVATION + CREATIVITY FESTIVAL

## Mission Statement:

The goal of the UAV Airframe C project is to design, construct and test an open source, open architecture, unmanned aerial platform to support aerial imaging systems. Airframe C is a second generation airframe project expanding upon the previous efforts of the P09232 UAV Airframe B Senior Design Group.

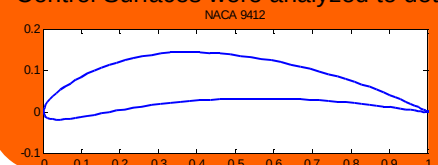
## Key Project Goals

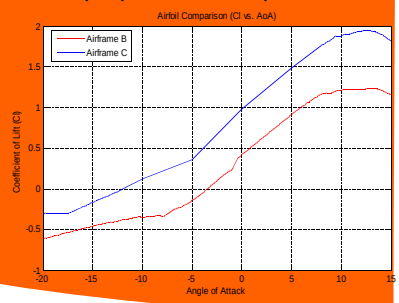
- Ability to carry a 15 lb payload
- Open architecture to integrate with a variety of systems
- Open source for future applications
- Ability to remotely control aircraft and payload
- Flight time of 20 minutes



## Wing Design

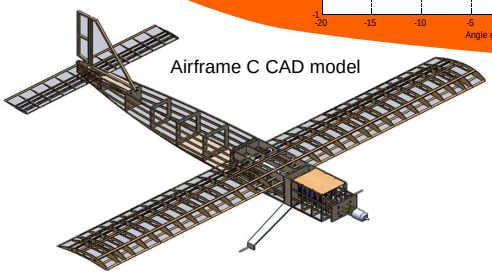
- NACA 9412 is selected to increase lifting capacity
- Plane body was increased in length to offer better input from tail control surfaces
- Wing span was shortened to decrease bending moment
- Control Surfaces were analyzed to determine proper size and placement



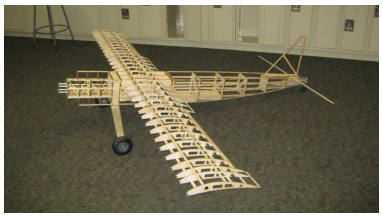




## Structural Design

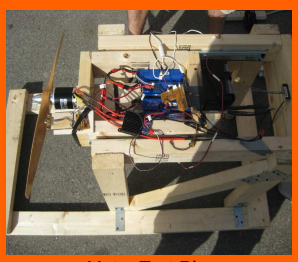
- Carbon Fiber Wing Spars used to strengthen wing and reduce deflection
- Wing was further re-enforced with a fiberglass skin
- Cargo bay located under wing to maintain balance regardless of cargo
- Expansion bays present throughout tail to support additional flight equipment
- Baltic Birch was used in the main body structure to increase load bearing ability
- Balsa was used throughout the plane to minimize weight
- Body, tail, and control surfaces were covered using Top Flight™ Monokote



Airframe C CAD model



Nearly completed airframe structure



Motor Test Rig

## Propulsion Selection

- A 3250 Watt Turnigy Electric motor is used to turn a 26 x 10 inch propeller
- 4 Zippy 5S 20C 5000 mAh Lithium Polymer Batteries provide 10000mAh flight power at 37 Volts
- Initial tests proved 26 lbs of static thrust and a wide open throttle static run time of 10 minutes
- Simulations estimate flight times in excess of 20 minutes

## Final Testing

- Taxi Testing and Skip testing were performed on April 24th, 2010.
- First flight at Hasman Field in Spencerport, NY on April 24th, 2010 with crash landing
- Second flight at North Hampton field in Spencerport, NY on May 6th 2010 with 2 successful flights and landings.
- Second Flight with successful aerial photography.
- All testing thus far has been without cargo

Testing the aircraft's center of gravity

Aerial Photograph Overlay

Aircraft in flight during a skip test

## Team Members

Daniel Graves (ME)
James Reepmeyer (ME)
Michael Hardbarger (ME)
Alex Funiciello (ME)
Brian Smaszcz (ME)

R·I·T


## Special Thanks:

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IMPACT

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