

Flapping Wing Micro Air Vehicle

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Air Force Research Lab Student Challenge

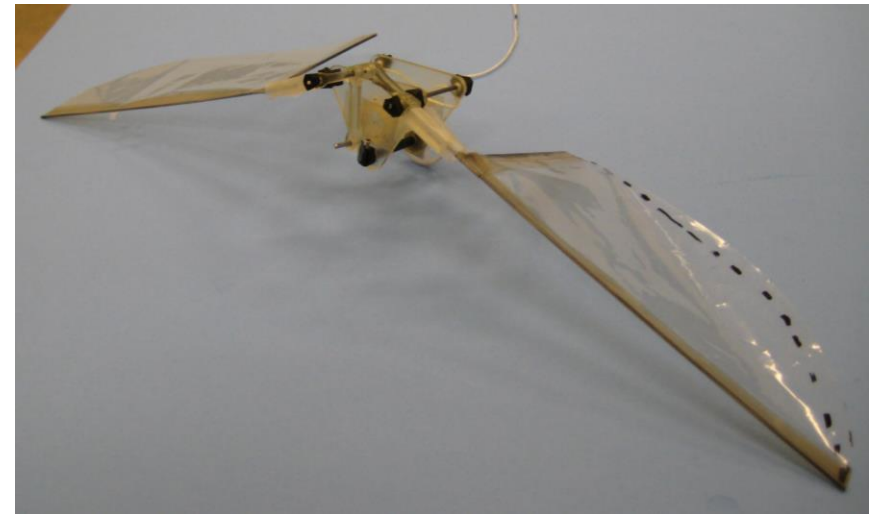
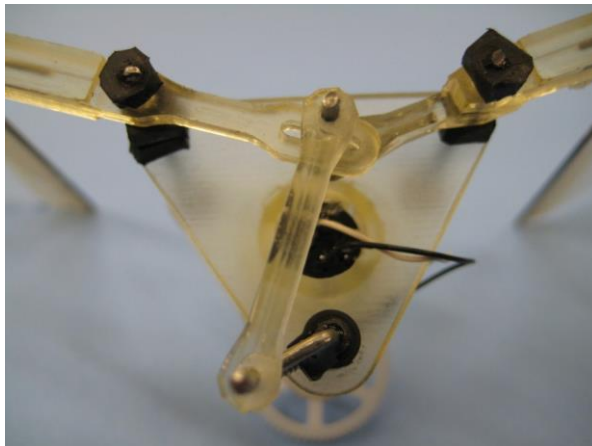
Design a flapping wing actuation system (ornithopter) that is small and lightweight yet powerful enough to flap wings at about 25 Hz

- Inspired by hummingbirds, flies, moths, and dragonflies
- Must Include vehicle control
- Must contains flexible wings

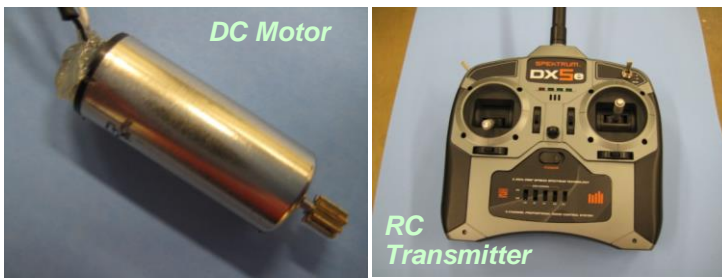


Prototype Goals

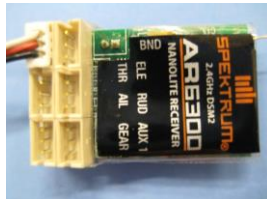
- 25 Hz flapping frequency
- 15 gram total mass
- 15 cm overall envelope
- Hovering & forward flight
- 60° wing angle



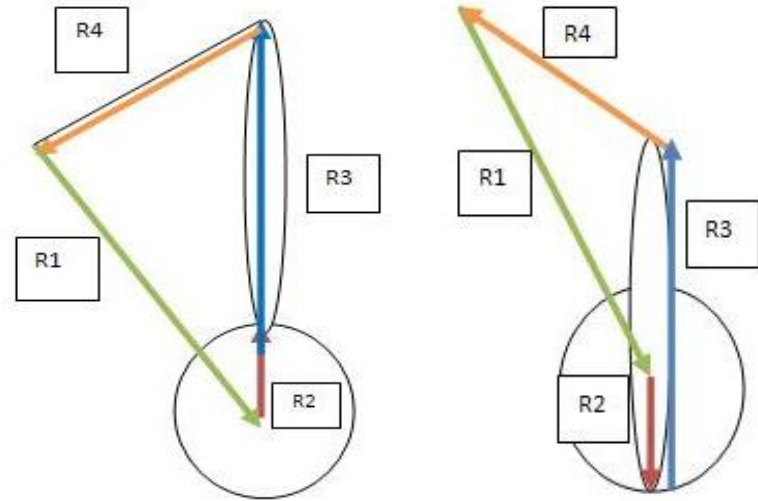
- Rapid prototyped parts
- Slotted wing link
- 0.32" Input link length yields desired wing amplitude



The ornithopter is powered by a small DC motor. The motor was originally designed for use in remote control model helicopters



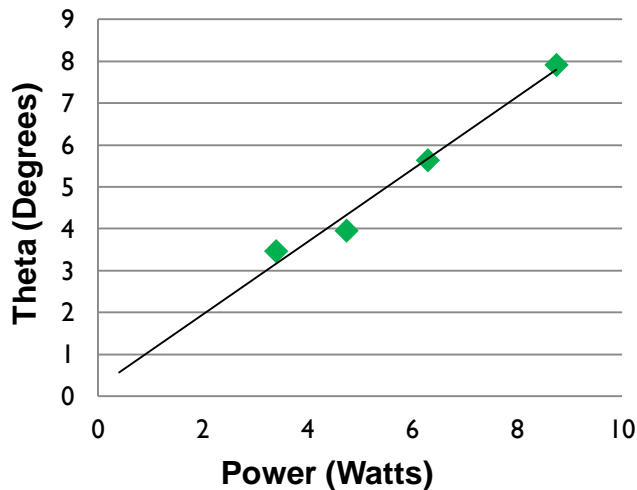
The ornithopter is controlled by a remote control airplane transmitter-receiver combination, capable of controlling up to six DC motors.



Fully Contracted Wing

Fully Extended Wing

Displacement Angle vs Power



Frequency vs Power

