BEHEMOTH ORNITHOPTER DESIGN NOTES

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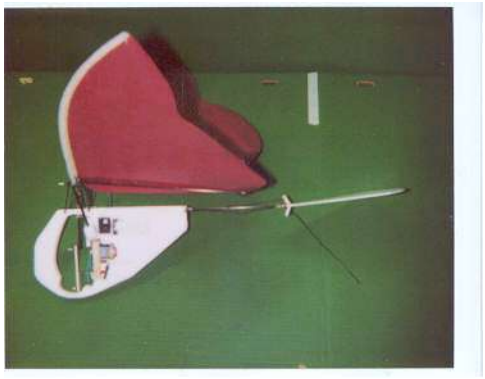
Behemoth started life as an experiment with circular wing ornithopters. [out of sheer curiousity]. This evolved into the present wing planform on the current Behemoth [Behemoth 3]

' Behemoth 3'



BEHEMOTH DESIGN AND CONSTRUCTION

Wingspan	27 inches
Length	20 inches
GW	55 grams

WING EVOLUTION

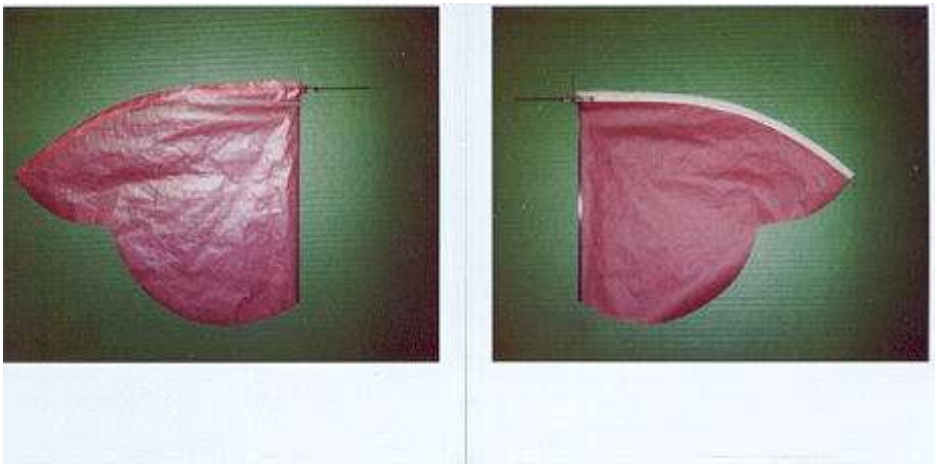
Behemoth's 1 and 2 had 'almost circular' wings and fixed trailing edges. [ie: The wing centre section trailing edge was attached to either the fuselage or a wing mount]

This combination didn't appear to produce sufficient thrust so the wing planform on Behemoth 3 was changed to include the outboard wing extensions and the trailing edge is floating free. This will [I hope] increase both the thrust and the lift.

CONSTRUCTION

WING

Tapered balsa spar curved aft outboard. EPP foam leading edge ' D ' section. Flat carbon strip wing root. Wing membrane is tissue.

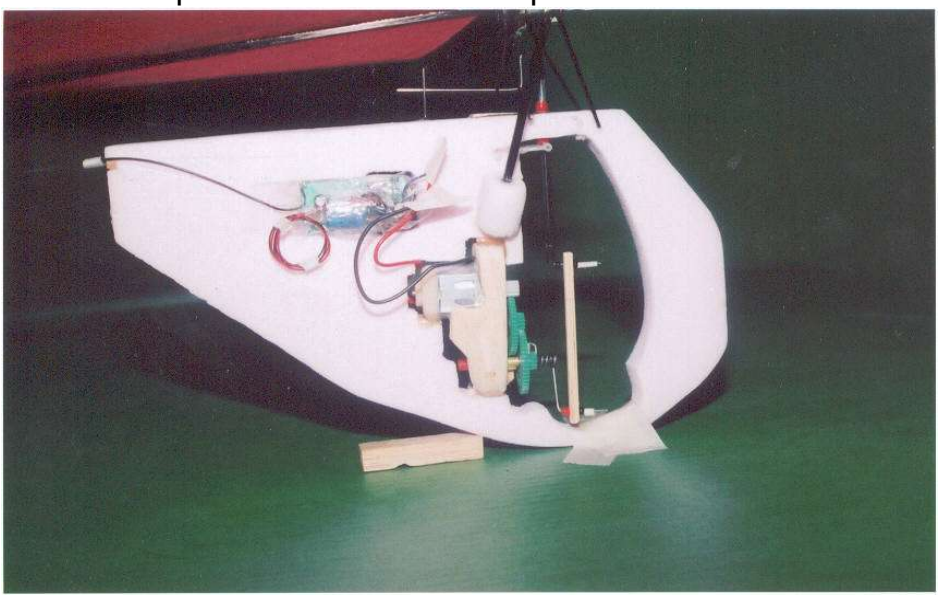


UPPER SURFACE **LOWER SURFACE**

FUSELAGE

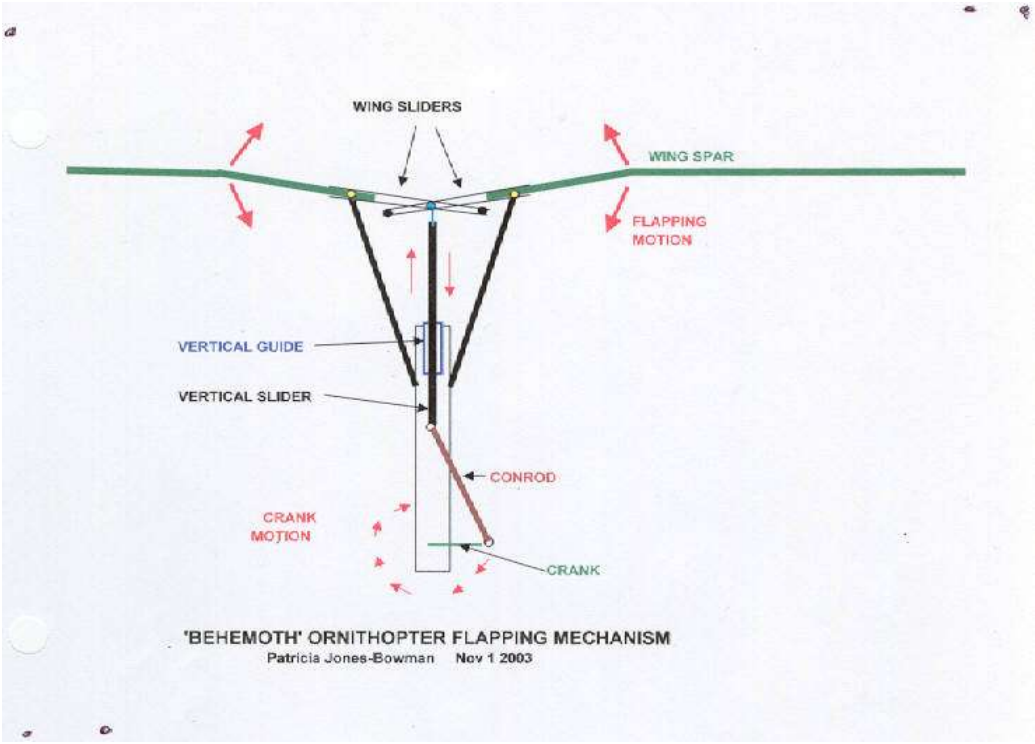
Pink 1/2 inch wallfoam cut, shaped and hollowed out to minimize weight as much as possible.

Tailboom is composed of 2 carbon rods epoxied into the foam.



FLAPPING MECHANISM

The flapping mechanism consists of a conrod [balsa] , vertical slider [carbon tube and wire] and guide [plastic tube] and 2 wing spar sliders [carbon rods]. This arrangement gives symmetrical flapping .



MOTOR AND GEARBOX

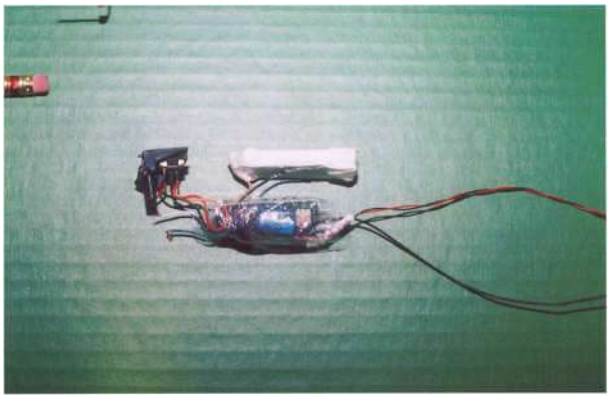
The gearbox is homemade, 2 stages with 19.2 to 1 ratio. I used plastic gears , carbon tube shaft, brass tube bearings and balsa and plywood for the case.

The motor is a small electric motor removed from a toy.

RADIO CONTROL EQUIPMENT

The radio receiver, lithium ion battery and combination switch/charging jack were removed from a toy rc aircraft [Atomic Toy's ZPlane]

The radio control was connected to the throttle only for initial tests.



FLIGHT TESTING

Glide tests were performed first. There was no tendency to roll or yaw. There was , however, a tendency to pitch down.

Flight testing was at full power and did not last long !! I attempted to adjust the CG aft to reduce the pitch down problem and had noticed some improvement. Unfortunately, Behemoth landed nose first , jammed the flapping mechanism and stripped 2 teeth on the stage 1 gear. So ends Behemoth's flight tests.

A landing gear is now being installed with the intention of conducting some ground testing.

Behemoth 4 is now under construction. There have been many design changes which will be detailed in 'Behemoth 4 Design Notes'

July 4 2004.
This interesting moth was sitting at our front door today.
It has a similar wing planform to Behemoth.
Note the scallopped trailing edges.

Patricia Jones-Bowman