ISSUE 37

APOGEE PEAK OF FLIGHT NEWSLETTER

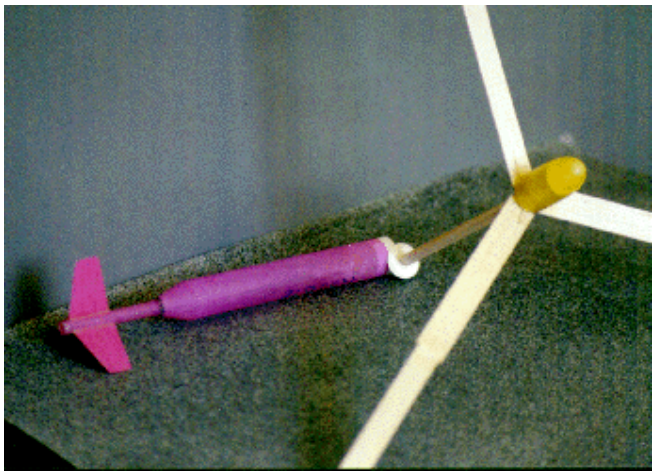
Flop-Tip Helicopter: Plans for an Internal Rotor Gyroc Model

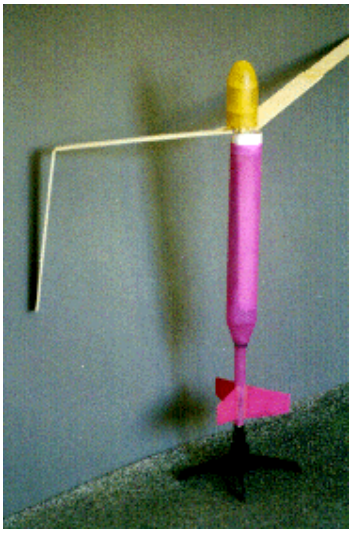
By Tim Van Milligan

This article is a description of a plan of a helicopter model created by George Gassawy. The plans were originally published in the Vol 1, No 4 issue of the "Journal of the International Spacemodeling Society." Since the F.A.I. is now making Gyroc (S9B) an official international contest event, George has asked me to re-publish the plans.

George developed this helicopter design around 1991. I never saw it fly at the Internats flyoff's, but George did show it to me while I was there in Chicago. I thought it was very innovative, and much lighter in weight than the one I was working on at the time.

This particular model was intended to be used in international competition. The rules are a bit different than NAR helicopter rules. For example, the model has to be 30 millimeters in diameter; for at least 50% of its length. Also, it had to be a minimum of 350mm long. The rules have now changed for the new FAI event, but this model could be easily modified. For those rules, you can get them at: http://www.spacemodeling.org/





For international competition, modelers will go to exceptional lengths to reduce the weight of the rocket. So for optimum performance, only the lightest materials would be used. This includes fiberglass/epoxy for the onion-skin-thick body tube.

I personally built one of these models a few years back. It was a pig at 18.7 grams. But that was because it was the first one of this type that I built. I only wanted to get it built and flown. I hadn't given much thought to try to optimize the weight yet. But for competition, I probably could get it down to a empty mass of 13 or 14 grams.

George's plans were actually laid out straight forward, except for the boom that runs through the center of the model. I talked to George about it, and he gave this clarification: "The rear views that show the rotors folded were drawn up to show the blades, and I just used copies of them without revision when I did up the new drawing.'

"The actual boom was not just hollow, but triangular. Built up from approximately 3/8" wide side strips of 1/16" light balsa, with the å'railing edge' of one strip overlapping the leading edge of another strip. That produced a nice LIGHT hollow boom. An alternative would be to use Apogee's 6 mm

APOGEE COMPONENTS
1130 Elkton Drive, Suite A
Colorado Springs, CO 80907 USA
www.ApogeeRockets.com
orders @ApogeeRockets.com
phone 719-535-9335 fax 719-534-9050

phenolic tubing."

Since this event was never held at the 1991 flyoff's, the rocket was never tested under the full power of a B7 motor. George did fly it under lower power: 1/2A3 motors with 2 and 4 second delays. George said that the 4 second delay was a better choice for this model. Using this as a guide, it would seem that a 8 or 10 second delay would be required when a B7 was used.

George couldn't remember what the mass of this model was, but since he lost it to a thermal while using the wimpy 1/2A motor, you can probably bet that it was really light!

One note on the drawing — due to software scaling techniques, the size of the model in the plans is not accurate. To scale this model from the plans, keep in mind that the main diameter of the model is 30 mm.

{ed. The ownership and rights of the plans belong to George Gassaway. Please do not copy, disseminate, or republish this or any article in this newsletter without the written consent of George.}

Plans in PDF format: Click Here

Flop-Tip Helicopter designer:

George Gassaway
1600 Oxmoor Rd.
Homewood, AL 35209 USA

About the Author:

Tim Van Milligan is the owner of Apogee Components (http://www.apogeerockets.com) and the curator of the rocketry education web site: http://www.apogeerockets.com/education. He is also the author of the books: "*Model Rocket Design and Construction," "69 Simple Science Fair Projects with Model Rockets: Aeronautics"* and publisher of the FREE e-zine newsletter about model rockets. You can subscribe to the e-zine at the Apogee Components web site, or sending an email to: ezine@apogeerockets.com with "SUBSCRIBE" as the subject line of the message.

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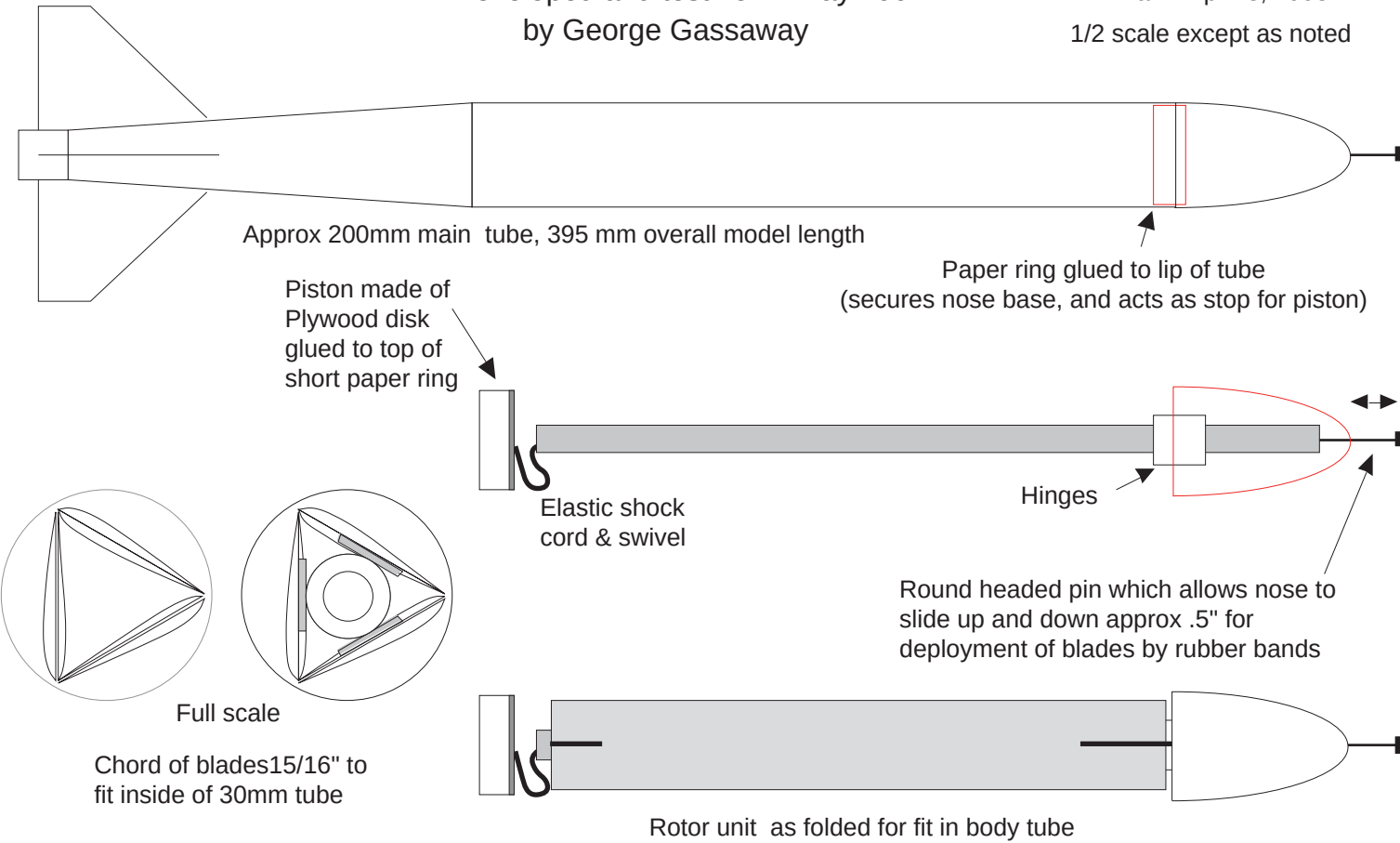
Flop-tip FAI helicopter design

Developed and test flown May 1991

by George Gassaway

Drawn Apr 23, 1993

1/2 scale except as noted



180° deployment
of tip section
2X view of
Tip blades folded
along main blades
1/16"
tip
blades
3/32"
main
blades
7"
6.5"
Monokote hinge on
bottom of blades, with
rubber band deployment
Vent hole
Swivel
Piston at top
of stop ring
1/4 scale view of deployed model