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Competition Rocketry

by Dan Wolf

Last time we talked about the boost/glide event, concentrating on the low impulse end. This time we'll discuss B/Gs sister event, rocket/glide or R/G. These two contest events are similar in that for both, the entry (or one portion of it for B/G) must have glide recovery. The difference is that in B/G, the glider may be attached to a rocket or pod on boost, and detach itself for recovery (e.g., the Space Shuttle). In R/G, the entire rocket must recover in a gliding fashion. No parts may be separated. In other words, what goes up as a rocket, must come down as a glider.

There are several methods that have been employed to achieve this transition from ballistic flight during boost to gliding flight during recovery. In the early days of the event, R/Gs of all types could be seen including no moving parts gliders, flop wings, sliding pods, sliding wings, and swing wing types. Today, competitors have narrowed in on two types for most impulse classes, sliding wings and swing wings. Sliding wings are the most popular of the two. Eighty to ninety percent of the R/G flown at most meets are sliding wing.

The plan shown here is of a typical sliding wing glider suitable for the 1/2A and A impulse classes. This glider, the Status 4, was designed by Tom Beach and first appeared in the "View from Zenith" newsletter, March '79 issue. It has been a favorite of mine and It has taken first place at many meets over the past several years, including first place in C Division "A" R/G at NARAM-33.

The plan is fairly self explanatory, but a few comments may be helpful. Cut the wing as one piece from 1/8" light balsa. Do not cut the wing at the middle line. The wing is a trihedral, so after airfoiling, separate the wing tips by cutting on the lines shown. Then bevel the cut edges to achieve the dihedral angle as shown in the plan. After the wing is dry, glue the plywood pieces to the bottom as shown. When done, the pieces form a sliding rail that is quite light, yet gets the job done. I prefer to cut the main rail and glue it to the boom first. Then I use it as a guide while attaching the rail guide pieces to the

wing. Glue the 1/32" pieces on the bottom of the wing first, making sure that they are positioned just wide enough for the rail to slide smoothly between them. If the fit is a little tight, sand the rail where it binds. Once you have it sliding smoothly, glue the 1/64" retainer pieces in place. Since this is a 1/2A-A class model, "cyano" glue can be used for the construction to speed things up a bit.

To fly, tie a rubber band on one of the piano wire loops on the bottom of the wing. Then attach the rubber band to the pin at the front of the glider. The rubber band should be loose enough to allow the wing to slide back to the boost position, but be strong enough to pull it forward to the glide position. Now tie a piece of thread to the loop on the opposite wing from the rubber band. Loop it around the rear pin, then bring it forward under the forward pin, and finally through the gas vent hole in front of the motor mount tube. With the wing held back in the boost position, tie, tape, or glue the end of string on the side of motor tube. When the ejection charge fires, it will burn the thread, allowing the rubber band to pull the wing forward to the glide position. Make sure the rubber band can't fall off, but will hold the wing forward in the glide position during the glide phase. Insert an engine and tape securely in place to prevent ejection of the engine from being kicked out at ejection (a DQ, the engine must stay with the glider too).

For 1/2A, use a 1/2A3-2T. For A, I prefer an A3-2T, but if unable to locate any of these, an A10-3T is probably a better choice than an A3-4T although your mileage may vary.

To trim the glider, insert a spent engine casing and gently hand toss. If the glider stalls, make a "stop" out of masking tape on the front of the rail to prevent the wing from sliding as far forward. If the glider dives, there are two options. First, do not insert the motor as far into the pod. Second, take a notch out of the pod standoff to allow the wing to slide farther forward. My experience has been that a 1/4" long notch is needed to allow the wing to slide forward enough for a good glide.

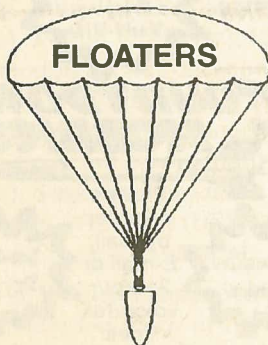
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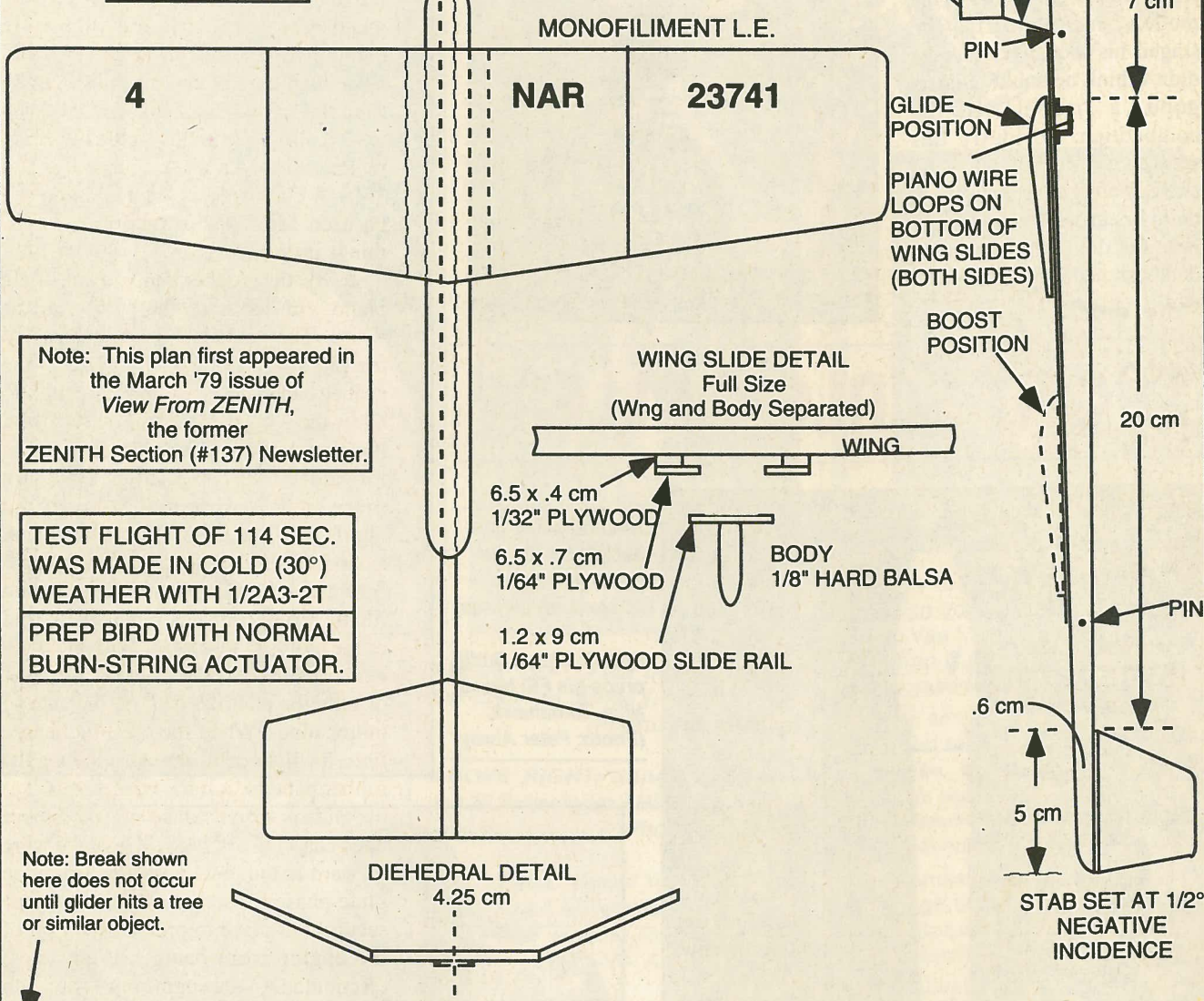
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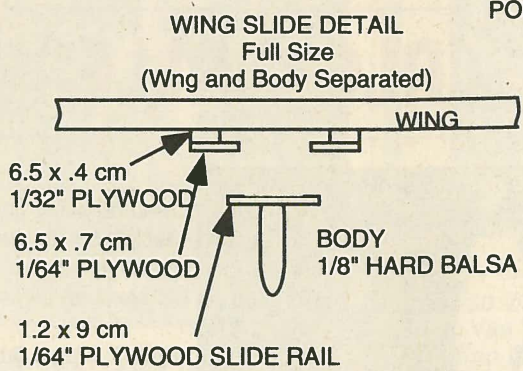
1/2A, A R/G by TOM BEACH

GLIDER PLANS
approx. 1/2 SCALE



Note: This plan first appeared in the March '79 issue of *View From ZENITH*, the former ZENITH Section (#137) Newsletter.

TEST FLIGHT OF 114 SEC. WAS MADE IN COLD (30°) WEATHER WITH 1/2A3-2T
PREP BIRD WITH NORMAL BURN-STRING ACTUATOR.



Note: Break shown here does not occur until glider hits a tree or similar object.

