A Review of the “ZAGI”
a competitor for slope combat

Trick R/C, operated by Jerry Teisan, produces several tailless gliders for combat on the slope. In addition to the “ZAGI-LE,” probably the most popular slope combat ’ship available today, Trick R/C produces the “B-2A” in silhouette scale and the “Razor,” which has a swept wing planform and sports winglets.

THE KIT

Our Trick R/C “ZAGI” came to us in a plain brown box measuring 28"x12"x4". It was nearly filled with components. A large plastic bag held the two wing halves still in their foam core beds, the pre-cut 1/8th inch balsa elevons, a complete hardware package, and the 12 page instruction manual. Outside the plastic bag floated a lead weight and a roll of packing tape. Although free to bounce around inside the box, neither of these objects seemed to have created any havoc with the foam cores.

The wings were impressive. The “ZAGI” has a wing span of 48", so each core is over two feet long. The airfoil Jerry uses is 12% thick, which makes the wings nearly two inches from top to bottom. The balsa elevons were not spongy, neither were they of such high density that they were overly heavy. The hardware package included pushrods, clevices, and control horns. The lead weight used for achieving the proper CG location weighed about 1.5 ounces. The packing tape was standard fare.

REQUIRED TOOLS

Anyone who has previously built an RC airplane more than likely has all of the tools needed to build a “ZAGI.” A sanding block with sandpaper of 150 to

320 grit is used to clean up the foam cores. Five minute epoxy is the only adhesive required. An X-Acto type knife and/or a Dremel tool makes easy work of cutting recesses in the foam. A ruler and a triangle or square with a 90 degree angle are used to place and align components. A round barreled pen or pencil is used to both mark the foam prior to cutting and as a fulcrum during balancing.

CONSTRUCTION

Cutting the "ZAGI" foam cores with a hot wire has got to be problematic because of the high taper ratio of the wings, yet the panels smoothed out nicely with a light application of sandpaper. We used the beds to support the wing panels during this process as well as while we rounded the leading edges. Once the wings were smoothed, everything, including the beds, was thoroughly vacuumed.

In order to have a firm fixture for construction, the two top beds are attached to each other using five minute epoxy; same for the two bottom beds. After placing waxed paper on the center line of the lower bed, the two wing halves were brought together and their fit checked. A mixture of epoxy and micro-balloons was applied to the root of each wing panel and the two parts brought snugly together using the bottom beds as a jig.

Believe it or not, when the epoxy has hardened, it's time to start covering! Long strips of packing tape are layered in slightly overlapping fashion from the trailing edge to the leading edge. We placed the tape strips down while alternating between the left and right wing panels, thus making sort of an overlapping weave at the center of the wing. Top surface first, then bottom.

Once the wing is covered, it's time to take care of the elevons. The instructions say to cover the elevons with tape and then use tape to construct a hinge. This turns out to be a LOT of tape, which equates to a LOT of weight, much of it excess. The "ZAGI" is so short coupled that an extra ounce at the trailing edge required four ounces in the nose to compensate. If we had it to do over again, we'd consider putting a couple of coats of dope on the elevons and using the tape only to construct the hinge.

Now that the airframe is complete, it's time to install the radio gear!

RADIO INSTALLATION

All of the main radio components are installed by forming a hole of the appropriate size at a predetermined location. Receiver, battery pack and servos are all press fit into the airframe. If done properly, this is very secure and affords quite a bit of protection.

Before laying out the location of the various components of your radio system, you’ll need to know which of three radio installation procedures will be followed. This is because Jerry includes detailed directions for installations using transmitter based mixers, for those using add-on mixers at the receiver (Christy mixer or equivalent), and for those utilizing the Du-Bro mechanical mixer. We’re using our trusty JR Century VII system which has both v-tail mixing and aileron-rudder mix. These two options, used together, allow us to fly elevon controlled aircraft off the single right hand transmitter stick.

Servo location is the same if mixing is at the transmitter or receiver, while the Du-Bro mechanical mixer requires servos be mounted in different locations. Locations of the battery pack and receiver are based on control setup, but are easily laid out.

Once locations of the components are marked on the foam, it’s a simple matter to carve out a properly shaped receptacle in the foam. We cut the foam into small squares using an X-Acto blade, then cleaned up the recess with a small router blade mounted on a Dremel tool. It’s important that everything fit snugly. We didn’t run into any problems, but you can always fill a too large hole with balsa scrap.

The antenna and the wiring to the servos is run through shallow channels carved in the foam. We used an X-Acto blade to cut an initial guide groove, then ran the Dremel router beneath the surface of the foam while following the guide groove.

The lead nose weight is the last thing to be embedded in the foam core. The control horns are mounted on the elevons. A pushrod connects each servo to its respective elevon.

Having everything out in the open is a unique visual experience, and utterly efficient for use in slope combat.

FINISHING CONSTRUCTION

Just two things left to do.

First, the elevons are set up for aerodynamic trim. This consists of using a straight edge to align the elevons with the bottom surface of the wing trailing edge.

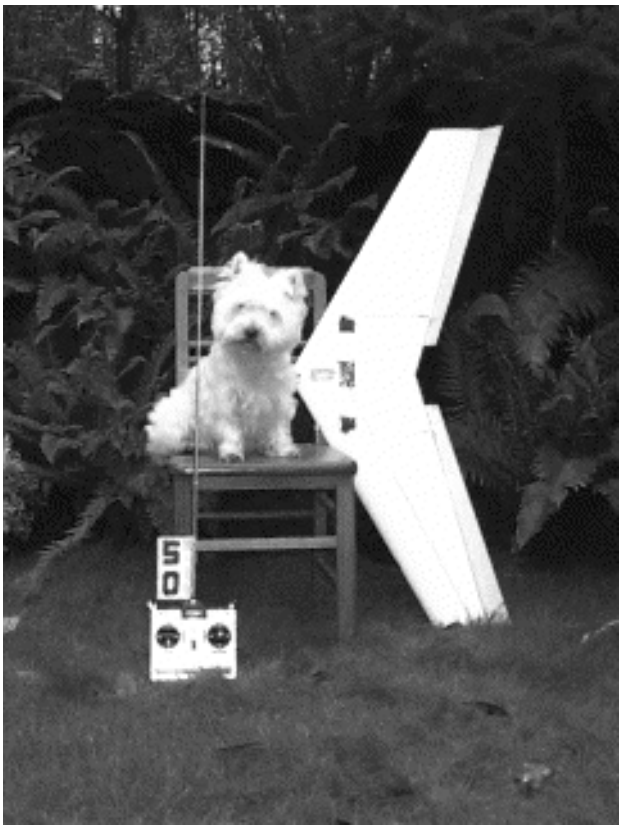
Second, the location of the CG is marked on the bottom surface of the wing using a triangle or square, and that round barreled pen or pencil listed under “tools needed” is then lightly taped across the centerline right over that mark. The wing is placed right side up on a flat surface and weight is

added to the nose in the area of the already existing lead nose weight until the complete "ZAGI" momentarily balances on the pencil. Because we fully taped the elevons, we had to add quite a bit of weight to the nose of our "ZAGI." As mentioned before, we will attempt a lighter finish on the elevons when we build another.

An optional step is painting. If you are to be involved in a slope combat environment, be sure to follow through on this. Identification of your 'ship in the heat of battle is imperative! It's also beneficial to use a different color for the top and bottom of the wing to aid in orientation under tense conditions.

FLYING

Due to uncooperative weather during late summer, our flying experiences with our "ZAGI" were limited to some tosses off our deck and over the field below. The "ZAGI" flies fast, rolls quick, and exhibits rapid pitch response. These are all good characteristics. Recovery from strange attitudes is easy due to the its inherent stability.



Hobie Dogg, our West Highland White Terrier, and the "ZAGI".

The instructions cover repair of major dings to the leading edge. It’s just a matter of cutting out the dinged section, gluing in a styrofoam block, sanding the block to shape, and retaping. Since our field is filled with man-eating blackberry bushes and a grove of young alder, we got to experience some minor dings to the leading of our “ZAGI” wing during our experimentation. Most of these disappeared overnight, just as the instructions promised. The others, all minor, have not been repaired as yet because they don’t seem to be adversely affecting flight performance.

CONCLUSION

The “ZAGI” builds incredibly fast - three hours max. We counted the curing time of the epoxy for this total, but not the time spent swinging various parts around our heads while making airplane noises. The resulting airframe is nothing if not downright cute. It is robust, flies great, and is ultimately portable. With some carefully chosen paint schemes, this little goblin has great potential as an art form.

Our “ZAGI” was produced by Trick R/C before the advent of the “ZAGI-LE,” and so is composed entirely of white styrofoam. The LE designation comes from the use of expanded polypropylene (EPP) foam on the leading edge of

SPECIFICATIONS		
	“ZAGI”	“ZAGI-LE”
Wing span	48"	48"
Construction	2 lb. white foam throughout	2 lb. white foam & EPP leading edge
Wing area	2.83 sq. ft.	2.83 sq. ft.
Airfoil	Zagi 12/5	Zagi 12/5
Weight	16 oz.	23 oz.
Wing loading	5.65 oz./sq. ft.	7.77 oz./sq. ft.
Required radio	2 channel with electronic or mechanical mixer	2 channel with electronic or mechanical mixer
Price	No longer available	US$45 plus US$6 P&P

the wing. EPP foam is nearly indestructible; huge dents immediately spring back to their original shape.

The EPP foam leading edge brings the overall weight of the "ZAGI-LE" to 23 ounces, and the wing loading up to a bit over 7.7 oz./sq.ft. The "ZAGI-LE" will fly in winds of 7 to 50 m.p.h. Jerry has flown his "ZAGI" with an additional 16 ounces of lead right on the CG, effectively doubling the original design wing loading!

Jerry has also added winglets to the "ZAGI-LE." These seem to improve performance, but can get knocked off in combat, leaving the aircraft nose heavy and more susceptible to hits from other combatants.

Due to the overwhelming acceptance of the "ZAGI-LE," the original "ZAGI" is no longer in production. The "ZAGI-LE" uses the same construction techniques and is available in six colors. It sells for US$45.00 plus $6.00 packaging and shipping. Trick R/C, Jerry Teisan, 938 Victoria Ave, Venice CA 90291. To order call (310) 301-1614. On the World Wide Web, <http://www.zagi.com>; E-mail to Zod@zagi.com.

Buy it, glue it, tape it, chuck in your radio and fly it! What a kick in the head!