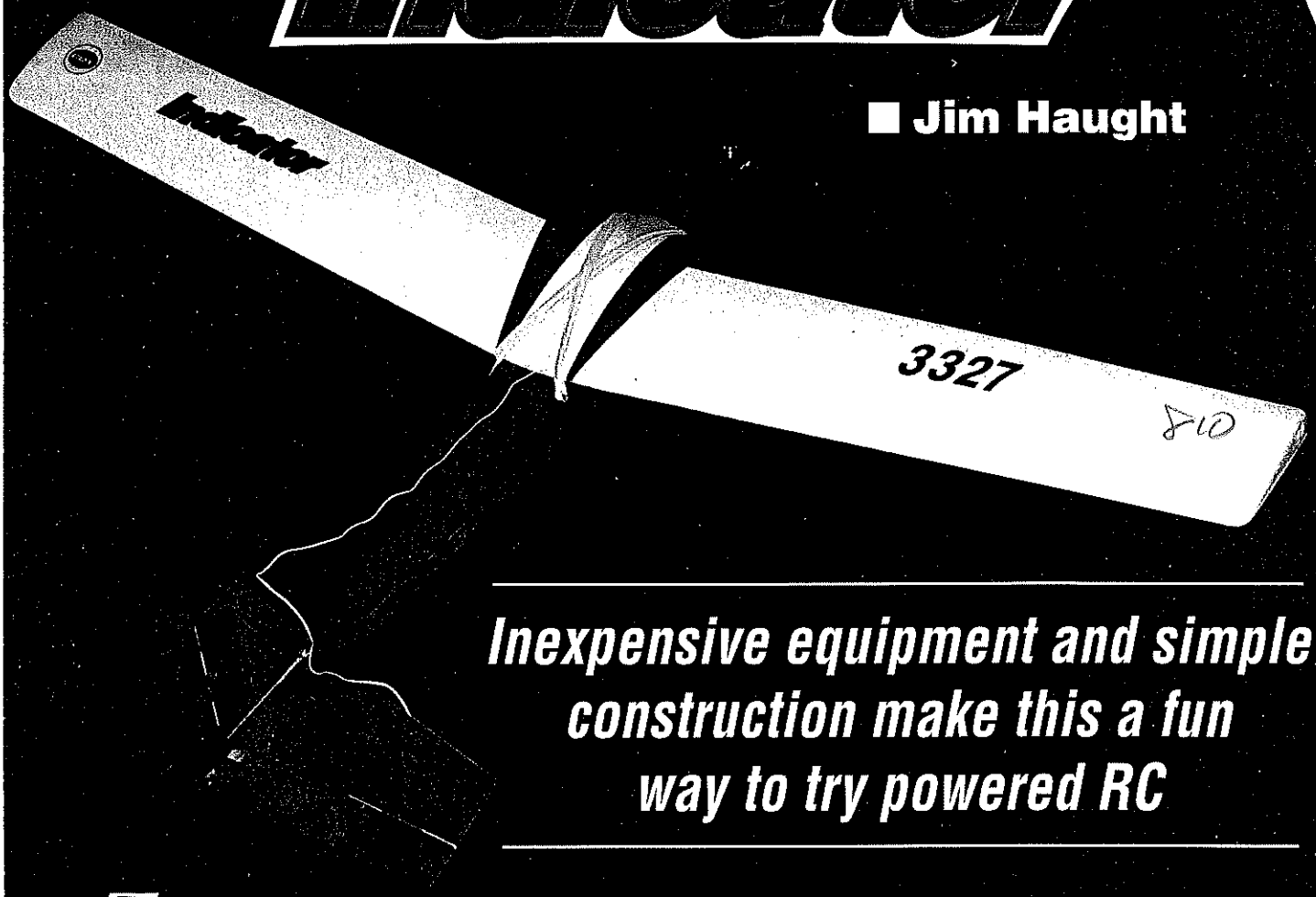
Indicator

■ Jim Haught



Inexpensive equipment and simple construction make this a fun way to try powered RC

Indicator is an 80%-size ½A-powered version of my Vindicator (October 1995 *MA*). Construction has been simplified, with all-sheet tail surfaces and a stock Sig foam wing.

The nose has been lengthened a bit from the "stock" Vindicator, to make the model less sensitive to balance without the need for ballast—dead weight that really hurts the performance of small models.

At 22 ounces ready to go, the model is not a lightweight, but there's more than enough power to fly the model with no problems. The foam wing has a thicker airfoil than Vindicator, which helps to slow things down and make the model easy to handle.

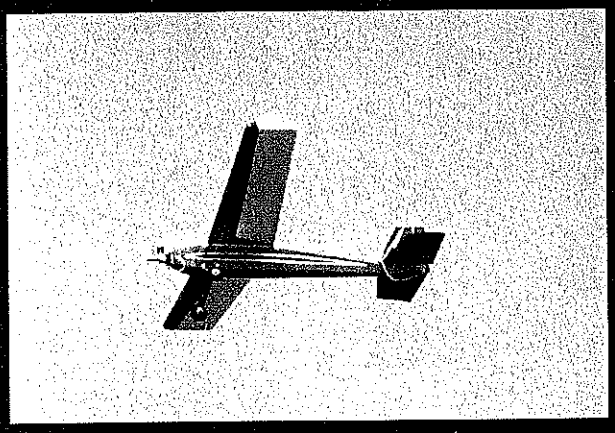
Perhaps the best endorsement came from test pilot Steve Kaluf (see sidebar), who felt that this model actually flew better than its big brother—it was more *fun* to fly. That's the whole idea!

CONSTRUCTION

Simplicity is the name of the game; easy-to-cut straight lines are everywhere. The hardware (landing gear, wheels, pushrods, horns, etc.) was Great Planes brand, purchased from Tower Hobbies ([800] 637-4989 for orders).

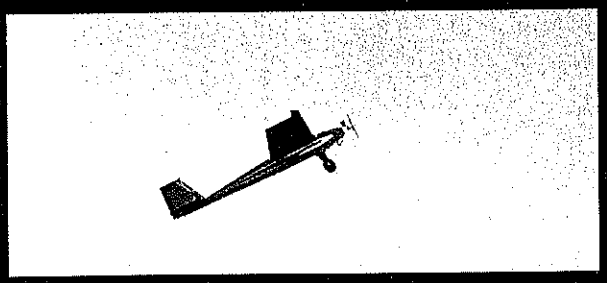
Wing: The foam wing eliminates many of the construction headaches that plague beginners. There are no dihedral joints to make,

Photos by the author and Matthew Usher Graphic Design by Carla Kunz



Flyby: Indicator is steady, smooth, and just plain fun to fly—even more so than its big brother, Vindicator.

With my hooves thundering down Stage Center at Muncie (6.4 on the Richter scale), Indicator climbs right out of my hand.



Above: The one-ounce tank holds enough fuel for several minutes of flight—more than enough for a beginner.

Right: Sig molded foam wing is finished with Plastinamel. Logo and stripes are cut from MonoKote trim sheets.

or leading edges to carve, or framework to be covered.

Instead, order the wing from Sig Manufacturing (401-7 S. Front St., Montezuma IA 50171; part number RP-FC-500). It's sold as a replacement part for a series of kit models.

All you really need to do to the wing is to sand it lightly with fine-grit paper to remove any bumps or "fuzzies" from its manufacture. Then it will need some kind of fuel-proofing protection. This isn't easy, because the solvents in many paints will attack (melt) foam.

I used a Sig product called Plastinamel for the red trim on the wing. It's very thick, with little or no solvent in it, so it's safe for the foam. It took a couple of coats to get everything filled up, but it seems to have worked well.

Tail Surfaces: These are cut from lightweight sheet balsa and sanded to the cross-section shown.

Hinging of the stab and rudder is accomplished with what are called "MonoKote hinges," although many other heat-shrinkable films can be used for hinge material. My hinges were made from 1-mil Model Research Labs Mylar (same material used to cover the Potato Man).

Cut two strips of film as wide as the roll of covering and about an inch long. With your covering iron heated up, lay the strips on your workbench—one

hesive-side up, the other with the hesive facing down. Slide the strips gether so there is about 1/8-3/16 overlap one edge.

Touch the tip of your iron to the erlap, so the adhesive is activated and e rectangles are joined—a sort of "spot eld." Be sure that the entire width of the erlap is joined—this is the equivalent the pin in a "normal" hinge. Cut this ng strip to the width of individual nges—perhaps an inch or so. Make up a antity of these hinges sufficient to ver the full hinge area of the surfaces be joined.

Mate the surfaces by attaching the nges to one surface first, alternating tween top and bottom. Align the hinges that the overlap is centered in the nge gap.

When you have a full "line" of hinges, gin mating the mating surface by taching one hinge at a time to the cond surface. Light tension can be plied to the hinge as it's being heated give a snug, gapless fit. Proceed along e hinge line until the full length has en joined.

Cover the stabilizer and rudder with eat-shrink film. I used Carl Goldberg lodels' UltraCote on the original.

Alignment of the tail surfaces is a bit asier if the stab and rudder are joined efore attaching the assembly to the uselage. Carefully mark the centerline n the stab, and trim the covering away here the rudder will make contact (so ou have a wood-to-wood joint).

Use thick CyA to join the parts, while aking sure that the rudder is positioned n the centerline and doesn't lean to one de—use a drafting triangle to hold the lignment until the glue sets. This ssembly may be set aside until the uselage is completed.

uselage: This is a sheet-balsa box that's uilt from the bottom up. The sides are ttached to the bottom first, then the nternal items (rails, braces, tank, etc.) re added. Finally, the top sections are ttached and the fuselage shell is sanded o shape.

A drafting triangle should be used epeatedly during construction to assure nat the fuselage is "square" and in lignment.

The landing gear is mounted to the ottom of the fuselage with crisscrossed 64 rubber bands, to allow some "give"

Indicator

Test Pilot's Report

IT IS ALWAYS fun to be involved with a new design. I take particular pleasure when I'm allowed to be the "test pilot" of a new model. Such was the case when Jim Haught asked me to be the first to fly Indicator. This model's wing is a bit fatter than the one used on the Vindicator, so I hoped it would fly a bit more slowly.

Jim is known for picking terrible days to test-fly new aircraft (windy/cold). Fortunately he messed up on the day picked for Indicator's first flight (calm/warm).

The Cox .049 started right up. I had never used the Cox Cobra radio before, but I must admit I like the one-hand grip and stick configuration. This would make a nice system for an RC hand-launch glider that did not require any mixing. *(Editor's note: That's what I bought the system for, but this project came up first.)*

We determined that a hand launch was in order. This is usually best when you do not have a throttle to work with. A hand launch will ensure that the airplane gets a good, straight start. If you try to ROG (Rise Off Ground), you would probably find that the engine torque makes the model turn around in a circle before you can correct with the rudder. (I do feel that Indicator would be better at ROG than most ½As since it has a nice, long tail moment that would help keep it headed in the right direction.)

You must be certain that the person doing the hand launch knows what he is doing. The wings must be level, with the nose of the aircraft pointed right at the horizon or even slightly down. If your launcher tosses the aircraft too hard, the engine could starve for fuel and die; too softly and the airplane will not be at flying speed. Be ready on the controls to correct for any problems your launcher may cause!

Fortunately I did not have any of these problems. It pays to have a free-flighter as your launcher! They hand-launch all the time, and really know how to do it.

Indicator flew right out of Jim's hands, requiring very few corrections from me. The engine was slightly rich; I recommend this as a good setting, since it tends to lean out a bit in flight. There is plenty of power available. In fact you'll probably be amazed at how well an .049 hauls this bird around.

Turns are very "groovy," and equal to the left and right. As is normal, a bit of elevator is required to maintain level flight in the turn. Indicator also recovers from turns nicely. There is not a lot of slop, as associated with many rudder/elevator models as they exit turns.

We were able to fly for approximately five minutes on the one-ounce fuel tank. When the engine cut off, the model was fairly high and well off the end of the runway. I was a little worried that it might not make it back (not a problem, though).

There was very little trim change at engine cutoff, except a slightly nose-down attitude, which I feel is important for a trainer type aircraft. You don't want the trim to change to the point that it is uncomfortable. A slightly nose-down attitude will naturally keep the speed up (also important).

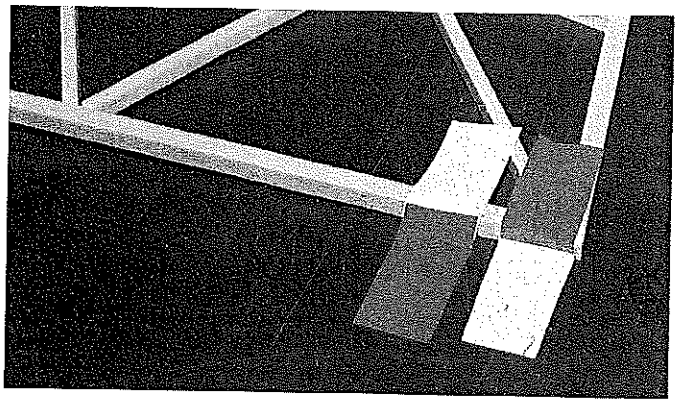
Allow Indicator to maintain this nose-down attitude all the way to the runway. As you near the ground, begin to pull back on the elevator, bringing the nose up slightly. This will slow the airplane, and as it gets into ground effect will provide for a nice, gentle touchdown.

Subsequent flight tests were flown in winds up to 15 mph. Indicator handles this amount of wind much better than most ½As I've flown. You need not be concerned about flying this model in this amount of wind.

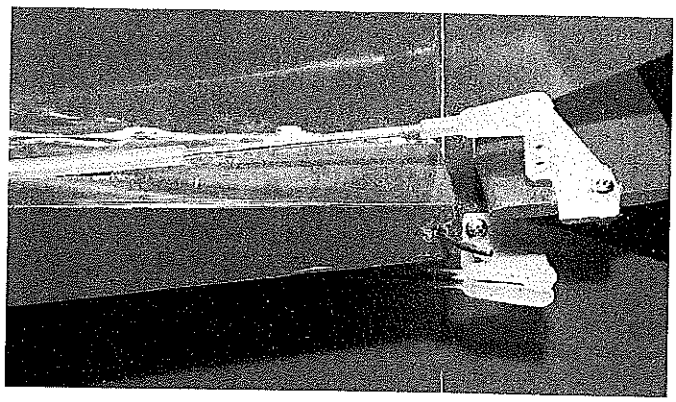
After you first get the airplane up, do some simple stalls with the engine running to show yourself where the "break" point is. You will find that stalls are very gentle, with no tendency for the wing to fall off to one side or the other (tip stall).

Indicator is a nice-flying airplane that is very easy to build. The Sig foam wing is very strong and provides gentle characteristics. I would recommend this model to anyone as a first building/flying experience. ✈

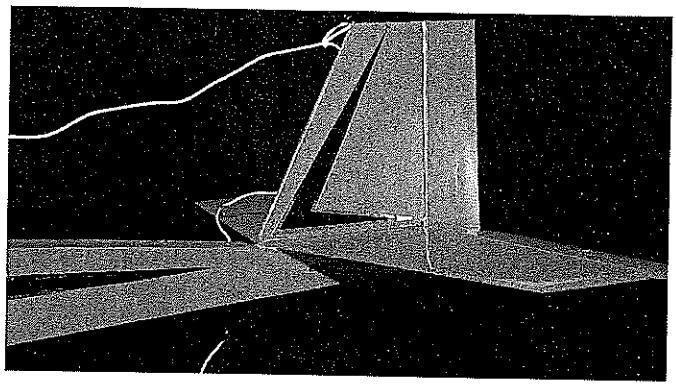
Steve Kaluf



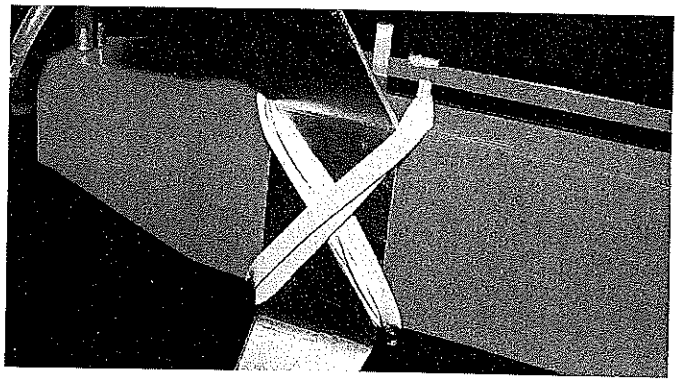
Here's how MonoKote-style hinges are applied, shown here on a Vindicator stabilizer. Text details the procedure.



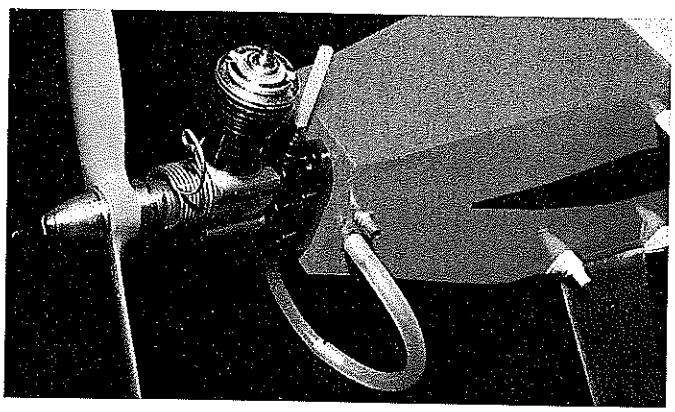
All hardware used is standard for ½A models. Music wire tail skid replaces steerable tail wheel on larger Vindicator.



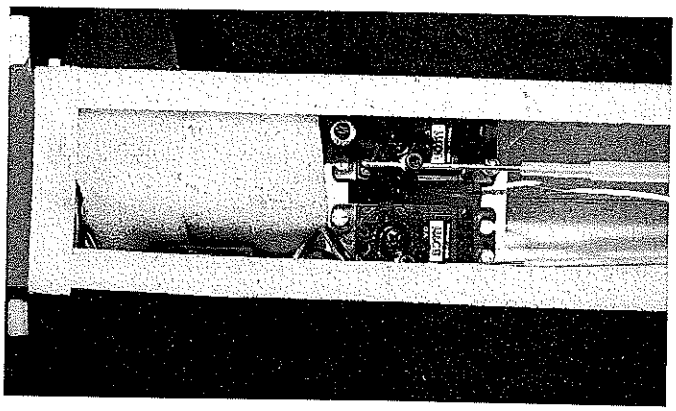
All-sheet tail surfaces are practical for this size model and are easier to build and repair than built-up structures.



Landing gear is attached with #64 rubber bands to allow the gear to shift or come off on those less-than-perfect landings.



Cox Killer Bee used for initial tests has more than enough power; "normal" ready-to-fly engines will work fine.



Test-fit of two-channel radio prior to adding grommets and all screws. Battery pack is four alkaline AAs wrapped in foam.

during rough landings. The gear will shift position or pop off, rather than yank out part of the fuselage!

As with the tail section, the original fuselage was covered with UltraCote.

The tail surfaces are glued to the fuselage after the shell has been covered. Be sure to scrape/peel the covering material away from all points where the surfaces contact. You want wood-to-wood joints at all times—not wood-to-covering; There's no strength there.

The radio should be installed after the rest of the model is complete, so the center of gravity (CG) can be accurately determined. On my model, the receiver and batteries are as far forward as I could get them, and the servos are positioned roughly about the CG.

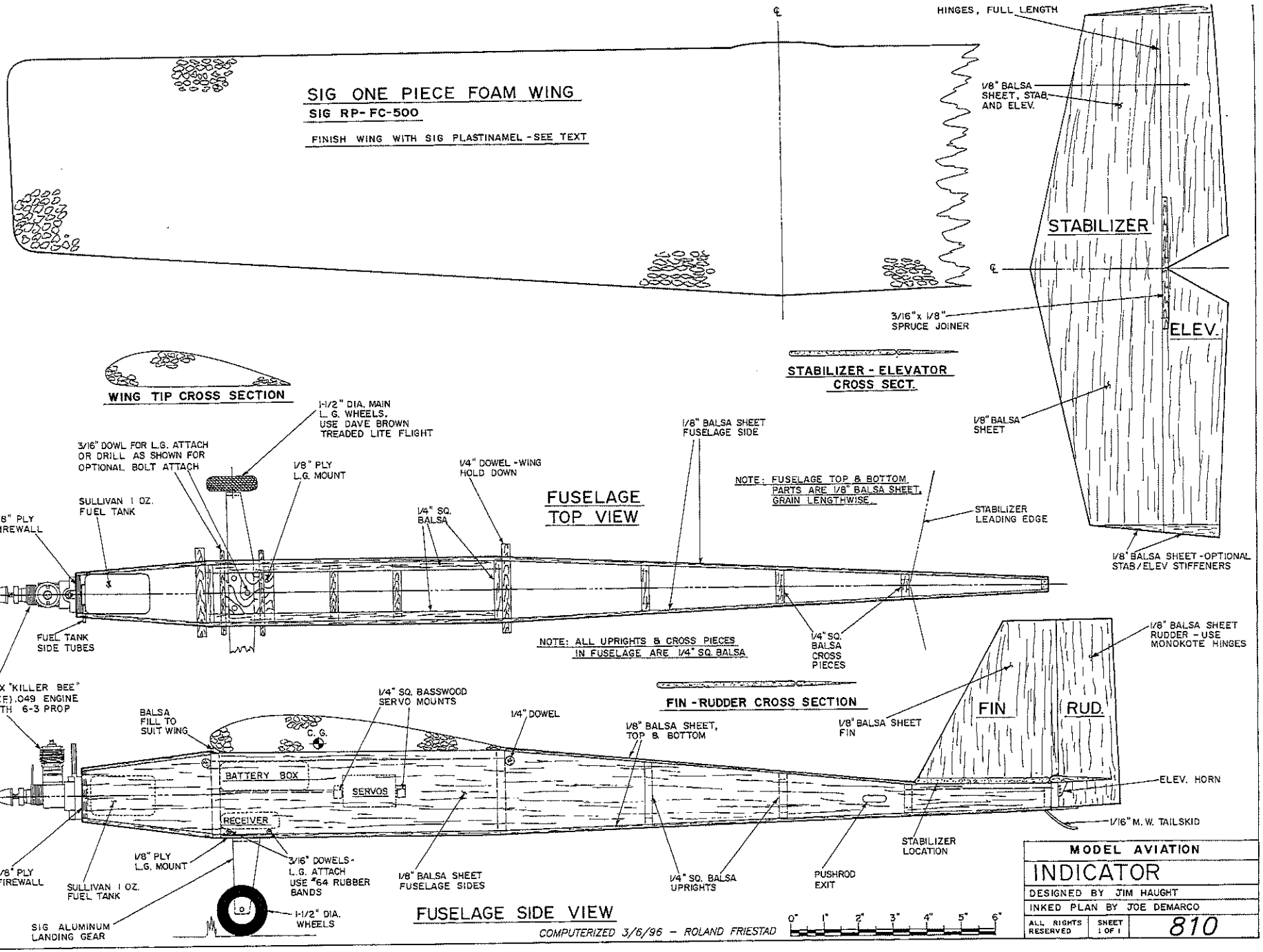
Preflight: The proper CG is important for a stable model. The foam-wrapped battery pack can be shifted until the correct balance point is obtained.

Check to be sure that the control surfaces have no bind, slop, or places where the action of the servo could be impeded. The action must be smooth and as free of friction as possible.

Once again, use your drafting triangle to check for alignment and squareness of the flying surfaces. A few minutes' work,

Indicator

Type: RC Sport/Trainer
Wingspan: 45 inches
Engine: Reed-valve .049
Functions: Rudder, elevator
Flying weight: 22 ounces
Construction: Molded foam wing, sheet balsa fuselage and tail surfaces
Covering/finish: Plastinamel (wing), Iron-on film (balance of model)



Full-Size Plans Available—see page 189

od a bit of shimming here and there, can ıve a lot of grief on the flying field.

lying: When you're at the field with the ıodel assembled, it's natural for some ıerves" to set in, and to get in a hurry to .y—to see how your new model will do. *'ut this is the time to slow down; back ff, take a deep breath, and stop to think verything through.*

If at all possible, get an experienced ilot to help you check things out—and ith a bit of arm-twisting, to fly your ıodel the first couple of times. You'll ave enough to worry about without the xtra pressure of flying a brand-new ıodel. Step back a bit and let someone ou trust fly the model, while you bserve the flight as closely as possible.

After making sure that no one else is n your frequency, do a radio range-heck by turning on the radio and having ne person carry the transmitter away rom the model for a good distance (a ouple of hundred feet or so), periodically esting the controls while the other person hecks to see if the surfaces move the vay they should.

Test-run the engine and hold the ıodel in various flight attitudes to be ertain that the engine will stay running egardless of position. You might also vant to time a tankful of fuel, to give ourself an idea of how long you can eep the model airborne.

Make sure there are no loose glue oints, that the wheels turn freely, and hat everything seems to be properly ligned.

Now you're ready for that first flight.

When the engine is running, check the ıeedle-valve setting to be sure the engine s not set too lean (needle valve too far losed, depriving the engine of fuel). If ıything, it's best to err on the side of ıaving the air/fuel mixture be just a bit ich (actually, too *much* fuel in the ixture). This can cost some power from eak, but that's better than a too-lean etting, which can cause the engine to uit at any time.

It will simply take some practice and a ew flights to find where the best setting s for consistent, reliable power. Each ngine is different, and some engines ctually "lean out" when the model is irborne—so your "good on the ground" etting might need adjustment for best performance in flight.

The original was tested with the Killer Bee .049 (the engine I had on hand at the ime), which is admittedly a bit more powerful than the ready-to-fly engines, but it's quite apparent that the other engines would be plenty "strong" enough.

All flights on my model have been hand-launched. There has been some breeze each time we flew the model, so we felt it would be less risky to launch this way, since there is neither a steerable tail wheel nor throttle control to help things along. We may try Rise-Off-Ground (ROG) takeoffs in calm weather—if we ever have any!

To hand-launch, face directly into the wind and be sure the wings are level, with the nose pointing straight ahead. Jog along with the model for a few steps and give it a firm push (*not* a throw—it isn't necessary) to get it going. See the photo of my graceful, balletic launching style (sounded like a herd of buffalo clomping down the runway) to get an idea. Note also that the model began climbing right away—an indication of the power available.

Indicator is far from an aerobatic airplane, but it can do some simple things like loops and stall turns. It's designed as a cruiser—to give you time to get used to the controls without great risk to the model.

It has been a fun project, and I have no complaint with the engine or radio—both have performed flawlessly, even during our midwinter test sessions.

I look forward to having a lot of fun with Indicator, and I hope it will do the same for you. ✈