

ELECTRIC DUCTED FAN FUN! THE ELECTRO-SCREAMER

Ready to try an electric ducted fan? Don Belfort designed this compact, simple aileron/elevator job for HiLine's Red Flame Blaster fan unit. Inexpensive to build and delivers surprisingly good performance, especially on seven cells. Build one and see for yourself!

This month, instead of the usual electric column, I have a real treat for you thanks to Don Belfort of West Chester, Ohio. Don and I have been pen-pals for three years, ever since I first inquired about his small DC-3 that appeared in one of the model magazines. In fact, we've only met face-to-face twice, both times while he was visiting relatives here in San Diego.

Those of you who have seen pictures of his aircraft grace the pages of this and other

and even includes a Styrofoam nosecone and tailcone. But aren't ducted fans expensive? Not this one! The second best part about this model is that the entire plane can be built for under \$50—including the motor and fan unit. The first best thing about this plane is the way it flies!

Don designed the model, has flown his prototype many times and still marvels at how well it performs. Everyone at his field oohs and aahs about this little

a beginner's plane—you should have experience with some faster, aileron-equipped models before flying this one.

A WORD TO THE WISE

Before starting construction, we need to make a statement on safety. Electric aircraft can be very dangerous due to their instant-on ability. The use of a ducted fan introduces additional safety concerns. The unit should always be powered up and down



The Electro-Screamer as built by *MB* columnist Roger Jaffe is covered in bright colors of MonoKote and Ultracote for good visibility. Model was designed around HiLine's Red Flame Blaster fan unit, which sells by itself for \$25.95 or complete with a six-cell 600-mAH NiCd pack for \$39.95, from HiLine, P.O. Box 11558, Goldsboro, NC 27532. S&H runs an additional \$2.50.

magazines know he's a prolific and very capable builder. Don shared with me a set of plans for his "Electro-Screamer," an RC electric ducted fan design powered with the 50-watt "Red Flame Blaster" fan system sold by HiLine. The unit comes assembled

ducted fan gem that "screams" as it moves like the Concorde. Riding his enthusiastic coattails, I built one too, and have experienced the same flight characteristics with the same responses from my fellow fliers. The Electro-Screamer is *not*

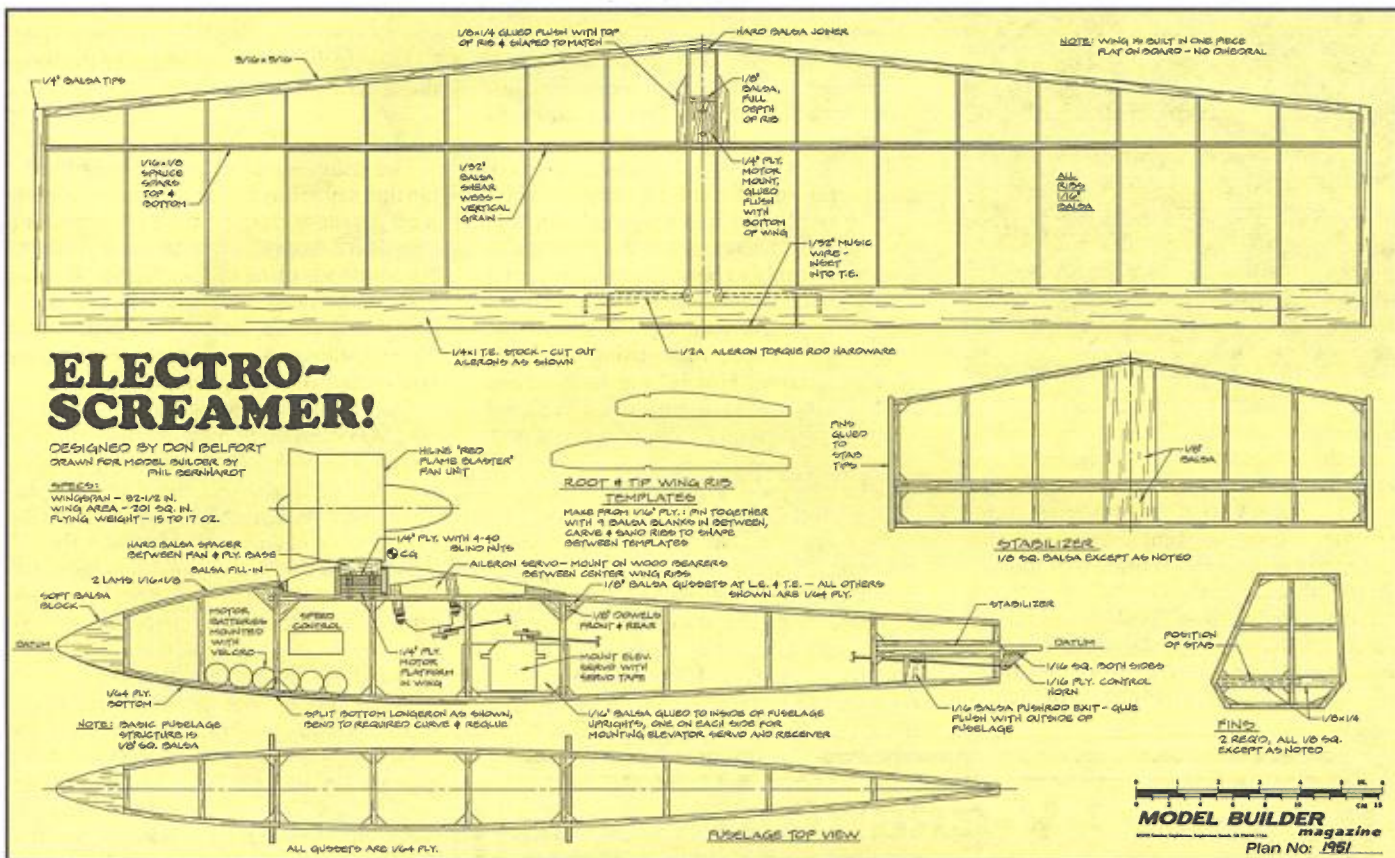


The prototype Electro-Screamer by designer Don Belfort. Simply mounting the fan unit above the wing avoids the complexities and hassles of an internally mounted installation. Wing could easily be bolted on if you're not partial to rubber bands.

slowly and smoothly. Never look into the fan unit when it is running or aim it at anybody in close proximity. If it is powered up indoors (like on the workbench), make sure the area is free of loose items which can get sucked into the duct and then expelled at high speed.

CONSTRUCTION

Begin by building the fuselage sides. Tape waxed paper over the plans and build one fuselage side, making sure that the balsa trusses are cut to the proper angle and meet the fuselage longerons with no gaps. After one side is assembled, cover it with



ELECTRO-SCREAMER!

DESIGNED BY DON BELFORT
DRAWN FOR MODEL BUILDER BY
PHIL BERNHARDT

SPRINGS:
WINGSPAN - 82 1/2 IN.
WING AREA - 221 SQ. IN.
FLYING WEIGHT - 15 TO 17 OZ.

HARD BALSA SPACER
BETWEEN PAN & PLY BASE

2 LAMIN 1/16" X 1/8"
SOFT BALSA BLOCK

PROPELLER
MOUNTED WITH
VELCRO

1/16" PLY
BOTTOM

NOTE: BASIC FUSELAGE
STRUCTURE IS
1/16" SQ. BALSA

HELIX "PRO
PLANE GLIDER"
PAN UNIT

1/16" PLY WITH 4-40
BLIND NUTS

ALERON SERVO - MOUNT ON WOOD BEARERS
BETWEEN CENTER WING RIBS

1/16" BALSA QUADDED AT LE. & TE. - ALL OTHERS
SHOWN ARE 1/16" PLY.

1/16" CORVELD
FRONT & REAR

MOUNT ELEV.
SERVO WITH
SERVO TAPE

1/16" BALSA GLUED TO SIDES OF FUSELAGE
UPRIGHT, ONE ON EACH SIDE FOR
MOUNTING ELEVATOR SERVO AND RECEIVER

SPLIT BOTTOM LONGERON AS SHOWN,
BEND TO REQUIRED CURVE & RESQUE

ALL QUADDED ARE 1/16" PLY.

ROOT & TIP WING RIB
TEMPLATES

MAKE FROM 1/16" PLY: PUT TOGETHER
WITH 1 BALSA BLANK IN BETWEEN,
CURVE & SAND RIBS TO SHAPE
BETWEEN TEMPLATES

1/16" T.E. STOCK - CUT OUT
ALERONS AS SHOWN

1/16" AILERON TORQUE ROD HARDWARE

1/16" BALSA, FULL
DEPTH OF RIB

1/16" PLY MOTOR
MOUNT, GLUED
FLUSH WITH
BOTTOM OF WING

1/16" MUSIC
WIRE -
NEED
INTO T.E.

1/16" BALSA TIP

1/16" BALSA, FULL
DEPTH OF RIB

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waxed paper and build the second side on top of the first.

After the two sides are built, cut triangular gussets from 1/64 plywood and glue them in place as shown. It's easiest to put a dab of CA glue in the corner that will receive the gusset, then put the gusset in place with tweezers. Use balsa for the four large gussets that hold the dowels for the wing rubber bands.

Pin and brace the two fuselage sides

upright over the top view and install the crosspieces. Make sure that the two sides are vertical and that the fuselage centerline is perfectly straight.

Rough cut and glue the noseblock to the front of the fuselage. Don used light balsa for his noseblock; I used a chunk of leftover blue foam used for foam wing cores. Both materials work well.

The tail section is straightforward—just build the parts over the plans. Be

sure that your balsa sticks are straight; it's important that the tail surfaces be as flat and true as possible. Remember to build two vertical fins.

You'll notice that the plan does not show individual templates for the wing ribs; Don used the old "balsa blanks between two plywood templates" trick to turn out a perfectly tapered set of ribs. Make the root and tip airfoil templates, complete with spar notches, from 1/16 plywood. Cut nine

■ LEFT: Model frameworks don't get much simpler than this! As pictured here, the nose on Roger's model is shaped from a chunk of blue foam; could also be carved from soft balsa, your choice. ■ RIGHT: Don Belfort launches for another exciting flight. Don says if you want to see this ship *really* move, try it on a seven-cell pack instead of the normal six.



THE ELECTRO-SCREAMER

Designed by Don Belfort

WINGSPAN	32-1/2 in.
WING AREA	201 sq. in.
FLYING WEIGHT	15-17 oz.
WING LOADING	10.75-12.25 oz. sq. ft.
OVERALL LENGTH	23-5/8 in.
POWER	HiLine's Red Flame Blaster ducted fan unit, running on six or seven cells.
RADIO	Three channels required (ailerons, elevator, motor).

balsa rib blanks, stack them together and pin the root and tip rib templates to opposite ends of the stack; position the templates so that the spar notches line up straight across the stack. Use a sharp knife and a medium-grit sanding block to shape the rib blanks to the outline determined by the two rib templates. After your ribs are sanded, cut the spar notches, pull the pins and *voila!*, you have your first stack of ribs. Use the same procedure to do the other side of the wing, but reverse the placement of the rib templates. If you forget, you'll end up with ribs for two right (or left) wings. You'll have to promptly destroy the evidence lest your modeling buddies find out and ridicule you unmercifully.

The rest of the wing construction is very quick and you should have no trouble. Don't forget to add the short length of music wire on the trailing edge at the center; this prevents the rubber bands from digging into the thin balsa trailing edge. The method of aileron hinging is not critical. Don used EZ hinges and I made mine using the heat-shrink covering. Finally, the fan's intake duct is cut from a foam coffee cup and glued in place with RC-56 or white glue.

COVERING

Don used Coverite's Micafilm covering on his model. Micafilm is one of the lightest coverings that can be applied with a heat iron, but it requires the builder to brush the adhesive onto the structure. Not having nearly as much patience as Don, I used both MonoKote and Ultracote. Any of the heat-shrink films will work well, but be very

careful when covering the fuselage, as over-tightening the covering can make the long-erons bow inward.

EQUIPMENT

The instructions for the Red Flame Blaster fan unit say to break in the motor by running it off a battery charger at 2 to 3 amps for a couple of hours. After break-in, HiLine recommends using motor cleaner. Beware that many motor cleaners will attack the Styrofoam cones, so try out your motor cleaner solutions on a leftover foam coffee cup before you spray it in the motor.

Don used a six-cell battery pack of SR 500 Max cells, which are roughly equal to Sanyo 450 SCRs. I decided to go with a pack of six N-600AA cells. Each AA size cell is 5 grams lighter than the SCRs, saving 30 grams (a little over an ounce). Although the AA cells don't have the discharge capabilities that the SCRs do, the maximum current draw of the Red Flame Blaster's Elf 50 motor is only 11 amps, which should be within the cells' operating range.

Don's model uses an Airtronics micro receiver, a 50-mAH receiver battery, Cannon servos and a Jomar MiniMax speed control. I'm using a Futaba Attack system with the MCR-4A receiver/speed control (which has an integral BEC circuit), and two Futaba S133 servos. Both configurations work well. Whatever equipment you use, just remember to keep the weight to a minimum.

WEIGHTS

Don's plane weighed in at 16.25 ounces ready to fly. The weight of my plane broke down like this:

Covered Airframe—	2.75 ounces
Motor—	3.50
Radio—	4.00
Battery—	5.00
Total—	15.25 ounces

FLYING

Initially you may want to test-glide the plane without the fan unit and the motor batteries aboard. This will save almost 8 ounces, which will bring the wing loading way down. Make sure the CG is at the

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SCREAMER *continued from page 22*

location given on the plans. Just give it a gentle toss and fly it to the ground like a glider to see if it has any nasty habits. If everything is straight and warp-free, it should fly like a pussycat.

Re-install the motor and battery pack. Pick a calm day for the first flights. It will be easiest if you can find someone to launch for you, but if not, the plane is very easy to launch yourself. After a firm, level throw, fly it straight and level for a few seconds to gain speed, then ease into a gentle climb. Both of our prototypes required just a couple of clicks of trim; mine required no aileron trim adjustment at all. Loops and rolls require little or no dive. With just a slight amount of washout in each wing, stalls are straight ahead and very crisp with no tendency to fall off on a wing.

The Electro-Screamer responds well to the controls right down to the stall and is a very stable flier. It isn't a floater with the power off, but it won't drop like a brick, either. Landings are easy due to the low wing loading.

(Just before going to press, Don called to say he'd just returned from KRC, where he flew his Electro-Screamer with a seven-cell pack. He was so ecstatic about the jump in performance that I've got to give it a try also!)

The design can be dressed up with an appropriate color scheme—just pay attention to the total weight and enjoy the electric elation. Thanks to Don Belfort for sharing his superb design. This plane is a delight to fly and you won't have to mortgage the house to build it!

When you build your Electro-Screamer, please let me know how it flies. You can contact me at 6462 Sunny Brae Dr., San Diego, CA 92119; (619) 463-4453 between 8 a.m. and 5 p.m. Monday through Friday and also on CompuServ at 74164,3237. Internet users can send E-mail to me at 74164.3237@compuserve.com. Of course, I'll pass along any comments to Don. **MB**