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AUGUST 1995

VOLUME 24

NUMBER 11



### ON THE COVER

Exquisite workmanship and an almost blindingly bright neon pink paint job combined to capture Best of Show honors for Walt Irwin's gorgeous scratch-built Super Corsair at the Endless Horizons Hobby Show in Long Beach, California early this year. Story and additional photos appear on page 83. Photo by Gary Wiles and Delores Brown of Photosensitive.

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# PLANE TALK

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Send in your favorite photos with a little information about the plane and yourself. If it's selected to run in "Plane Talk," you'll win a half-year *Model Builder* subscription (or extension if you already subscribe). Send your best to Plane Talk, c/o Model Builder, P.O. Box 2459, Capistrano Beach, CA 92624-0459.

Eighteen-year-old Australian modeler Michael Towell did an exceptionally nice building job on this Peanut Scale rendition of the Sorrel Hiperbiplane, done up in what we believe to be the colors of famed aerobatic pilot Joann Osterrud's personal aircraft. Mike took the time to add some intricate detailing; this, plus the light weight of only 7.5 grams and the "lifting body" fuselage, ought to make the distinctive looking biplane a real threat at indoor Peanut contests. *Michael Towell, 92 Lamonerie St., Toongabbie 2146, Australia.*



While not often seen on this side of the pond, CO2-powered FF Duration is a popular event over in Europe. Typical of such planes is the GS-49 designed by Gerhard Schuster of Austria; this example was built by German modeler Franz-Joachim Ahl for a Brown A-23 motor, spans 49cm, has a 7cm chord, and tips the scales at a mere 14.5 grams (about 1/2 ounce). Covering is super-light metalized Mylar; the fuselage is a graphite tube. Of course, with an airplane this light, something out of the ordinary is needed for a DT; this one folds its wing in the center and descends like a shot bird. Franz feels the wing chord may be too short, as it needs almost as much power as his twice-as-heavy 11.5cm chord ships; still, he says it could easily go for 5 minutes if he were to let it. *Franz-Joachim Ahl, Lukas Cranachstr. 2, 15. Stw., D-67227 Frankenthal, Germany.*

With its excellent year-round flying conditions, it's no wonder that a growing number of modelers, upon retiring, are picking up stakes and moving to Florida. One of those is Manny Sousa, a former Naval aviator who now flies with the Northwest Florida Modelers club. One of several photos he sent was this one of his very nicely done 1/4-scale Marquart Charger, built from the Walt Moucha kit. Span is 74 inches, flying weight is 13 pounds, and the power comes from a Super Tigre 3000. Covering/finish is Sig Koverall and dope. Manny says the model was built back in 1990 and is still going strong. *Manny Sousa, 2960 Bay St., Gulf Breeze, FL 32561.*





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R.Q. "Speedy" Diaz, a staunch supporter of the San Diego Orbiters club, sent this photo of himself and two of his latest FF ships: an Enya .19 powered Texan 480 for Class A Nostalgia, and a Mathis-designed Jalapena with Cox .049 for 1/2A and F1J. Speedy writes: "As my eyes get weaker I find that the brighter I color my models, the easier they are to keep in sight and find. I use Krylon's fluorescents sprayed on a K&B primer base. I fuelproof with Coverite's Glaskote. On Polyspan I use

two coats of nitrate dope, one coat of Krylon and a coat of thinned Glaskote. Works great for me!" (Might mention that it was Speedy who kindly donated some very rare issues of *Model Builder* to the Orbiters, to be auctioned off to raise club funds—see their classified ad on page 90.) R.Q. "Speedy" Diaz, 1444 Campus Ave., Redlands, CA 92374.

What can be prettier than an Old Timer putting along lazily overhead? Technically, this Jerry Stoloff designed "Bulldozer," circa 1945, came along too late to qualify for U.S. SAM events, but there's no denying the model fits right in with the spirit of the Old Timer movement. The 4-foot span model pictured belongs to Czech modeler Jaromir Pipek, who flies it with a small two-channel RC system controlling the rudder and elevator. He also has the engine compartment set up so he can fly with either

a spark ignition O&R .23 sideport or a replica Super Atom 1.8cc diesel. This is real fun flying, folks! Jaromir Pipek, csl armady c 830, 39901 Milevsko, Czech Republic.



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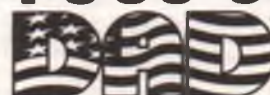
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BY FRANCIS  
REYNOLDS

## • The Plot Against Those Who Plot Airfoils

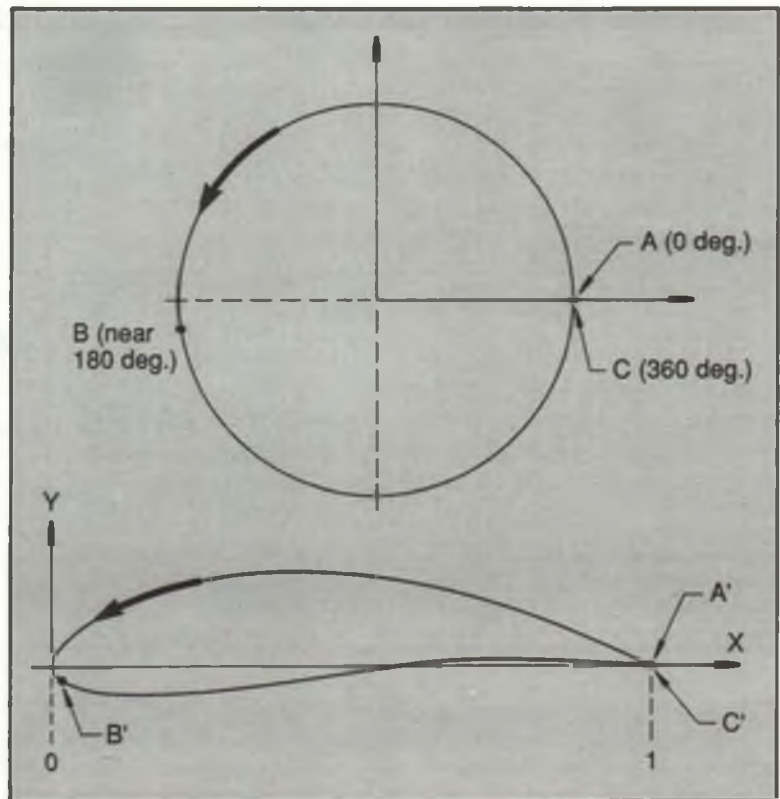
Many of us airplane designers plot the airfoils we want to use, to the size(s) we need. In the past we had no choice but to do it by hand, but nowadays the easy way to plot an airfoil is to do it by computer, using any of several commercially available airfoil software programs (see MD&TS, August 1994). If one is sans computer or airfoil software, or if one wants to use an airfoil which isn't in the available software, one can either plot it manually from the airfoil's ordinates—also called coordinates—or enter the coordinates into the software and let the computer do the plotting.

I've done lots of manual airfoil plotting in the past, and a lot of airfoil plotting by computer in the last few years. I use Bernard Crowe's excellent *Cygnat Foiled Again!* software. It has a hundred or more of the most popular airfoils on file, but it didn't have the one I currently needed—the S1020, a foil Michael Selig recently developed especially for ornithopters. I obtained the coordinates for the S1020 and was about to plot the airfoil when I discovered that I couldn't make head or tail (make that L.E. or T.E.) out of the coordinates table; and the columns don't have labels!

All of the manual airfoil plotting I had done previously was with coordinates obtained from aerodynamics books, model magazines, and NACA reports. An example of the old format for airfoil coordinates, which I was used to, is shown in abbreviated form in Table 1, for the Clark-Y airfoil. All of the numbers here are percentages of the chord length. If you've never plotted airfoils before, try

the Clark-Y using this table. If you make the chord 10 inches you won't have to do any arithmetic. It isn't hard, and is actually kind of fun. Using 10x10 grid paper makes things much easier. The full coordinates table shows more data points than I've listed, but even so, the complete shape needs to be filled in with French curves or

to you as it was to me, try your hand at plotting the sample Clark-Y airfoil from Table 2 before you read further. When it baffled me I phoned several people more expert in aerodynamics than I, but they couldn't help me. I finally figured it out for myself, but if this many airplane types don't know about it, it needs to be in this here



If it's been a while since you've plotted an airfoil by hand, you may not be familiar with the modern way of doing it. The process involves a technique called "conformal mapping" (see text for an explanation). As listed in Table 2, the coordinates begin at the trailing edge, go forward over the top surface, around the leading edge, and back along the bottom surface to the trailing edge. All of the new airfoils being developed these days are done in this manner.

a good eye and a steady hand.

The new form, which threw me, is shown in Table 2, also for the Clark-Y. This table is also abbreviated. All of my aerodynamics books used only the old form, as do Abbott and von Doenhoff; but in Michael Selig's book, *Airfoils at Low Speeds* (more commonly known as "Soartech 8"), all of the coordinates are in the new form.

If this new format is as new

now Technical Stuff column!

Note that in the new format, the second column starts with 1 and ends with 1, and the third column starts with 0 and ends with 0. Curious indeed. It turns out that the first column merely assigns identifying numbers to the stations at which the airfoil designer measured; the numbers in this column are not used in actually plotting the airfoil.

The second column lists the

*continued on page 14*

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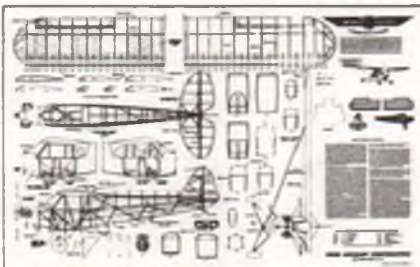
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## GP'S NEW J-3 CUBS

Realizing what a good thing they had with their .40-size Piper J-3 Cub (see the review in last month's *Model Builder*), the folks at Great Planes wasted



no time in coming out with .20- and .60-size versions of the classic lightplane. Sized at 1/7 and 1/4.7 scale respectively, the models span 61.2 and 90 inches; the latter also includes directions for clipping the wings to 83-inch span for better aerobatic performance. Like their predecessor, both of these new kits feature strong, interlocking construction, and nearly all exterior surfaces are balsa for an easy, attractive finish. The .20-size Cub retails for \$119.99, the .60-size for \$219.99. They're produced by Great Planes Model Manufacturing Co., 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-3630.

## KEEP 'EM QUIET!

Something unique in the way of engine silencers is the new "Arise" muffler from Du-



Bro—unique in that it has none of the usual internal baffle plates that restrict the flow of exhaust gases, choking the engine in the process. Instead, the Arise muffler allows exhaust gases to flow freely through a series of soft surfaces and specially contoured forms designed to break up the sound waves. Du-Bro says you can expect a noise reduction of 6 to 10 dB at 3 meters and may even get an increase in engine power as well. The Arise muffler replaces the aft section of

your engine's existing muffler; it's a universal design to fit two-strokes from .25 to 1.08 cubic inch displacement, and weighs less than 2 ounces. Mounting hardware and one of Du-Bro's new heat-resistant silicone Ex-

haust Deflectors (also available separately in two sizes) are included. From Du-Bro Products, P.O. Box 815, 480 Bonner Rd., Wauconda, IL 60084; (800)

848-9411.

## FAST OR SLOW—TAKE YOUR PICK

Speed 400 electric pylon racing is a popular event in Europe, and one of the most competitive kit racers is



Graupner's Mini-Viper, available in the U.S. through Hobby Lobby. The model features all-balsa construction and an unusual swept-forward wing.

According to the Graupner catalog, best performance is achieved with a 7.2V Speed 400 motor running on seven cells and turning a 6x5.5 Graupner Speed Prop (HL cat.

#GPF06055).

At the other end of the speed spectrum is Hobby Lobby's "Quicksilver," a 66-inch span, 1/6-scale ARF replica of the popular ultralight. Per the full-size aircraft, the model sports rudder/elevator/throttle con-

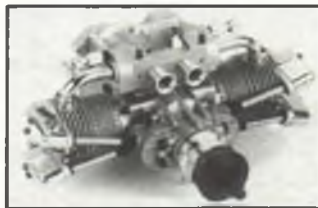


trols, Dacron covering and a bolt-together aluminum tube structure. A .46 two-stroke is recommended. There's even a video available for those who want to see the model in action before shelling out the bucks.

Full info on these and the many other HL kit offerings is contained in Catalog 25, available free for the asking from Hobby Lobby, 5614 Franklin Pike Circle, Brentwood, TN 37027; (615) 373-1444.

## NEWS FROM HORIZON

Bridging the gap between Saito's 130T and 300T is the new 182TD twin-cylinder four-stroke, based on a combination of two Saito 91S cylinders. Features include true AAC piston/cylinder construction, dual carbs, two plugs per cylinder, and an integral backplate engine mount. The Horizon folks say this brute will turn a 15x8 APC prop at 10,000-10,200 rpm, a 15x10 APC at 9,000-9,200 rpm.



Then there are the new "Extra" four- and five-cell battery packs from JR, being offered in a wide selection of capacity ratings (600 to 2800 mAh) and configurations. These premium quality packs are made with Sanyo E-series high-capacity cells, the connecting straps are quadruple welded (not soldered), the connector lead is extra heavy gauge wire, and the packs are sealed in double-thickness shrink wrap for extra



vibration resistance.

Saito engines and JR radios are distributed in the U.S. exclusively by Horizon Hobby Distributors, 4105 Fieldstone

Rd., Champaign, IL 61821; (217) 355-9511.

## ALTECH'S NEW HELI

First there was the Tsurugi XX, an upgraded, pro-style version of the popular Tsurugi .60-size helicopter. Now Hirobo's engineers have done the same with the SST-Eagle, one of the most consistent FAI contest helis ever produced. The new SST-Eagle 2 includes many upgrades as standard equipment, including the following:

- Push-pull linkages throughout.
- Newly developed autorotation clutch.
- New autorotation tail drive system.
- New SSR-IV metal rotor head.
- New aluminum main frame and bearing holders.
- New counter gear assembly.
- Newly designed wood main blades.

The list goes on, but you get the idea. Suffice to say that the new SST-Eagle 2 carries on the fine tradition of its predecessor with improvements for which top fliers have been wishing. Hirobo helicopters are distrib-



- P-38. All feature wire-cut foam core wings, epoxyglass fuselage(s), vacuum-formed raised-line canopy and all necessary materials, hardware, plans and instructions. The P-40 and P-51 retail for \$199.95 each, the P-38 goes for \$324.95. From K&A Models Unlimited, 6059 Faculty Ave., Lakewood, CA 90712; (310) 804-0006; Fax (310) 804-5092.

## INDUSTRY NEWS

Our friend Tom Herr's FF kit business has proven so successful and grown so fast, he's been forced to move to larger quarters. By now, Tom will have relocated his laser cutter and other machinery to Herr Engineering's new facility at 1431 Chaffee Dr., Suite #3, Titusville, FL 32780; (407) 264-2488; Fax (407) 264-4230. Two bucks will get you a complete catalog of Tom's great kits and other FF-related products.

## ERNST'S ULTRA STAND

The "Ultra Stand," the newest modeling accessory from Ernst Mfg. Inc., is an exceptionally nice, sturdy plastic utility workstand for use in the shop or at the field. We received a sample and were especially im-

- pressed with the overall quality of the molding and the fit of the end supports into the base—snug and completely slop-free, yet easy to take apart for storage. The cradle section of each end support is lined

uted in the U.S. by Altech Marketing, P.O. Box 391, Edison, NJ 08818-0391; (908) 248-8738.

## K&A'S PSS GLIDERS

For the utmost realism in a Power Scale Slope glider, K&A Models is offering what it calls its "Honest Scale" warbird series—Honest Scale meaning there has been no stretching or narrowing or other liberties taken with the scale outline, as is almost always the case with PSS models. Presently available are a 36-inch span P-51D, 38-inch P-40 and the flagship of the fleet, a 50-inch span



- with 3/8-inch thick high-density foam rubber to protect the finish on your model's fuselage, and the base has two molded-in trays for tools or other items. The Ultra Stand re-

with 3/8-inch thick high-density foam rubber to protect the finish on your model's fuselage, and the base has two molded-in trays for tools or other items. The Ultra Stand re-

- tails for only \$11.95—check it out at your local hobby shop. You can also order direct (add \$3.50 for shipping and handling) from Ernst Mfg. Inc., 37570 Ruben Lane, Suite B, Sandy, OR 97055.

## DAVE'S PSS WARBIRDS

In addition to the WWII bomber slope gliders described in this month's RC Soaring column, Dave Sanders of Dave's



Aircraft Works is offering complete semi-scale slope glider kits for some famous WWII fighters, including a P-40, Me-109, P-51, Ki-61 (pictured), and a Focke Wulf Ta-152 (a long-wing Fw-190). All feature Selig 3021 balsa sheeted foam core wings, span from 30-1/2 to 34-1/2 inches, and weigh 14 to 18 ounces ready to fly. These little screamers would be perfect for cut-throat slope combat—or just keep one stashed in the trunk in case you pass an irresistible slope. For prices and ordering info, contact Dave's Aircraft Works, 123 Avenida Buena Ventura, San Clemente, CA 92672; or give Dave a call at (714) 498-4478.

## TWO-WINGED HOTDOGGER

The second in Global's Deluxe Kits series is a sleek, racy-looking aerobatic biplane

- dubbed "Tecate"—and if the looks are any indication, it must be a real blast to fly! Can-tilivered, radically tapered wings (for a biplane), thin airfoils and exceptionally clean



- lines add up to a very attractive ship that looks great and delivers performance to match. Unfortunately the press release did not include engine sizes, wingspan or any other specifications, but those interested in this high-performance biplane can get full particulars from Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728-8610; (714) 963-0133.

## ACE'S "SIMPLE" ULTIMATE

- Ace R/C's new "Simple" Ultimate biplane is a Fred Reese design featuring injection-molded foam wings and simplified balsa/lite-ply fuselage and tail. Load it up with a hot little Schnuerle-ported .15, four



- mini servos and a small battery pack and you'll be in for a handful of fun on a shoestring budget. Specs: 33 inch span, 396 square inches total, 28-1/2 inches long, 28 to 34 ounces flying weight. The Simple Ultimate kit retails for \$54.95 and is produced by Ace R/C, 116 W. 19th St., P.O. Box 472, Higgsville, MO 64037-0472. MB

stations used, in decimal fractions of the chord as measured from the leading edge. But this list doesn't start at the leading edge, as the old coordinate format did; it starts at the trailing edge (1.000), works up to the leading edge (0.000) somewhere near the middle of the column, turns around and saunters back to the trailing edge again!

The third column shows the height of the upper surface of the airfoil, in decimal fractions of the chord, until it gets to the leading edge; then it switches horses by wrapping down around the leading edge

and lists the lower surface ordinates, including negative values (below the reference line).

By the way, the coordinates that were given to me for the S1020 had only two columns, eliminating the first one which isn't useful in hand plotting anyway. Soartech 8 shows all three columns on all of its airfoils.

**THE HISTORY OF THE MYSTERY**

I called Prof. Michael Selig at the University of Illinois and Dr. Paul Rubbert, chief of the Boeing Aerodynamics Research Group, and also corresponded with Herk Stokely, asking them all how the new for-

mat came about. Eppler had a major part in popularizing it in the 1950s, but it was around a long time before that. It wasn't originated just to be different, however; modern theories of fluid flow and the use of computational fluid dynamics computer

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**TABLE 1—CLARK-Y  
COORDINATES  
(OLD FORMAT)**

FROM L.E.	UPPER %	LOWER %
0	3.50	3.50
10	9.60	0.42
20	11.36	0.03
30	11.70	0.00
40	11.40	0.00
50	10.52	0.00
60	9.15	0.00
70	7.35	0.00
80	5.22	0.00
90	2.80	0.00
100	0.12	0.00

**TABLE 2—CLARK-Y  
COORDINATES  
(NEW FORMAT)**

1	1.000	0.000
6	0.897	0.025
8	0.804	0.044
10	0.691	0.064
11	0.629	0.073
13	0.500	0.087
15	0.371	0.093
17	0.309	0.093
21	0.196	0.085
25	0.103	0.066
35	0.000	0.000
45	0.103	-.028
49	0.196	-.028
53	0.309	-.025
55	0.371	-.022
57	0.500	-.018
59	0.629	-.013
60	0.691	-.011
62	0.804	-.007
64	0.897	-.004
69	1.000	0.000

programs make this new system of "calculating around the shape" very natural for aerodynamicists who are developing new airfoils theoretically.

Dr. Selig, in a letter to me, put it this way: "Airfoils can be mathematically designed through what is called conformal mapping, in which a circle is 'mapped' (or stretched) into an airfoil. The modern format comes about as follows. Points on the circle A/B/C are mapped to points on the airfoil A'/B'/C'. The point A on the circle is at 0 degrees, point B is near 180 degrees

*continued on page 86*



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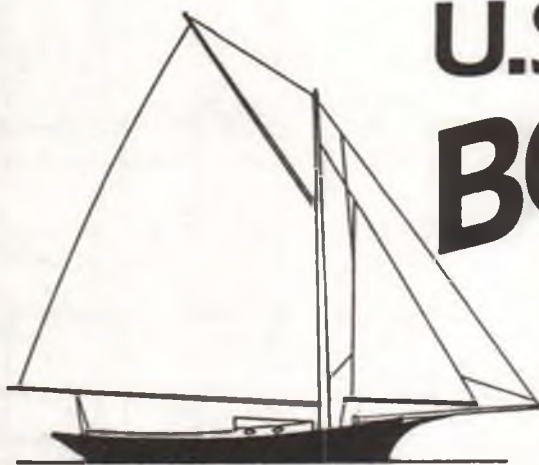
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- Charge at standard rates of 750mA or below. Fast charge only with equipment specially designed for NiMH batteries.
- Allow longer charge times. NiMH batteries offer about twice the capacity of NiCds, and require correspondingly longer charge times.
- Use between 32-104°F. Extreme temperatures can cause rapid loss of stored charge.
- Use tabbed NiMH cells for pack building. Applying a soldering iron directly to untabbed cells may cause permanent damage.
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# ELECTRONICS CORNER

BY ELOY MAREZ

- Eloy's Ugly Airplane Contest
- Astro Flight News
- DIY Elevator Presets
- Personal Frequency Monitoring
- DMM Tips

It's been said that "beauty is in the eye of the beholder." If that's so, then the reverse—that is, the lack of eye appeal—has also got to be a matter of the individual eyeball. It's also been said that "opinions are like noses; though some are bigger than others." Well, to my eye, and in my opinion, there are a lot of RC airplanes out there without any beauty at all. In fact, many are what, if viewed with a Southern eye, would be described as "ugly"—being somewhat worse than just "ugly."

If you agree, you and I are going to decide the "ugliest" airplane to be found, and you'll get a chance to win a *not-ugly* RC airplane kit, the new "Fantasy" from Major Hobby, and a companion K&B .45 Sportster engine.

Before I tell you how to get in the running for this realistic looking and flying combination, let me tell you what, to me, is not attractive. Actually, I think of many of today's designs as "things" more than airplanes. Boxes with wings, no semblance of a cockpit or canopy, with an engine hanging out in front—with a spinner yet—does *not* a real airplane make! Profile, stick and PVC pipe fuselages leave me cold. Unrealistic flight characteristics don't do much for me either.

The B-36 I saw at the QSAA meet in '93, flitting along at 8,000 mph scale speed, doing loops and rolls, insulted not only me but a truly grand old lady. And what about those flying hamburgers and dog-

## AstroFlight, Inc. Electric MOTOR HANDBOOK

*The Why, What and How of Electric Motor Theory and Practice. A MUST for the High-Tech Hobbyist!*

By Robert J. Boucher



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- Tuning Your Motor
- Electronic Speed Controls
- Setting up Your Electric Plane, Car, or Boat
- ... AND MORE!

Astro Flight's "Electric Motor Handbook," by Robert Boucher, is must reading for all who take their electric powered modeling seriously.

houses? Barf! To make things worse, these are what our show (?) teams often use when performing in front of non-modeling audiences—enhancing the "grown men playing with toy airplanes" picture that the general public has of us already. Is that the kind of image you as a modeler want presented to your family and friends?

The last time I commented on these flying "things" in print, I received mail from a number of those who fly them, informing me, with some pride, that such contraptions are very difficult to fly. My question to them is, if that's so, what the heck are you doing flying them in front of a large crowd of spectators? A few years ago, one such spectator was killed by a flying lawnmower during a demonstration of RC flight. I can't help but feel the accident

would not have happened had a normal, stable, controllable airplane been flown instead.

I would like to say that while I am most impressed and pleased with the Scale Masters and Madera style of airplanes, I have no problem with designs such as those flown in pattern competition, which evolved for a specific purpose and which bear some resemblance to a real-life airplane. And Francis, I can accept all manner of unorthodox looks in a one-time model built to prototype an idea or design, but spare me that in a kit or plan for scratch builders.

Since I see so many esthetically pleasing and scale-like airplanes around, I know that some of you will agree with me. Here's your chance to strike back. Keep America Beautiful; let's crash—at least



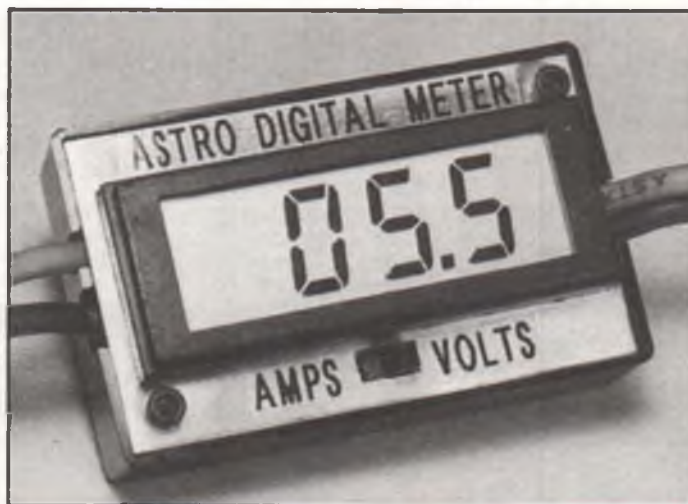
in print—the Uglys. Write and tell me about the worst-looking RC model design you've seen, either in a magazine plan or kit. If possible, send a picture; one cut out of a magazine will do. In a couple of months you can read the results here; we'll list the 10 most unwanted, based on the number of votes they receive. Also at that time, we'll announce the Fantasy/K&B winner, which will be determined by a drawing from all entries received.

If you are a manufacturer of airplane-looking airplane model kits, and would like to donate one for a 2nd place (or more!) winner, we'll be glad to include you as one of those who appreciate the finer things of (RC) life!

### ELECTRIC POWER GOODIES

Astro Flight Inc. has a couple of new products of interest to many. One is the *Electric Motor Handbook*, authored by electric power pioneer Robert Boucher. This has to be the best information on the subject of electric motors for model power under one cover. It includes every related subject from electric and motor theory to speed controls, and includes a lot of information that will help you select the best motor for your specific application and put it to work to its full advantage. The book gets a little technical in places, but is written in language that all serious electric power enthusiasts will be able to understand.

Another Astro Flight product worth more than just a second glance is the Digital Meter, for motor voltage and current readings. This instrument is es-



Accurate measurement of an electric motor's applied voltage and running current is essential to evaluating its performance. Such measurements are easily made with Astro's Digital Meter.

pecially useful for its latter feature—after all, you can read voltage fairly accurately with your \$9.95 digital voltmeter. With the Astro unit, you get accurate readings of either voltage or current at the flick of a switch. Knowing these values

is the first step towards the efficient use of your electric power system.

The Astro Flight Digital Meter's suggested retail is \$69.95; check the local price at your favorite hobby shop. And contact Astro Flight should you need further information about either of these worthwhile products.

### ADD-ON ELEVATOR PRESETS

Cox Products' Larry "The Lone" Renger offered the following suggestion for those flying sailplanes with basic non-computer transmitters. In effect, it adds preset switchable elevator throws, such as used during launch or while thermalling, to those systems not so equipped. This worthwhile modification requires only a Radio Shack switch (275-1545), a couple of 10K 15-tum pots (271-343) and two 4.7K resistors (271-1330). The actual wiring is just as simple.

Installation within the transmitter is not

critical and will be determined by your particular unit. The only real consideration is space, a logical location for the switch, and access to the pots. The parts could all be mounted on a piece of perforated PC board (RS 276-159) and supported by the switch. It's always a good idea to keep all associated wiring short, and as far away from the antenna and RF circuitry as possible.

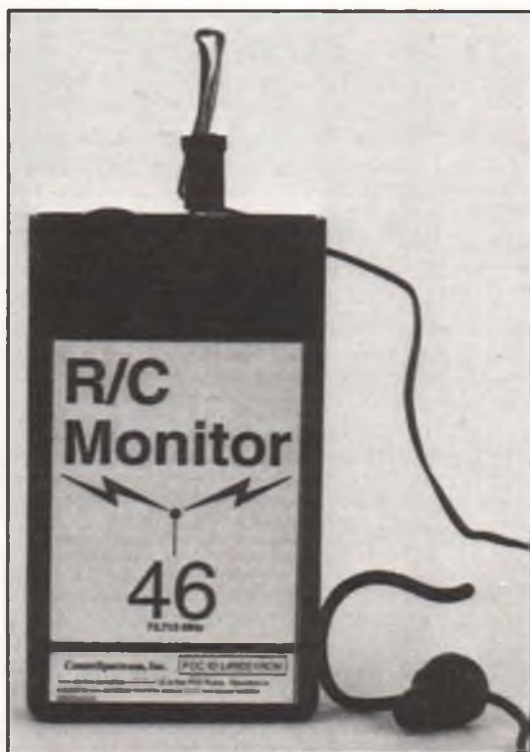
As shown, the transmitter will operate normally with the switch in its middle position; and will select either up or down elevator, as dialed in with the additional pots, in the other switch positions. Should you prefer two preset "up" positions, place both pots on the side of the main control pot that gives that control function. One single pot can be installed for those who want just one preset. To adjust, throw the switch and set the appropriate pot to the desired elevator throw. Thanks Larry—say hello to Tonto for me!

### WHO'S ON MY FREQUENCY?

A single flight channel monitor has finally appeared. I say "finally" because I've been expecting one for some time, and have even experimented with a few circuits myself. This one, aptly named the "R/C Monitor," is being offered by CommSpectrum, Inc., 2263 N.W. 2nd Ave., Suite 202, Boca Raton, FL 33431; (407) 391-8309.

The value of such a device should be obvious. Admittedly, there's little you can do about any interference that comes on during flight. However, it can save you from taking off on a frequency being interfered with. If an out-of-control crash should occur, turning off your transmitter should confirm for you whether interference did occur or whether your mishap was due to one of the many other reasons that eat airplanes.

The CommSpectrum monitor is a small belt-supported device, not unlike those radio/cassette players that teenagers



The assurance that you are not taking off with RF interference on the channel in use can only be done with a monitor. Check yours with CommSpectrum's single channel unit. Described in text.

beat their eardrums out with. It monitors your flight channel and has only one control, a combination on-off and volume control knob. Inside, we find a modern SMT dual conversion, narrow band, crystal-controlled receiver, similar to a standard RC receiver except that instead of a decoder, it's equipped with an audio amplifier. With a good set of alkalines installed, the operating time should exceed 150 hours.

The CommSpectrum Monitor is priced at \$149.95, and is available on the 72 MHz channel of your choice; channel changes are available should you also change in the future. A 50 or 53 MHz version is not available, though I believe that one would be considered if the demand existed—contact CommS. if you feel the need.

## DIGITAL MULTIMETERS

DMMs, as they are generally referred to, have come a long way since they first appeared many years ago. There have been constant improvements to the instruments themselves; some will now read frequency, and various probes are available with which measurements such as temperature can be made. It can be confusing when the time comes to purchase one, and you soon get the feeling

that whatever you do decide on will be obsolete next week.

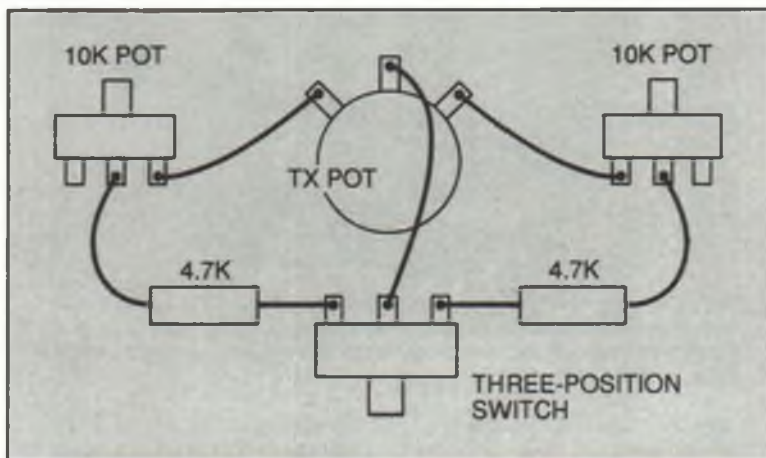
There are a couple of features that I would recommend you look for in your new DMM. My Fluke Model 27 has an analog bar appearing below the digital read-out. This bar will increase or decrease in

log bar greatly simplifies this process—you adjust for minimum or maximum length; only then do you need to read the numbers. Once around with this feature and you'll never have another DMM without it.

Next is what is called a MIN/MAX reading—obviously standing for minimum and maximum. At the touch of a button, you can select to read either value, and a corresponding indication will appear on the display. Often we wish to know the peak value of something in a circuit, which can differ greatly from its average reading, and which is impossible to read on those rapidly blinking digits. When set, such an instrument will display whatever changes occur, but will hold at the MIN (or MAX) value reached. Things like the peak current demands of servos and its affect on the system battery voltage can now be accurately

measured. Electric fliers will find it useful to measure peak motor starting currents (taken by reading the voltage drop across a series resistor) and its effect on the battery voltage. You'll see some real surprises.

GOOD LUCK in winning the Fantasy and K&B engine—send your favorite "Uguly" information to me at 2626 W. Northwood, Santa Ana, CA 92704. MB



Larry Ponger's scheme for adding preset elevator positioning to transmitters not so equipped. The original wiring is not changed; neither is the transmitter when the switch is in its center position. Explained in text.

step with the value being read. It's extremely handy when adjusting, when "peaking" or "nulling" a circuit adjustment. At such times, a purely digital display can be a nuisance, as extra concentration is required to catch the point at which the reading reaches its minimum or maximum and though it's still changing, is now doing so in the opposite direction. The ana-

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area and will weigh about 24 oz. fully  
equipped. This is a wing loading under  
9 oz.! You will have nearly 10 minutes  
of motor run and you will probably stay  
aloft for 30 minutes — and longer in  
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# HANNAN'S HANGAR

BY BILL HANNAN

**“Growing old is mandatory; growing up is optional.”**

This month's quotation, credited to "Inge" by Timothy Voak, is worthy of careful consideration. Too often, advancing age is used as an excuse for giving up pleasurable activities associated with youth. Why not retain a playful attitude regardless of your age? The late Walt Mooney once remarked: "Dignity is greatly overrated," and I agree. We are especially fortunate that our hobby lends itself to a lifetime of fun and satisfaction, even if some misguided people may feel that as adults (or senior citizens!) we should not be "playing with toy airplanes."

## **TOO MUCH OF A GOOD THING?**

Satisfying as model building is, we mustn't become absorbed in it to the exclusion of everything else. We may be tempted to devote all of our spare time to modeling, but even if we could eliminate those other "distractions," likely we would soon suffer hobby burn-out or boredom.

Assuming that you allow plenty of time for your spouse, family and friends, how about starting a second hobby? Learning to play a musical instrument? Getting more exercise? Maintaining a balance in living is just as important as correctly balancing an airplane. Time cheerfully spent away from the building board can be physically beneficial and psychologically recharging, providing a fresh outlook when returning to your latest modeling project.

## **A CASE IN POINT**

As a youngster in Montana, I sometimes flew models over snow, but never cared much for winter sports. Later, living in southern California, the mild climate permitted year-round free flight model flying with good companionship and plenty of exercise. However, following a move to northern California, where seasonal variations assure rain and snow, my modeling (and writing about it) became increasingly sedentary and solitary. In



Ah, the joys of youth! This delightful sculpture photo is from the Sierra Galleries in Tahoe City, California. Reader John Penhallow found it while on a skiing trip.

an effort to keep me physically active, Joan, my wife, suggested we take up cross-country skiing. Models and skiing may seem worlds apart, but there are numerous parallels. For instance, the term "Nordic" is applied to both cross-country skiing and towline gliders. (Nordic skiing is as different from "Alpine" downhill skiing as control line is from RC.)

Both modeling and skiing require enormous amounts of practice before much progress can be achieved, because simple-appearing techniques require lots of experience to master. In fact, trying to learn skiing at age 63 gave me a fresh appreciation for the frustrations

encountered by beginning model builders, whatever their ages! Patience and persistence are the only answers.

Model building and skiing are both international in scope, and even the equipment involved has equivalents. One can choose low-tech/low-cost or high-tech/high-cost in either discipline. The French Farman Mosquito shown in one of our photos is decidedly traditional in construction, in marked contrast to the skis which employ carbon fiber, as do many high-performance model airplanes. The Mosquito is composed of balsa from Ecuador, tissue from Japan and is powered by an American CO<sub>2</sub> engine



What does this Farman Mosquito model have to do with cross-country skis? Read the column!

mounted on a firewall made from Finnish plywood. The French brand skis were actually manufactured in Austria, while the fiberglass ski-poles came from Finland. The air through which the model flies and the snow on which we ski are, presumably, in continuous worldwide circulation!

Look carefully at the ski-tip emblems, which are tiny tri-colored chickens—most appropriate for my intrepid skiing approach. As George Benson put it, my style is “pure poultry in motion!” Certainly I’ll never be another Alberto Tomba, yet that doesn’t deter me from trying. John Caldwell, in his *New Cross-Country Ski Book*, wrote: “Things you work hard for and succeed at are the most satisfying.” And: “The range of possibilities for enjoyment is unlimited.” Equally true for model building.

### NEW OLD FLYING SITE

According to noted indoor modeler Andy Tagliafico, via Jim Longstreth and Dave Linstrum, the WWII blimp hangar at Tillamook, Oregon is now available for microfilm model flying. The facility is now a museum for lighter-than-air memorabilia, and it’s hoped

that model flying and museum activities may prove to be mutually beneficial.

### CAPACITOR CRAFT

Few items in this column have attracted more interest than the capacitor-powered models featured in the January issue. Dick Johnson installed a Union Model Company system in a Frank Ehling designed AMA Cub, and demonstrated it to a group of Texas indoor modelers, telling them that they were watching “high-technology electricity mated to low-technology aerodynamics!”

### GONE WEST

Sadly, according to Dick Johnson, Irwin Polk, long-time marketer of model supplies and Mabuchi electric motors, passed away during January. Our condolences to his brother Nat and many friends and associates.

### NEW PRODUCTS

Ken Sykora’s 1995 Oldtimer Model Supply catalog is now available, featuring a broad range of supplies, accessories and plans. Included are balsa and Hinoki wood, bamboo, rubber, books, balsa and hard-

wood wheels, covering materials and much more—truly an old-time model shop at your mailbox. This year’s catalog is electric blue in color and is marvelously decorated with Otto Kuhni’s meticulous line drawings, punctuated by philosophical quotations such as this: “ROG means Rise Off Ground, ROW means Rise Off Water, and ROC means Rise Off Couch . . . and build!” To order a copy, send \$2 to Oldtimer Model Supply, P.O. Box 7334, Van Nuys, CA 91409.

◆ ◆ ◆  
Dave Linstrum has announced Volume 6 in his Best of Hangar Pilot series, with plans by the MIAMA indoor model club’s most talented designers. It’s priced at \$7 postpaid. Dave’s 1995 Scale Flier Calendar, containing 14 planes worth modeling, is on

panded their range of free flight rubber-powered kit models to include the classic Fairchild 24 and the Fokker D.VII. The Fairchild spans 30 inches, and may be configured in either the radial or in-line engine version. The D.VII, spanning 24 inches, has an appealingly nostalgic quality reminiscent of vintage models.

Both kits contain high-quality balsa, laser-cut parts, computer-drawn plans, building instructions, colored tissue covering, molded plastic propellers and markings. A catalog of these and other kits costs \$2 from Herr Engineering, 5648 Kingman Ave., Portage, IN 46368.

◆ ◆ ◆  
Glenn Campbell has announced the initial offering of genuine Esaki “Lite Flite” tissue in colors including red, white, yellow, blue, orange, black and green. Averaging 4 grams per 18x24-inch sheet, they are priced at 85¢ each. As a bonus, a Japanese Pea-



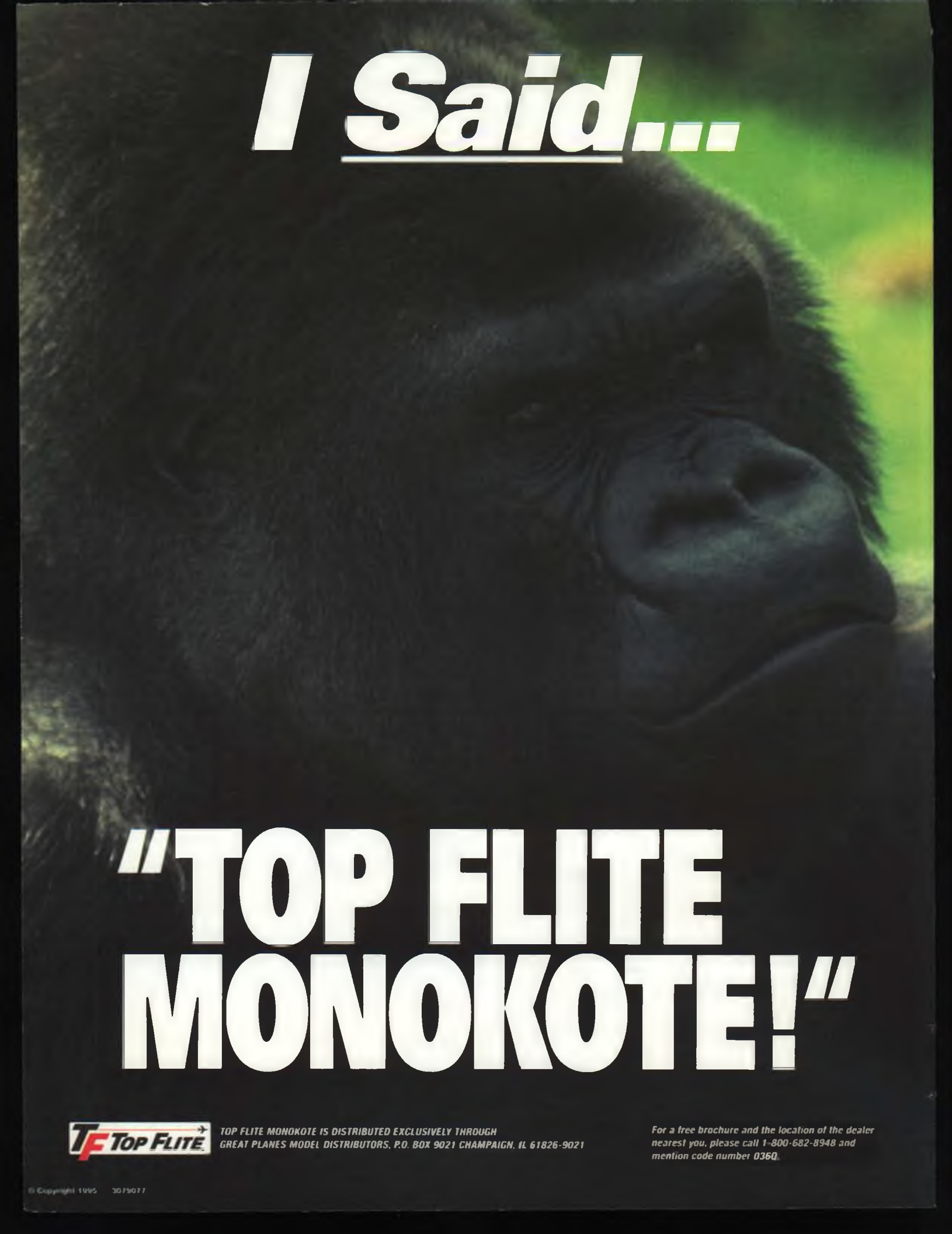
Dr. Keith Shaw’s large electric powered RC Chester Goo racer was based on Vern Clements’ construction plans. Like all of Keith’s electrics, this ship really performs!

◆ ◆ ◆  
sale at \$4 postpaid, or \$3 if ordered with the Volume 6 Hangar Pilot, directly from Dave Linstrum, 1109 36th Ave. W., Bradenton, FL 34205.

◆ ◆ ◆  
Herr Engineering has ex-

nut Scale plan is included with each order. Postage and handling is \$3 (USA), \$4 (Canada and Mexico) and \$5 (overseas, surface mail), from Campbell Model Supply Co., 37742 Carson St., Farmington

*continued on page 77*



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Twenty years ago, Top Flite added the P-51B Mustang to our original series of scale warbird kits. To celebrate the anniversary, we've now produced a small number of Limited "Gold" Edition Collector's P-51B kits...

Kits which offer even more scale realism than the original 1975 P-51B, plus our advanced, state-of-the-art Gold Edition engineering.

Each Limited Edition Collector's kit includes a certificate of authenticity, signed by kit designer David J. Ribbe and individually numbered.

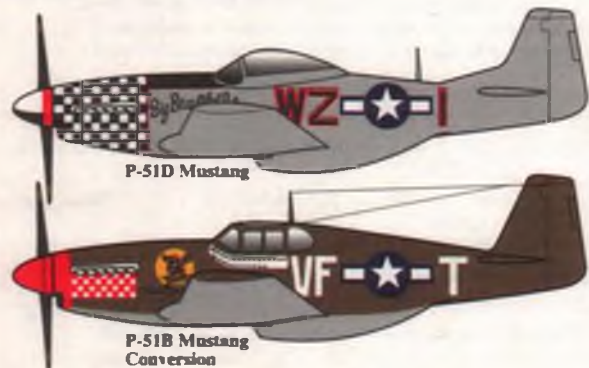


## A must for collectors AND scale warbird enthusiasts.

You don't have to be a collector to admire this "Gold Edition" model's high-quality materials and computer-designed parts. Few "B" versions of the famous P-51 Mustang are available...even fewer make accurate scale building so easy.

The realism extends to six-color decal sheets that faithfully reproduce all markings of the P-51B "Shangri-La"—the same aircraft modeled in Top Flite's 1975 classic.

This Limited Edition Collector's P-51B Mustang kit will be available only while supplies last, so see your hobby dealer today. For more information and the location of the dealer nearest you, please call 1-800-682-8948 and mention code number 036P.



## Conversion Kit Also Available

Now you can convert your Gold Edition P-51D Mustang Kit (TOPA0110, available separately) to the rare "B" version! Our P-51B Conversion Package (TOPA1615)—available on a continuing basis—includes everything you'll need for the modification: die-cut ply fuselage pieces, "turtledeck" canopy, "Shangri-La" decals, plans and instructions. Use it whether your "D" is still in the box, partially built, or entirely assembled!



P-51B Mustang (TOPA0111):  
Wingspan: 65 in, Wing Area: 734 sq in,  
Weight: 8-10 lb, Length: 56.5 in, Requires: 2-stroke  
.60-.90 or 4-stroke .90-1.20 engine and 4-6 channel radio

# P-51B MUSTANG

# Helicopter World

BY JAMES WANG



## THE MODEL HELICOPTER BAZAAR

James spotlights some of the newest **helicopter goodies** to come on the market, ones he finds especially interesting and newsworthy.



■ LEFT: Ray St. Ouge displays Miniature Aircraft's new XL-46 Graphite. Features carbon fiber sideframes and tall boom, uni-ball clutch system, and a hot-looking new epoxyglass canopy. Rotor diameter has also been stretched to 62 inches. ■ RIGHT: Pegae Model Products produces these beautiful CNC-machined, blue anodized aluminum cooling fans for the X-Cell 88, TSX 5-Star, Concept 30/40, Kall ZR, and Shuttle ZXX. By contrast, the stock Concept 60 plastic fan pictured on the right has straight blades. Also pictured is Pegae's FlexTorque helicopter starting system.

**T**his month we have several new helicopter items to tell you about. First on the list is a 25-minute video, entitled "What Is He Doing Now?", from two-time world champion and six-time national champion, Curtis Youngblood. Last year, Curtis and his wife Julie took a professional video crew to the Nevada desert to make this special video, which shows the latest in 3-D helicopter aerobatics.

This is not an instructional video; it's choreographed with music to provide pure entertainment. There are four separate segments set to different tempos of music: alternative, classical, jazz and a wild, macabre sort of music for the night flying segment. Each segment is a complete flight; there was no splicing. Julie did the planning and choreography. She says Curtis had to do each flight several times in order to get one that was pure dynamite. You'll see some incredible anti-gravity maneuvers in this video. The 3-D night flying is unbelievable. You can see

only the lighted skids and rotor blades tumbling in the air—the helicopter is virtually invisible.

They picked the desert outside of Las Vegas to film this video because the open space and blue sky provide a perfect background. You can have your own copy of this wonderful tape by calling Youngblood Enterprises at (512) 869-0236. It's definitely worth the 20-some dollars.

Curtis says their next tape (planned for 1996) will deal with 3-D flying. When it comes to 3-D hotdogging, Curtis is the pioneer and the *best*.

• • •

The next new item is the Pegae Model Products metal cooling fan and starting system for the Concept 60/30, Enforcer and X-Cell. The Pegae fan has eight curved blades and is CNC-machined from 6061 aluminum bar stock to ensure true run-



# Helicopter World



■ ABOVE: Horizon's "Wacky Tacky" is a pliable, gum-like stuff that works great for cleaning hard-to-reach areas on your helicopters. ■ RIGHT: Four-strokes are beginning to gain a following among heli fliers. This is Bergen Machine & Tool's self-aligning clutch, metal hub and G-18 sideframe assembly for X-Cell mechanics and the YS/Futaba .91 Air Chamber engine.



ning. With the Pegae fan and metal starting cone installed on my Concept 60, my dial indicator measures only .002-inch runout. By comparison, my stock plastic fan has .015-inch runout.

Also new is Pegae's FlexTorque starting system. Instead of using the metal cone, Pegae makes a special stud that mates with a one-way Torrington bearing inside the FlexTorque extension. The FlexTorque has a steel spring in the middle so that you don't have to hold the electric starter perfectly in line with the clutch shaft. Call designer Peter Park at (216) 486-5460 for more information, or write to Pegae Model Products, 358 Claymore Blvd., Richmond Heights, OH 44143.

• • •

A friend recently loaned me a pair of Competition Structures' 550mm graphite main rotor blades to try on my Ninja. The blades are very well made and come perfectly balanced—we didn't have to add any balancing tape at all. The blades weigh 120 grams each. (Typical stock .30-size wood blades weigh 85-100 grams each.) The graphite blades don't make my Ninja fly any faster, but they do give excellent hover stability and autorotations. At \$189.95 a pair, they aren't cheap, but they are indeed very well made. For those on a budget, Competition Structures

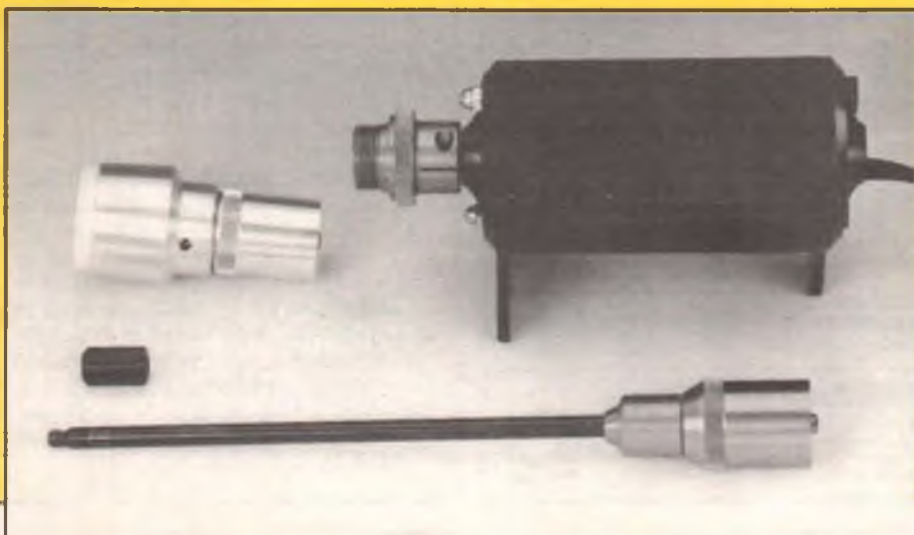
produces an identical epoxyglass version of these blades which perform equally well, but only cost \$99. These blades will also fit the Shuttle, Concept SR and Enforcer. To order, call Competition Structures at (408) 223-2811.

• • •

Horizon Hobby Distributors and KSJ have introduced three new tail rotor blades—a white .60-size, 95mm length (KSJ269); a pink .30-size, 85mm length (KSJ280P); and a yellow .30-size (KSJ280Y) tail blade. They have a tapered chord, a symmetrical airfoil and a 45-degree cutoff at the leading edge. I've tried them on my Concept 30, Concept 60 and X-Cell 60. For everyday flying, they are excellent because they are rugged and inexpensive (\$6.95 for the .30-size and \$9.95 for the .60-size).

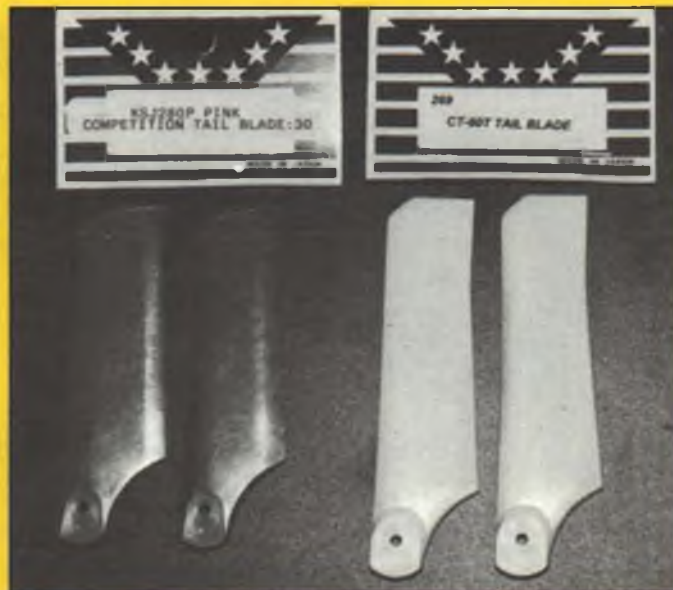
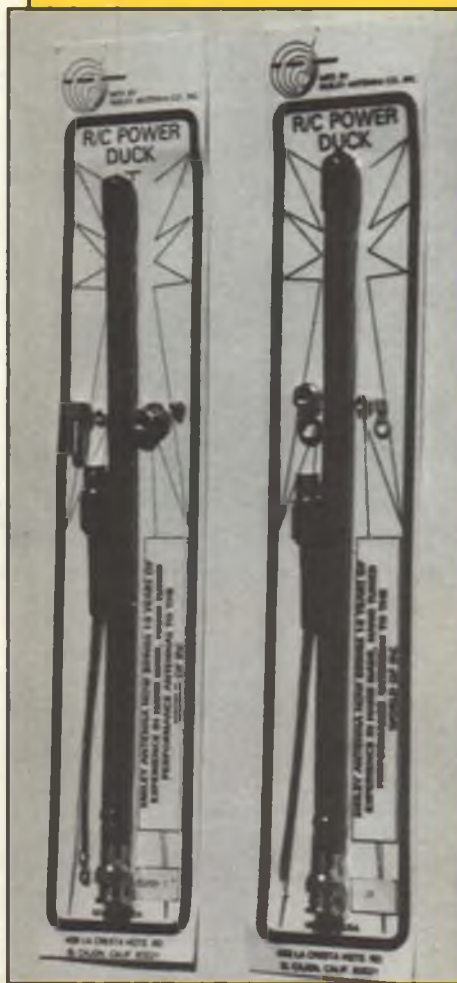
Horizon Hobby Distributors also has a new compact 12-volt electric starter with a one-way Torrington bearing inside, which allows the unit to free-wheel when the engine starts. The output shaft is supported by two radial bearings. It comes with a hex key extension for helicopters; the corresponding hex-shaped receptacle must be fitted onto the helicopter clutch shaft. An optional metal cone and rubber cup for starting airplanes is sold separately.

Another nifty item is "Wacky Tacky" (DYN2010, \$4.95), a gum-like substance used for cleaning hard-to-reach areas on model cars and helicopters. It's pretty interesting stuff—I tried a piece and it works! You simply press this pliable material on a model, then peel it away to remove dirt and grime. It's great for keeping your heli's main gear and en-



KSJ's compact electric starter can be used for both airplanes and helicopters. The ball extension in the foreground sports two radial bearings and a one-way Torrington bearing that allows the unit to free-wheel when the engine starts. KSJ products are distributed by Horizon.

# Helicopter World



■ FAR LEFT: "R/C Power Duck" antennas from Smiley Antenna Co. are perhaps the best known of the "rubber ducky" antennas. Individually tuned to your particular frequency, Power Ducks are available to fit most of the various competition radios on the market.  
 ■ LEFT: The new .30 and .60-size plastic tail blades from R&J and Horizon Hobby Distributors.

gine clean. It comes in a roll about 12 inches long.

At the WRAM show, Miniature Aircraft was displaying their new XL-46 Graphite kit. The layout is similar to the proven X-Cell 40, but the frames and tail boom are graphite, and it has the large Pro paddles. The tail boom is longer to permit longer main rotor blades. It also features a new lightweight epoxyglass canopy. It should be out by the time you read this.

Also at the recent WRAM show, Bergen Machine & Tool displayed its new G-10 sideframes for the YS .91 four-stroke engine. A handful of pilots in the US are flying the YS .91 engine in their helicopter. I've flown Robert Gorham's Eagle with the YS .91; it had at least as much power as a regular two-stroke .61 engine. I estimated Robert's Eagle was doing at least 80 mph. Bergen Machine & Tool is located at 17013 Lakeview Dr., Vandalia, MI 49095; (616) 476-9364.

A neat item I recently tried is Smiley Antenna's "R/C Power Duck" transmitter antenna, one of the so-called "rubber ducky" antennas on the market. The coiled antenna is completely hidden with a PVC covering and a rubber tip. The antenna can be removed from the transmitter by twisting the BNC connector. Installation on your transmitter involves removing the original antenna, soldering a wire to the inside of the transmitter, and bolting the BNC connector base in place. It takes about 30 minutes for the changeover.

I did some range tests on the ground and could not detect any reduction in radio range. The short length makes it ideal for heli pilots who do a lot of close space hovering. The R/C Power Duck is available direct from Smiley Antenna in California at (619) 579-8916 or (800) 527-5439. You must specify the brand and transmitter model and frequency that you intend to use. It is available in your choice of black, blue, pink or yellow.  
 See you next month. *MB*

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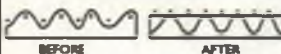
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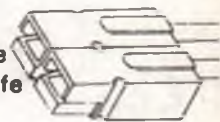
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If you still think you need more power, both servos come in metal gear versions for even more torque and greater durability. So, if you are one of those special people who truly believe that bigger is better, Hitec RCD has the servo you need. See for yourself at a dealer near you. For more information contact:

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torque: 133 oz/in  
speed: 22 sec/60 deg  
size: 2.3x1.1x2.0"

### HS-705MG

\*Metal gear  
torque: 161 oz/in  
speed: 27 sec/60 deg



### HS-605BB & HS-605MG

Power Servo  
\*Dual Ball Bearing  
wt. 1.73 oz  
torque: 77oz/in  
speed: 16 sec/60 deg  
size: 1.6x.8x1.5"

### HS-615MG

torque 105 oz/in  
speed 22 sec/60 deg



# PLUG SPARKS

BY JOHN POND

• More  
On Frank  
Zaic and  
JASCO

• The  
Megow  
"Chief"

• The  
Forster  
.29/.35

This month we continue with the story of Frank Zaic's activities. After only getting up to 1938 last month, this writer must reluctantly admit that covering all of Frank's activities would require a large volume!

No question about it, Frank was a prolific writer and correspondent. When he did not put out a 1939 Year Book, he cleverly put together a softbound book featuring photos of models seen at the 1939 Nationals and the Wakefield meet. Included were small three-view drawings of several interesting designs (somewhat like his Year Books, only simpler). Results of the two meets were also featured. Zaic did a tremendous job of preserving model history in this publication.

In 1938, when the AMA needed a national newsletter and editor, the job naturally fell to Frank Zaic, who produced the first few issues of *Model Aviation*. Amazingly, Frank was able to produce *Model Aviation* in light of all his work with the Year Books, catalogs, and the embryo *Model Aeronautics*.

All during this time, Frank

was still running JASCO (Junior Aeronautical Supplies Co.) along with his brother and sister, John and Christine. Upon Frank's move to Ithaca, by mutual agreement, the company name was changed to JETCO; the name JASCO was reserved for Frank. He had always regarded the kit business as a sideline, but it was profitable for quite some time.

The advent of WWII left Frank in a state of indecision. Being too old for the draft, one option was to go into defense work. However, Frank felt this was not the way to go. About this time, Herb Weiss, in a reply to Frank, indicated that the Hampton Roads Coast Artillery Board was looking for



Instead of a 1939 Year Book, Frank Zaic put together "The National Model Airplane Meet in Pictures"—a softbound volume of photos taken at the 1939 Nats and Wakefield competition. This is a rather poor copy of the cover, but you get the idea.

people with Frank's qualifications.

Turned out the job was Civil Service, being classified as an Engineering Draftsman. Projects he worked on included designs for pontoon radar targets, used to check the range settings for big guns. It was a fortunate job as it allowed Frank to visit Christine every other weekend to see how JASCO was going. Another perk was being part of the Langley Brainbusters club. During this time, he designed the Trooper and Floater gliders using wartime materials, hardwoods, etc. These models were built in a rented room, checked out, and sent to Christine for kitting and/or sale of plans.

At this point the draft age was raised, and Frank noted that no more deferments were being given. The C.O. of the Board offered an enlistment at Fort Monroe with several weeks of Basic Training. Upon



Frank Zaic served as editor of the first several issues of "Model Aviation," the official publication of The American Academy for Model Aeronautics (later shortened to Academy of Model Aeronautics). Illustrated here are the covers of the first two issues, June and August 1938.

completion, Frank would be sent back to the Board as a Tech. Sgt.

As luck would have it, the Air Corps was being built up. Having had some experience with airplanes, Frank was assigned to the Air Force as a squadron draftsman at Salt Lake City. This was great! No school, no responsible world. This left him with time to start the book, *Model Glider Design*. This was done on the way to Greensboro, carrying a small drawing board and a typewriter. Finished plans and script were sent to brother John to put into shape for publication.

Frank was finally shipped out on a 30-day convoy to Italy. However, by the time Frank arrived, the Nazis had hoisted the white flag—they knew Zaic was coming!

(As a side note, Frank made another overseas trip in 1956 to attend the FAI General Assembly in Vienna to receive a diploma annually given by the FAI in memory of Paul Tissandier, an early French airman and first treasurer general of the FAI. These highly coveted diplomas are generally awarded to noted aviation figures such as Roscoe Turner, William T. Piper, and others. Needless to say, Zaic was the first American in the field of model aeronautics to receive this award.)

Discharged from the Air Force on September 15, 1945, Frank returned to find that JASCO, under Christine and her father, had become a profitable concern, thanks to national distribution. Frank updated the kits to balsa construction but still missed his first love, the publishing of his Year Books.

Frank enrolled in Cornell University under the G.I. Bill. Having gotten set up, Frank naturally gravitated toward the production of his post-war Year Books. The 1951-52 issue took quite some time to assemble, but this was due to his interest in another book he was working on, *Circular Airflow*. Frank was quite enthused about this



The Zaic Model Aeronautic Year Books, 1953 to 1965. Real dedication!

new book, but it turned out that the world wasn't ready for this innovative theory. What Frank had failed to recognize is that free flight had dwindled in numbers as the new craze, control line, was coming of age. With flying fields disappearing and sponsors looking for local or urban type meets, control line was just the right thing for displaying model aviation.

Frank then produced the 1953 Year Book, but his stay at Ithaca was over; the G.I. Bill benefits were considerably reduced, requiring full-time attendance at college. The situation was resolved by his good friend, J.P. Glass, who offered Frank a job with his Clifton Precision Products Company in 1955. This allowed Frank to work in his own manner as long as work deadlines were observed. The 1955-56 Year Book was the result.

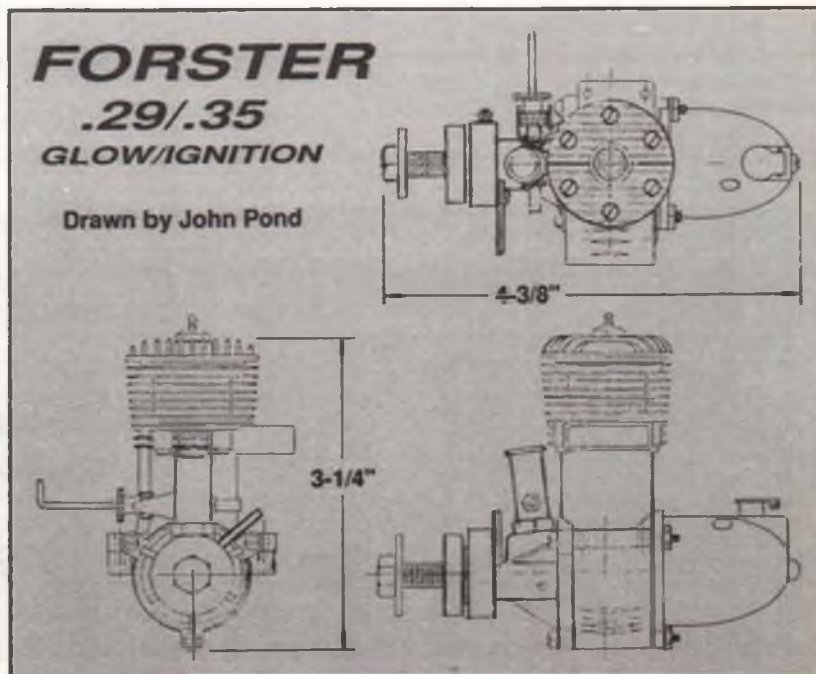
While working at the J.P. Glass concern, Frank was able to put together

yet another book, *Model Aeronautics Made Painless*, done at the boarding house. The money earned from this book, in conjunction with his regular job wages, allowed Frank to make numerous trips—New York, West Coast, Mexico and a series of overseas functions.

While preparing his 1957-58 Year Book, Frank met Carmen, his bride to be, whom he dated on weekends. In 1959

they were married, and Frank thoroughly enjoyed home cooking plus being able to prepare the 1959-61 issue. The profit/loss statement again showed a loss (he didn't pay himself a salary), but he was able to travel abroad to important modeling functions.

In 1962, Frank and Carmen moved to Northridge, California, with the high hopes of being a part of Litton Guidance



ENGINE OF THE MONTH

# PLUG SPARKS

**The Megow  
"CHIEF"**

Span — 86 in.  
Wing Area — 712 sq. in.  
Overall Length — 48-3/4 in.

*Designed in 1940 by Walter Eggert*

- WING:** Three-panel design (flat center section) with top-and-bottom fore and aft spars, leading edge sheeted on top only. Unspecified but modern-looking undercambered airfoil.
- FUSELAGE:** Elliptical cross-section, crutch and formers, fully planked with 3/32 balsa.
- TAIL:** Conventional construction. Horizontal stab has semi-symmetrical lifting airfoil. (Pond's plans detail a suggested rudder and elevator installation for RC flying.)

Plans for the Chief in 86, 70 and 55-in. spans are available from John Pond O.T. Plans, P.O. Box 90310, San Jose, CA 95109-3310.

NOT TO SCALE

## MODEL OF THE MONTH

Systems—then a growing company. But things did not work out, and after working most of 1963, Frank joined the ranks of the unemployed.

During the 22 months that he was with Litton, Frank was able to print *Circular Airflow* and the 1964-65 Year Book. It was then that he hit on the idea of forming a Year Book Club to finance annual Year Books. A \$10 membership fee included two books and a membership pin. Response was disappointingly low—only 150 mem-

berships.

As Frank observes, he suffered a bruised ego more than he would admit. After all, he did sell 10,000 copies in 1938! Hence, with limited funds, the Year Books were shelved and Frank instead developed a series of models designed for Juniors. Finally, after 18 months of unemployment, he was rehired by Litton. He worked the deal to include only a three-day work week, leaving the rest of his time open for improving the kit business.

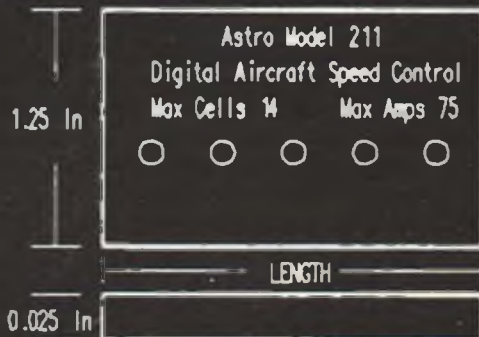
Encouraged by financial security, Frank decided to update the old 1933 *Model Airplane Guide and Log Book* and 1934 Year Book as one. In addition, he finished all of those drawings (and material) received in 1938 for the 1939 book. This, plus some of the excellent catalog material, made for a greatly enlarged 1934 Year Book. This latest one is a real treasure.

Frank then hit on the idea of combining all of the modeling material written by Merrill Hamburg for *American Boy*, spon-

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On Resistance	0.005 Ohms	0.005 Ohms	0.003 Ohms	0.002 Ohms
Brakes	No	Yes	No	Yes
Switching Rate	2800 Hz	2800 Hz	2800 Hz	2800 Hz
Heat Sink	Yes	Yes	Yes	Yes
Connectors	Zero-Loss	Zero-Loss	Zero-Loss	Zero-Loss
Length	2.5 Inches	2.5 Inches	1.6 Inches	2.0 Inches
Bare Weight	30 gm	30 gm	20 gm	25 gm
Retail Price	\$129.95	149.95	\$84.95	\$109.95



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sors of the AMLA (Airplane Model League of America). From 1928 to 1931, Merrill did a terrific job of introducing America to model airplanes. Surprisingly, there were enough modelers who had saved the material from those old magazines to make up a large softbound book. Personally speaking, I thought Zaic did a terrific job of acquiring and collating all the magazine articles. Reading this book is a real trip into the old days—I did like it!

Concluding this write-up, Frank Zaic has been simply incredible when it comes to gathering and preserving our modeling heritage through his books. We can't wait to see what Frank has in mind for an encore!

### MODEL OF THE MONTH

Ten years ago, at the eastern SAM Champs at Westover AFB, this columnist had the pleasure of meeting Walter Eggert Jr., who was one of the model designers for Megow. Eggert had brought out his 8-foot, 1936 Eaglet for approval as an Antique. No problem as there was copious documentation for this model, but what caught this writer's attention was that the model looked very much like a straight-wing version of the noted Soaring Eagle series of 1939. These models, produced in Class A, B and C versions (47, 54 and 72-inch wingspans respectively), featured a lovely gull wing that was tedious to build and prone to damage.

In 1940, Eggert followed up with a model known as the Megow Chief, which turned out to be a beautiful performer. John Pond O.T. Plan Service has three full-size plans of the Megow Chief available, at 55, 70 and 86-inch wingspans, the latter being the original design size.

### ENGINE OF THE MONTH

Around 1939, Forster Brothers produced the Forster .29 and .35 using the same idea as Ohlsson, Torpedo and other manufacturers—two different class engines built around the same crankcase and sometimes sharing other parts as well. Performance figures for the Forsters looked exceptionally good until one read the fine print and found that the impressive performance figures were derived using alcohol-based fuels.

Sometime after WWII, Forster Bros. offered glow and spark ignition versions of the front-rotor .29 and .35. Despite this, sales fell off as competition was very fierce with Atwood, Ohlsson, Delong and even the "slag" .29 engines. Later, Ralph Mroch (REMCO Mfg. Co.) picked up all the material, dies, etc. necessary to continue production of the .29, .35 and .99 engines and

managed to produce a limited number, but the quality was quite poor and the reputation of Forster engines suffered as a result. Then, about four years ago Randy Linsalato of RJL fame acquired all of the Forster stock and is now turning out excellent engines—this in addition to the several other engine lines he produces.

The front rotor spark ignition Forster .29 and .35, although originally produced after 1950, were approved by the

SAM Engine Committee as old time engines. As Jim Perssons of the Engine Committee says, "We judge the engine on appearance; if the engine looks like an old timer and runs with no appreciable advantage, we approve such engine as an old timer." Forster engines in .29, .35 and .99 sizes are now being produced by RJL Industries, P.O. Box 5, Sierra Madre, CA 91025. Write for prices and availability. **MB**

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# Fw 56 Stösser

All Airdrome plans are designed for medium skill level scratch builders. They show the complete wing, tail, and fuselage panels, and all cut-out parts such as ribs, formers, etc. Structurally, they are, for the most part, classic balsa open frames—much like enlarged rubber-powered scale models of the 1930s. Although very light in comparison with the overly heavy typical “gas” jobs of the post-WWII era, they are much stronger than their 1930s ancestors. This is achieved with selective use of thin plywood gussets, shear webs, spruce longerons, a few small plywood doublers, and some carbon fiber strips.

Too quick a peek at an Airdrome plan may be intimidating, as they are loaded with many construction and detailing hints. Careful scouting will reveal their basic simplicity by avoiding subjects that require retracts, flaps, etc.

### FW 56 CONSTRUCTION

Notwithstanding its bird-like, swept-back, semi-elliptical wing, the Stösser's beauty really starts with its elegant, aerodynamic fuselage.

### 1937 FOCKE WULF FW 56 STÖSSER

Designed for electric power by Steven L. Stratt

SCALE .....	2"=1'
WINGSPAN .....	78 in.
WING AREA .....	630 sq. in.
FLYING WEIGHT .....	Approx. 98 oz.
WING LOADING .....	Approx. 22.4 oz./sq. ft.
POWER .....	Geared Astro 40 or equivalent.
RADIO .....	Four channels required.
CONSTRUCTION .....	Balsa, spruce, plywood.

A warp-free copy of this difficult-looking, compound-curved form is easily built around a square-sided inner box structure which



The concluding of the author's two-part feature on his 1/4 scale model of the famous 1937 German monoplane—an example of electric RC scale at its very finest. This month: construction and detailing. Full-size plans for the Stösser are available from both Airdrome and *Model Builder Plans Service*.



closely follows the original's Warren Truss welded steel tube frame. The longerons are 1/8-inch square spruce, with 1/8-inch square hard balsa uprights and diagonals back to the cockpit, medium balsa aft of that.

To insure squareness of the crutch, make a rectangular box jig from 1/8-inch balsa sheet that fits inside the straight forward section of the fuselage. Wrap it with Saran Wrap.

After completing the two side frames over the plans, tape them in position to the box jig's side. Pin or tape this assembly precisely over the plan and CA all the vertical and cross braces over it. Remove, invert and tape the flat top over the plan again. Add the bottom braces.

Now you can gather the fuselage ends together and CA the 3/8-inch medium balsa rudder post over them. Later, you will need to tape its rear face concave to fit the thick convex L.E. of the rudder. Then, position snug-fitting cross braces (1/8-inch square medium balsa) top and bottom to obtain the desired curvature of the rear fuselage. Constantly check the verticality of both frames with any handy squaring device while you finish the crutch by adding all the remaining vertical and diagonal braces.

Finally, pull out the jig from the nose. After marveling at the squareness of your box structure, strengthen all the joints from the cockpit forward with scissors-cut 1/64 plywood gussets applied with gap-filling CA, on the inner surfaces only. Complete the nose as shown on the plans. Don't try to bend it; it's too abrupt a curve.

To transfer the rib and former patterns without cutting up the plans, copy them in groups by Xerox, spray the copies on the back with artist's rubber cement and mount them on wax paper. Roughly cut out each pattern, then peel them off the wax paper backing and stick them onto the balsa sheets in a close, economically spread pattern, noting the direction of the wood grain. Now cut them out, carefully hugging the outside of each outline to allow for final sanding on the fuselage.

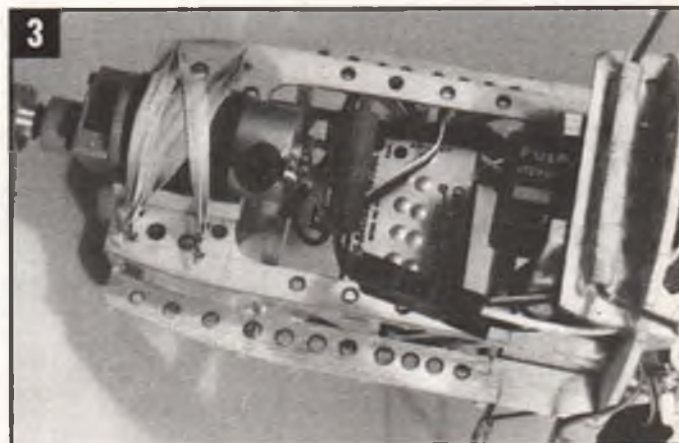
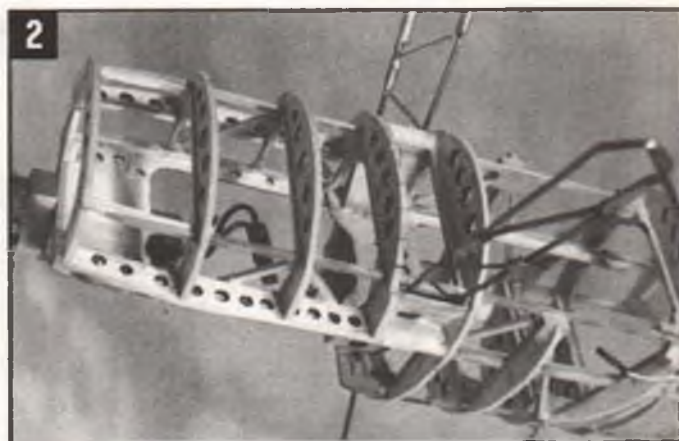
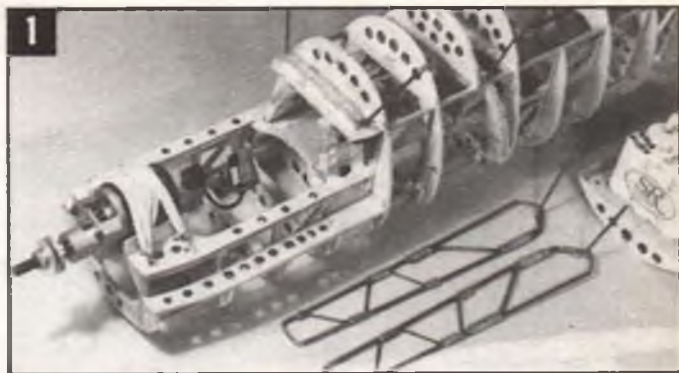
Apply all of the formers to the fuselage. You'll probably break some of the narrow tops of the rear-most formers that form the raised tail pylon, so don't think you're especially clumsy—I had to patch mine too! CA the 1/8-inch hard balsa pylon top over these former tops, and make certain it's square, as it supports the removable horizontal stabilizer. Don't fill in the pylon sides yet.

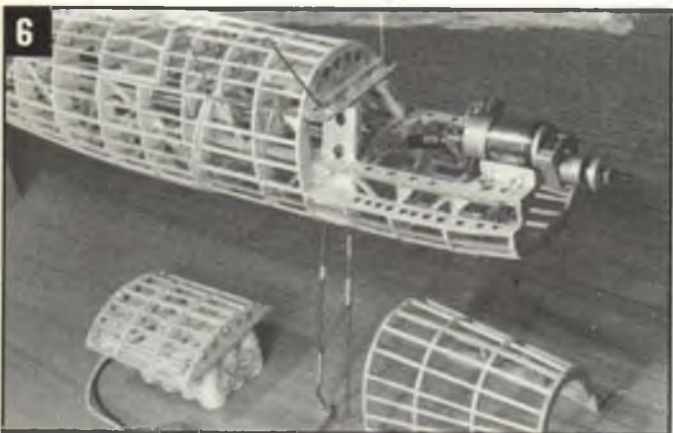
This is a good time to build the landing gear boxes. As shown on the plans, they form an inverted V inside the fuselage, with the apex serving as a base for the wing's front cabane strut. Carefully gap-fill this entire section with thick CA and micro balloons filler, as it is the major load-absorbing structure for the wing and landing gear.

Use a good vise and a wire bending jig to form the 1/8-inch M.W. removable landing gear. My design borrows the venerable Warren Truss again for the main outer frame of each leg, which is then braced by 3/32-inch M.W. Remember to make a left and right frame! Toe-in each "axle" ending and solder a brass tube over it for your wheel bushing, etc. The legs should slide into each landing gear box snugly so as to not drop out during aerobatics or landings. **Photo #1** shows the basic fuselage structure with the formers in place (note the lightening holes in the formers and the motor mount pieces) with the landing gear legs in the foreground. **Photo #2** shows the legs plugged into the landing gear boxes.

The cabane struts are also made from 1/8-inch M.W. Sandwich them at the bottom between grooved hardwood (spruce or bass) cross braces with thick CA. Wrap them with 15-pound nylon fishing line and CA in place. The front one sits atop the landing gear boxes. (Refer back to **Photo #1**.) Solder steel (not copper!) round electrical connectors on the upper cabane strut ends. The wing is mounted to these by means of 1-inch long #6 socket-head sheet metal screws. Bind and solder the 3/32-inch diagonal cabane braces and relax—the aerobics are over.

Before putting on the stringers, fit all of the operational equipment into the fuselage. First add the 3/32-inch plywood motor base (C10) in the nose, with two triangular balsa strips forming the motor cradle. Attach the motor with rubber bands. The small 250-mAH radio battery is located at the very front of the fuselage, below the





motor, and is held in place with Velcro. The Astro Flight 207 speed control and receiver/harness/fuse/switches follow as suggested on the plans. **Photo #3** shows the equipment installation in the nose.

Now build the battery cradle in its belly position. CA the two 3/32-inch plywood servo rails below seat level in the cockpit and screw the servos in place (I used Futaba S133 micros). **Photo #4** shows the motor battery and rudder and elevator servo installation. Note that a Sullivan #503 flex-cable pushrod is used for the elevators, while a pull-pull cable setup is used for the rudder using black Dacron trolling line. A separate detail sheet supplied with the plans shows how the cables are installed.

Build up the engine cowl in place over the Saran Wrapped fuselage nose section. Laminate the nose cowl from three pieces of 1/2-inch balsa, carve it to rough shape and CA it to the engine cowl permanently.

The horizontal stabilizer is built up with its special 1/16-inch plywood center rib sporting a protruding tongue under its leading edge. This centers the stabilizer into a slot in the tail pylon's top. Two #4x1/2-inch socket-head sheet metal screws through 1/16-inch plywood gussets at the rear hold the stab in position. Sheet the entire top of the fixed stab with 1/32-inch medium balsa and only the bottom center with 1/16-inch sheet; the elevator is not sheeted. **Photo #5** shows the framed-up stab (before the leading edge was sheeted) and rudder in place on the fuselage.

Trial fit the elevators to the fixed stab, trimming the L.E. and T.E. along the hingeline for a snug, freely rotating fit. The single 1/16-inch plywood elevator horn is angled forward and downward at dead center over the 3/32-inch M.W. joiner. Fit the stabilizer/elevator assembly in position and insure free rotation of the elevator horn in its slot on the tail pylon. It should swing 30 degrees up, 20 degrees down.

The thick, finless rudder is built flat and then ribbed to its air-foil shape that flows smoothly from the rear of the fuselage. In **Photo #5** you should be able to see the "ribs" on either side of the flat center structure. Carefully carve and sand its wide, thick, built-up soft balsa L.E. to a semi-round cross-section that tapers upward to its top. Shape the thick rudder post to fit the rudder's leading edge, then trial hinge the rudder with Robart #308 (steel point) hinge points. Follow the manufacturer's directions for scale hinging, which requires a pivot deeply sunk into the leading edge of the rudder. Adjust for a 25-degree throw left and right.

Getting back to the fuselage, lightly tack-glue the engine cowl to the nose and commence laying on the stringers (no gluing yet!) in smooth curves. Tape each one down just long enough to mark its path over the formers. Let the stringers go over the cockpit opening also to form the cockpit side panels. I do about three or four

*continued on page 82*



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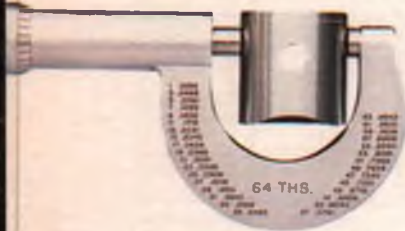
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# RIVERS OF AIR, OLD BUZZARDS AND BEAUTIFUL SCALE SAILPLANES

This month, Bill reviews the new instructional video from the old Glider Guru himself, Dave Thornburg. Also discussed: Dave Sanders' WWII bomber PSS gliders, and the big scale glass sailplanes produced by Inhoff Models in Canada.



Here's what vintage scale soaring is all about, folks. Ron Gestin turned out this beautiful 1/4-scale example of the Minimoia, one of the best-known classic sailplanes of the '30s. Ron scratch-built the 168-inch span bird from C. Williams (English) plans, available in the U.S. from Bob Holman. This photo was taken at the D.U.S.T. Winter Soaring Festival in Palm Springs, California this past December, just prior to the Minimoia's maiden flight. ■ UPPER RIGHT: The first flight of Ron Gestin's Minimoia proved completely successful—Ron says the ship flew and handled great. It ultimately was awarded both the John Robinson Perpetual Trophy and Pilots' Choice Trophy at the D.U.S.T. meet. Rex Powell photos.

To most all who have given it a try, this hobby of building and flying radio control model sailplanes has proven challenging, and therefore very rewarding and gratifying. One problem common to those at the bottom of the learning curve is that quite often they have no one to learn from—no mentor or teacher. Most of these lone eaglets somehow manage to get off the ground and eventually solo. However, there comes a time when 2-minute "sled rides" from a hi-

start begin to lose their thrill. The reward of sustained flight remains out of reach, shrouded in mystery.

For those solo eaglets who are motivated and willing to hang in there, there is now a helpful video. I believe it's an excellent tool which can be used to understand the mystery of sustained flight, to break the bonds of gravity and go "up there" with the big soaring birds.

The video is called "Old Buzzard Goes Flying," and was written by and stars the

creator of the hitchhiking Old Buzzard, Dave Thornburg! It also just happens to be a very entertaining video. (What else would you expect from Dave?) It's one which those of us who simply can't get enough RC soaring during daylight hours will enjoy. I've watched it three times in the last two months (and parts of it even more). Even though directed mainly toward the newcomer, I haven't grown tired of watching it, and pick up new things from it each time.

In general, the video is based on Dave Thornburg's popular and educational book, entitled *Old Buzzard's Soaring Book*. Some of the topics covered in the video are: first model recommendations and what model types to avoid; preflight safety checks; how to test-glide a new model; troubleshooting a plane that doesn't fly right; and the main topic, Thornburg's "river of air" concept. Here you'll really learn a lot about observing model behavior in lift and sink, including what a lightweight model does when it encounters a thermal and how to respond to it; and search-and-find flight patterns which get you into lift most efficiently.

The last section of the video delves into the most challenging and rewarding form of thermal flying: hand launch. Here you'll learn which models work best and how to modify models to launch higher, techniques of finding lift near the ground, using thermal flags or thin Mylar streamers to show you what the air around you is doing, how to use bad flights to practice landing approaches, and much more. "Old Buzzard Goes Flying" is the result of 10 months of labor and input by a group of New Mexican RC soaring fanatics; the list of credits at the end is long.

So, if you're a novice, you now have it in your power to speed up your learning curve and unlock the mysteries of the "river of air." If you already know it all, fill your brain with some good humor, good flying tips, banjo music and thermals before you retire for the night.

The cost of the video is \$24.95 plus \$3 shipping. Contact Taylor Collins at Soaring Stuff, 9140 Guadalupe Trail N.W., Albuquerque, NM 87114; (505) 898-8281 for more information. He accepts MC and Visa if you're shy of cash this week.

#### BOMBER'S AWAY!

When you think of scale sailplanes, no doubt your first associations will be Minimoas, Libelles, AS-W 24s, Saltos and the like. If you frequent the slopes, you might even think of power scale slope (PSS) warbird fighters like P-51s and Messerschmitts. You probably wouldn't think of WWII bombers, but that's exactly what Dave Sanders of Dave's Aircraft Works, 123 Avenida Buena Ventura, San Clemente, CA 92672; (714) 498-4478 is offering. These WWII bomber gliders—a B-17, B-24 and B-25—are aileron/elevator designs for scratch builders.

The big B-24 features a 72-inch span and uses a Göttingen 387 airfoil for high load carrying capacity. It also makes a slow and gentle aileron trainer, with mellow stall characteristics, light wing loading and all the other advantages of a larger airframe. The smaller, 50-inch span B-25 is a fully aerobatic model and is more manageable for folks with compact transportation. It offers sprightly performance for a scale warbird.

The B-17 is a little hotter ship with a slightly higher wing loading; this one is still



Inhoff Models International produces this impeccable, true-scale replica of the AS-W 24. The scale is 1/3.5, which results in a big 4.28-meter (14-foot) wingspan. Flying weight is 13 pounds. Very stable (Matt Inhoff reports one ship was lost O.O.S. when the airborne radio battery went dead) and easy to fly and yet very aerobatic.

under development and is scheduled for release later this year.

These bombers are a real kick for formation flying and conducting coordinated drops of paratroopers or powder-bombs. They provide a relaxing alternative to your faster, smaller, higher performance planes.

In addition to these, Dave Sanders has other small PSS designs available including a P-40, Ki-61 Tony, Me-109, Focke Wulf, etc. There's also the "Saber," a non-scale 60-inch span wingeron aerobatic ship.

All of Dave's designs feature a balsa or plywood sheeted foam core wing and all-balsa fuselage and empennage construc-

tion, send an SASE for a copy of his 1995 catalog!

#### INHOFF MODELS INTERNATIONAL

My March column, in which I noted the disappointing flight performance of Mark Foster's Inhoff AS-W 24, really struck a nerve with Matt Inhoff, who replied in part:

"In the article, you stated that Mark Foster's Inhoff AS-W 24 'was always down in 2 minutes or less.' I immediately knew that something was *very wrong* with the model in question. After calling Mr. Foster, it seems that the model was purchased used, via Australia. Probably in the interim, the building instructions and/or the plans

## MONARCH HLG UPDATE

**Editor's note:** In the review of the DJ Aerotech Monarch HLG that appeared in the May '95 Model Builder, we mentioned that the model was available exclusively from Northeast Sailplane Products (16 Kirby Lane, Williston, VT 05495; 802-658-9482), who supplied the review kit. Shortly after the article appeared, Monarch designer Joe Hahn called to say that two other firms—Slegers International (Route 15, Wharton, NJ 07885; 201-366-0880) and Soaring Specialties (1403 Lincolnshire Rd., Oklahoma City, OK 73159; 405-692-1122)—are carrying the model as well. In addition, we learned that the Monarch is now being produced both as a basic kit as reviewed, and also with factory pre-sheeted wing and tail surfaces. All three of the above mentioned outlets can supply you with either version of this truly phenomenal competition mini-sailplane. MB

tion. Rolled plans and detailed instruction manual are \$20 for the B-24, \$10 for the B-25. Pre-cut foam wing cores are also available for \$20 for the B-24 and \$10 for the B-25. Prices are F.O.B. at Dave's Aircraft Works, San Clemente, California. For mail orders, include \$5 for shipping and handling. For a look at some of Dave's

were lost.

"Our AS-W 24 has a Wortman FX60-126 airfoil, not a Ritz as mentioned in the article. This airfoil has a negative pitching moment, therefore I chose a reflexed airfoil section for the stabilizer. This in effect is a lifting section, highly undercambered, and is mounted upside down. This gives a

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down-force on the tail which balances out the negative pitching moment of the wing." (Of course, as you've probably guessed by now, Mark had mistakenly mounted the stabilizer right side up, which accounts for the short flights! I never suspected there was

"Our 1/3.5 scale AS-W 24, which spans 4.28 meters (14 feet), has been in production since 1990. It was designed from the manufacturer's drawings, making this a truly scale design. The white epoxyglass fuselage is quite light; the seam lines are



The 25-meter Schleicher AS-W 22 is a modern supership capable of truly phenomenal performance, and Inhoff's 1/3-scale model (27.3 feet!) has performance to match. Built-in water ballast tanks in the wings can boost the flying weight from 44 to 55 pounds. The water can be jettisoned by radio if lift is weak.

something wrong with the way the model was set up, but assumed it was the model itself.) "We've found our choice of airfoil to have been so accurate that there are hardly any trim changes throughout the flight envelope. We can slow it down to a crawl near the stall, without it falling off on a wing."

• • •

I recently received another letter from

almost invisible and can easily be polished out. There is no painting required on the fuselage, as all trim is on an extensive, self-adhesive trim sheet.

"The clear (or optionally smoked) canopy is mounted on a scale fiberglass canopy frame, yielding a very solid unit. The tailwheel is installed, as are the elevator control pushrod and bellcrank assembly. Most customers prefer a cable setup for the rudder. As an optional accessory,



PSS WWII bombers? Why not? Dave's Aircraft Works markets plans and foam wing cores for the B-24, B-25 and B-17 pictured here. Anyone for some formation bombing of the local hills?

Inhoff Models International regarding their line of kits. It's informative and interesting, so I thought I'd share parts of it with you:

"Although not well known outside of Europe, Inhoff Models produces some of the best models available anywhere. This isn't some PR hype; these words stem from some of our competitors.

we offer a robust retractable landing gear unit, complete with wheel.

"The wings are manufactured with a foam core, a 2/3 long obechi spar, and are reinforced with unidirectional rovings and cloth. Trailing edges are fiberglass reinforced. Graupner spoilers are used as they are easier to adjust and maintain. Ailerons

have been cut out and only require hinging/boxing. Leading edges and planking are obachi, which is pressed in jigs and vacuum bagged overnight. To date we have not had a single reject! As you can see, these kits reduce building time considerably.

"We've delivered many AS-W 24 and Discus (also 4.28 meter span) kits in Germany, Switzerland, France, Austria and Australia. A few have made it to the U.S. as well. Due to our reorganization, we are now turning our eyes to the North American market and have formed a new parent company, Inhoff Models Int'l, based in Kelowna, BC, Canada.

"We have scale fuselages for several other sailplanes available on a custom-order basis. These range in size from a 5 meter DG 600 to our 1/3-scale, 8.33 meter AS-W 22 and two-seater AS-H 25 flagships. A lot of engineering time has been invested in the lat-

ter two projects. For example, they have a scale wing/fuselage attachment (similar to a tongue-and-groove design); the wings are joined simply by mating the inner panels to the fuselage and pushing two steel pins through the spar from the cockpit, just like

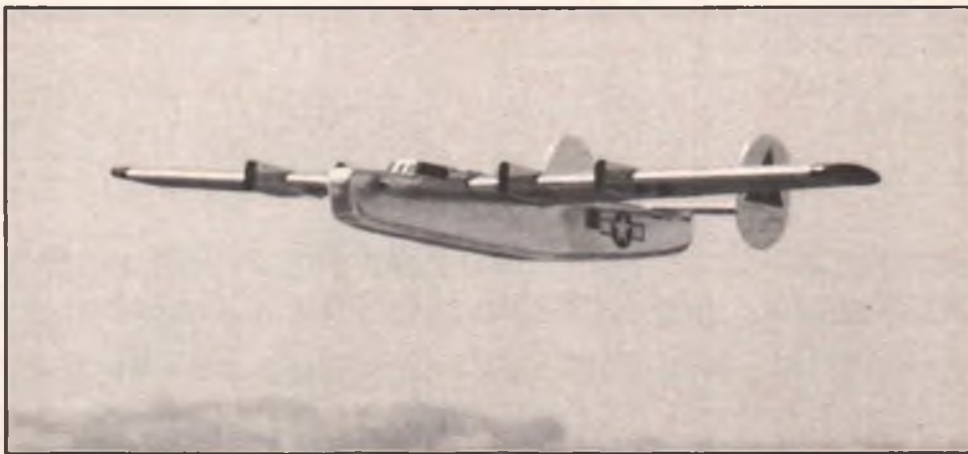
specially manufactured stainless steel spoilers, and the ability to carry up to 11 pounds of water ballast in four wing tanks. This may be jettisoned in flight.

"All of our 'kits' are delivered in a custom-made fiberglass shipping container similar to roof-mounted ski containers. This provides for secure mounting of all components during shipping as well as giving the owner a perfect transport/storage box.

"Only 50 AS-W 22Bs and AS-H 25s will be manufactured . . . ever. Each component is serialized and replacement parts are available only to

registered buyers. Pricing has been fixed and is high by 'normal' model standards."

You can reach Inhoff Models at 113 Verna Ct., Kelowna, B.C., Canada V1V 1S9; (604) 763-6453, fax (604) 763-2468. **MB**



Man, this looks like fun! Dave Sanders has his B-24 set up with a third servo for opening the bomb bay doors—look out below! Profile nacelles look convincing in flight while adding next to no drag. Text tells where to get plans and cores.

the full-size ship. Both models share the same wing, as do the full-size machines.

"The foam-core wing is built up in four panels and has six control surfaces (inner flaps, middle flaperons and outer ailerons),

## COMING NEXT MONTH

Review features in **MODEL BUILDER** will include:

- Miniature Aircraft's XL-Pro RC Helicopter (Part 2)
  - The Tiger Shark F-20 from Cermark
  - The Whipit Competition Hand-Launch Glider from Global
  - The Kyosho HyperFly Electric Helicopter from Great Planes
  - Futaba's SkySport 6VA RC System
- Also, look for Dan Vincent's report on the 1995 "Gator Shoot-Out" RC Scale contest.

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# PRODUCTS IN USE

■ By Bill Thomas  
Photos by Jeff Perez

## Cox Products' "Katydid"

Long known for their line of foam and plastic ARF models, Cox is breaking new ground with this cute little all-wood high-winger—a perfect match for Cox's Dragonfly .049 RC engine.

**T**he following is a conversation that never took place at the local flying field—but it could have!

**Me:** Hi guys! Sure looks like a great day for flying!

**Flying Buddies:** Hi, Bill. It sure is! This is awfully nice weather for March. So, what's new?

**Me:** Oh, not much, I guess. Hey, did you hear that Cox has a new airplane out?

**F.B.:** No, but that's not unusual. It seems like they're always coming up with something new. What did they make with their big foam wing this time, a biplane?

**Me:** Naw, you got it all wrong. This is an all-wood, film-covered ARF trainer.

**F.B.:** Gee, that *is* different for Cox, but tell me why, with a ton of ARF trainers already on the market, they think there's a need for one more?

**Me:** This one's 1/2A size! It's a little yellow cutie that'll fit in the trunk of the smallest car without even taking the wing off! It's supposed to use the Cox Dragonfly engine, which has a throttle, giving it three-channel control. Wait a minute—I'll go get it and show you the new Katydid!

• • •  
The Cox Products Katydid is quite different from the rest of their line of almost-ready-to-fly airplanes. It features all-wood construction pre-covered with a heat-shrink plastic covering. It's not a foamie!

Upon opening the box, I found five basic pre-covered components and two small bags of hardware all neatly packed and pro-

tected from damage by cardboard dividers. Also contained in the box were the assembly/flying instructions and a large sheet of colorful Mylar self-adhesive decals.

Assembling the Katydid is very quick and easy and is covered in detail in the instruction book. It took me one evening to assemble the wing, horizontal stabilizer/

elevator assembly, vertical stabilizer/rudder assembly, and attach the landing gear. The next evening was spent installing the radio (I used a three-channel Cox Cobra system), the Dragonfly engine and the pushrods. The whole process was trouble-free. Anyone who can mix epoxy and turn a screwdriver should have no problems





putting this model together.

During construction I came up with a couple of helpful hints which, although not at all critical, may serve to help someone through a first-time assembly.

First, when assembling the wing, I like to run a strip of masking tape around both of the wing half roots before epoxying the panels together. I don't know about you, but I have a tendency to use too much epoxy, which oozes out all around the joint. After sliding the wings onto the plywood dihedral brace you can wipe any excess epoxy and pull off the masking tape before the epoxy hardens. This will insure a clean joint.

Another hint concerns mounting the servos. The servos are mounted on two wooden rails which fit the inside width of the fuselage and are glued as an assembly onto two more rails which run the length of the cabin area. I would suggest that you don't glue the servos in place quite yet, as they can be moved fore or aft on the rails to help properly locate the center of gravity without having to add lead weight (read: dead weight!).

Skip ahead and assemble/install the landing gear and empennage (horizontal/vertical stabilizer assemblies) and build and



The Katydid is supplied as a set of ready-to-assemble components, complete with hardware and self-adhesive decals. A good-looking ship, no?

you can slide the servos as needed to get the airplane to balance. Once this is done you can glue in the servos and make the Z-bends. No mention is made in the instructions about control surface movement, but I would start with minimum travel (farthest hole out on the rudder and elevator control horns) at least for the first few flights, as the Katydid is a pretty responsive airplane.

The Katydid kit does not include an engine, but Cox kindly supplied one of their Dragonfly .049s for this review. This airplane and engine combination goes together like a hand and glove. The Dragonfly

install the throttle, nosewheel steering, rudder and elevator pushrods. Don't make the Z-bends where they attach to the servos until after the servos are glued in. Install the foam-wrapped battery and receiver in the forward compartment just behind the engine.

I used, and recommend, a 270-mAH NiCd battery. At this point I cut out a piece of cardboard 2 inches high and slightly wider than the forward bulkhead; this, when angled in (in front of the

bulkhead) and released, will keep the receiver and battery pack from shifting in flight and possibly falling back into the cabin area. At this point the engine can be mounted and the wing dowels installed. (Small hint: if you plan to use the "windshield" provided on the decal sheet, apply it before you install the front wing dowel. Then the hole for the dowel can be punched out and the dowel installed neatly.)

That done, slip in the servo tray, mount the wing and check the CG. If it's not within the desired range



The author gets some run-in time on the Dragonfly .049 before the Katydid's maiden flight. As Bill relates, running a few tanks through a new engine before sending it aloft can save you some embarrassment and a possibly broken airplane.

engine has some basic assembly involved (fuel tank and clunk setup) and the cylinder must be relocated to an upright position. The instructions that come with the engine and the Katydid kit cover this nicely and should pose no problem.

Now for the fun part—flying! My Katydid was completed in late February and although nice flying days are rare here in Kansas this time of year, I lucked out and found myself at the flying field on a sunny 65-degree day. I hadn't had an opportunity to break in the engine yet, so following the Dragonfly instructions, I ran it (on the ground) through two full tanks. The

## COX PRODUCTS' "KATYDID"

WINGSPAN ..... 41 in.  
WING AREA ..... 265 sq. in.  
LENGTH ..... 28 in.  
FLYING WEIGHT ..... 24 oz.  
WING LOADING ..... 13 oz./sq. ft.  
RADIO ..... Two channels  
(rudder/nose gear, elevator)  
or three channels (rudder/nose  
gear, elevator, throttle).

Produced by Cox Products,  
350 W. Rincon St.,  
Corona, CA 91720;  
(909) 278-1282.



Our author makes a close pass for photographer Jeff Perez. Bill finds the Katydid to be quite responsive to the controls, fairly aerobatic for a rudder/elevator ship and exceptionally rugged. With minimal control throws the Katydid would make a fine trainer, as long as a competent instructor is available to help with the first several flights.

engine was sounding healthy, so I thought I was ready to go.

To make a long story short, the "Haste Goblins" were handy and about 30 seconds into the flight the engine went lean and lost power at the most inopportune moment. I quickly put the nose down and landed straight ahead in a dusty wheatfield. The plane snagged a bush and went tail over nose, coming to rest upside down in a cloud of dust!

Upon retrieval, I found no damage except for the nose gear being bent back slightly. It was covered with fine dirt which sticks to exhaust residue like a magnet. I took the airplane back home, cleaned it up and disassembled the engine for a thorough cleaning. The inside of the fuel tank and the reed were completely covered with the dirt from the field. After a thorough cleaning, I reassembled and reinstalled the engine to await the next chance to fly.

The next nice day came three weeks later. Back at the flying field, I decided to make sure the Dragonfly was ready so I ran three more tanks through it. The last tank found the little engine really screaming and wanting to go!

This time the Dragonfly ran beautifully and I had a chance to really check it out. At full throttle the Katydid is a fairly fast airplane—quite a bit faster than the big "floaters" I usually fly. It's an honest flying airplane, meaning it will go right where you point it, and it can be talked into some mild aerobatics like loops and barrel rolls if you enter from a shallow dive. I found myself flying at full throttle most of the time, using the throttle only for descents and landings. The initial flights indicated a need for some downthrust, so I installed two small washers on each of the upper engine mount bolts between the tank and the firewall. This cured the model's tendency to nose up under power and nose down at idle. I can now leave the trim alone and just fly the airplane.

Although the Katydid is capable of R.O.G. (rise off ground) takeoffs, I've been

hand-launching it most of the time. Because of its light weight and the stiff breezes at the times I went out to fly, any effort at taxiing only resulted in the airplane flipping over so quickly that I hardly had time to close the throttle. That's OK—we have two or three days every year with no wind, and I plan to take advantage of them!

In conclusion, I think the Katydid is a neat little package. It's small enough to haul around in the trunk for that lunch hour flying session or a quick flight after supper. It's rugged. Ask me about "losing it" downwind, clipping a utility pole about 25 feet up, spiraling into the ground and finding absolutely no damage! I won't guarantee you will be that lucky, but it definitely convinced me!

If you have no experience flying and can't locate a qualified instructor, I must say in all honesty that you would be better off with one of the other Cox Products kits,



The Cox Dragonfly .049 is a great little 1/2A powerplant, featuring an effective throttle, muffler and a large backplate fuel tank complete with a clunk-type fuel pickup for sustained inverted flight.

such as the EZ Bee II, Thermal Hawk, etc.; but if you can find an instructor to help you through the first dozen or so flights, the Katydid could be the right airplane for you. More experienced modelers just looking for a small, fun package might want to adapt a more powerful engine such as the Tee Dee .05 RC or .09 RC with a larger fuel tank for more air time. As for me, some people have been wondering about my cologne lately (smells kinda like castor oil), so I'm thinking about trying a little Astro Flight 035 electric on my Katydid. Then they'll never know! Have fun! **MB**

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*Not Included in kit: Radio, Engines, Wheels, Covering Material, Glues, Props & Floats*

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# FREE FLIGHT

BY BOB STALICK

- **New Events**
- **The .020 "Little Hopper"**
- **New Free Flight Products**

It seems as though every time I open a newsletter, staring me in the face is someone's idea of a new event. Legal Eagle, which was highlighted in the June issue of *Model Builder*, is a popular new indoor event. Here in the northwest, Fred Guilfoyle is promoting an .020 power event featuring reduced-size Nostalgia era models. Even this column recently promoted an .010 event through a postal contest. I also see that some SoCal clubs are sponsoring a "design of the year" event—this year, it's Taibi's Starduster X. The rules include faithful adherence to the original plans including choice of engine, etc., etc.

One of the nice things about all of these new events is that it gives columnists like me the chance to feature some designs that might not otherwise see the light of day. If you're like me, you build more models (or at least *start* to build more models) than you ever fly in competition—I have a number of ships that are in the "under construction" stage and have been there for at least a year. Each time a new event emerges, I feel this distinct urge to build at least one model to enter in it. Consequently, the ship currently under construction takes a back seat while the new heartthrob gets all the attention.

I don't think we should put



The late Bob Hunter's beautifully decorated Sabalite 1300 was on display and flown at the 1984 U.S. FF Champs at Lost Hills, California. Here, Jeff Phillips returns from another successful flight. Photo by Fred Terzian.

a moratorium on new events, but unless we get a large number of new contestants at our meets, we'll end up with more and more events and fewer and fewer contestants in any one of them. It's no wonder the AMA is now requiring a minimum of five contestants pre-entered in each Nats event in order to keep it on the schedule. Maybe it's time again to review our event schedule. Maybe it's time to do some housecleaning and reduce the number of events we sponsor.

Bob Hatschek claims we

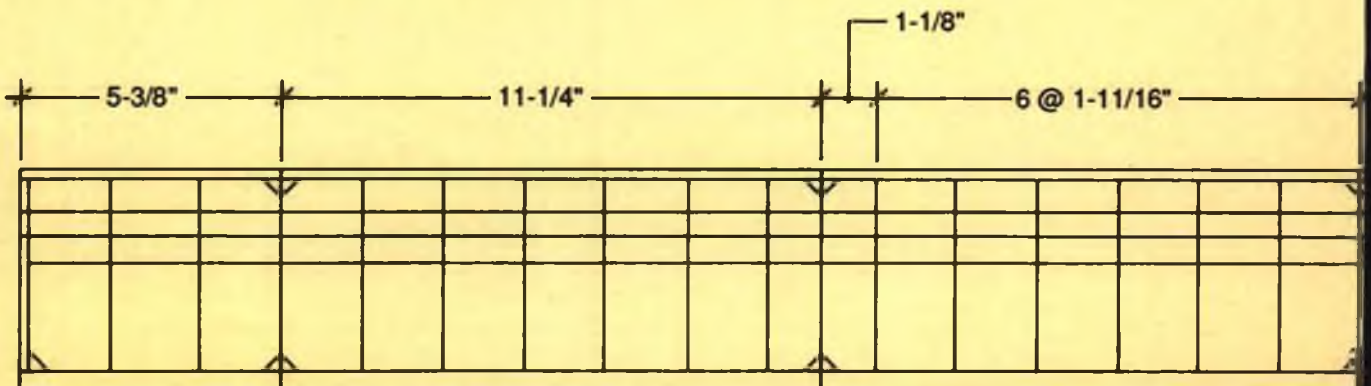
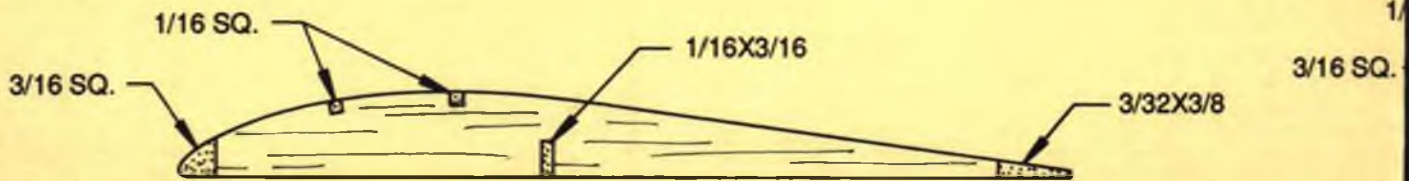
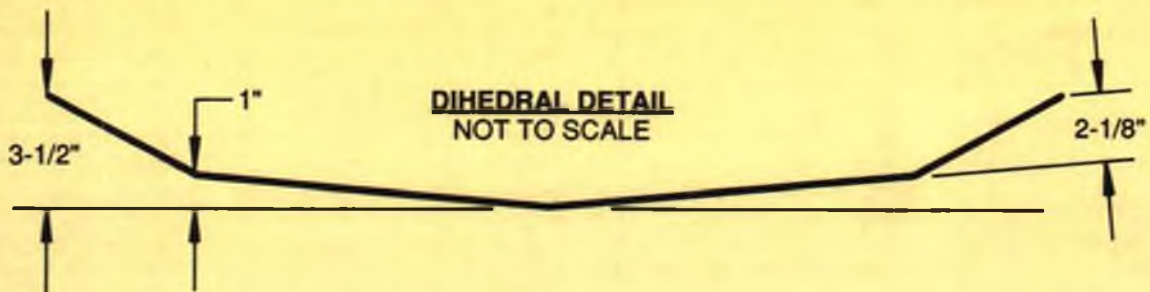
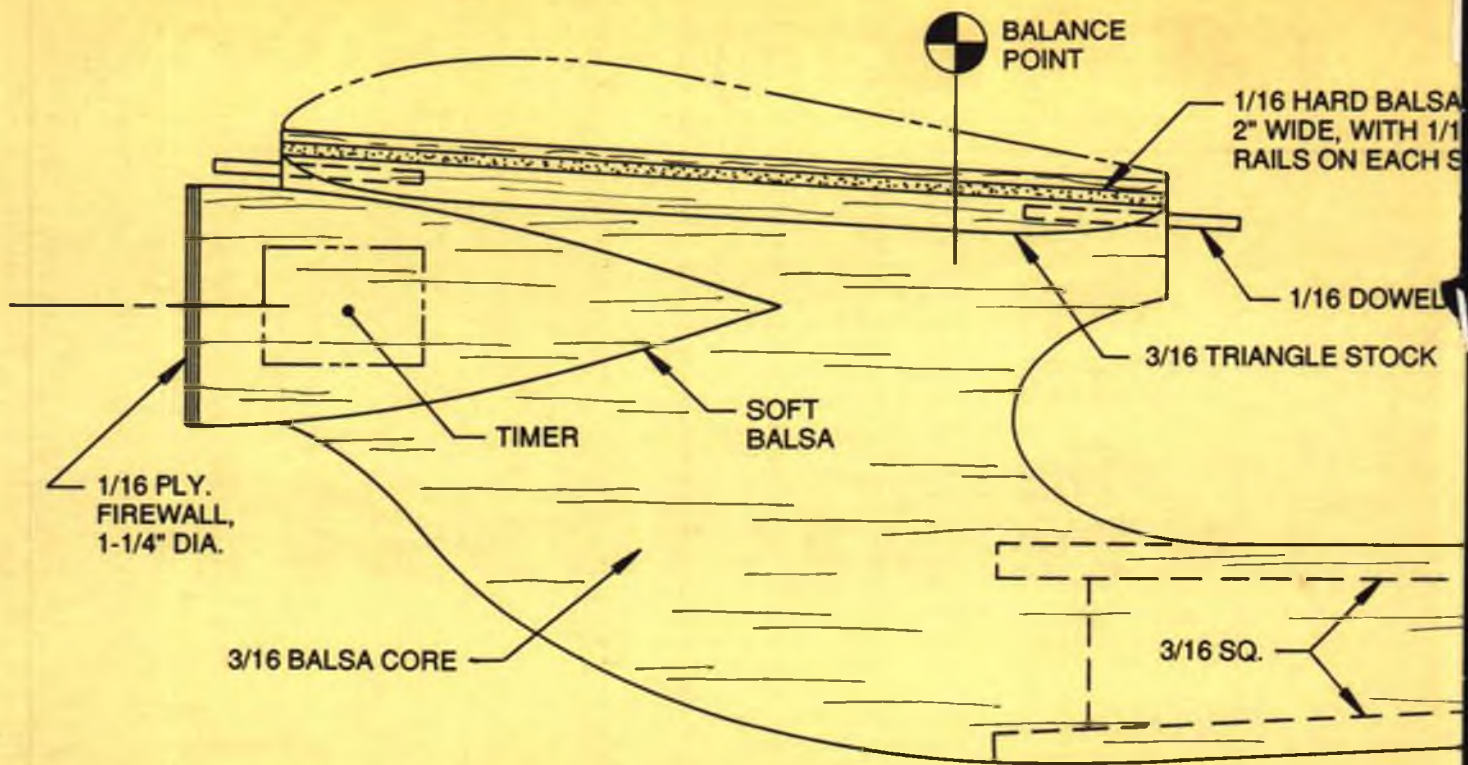
have way more events that we can possibly support and cites the European schedule of events as a comparison. Most European countries host the FAI events and may have one or two regional or country-specific events. We have not only the AMA and FAI schedules, but also our own special events, from Old Timer to Nostalgia, from regional and club events to the various oddities noted earlier. Is it time to prune the deadwood from the list? I think so.

## PLAN OF THE MONTH: Little Hopper

Guntis Sietens was a competitive free flier in the northwest up until a decade or so ago, when he moved to northern California. Before he left, he had experimented with high-thrustline models, such as the Cloud Hopper. Guntis' Little Hopper is a reduced (.020 size) version of his 1/2A design, and should be a good flier in the



Framework of Bruce Augustus' structurally revamped (but still within SAM guidelines) 1938 Rambler, designed by Gil Sherman. One of the hot tickets in the Old Timer free flight game, the 72-inch span Rambler is being offered in a two-sheet plan set by Bruce, showing such niceties as aluminum engine mounts, screw-adjustable rudder tab, etc. Also included is an eight-page booklet of building and flying instructions. Going price of the complete package is \$24.95 postpaid, direct from Bruce at P.O. Box 450, Sun Valley, ID 83353.

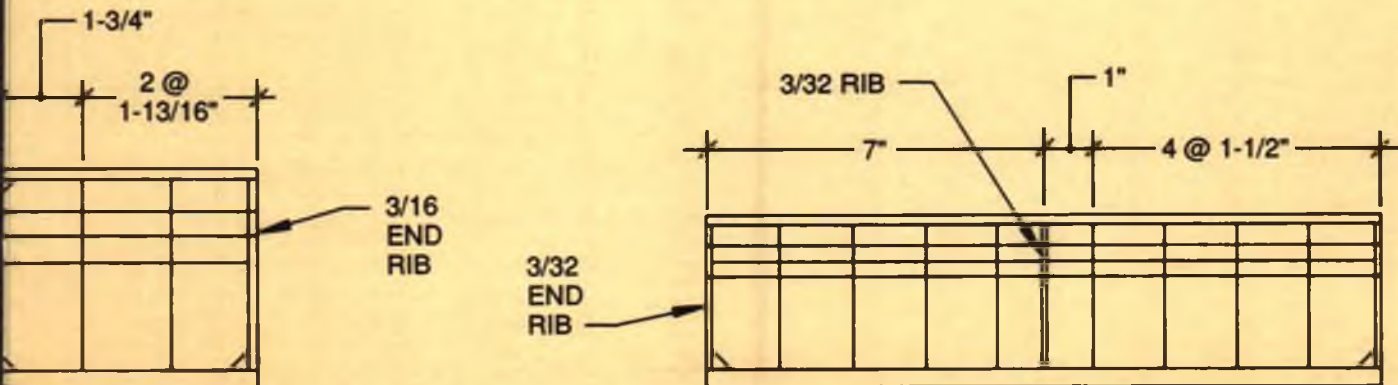
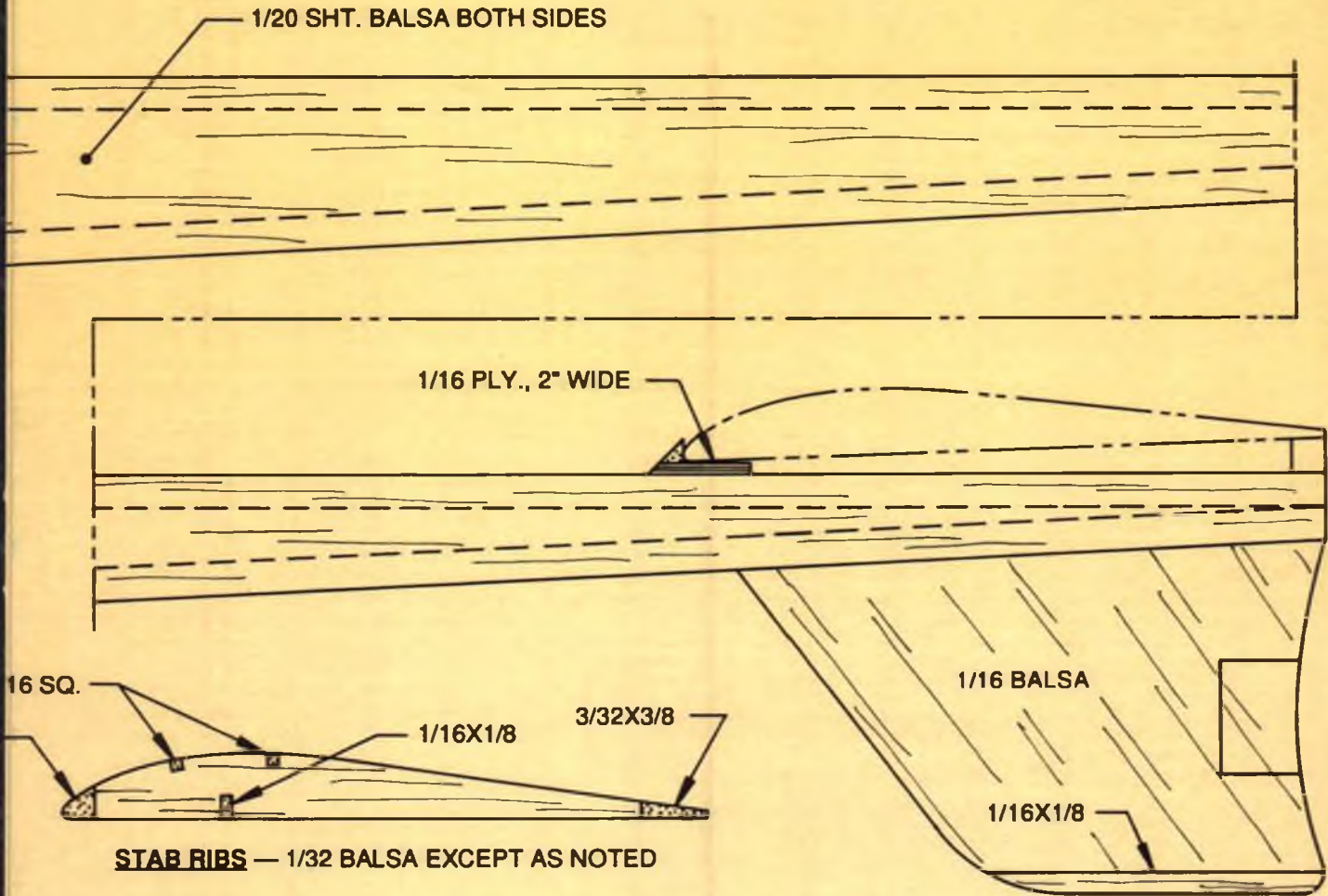


# LITTLE HOPPER!

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A TEE DEE .020 DESIGN BY  
GUNTIS SIETENS

SPAN: 33.25 IN.  
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STAB AREA: 50.75 SQ. IN. (33%)  
FLYING WEIGHT: 3.6 OZ.



STAB LAYOUT AND RIB SPACING



The annual Misery Meet this past February was indeed miserable. Few official flights were logged. Here Fred Wilson launches Al Borer's all-balsa A-1 model, the Cheapskate, designed by John Clear. As the day wore on and the rain continued to fall, Al had to continuously rebalance his model, ending up with a wad of clay about the size of a golf ball stuck to the nose.

.020 duration event being sponsored by Fred Guilfoyle. Presented here are full-size patterns for the wing and stab ribs and fuselage; sub-scale drawings of the wing and stab show the rib spacing, which is really all you need.

As I reviewed the drawing, a couple of thoughts struck me. The fuselage could be built lighter and stiffer by substituting 1/8x3/16 longerons and some 1/16x3/16 uprights and diagonals in place of the 3/16 square. Also, the 3/16 solid balsa core front end could be hollowed out in several places to reduce weight. Otherwise, the ship looks very straightforward and simple to build. As a high-thrustline model, it should be built without wing warps or maybe a little

curves to the wing and tail units made it a particularly attractive ship, and I'm sure the company that kitted it sold thousands of them. I'm also sure that only a few hundred were ever completed and flown. Unfortunately, most of the kits I saw were made from run-of-the-mill balsa and featured uncrisp die-cutting. The completed model was typically grossly overweight. Strangely enough, even hauling around the extra 4 or 5 ounces, they still flew well.

Think you know the name of the model? Write it down and send it to the magazine. If yours is the one drawn at random from among the correct entries, you'll win a free one-year MB subscription. Simple as that. Enter now.

washout in each tip, and should be flown to the left under power and left in the glide. Trim is just like a Starduster with slight left tab for power and left stab tilt for glide.

### AUGUST MYSTERY MODEL

If you ever built and flew A-2 (now F1A) gliders, there's a good chance this model was one of your first ones. The seductive

### MAY MYSTERY MODEL WINNER

*Editor's note: Over the last couple of months we've had an especially low response from readers concerning the Mystery Models—only two for April, and to date only three for May. Part of the reason may be the subjects featured, but part of it also must be that we're simply turning them around too quickly—not giving readers enough time to respond. Every month, MM entries continue to trickle in after the winner has already been chosen. To that end, we're going to push back the MM write-ups by one month, so that those who don't respond immediately won't be left out. We'll have the May winner for you next month, the June winner in the October issue, etc.*

### NEW ISSUES FROM TEXAS TIMERS

Hank Nystrom continues to develop his high-quality FF specialty products. His latest is the Texas Max Timer, a combination engine shutoff and DT timer which features independent adjustment of both functions and has the very positive wire switch system. My sample is the Max III timer, which means it is useful for 3 minute maxes. It weighs in at 20 grams and needs a remote shutoff to be complete. I did a number of test runs, and it consistently exceeded 4 minutes in the DT mode. The cost is a most reasonable \$28 plus \$2 postage per order.

In addition to his seven different types of timers, Hank also has a bunt mechanism, remote pinch-offs, tubing, bladder fittings and bladder check valves. He's also experimenting with a Texas Old Timer, for spark ignition Old Timer models. I recommend your support of Hank's efforts, because he produces superb equipment that we need and can use. Send an SASE to Texas Timers, 3317 Pine Timbers Dr., Johnson City, TN 37604 and ask for a brochure and price list.

### NATIONAL ONE-DESIGN EVENT

Bill Vanderbeek is interested in determining whether the general free flight public has any interest in competing in a national level one-design event for 1996. The design would be the RamRod 250 as presented either in the Berkeley/Sig kit or in the M.A.N. plan. Sig Mfg. Co. has indicated interest in reissuing the RamRod kit, if enough interest can be generated. Bill tells me that the 1995 Starduster X competition generated 30 kit sales just in SoCal. As with the P-30 event, this could be a postal contest with scores from around the country being tallied. The idea is in the formative stages at this time, but if it strikes your fancy, contact Bill and let him know. He can be reached at 1300 Simon Ln., Los Altos, CA 94022; (415) 949-3366.

*continued on page 76*

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# Flash

Sundays Will Never Be the Same!



# 1995 COSTA RICA

BY ELOY MAREZ



We can always count on Miami's Frank Reyes to show up with a large, immaculately constructed and realistically flown airplane. This year it was this beautiful Weeks Special, a replica of Kermi Weeks' competition aerobatic biplane.



■ LEFT: The 1995 "Best of Show" and "Best Helicopter" awards both went to Luis Sanchez, from Miami, who thrilled one and all with fantastic flights with his X-Cell chopper.  
 ■ ABOVE: The flight line at Aeromodelismo Costa Rica's field shows the wide variety of airplanes present at this, the 13th Tropical Fun-Fly. Note the extent of Kodak's sponsorship.



The local media (radio, TV and press) were introduced to Sig's Wonder and the planned aerial combat event by Fiorella Martinez of LACSA Airlines. Mode: belongs to Col. Robert E. Thacker.

**Our roving correspondent once again journeys to the "Garden of the Americas" to report on what has become one of the best-known and most popular modeling fun-flies anywhere.**



■ ABOVE: This young fellow has good reason to smile. Fourteen-year-old Agosto Delgado came from Panama to beat out all the old-timers at aerial combat with the Sig Wonder; event was much applauded by all the spectators. ■ BELOW: International cooperation in the forms of Fernando Chavez (left), of Costa Rica, about to hoist Bob Thacker's Falcon 880 "Best Glider" winner into Costa Rica's wild blue yonder.



■ ABOVE: Jose "Pepito" Travieso, of Miami, with his French Rafale ducted fan was awarded this year's "Best (Static) Jet" award; the aircraft flies as good as it looks. ■ BELOW: One of California's most successful scale teams, Diego Lopez (left) and Gene Barton, ready Diego's CAP-10 for its first flight into Costa Rican skies



# Costa Rica

For the past 12 years, Costa Rica's Tropical Fun-Fly was held in May, the month that begins the rainy season, which always worried us. This year, in order to be assured of dry weather, the event was held in March, and guess what? It rained! Actually, it was only an unseasonable sprinkle, which did not seriously affect things, and the flying continued as usual.

The actual dates were March 10-12, and some 50 fliers, many with two or more airplanes, came from nine countries. As this is not a serious competitive event, a wide variety of aircraft were flown, ranging from large scale to sailplanes to a Panamanian witch! In addition, this year a ribbon cutting combat event was flown, using Sig Wonders.

As in past years, Sunday was a highly advertised public day, with a large crowd estimated at 6000 being present. A well-versed bilingual announcer kept up a running commentary so everyone went away with a good understanding of modern radio control airplanes and their capabilities. At Sunday night's closing banquet, the following winners were announced:

- Best Single Engine, Static ..... David Baker, Costa Rica.
- Best Multi-Engine, Static ..... Rafael "Pepo" Cano, Panama.
- People's Choice ..... John Cook, Canada.
- Most Aerobatic ..... Clark Hopkins, Florida.
- Best Glider ..... Col. Robert E. Thacker, California.
- Best Jet ..... Ray Gonzales, Florida.
- Best 1/4-Scale ..... Bill Gowing/Anthony Greco, Florida.
- Best 1/3-Scale, Static ..... Clark Hopkins, Florida.
- Best Jet, Static ..... Jose Travieso, Florida.
- Best Helicopter ..... Luis Sanchez, Florida.
- Worst Crash ..... Forest Waller, Panama.
- Wonder Combat ..... Agosto Delgado, Panama.
- Best of Show ..... Luis Sanchez, Florida.

An event of this type cannot take place without major supporters, and we are indeed lucky to have a large number of them from outside the RC industry. First amongst them is LACSA, The Airline of Costa Rica, who flies us and our airplane boxes down in modern Airbus 320s and spoils us while doing so. There are airlines that provide more luxurious service, but none that do so with more efficiency, courtesy and finesse. Amongst the other sponsors are Gallito (candy), Cacique (liquor), El Hotel Irazu, Coppertone, Kodak, Heineken, Carrier (air conditioning), El Hobby Shop, and Sav-On Hobbies (formerly Texson) of Miami. We appreciate their sponsorship, and appreciate even more the fact that the executives of these companies were with us at a press conference at the hotel and at the field.

Enough words—join us in pictures at Aeromodelismo Costa Rica's flying field, and plan on joining us in person there in 1996. It won't rain—we promise! MB

# MODEL BUILDING 101 + *MODEL BUILDER* = NEW MODELERS



**A middle school program aimed at growing  
the future crop of model aviators!**

It's no secret that most model airplane enthusiasts are "elder statesmen." Most of you are over 50 now, but started with model airplanes in your youth. Some of you continued to build and fly all through your working years, but most of you returned to the hobby after a two- or three-decade hiatus.

As the model aviation industry looks to the future, many voice concern because we aren't seeing youngsters getting involved with model airplanes. There are many other activities competing for a youngster's attention. There doesn't seem to be much interest in the technical disciplines. We may have forgotten that "heart, head and hands" can still create the new wonders of the world. Learning through model building means "the sky's the limit" for creativity in these middle school students.

That's the reason behind Model Building 101, Inc., a not-for-profit company I started in 1994, with some assistance from Frank Garcher, president of Midwest Products. MB101 is a comprehensive course for students in grades six through eight. With Model Building 101 guidance, students build three models as part of their school science course. Each grade completes a more difficult and complex aircraft, learning along the way detailed information about the science of aviation.

Thus far, MB101 has successfully taught more than 800 students, mostly in the Southeast. This is nothing to what we can and will do!

Our program is dedicated to training teachers, who then conduct classes in aeronautics by using model airplane building and flying.

Sixth graders build Frank Ehling's famous Dart, modified to MB101 requirements, quickly learning the use of building tools and equipment. They are taught the meaning of aeronautical terms like lead-

ing and trailing edge, vertical fin (as opposed to rudder), stabilizer (as opposed to elevator), and Bernoulli's theory of lift. They are shown the need for and use of flight surfaces and relative ratios, plus the necessity of applying all this knowledge, to make their Darts perform satisfactorily.

Seventh graders who complete the Dart are then eligible to build a modified version of John Gomez III's wonderful flying Tennyson. This cambered-wing, high-pylon stick model is the perfect platform for advanced studies of building and flying techniques. Students are shown the influence and effect of thrustline, CG, CLA, CL, moment arm and interaction of wing, stab and fin. Knowing that these basic and interrelated forces are incorporated into the Tennyson converts the facts from dry, boring technicalities into dynamic, immediately useful information.

Eighth graders who complete these two models are then qualified to build an electric aircraft. Although still in the design stage, MB101 will have a prototype for our schools' late fall classes. It incorporates some unique features that make it particularly suitable to this last class in our course. Read more about these and other developments in our program in future monthly columns here in *Model Builder*.

Our concentration on "teaching teachers" creates a resource who can influence students year after year. Within those students are our future aviation advocates and contributors.

We provide all materials needed to begin and later expand the MB101 program locally: A manual of Standard Operating Procedures (SOP), videotapes on building the Dart, Tennyson and Electro, newsletters that share what's being done by other groups throughout the country, and finally, we act as a clearinghouse for all information about this phase of science.

*Model Builder* shares my concern about a shortage of future modelers, and has pledged its resources and energies to help Model Building 101 grow. Each MB101 student will receive a complimentary four-month subscription to *Model Builder*. This will reinforce what the 11- to 14-year-olds have learned and expand their awareness of the possibilities in model aviation. Each MB101 instructor, teacher and principal will receive an unlimited complimentary subscription. *Model Builder* will donate gifts and prizes to be awarded top students in each MB101 class.

However, MB101 needs *your* help, too. As a not-for-profit enterprise, it was never designed to accumulate funds. I receive no salary, nor do my instructors or part-time secretary, Becky. Yet, MB101 does have expenses—preparing classroom materials, procuring kits, postage for newsletters, telephone bills, etc. We have a policy that students who can't afford the few dollars required to build a model, will be given the material free of charge. Hopefully, no child will ever be deprived of this worthwhile experience.

Unfortunately, it does take money. Many firms have generously supported us with supplies and materials, yet we also need your tax-deductible donations and/or bequests. The bigger our war chest, the more students we can bring into this lifelong hobby.

Individual modelers and teachers who desire more information on starting a local program—and/or to send donations—can write J.J. Levine, Model Building 101, Inc., 1891 Branchview Dr., Marietta, GA 30062; (404) 973-3598. Please enclose a business-sized (#10) envelope bearing 55¢ postage for further information.

Come join Model Building 101 and *Model Builder* to establish for the future what we've lost in the past. **MB**

Are you ready for this?

**SIG**

KIT NO. RC-66



*You'd better be!*

# WONDER

*Designed by: Bruce Tharpe*

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Wonder how it flies? Wonder IF it flies? Your first adrenalin-pumping, action-packed, speed-blurred WONDER flight will answer those questions in a big hurry! The WONDER is best described as a very fast, go-where-you-point-it, turn-it-quick-or-it'll-be-gone kind of plane designed for hot-thumbed R/C pilots. With an .09 or .10 size engine, the WONDER is actually a very nimble, aerobatic, smooth flying sport plane, but with a snarlin' .15 or .19 up front it's a hand-launched hot rod! Landings are no sweat thanks to the thick symmetrical airfoil and the light wing loading. C'mon, shake things up and take a walk on the wild side of sport flying - fly a WONDER!

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WING AREA: 338 sq. in.  
WEIGHT: 26 - 38 oz.  
RADIO: 2 - 3 Channel  
(Aileron, Elevator, Throttle)



**CAUTION:** The Wonder is not recommended for beginners or the faint of heart. It's fast!

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# DEAR JAKE

## Advice for the Propworn

### DEAR JAKE:

I had to travel to Sacramento, California for a business meeting last week. It was my first experience with the "Friendly Skies." I have a few questions that a veteran frequent flier such as yourself might be able to answer.

First: Why does each row of nine seats (I was on a jumbo jet) have only enough overhead storage for four people? Second: Why did the stewardess who sold me a movie headset for \$4 spend the entire movie standing in the aisle serving food and drinks and blocking my view of the screen? Third: When they asked the window seat passengers to lower their window shades so we could see the movie better in a darkened cabin, why did not one of them comply? Fourth: How can a takeoff in Philadelphia be held over 40 minutes by an air traffic delay in St. Louis? And finally: When we arrived late in St. Louis and they asked passengers who had reached their final destination to stay seated and let connecting passengers off the plane first, why did everybody jump up and clog the aisles the instant the seat belt sign was turned off?

I found the entire experience rather unpleasant and the people involved extremely discourteous. Did I encounter the rule or the exception?

Harried in Harrisburg, PA

Dear Harried:

Since you didn't say anything at all

about unidentifiable food, butt-numbing seats with no leg room, coffee-spilling turbulence, or lost and/or shredded luggage, I would have to say your flight was a remarkable variation from the established norm. You lucky dog!

Jake

### DEAR JAKE:

How come when I do a 4-Point Roll, the judges take it literally and give me 4 points? Then when I do an 8-Point Roll, they don't care what it's called and only give me 4 points again.

It's not fair! I'm entitled to just as many points as the next guy. I demand more points!

Unjustly Denied in Bellevue, WA

Dear Unjustly Denied:

I believe if you remove your hat, you will find that you have at least one more point than the judges have given you credit for.

Jake

### DEAR JAKE:

In your scholarly dissertations on aerodynamic phenomena, you have attributed lift to a subatomic particle called the aerion, and you have associated the Bergstrom Oblate Air Mass (or B.O. Thermal) with two subatomic particles called the olfactoron and the beode.

In your treatises on Kinematic Ugliness and Emotional Torque, however, I don't believe you have ever identified an associate subatomic process or particle. Do these phenomena take place at other than the subatomic level? Please enlighten.

Professor in College Park, MD

Dear Professor:

For new readers and as a refresher, let me first explain the phenomena you speak of.

continued on page 62

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VOLUME 2 ISSUE 1

SPRING 1995

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# PRODUCTS IN USE

■ By Bruce Edwards

## LANIER RC'S 1/4-SCALE LASER 200

Here's a Big Bird that has it all—great looks, easy construction and outstanding aerobatic capabilities.



**T** Although its performance has since been eclipsed by newer production aircraft such as the Extra series and the Sukhoi, the full-size Laser 200, now more than 15 years old, is still considered one of the best world-class competition aerobatic monoplanes ever designed. The aircraft was immortalized by aerobatic pilot extraordinaire and many-time U.S. team member, Leo Loudenslager, who flew it to at least one World Championship. Radio controlled models of the Laser have been built in all sizes, and it continues to perform brilliantly even when pitted against the very latest competing scale designs.

Loudenslager's Laser, N10LL, originally featured an overall metallic blue livery with yellow trim and white stars (Bob Banka's Scale Model Research has a Foto-Paak available of the airplane in this color scheme), but was later changed an attractive red "Bud Light" paint job, which my building partner Ron McKonly and I chose to use on our 1/4-scale model of the Laser

■ ABOVE LEFT: Roxie Andrews, one of our columnist's neighbors, provides an attractive size reference for his latest scale ship. At 74-inch span, the 1/4-scale Laser is an ideal size—large enough to provide the solid handling of a Big Bird, but not so large as to be a pain to build, transport and store. ■ ABOVE: Scientific proof exists that red-and-white planes fly better... well they look nice, anyway! Model was finished in the livery of champion aerobatic pilot Leo Loudenslager's Laser, using Coverite's 21st Century film and paints; the Bud Light decals came from Bob Godfrey in Florida. From all angles, this is one sharp looking aircraft!

200 as produced by Lanier RC.

### THE KIT

Lanier typically supplies good drawings and instructions with their kits and their Laser 200 is no exception. Two clear plan sheets and an 11-page set of building instructions are laid out in logical steps that will prevent the kit builder from constructing himself into a corner.

This worked well for Ron and myself with no pitfalls. We divided the work, Ron doing most of the wing construction while I did most of the fuselage. When the occasion warranted we worked together with no real defined lines—a real team effort.

We encountered few difficulties in the wing construction even though this was our first experience with a tubular spar type of

wing. The foam wing cores were well cut, requiring only a little sanding as usual, and the wing skin sheeting was of fairly good quality. To speed things up we used 3M "77" spray contact cement, instead of the epoxy recommended, for attaching the wing skins.

There are several ways to make holes in foam wing cores for the aileron servo leads. My favorite is to make a tubular cutting tool by joining as many 1-foot lengths of brass tubing as needed to extend from the root to the servo box; I serrate one end and mount the other in a cordless electric drill. Drilling the hole obviously requires some care, but with a little forethought and planning you will make a nice clean hole that comes out right where you want it.

Ron sanded the finished wings and gave





Power for the Laser comes courtesy of a pump-equipped O.S. 1.20 Surpass II four-stroke mounted on a very effective J'Tec Sauf-Vibe soft motor mount. Tre-Turn spinner adds a real touch of class.



cockpit/wing hatch will fit properly. I found the Laser fuselage to be easier to build accurately than the Stinger fuselage, primarily because of the tubular wing spar.

Some builders don't care for the mahogany plywood doorskin fuselage sides that come with Lanier kits. I decided to be different and substituted lite-ply for the fuselage sides. In retrospect, this was nothing but a waste of time, and is not recommended. If you want to lighten the sides, use a hole saw to put lightening holes in the pieces provided.

The only other change I made in the

## LANIER'S 1/4-SCALE LASER 200

WINGSPAN .....	74 in.
WING AREA .....	855 sq. in.
FLYING WEIGHT .....	8-9 lbs. (10 lbs. 6 oz. as tested).
WING LOADING .....	28 oz./sq. ft.
OVERALL LENGTH .....	57 in.
ENGINE .....	.60-1.08 two-stroke, .81-1.20 four-stroke (O.S. 120 Surpass II with fuel pump used).
RADIO .....	Four channels required.
CONSTRUCTION .....	Balsa, plywood, foam wing core; ABS plastic turtledeck, hatch, cowl and wheel pants.

Produced by Lanier RC,  
P.O. Box 408, Oakwood, GA 30566; (404) 532-6401

them the "Woodpecker" treatment prior to covering. Everyone I know who has tried the Woodpecker has been very satisfied with the results, because it really does work as advertised. It's a hand-held tool with four very sharp pointed wheels; rolling it over the sheeted areas of your framework punches tiny holes in the surface, which effectively keeps air bubbles from appearing under iron-on coverings.

Ron did a fine job of covering and trimming the wings with Coverite's light red and white 21st Century film. Gold Goldberg trim tape was applied around the white trim, and the Bud Light decals were purchased from Bob Godfrey in Florida.

We had decided beforehand to use a JR XF622 computer radio, but now discovered we didn't have enough servos to go around. Fortunately I happened to have two Hitec RCD HS-605BBs on hand, so they were used for the ailerons. The 605BB is a durable, exceptionally powerful servo (factory rated at 77 ounce-inches at 4.8 volts)

with dual ball bearings on the output shaft and helical-cut resin gears—very smooth and strong. To complete the aileron hook-up, we used 3/32 music wire pushrods with a Du-Bro ball socket on the servo arm and a Sullivan clevis and keeper on the aileron horn.

We recommend that you install the 4-40 wing retaining screws on the top of the wings as shown on the plans. One of our local fliers didn't want the screw heads to show and so he mounted his screws from the bottom. Well, the poor fellow was distracted during assembly one morning and left off one screw. In flight the wing slid off the spar joiner tube just enough to allow the anti-rotation pin to disengage. You can imagine the result!

The tail feathers on the Laser are about as simple as you can get, being mainly 1/4 square and 1/4x3/8 balsa.

The fuselage is quite easy to build but does require that you build it accurately, so that the molded ABS turtledeck and

fuselage was the addition of a piece of lite-ply on top of the front of the fuselage from the firewall to F-2. I also added a stiffener under the top cowl mount block.

We used an Ohio Superstar Products full-casting tailwheel assembly, actuated by a tiller bar attached to the bottom of the rudder. This unit is designed so as to support the wheel on both sides; it won't bend sideways like most wire tailwheel struts do after a few landings. The fuselage is very narrow at the aft end and there was little room for the mounting straps that hold the tailwheel assembly on, so I routed a groove in the mounting block and simply glued the gear in place.

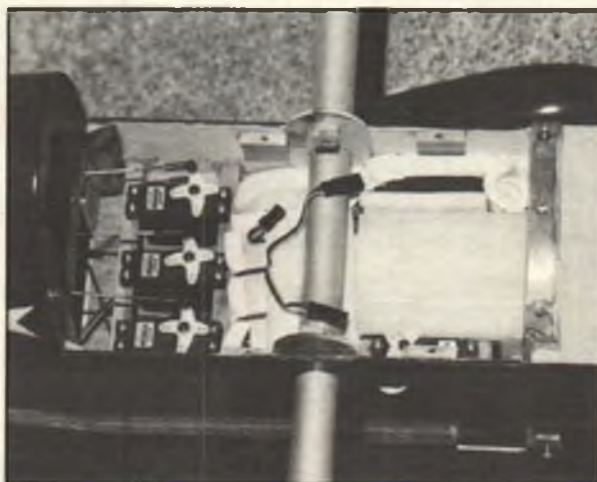
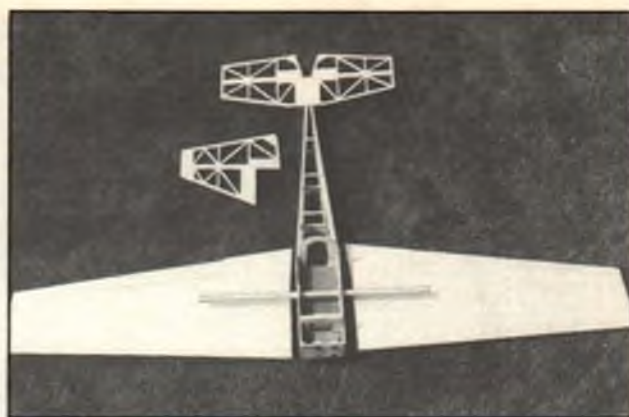
Ohio Superstar's "All Thread" threaded inserts were used to good effect to attach the cockpit hatch, cowl and wheel pants. These handy plastic inserts are made in sizes to accept machine screws from 2-56 to 1/4-20. Simply drill a suitable hole, glue the All Thread in place and you're set.

In order to speed up the Laser project I

called Steve Durecki at Fiberglass Specialties and asked if he had a fiberglass cowl and wheel pants for Lanier's 1/4-scale Laser; these to be used in place of the ABS parts supplied in the kit. As it turned out, Steve was just completing his first run of accessories for this model, and a cowl and wheel pants arrived at the Big Bird hangar in short order. All that was needed was to trim off the molding lines, trim the cowl to fit the engine, fill a few small holes with putty and give them a good overall sanding.

Two coats of Coverite's 21st Century primer were sprayed on the turtledeck, the cockpit/wing hatch, wheel pants and

■ **RIGHT:** The Laser's basic components, framed up and ready for final assembly. Foam wing cores are sheathed with balsa top and bottom. Tail surfaces are simple built-up stick and sheet balsa. Note the strong aluminum tube joiner that supports the wings. ■ **BELOW LEFT:** Just like the full-scale aircraft, the model Laser's tail surfaces are rigidly braced to withstand the rigors of violent aerobatics. Those braces are absolutely necessary—don't leave 'em off! ■ **BELOW RIGHT:** For the radio, Bruce chose a JR XF622 computer system. Installed in the fuselage are four JR 507 servos—two for the elevators, one for rudder and one for throttle—plus one Hitec RCD 605BB servo in each wing panel for the ailerons.



cowl, sanding between coats. After 24 hours the components were wet sanded, then light red 21st Century paint was sprayed on the primed parts—first a light mist coat that was allowed to set for several minutes, then a wet coat. You have to go carefully with the wet coat to prevent runs, but if you follow the instructions and

spray at the correct distance, 21st Century paint will give you the best paint job you'll ever get out of a spray can.

In all, I applied four coats of paint, sanding with 600-grit wet-or-dry prior to the final coat. The plane now had a beautiful glossy red paint job on the paintable fuselage components. I covered the rest of the

areas with light red 21st Century film.

Up until now I haven't been too anxious to try a computer radio, having had so many problems with my personal computer; nevertheless we decided to go with a JR XF622 computer system. Eloy Marez reviewed this system in the August '94 *Model Builder* and I'd like to reinforce his findings by saying that, though challenging for this first-timer, setting up

the flight controls using the 622 was very rewarding. I could barely believe it; something with computer controls that had logical, understandable instructions! Thanks, JR, for not giving me more gray hairs!

### FLYING

We arrived at the local flying field about 3:30 p.m. on a February afternoon, which gave us a couple of hours of light for the first test hop and picture taking.

We flew my U.S. 1000 first to hone our rusty flying skills, and then assembled the Laser. Taxi tests proved that the steering was true but very sensitive. The takeoff roll was beautiful, made all the more so by the sun breaking out from behind the perennial northwest cloud cover and golden sunshine sparkling off the bright red finish.

We flew the plane through its paces and knew we had a real winner on our hands. The model weighs 10 pounds 6 ounces—light enough to allow the O.S. 120 to give the plane all the performance we could ask. The Laser is easy to land for experienced pilots; stall tests indicated that torque would pull the plane to the left slightly at full stall and slow idle, but no one is going to try to land a Laser like that anyway.

Ron and I plan to fly the Laser in turnaround pattern this summer. I don't know if we'll win any trophies (and don't really care), but we'll have a lot of fun and a plane capable of doing the job for us! **MB**



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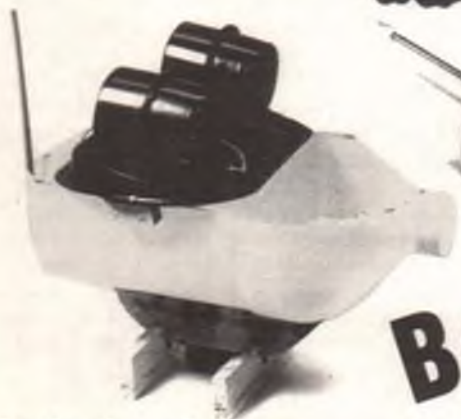


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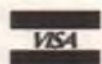
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# PRODUCTS IN USE

■ By Eloy Marez

## JR'S INCREDIBLE "SUPER SERVOS"

The next generation in servo technology is here and available now. For those who demand the very best, these servos demand your serious consideration.

**H**orizon Hobby Distributors, importers of JR radio control equipment here in the U.S., has recently introduced a new series of servos: JR's "Super Servos." They're not for everybody—and, as in the case of full-blown competition computer radios, the question "Who needs them?" will no doubt be heard.

Looking at JR's new servos purely as a development of RC electronics, they are a major step forward, and effectively obsolete all other servos presently in production. And there are many fliers who can use these servos' features to advantage. It's my understanding that such fliers as Chip Hyde, Hanno Prettnner and Curtis Youngblood use them—to documented

advantage! As history has shown, developments like these often lead to items useful to more of us.

Contrary to some thinking, servo quality is not simply a matter of torque and speed. Super Servos are not particularly high in either. What they do offer is the precise application of control surface thrust, regardless of the amount of control signaled, and the ability to maintain a given control command under all aircraft maneuvers, speeds and attitudes.

In many modern electronic products, advances are in some way associated to computers, or to the computer's brain, the microprocessor. And the Super Servo is no different! In it, the electronics that drive the

motor are based on a microprocessor, allowing the designers to program it to operate in ways not possible with older, less sophisticated methods.

So what do JR's Super Servos have to offer? Let's begin by referring to Figure 1, furnished by Horizon, of a comparison of the torque characteristics between a Super and a conventional servo. The first significant thing seen is that the deadband has been eliminated—an important feature. Deadband can be described electronically as the difference between the input control pulse and an internally generated reference pulse. This means there can be a pause between the time you move the control stick and when the servo starts to follow. Deadband is necessary to prevent servo hunting, and making that buzzing noise we sometimes hear. The Super Servo claims no deadband, possible because the microprocessor amplifier is able to differentiate between more closely related input and reference pulses than can the older style amplifiers.

Now note the torque curve for the "older" servos. I find this extremely interesting because outside of my own writings, I've never read anything, either in a manufacturer's data or in the model press, that explained that the torque claimed for any given servo is there only at certain times, and not at some very critical ones. Basic DC motor theory says that a motor is not producing its maximum power output until it has reached its maximum speed. Therefore, the command to the servo has to be long enough for the motor to reach full speed before maximum torque is produced. *This does not happen when short commands with short motor runs are made!*

A look at Figure 1 will confirm that thinking; max torque for a conventional servo is not reached until the motor has run long enough to reach peak speed. Ac-



JR's "Super Servos" don't look significantly different from those that you're presently using, but the differences are there, and will result in improved control precision for high-performance aircraft being flown by high-performance pilots.

According to JR, it takes 21 degrees of servo travel to reach this point! Thus, when making small control movements, only a fraction of the advertised servo power is available.

Now look at the torque output curve for the Super Servos. Note the absence of deadband, and the immediate rise of torque to its maximum value. There isn't going to be any delay in waiting for the motor to wind up before full torque is available, nor will there be any lessened torque during small control movements. As a bonus, this means that the Super Servo has far greater "holding" power—that is, it will maintain a commanded position far better under conditions of changing back pressures applied by control surface loads. See Figure 2.

How are these wonderful things accomplished? Obviously it's going to take some first-class mechanics; the case, the gear train, the pot drive, and the motor all have to be of top quality, and in the Super Servos, they are. The secret is in the electronics, in that electronic brain, the microprocessor.

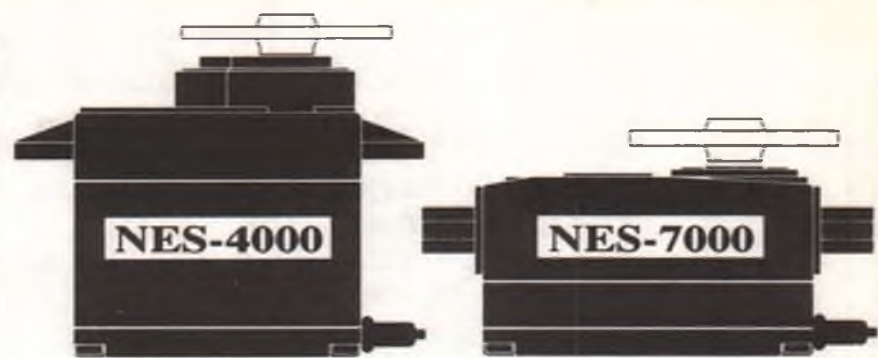
When a conventional servo is commanded to operate, the amplifier applies battery voltage to the motor in short pulses at the same rate that control information is received from the transmitter—around 60 Hertz. That is, a voltage pulse is fed to the motor 60 times a second, which is actually a very low figure. Of primary importance is the ratio of the on to off time that voltage is applied to the motor—the higher the better.

Within the Super Servo, thanks to some electronic wizardry, the motor control pulses are applied at over 2000 Hz—that is, the motor is now receiving voltage over 2,200 times a second. Hence, the motor reaches full rpm much faster, the servo responding faster to whatever commands it receives. Holding power and resolution (the stick-to-servo relationship) are likewise increased.

Higher power in a servo is possible only through higher electrical energy consumption. You don't get something for nothing! That fact is stressed in JR's instructions for the Super Servo; you're going to need higher capacity batteries to keep the same flight time as you did with your old conventional servos. The instructions recommend reducing the flight time by 10 percent for each Super Servo used. Or, conversely, increase the battery capacity by 10 percent for each Super Servo. Incidentally, JR's Super Servos are rated for 6 volts, for those who prefer five-cell batteries.

For those who like numbers, the Super Servos draw approximately 40 mA standing current, compared to 5-10 mA for conventional types. Of course, operating current increases dramatically with both types, based both on design and by the applied loads.

Cutting down on flight time and/or increasing battery capacity is good advice.



Weight: 1.83 oz.  
Dimensions: .73x1.52x1.32  
Transit Time: .17 sec.  
Ball Bearings: Dual  
Motor Type: Coreless

Weight: 1.48 oz.  
Dimensions: .88x1.73x1.02  
Transit Time: .16 sec.  
Ball Bearings: Dual  
Motor Type: Coreless

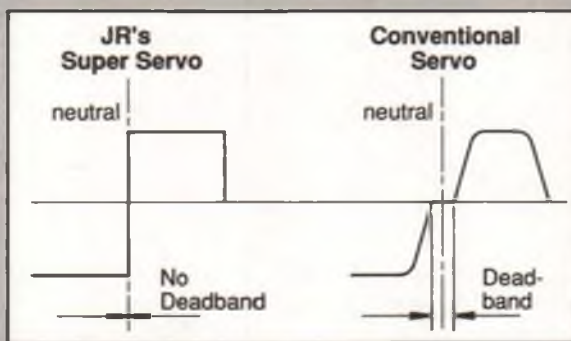


Figure 1. A comparison of the deadband and torque curves between the Super Servo and conventional servo clearly show the operational advantages of the former. More info in text.

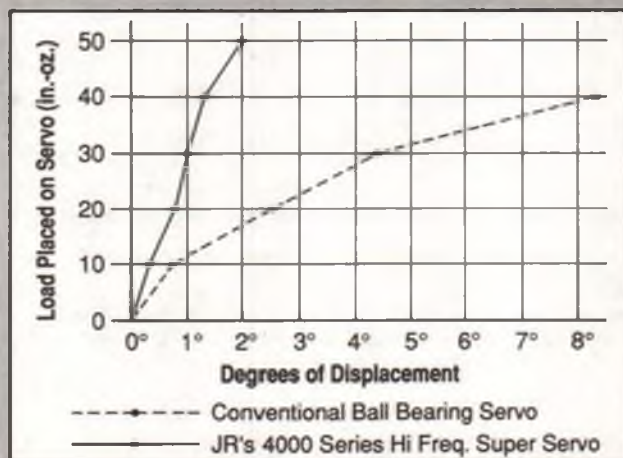


Figure 2. A graph illustrating the Super Servo's holding power as compared to a conventional servo. Note the difference in servo arm displacement between the two at, say, 30 ounce-inches of "push" against the servo. Quite a significant difference!

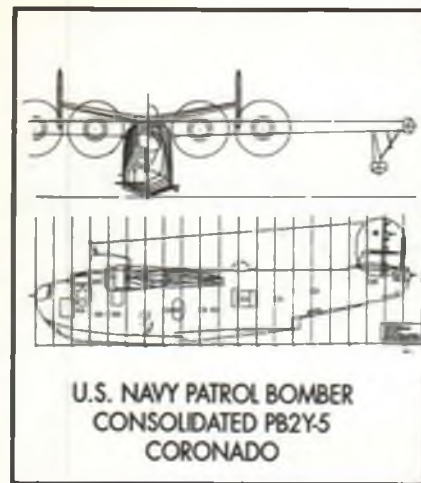
However, in effect, you're still flying blind! It is always good to know just how much available flight time one does have, with or without Super Servos. Capacity measuring devices are available that are able to measure flight time accurately, as well as helping you keep track of the exact condition of your NiCds.

There are a couple of other good ideas as regards heavy drains on your NiCds. One is to use a four-cell pack for the receiver and a separate, larger five-cell pack for the servos. The advantage here is that should the servo pack become dangerously dis-

charged, you'll know it because the controls will operate slower than normal and with reduced response, but most important, the receiver will not stop working and you won't lose complete control.

Isn't it great to know that the RC equipment so readily available to us is right at the edge of technology?

The bottom line—the price, right? Performance of this type does not come cheap. The NES-4000 and 7000 carry a suggested retail price of \$139.95. Your hobby shop prices will no doubt be lower. Check them out! **MB**



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## GALLANT MODELS

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## DEAR JAKE cont. from page 54

*Emotional Torque is a force that builds up as a model is being built. The more time, attention to detail and love that the modeler puts into his model, the more Emotional Torque it accrues. Unfortunately, Emotional Torque generates an attraction between the model and solid objects like buildings, trees, and the ground. Consequently, meticulously built models with spectacular paint jobs crash early and die young.*

*Kinematic Ugliness is the antithesis of Emotional Torque. Ratty looking airplanes bought at swap shops or thrown together with a complete disregard for appearance are charged with a force called Kinematic Ugliness, which repels people and objects. Kinematically Ugly airplanes, therefore, rarely crash and usually last forever. They are like the proverbial bad penny that can't be gotten rid of. Kinematically Ugly airplanes have even been known to make Emotionally Torqued airplanes crash just by flying in their vicinity.*

*Scientific opinion varies as to the exact mechanism by which Kinematic Ugliness and Emotional Torque build up in a model and how they impart their attractive or repulsive forces. Theories include: electromagnetic field distortion by alpha-waves from the modeler's brain; celestial alignment influences on the Cosmos while the model is under construction; witchcraft; Murphy's Law corollaries; Bermuda triangle time/space continuum vortices; and residual effects from the prehistoric visits of ancient astronauts. My favorite explanation comes from a theologian named McMurtry who suggests that the Almighty has a strange sense of humor and just likes to mess with our minds.*

*Regardless of the true cause, who among us can deny that these phenomena occur? With the exception of Hangar Queens that no one has ever tried to fly, can anyone out there claim to have a gorgeous, 1000+ hour project that ever outlasted some junker that's been flying since the Nixon administration? I doubt it.*

Jake

## DEAR JAKE:

One of the local malls had a model car show this past month. Several area clubs had displays of model cars of all sizes and description. Some of the 1/4-scale hot rods were very impressive. I overheard two fellows discussing something called moon disks. What's a moon disk?

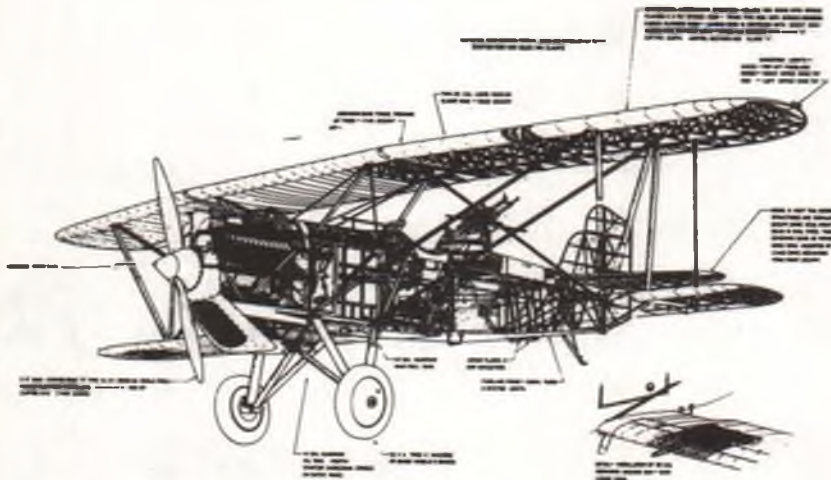
Greg in Garfield, NJ

Dear Greg:

*A moon disk is a back condition suffered after attempting to bend over and drop your pants at the same time. Medical research has determined that moon disks are most prevalent among teenage males in the last few rows of school buses.*

Jake MB

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## PROMOTING SUNDAY FLYING

**John tells how his club is experimenting this year with a series of monthly fun-flies in an effort to get more of the members out on the field at the same time for some fun flying. It's an idea that other clubs can also put to good use.**

**D**oes this scenario sound familiar? Tom and Dick fly their stunt planes at 8 a.m. every Sunday morning and wonder where the rest of the club members are.

Harry shows up at the field at 1 p.m. with his combat planes. It's a beautiful day; where is everybody?

Joe and Bob were out practicing with their racing planes all Thursday evening, with the circle all to themselves.

Tom and Sally took their new Ringmaster to the field on Saturday afternoon, hoping to get some advice from the experts, but had to learn what they could from their own novice efforts.

As it turns out, everybody in the club went flying sometime during the week, and never ran into anyone else from the club. Almost everybody. Ed couldn't reach anybody on the phone so he stayed home and watched "how to build stunt plane" videos.

It's something every club experiences—plenty of active members but everybody going off on their own. How do we get everybody together on the same day once in a while for some fun flying?

Contests are a natural solution to the



One of Canada's top fliers, Alan Resinger, of British Columbia, builds large, beautiful stunters that come apart in several sections for transportation—his Firecracker is one such example.

problem, but they have the drawback of intimidating the novice or casual fliers, or they require specialized airplanes, an entry fee, and other potential drawbacks.

Clubs have tried different solutions with varying success. My own home club, the Eugene Prop Spinners, is experimenting in 1995 with a novel approach to the subject. The club has decided to put on a "fun-fly" at least one Sunday a month. The activity has two purposes: to encourage club members to fly together on a regular basis, and to attract some of the more casual members to organized flying in a low-key, "fun contest" setting. Based on the first couple of months' activities,

the concept appears to have some excellent potential for meeting those two goals.

Each month's activity is nominally a contest, but without entry fees or monthly prizes. There's a different type of flying each month. Most of the activities are based on formal competition categories, with a couple of just-for-fun activities thrown in.

The contests begin with a brief seminar for the novice fliers, at which one or more of the club experts give some tips on how to participate. Club members have rules handed out at previous meetings or via the club newsletter. We use regular AMA or regional rules for the competition but loosen them up to allow more flying (more racing heats than usual, for example). Rules for airplanes are loosened up when appropriate, too. For example, any plane can be used to fly the Old-Time Stunt pattern.

A scoring system leads to year-end per-



Randy Scheffner's Flying Fool, dubbed "Miss Dart," with O.S. .35 for power, is his favorite CL ship. Our columnist is encouraging readers to contribute photos of their favorite planes—one text.





One of our columnist's favorite sights on the contest circuit is Bob Palmer's classic stunner, the Thunderbird. Here are two fabulous examples, both owned by Joe Dill of the Seattle Skyriders. The one on the left was built by Joe; the other was built by Bob Emmett in 1983, acquired and refinished by Joe in 1984.

petual trophies for the racing, stunt and carrier categories, and there's an "I'd Rather Be Flying" trophy for the oddball events. Points are awarded just for showing up—an added twist that provides an incentive for all club members to participate each month, whether they are interested in that month's particular activity or not.

The fun-flies are open to visitors from elsewhere in the region, and they can score points, too. The monthly activities are not formally sanctioned, and the dates are "floating" until formally announced in the newsletter each month. This allows the dates to be shifted to steer around formal contests in the region, conflicts with other users of the field, etc.

Any local club could vary the program to suit local interests, but the Prop Spinners' advice is to keep the variety. Don't limit your activities to just one type of flying—that defeats the purpose. Make sure the stunt fliers get a turn on the handle in a race, and the combat guys have to struggle through a stunt pattern!

The following is the Prop Spinners' overview statement, followed by the schedule used by the club for 1995. It would be interesting to hear from other clubs about how they organize their year's activities; send the information to the address at the end of the column and we'll include the information in a future column.

#### Prop Spinners' Fun-Fly Schedule and Scoring System

**Purpose:** To provide a regular schedule of club activities based on control-line model aviation competitive events.

**Goals:** 1) To encourage members to participate in club activities on a regular basis; 2) To prepare interested club members for sanctioned competition.

**Activities:** A rotating schedule of aerobatics, carrier, combat and racing contests. These will be held approximately once a month on Sunday mornings. These will be non-sanctioned events intended primarily for club members, though out-of-town guests will be welcomed, provided they are AMA members. Brief seminars on "how to do it" will be provided by club experts as

desired by the participating members.

**Awards:** Perpetual trophies will be awarded to the top scorers in each category for the year.

**Scoring:** The scoring system is designed to encourage participation by club members, whether the activity is within their particular specialty or not.

**Competition Points:** Points will be awarded for each month's activity in the following fashion: 1st place is worth 10 points, 2nd place 9 points, 3rd place 8 points, 4th place 7 points, 5th place 6 points, 6th place 5 points, 7th place 4 points, 8th place 3 points, 9th place 2 points, 10th and all other places—1 point.

**Participation Points:** Every club member who shows up and stays for most of the activity at any of the fun-flies will receive 1 participation point. The member may apply those participation points to his/her own interest area at the end of the season. In order to score participation points, a member needs to be present at the site as a contestant, an official, a helper, or merely as an observer and supporter. Competition points break all ties. Participation points may be divided between events any way the flier chooses, so long as he/she actually participated in the events. Out-of-town guests can score points, too.

As an example, let's say Mel is only interested in flying aerobatics. However, he shows up to help at a two racing contests, two combat contests and one carrier contest, thereby scoring 5 participation points, plus the 2 participation points he gets for the two aerobatics contests, for a total of 7 participation points. Mel finishes 2nd in both aerobatics contests, scoring 9 competition points each time. Therefore, his total aerobatics score is 18 competition points plus 7 participa-

tion points for a total of 25 points. Mel also could have chosen to break up his points between two events in any way he chooses. He could have flown in the carrier contests, and applied 3 of his participation points to carrier and 4 to aerobatics.

**Recordkeeping:** The fun-fly coordinator will keep track of the scoring. The event director for the day will settle all disputes about results of an individual fun-fly event; his/her decision will be final. The coordinator will settle all disputes and questions about the scoring; his decision will be final.

**Rules:** The AMA rulebook will be followed in all events where it applies; regional rules will be used in all events where



It's almost too beautiful to fly, and the designer/builder, Howard Rash (pictured), decided it was too much work, too! But this is the design Howard used in his last World Championships effort. It's made almost entirely of space-age materials, including lots of carbon fiber. Note the built-up elevator. Light, strong, and many hours of building time! It always draws a crowd at contests.

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they apply. The contest procedure may be varied to allow for more flying; for example, more racing heats may be run, or more official flights allowed in carrier or aerobatics.

### Schedule

Events will be on the second Sunday of the month, except in the case of a conflict with other scheduled regional competition events or conflicts with non-modeling activities at the flying field. This schedule is subject to change. On the Saturday before each event, call either the coordinator or the club president to confirm. All events will start at 10 a.m.

**January:** Northwest Sport Race in a round-robin format. All fliers will be guaranteed at least two heats of racing. Four planes will be taken to the feature race.

**February:** Handicap Precision Aerobatics. Regular AMA pattern will be used. Beginners can fly as many maneuvers from the rulebook as they can. All fliers will be guaranteed at least three official flights. No appearance points; no builder of the model rule. Handicap points: Experts 0, Advanced 25, Intermediate 50, Beginner 100.

**March:** 3x1 Fun-Fly. One plane for three events (time target, spot landing, hi-low). Simple rules will be handed out at the February club meeting. Any plane on 60-foot lines that can take off the ground is legal. Points applied toward a special "I'd Rather Be Flying" award.

**April:** Navy Carrier. The practice deck will be used; everyone is guaranteed at least three official flights. Profile rules, but any carrier plane is legal; no scale bonus points.

**May:** 1/2A Combat in a triple-elimination format. You keep flying until you've lost three matches.

**June:** 1/2A Mouse Race I. Everyone will be guaranteed at least two heats; three to the feature.

**July:** Old-Time Stunt. Everyone will be guaranteed at least three official flights. Planes need not be legal for OTS; just fly the OTS pattern.

**August:** Navy Carrier. Same rules as April.

**September:** 80-mph Combat. Any plane on .018x60 lines is legal, any fuel system, .40 engine max. Triple-elimination format. Only two planes allowed for the contest. Speed limit enforced.

**October:** Flying Clown Race. A PDQ Flying Clown, either from kit or scratch, .19 engine max, 1-ounce tank. Everyone will be guaranteed at least two 15-minute heats; three to the feature.

**November:** Handicap Precision Aerobatics. Same rules as February.



The classic lines of the Voce Chief are a favorite of many longtime CL fliers. This fine example was built by Dave Royer. Photo by Jim Cameron.

**December:** Rain or Shine Roundup. Bring the most unusual or interesting plane you have. Everyone who shows up will have a vote in ranking the planes on appearance, originality and flying. Flight points will be based on a freestyle stunt pattern. Points toward the "I'd Rather Be Flying" award.

### FAVORITE AIRPLANES

Most CL fliers have several airplanes, but there's always one favorite. It may not be the best flying or the best looking, but for some reason it's the one we like best.

I recently started building a replica of my first large airplane, a profile Sterling Navion from the early 1960s. My memory wasn't fooling me—it's a gorgeous airplane.

Recently, Randy Schoffner of Cridersville, Ohio sent in a photo of his favorite, a Sterling Flying Fool. He's powered it with an O.S. .35 and covered it with silkspan and dope for a traditional finish. Randy says he's had trouble finding other CL fliers in his area and would like to hear from anyone nearby who would like to get together for flying and building. His address is 313 Marcella Ln., Cridersville, OH 45806.

Randy's letter inspires what I would like to make a periodic feature of this column: a series of "favorite airplane photos." Regular readers are encouraged to send in a good glossy print or slide of their own personal favorite. I'll select one periodically to go with the column. Be sure to include some details, such as the engine, finish, etc.

To get things started, I'm including, along with Randy's Flying Fool, photos of some favorite planes I've seen on the contest circuit over the past couple of years.

Now let's hear from you.

Questions, club news, contest information, technical tips, photos and other items of interest to CL fliers is always welcomed. Write John Thompson, 295 W. 38th Ave., Eugene, OR 97405. E-mail at JohnT4051@aol.com. **MB**

# HAS THIS EVER HAPPENED TO YOU?



*Has your RC model warship ever been caught in a lake full of BB cannon armed model ships seemingly bent on mutual destruction ?*

*Has your model warship ever actually been SHOT AT with BBs by another that was really trying to SINK IT ?*



*Has your model warship actually been SUNK because its soft balsa hull skin was so full of BB holes that it could not stay afloat ?*



*Have you ever gotten your pride as well as your pants wet while recovering your sunken RC model warship ?*

*Have you ever GOTTEN EVEN with your opponents for doing these things to you and your RC model ?*



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# KYOSHO'S "HYPERFLY" ELECTRIC HELICOPTER

**With the HyperFly, Kyosho's engineers have taken helicopter design to its most basic. Anyone who can competently handle a two-channel RC glider should have no problems with this highly simplified rotary-wing flier! Part 1 of 2.**

**L**ast month I promised you a review of the Kyosho HyperFly electric helicopter. Let me preface this report by saying that my knowledge of RC helicopters, electric or otherwise, was nonexistent prior to opening the box. I've never put one together and certainly have never flown one. I didn't know my collective from my cyclic, and I thought an autorotation was some sort of funny dance. Now that you know where I'm coming from, let's get started.

*Cast of characters:*

Roger Jaffe, Kit Builder.

Roger's wife, Cathy.

*Roger's children:*

Ben, *The Inventor* (age 9);

Adam, *The Mischievous One* (age 4);

Sam, *The Baby* (age 2);

Emily, *The Daughter*, almost perfect in every way (age 7).

**February 12, 1:15 p.m.:** Cathy takes *The Daughter* shopping, *The Inventor* is at the neighbor's house and I have *The Mischievous One* and *The Baby* in the garage/work-



RC helicopters don't get any simpler than this, folks. The HyperFly requires only two channels, for *left/right* and *right/left* cyclic; a large clear plastic *hub* takes the place of the normal ball rotor; and there is no motor control, flight duration being limited by the battery pack. Flights typically average 3-1/2 to 4 minutes.

ings and adjustable timing, which will give more power but shorter flight times.

**1:45 p.m.:**

*The Mischievous One* and *The Baby* are now collecting pillbugs out of the grass and putting them in a plastic cup. Pillbugs of the world, beware!

The HyperFly goes together in 23 steps. Each step is broken down into a couple of simple tasks and the parts are packaged in one of

five numbered bags. Everything fits just as smooth as glass—no tweaking or trimming is necessary, even for the servos. The ends of the control rods have ball-end connectors; Step 3 shows, in actual size, how long the control rods should be and how to orient the connectors and the Z-bends.

**2:09 p.m.:** Dropped a teeny, tiny screw into a large pile of balsa sawdust. The book cautions you not to build this kit over thick carpet or anything that might swallow a screw or other small part. OK, so I'm not building over thick carpet—a large pile of balsa dust has the same effect. I hate balsa dust.

**3:05 p.m.:** Cathy and *The Daughter* have come home—time to bring the boys inside and retrieve *The Inventor* from my neighbor's house. Total work time for this

**ERRATA.**

As seems to happen more often than not whenever we present some sort of do-it-yourself electronics project, Gremlin manage to sneak in and mess things up. The latest instance was the low-rate speed control described in this column in the May '95 issue. Corrections to the schematic on page 32 are as follows:

1. R9 is a 10K resistor; it was left out of the parts list. By the way, all resistors are 1/2 watt, 5 percent.

2. The arrow on Q1 should point in, not out.

3. Pin 6 of IC1B is connected to the R2/C2 junction. R3 and R4 are interconnected. There is no junction between these connections.

Our apologies to those who have already discovered these errors on their own. MB

shop with me. They find their *Big-Wheel* tricycles and begin to terrorize the flowerbeds.

The HyperFly kit is very complete and amazingly simple. The instruction manual is 20 pages long, with clear and concise directions and illustrations. The nuts, bolts and screws are shown actual size, which is a big help since many of the parts are very similar in shape and size. There is a complete parts list along with part numbers so replacements can be ordered if necessary. The rotor head and flybar comes assembled, tested and balanced.

Power is supplied by a six-cell, 1,100-mAH NiCd pack (not included) and a Kyosho LeMans AP29 ferrite motor. As an option, you can also buy a high-performance version of the AP29 with ball bear-

session has been 1 hour and 50 minutes.

**February 15, 3:00 p.m.:** Today I get to come home early, take care of *The Mischievous One* and *The Baby* . . . and work on the HyperFly.

It's looking like a helicopter! Almost all of the parts are assembled now and there are just a few more pieces to install. The first order of business is to put in the receiver and connect the "universal" BEC plug. The plug looks like it should fit in just about every type of receiver. The real caution here is to make sure the plug is inserted with the proper polarity. If you're unsure of the plug orientation, just look at a servo connector and how it plugs in. Orient the BEC connector so the positions of the red and black wires match those of the servo.

Now I was confronted with a mystifying situation: Which servo controls roll (right and left), which one controls pitch (up and down), and which direction should each one go? Never having built a helicopter, I was totally without a clue. By watching the movement of the swashplate and studying ahead in the instruction manual I was able to deduce that a right/left movement of the swashplate tips the rotor blades right and left and a forward/backward movement tips them fore and aft. No doubt a stupid question for anyone with even a hint of helicopter knowledge, but remember, I'm completely green (but getting better all the time).

**3:45 p.m.:** Construction has stopped—*World War Three* has broken out in my garage. It appears that the ownership of some scrap balsa is in dispute and requires the mediation of someone older, more experienced—and bigger. Total construction time this session has been only 45 minutes.

**February 20, 10:35 a.m.:** Cathy is grocery shopping without the children—the four of them are doing their own things in



The small parts that go into the construction are packaged in five individual bags (plus one bag of wrenches), which get opened sequentially as the parts are needed.

different parts of the house.

I'm now at Step 12—Rotor Head. The rotor head and flybar are pre-assembled and factory balanced; the only thing left to do is install the main rotor blades. The blade washers are molded plastic with two pins that fit into holes on a small phenolic board connected to the main rotor. The two pins are of different lengths; as a result, the blade washers automatically cant to the proper angle of incidence. The rotor blades attach to the other end of the blade washers.

The flexible plastic fuselage and clear canopy are cut out using indentations and score marks as cutting guides. The instructions say you'll want a pair of Lexan scissors to cut out the canopy. If you already have a pair, go ahead and use them, but if you don't, save your money. A good pair of household scissors works almost as well. The canopy has two score marks—be sure to cut along the lower of the two. The canopy is held onto the fuselage with four small pieces of Velcro; it's very easy to remove to change battery packs.

The HyperFly requires no painting, as all decoration is done with decals. Take your time with them—they're extremely sticky and you only get one chance. After they're on, they're stuck for good. Also, be sure to attach the blue and orange strip decals to the main blades because they're needed to adjust the blade tracking.

**11:35 a.m.:** *The Mischievous One* and *The Baby* are playing together (amazing), *The Daughter* is having a tea party with some stuffed animals and *The Inventor* has arranged the toy wagon, two Big-Wheel tricycles, three scraps of plywood, some string and masking tape into something even Einstein wouldn't recognize. Time to go in and make lunch.

**2:10 p.m.:** Cathy is home, the kids are playing and I'm in the workshop again!

I've found a slight problem with the



The HyperFly box advertises the model as being "Flight-ready in 4-5 hours!" Never having messed with choppers before, it took our columnist a bit longer—5 hours and 40 minutes, to be exact.

plastic battery clip attached inside the fuselage—it's too small for the battery pack. To make the pack fit I had to trim some of the shrink-wrap from the area that fits in the clip.

On the subject of batteries, I noticed that although there are Tamiya-style connectors on the battery pack and the motor, the plugs are reversed from other equipment I have. This battery pack has a male nylon plug with female pins versus female nylon plugs with male pins on my other battery packs. Before I can use my charging system, I'll have to make up some adapter cords. Not a real problem, just a bit of a nuisance.

**2:50 p.m.:** Time to call it a day. Total time so far is 4 hours, 15 minutes.

**February 22, 3:35 p.m.:** I see the light at the end of the tunnel.

The motor switch is located on the bottom of the fuselage and is attached to a long section of music wire. To turn the motor

### KYOSHO'S "HYPERFLY" ELECTRIC HELICOPTER

LENGTH .....	34.3 in.
WIDTH .....	3.0 in.
HEIGHT .....	7.5 in.
ROTOR DIAMETER .....	22.0 in.
FLYING WEIGHT .....	23.75 oz. or less tested.
MOTOR .....	Kyosho AP28
BATTERY .....	1,100 mAh, six cells (not included with kit).
RADIO .....	Two channels required.

Great Planes Model Distributors,  
P.O. Box 9023,  
Champaign, IL 61826-9023.

on, you just pull the wire down and launch. As the batteries become drained, the helicopter comes down and when it's just a few inches off the ground, the wire gets pushed up and the motor shuts off.

The instruction manual warns you to be extremely careful when making blade adjustments, particularly when the battery pack is connected. With the battery connected, the only thing protecting you from a full-on motor is the motor switch. Be sure it's up tight against the fuselage and don't wear any loose-fitting clothing that might catch on it. Also, be sure to wear some safety glasses or goggles when looking at the blades during the tracking and balancing adjustments.

The instruction book gives you the servo control throw measurements in millimeters and inches, but it's easier and more accurate to use a metric ruler for the adjustments. The manual also gives you the swashplate angles, in degrees, at neutral servo settings. The best way to check these settings is to trace the angle shown in the book onto some plain paper and cut it out. You can use the cutouts as templates to set the neutral positions.

Next, remove the main rotor blades,

pick up the helicopter, *put on your safety glasses* and turn on the motor. The motor starts up in a hurry and it can be startling—make sure you have a good grip. With the bladeless rotor spinning, you should feel no vibration from the flybar and the paddles. My helicopter was as smooth as silk. Next, reinstall the rotor blades and do the test again. With any luck, you won't notice any vibration. I wasn't so lucky—my heli almost shook itself out of my hand.



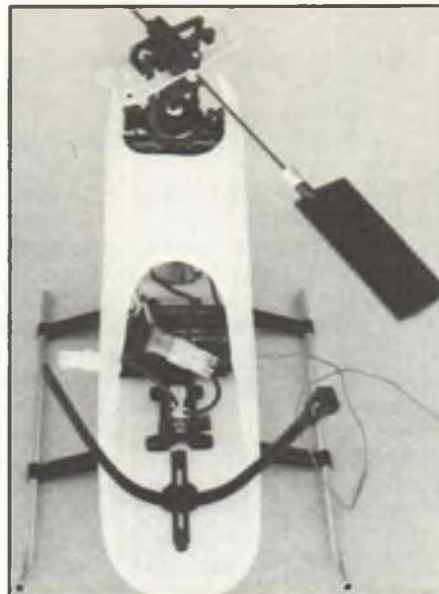
Aft view of the main rotor assembly installed in the fuselage pod, prior to installing the tail boom. Simple and light and amazingly tough—as Roger was soon to learn.

I spent the next 30 minutes adding trim tape to the blades in various combinations to try and balance it, all without success.

**4:45 p.m.:** I give up—time to call it a day. Total time now stands at 5 hours, 25 minutes.

**March 1, 7:30 a.m.:** The kids have gone to school so I have a few minutes to “work” before going to work.

I talked to the folks at Great Planes (the distributor of the HyperFly) early this morn-



Front view of the pod with the battery removed reveals the Futaba R127DF receiver, motor on-off switch and battery hold-down strap.

ing. They told me that balancing the blades is really a combination of two steps: blade weight (Step 17) and blade tracking (Step 18). I checked the blade tracking and found the orange blade almost a full inch above the blue blade. After adjusting the tracking, the vibration was cut way down. I then placed two pieces of trim tape, one at a time, across the outboard edge of one of the blades and the vibration disappeared! After some guidance, what seemed a hopeless task became one of the easiest.

**7:45 a.m.:** Total time to build stands at 5 hours, 40 minutes. The HyperFly is ready to fly but I have to go to work—bummer!

The conclusion of this review will appear in next month's column. In the meantime, I welcome comments and questions. Direct them to me at 6462 Sunny Brae Dr., San Diego, CA 92119; (619) 463-4453 (between 8 and 5 Pacific time, Monday through Friday), or through CompuServe at 74164.3237, or through the Internet at 74164.3237@compuserve.com. **MB**



The completed main rotor assembly. Builder is in R with installing the motor, servos (Futaba S133 micros seen here) and pushrods; everything else on the rotor assembly is pre-assembled at the factory.



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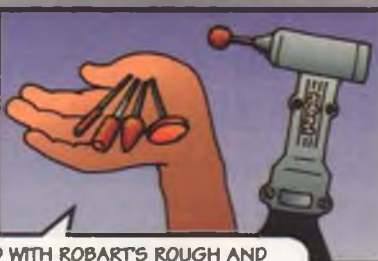
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8.5 X 2.9	2 - 3.95	8.75 X 8.0	5 - 3.95	11 X 8	2.49	13 X 6	4.25	20 X 14	25.00	20 X 14	25.00	24 X 14	55.00
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# PRODUCTS IN USE

■ By James Wang

## THE XL-PRO FROM MINIATURE AIRCRAFT USA

An excellent example of the current level of RC helicopter technology, the .60-size XL-Pro over the last two years has proven itself to be one of the most potent competition machines available.

**T**he XL-Pro from Miniature Aircraft USA has been on the market for about two years now, and has won more than its share of contests. It was designed to be the ultimate .60-size competition machine. I've flown four other XL-Pros besides my own, and I can honestly say that it is one of the best .60-size helicopters on the market. It's smooth, maneuverable and predictable. This month we will go over the XL-Pro's flying characteristics. Next month, we'll zoom in on the engineering details.

I can summarize the XL-Pro's flying qualities in three words: I love it! The model

is very smooth and predictable. In hover, it just sits there—no swaying or heaving. In forward flight, it tracks like an arrow on rails—there is absolutely no pitch-up tendency, neither is there any perceivable Dutch rolling behavior or lateral rocking of the fuselage.

The four other XL-Pros I've flown were built and set up by beginners and intermediates, but they all flew extremely well. Once the model is trimmed out, it flies like a .60-size pattern plane: it goes where you point it. If you put it in a gentle banking turn, it will maintain that banking attitude. After you level it out, it will remain straight

and level with very little correction needed. Smooth flying with the XL-Pro is effortless. This model makes the pilot look good!

The XL-Pro's stock wood blades are about 690mm long; each finished blade comes out around 200 grams. They provide excellent hover, fast forward flight, and gentle autorotations. The 14 percent thick cambered airfoil has an excellent lift-to-drag ratio, zero pitching moment, and flies well inverted, too. When building these blades, don't round off the leading edge with sandpaper, as this will desensitize the cyclic response. I recommend gluing in all of the lead weight that comes with the



James checks out his flying buddy Alan D'Elena's XL-Pro. It's powered by an O.S. .61 FX with Hainl 666 muffler underneath.



blades.

I've tried a few different fiberglass blades on my XL-Pro, including the Zig-Saw GP9, DY F1, and G-Blades. The ones I like best are Miniature Aircraft's new fiberglass/graphite Rotorsport Pro-III blades. Two versions, FAI blades and 3-D hotdogging blades, are offered; the difference is in the weight and planform. Both blades come in black or white. The hotdogging blades are 690mm long, weigh 180-185 grams each, have a symmetrical airfoil and a constant chord from root to tip. The FAI blades are 690mm, weigh 195 grams, have a semi-symmetrical airfoil and taper in chord width, from 2.6 inches at the root to 2 inches at the tip. I've used both blades on my XL-Pro.

The XL-Pro is very agile with the 3-D blades—it easily does 70+ mph. The slightly heavier weight of the FAI blades gives a bit more inertia for autorotations and a bit more stability in high-speed flight. For sport flying, I suggest using the FAI blades. These blades are made in Europe and the craftsmanship is exquisite. And, at \$159.95 a pair, they don't cost any more than your typical run-of-the-mill glass blades.

The Pro paddles are large and have more surface area than other .60-size helicopter paddles. The kit includes three strips of lead which can be used to bring the paddles up to 50 grams each. I use two strips of lead inside each paddle, which makes each one 38 grams. With this and no flybar weight, my XL-Pro is extremely stable in hover, yet there is ample cyclic response rate for aerobatics and hotdogging. For contest work and beginners, 50 grams would be better. For all-out hotdogging, glue in just one strip of lead or use no lead at all.

My friend Ray St. Onge uses no lead inside his paddles; he uses flybar weight

instead. He slides the weight out for higher stability and inward for aerobatics. You have to decide what kind of flying you will be doing beforehand, because once the paddles are assembled, they are nearly impossible to break apart.

The weight of the paddles makes the flybar function like a mechanical autopilot to help stabilize the model. Using heavier paddles makes the model more stable and is equivalent to cranking up the gain on your tail rotor gyro. At the same time, heavier paddles reduce the immediate pitch or roll response rate when cyclic commands are given. This won't affect the final, steady state roll rate, however.

Using heavy paddles is like using a lot of exponential on your programmable ra-

tive yaw control.

I've used these blades to good effect on other helicopters as well. For example, I used to use wood or plastic tail blades on my Schluter Scout. Every time I did a pirouette in forward flight or a sideward loop, where lots of tail rotor input is needed, I could clearly hear the tail rotor making groaning noises as the tail rotor drive wire would load up or unload unpredictably. Once I put the NHP graphite tail blades on my Scout, the noise disappeared. These lightweight blades have very low inertia, hence they don't load up the tail drive system. Also, the thick symmetrical airfoil does not generate an unwanted pitching moment that could exert a push or pull force on the tail rotor pitch control mechanism.

A helicopter of this caliber can provide top performance only if a reliable and powerful engine is used. My choice for the XL-Pro is the O.S. .61 SX (or RX) or O.S. .61 SFN. I think the SX provides about 10 percent more top end power than the SFN. This may be due to the new big-bore carburetor on the SX/RX. But an SFN with raised exhaust timing provides equal power.

The SX and RX come with the new O.S. 60B carburetor. There are three adjustments on the 60B: a high speed needle, a medium speed needle, and an idle mixture adjustment. The high speed needle meters the overall fuel

flow to the engine. It determines the engine performance at full throttle, but it also affects the hover characteristics to a certain degree. Hover characteristics are determined by a 50-50 combination of idle mixture adjustment and high speed needle. The medium speed needle controls the transition characteristics around mid-range.

My advice for setting up a new SX or RX in the model is that you don't touch the factory-set idle mixture. Just open the high speed needle to 1-1/8 turns, and set the medium speed needle at 1-1/4 turns. Use a fuel with about 15 percent



Ray St. Onge demonstrates the switchless inverted stability of the XL-Pro.

dio. I don't like the controls to be too damped or too touchy, so I think 30 to 40 grams is a good starting weight for the XL-Pro paddle. You can always add flybar weight later.

The excellent tail blades is another reason why the XL-Pro flies so well. The kit comes with a pair of super-lightweight NHP graphite short tail blades. Each blade weighs about 5 grams. The light weight and symmetrical airfoil give crisp and posi-



■ FAR LEFT: The XL-Pro main rotor head with adjustable Bell-Hiller mixing ratio. Notice that the flybar weights are all the way in for hotdogging.

■ LEFT: Close-up of the XL-Pro's beautiful graphite tail boom and fin. The excellent NHP graphite tail blades weigh only 5 grams each; the resulting low inertia makes for very crisp and positive control response.

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nitro. After the engine has started, let it warm up by putting the helicopter into a hover. Depending on the fuel, the exhaust system and the weather, you shouldn't need to open or close the high speed needle any more than 1/8 of a turn richer or leaner to get a smooth, smoky rich hover.

After the engine has warmed up, land the helicopter and fine-tune the idle mixture until the engine idles very smoothly. It should be able to sustain this smooth idle indefinitely. A good glow plug is essential—I use an O.S. #8 glow plug.

Now put the helicopter into a hover again. The idle mixture screw actually has quite a bit of influence on the engine mid-range hover characteristics, but doesn't affect the full throttle performance. Fine-tune the idle mixture until the hover is smooth. In general, if the engine idles perfectly, then the idle mixture setting should be good for hover, too. You might want to richen the idle mixture by another 1/8 of a turn to give a really soft and rich hover. When properly set, the engine noise should remain constant, without any fluctuation. I like the smooth, whining gear mesh sound on the XL-Pro and X-Cell 60. When an X-Cell is in the air I can recognize it just by the sound. It's music to the ears!

The final step is to go back and fine-tune the high speed needle setting. This can only be done in full-throttle forward flight, or if you have a run-up stand. For beginners, you may just have to assume that what was set for hover is about right. The medium speed needle is fine-tuned by checking the acceleration rate from hover to full throttle. Opening the medium speed needle slows down the pickup; leaning it quickens the acceleration. Too lean a mixture can starve the engine of fuel during acceleration.

I've tried the U-shaped Magna Pipe, the regular hotdog-shaped Miniature Aircraft muffler, and a Hatori 666 muffler on my O.S. RX and side-exhaust O.S. SFN engines. My personal favorite is the Magna Pipe for both engines. Using 15 percent nitro fuel, it's easy to see that the pipe gives more power than the muffler. With the pipe, my XL-Pro peels out the moment I punch the throttle. If a pipe is used, the hover rpm mustn't be too low. A two-speed setup (1,200 rpm for hover and 1,700 for forward flight) won't work with a pipe because the pipe is tuned for higher engine rpm. I hover at 1,500-1,550 rpm and use 1,700 rpm for forward flight aerobatics.

Another reason I like using a pipe is that I like the high-rpm "turbine" sound of a pipe. Using 1,500 rpm for hover also gives crisper cyclic control and more gyroscopic stability than 1,200 rpm. If you prefer the 1,200-1,700 two-speed setup, a muffler would be a better choice than the pipe. But then you'll need to use 30 percent nitro fuel to achieve comparable performance. This is a personal choice.

*To be continued next month. MB*

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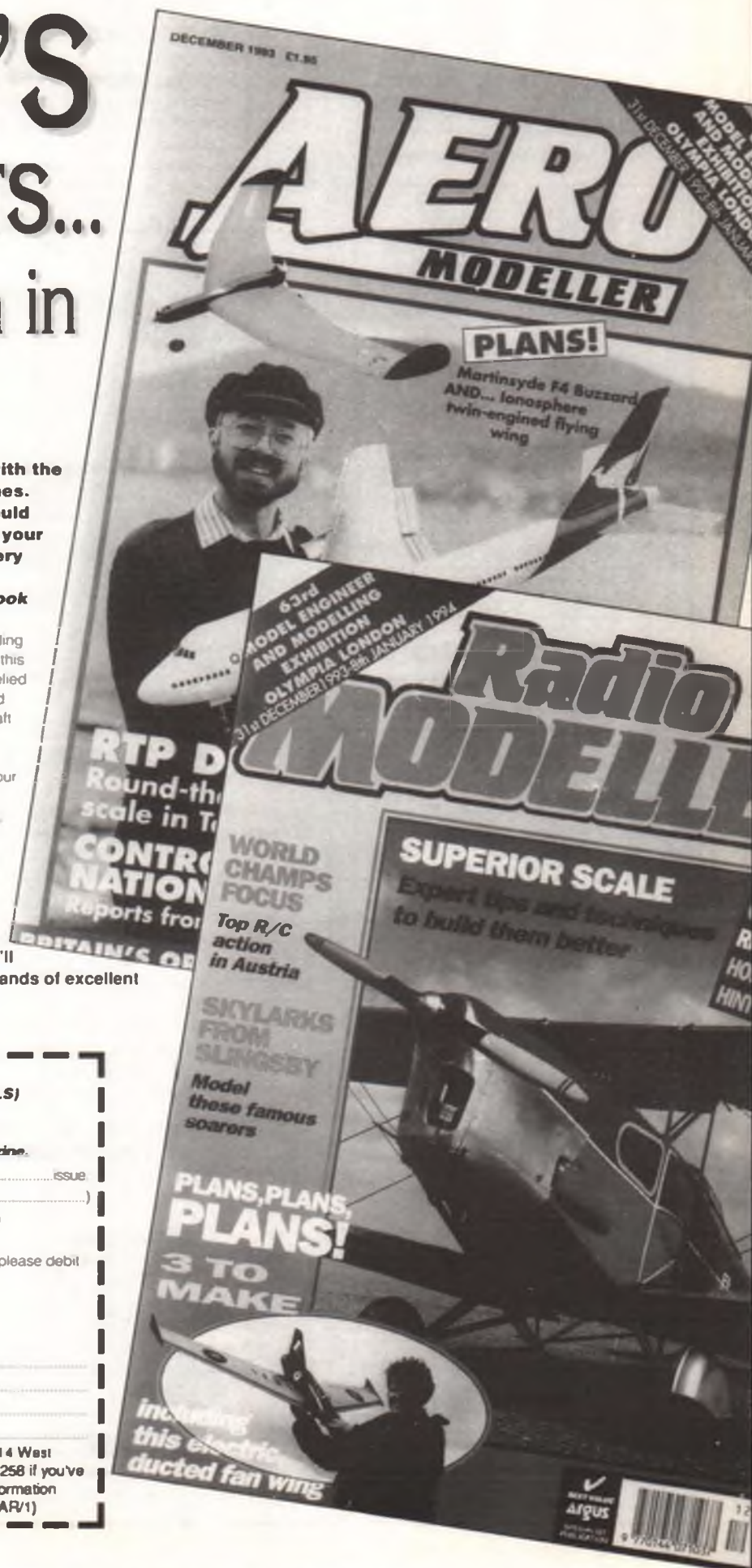
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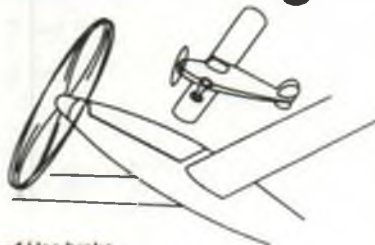
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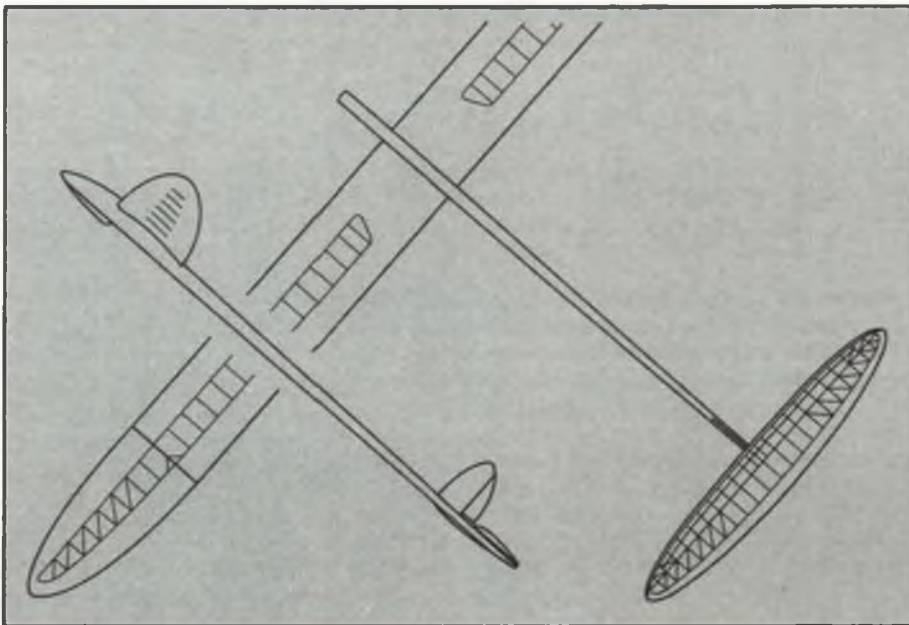
## FREE FLIGHT cont. from page 48

### NEW O.T.S. CATALOG

I always enjoy receiving the newly issued catalogs from Oldtimer Model Supply. Ken Sykora, the proprietor, fills his nicely produced publication with wit and humor. In addition, he provides the scratch builder with little-known and very valuable supplies unavailable elsewhere. Looking

into a lopsided bubble. The colder air that replaces the warm air is denser, causing the base of the thermal to shrink. Sooner or later, the base shrinks down to nothing, and the bubble is free.

"This is not the only process that causes a thermal to pop free. If the wind is blowing, the thermal will move with it. When it collides with a large object (tree line, building, hill, etc.) it becomes detached from the



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for milled bamboo, silver nitrate dope, Chicago-style prop hinges, threaded prop bushings, or Jimmie Allen Bluebird balsa wheels? It's in there. Many other goodies are also in there, besides quotes such as, "ROG means Rise Off Ground, ROW means Rise Off Water, and ROC means Rise Off Couch . . . and build!"

Don't have your 1995 catalog yet? Order it from Oldtimer Model Supply, P.O. Box 7334, Van Nuys, CA 91409. Tell Ken you read about it in *Model Builder* Free Flight. Send him 2 bucks to cover costs. You won't be sorry.

### SOME HINTS ABOUT THERMALS

The following was gleaned from the *CIA Informer*, which credits Bob Swet as the author.

"Air heats up over a dark surface, first forming a small dome of hot air. It isn't necessary to have a dark surface, it just needs to absorb heat more quickly than its surroundings. As more air heats up, the thermal dome grows. The warm air starts to rise and cold air rushes in to take its place. This cold replacement air is the effect we call 'sink.'

"At an altitude of 30 to 40 feet, the prevailing wind has a noticeable effect. It will start pushing the top of the dome over. Slowly, the top of the thermal dome grows

ground.

"Thermal indicators: Be alert for a wind direction or velocity change. These changes may imply a thermal nearby. If the wind velocity increases, look for the thermal downwind. If the velocity decreases, head upwind. If the wind temporarily stops altogether, the thermal is likely directly overhead. If the wind changes direction, look for the thermal in the same direction that the wind is blowing.

"Hints: The wind created by a thermal will always be heading toward the center of the thermal. Tall grass serves as a good telltale sign for wind direction. Don't be too proud to take a clue from what other models are doing in the sky. Their flight characteristics can show whether they are in sink or lift. If they are in strong lift, you may want to join them, but if they're too high above you, the bubble is probably already detached. Study and time the patterns of passing thermals by watching the models marking them. Pay attention to location, altitude, time and wind direction. Chances are that thermals leave at regular intervals.

"Low, puffy white clouds normally indicate rising air. Of course, cumulus clouds are the result of warm, moist thermal updrafts that have condensed into water vapor. But remember that 'sink' and thermals will always exist in close proximity." **MB**

# HANNAN'S HANGAR

cont. from page 21



Tom Mallen II built this beautiful compressed-air powered Junkers W-33 "Eurasia" free flight scale model.



This model of the Bernard "Dionae Casari" (Yellow Bird) by Reg Boor, of England, via Bill Kincheloe, was built from Hurst Bowers' plans in the "MAX-FAX" newsletter. Flights average 50 seconds.

Hills, MA 48331.

Clarke Smiley has a new illustrated catalog of plans and three-views from a wide variety of sources, as well as laser-cut ribs and decals for some of the subjects. Plans offered are for FF, CL and RC models, in many different styles and sizes. To obtain a catalog, send \$3 to Clarke Smiley, 23 Riverbend, Newmarket, NH 03857.

When responding to any of these people, please tell 'em *Model Builder* sent you!

## WHITEHEAD NEWS

Joe Shultz sent us information relating to the ongoing testing of the German reproduction of Gustave Whitehead's No. 21B pre-Wright design. Initially equipped with a modern ultralight engine, the craft has recently been fitted with copies of Whitehead's original powerplants. It is expected that flights may soon be attempted,

and we'll keep you informed on the results.

## AEROBIC AIRPLANES, ANYONE?

In keeping with the current physical fitness trends, Herb Weiss, tongue firmly in cheek, offers these thoughts: "Clearly Free Flight is the best for everyone for medical reasons, and Radio Control is for couch potatoes. It is easy to spend five hours per week chasing outdoor free flight models. I did. But this also suggests a new RC event, 'Five Mile Point to Point Race.'

"Entrants loft their models over the starting area, and at the sound of the starter's pistol, start running cross country, keeping their models overhead. Each entrant must carry all needed control equipment personally. No additions, repairs or recharges en route.

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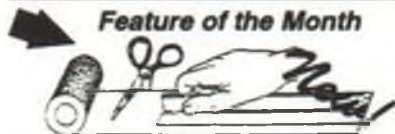
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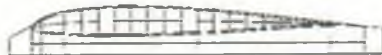
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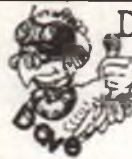
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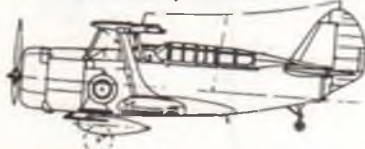
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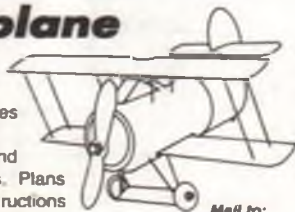


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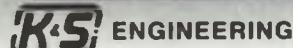
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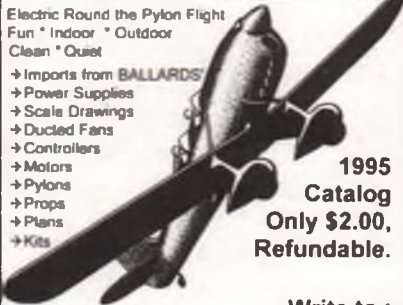


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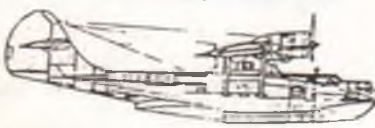
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**Stösser** cont. from page 34



stringers at a time, then strip them off and notch the formers for a snug fit. Do this *singly* by trial fitting each stringer in the notches.

Try for a smooth transitional flow from the nose cowl's stringers aft into the fuselage as shown in **Photo #6**. When satisfied with the rapidly growing beauty of your work, tweak a drop or two of CA into each joint and gap-fill it. Now carefully scallop the formers' edges so that the fabric covering material will contact only the stringers for the correct scale look.

At this point, start planking the nose, including the engine cowl and cockpit. Keep in mind that after sanding, these sheeted surfaces should meet the aft fabric areas' surfaces smoothly. Having done this, you can now make the laminated balsa firewall cowl. I made mine removable. This means it must fit over the front cabane strut base, and its rear face must fair into the fuselage. Its front curvature forms the hot engine air exit gap behind the engine cowl; a useful scale detail for our electric motor!

Lastly, plank the battery cradle and the cockpit area. Cut out the side-swinging cockpit side panels. Later, at the covering stage, hinge these with MonoKote to swing out and down approximately 180 degrees. Note the round-headed pins that latch them in the closed position.

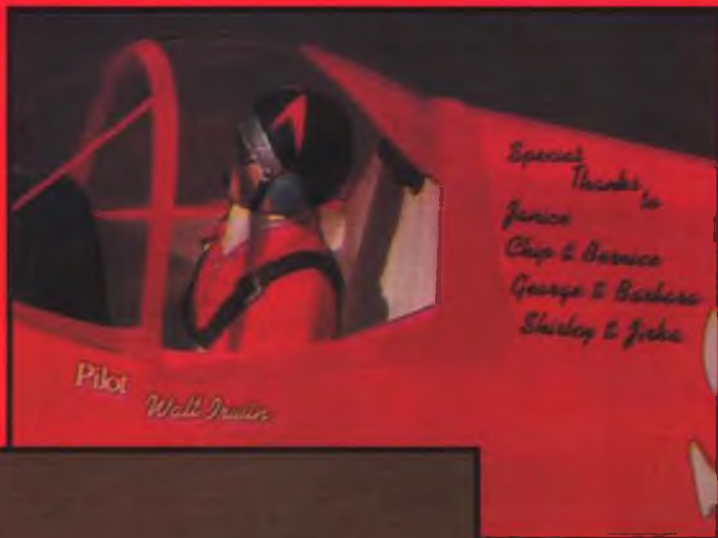
Use medium to hard balsa for the removable landing gear leg pants. Note how they're "hollow" carved to slide down over the top of each L.G. leg. To keep your pants up against the fuselage, wrap them with

contact-cemented 1/4-inch-thick foam sleeves. Again, remember to make a right and left one. You may have to add some extra foam sheet if your pants droop too easily. Fear not—the pants are very light and you'll get little drooping, so don't chicken out and glue them on permanently!

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BY WALT IRWIN

A modeler for 60 of his 65 years, Walt Irwin of El Toro, California, evolved through carving solid balsa airplanes (out of a broken surfboard!) to 10-cent kits, to gas-powered FF, to U-control and finally to RC. He's built and championed model race boats. But he'd never entered an airplane for judging until the 1995 Endless Horizons Hobby Show in nearby Long Beach. His Stits-covered Super Corsair topped the Sport Scale category. It was scratch-built in 26 months from Jim Meister plans, and Jim flew its maiden flight. The ship, painted rose neon pink, uses Robart retracts,



Above: Meister's painted airfoil proved to show, relaxed flight — just what builder wanted. Upper Right: Special film was required to capture ship's true color! Right: Walt spent three days on cowling checkeredboard, each handcut and tapered. Below: On-side look at the lovely Super Corsair. Best of Show in Sport Scale at Long Beach 1995.



Du-Bro wheels and fuel filter, G-62 engine with Slimline muffler, 2210 Puma prop, Aerospace Composites canopy, Futaba electronics and flies on Klotz fuel with Robart Snake Oil lubricants. Walt covered Meister's special airfoil wings with Stits covering material from F&M Enterprises, feathering the sheeted fuse with sprayed Stits and painted the ship with House of Color automotive paints and polyurethane clear. Walt chose Meister's plans for the airfoil that produces slow and relaxed performance — easier, he says, than his favorite flyer, Das Ugly Stik.

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Finally, note how the top rear tip of each pants leg fillet overlaps the battery hatch. I hated to do this, but simply had to stick to the beautiful scale shape.

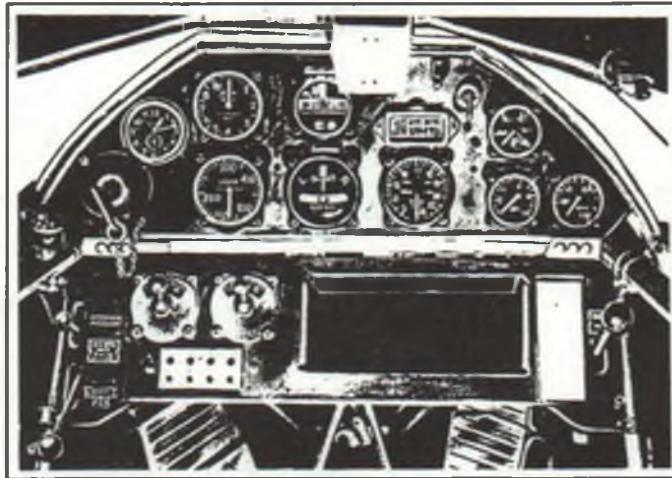
Trial fit the landing gear legs into their box slots before you do any finishing. If they can slip out too easily, remove them, add a thin plastic "jam" strip and firmly push them back in. Shoot for a hand-tight press fit—firm enough to prevent the gear from dropping out during aerobatics and landings.

For the wing, I chose to use a revised flat-bottomed Clark Y airfoil for easier building and more lift, but retained the scale tapered, thinning center section. It's too noticeable to omit, especially since it was so widely used in European parasol fighters such as the Polish PZL series, etc. You must make a jig to support the center-section ribs in correct alignment to avoid my wing incidence mishap mentioned in Part 1 last month.

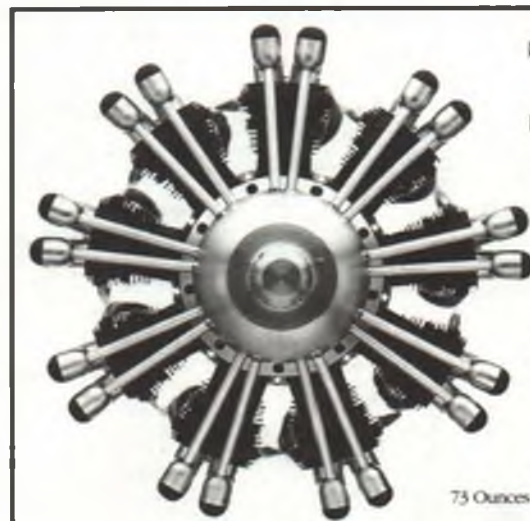
Build the center section and two main panels separately. Their structure is fairly straightforward except for the center section and the semi-elliptical tip/aileron trailing edge curvature. The latter are formed by curved balsa sheet sections. The ailerons are *not* built as part of the wing. Make them separately with thick, tapered, semi-rounded leading edges that fit so as to rotate smoothly and snugly behind the concave wing trailing edges at the hingelines. Trial fit these with Robart #308 (steel pin) hinge points, same as on the rudder. Adjust the ailerons for a 30-degrees up, 20-degrees down throw.

CA the wing panels to the center section with the dihedral/sweepback required. Add all of the spar shear webs, dihedral braces, hardwood attachment blocks and the .007-inch thick, 1/8-inch wide carbon fiber reinforcing strips (top and bottom) on the front spar.

Build a box for the aileron servo and install it with access from the bottom. Snake the Sullivan #503 Golden Rods through the ribs and install a Du-Bro #183 ball joint connector at the servo to receive the threaded rod ends. I use small plastic clevises at the aileron horns adjusted for the least



To help with cockpit detailing, Airframe's *Fw 56* plans include a full-size Xerox copy of the panel layout and instruments, from which you can have glossy photoslabs made. Includes instructions on how to go about converting them into a very realistic looking instrument panel.



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play before feeling any resistance or binding. Photo #7 shows one half of the wing with the aileron servo box and pushrod installed, prior to sheeting the top.

Before sheeting the wing, align the wing for squareness to the fuselage thrustline and at zero degrees incidence. Drill and attach the wing with four 1-inch long #6 socket-head sheet-metal screws. Snake an aileron extension lead from the receiver up the left front cabane strut with its connector ending about 1-1/2 inches beyond the strut's top. This eventually will reach into a tiny hatched opening under the wing L.E. to mate with the aileron servo lead. Now sheet the wings as shown (use 1/32-inch medium balsa only on the top for the electric version).

Purchase a set of airfoil-shaped aluminum struts to the nearest available width to make the V-struts. Make temporary dummy balsa struts to properly fit the wing to the fuselage and then cut off your aluminum struts to match. The narrower struts should be cut about 1-1/2 inches too long so that their bottoms penetrate the trailing edge of the larger struts to form the V. To do this, grind a slit in the aluminum for a tight fit and stick them together with gap-filling CA.

I concentrated in faking beautiful scale-like fillets at the V-strut apexes, where they are most visible, joining the fuselage. They're shaped from medium balsa and CA'd around the truncated V-strut bottom ends. Each strut is attached by a 3/8-inch #4 socket-head sheet metal screw from below. It must not emerge from the top of the fillet and should bite into the aluminum strut for strength. The tiny N-strut braces between the V-strut and wing are from airfoil-shaped dowel and permanently CA'd at 90 degrees to the V-struts.

### FINISHING

As mentioned in Part 1, our 2-inch scale subject is D-1AQA. This was a typical trainer with many riveted dural nose panels. Several of these were piano-hinged for maintenance access. The remainder was mostly silver doped fabric, all of which, when executed well, is truly spectacular!

Practically all of the nose paneling on my model is covered with Chrome Silver MonoKote over the 1/16-inch balsa sheeting, which was first coated with Coverite's Balsarite. For added realism, rub the panel areas with fine steel wool in different directions and separate the panels with 1/64-inch flexible black Letraset tape. See Photo #8.

All of the compound curved parts like the nose cowl, firewall cowl, tail pylon base, L.G. pants, and top and bottom fillets are sanded, sealed and sprayed with Silvaire Aluminum Aerogloss. Cover the straight, larger pants leg areas with the Chrome MonoKote.

The entire wing, tail and fuselage remaining areas are covered with English Sil-

*continued on page 88*

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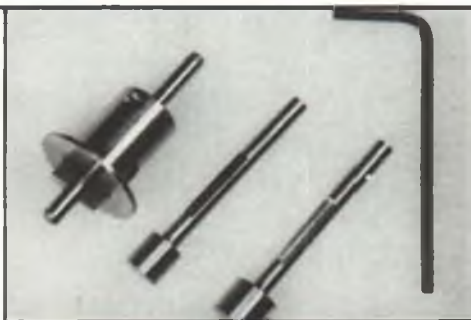
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## TECH. STUFF cont. from page 14

and C is at 360 degrees. Points A and C (and A' and C') coincide. The airfoil coordinates are generated by going around the circle from 0 to 360 degrees; that is, by starting at the trailing edge (0 degrees) moving along the upper surface to the leading edge (180 degrees) and then around the lower surface to the trailing edge (360 degrees). Since the coordinates are generated while going around the circle, the coordinates are listed in this format."

H.A. "Herk" Stokely is an RC soaring modeler and is the author of the RC Soaring column in *Flying Models* magazine. In addition, he's the publisher of the Soartech Journals, which have included publication of Michael Selig's airfoil data. Needless to say, Herk is knowledgeable about airplane technical stuff, and he was a great help to me in sorting out airfoil plotting methods and history.

Herk reminded me that originally, old airfoils such as the Clark-Y were plotted from a list of coordinates which used a "baseline" (the flat bottom of the Clark-Y, for instance). A little later, most wind tunnels switched to the "chord line" system, where the reference line is from the extreme leading edge to the trailing edge. Now part or all of the lower surface coordinates are negative numbers.

Herk Stokely makes another observation which may help explain the growth in popularity of the around-the-circle system:

"When Eppler wrote his program for computer design and analysis of airfoils, the pen plotter was the only way to get a smooth output plot from the computer equipment then available. It was natural that he should use the computer to output coordinates that were optimized to drive a pen plotter. I'm sure that if you wanted to draw an airfoil freehand without lifting the pen, you'd start at the trailing edge, draw forward over one surface around the nose, and back to the trailing edge. That's the way the pen plotter does it too."

## NEW AIRFOILS & PROFESSOR MICHAEL SELIG

A year ago we talked about Dr. Selig's work on airfoils. It's time to review a bit of what was written then. Prof. Michael Selig teaches airplane technical stuff at the University of Illinois. He's also a sailplane modeler and has been developing new low Reynolds Number airfoils for modelers in the UIUC open-circuit wind tunnel, along with several other modelers and some graduate students. Earlier he conducted a similar foil development program with John Donovan and the late David Fraser at Princeton University.

Michael sent me a six-page report on their program. Space prevents me from quoting much of it, but here is a summary: The Princeton work involved over 1,200

hours of wind tunnel testing, and resulted in the development of over 60 new airfoils. These were presented in Soartech 8, titled *Airfoils at Low Speeds*, which is available from the Soartech Journal, in care of H.A. Stokely, 1504 N. Horseshoe Circle, Virginia Beach, VA 23451. This paperback book is 398 pages long and sells for \$20 by book-rate mail, or \$23 by first-class mail.

Plotting airfoils is the second half of our wing-section needs. The first half is knowing the performance of the airfoils so we'll know which one to choose. Soartech 8 gives the lift and drag coefficients vs. angle of attack (each at several low Reynolds Numbers) of a few older and a great many recent airfoils, and a lot of other good stuff.

Selig reports that the new foils have resulted in marked improvements in sailplane performance in particular, but he sees improvements to be made with better airfoils on sport and aerobatic RC models, free flight, electric models, and on helicopter blades.

But there's a lot more work to be done, such as turbulator tests, and more good airfoils are needed. He also wants to test wings with blended airfoils, such as we've discussed in connection with airfoil plotting. There's also a continuing need for new tunnel models. Michael's team invites interested modelers who would like to build wind tunnel models for the test program to contact James J. Guglielmo, Coordinator, Dept. of Aeronautical and Astronautical Eng., University of Illinois at Urbana-Champaign, 306 Talbot Laboratory, 104 S. Wright St., Urbana IL 61801-2935; (217) 244-0684 work; (217) 367-1960 home (answering machine); (217) 244-0720 fax; e-mail: jjgug@uxh.cso.uiuc.edu.

Selig went on to point out that this program for modelers requires funds for equipment, maintenance, upgrades, and particularly to compensate the graduate students for their time in running the tests. He encourages modelers, the recipients of this research, to contribute to it. Send your contributions to Prof. Michael Selig, at the above address. Michael's phone number is (217) 244-5757. Make checks payable to "University of Illinois, AAE Dept." Also, please write "Selig—Wind Tunnel Testing/AAE Unrestricted Funds" on the check and provide a letter stating that your contribution is to be used by Prof. Selig and his group of students (both undergraduate and graduate) in support of airfoil wind tunnel tests.

### PARTING WORDS

As I write this, it is Valentine's Day. I'm reminded that the average model builder, despite the deceiving exterior, is quite capable of such feelings as love, affection, intimacy, and caring; but in modelers these feelings just don't involve anyone else. (Borrowed from somewhere).

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**Stösser** cont. from page 85

ver Solartex woven fabric; Coverite's Silver 21st Century woven fabric is essentially the same thing. It's incredibly strong, realistic and easy to apply. Be sure to again coat the balsa with Balsarite.

Drill four holes through the top of the fuselage nose section for the scale rigging cables. Snake 36-pound black Dacron trolling line (same as used on the rudder cables) through the holes. As seen in **Photo #9**, these lines run up to the cabane strut top ends through eyelets, then to the base of each N-strut where they are pulled taut through tiny S-hooks that attach into pre-drilled holes in the aluminum V-struts. They are removed by stretch-pulling them out, to demount the wing after which they remain safely attached to the cabane struts.

Follow the photos and plans for the riveting patterns and piano hinges, etc. Render the old 1930s non-flush riveting by gently pressing a conical pointed nailsetting tool into the MonoKote surface without puncturing it. I ruled water-soluble felt tip pen lines for rivet row guidance. The tiny conical embossing marks reflect light quite noticeably and from two or three feet away, look like convex rivet heads.

The piano hinges are straight lengths of 1/16-inch O.D. aluminum tubing CA'd over the Chrome MonoKote. If you did your planking and sanding correctly, these hinged surfaces will have magically turned out to be straight! To get the piano-hinge look, score the tubes with equally spaced radial lines made with a fine-pointed permanent black ink marker.

The "air brake" for dive bombing and a chord-wide center strip on the top of the wing center section are aluminum litho plate, as are the various small access plates and recessed "stop" covers.

A close-up of the cockpit is shown in **Photo #10**. The cockpit's side panels are MonoKote hinged and swing open to reveal the details. Spherical-head pins hold the side panels in the closed or "up" position.

In **Photo #11**, note how the thick L.E. of the rudder fair into the end of the fuselage, the ends of the rudder control horn protruding just enough for the cables to be attached. The scale-like aluminum plate at the center covers the stab's two hold-down screws and the balsa tail fairing.

Cut out all of the black code letters and the rudder swastika insignia from Coverite's "Graphics" trim sheets. With each order of Airdrome's plans, you get B&W instrument panel fascia and any other existing decal nameplates in Xerox form from which you can have glossy photostats made, etc.

By now you will no doubt be feeling some satisfaction at having gotten this far. Soon you'll begin to feel an overwhelming urge to assemble your model. Following this you will find yourself sneaking loving looks at your creation and will have a tough time absorbing the swelling pride of your accomplishment. If not, you're in the wrong hobby! **MB**



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