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REID'S "8-BALL SPECIAL"
See page 36

ON THE COVER

One of the latest high-performance 2-meter competition sailplanes to hit the market is the "Lancer," designed by expert builder/flier George Voss and displayed here to good advantage by his 17-year-old daughter, Rowena. George has been experimenting with hot-wiring elliptical foam core wings and has come up with a system he's using to make the Lancer's wingtip panels. The 525 square inch wings are reinforced with carbon and sheeted with balsa, the tail surfaces are built up, and the fuselage is fiberglass. George runs a small outfit called Soaring Specialties—see his ad elsewhere in this issue.

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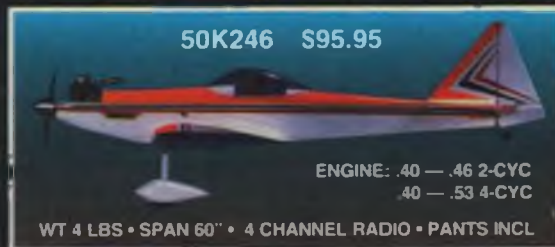


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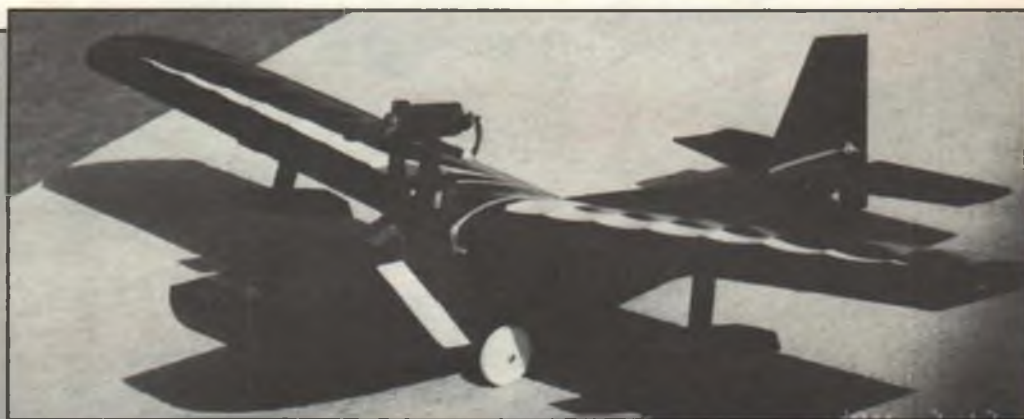
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A relative newcomer to RC flying, John Klimesh, 59, of Mabel, Minnesota, has been flying for about a year now and says he's been having a great time. He writes: "This summer I purchased a Great Planes Easy Sport 40. Wanting an airplane that didn't look like hundreds of others, I cut off the back portion of the canopy, moved it farther back on the wing and built a turtledeck back to the fin, then made a different dorsal fin. I reshaped the nose and made it removable. I substituted wider aileron stock and tapered them, giving the wing a slightly tapered look. A friend helped me cover the ship with MonoKote insignia blue over dove gray and applied Navy markings. I even made simulated guns and installed Vortac bomb drops in the wings. It is powered by an MVVS Sport .40 with tuned pipe, and is a great flier. Control is by a Futaba six-channel radio." *John Klimesh, 3636 218th Ave., Mabel, MN 55954.*

We've heard nothing but good reports about the Ace Puddlemaster electric seaplane—actually an only slightly modified version of Scott Hartman's Pondsider, which appeared as a construction article in the March 1992 *Model Builder* and for which plans are still available (#3922, \$14). The Puddlemaster pictured here was built by Reuben Schneider, who reports the 48-inch span model to be a



smooth flier at 39 ounces with an Astro 035 cobalt running on six 900-mAH Sanyo SCR cells. Covering is Coverite's Micafilm, the radio is an Ace system using two Bantam Midget servos, and the speed control is one of Hardy Benson's tiny BEC units. That landing gear is Reuben's own invention, using plastic bottle caps (!) for the wheels. The gear weighs only 12 grams complete and is of course removable for water flying. *Reuben Schneider, 2248 E. Ocotillo Rd., Phoenix, AZ 85016.*



An excellent example of original design and scratch building is this electric ducted fan model of the Heinkel He-162, one of Germany's WWII jet fighters, as turned out by Finnish modeler Bo-G. Jacobsson. Replacing the original's single jet engine situated above the wing is an Astro 05 ducted fan motor mounted in an English-made Morley fan unit, running on nine 1000-mAH Sanyo cells. A Multiplex radio controls the ailerons,

elevators and motor. The configuration is actually quite similar to Don Belfort's Electro-Screamer, a smaller model designed around HiLine's Red Flame Blaster fan unit; it was featured as a construction article in the January '95 *Model Builder*. *Bo-G. Jacobsson, Pilbackev. 1-3 C, FIN-06450 Borga, Finland.*

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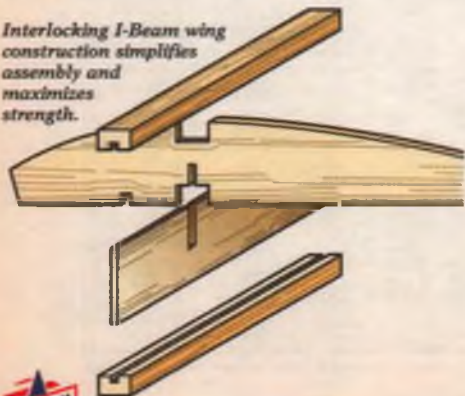
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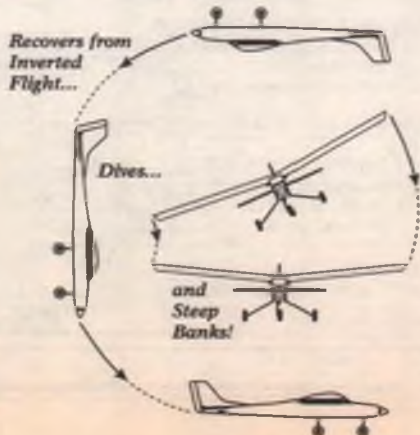
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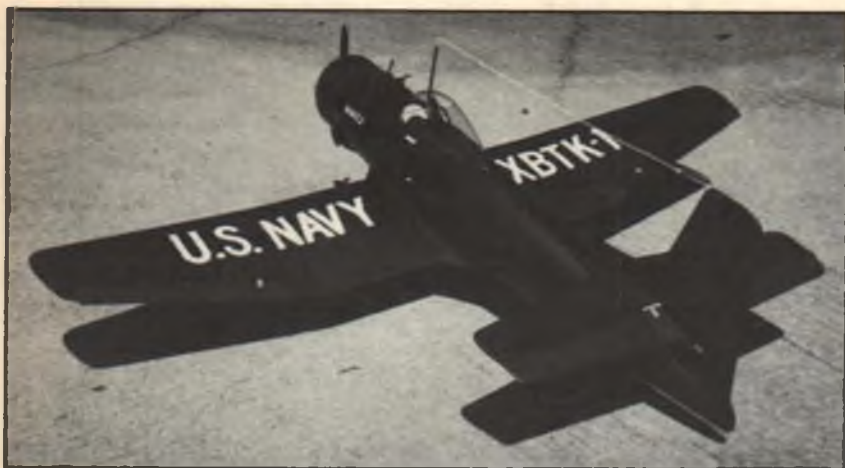
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When it comes to modeling obscure subjects, nobody rivals the late Master Peanuteer, Walt Mooney. Interestingly, it was one of Walt's models, the 1944 Kaiser-Fleetwings XBTK-1 torpedo bomber, the featured Peanut in the June 1986 *Model Builder*, that served as the basis for Walter J. Pleier's very nicely done RC model; he simply enlarged the plans four times, to 52-inch span, engineered the structure for RC and ended up with a very attractive four-channel model. Walt writes: "Initial flights were pretty erratic and the plane was difficult to handle. I'm not a very good pilot, having been at this sport of RC about three years, but I knew this plane needed a change. I added almost 2 inches to the chord of the horizontal stabilizer and that tamed the plane considerably. I can now handle it without my knees knocking. A Royal .46 and 10x6 APC prop drag this thing around at a pretty fast clip." *Walter J. Pleier, 103 Prince Pl., Greenville, NC 27858.*

tal stabilizer and that tamed the plane considerably. I can now handle it without my knees knocking. A Royal .46 and 10x6 APC prop drag this thing around at a pretty fast clip." *Walter J. Pleier, 103 Prince Pl., Greenville, NC 27858.*

Here's one of those just-for-fun models born out of a "What if?" brainstorming session between Jess Peters and his buddy Jerry Brasel: *What if we put a pair of Sig Four-Star 40s on one wing?* Jerry bought the kits and covering and Jess did the building. "The wing was built per the instructions," Jess writes, "with the addition of a 15-9/16 inch scratch-built center section. The fuselages required only a slight modification for the scratch-built, bolt-on tailfeathers. It flies great with a pair of O.S. .25 SF engines. Man, what a sound! The first time I flew it, one engine quit and I didn't know it until Jerry pointed it out. In a later flight, Jerry was making a low inverted pass when one engine quit and he had to be told. He merely rolled it upright, went on around and landed. We have step-by-step instructions and plans available if anyone is interested." *Jess Peters, 2565 Dombey Rd., Portage, IN 46368.*



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MODEL DESIGN & TECHNICAL STUFF

BY FRANCIS
REYNOLDS

•The Modelers Hall of Fame

•Designers: Made or Born?

•Rubber

The AMA has a "Hall of Fame" which recognizes and honors the greatest modelers among us. It was started in 1969, and usually elects several more members every year. Through 1994 there have been 122 of these great modelers recognized. Election to the Hall of Fame is based on outstanding achievements in the areas of competition, design, experimentation, leadership, organization, contest direction, writing, publishing, manufacturing, etc. Candidates for the Hall of Fame may be nominated by anyone, but members are elected by a Hall of Fame Selection Committee.

I believe I've seen *Model Aviation* magazine announce the election of new members to the Hall of Fame; there is a plaque (which needs to be updated) at the National Model Museum at Muncie; but nowhere have I seen the complete list of these great modelers published. I have urged the AMA to rectify this, but in the meantime MD&TS helps honor these

men and women. The list included with this month's column is complete to 1994 and the names are listed in order of their election to the honored group. A (D) after a name indicates the modeler is deceased.

Oh, boy! Do some of the names on that list bring back memories?

ARE DESIGNERS MADE OR BORN?

In my book, *CRACKPOT OR GENIUS, A Complete Guide to the Uncommon Art of Inventing*, I wrote that inventors may be born to invent, but they also have to learn to invent effectively; and that the learning part was largely the purpose of the book. "Designing" is quite similar to "inventing"; both employ creativity and a lot of other good skills and experience, but the creativity required in inventing is at a more basic, unique and original level than in designing. There is no clear line between inventions and designs, however. If in doubt, a way to categorize a particular piece of original work is to apply for a patent.

If the patent office rules that there is sufficient "novelty" or uniqueness in the design to make it patentable it is, by their definition, an "invention." (Some argue that "unique" is an absolute word, but take my word for it, in the field of inventing at least, there are degrees of uniqueness.)

The fact that I write this column should tell you that I am very interested in designing (and I am equally interested in inventing)—designing airplanes and inventing ornithopters, for instance. I am also interested in the *philosophy* of designing and inventing. One of the major goals of MD&TS is to promote, encourage and teach original design.

I don't often see the original designs of you readers, but I am sure they are many and worthy. However, some readers of the column show a distinct disinterest in designing; or is it an unfortunate and unrealistic lack of self-confidence in their ability to design practical things?

This question was brought to my attention after MD&TS for February 1995 talked about my original design flight stand for RC models. The title on the item was "Flight Stand Design," and no plans or detailed instructions were given. I described, in general terms, what I had designed, built, and have used for 27 years, in order to give readers some information from which they could design their own flight stands—ones at least as good as mine and probably better for their particular flying requirements.

I was surprised to get a large number of letters requesting drawings for my flight stand, or wanting a lot of additional details. Even good and experienced designers will need help when designing something which requires knowledge that the designer does not have, such as electronic, stress analysis, or aerodynamic information; but a flight stand? Design of simple, understandable things is mostly just the application of common sense. Don't you all have that?

I don't wish or mean to put anyone down. As they say, "Different strokes for different folks." I personally don't care for fishing, dancing, baseball, opera, or video games, and I would resent anyone putting me down for lacking one or more of those interests. In the field of airplane modeling there are many separate interests—rubber power, scale, control line, free flight, RC, pattern, fun-fly, soaring, helicopters, and more. It behooves us to respect our fellow modelers' differing interests, and to work for the good of modeling as a whole. Beyond that, I personally have a real interest in looking in on areas of modeling other than my own from time to time. I always learn a lot, and develop a stronger admiration for what "they" are doing.

So, what I will now write is not a put-down for anyone, but only an attempt to encourage and promote designing. I suppose one could interpret this as proselytizing, but it really isn't because I am not promoting pattern model design, or sail-

continued on page 14

THE MODEL AVIATION HALL OF FAME

Walt Good	Phil Kraft	Dan Pruss (D)
Henry Struck	Maxwell Bassett	Frank Cummings, Jr.
E.J. Lorenz	Irwin Polk	William Hannan
Frank Zaic	Duke Fox	Robert Hatschek
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Bert Pond	George Perryman	Woody Blanchard
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Dick Korda (D)	Kenneth Held (D)	Earl Stahl
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Dale Kim	Lawrence Williams	Joe Beshar
Al Lewis (D)	Robert Campine	Paul Boyer
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Joseph Ott (D)	Bud Romak	Milton Huguélet (D)
Howard McEntee (D)	Owen Kampden	Carl Fries (D)
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Ed Rockwood (D)	Frank Nelkimken	Howard Bonner (D)
O.C. Randall (D)	William Wylam	Joseph Foster
Leon Shulman	Richard Sarpolus	Don Lowe
Wally Simmers	Victor Stanzel	John Tatone (D)
W.L. "Bill" Brown	Joseph Stanzel	Col. Hurst Bowers
E.T. Packard	Bill Effinger	Charles Tracy
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t x 60° @4.8v	.24 Seconds	.24 Seconds		.24 Seconds	.20 Seconds	.20 Seconds	
L x W x H	2.3" x 1.1" x 2"	1.6" x .79" x 1.6"		1.6" x .79" x 1.4"	1.4" x .7" x 1.25"	1.1" x .53 x 1.1"	
Weight	3.5 Oz.	1.8 Oz.	2.1 Oz.	1.7 Oz.	1.1 Oz.	0.67 Oz.	0.77 Oz.

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GREAT PLANES' GREAT LEARJET

One of the most interesting new models to come along recently is Great Planes' replica of the Learjet 35A, the famous eight-passenger business jet that was first introduced something over 20 years ago. Like



their F-14 and F-15 kits, the Lear is powered by a nose-mounted airplane engine swinging a standard tractor prop, making it easier and more affordable to enjoy the "jet experience." The model is designed for .40-.50 two-strokes, spans 55-1/2 inches, and requires a four- or five-channel radio with four to six servos. Retracts are an option but are absolutely essential if you want to do it right—who wants to see a Learjet flying with the gear down all the time? Construction is all wood with molded ABS plastic canopy, tip tanks and engine nacelles, and the kit is complete with hardware including an adjustable engine mount and fixed landing gear, as well as decals for the windows and markings. A special Learjet spinner (GPMQ4542) is available separately. The Learjet 35A kit should be out by now—check it out at your local hobby shop. From Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300.

IRVINE DIESELS

As we mentioned in the July "Over the Counter," Altech Marketing is importing the en-



tire line of English-made Irvine model engines and distributing them in the U.S. That includes the full range of Irvine diesels, from the little Mills .75cc replica to the .40-size ABC RC and CL Stunt engines. The Irvine .20 ABC RC Diesel pictured here features dual ball bearings supporting the crankshaft and a true ABC piston/cylinder setup; quoted horsepower is 0.4, and the rpm range is listed at 3,000 to 18,000—an idle-to-top-end ratio as good as many glow engines of this size.

Besides engines, Altech stocks a complete line of spare parts and can perform service whenever necessary. A catalog and technical specs are available free of charge from Altech Marketing, P.O. Box 391, Edison, NJ 08818-0391; (908) 248-8738.

SUPER ELECTRIC GEARBOXES

In this month's "Electric Power" column, Roger Jaffe talks about electric duration flying using small motors with high-ratio reduction drives.



Here's another look at the German-made Ludwig gearboxes available from Hobby Lobby as mentioned in one of the photo captions. These are super-smooth, precision machined all-metal units featuring four ball bearings, steel gears and hardened steel shafts; the prop rotates in the same direction as the motor, and there is no offset between the motor and prop shafts. They're available in various sizes to fit the Graupner "Speed" series motors, in ratios ranging

from 1.9:1 to 5.9:1. Full details are contained in Hobby Lobby's Catalog 26, available to new customers for \$2.50 (includes a \$6 first-purchase discount voucher). Order your copy from Hobby Lobby, 5614 Franklin Pike Circle, Brentwood, TN 37027; (615) 373-1444.

HITEC SERVOS

Falling into the "standard" size class of servos are Hitec



RCD's HS-422 (iron oilite output shaft bushing) and HS-425 (dual ball bearings), both sharing the same 1.6x.8x1.4-inch case. Both servos are rated at 43 ounce-inches of torque and .20 second for 60 degrees of rotation, and feature Hitec's custom integrated circuitry and SMT construction. The price is right, too; the HS-422 retails for

\$19.95, the 425 for \$28.95. Connectors are available for Airtronics, Futaba J, JR and Hitec systems. Hitec RCD, 10729 Wheatlands Ave., Suite C, Santee, CA 92071; (619) 258-4940.

PROGRAMMING THE FUTABA SUPER 7

Don Edberg, RCM's Soaring columnist, Team Futaba's sailplane pilot and acknowledged expert on computer radios, has just completed a new 96-page, profusely illustrated book entitled *Programming the Futaba Super 7 Radio System for Aircraft & Sailplanes*, aimed at

All material published in OVER THE COUNTER is quoted or paraphrased from press releases, furnished by the manufacturers and/or their advertising agencies, unless otherwise specified. The review and/or description of any product by MODEL BUILDER does not constitute an endorsement of that product, nor any assurance as to its safety or performance.



weight can range from 5 to 11 pounds. Kit includes hardware, clear canopy, two sheets of plans and complete instructions, for \$159 plus shipping. For a brochure on the Sailaire and other products, send an SASE to Dream Catcher Hobby, Inc., P.O. Box 77, Bristol, IN 46507; (219) 848-1427.

MODEL PLANS GALORE!

Super 7 owners looking for additional guidance on how to get the most out of this versatile system. Unlike the manual supplied with the radio, Don's book is written in plain English for ordinary folks, not computer programmers. Covered is each and every aspect of programming the 7UAFS, 7UAPS and 7UGFS radios—including not only *how* to set up the various functions but *why* you would want to use them in the first place. The books are priced at \$10 each; S&H runs \$2.40 for 1st class, \$1.24 for book rate. California residents add 80¢ sales tax. Foreign postage is \$3 for Canada, \$6 overseas. Buy three and you'll get a fourth copy free. Order from Dynamic Modelling Super 7 Book, 4922 Rochelle Ave. #4, Irvine, CA 92714-2941.

Scratch builders will want to get a copy of the newly released Model Aircraft Plans Handbook No. 1 put out by Nexus (formerly ASP), the English publisher of such model



NOSTALGIC SOARING

If you've been involved in RC soaring for more than just a few years, you'll remember the big "Sailaire" designed by Tom Williams and kitted by him under the Craft-Aire label.



Now, after a long hiatus, the Sailaire is back, having been reintroduced by Dream Catcher Hobby, Inc. Construction is the same as before—all-wood built-up wings and tail with machine-cut parts, molded epoxyglass forward fuselage pod and rolled plywood tailcone. Wingspan is 149 inches, wing area is 1643 square inches and the flying

mags as *Aeromodeller*, *RCM&E*, *Radio Modeler*, *Silent Flight*, and *RC Scale Aircraft*. The catalog comprises over 170 pages and includes photos of most of the models described. Bob Holman is the U.S. agent

for Nexus and can order any of the plans listed, if he doesn't already have it in stock. The catalog is priced at \$6 plus \$3 S&H, from Bob Holman Plans, P.O. Box 741, San Bernadino, CA 92402; (909) 885-3959.

VACUUM FORMING MADE SIMPLE

For those serious about doing their own vacuum forming, Vacuum Form is offering its Hobby-Vac Deluxe unit, an affordable benchtop machine that will pull up to 28 inches of

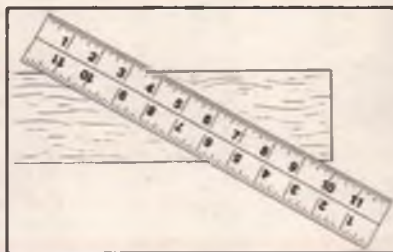
vacuum—enough for plastics up to 3/16-inch thick, or for getting minute, exacting detail in thinner materials. The two-stage design uses your household vacuum cleaner to pull the plastic down fast and then switches to a powerful 3/4-



horsepower pump to boost the vacuum five times higher. The unit shown has a 110V oven with guided clamp frame, the second stage pump and front-mounted vacuum gauge; other options are available as well. Call or write for a free catalog. Vacuum Form, 272-D Morganhill Dr., Dept. 100, Lake Orion, MI 48360; (800) 391-2974.

A STRAIGHTEDGE THAT STAYS PUT

Fourmost Products has just introduced its new Non-Slip Ruler, a 12-inch hard aluminum straightedge with tiny stainless steel grippers on the back, designed to keep the



ruler from slipping as you mark or cut wood. Comes with its own storage tube and retails for \$6.95, from Fourmost Products, 4040 24th Ave., Forest Grove, OR 97116; (503) 357-2732.

OLD TIME DIESEL REPLICAS

For you engine collector and O.T. model types, Don Belote of Classic Old Time Engines is now importing a lim-



ited number of beautiful Swedish-made replicas of the 1947 Micro Diesel, a 2.5cc (.15 cubic inch), 5-1/2 ounce powerplant that differs from the original only in the use of a conventional wrist pin in place of the ball-and-socket connection, and has a pressure die-cast aluminum crankcase. Each engine is bench-run, serial numbered and includes a copy of the test report from the April 1948 *Air Trails*. Send Don an SASE for full particulars and pricing info. Classic Old Time Engines, 15731 Five Point Rd., Perrysburg, OH 43551; (419) 878-8144.

FREE FLIGHT GOODIES

Hank Nystrom, proprietor of Texas Timers, is now offering a new dual-function, lightweight (19 grams) unit that is both an engine timer and dethermalizer timer built into one case. These "Texas Max" timers are available in two versions: the Max I is for Category I fields using a 5-minute max, the Max II is for Category II or III fields with their 3- or 2-minute maxes. Either timer allows you to set the engine run time and DT time independently. Both versions require the use of a separate engine cutoff device such as the Texas Remote Pinchoff. An SASE will bring full details and



prices. Texas Timers, 3317 Pine Timbers Dr., Johnson City, TN 37604. MB

plane design, or any other specific field. Designing was required for all airplanes of all types at their beginning. In my opinion, the people who design them have the most fun and the most satisfaction.

In support of the born-to-design theory, I have always been a designer at heart. I piled my blocks differently and with much more interest than other little kids did. I worked with my Erector set for hours and hours, but my projects were seldom in the Erector set manual. I designed almost all of my hand-launched gliders and rubber models from age 10 on. When I buy a new product I often see one or more places where the design could be improved, and I immediately modify it to suit myself.

A very few times I have tried to build a model from someone else's plans, but I couldn't stand to incorporate what in my opinion were design mistakes, and I usually wished I had designed it from scratch in the first place. In these cases the models I ended up with were always greatly modified. Not necessarily modified for the better, you understand, but we designers learn

to be better designers by making mistakes. If making mistakes is very painful for you, designing or inventing is probably not your bag.

We born designers get some of our kicks by being original, being different. We may not be the arm-wrestling champs, the bridge-playing champs, the chug-a-lug champs, or the pattern-flying champions; we are the champions at designing and building things so they work in an optimum manner. We compete with each other to design better. The more education and experience we get, the better we become and the more ego satisfaction we get from designing.

The above words will probably ring some personal bells with those of you similarly infected by the design bug; but the "normal" people among you may find this all quite strange.

I have a number of patents—they haven't made me rich, but money wasn't my goal. The real reason for inventing or designing is for the challenge of it. "A true inventor can no more help inventing than he can help thinking or breathing."—Alexander Graham Bell.

What we (Alex and I) are saying is that designing is both fascinating and reward-

ing. Try it, you might like it! For me, the designing part of this broad modeling hobby of ours is by far the most interesting of all of its facets. For me, the most important reason to build and fly a model I have designed is to prove or disprove the merits of the design. But if you are not a designer type and would rather get your modeling kicks out of flying, then I will leave you alone. (But you may continue to read this column, if you wish.)

One parting shot: There is the story of the woman who had never eaten strawberries and refused to even taste one. Her reasoning was that if she tasted them and liked them, then she would regret not having eaten them all of her life. So *don't* try designing, you might like it!

But back to the item which prompted all this. If you are really not interested in designing your own flight stand but want one like mine, it is going to be put out in kit form (not by me). I will keep you posted.

RUBBER

A contingent of our aeromodeling fraternity has specific interest in the restitution characteristics of selected elastomers. They prefer the use of energy of restitution from stressed organic materials of this class for powering model aircraft over the energy which may be obtained from the exothermic oxidation of methanol or hydrocarbons in heat engines.

Having set a proper scientific tone, I'll go on to say that I am now the fascinated owner of a new scientific rubber toy. Said toy consists of two identical-appearing small black rubber balls about 7/8-inch in diameter. The word "appearing" is crucial to this discussion, since they are most unidentical in other respects.

When one of the balls (which is made of neoprene) is dropped onto a hard surface it bounces very well—not as well as a "superball," but well. However, when its

continued on page 86

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GETTING STARTED IN ELECTRIC DURATION

The Europeans have been developing this interesting facet of electric flying for some time, but it's just now starting to catch on in the U.S. This month Roger explains the ins and outs of electric duration with the assistance of electric expert Jerry Smartt.

When I started flying again after a two-year absence (many years ago) I was working on a construction job just 5 minutes from the ocean cliffs at Torrey Pines, near San Diego, California. I drove out there one day at lunch and saw some of the most beautiful gliders flying effortlessly along the slope. Not knowing any better, I asked a pilot how long one is able to fly along the slope—the answer was quite obviously “as long as the wind and the batteries last”!

Putting in a long flight with a glider along a windy slope isn't much of a challenge, but what if a pilot wanted to make long flights from flat land with an electric model? Jerry Smartt, of Warsaw, Missouri, has been experimenting with duration electric aircraft for a number of years now and I would like to tell you about his progress.

Jerry has been a regular correspondent of mine since I started writing for *Model Builder*—in fact, he sent me the first letter I ever received in response to my first column. Jerry isn't content with a 5-minute climb and a 30-minute flight from thermal to thermal. His goal has been to achieve *continuous motor runs* of well over an hour and flights longer than that—a feat that he and a number of his friends can now accomplish with regularity.

LET'S START AT THE BEGINNING

What do you need to run your electric motor for over an hour? Jerry has done countless experiments with different motors, props, gear drives and battery pack combinations. There are two schools of thought about how to fly a duration electric model without benefit of thermal activity. One method is to make repeated short-run blasts to altitude with (hopefully) long glide times in between. The other method, the one that Jerry prefers, is to fly low and slow (under 30 feet and at a walk-



Novel inverted V-tail pusher duration aircraft by Mike Finnan of Covington, Louisiana. Wingspan is 72 inches, wing area is 800 square inches, airfoil is an Eppler 362. The V-tail angle is the normal 110 degrees. Ready-to-fly weight is 4 pounds. Motor is a Graupner Speed 600 00 12V with a Leisure 3.8:1 long shaft gearbox. The battery pack consists of 12 1700-mAh SCRC cells wired in two six-cell packs. A servo operates a series-parallel switch and an on/off switch for throttle control. Propeller is a 15-inch Master Aircrew.

ing pace) and run the motor continuously. Since duration flying requires very long run times, cruising current draw has to be very low—typically less than 5 amps. Inexpensive ferrite motors are best suited to this type of flying, and gear drives and large propellers are a necessity.

COMBINATIONS

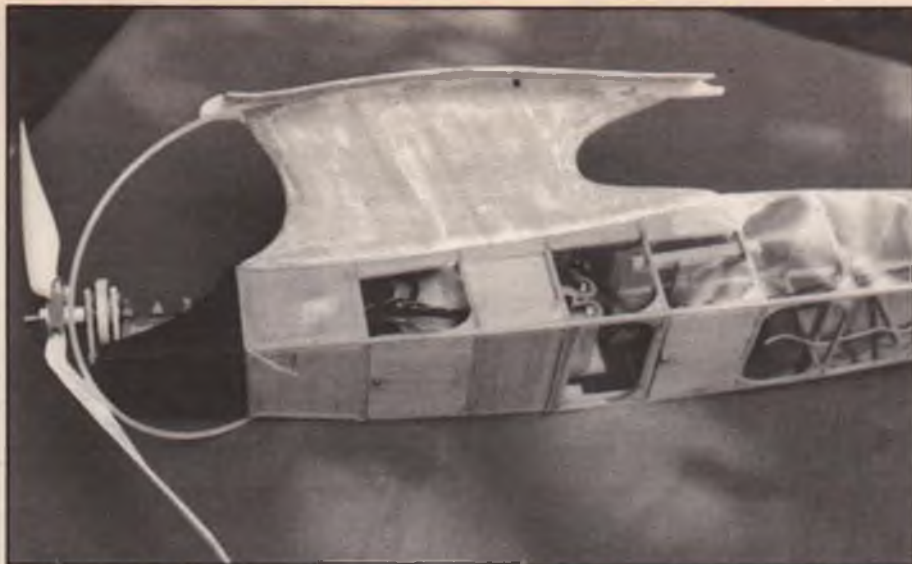
One of Jerry's favorite equipment combinations is the Graupner Speed 400 7.2V motor, a Ludwig 5.9:1 reduction gearbox and the 15-inch Graupner folding propeller—all available through Hobby Lobby. Running on 10 cells, Jerry says you can expect 3,000-4,000 rpm at a miserly current draw of 2 amps. This is enough power to fly a model with a 60-inch wingspan and

500 square inches of wing area. Of course, the model has to be very light.

As an experiment, Jerry took a Leisure 28-turn ferrite motor and had it rewound with 90 turns of 25 gauge wire. He hooked it up to a Model Electronics 6:1 gearbox and a 17x10 propeller; at full throttle the motor put out 3,700 rpm with a current draw of 1.4 amps! With his battery pack and a continuous motor run, he could have expected a duration flight of 1 hour and 50 minutes! This same motor with a 3.8:1 reduction and a 12x7 or 13x7 prop would also be an excellent duration configuration.

GEARBOXES

Naturally, a small motor can't swing such a big propeller without a gearbox or



Old timers make good electric duration models too. This is the footage for Jerry Smart's very lightly built Lanzo Bomber, a favorite among electric fliers. That piece of Myral protects the pylon against strikes from the big Aeromax 16-3/4x15 propeller.



Close-up of the business end of Jerry's Lanzo Bomber showing the 17-turn Trinity car motor and a 7:1 Superbox from Model Electronics. Jerry reports needing very little throttle to get this bird in the air and he has extra power available if needed.

other speed reduction component. In general, the higher the gear reduction, the larger the prop you can swing and the lower the current draw you will have. There are several gearboxes available with a 3:1 ratio or higher, and I have found three manufacturers that make reducers up to 6:1. If you are mechanically inclined you can even make one yourself. Of course, when you start to mix and match components, you'll come upon compatibility problems between pinion gears and motor shafts, gearbox shafts and propellers, gearbox mounting holes and motor mounting holes and the like. But hey, that's half the fun. (Flying is the other half!)

CONTROLS

What about motor controls? Usually, an on/off switch works the best—it's simple and has low resistance. You can use a servo-actuated switch or one of the newer electronic switches. Be mindful of the kind of

gearbox you have if using a mechanical switch or an electronic one without a soft-start. If the gearbox uses plastic gears, or a metal pinion gear and a plastic spur gear, the sudden start you get with a mechanical switch may strip the gear teeth.

Proportional speed controls are also useful for duration flying. Jerry reports that many duration pilots even reduce throttle at times if there is sufficient

altitude. His Lanzo Bomber flies very well using just a little bit of power. As Jerry says, "If full equates to 2 amps, then half-throttle equates to 1 amp—better!"

THE KEY TO IT ALL

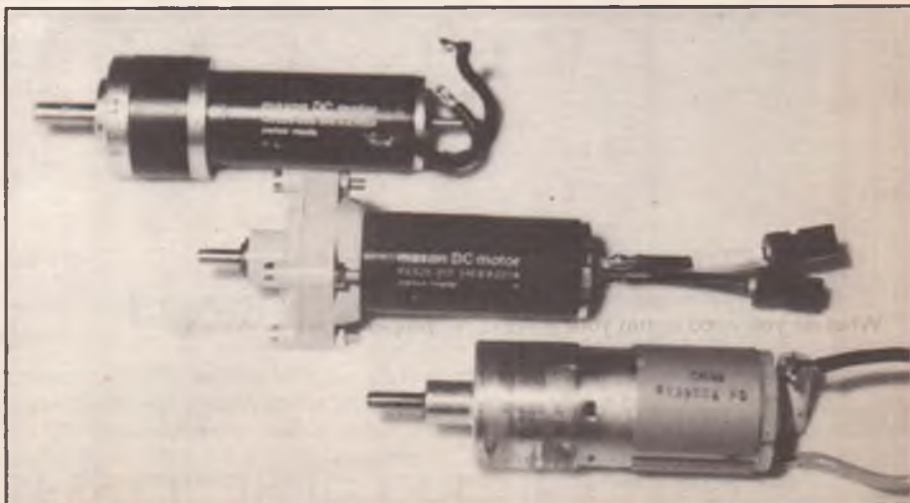
The key to electric duration flying is *low current draw*. The electrical system doesn't care how heavy the plane is; motor duration is determined solely by current draw, and that is determined by a number of things—resistance, motor constants and the like. Your motor/gearbox/propeller combination must be optimized to get the best motor run. After you do that, you need to make the plane as light as possible so it will fly with the least amount of power.

As an example, suppose your power pack is made up of eight 1,800-mAH cells and that your motor/gearbox/propeller combination draws 7 amps. This means the motor run is expected to be 1.8 amp-hours / 7 amps x 60 minutes = 15 minutes. Suppose that using a higher reduction ratio brings the current draw down to 3 amps. Now your duration has more than doubled to 36 minutes. Let's say you can reduce the prop pitch by an inch, with enough air-speed to maintain control of the plane and reduce current to 2.3 amps—now your duration is almost 50 minutes!

I suppose there is an argument that the prop will unload in flight and further reduce the current draw, but remember that in Jerry's method of duration flying, you fly low and slow. The prop isn't going to unload enough to make much of a difference.

COMPETITION

Suppose you have this awesome duration setup and you want to compete with others. Unfortunately, according to Jerry, electric duration contests are very rare in the U.S.—the "All Up/Last Down" event is probably the closest thing we have to a duration contest but the limitations on



Jerry Smart has done a lot of experimentation with various electric motors for duration flying. Pictured here from top: a Swiss-made Maxon motor with 5:1 gearbox (weighs 0-1/4 ounces), another Maxon with a lightweight 8:1 gearbox (11 ounces), and an inexpensive Graupner (Mabuchi) 388 with a Ludwig 4:1 gearbox (4-3/4 ounces). The costly Maxon motors are favorites of European duration fliers. In the U.S., Hobby Lobby offers the Graupner motors as well as the precision German-made Ludwig gearboxes.

motors, batteries, wiring and/or propellers lead to a loss of innovativeness and creativity—you only do what is required to win, and if you know that the longest flight will only be 35 minutes or so, what point is there to building a plane that will fly for 90? What's really needed is an event specifically for these duration models with no limitations to the configurations.

To that end, Jerry teamed up with Frank Korman, a well-respected electric modeler with the Dallas Electric Aircraft Flyers, and they sponsored a duration contest in June of last year in Texas. A handful of people entered the meet; the highlight was a duel between Gary Warner and Jerry. Jerry posted a 49-minute flight early on and Gary had a crash after only a 10-minute flight. Taking advantage of the fact that he lives only minutes from the flying field, Gary went home, fixed his plane, came back after lunch and posted a 1:12 flight time. Jerry was forced to fly again and posted a 1:17 flight to win the contest.

With the June duration meet behind him, Jerry wanted to expand the event to include other electric duration modelers throughout the country. In June 1995, he sponsored a postal contest with some very simple rules: any plane is eligible, the flight must be made on June 17, and for this year the pilots can use thermal activity to prolong their flight. The contest is going on as I write this, so as soon as I get the results I'll pass them along.

JERRY'S PLANE

The pictures show one of Jerry's duration planes, a modified Lanzo Bomber. Kip Merker of Tucson, Arizona builds some duration planes for Jerry and others in the field. Jerry modified it by using half an elevator, placing the servos in the tail, cutting lightening holes in the ribs and trailing edge, and scalloping the inside of the leading edge. He used Oracover Lite



Jerry's propeller assortment, from top: a 18x18 Schöberl (German), 17x12 RASA (British), 17x10 RASA, 16x16 Schöberl, 16-3/8x15 Aeroant (German), and a 15x9-1/2 Aeroant.

(also a Hobby Lobby import), says it's very light and goes on like magic with low heat. He uses a 17-turn Trinity car motor with a 7:1 Superbox from Model Electronics.

OTHER DURATION FOLKS

Jerry directed me to Mike Finnan of Covington, Louisiana, who is a duration enthusiast in the New Orleans area. He sent me some photos of his unique inverted V-tail duration plane; it has many flights on it now and is well broken-in. It flies with a Graupner Speed 600BB 12V motor, a Leisure 3.8:1 gearbox and 12 1,700-mAH SCRC cells wired as two six-cell packs in a series-parallel configuration. All 12 cells in series are used to launch the plane and gain altitude, then the packs are switched to two six-cell packs wired in parallel for the rest of the flight. Motor runs are averaging about 45 minutes with a current draw of 4 amps on six cells and 11 amps on 12. The prop is a 15x10 Master Airscrew folder.

LET THE SUN SHINE IN . . .

The next question in Jerry's mind is, "Is

it possible to make a duration aircraft fly for a long time without batteries at all?" So far, his experiments with solar power have shown that it's possible—with a couple hundred solar cells. I don't have specific details about the plane he plans to use, but it's a custom-designed ship with a customized electric motor and a special 14:1 gearbox swinging a 24x24 propeller at 800 to 900 rpm. The plane will span 90 inches and weigh only 30 to 40 ounces ready to fly. Power will be supplied by 288 solar cells plus a few more to provide power to the radio. You can bet that as soon as I get a picture of it and hear the details of its flights, I'll pass it along to you.

That wraps up duration—hope you enjoyed it! If you're interested in this kind of electric flying, feel free to contact Jerry directly at Rt. 3 Box 300, Warsaw, MO 65355; (816) 438-5682. And as always, you can contact me at 6462 Sunny Brae Dr., San Diego, CA 92119; (619) 463-4453 (between 8 and 5 Pacific Time, Monday through Friday) or through the Internet at 74164.3237@compuserve.com. **MB**

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PRODUCTS IN USE

■ By Bill Forrey and Larry Enger

MM GLIDER TECH'S COMMONER AND ILLUSION RC HAND LAUNCH GLIDERS



A look at a couple of traditional all-wood competition chuckies that can give the glass-and-foam crowd a run for their money!

■ **RIGHT:** Birds of a feather! It's easy to see the design similarities between the Commoner (left) and the later Illusion. At 480 square inches, the Commoner is by far the largest RCHLG on the market. The Illusion is smaller but has a more efficient double-taper wing planform.

MM Glider Tech's two RCHLGs, the Commoner and Illusion, are what we consider a welcome return to all-balsa, "build-it-yourself" RC competition hand-launch gliders. There are so few similar models being offered today that these two are almost in a class by themselves. Fortunately, they have the kind of performance that fliers from near-beginner right up to the seasoned competitor can fall in love with.

The two airplanes are actually quite similar in design, the Illusion being a refined, more competition-oriented version of the Commoner. The Commoner features a simple constant chord wing, 59-inch span and huge wing area of 480 square inches; it's the better all-around choice for novice to intermediate builder/fliers. The Illusion, with its double taper wing planform, smaller wing area and shorter span, is the better choice for the intermediate to advanced competition flier. Speaking of competition, Merrill Farmer, designer and manufacturer of both of these models, flew an Illusion to an excellent 5th place finish at the big ISS hand-launch meet at Riverside, California in June. The contest at-



tracted 27 entrants, and eight of the top ten were flying new-generation aileron ships.

(Editor's note: For this 2-in-1 review, we enlisted the talents of two experienced model builders, MB Soaring columnist Bill Forrey and his friend Larry Enger. Each commented separately about their models.)

CONSTRUCTION

As can be seen in one of the photos,

both models feature basically the same construction. The wings use the Selig 7084 airfoil with 1/32 balsa sheeting on the upper leading edge only, the fuselages are simple sheet balsa boxes with a couple of bulkheads and 1/8 square in the corners, and the stabs are flat, built-up stick structures.

THE COMMONER—BILL FORREY

The Commoner built quickly and in



Another difference between the two planes is the Illusion's smaller vertical stab area, to compensate for the smaller wing area. The horizontals are the same size, just a slightly different outline.



The Commover (pictured here) and Illusion handle so well that they can be quickly looked into a light forecast lane without reservation—you never give up hope for till even when they get this low.

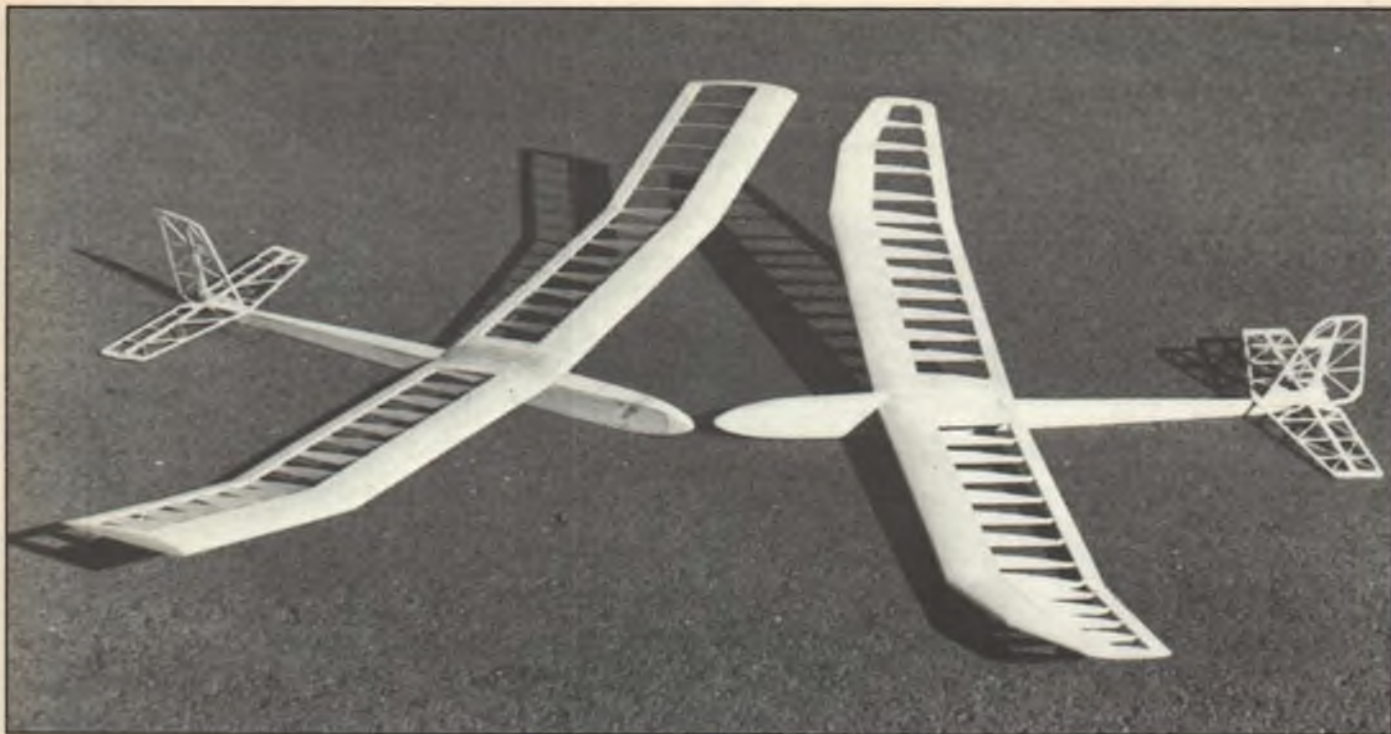
general was a pleasure to build. All parts are machine cut and sanded—nothing is die-cut.

One area that concerned me was the wing polyhedral joints; the tip panels are simply butt-glued to the main panels, with no joiner or other reinforcement. According to the designer, the intent here is to have the tip panel break off cleanly in a badly botched landing or mid-air—an advantage during HLG competition because you could have the panel glued back on and be flying again in minutes. Still, for general sport flying it seemed a good idea to beef up the joints by gluing carbon fiber strips, 1/4-inch wide by 1-inch long, to each of the four spar cap joints. The wing is still in one piece after many ground-loops and a few weed-whacking spin-outs.

The instructions have you install the pushrod tubes in the fuselage *after* the top and bottom sheeting is in place—a difficult job at best. I followed the instructions to the letter and learned how frustrating it is to drill holes in hard-to-reach bulkheads buried in a skinny balsa fuselage. By using a pin-vise, a "pencil" wood burning iron and X-Acto files to drill and then open up the holes in the inaccessible bulkheads, I

Illusion's smaller wing area gives it a better glide ratio. The Illusion handles lighter than the Commover as a result of its smaller size, lighter weight and lower-drag wing design. Flight photos were taken at City Park, in Southern California.





The Commoner and Illusion nose-to-nose again, this time in a bare-bones state to illustrate the simple, straight-forward construction. Text includes a couple of good suggestions for beefing up the structure and simplifying the assembly.

MM GLIDER TECH'S COMPETITION RCHLG'S

	Commoner	Illusion
WINGSPAN	58.75 in.	56 in.
WING AREA	480 sq. in.	429.5 sq. in.
FLYING WEIGHT	15.8 oz.	13.6 oz.
WING LOADING	4.74 oz./sq. ft.	4.56 oz./sq. ft.
OVERALL LENGTH	37.4 in.	36.5 in.
AIRFOIL	Selig 7084	Selig 7084
ASPECT RATIO	7.19:1	7.30:1
HORIZ. STAB AREA	62 sq. in. (13% of wing)	62 sq. in. (14.4% of wing)
VERT. STAB AREA	27.3 sq. in. (5.7% of wing)	23.6 sq. in. (5.5% of wing)
SUGGESTED RETAIL	\$41.95	\$41.95

Produced by MM Glider Tech,
P.O. Box 39098, Downey, CA 90239; (310) 923-2414.

managed. But it would have been much easier and neater to drill the holes in the bulkheads and install the pushrod sheaths before adding the top and bottom fuselage sheeting.

THE ILLUSION—LARRY ENGER

When I first looked at the plans for the Illusion, right away I liked it. I liked the looks of the double-tapered Schuemann wing planform. At 418 square inches the wing area is greater than most other hand-launch designs even though the span is only 56 inches.

The kit supplied for this review was from the first production run and, as is usually the case, contained a few errors that have been corrected in later kits. For example, some of the tip ribs were cut a bit longer than needed (I just moved them inboard

continued on page 67

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Weight: 7.5-10 lb (3402-4536 g)
Wing Loading: 24-32 oz/sq ft (73-98 g/sq dm)
Length: 48.25 in (1250 mm)
Engine Required: 2-stroke .61-.91 cu in (10-15 cc) or 4-stroke 91-1.20 cu in (15-19.5 cc)
Radio: 4-6 channel with 4-7 servos.

The DML version of the AT-6 shown here is covered in Top Flite Microfoam® Aluminum, Missile Red, Cub Yellow and Black. This kit includes the parts and decals to build either the Air Force AT-6 or Navy DML.

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With a Top Flite Gold Edition AT-6, you can create a scale modeling classic...even if it's your first scale project.

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Gold Edition Warbirds Roster



P-40E Warhawk Wingspan: 64 in



P-51D Mustang Wingspan: 65 in



F4U Corsair Wingspan: 62 in

Winter (Re)building Projects

Don't be too quick to throw out that broken airplane. With a little planning, even a badly damaged model can often be repaired to almost-new condition.



■ ABOVE: A standard feature of the Paul Agerton Northwest Control Line Regionals, held this past Memorial Day, is the Eugene Toy & Hobby truck, now run by Mark (pictured) and Alan Agerton, for whose late father the contest is named. ■ RIGHT: Idaho modeler Pat Johnston proves that unusual designs can fly well. His profile Go-Bee is a competitive precision aerobatics plane.

It's autumn and the contest season is winding down, turning our thoughts to winter building projects.

But first, what about those winter repair projects? Most fliers—especially competitors—have plenty to do at this time of year just cleaning up from the flying season.

Here at *Model Builder* CL headquarters, we have our work cut out for us. As this is written (and it's only June), the shop already is knee-deep in repair projects.

An attractively painted pile of small pieces that used to be a stunt plane will need to be cannibalized for its usable parts (I think there's an engine in there somewhere). A carrier plane needs to have a wing repaired and recovered. A couple of combat planes need parts grafted on. The trainer needs a new landing gear (one of the club novices hasn't mastered smooth

landings yet!). There's a pile of Cox engine parts that, once assembled, might make a mouse race motor. And so it goes.

Putting off repair projects tends to make for a messy shop and, by the time you get around to the job, it's easy to forget everything that needs to be repaired on a particular plane. That's why it's a good idea to get those repairs out of the way as soon as possible.

The first thing you have to think about when confronted with a damaged plane is whether it is worth repairing at all.

Don't be too hasty to throw a broken plane in the trash. Often the damage isn't as serious as it seems at first glance. If the breaks are clean, often even detached wings and broken fuselages can be glued back together. The plane may never be as good as new, but it may be useful for other purposes. For instance, the repaired plane

may make a good trainer. A fixed stunter can give you a chance to practice getting those bottoms really low without worrying about the plane. A repaired racer could be a backup, or handed down to a local novice. Combat planes don't need to look good; if it flies well, who cares if the new wing is a different color from the old one?

On the other hand, you may conclude that the repairs are too much trouble, no matter what the intended use for the plane. Some years ago one of my Nitroholics Racing Team Northwest Sport Racers, a Ringmaster, suffered a racing mishap—a solid smack on the pavement. It remained mostly in one piece, so I decided to repair the damage. After many hours of cleaning, sanding, regluing, applying carbon fiber, recovering and repainting, I realized that I had spent nearly as much time on the repair as I would have in building a new

plane. And the repaired racer, now a backup, has been subject to various structural maladies ever since. That initial crash did a lot of subtle damage that keeps showing up years later.

The first thing to do is to evaluate the damage. This requires a thorough cleanup to get all the oil off the finish right away so that you don't contaminate possible glue joints. The covering probably will have to be removed anywhere there is suspected damage, so you can look for cracks and loose joints.

One of the first things to be lost in a crash is good alignment and trim. If there's no hope of getting things straight, we'll have to resign ourselves to the fact that the plane will be a trainer or a sport plane at best. Its days of competition are probably over. However, if the major pieces are more or

should run lengthwise in the direction of stress. Fiberglass cloth can be used to strengthen stress areas that have suffered multiple, omnidirectional fractures. Apply it with epoxy or epoxy paint. Once sanded, it also provides some cosmetic covering over the rough repaired areas.

Pay particular attention to areas subject to stress and vibration—around the front end, for example. Replace parts that appear fuel-soaked.

High-stress areas such as spars and front ends need special effort to make sure they are strong after the repair. In addition to the carbon fiber reinforcement, sometimes a sub-spar can be installed to tie the broken parts together. One of the large 2-inch cutting wheels available for Dremel tools (one brand is called "Tuf-Grind") can be useful in cutting slots for sub-spars and

were held for the 24th time over Memorial Day weekend.

The 1995 event was blessed with three days of perfect weather, an all-time high entry and fantastic competition with many national- and world-class fliers attending. The 38 events in aerobatics, racing, combat, scale, carrier and speed attracted news coverage and lots of spectators. There were some sideshows as well, including Grant Hiestand's huge pink electric-powered plane, which he let many people fly over the three-day contest.

John Lowry of Fox Manufacturing Co. competed and was the featured speaker at the Saturday night banquet as well. He had the Fox van on the field and dispensed parts and advice to the fliers all weekend.

A new feature of the 1995 event was a unique style of trophy. Every contestant,

■ **RIGHT:** At the '95 Northwest Regionals, Gary Harris of Portland pulled off his first major contest win in a well-attended field of top-gun fast combat fliers.

■ **FAR RIGHT:** The complete MarCrist Industries "Spin-Less" unit as described in text; lets you fly a CL model from outside the circle. Could be useful for disabled folks who want to fly but can't turn in the center of the circle, or for those in hot climates who would rather do their flying from under a shady awning while sipping a Coke.



less intact, the repair may be fairly straightforward. It may not be possible to completely disguise the repair joints, but if appearance isn't critical, that's no problem.

The first thing I do is see how well the parts will fit back together. Jagged joints often can be repaired with thin CA glue, which can be applied after the joint is stuck back together because it wicks its way through the wood.

Sometimes the jagged joint has distorted and the parts can't be realigned. In that case, we'll have to remove the jagged parts and splice in new material. Angled joints provide more gluing surface. Some sort of straightedge, triangle or other alignment guide may be necessary during the gluing process.

Carbon fiber tow or tape is invaluable for repairs, often resulting in a joint that is stronger than the original material. Carbon fiber is available at good hobby shops or through several mail-order suppliers. It can be applied either with CA or with epoxy. It

cleaning out other damaged areas.

After any crash, check all control system parts, even if nothing looks damaged at first glance. Hinges, pushrods, linkages, bellcrank mounts and leadouts can suffer subtle damage that can lead to an in-flight failure. Adjustable leadouts can come loose, and tip boxes can spit their weights. If you can't see the control system, work it carefully and feel for catches or changes in its movement characteristics.

Even if repaired airplanes wind up hanging in the back of the shop for long periods, they will come in handy over the years. You never know when your first-choice plane will suffer a mishap and you'll want the backup. And there's always a novice who needs a first flying experience that the repaired plane may be able to provide.

THE '95 NORTHWEST REGIONALS

The Pacific Northwest's annual Paul Agarter Northwest Control Line Regionals

upon entering, received a trophy base hand-made out of one of several fine woods by the Eugene Prop Spinners, led by master wood craftsman Dave Shrum. Those fliers who placed were awarded engraved plaques that could be attached to the trophies. Those who did not place received "participant" plaques. During the course of the contest, each competitor was photographed by Dave and an assistant; the pictures were mailed out later so that the fliers could insert them into a Plexiglas frame that was part of the trophy. The trophies were, as usual, supplemented by a huge array of merchandise prizes either donated by suppliers or purchased by the Prop Spinners.

Grand Championship trophies went to Mike MacCarthy (1st), Todd Ryan (2nd) and Junior flier Julie Rice (3rd).

YOU NEED ONE OF THESE

Just when you think you've seen every conceivable CL product, somebody comes out with a new idea.

Or maybe it's an old idea.

Periodically over the years we've received questions about legendary products that allowed the flier to sit outside the circle while flying a control line plane. We even found ads in 1950s model magazines for such a product, but seldom encountered anyone who had actually seen such a system.

Now, you can see such a system at work. You can even buy one, should you desire to do your flying sitting down. It's called "Spin-Less," and is manufactured by MarCrist Industries of Tucson, Arizona.

Seeing is believing. MarCrist has produced a promotional video that shows various pilots flying several different 1/2A airplanes from outside the circle, controlling the planes with a stick connected by a long linkage system to a center post upon which the lines pivot. They were doing lots of simple stunts and apparently had good line tension. It's an interesting novelty that might also have some practical use for beginners worried about dizziness or disabled fliers unable to turn in the center of the circle.

For information about the Spin-Less system, write MarCrist Industries, 997 W. Paria Lane, Tucson, AZ 85704. Their phone number is (800) 552-2009.

NEW CLUB SITES

Three CL clubs at opposite ends of the country have recently dedicated new flying sites.

Fliers in AMA District II dedicated a new county-funded site in Brookhaven, Long Island last May. The site is off Exit 68 from the Long Island Expressway, about five miles due north at an abandoned missile site. There are two good flying circles (one paved and one with a paved launching/landing area) and a parking lot. Eastern stunt flier Rich Peabody reports that the site was developed through the efforts of Vic Macaluso, District II PAMPA director, and the Defense Hill Modelers. The field is open for practice during daylight hours after 9 a.m. Vic can be contacted at 34 Campo Ave., Seldon, NY 11784.

Out west, the Seattle Skyraiders dedicated their new site at Clover Park Technical College at 4500 Steilacoom Blvd. S.W., in Lakewood, south of Tacoma, Washington. The site is on the end of a runway that is closed to full-scale aircraft on the weekends. (Now that's a switch—big planes stepping aside for models!)

In Salem, Oregon, members of the Western Oregon Line Fliers started flying at their new site at Salem Airport. The city-owned site was obtained for the WOLF club through the efforts of club members who worked with a city council member who made it has last public service project before dying of an illness.

SOCAL CONTEST CALENDAR

The 12th annual Seebree Hayes Memorial Control Line Contest is scheduled for

October 14-15 at the Whittier Narrows CL site in Los Angeles. Saturday's events include all classes of Speed; Mouse I, Goodyear, Foxberg and Rat Race; Beginner, Old Time and Nostalgia Stunt; and Sport and Profile Scale. On Sunday will be Speed; FAI, Formula, Unlimited; Texas Quickie Rat and ACLA Slow Rat Race; Intermediate, Advanced and Expert Precision Aerobatics; Profile, Class I/II and .15 Carrier; and 80-mph Combat.

Also at Whittier Narrows, on December 10, is scheduled the annual Toys for Tots Fun-Fly, sponsored by the 101st Squadron Screaming Eagles and the U.S. Marine Corps. It's a "fly what you bring" event for any kind of airplane. In conjunction with the fun-fly will be a speed contest. The carrier deck will be available for practice. The entry fee is one unwrapped new toy (toy guns, cash and model airplane kits are not accepted).

For information about both events, contact Contest Director Virgil Wilbur, 998 Cedardale Dr., Santa Fe Springs, CA 90670.

Don't forget to send contest fliers, contest results, club news, photos, questions, technical tips and other items of interest to CL fliers to the *Model Builder* Control Line column. Write John Thompson, 295 W. 38th Ave., Eugene, OR 97405. E-mail at JohnT4051@aol.com. **MB**

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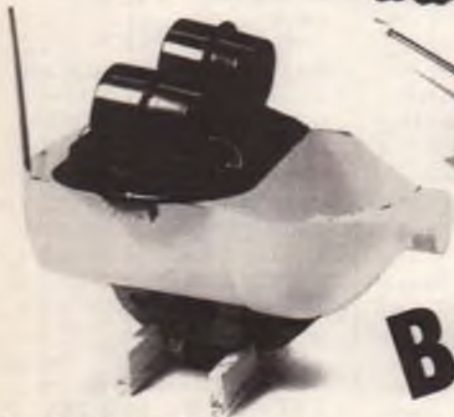


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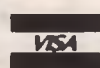


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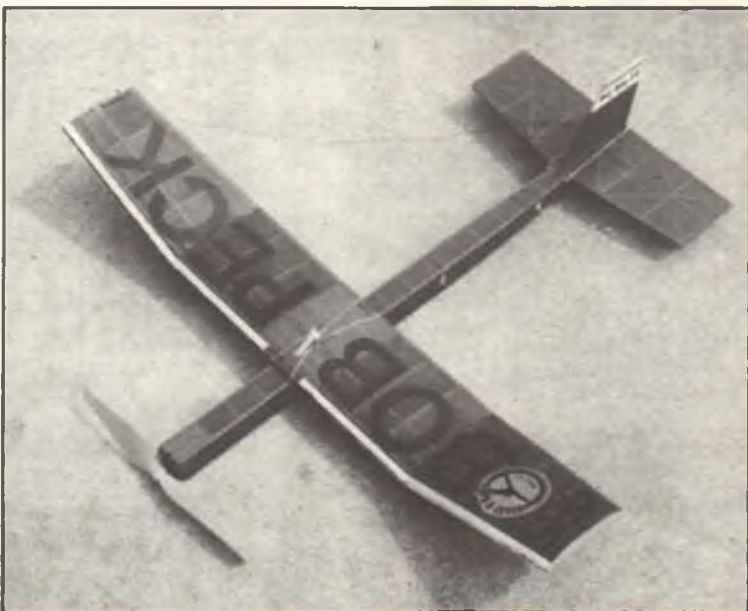
•The Uproar in Nostalgia

•New Free Flight Goodies

•The Importance of Hearing Protection

Frank Ehling, whose name should be very familiar to anyone involved in free flight competition, once was known as "Old Loophole" Ehling. The reason, as I recall, was that he had a knack for finding some quirk or unrecognized omission in the rules that allowed him to gain a competitive advantage. Consequently, he was viewed by contest directors and rules makers alike as a person you wanted to consult before the rules were finally adopted. Frank had that kind of a mind. Probably he would have made a good attorney, but he served for many years as the technical director of AMA where he put these same skills to good use.

It would have been nice to have a Frank Ehling around when the NFFS Nostalgia rules were first promulgated by Ralph Prey and Bob Larsh almost 10 years ago. Once this retrospective event was brought forward for those of us who recalled flying those early glow-powered ships and longed for the days when life (and free flight competition)



Dave Linstrum sent along this photo of his One-Night 28, a Pack-Polywax kit for the P-30 event. He completed it in just over one night, but in time to forward to the Orbiters P-30 postal contest on July 16. Model was constructed and flown in memory of Bob Peck, its designer. Note the wing-mounted DT system—fuse sticking out of the center panel of the wing.

was simpler and more direct. So, the rules were set, with 1956 as a cutoff date and with specific models excluded.

As time went on, however, several designs that probably should not have been allowed to compete sneaked onto the approved list. Although it would be a gross oversimplification to identify all of these models as British designs, in fact, the majority of them are. They include such designs as the Y-Bar, the Creep, the Eureka, and most specifically, the Jays Bird. All of these ships are rear-fin models, most with high pylons to handle powerful engines. The Jays Bird has a longer tail moment and smaller stabilizer than was common for British models of the period. These features make it a closer relative to the modern AMA competition model than to the Spacers and RamRods of the 1950s. Consequently, a number of

Nostalgia fliers have complained about the eligibility of the Jays Bird.

Harlan Halsey, an active free fliker and Oakland Cloud Duster, was moved to write the NFFS with an impassioned plea that the Vic Jay design be disallowed in Nostalgia. The Cloud Dusters have also appealed to the NFFS Nostalgia Committee to disqualify the Jays Bird from Nostalgia competition.

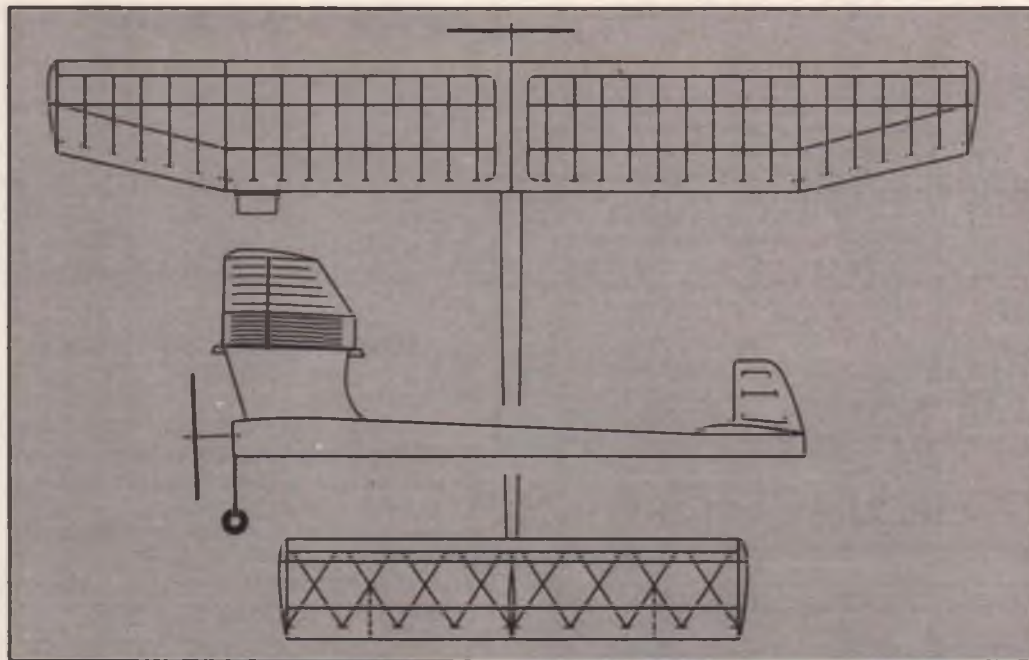
As a consequence, the NFFS Nostalgia committee is reinvestigating its own rules and prior decisions to see whether such models as described above should continue as approved designs or whether some other such action should be taken. If you are a Nostalgia buff, stay tuned to this column for updates on this potentially contentious topic.

NOVEMBER MYSTERY MODEL

As I noted above, a number of British designs have proven to be very competitive for the Nostalgia event. Here's one design from across the pond that might even pass for a 1950s-era U.S. design. Give-



One of John Kamia's P-30 models, a Len Sherman design that features a 1/32 rolled balsa tube fuselage. John flies it on four strands of 1/8-inch FAI Tan II and gets 1,600 turns into the motor. Like Dave Linstrum, John finds the wing-mounted DT to be a very positive way to bring the model down from those boomer thermals.



NOVEMBER MYSTERY MODEL

away features include the sidewinder-mounted engine and the high pylon. It was actually designed by a two-person team, one Italian and the other British. This model and its derivatives were quite successful and were the subject of a number of construction features.

If you think you know that name of the design, you can enter this little game we play here every month. Just send your guess in to *Model Builder* magazine. The one whose name is drawn from among the

correct replies gets a free one-year MB sub. Do it now.

JULY MYSTERY MODEL WINNER

Frank "Old Loophole" Ehling, as he's referred to at the beginning of this month's column, ranks as one of modeling's most prolific designers, having had construction articles published in all the model mags beginning in the '30s and continuing right up through the '60s. One of those articles, appearing in the June 1951 issue of *Air Trails*, was for

the "Supersonic Wing," a jet-like, all-balsa, swept-wing tailless powered by a Jetex 50. The whole model could be built from a single sheet of 1/16x3x36 balsa, and the motor was simply mounted to the side of the profile fuselage. All six of those who wrote in were correct in identifying the model, and the free one-year MB sub was won by Martin Francis of Pleasant Hill, Iowa.

(Might add that Jetex motors and fuel, long out of production, are once again available; they're now called Jet-X, and

are being distributed by DARE Products, Inc., 551 N. Centre St., P.O. Box 521, Cumberland, MD 21501-0521.)

TEXAS TIMERS NOTICE

Hank Nystrom, producer of those great Texas Timers, issues the following admonition to his customers:

"A potential problem has surfaced with the Max I and Max III timers. The DT release can fail to function if the eyelet/loop/washer used on the timer post is too wide. The eyelet can jam against the start release wire and the DT post will not fall down.

"The solution is simple: use a very narrow connection to the post. Please test your installation to verify this cannot jam, or correct as needed."

If you have any comments or inputs concerning any Texas Timers product or simply want information about this excellent equipment, please contact Hank Nystrom, 3317 Pine Timbers Dr., Johnson City, TN 37604.

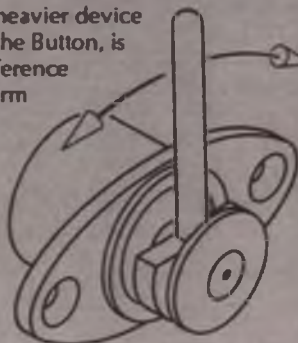
CARBON FIBER TOW

Barry Berman is selling carbon fiber tow in 50-yard lots for \$6 postpaid. If you are like

The Wheels & Wings "Badge" DT Timers

In the Over The Counter column in the July '94 MB, we told you about the "Button" super-light micro dethermalizer being produced by Bob Munson of Wheels & Wings. Now Bob has come out with a follow-up unit, a slightly larger, slightly heavier device for bigger models; he calls it the "Badge," and, like the Button, is offering it in both Lite and Classic versions, the difference being the length of time it takes the rotating timer arm to make one revolution with a given amount of pull exerted by the elastic DT line. Externally the two Badge timers are identical.

Like the Button, the Badge is a rotary viscous fluid timer, the only moving part being the rotor, which incorporates a post for the elastic DT line to loop over. The rotor is fixed to a wire shaft that protrudes into the base; inside is the viscous fluid medium that provides the resistance to rotation. In use, you'd loop the DT line over the post, wind the rotor to a predetermined position, and launch; the pull of the DT line slowly unwinds the rotor until the line slips off the post and the stab pops. Clean, neat, easy and reliable—what more could you ask? You'll need to do some experimenting, obviously, to find out how far to wind the timer's rotor to get the desired DT time on



a given model, but that's no big deal. The Badge Lite takes about 7 minutes to make one revolution with a 1-ounce pull (the minimum recommended DT line tension); the higher-resistance Badge Classic goes about 20 minutes per ounce of pull. A 2-ounce pull cuts the time in half, etc. Either of these timers can be double or triple wound for longer flights.

Size-wise, these timers are the smallest things going—a lot smaller than illustrated here. Overall width of the mounting flange is about 3/4-inch, the "barrel" on the back of the base is 23/64-inch diameter by 1/4-inch long, and with the timer in place on your model, the outside tip of the rotor sticks out 9/32-inch from the fuselage side. Both timers weigh just 1.2 grams each—1/2 gram heavier than the Button timers.

So there you have it, a clever, light, well-designed little unit to keep your cherished models from flying into the next county. Both the Badge Lite and Badge Classic come with instructions and sell for \$13 apiece; shipping and handling runs \$1 per order, and California residents need to add 8 percent sales tax. Order yours from Wheels & Wings, P.O. Box 762, Lafayette, CA 94549-0762, or send Bob Munson an SASE for further details. MB



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me, 50 yards will probably last a lifetime, but if some of your buddies would go together with you, you can have all you need for practically nothing. Barry's address is 1375 N. Broadway, #E-6, Escondido, CA 92026.

SUPERIOR PROPS' Balsa Filler

Ed Wickland has been doing well with his cottage industry, Superior Props. If you haven't seen or used any of his propellers, you are missing something. He has balsa propellers for rubber models of all sizes, from 4 inches to 24 inches in diameter. He also produces Montreal-type prop hubs, drilling jigs, folding mechanisms, etc. It's safe to say that if it has anything to do with rubber model propellers, Superior Props makes and sells it.

Now Ed has come out with something new, a new balsa filler that mixes with water, can be easily sanded or even ironed to a feather edge, and will not crack or shrink. It comes in small plastic resealable plastic bags—three bags for \$3.25. The stuff works great. If you want to try some, send your order to Superior Props, 2412 Tucson Ave., Pensacola, FL 32526. Ed's price list suggests a minimum postage per order of \$3.50.

PROTECT YOUR HEARING

When I first began flying FF in the early 1960s, I never thought of using hearing protection. As engines became more powerful, faster, and noisier, I began to think I should do something to protect myself. It wasn't until I started noticing a ringing in my ears after launching some of the bigger models, that I knew it was past time to act.

Terry Thorkildsen prepared a lengthy report citing the effects that our high-revving engines can have on our hearing. I've excerpted parts of it for the column. I strongly urge you follow Terry's advice.

"For those of us who fly gas models, protecting our hearing should be a major concern. We all know people who have come back from the military and suffer severe hearing loss due to exposure to excessive noise from aircraft, guns, or heavy weapons. Other examples are kids who listen to loud rock music, or people who shoot guns when target practicing. Hearing aids and lip reading are not something to look forward to as we age and our hearing naturally deteriorates.

"Scientists have concluded that excessive exposure to noises above 90 dBA will damage your hearing. Hence, if your profession or hobby subjects you to levels above this for extended periods, you should protect your hearing or you will suffer the consequences. At levels below 80 dBA, you



Most modern think of Hobby Lobby as strictly an RC-oriented company, but they do have some neat free flight stuff; two good examples are these scale models from Czechoslovakia. The Taylor E-2 Cub (left) spans only 13 inches and can be purchased either as a pre-built but uncovered framework or completely built, covered and assembled as pictured here; both versions of the Cub are supplied with a Gasparin G24 CO₂ motor. Several sizes of the great Gasparin motors are also now being stocked. The 26-inch span DeHavilland Beaver (right) is a complete builder's kit designed for CO₂ power; we have one of the companion J-3 Cub kits produced by the same company and must say that it is truly an excellent piece of work. See Hobby Lobby's ad elsewhere in this issue for catalog ordering information.

may be okay, but why take a chance at all when you don't have to?

"Hearing loss can be accumulative or can be a result of a sudden impact if it is loud enough. The louder the noise, the less time it takes to suffer hearing loss. At noise levels above 115 dBA, exposures of less than 15 minutes a day can do damage. I am sure that most of our hot Schnuerle engines are putting out more than 115 dBA when we are standing next to them trying to tune them in. If it hurts your ears to listen to it, you can be assured that it isn't doing your hearing any good.

"For my own hearing protection, I put

in ear plugs when I arrive at the contest, and when I fly anything above 1/2A, I use acoustical earmuffs. This type of ear protection can be bought at gun shops or hardware stores. The soft disposable foam plugs that you can roll up and put in your ears do not provide adequate protection, so if that is all you use I would strongly advise also using the ear muffs for the best protection. If you think that cotton in each ear is enough, then you had better go only to silent meets or stick with indoor flying.

"For those fliers who say they can't hear their engines for the best tuning with the ear protection in place, I say bulpucky on

anything larger than 1/2A! I actually find it much easier to tune the engine since it takes the edge off the noise, so that you can concentrate on what you are doing instead of just wanting to get rid of the model due to the excessive noise it makes."

I recall meeting world F1C champion Lars Olofson at the Springfield, Ohio Nats back in 1977. He was the first flier I ever met who always wore his ear muffs. I called them Mickey Mouse ears. I learned a good lesson from him then, and Terry's article is a good reminder for all of us.

Bob Stalick, 5066 N.W. Picadilly Circle, Albany, OR 97321. MB

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HANNAN'S HANGAR

BY BILL HANNAN

**"Tiny
'toys' can
treat you
to terrific
times."**

Good things can indeed arrive in small packages, as demonstrated graphically this month.

A CASE IN POINT

Ramon Katigbak, whose 4-1/2 inch span glider is shown displayed by his daughter, Mona, explains that it is a reduced-size variation of Robert Warmann's "Pseudo" catapult glider, published in the National Free Flight Society's *Winning Indoor Designs* book. Ramon's glider, about two-thirds smaller than the original, is launched with an ordinary rubber-band. As he puts it: "The problem is keeping the tiny things in sight; flying from my yard I've already lost two. This is not a toy, but a 'serious' model in every respect except size."

ABOUT THOSE GEE BEES

In spite of being work intensive and challenging to fly, Gee Bee models continue to attract builders. Masayuki Suzuki, designer of the Condenser Power kits reviewed in this column a while ago, also builds scale models. His Gee Bee Z was patterned after Bill Turner's full-size reproduction which starred in the movie "The Rocketeer." Truly international, this



Sub-miniature catapult glider, by Ramon Katigbak, of the Philippines, is demonstrated by his daughter Mona. More information in text.

model of a classic American racer is powered by a Czechoslovakian CO₂ system and was constructed in Japan.

Regarding that Gee Bee R-2, Rainer Gaggl, of Austria, began with an American Gene Dubois kit and modified it considerably. The model's cowling and wheel pants were made from foam, covered with paper, then impregnated with CA

glue. The remainder of the model is paper covered, and the paint was applied with an airbrush.

Power is furnished by a "Rainmot 21" CO₂ system, one in a series manufactured and marketed by Gaggl. This Gee Bee was convincingly demonstrated during the international Openscale '95 contest, where it placed 4th, competing against a field of much larger models.

OPENSCALE '95

Speaking of that Czech Republic contest, some 61 entries participated, almost equally distributed between its two categories, Rubber Scale and CO₂/Electric Scale. Represented were Austria, England, France, the Slovak Republic and the USA, as well as the host country.

Static scale judging was conducted in the Brno Santon Hotel, and according to reporter Ivo Ceresnak, who served as a judge, was extremely difficult, because the quality and accuracy of the models were so high that the differences were minimal.

Although Saturday's flying



Nicely detailed 1/16-scale Gasparin CO₂ powered Gee Bee Z was constructed by Masayuki Suzuki, of Japan, and is described in text.



Austrian Rainer Gaggl placed 4th in Openscale '85 with this CO₂ powered Gee Bee R-2, competing against much larger models. Photo by Ivo Corusanak.

at the Medlanky airfield was interrupted by two brief storms, the weather did permit two rounds of competition in each class. In the evening a lavish banquet was arranged for all the competitors and the staff. This turned out to be "very romantic," since electricity was lost during the storms, so the delicious meal was served by candlelight!

The airfield was still wet on Sunday morning, however the wind was perfectly calm, with blue sky and white clouds. The well-publicized event attracted about 500 spectators, as well as merchants with model aircraft kits and accessories.

Some competitors attained perfect flights, including Radek Jedlicka, whose Cihak Rapid achieved a duration of 3 minutes, 24 seconds! In common with most scale contests, a wonderful variety of models were flown, as shown by this brief sampling: Porterfield, several Piper Cubs, two Fokker D.VIIs (one entered by American Charles Hill), Waterman racer, Brandenburg, Demoiselle, Hurricane, Ambrosini, Bede, Pilatus, Bücker, Corsair and even a Tsunami racer. Results were as follows:

Rubber Power, Open

1. Pavel Stranik, Czech Republic: Bellanca.

2. Lubomir Koutny, Czech Republic: MiG-DIS.

3. Petr Koutny, Czech Republic: Ki-61 Tony.

Rubber Power, Junior

1. Tomas Kunert, Czech Republic: Oscar.

2. Jiri Heintl, Czech Republic: Robertson.

3. Martin Vidensky, Czech Republic: Itoh.

CO₂/Electric, Open:

1. Jan Kubica, Czech Republic: Curtiss P-1.

2. Vladimir Vanek, Czech Republic: MS-35.

3. Rainer Gaggl, Austria: Sablatnig. (Rainer also placed 4th with his R-2 Gee Bee.)

CO₂/Electric, Junior:

1. Martin Jansa, Czech Republic: Spitfire.

2. Ondrej Stofa, Czech Republic: Jodel.

3. Marek Stofa, Czech Republic: Magister.

The competitors and visitors thoroughly enjoyed the meet, the friendly ambiance and the beautiful South Moravian

countryside. Planning has already started for Openscale '96.

INTER-GNATS

Meanwhile, the Pistachio promoters of Florida's MIAMA club were conducting their 12th Annual INTER-GNATS contest for really tiny flying scale models, which attracted some two dozen entries in the Pistachio class and five in the "Model of a Model" classification. Although the majority of the entries were from Florida, proxy entries were sent by

George Benson (California), Ron Hummel (Nevada), and Enrique Maltz (Israel).

Winners among the Pistachios were: 1. Dr. John Martin, Goldwing ultralight (Best time:

minute 4.5 seconds); 2. Dave Linstrum, Pacific Ace; 3. George Nunez Sr., Streamliner.

COMMERCIAL CORNER

Hobby Supply South's Denny Atkins and Ray Abadie, who bill themselves as "The Airplane People," recently released a new catalog. Unusually diverse, the 40-page publication showcases products from the Czech Republic, England, New Zealand and the U.S. Included are kits, powerplants, tools, books, building and finishing supplies, accessories and much more. Exceptionally well organized, the catalog has a comprehensive index and even some handy hints and interesting trivia. Four dollars will bring your copy from Hobby Supply South, 5060 Glade Rd., Acworth, GA 30101.

PLANS

Very reasonably priced



This impressive P-51D Mustang is a new rubber-powered "Styro-kill" introduced during Openscale '85 by its Czechoslovakian manufacturer, M. Poduska. Ivo Corusanak photo.

- 1 minute 38.9 seconds); 2. Jurgen Kortenbach, Heinkel 100; 3. Ron Hummel, Fike E.

Model of a Model: 1. Don Brimmer, Pussy Cat (reduced from Dick Baxter's *Model Builder* plan), (Best time: 1

model construction plans from the 1930s and 1940s are available from Charles F. Schultz, 910 Broadfields Dr., Louisville, KY 40207-4342. Although most are for rubber-powered scale models, others are of

HANNAN'S HANGAR



Jim Sugimoto's magnificently crafted Peanut Scale Grumman Ag-Cat, puts in flights averaging about 47 seconds. Photo via Chester Mack.

sport types, including a few gas jobs. Also offered are a series of detailed scale documentation drawings. For a copy of the complete list, send \$1 and a business-size SASE to Mr. Schultz.

MODEL ENGINE COMPANY HISTORY

Entitled *They Should Have Kept the Bear*, in reference to a logo employed by the firm, this rather unusual account, by Ted Brebeck, gives a rare insider's look at the Herkimer Tool & Model Company, OK Engine company, the people and their products. Engine collectors will appreciate the specifications of OK engines, production dates and the various descriptions.

Three full-color photo prints show 31 of the engines, including the twins, Cubs,

Bantam, diesels and CO₂ types. This book is available at \$11.95 postpaid, from OK Engines, Box 255, Mohawk, NY 13407. Note: Although OK engines are no longer produced, some engines, parts and posters are still available—a complete catalog is \$2.

RESOURCE LIST

While we're on the subject, it might be well to mention that Jim Alaback's Old Time Modeling Resource list is well worth having, since it gives names and addresses for firms dealing in plans, kits, engines, repairs, publications, and accessories. Jim conducts the "Old Timer Topics" column in *Flying Models* magazine, and really keeps up with vintage model activities. To get your copy, send \$1 to Jim Alaback, 12366 Nacido Dr.,

San Diego, CA 92128.

SIGN-OFF

Gerald Myers, of Redway, California, offers these thoughts for older beginning modelers:

"There is something fundamentally flawed about the idea of taking up something 'late in life.' If you can have fun doing something, it definitely isn't too late to do it. There are some real advantages too... starting with the attitude that you are only going to do it for fun, strips away all the macho competitive stuff, and allows one to relax and enjoy the process of learning. I'm a winner every time I fly and enjoy it. It also provides motivation. I took up Alpine skiing a little late—I was 49. After six years I got reasonably competent, but chucked it this year and switched over to a snowboard—why should kids have all the fun? My wife, Maril, enjoys skiing so much she started an aerobics class three times a week six years ago, and is still at it, staying very fit for ski season.

"It's not just physical stuff either, of course. For years I've wanted to build a model boat, and our trip to Sweden last year really got me motivated, after visiting a maritime museum there. Sitting on the file cabinet behind me is an almost completed Grand Banks Dory, which is turning out very nice indeed—the building process has been most enjoyable—really taking my time and getting it right.

"Jassman Thelonious Monk said it best: 'Cats that don't take chances ain't worth nothin'. Sometimes I play a song I've never heard.'" Need we say more? *MB*



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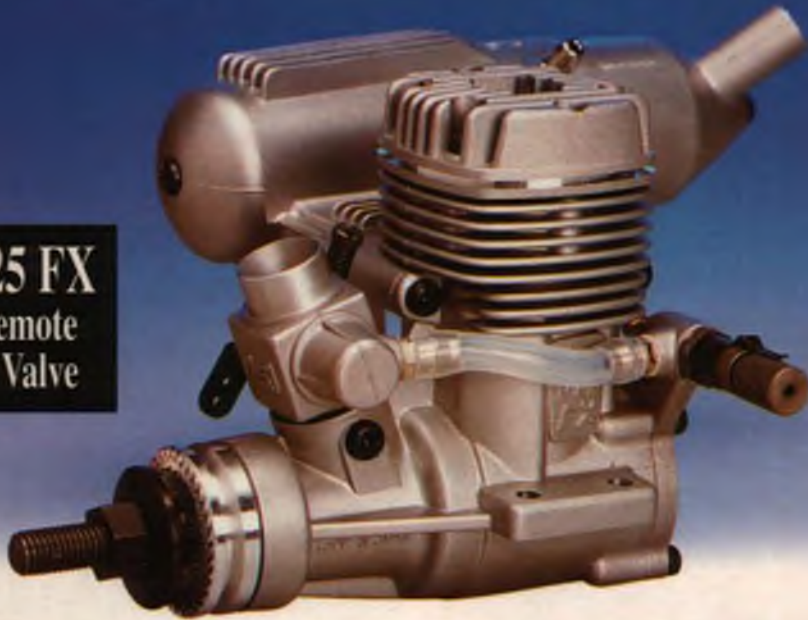
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Surface Treatment	A	F	F	F	F	F	F
Delamination Strength	A	D	D	C+	D	C+	D
Slots or Holes	A	A	A	A	A	D	D
Glue Action: Wicking	A	A	B	F	F	F	F
Delayed Cure	A	C	C	F	F	F	F
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PRODUCTS IN USE

■ By Bruce Edwards

REID'S "8-BALL SPECIAL"

Our Big Birds columnist is very impressed with both the kit quality and the flight performance of this large, highly aerobatic sport monoplane from Reid's Quality Model Products.



THE 8-BALL SPECIAL

WINGSPAN	85 in. (91 in. with homemade tips added).
WING AREA	1,360 sq. in.
FLYING WEIGHT	17 lbs. 8 oz. (18 lbs. 11 oz. as tested).
WING LOADING	29 oz./sq. ft. (31.6 oz. as tested).
OVERALL LENGTH	63 in.
ENGINE	G-38/Q42-52.
RADIO	Four channels required.
CONSTRUCTION	Balsa, plywood, foam wing cores.

Produced by Reid's Quality Model Products,
16 Main St., Phelps, NY 14532; (315) 548-3779.

The 8-Ball is designed with a two-piece cowl that is easily removed and installed without having to remove the prop. The airplane is really designed for G-38 or Q42/52 gas engines, but Bruce found his big Saito 300 twin likewise does a fine job of hauling the ship around with authority. Note that he's got the fuel system plumbed for muffler pressure using a Fourmost check valve on each line.



■ **RIGHT:** Underside view of the tail showing the heavy-duty control linkage hookup, tail brace wires and the Sullivan steerable tail wheel assembly. ■ **BELOW RIGHT:** Bruce used a powerful Hitec 615MG metal gear ball bearing servo for each aileron, mounted exposed on the bottom of each wing panel. Angling the servo output arm like this with the ailerons at neutral provides the desired differential movement (i.e. more up than down). Lots of aileron throw here!



Dave Reid called in the spring of 1993 to ask if I would do a review on his latest Big Bird sportplane, called the "8-Ball Special." It has taken me quite a while to get started on it, having committed to other projects that I had to finish up first, but I'm now happy to report the 8-Ball Special is complete and has proven to be a fast building, fine flying plane.

CONSTRUCTION

I was very much impressed with the quality of the wood in the 8-Ball kit. The fuselage sides were an excellent grade of lite-ply, and all of the plywood formers were cut square and true with no warping. The wing spars were nice and straight, as was the rest of the stock wood supplied.

The 8-Ball's fuselage is basically a plywood box that tapers aft of the wing to the rudder post. The only problem I encountered with the building sequence was when the instructions specified pulling the fuselage sides together before all of the forward formers, wing saddle and bottom sheeting in the forward fuselage were installed, causing the fuselage sides to bow outward. I called Dave Reid to discuss this; he said he had already upgraded the instructions. He sent me a revised (current) copy of the building instructions and I could see that later purchasers of the kit will not encounter any problems here.

Prior to sheeting the top of the fuselage I installed the servo rails by carefully cutting mount holes in the sides of the fuselage, then gluing the rails in place. Gussets were installed around the rails on the inside of the fuselage to give them additional strength. I also installed supports for the large size Sullivan Gold-n-Rods, which I

used for the elevator and rudder. I like the large Gold-n-Rods for Big Birds because they give a nice lightweight system with very little free play. Large Du-Bro ball sockets were later installed on the each end of the rods, and large Du-Bro control horns were used on the rudder and elevator.

After sheeting the top of the fuselage I moved forward to the firewall. To support my Saito 300 twin four-stroke, I decided to use Aerotrend soft engine mounts, which are made in Australia and sold in the U.S. by Cirrus Ventures/Scale Aviation USA. These mounts are very well made and use bolts that go all the way through the firewall but ride in two-piece urethane rubber shock mounts. The throttle servo pushrod is one of Sullivan's new Carbon Fiber Precision Rods, #585. The carbon fiber rod runs inside a gray outer sheathing and is not sensitive to temperature changes. I added

about a 1-1/2 inch piece of flexible cable to each end of the throttle pushrod because the throttle lever and the servo wheel move in an arc rather than a straight linear motion.

I installed a Du-Bro 24-ounce fuel tank, mounted on a plywood plate which might be too low if you're not using a pressurized fuel system. I'm using muffler pressure to give the Saito a positive fuel supply.

The foam wing cores are accurately cut with a semi-symmetrical airfoil, with pre-cut grooves for the 1/4-inch square top and bottom hardwood spars. A 1/4-inch plywood spar joiner fits between the spars in the center. The cores required just a little sanding to clean them up prior to sheeting.

The 8-Ball Special's foam wing is not entirely sheeted; 4 inches of the leading and trailing edges are sheeted with 3/32-inch

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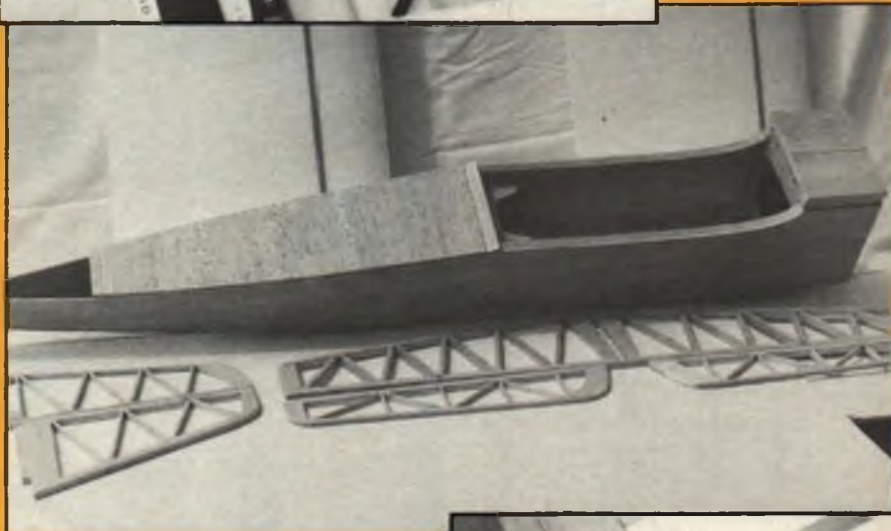
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■ LEFT: The airborne system all loomed in and ready for the final large foam rubber pieces to keep it safely in place. Bruce finds the Sullivan large Gold-n-Rods and De-Bro ball sockets provide a smooth control system. No two servos alike in this fuselage!

■ BELOW: Framed-up fuselage and tail parts—just a basic box and built-up flat empennage, about as simple as you can get.



■ RIGHT: Barely visible here is the Granite State RC Products' iron-on gapless hinge that Bruce used for his 8-Ball's ailerons—see his comments in text.

balsa with 1/2-inch wide capstrip "ribs" in between, spaced every 5 inches. I installed twice as many capstrips so that my covering iron would fit across them and make the covering process easier. The extra ribs also look nice.

I used Ohio Superstar Products' "Fastape" wing skinning tape to attach the balsa sheeting to the foam cores. It's easy and fast and not at all messy like epoxy or contact cement. The cores must be lightly sanded and very clean (preferably vacuumed) prior to applying the tape, and a good deal of pressure is required to ensure a positive bond. Several local Big Bird builders were somewhat skeptical of the tape's holding ability, especially under warm weather conditions. I think I pretty well laid that myth to rest because it was over 95 degrees on test flight day and I experienced no difficulties. I certainly plan to use Fastape on future foam wing projects.

The barn door ailerons are cut loose and the hinge line faced with 1/4-inch balsa after the wing is sheeted. The kit does not come with wingtips, so I made my own. I think it gives the plane more character.

Dave Reid encourages the use of Granite State RC Products iron-on gapless hinges



for the ailerons, so I thought I'd give them a try. Following the instructions, it took me about 15 minutes to do each aileron, and when the job was done I had the tightest fitting, smoothest, most effective operating ailerons I've ever installed on a plane. If you haven't tried it, you'd do well to give the Granite State gapless hinge material a try.

Dave advised me to install a 5-inch long 1/16 plywood doubler just behind the leading edge to give extra strength for the wing dowels, and I did so. Subsequent kits will have this feature.

The tail surfaces are easily and quickly built from 3/8-inch balsa. I used Ohio Super Star All-Threads on the hard points of the horizontal stabilizer and vertical fin for the bracing wires.

continued on page 85

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PRODUCTS IN USE

■ By John Lupperger

THE 1/2A THERMAL HAWK FROM COX PRODUCTS

Don't dismiss this two-channel .049-powered sailplane just because it's made of foam and plastic. The Thermal Hawk is a true thermal duration RC model capable of some excellent soaring performance.

If the Thermal Hawk looks familiar, it's because it's actually an adaptation of existing parts from previously released Cox kits, an approach that Cox has used to good advantage with their Spyder (reviewed in *Model Builder*, January 1994) and several other models. Besides being a fun sport model, the Hawk is well suited for the AMA's RC Duration event No. 702, which limits wingspan, weight, engine size and fuel allotment. The idea here is to get as long an engine run as possible on the allotted fuel, then to finish out your time for a "max" flight by finding and riding thermals.

ASSEMBLY

The wing panels and vertical and horizontal stabs are made from injection-molded foam—light, but surprisingly strong. The blow-molded polyethylene fuselage is light and extremely rugged. The hardware supplied is of the highest quality, and nothing else needs to be purchased except the radio and engine.

The Thermal Hawk is very simple to assemble and should require somewhere between six and ten hours to make ready to fly. The assembly manual is six pages long, consisting of isometric drawings and callout-style instructions. These are relatively easy to follow and should not cause any problems, even for a fairly new RC pilot. At times the assembly sequence seems a bit disjointed—the manual has you first working on the fuselage, then the stabs, then the wings, then back to the stab, etc. In the end, however, everything goes together, and it all makes sense.

As glue won't stick to the polyethylene fuselage, it is necessary to mount other parts to it with screws or rubber bands. The



firewall is mounted to the front of the fuselage with four #2 machine screws. The firewall has a flange that just fits in the opening in the front of the fuselage; the four screws go through the fuselage sides and into the flange.

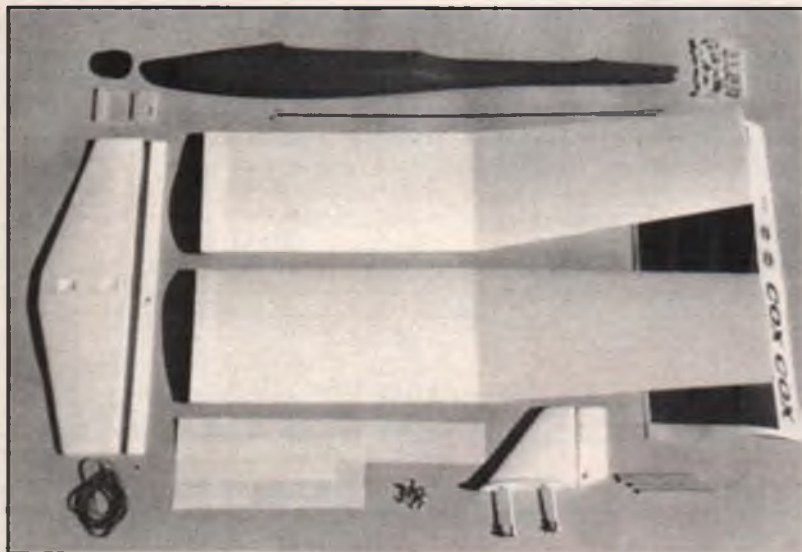
The molded foam elevator and horizontal stab require a light sanding to round the leading edges before the control surfaces are tape-hinged in place. The hinging material is supplied, and is even pre-cut to the proper length. The vertical stab has two round plastic posts protruding from its bottom, which are used to mount it and the horizontal stab to the fuselage. Be careful

not to overtighten the stab fasteners on the bottom of the fuselage, as the plastic posts could be pulled out of the vertical stab. When the fasteners are cinched down the entire tail assembly is secured to the fuselage.

The two wing panels are butted together at the root (without glue) on 3/16-inch hardwood dowels, then the center section is permanently joined with a strong, clear tape provided in the kit. This is where I ran into the same problem I had with the Spyder kit I reviewed last year: the dowel holes drilled in the roots of both panels were off by about 3/16 of an inch. The fix

THE COX THERMAL HAWK

WINGSPAN 53.7 in.
WING AREA 358 sq. in.
WEIGHT RTF 20 oz.
 (22 oz. as tested).
WING LOADING 8.0 oz./sq. ft.
 (8.8 oz. as tested).
AIRFOIL Eppler 214.
ENGINE Cox .049 Texaco.
RADIO REQUIRED Two channels
 (elevator/rudder).
SUGGESTED RETAIL \$71.00.
 Produced and distributed by Cox Products,
 Inc., 350 W. Rincon St., Corona, CA 91720-
 2004; (800) 451-0339.



■ ABOVE: The kit parts laid out. Low parts count means short building time. ■ ABOVE RIGHT: Both pushrod wires exit the top of the fuselage and go up and over the horizontal stab. ■ RIGHT: The engine is bolted to a special plastic mount which is screwed to the fuselage. Cox's .049 Texaco engine is designed for long motor runs (maybe TOO long—see author's comments in text) and the ability to turn a fairly large prop without overheating. ■ BELOW RIGHT: Two Futaba S3002 servos fill the fuselage, the receiver and airborne battery are located in front of the servos.



was to elongate the holes in one panel so that the leading and trailing edges could be aligned, then join the wings with 5-minute epoxy and tape them together as per the instructions. Clear pieces of stiff, self-adhesive clear plastic are then applied to the leading and trailing edges to protect the wing from the hold-down rubber bands. The instructions recommend that the wings be balanced laterally, however mine were fine right out of the box.

A servo tray is provided that fits Cox's mini servos perfectly, however, I didn't have any Cox servos handy. The instructions recommend cutting the tray and repositioning it when you screw it into the fuselage to fit other servos. The only servos I owned that would fit the tray without modification were metal-gear, ball bearing Futaba

S-3002s, which I went ahead and used even though they are way overkill for such a simple model. The airborne battery and receiver are wrapped in foam and inserted through the radio cutout in the fuselage prior to mounting the servo tray with screws through the sides of the fuselage.

The wire pushrods are threaded at the tail end for a clevis, and have a Z-bend at the servo end. Precise directions are given for completing the bends necessary to allow them to exit the fuselage and attach to the control surfaces.

FINISH

Most Cox models do not require finishing, nor is it usually recommended. The Thermal Hawk is an exception, however. Since the model can reach extreme altitude



at the end of an engine run and while thermaling, it is recommended that the bottom of the wing be painted or covered in a dark color. This is listed as a step in the instructions, which I have to admit I didn't notice (due to the fact that there are no illustrations with this step, as there are with all other steps). My model is the natural white of the foam, and it becomes very difficult to see at altitude. (I plan to add dark trim to the bottom surface for visibility.)

I used the supplied Mylar graphics in the kit for decoration, but found that the pattern leaves you with some very fine points that always end up peeling up. I will probably remove them and use some simpler design. The plastic fuselage does not require any finishing. Mine came in a bright turquoise color, but I understand that later kits now are supplied with fuselages molded in a darker royal blue.

ENGINE BREAK-IN

I used a Cox .049 Texaco engine for power. Break-in was accomplished with Cox Super Power Fuel and a 6x3 Cox nylon propeller. After running a few tanks of fuel through the engine at a fairly rich setting I switched to the recommended 7x3.5 Cox gray prop for flying.

FLIGHT PERFORMANCE

The first day of decent weather (after several weekends of rain in Southern California) was immediately after a morning

rainstorm. The air was clear and beautiful, although a bit on the windy side with gusts up to 15 mph and more. Not ideal, but I just couldn't wait any longer.

My first surprise was the Thermal Hawk's climb rate. I had expected that the low-compression Texaco engine with the relatively large 7x3.5 prop would be very fuel efficient, but at the expense of power. Boy, was I wrong! At a flying weight of only 22 ounces, this power combo moved the Thermal Hawk out at a good pace. The Texaco engine ran close to four minutes, taking the Thermal Hawk to the limits of visibility. With a plane this small I'm not too sure of the altitude, but I would guess that even with an effort to keep it level, it probably made 700 feet or better. Then, to top it all off, I ran smack-dab into the center off a "hat-sucker" thermal! At this point I wished I'd seen that section of the instructions that called for a dark surface on the bottom of the wing. That first flight lasted almost half an hour, and it could have been longer if my neck hadn't started to get sore.

After relaxing for a while, I put in half a tank of fuel and launched again. Even with the reduced fuel capacity, the Thermal Hawk still reached decent thermaling altitude. It was surprising how well the undercambered airfoil penetrated in the fairly windy conditions. Once again I ran smack-dab into the center of another good thermal and was shortly at the limits of vi-

sion. This flight lasted well over 20 minutes. Several more flights were made, none shorter than 10 minutes. I don't think anyone would have too much trouble "maxing" with the Thermal Hawk. With a little practice, 15+ minute flights could easily become the norm. (Editor's note: Since this article was written, Cox has come out with its "Texaco Jr. .049," a small-tank version of the engine the author used. The Jr. would be the way to go for those who want to limit their flight times and/or keep the model within a closer range of vision.)

As a sport model the Thermal Hawk would be very good for the newer RC pilot. It is very forgiving and has no bad tendencies. Stalls are straight ahead with no tendency to drop a wing, and very tight, nose-up thermal turns can be made without tip stalling. The Thermal Hawk slows nicely during final approach and can be flared for a nose-high soft arrival every time.

CONCLUSION

The Thermal Hawk builds quickly, is easy to fly, and is a whole bunch of fun. The kit and engine are relatively inexpensive, and it only requires two channels of radio gear. The Hawk is easy and simple enough for the novice, but with enough performance potential to excite the experienced pilot. Whether you plan to fly competition or just want a great flying sport model, you couldn't do much better than the Cox Thermal Hawk. **MB**



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THE “LIBELULAE” MINI-STICK

The name is Latin for “Dragonfly,” and what it is, is a prime example of the smallest indoor competition duration models, a tiny 7-inch span flier capable of flights of 10 minutes or more. Interest in these minuscule models is so high that Mini-Stick will become an official AMA event in 1996.

■ By Phil Alvarez



■ LEFT: What looks like microfilm covering is actually a super-lightweight type of Mylar called Polymicro; text tells where to get it. Rules limit Mini-Sticks to wood props and plastic/paper coverings only. ■ ABOVE: Another version of the Libelulae. This view emphasizes the long tail moment and 7-inch span stab (same as the wing). Maximum allowable stab area is 50 percent of the wing area. The smooth covering is Polymicro that has been crinkled and then ironed smooth; the author says it's easier to handle and is stiffer.

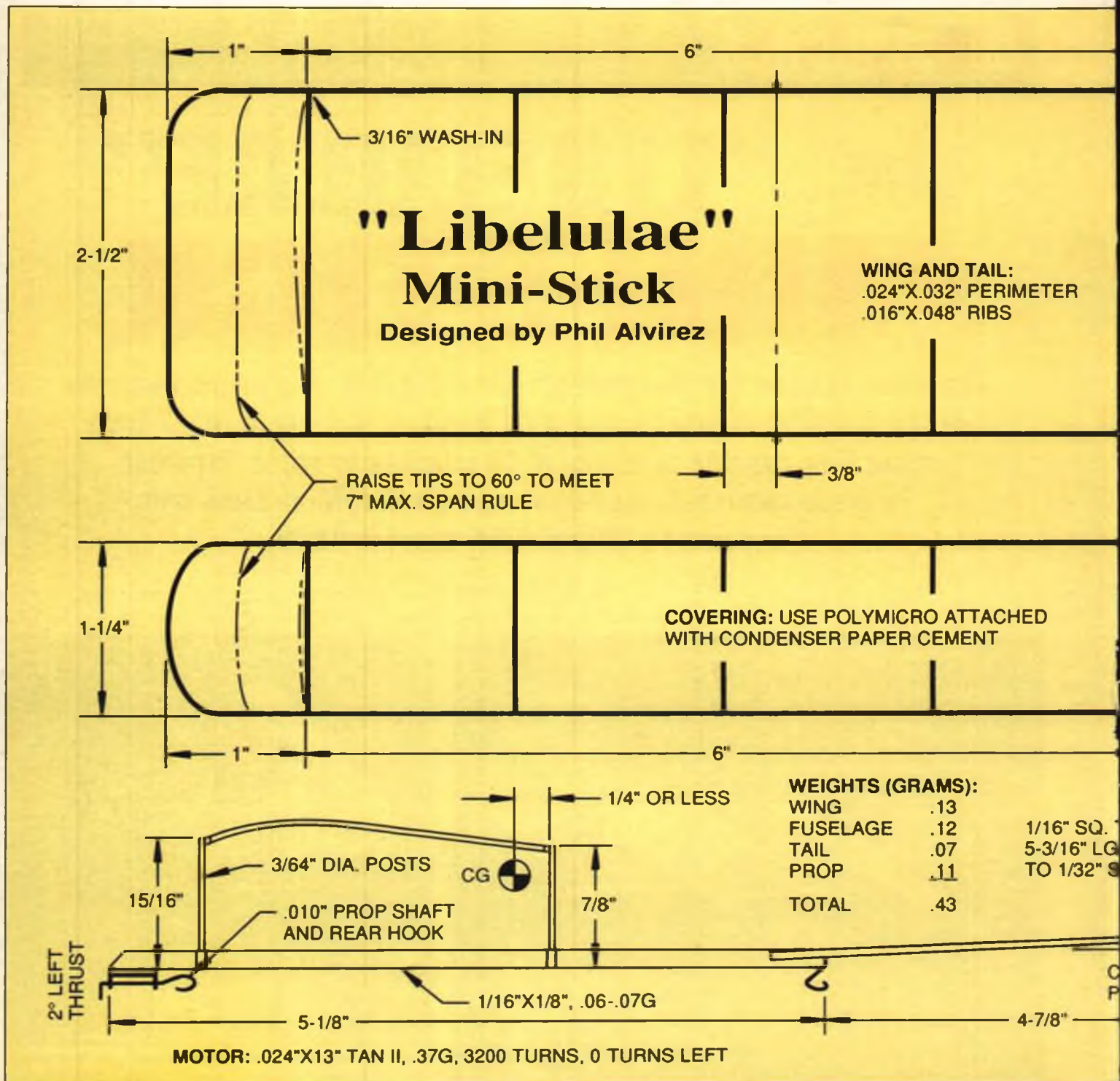
Mini-Sticks, those diminutive flying machines, the most versatile of all, are extraordinary performers that can put in flights of over 10 minutes. If in doubt, pay a visit to any of the local indoor clubs, or go to Johnson City and see all. Ah, that wonderful feeling . . .

Being at Johnson City is an experience like no other. Gentry Field (the official name of the gigantic indoor football field with a

ceiling of 117 feet) is indeed our field of dreams, where you meet all the living legends of indoor modeling—Tom Vallee, creator of the Mini-Stick class; Andy Tagliafico, Larry Coslick, Bernard Hunt, Jack McGillivray, Walt Van Gorder, Jim Clem, Richard Miller, Dan O'Grady, etc. What you see, what you learn, all the personalities you meet, the planes you watch flying, flying your own planes and being one of

the flock, walking through that immense space with all the tables with models and tools that you leave freely, brings you back to those years of the Nats hosted by the Navy, back in the '50s and '60s.

The 1995 United States Indoor Championships—the 14th—were run by the St. Louis gang as smoothly and efficiently as anyone could dream. Records were broken, we went through six huge tanks of



helium retrieving planes from the girders, and had the time of our lives!

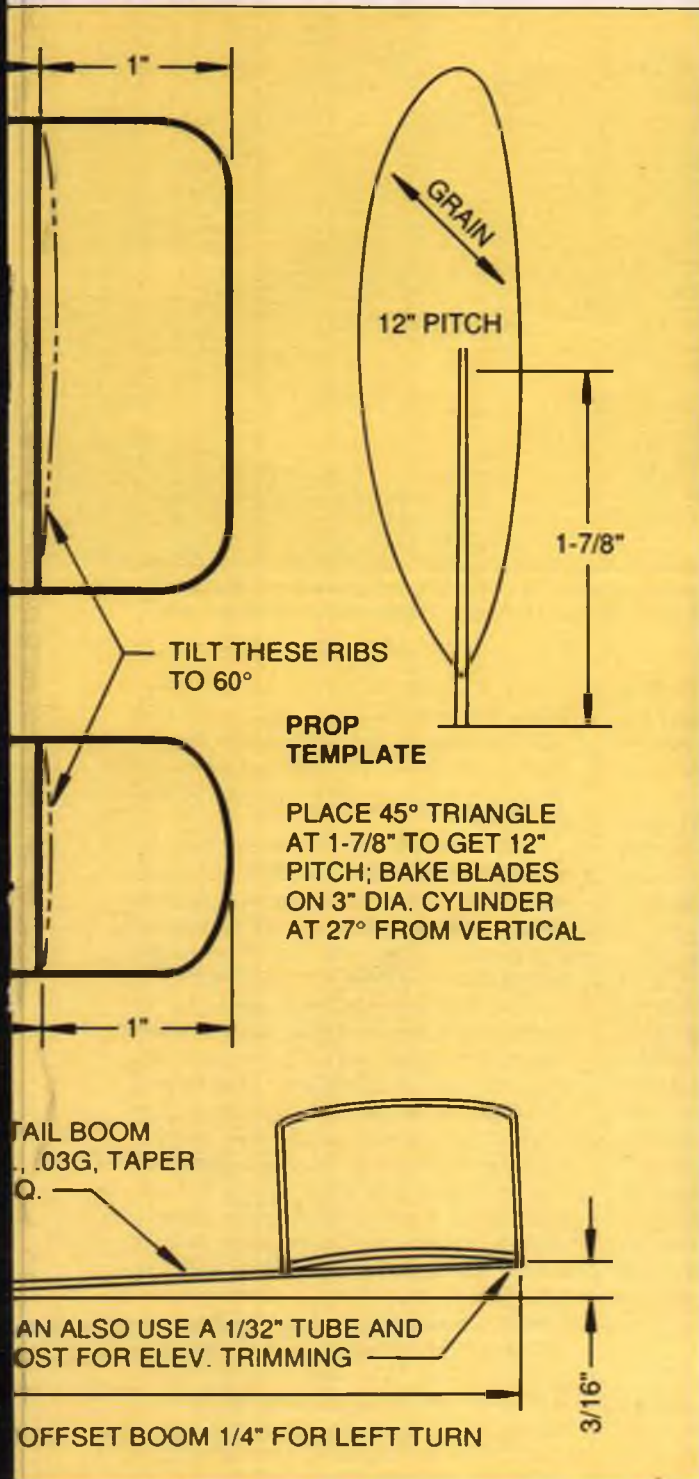
I flew at Johnson City for the first time last year, and had a hard time trying to find the right combination of rubber. First, my planes didn't climb high enough, then in three consecutive flights I hung up three of my Minis. This year, things began to work. With the Mini-Stick presented here I got my best time so far (11:16) and took 2nd place in the mass launch. It handles torque well and is relatively easy to build. The key factor is the prop, coupled to the right combination of motor—width, length, weight

and number of turns. The pitch is very low, and this lets you use a thinner motor that allows for more turns to stay kicking longer.

Mini-Sticks are as good in the largest place as in the smallest. You can build them for fun, without any worry about super performance, or aim for the best times, for which it is necessary to get some equipment, such as a scale, a pitch gauge and a torquemeter. You can buy these items or build them yourself. The scale appeared for the first time back in 1937 and another later version was published in 1960; the pitch gauge and the torquemeter were pre-

sented in club newsletters. I'll be glad to send you copies of all three, if you send me \$2 to cover the cost of copying and postage. My address is 1350 Arncliffe Pl., Windsor, Ontario, Canada N8S 4K3.

To achieve competitive performance, the first thing you have to do is build to weight. This means weighing *everything*, and keeping records of each and every one. Weigh the components of the wing (ribs, spars) and record them on the sheet for that specific plane. Keep track from which sheet and from which side and edge of that sheet the pieces came from. You'd be surprised



at how much the density changes in the same sheet of balsa! Weigh the wing before and after covering. Let the adhesive dry for several days before you get the final figures. This is the only way to learn what weight to start with on your next plane's parts in order to end at the desired figures.

The pitch gauge makes prop building much simpler, and you can check its angles at several stations later (props develop warps with humidity changes). The torque meter allows you to get the most out of the rubber without breaking it, and is a

great help to let you release the motor after winding.

CONSTRUCTION
Make the motor stick from light B or B-C grain, about .06g; it helps take care of the torque as it flexes downwards, reducing the tendency to increase the angle of attack and stall. It also increases the wash-in on the left wing, avoiding a spin. The tail boom's weight before sanding from 1/16 square is .04g; .03g finished after tapering at the rear. Don't try to save weight in the boom; you need to keep the tail rigid.

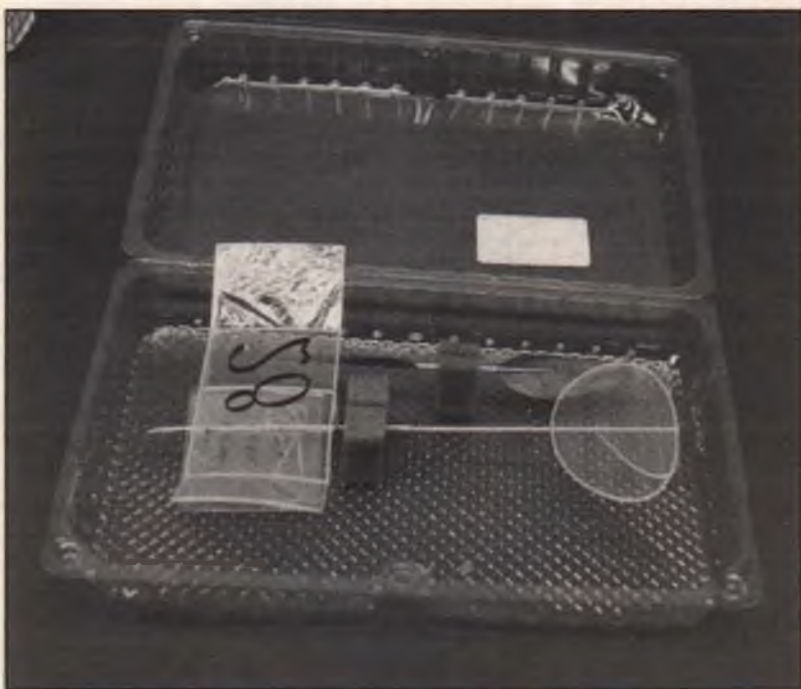
Cut the 1/32 spacer for the thrust bearer and glue it in place with Ambroid. Glue the thrust bearer in place with 2 degrees left thrust. Bend the rear hook from .010 guitar string and glue in place with

Ambroid; when dry, glue the wedge in place. Glue the tail boom at the specified angle.

Make the wing post tubes from tissue paper rolled on a piece of wire the same diameter; rub the wire with oil to prevent the glue from sticking. Roll the paper with white glue and remove it from the wire before the glue dries.

Strip the wing and stab spars from C-grain to the weight specified, sand a piece of 1/32 C down to .024 for the ribs, make the rib template from 1/64 plywood and cut the ribs about 1/8-inch longer.

Hold the spars in place with small pieces of cardboard pinned around the edge. Remember to keep the outline dimensions (wing and stab chord, span, motor stick and boom) 1/32-inch smaller than the sizes shown to clear the maximum legal dimen-



■ TOP: Some of the author's Mini-Sticks and propellers; he's built over 100 props! Lots and lots of hours invested here! ■ ABOVE: Mini-Sticks are so small that they can be transported and stored in a clear plastic food container—check with your local bakery.

WARBIRDS ONLY

Warbirds Over Delaware features fighters and bombers of all shapes and sizes, both static and in flight. See twin-engine transports and bombers, Nick Zirolli's new P-61 Black Widow night fighter, Spitfires, Mustangs and more. Pilot and builder interviews show and tell components used. If you like the throaty sound of large horsepower engines, high-speed passes and simulated dogfights, you'll love Warbirds Over Delaware!



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The biggest names in fan jets star in this hot-hot-hot video! See Bob Violet rip up the skies with his prototype F-4 Phantom, powered by twin 91 engines. Knockout scale paint job! G.L. Hamilton's P-80 Shooting Star, second at '94



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The so-called Mini-Dome at Johnson City, Tennessee—an indoor flier's dream come true. It was here, at the U.S. Indoor Championships earlier this year, that the author recorded an amazing 11:16 flight with the Libelulae described in the article.

sions. Trim the ribs to size and glue them in place using a small brush to apply the cement (Indoor Model Supply or Micro-X) and tilt the dihedral ribs 60 degrees outwards to match the tips.

Build the tips/rudders from A-grain, soaking the pieces overnight and carefully bending around a template, holding them down and baking them at 250 degrees F and letting them cool down before removing.

COVERING

Preferably use Polymicro, which is the very lightest, available from Wayne Trivin, 7408 W. Hanna Ave., Tampa, FL 33615. Use thinned condenser paper cement to stick it to the structure. Apply the cement and let it dry, then place the covering loosely in place and activate the cement with acetone, gently rubbing the edges until it sticks. Trim the edges with a new single-edge blade or scalpel. Check for recommended wash-in. If necessary, soften joints with acetone and twist the structure until you get it.

PROPELLER

If you're building to minimum weight, get a piece of 1/32x3x36 C-grain that weighs 4 grams. Make a blade template from 1/64 plywood and cut two blades with the grain at 45 degrees as shown. Sand them down with a sanding block with 220-grit sandpaper, 20 gentle strokes at a time, and check for thickness. Repeat until the blade starts to flex. Now change to a 400-grit block and continue until the blade is flexible—but not too flexible. By now it should weigh about .04g. Repeat with the other blade.

Note that you are sanding to reach a certain flexibility, not a certain thickness, because what you need is a blade that flexes to take the shape of the cylinder when baking it, but is not too flexible and bends too much when turning under

power. If you're not sure of the ideal flexibility, make three pairs, one on the stiff side, another on the flexible side, and a third in between, and flight test them and see which one works best, then you'll have the feeling.

Soak the blades for 15 minutes, remove the excess water with a napkin and place on the cylinder between layers of paper at the angle shown. Bake for 30 minutes at 212 degrees F. Let it cool down overnight before removing from the cylinder.

Cut, drill and sand the prop spar to shape. Bend, trim and glue the prop shaft square to the spar and let it dry overnight. Place the spar/shaft in place on the jig and accurately trace the spar location on the blades. Using a very small brush, apply a thin line of cement to the spar and then to the blade and join them before it dries, placing the blade at 45 degrees. Place a small piece of cotton on the blade to hold it over the jig until dry. Repeat with the other blade. Both blades *must* have the same pitch and also the same height at the tip, otherwise the prop will vibrate and perform poorly. When dry, insert the Teflon washer or glass bead and bend the hook to shape.

Glue the tail in place, mount the prop, place the wing over the fuselage and try to find the balance, sliding the wing until you find it. Mark the wing position, mount the wing tubes on the posts and glue the posts in place on the motor stick. When all is dry, test-glide the plane with the prop mounted but without motor. It should glide down gently. If not, adjust the wing incidence.

Make a .024 motor about 10 inches long, wind about 500 turns and release the plane. It should fly in a circle 8 to 10 feet in diameter, perfect for any room in your house or any indoor site in the world. How about that! Is there any other type of plane that can do that? MB

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Flash

Sundays Will Never Be the Same!



PRODUCTS IN USE

■ By Al Wheeler

TOP FLITE'S GOLD EDITION P-40E WARHAWK

Mr. EEE-Z-FLI takes a break from scratch building and turns out an exceptionally nice rendition of the latest in Top Flite's series of Gold Edition 1/7-scale WWII fighter kits.

T As a frequent contributor to *Model Builder* in the form of plans and construction articles for my ongoing series of EEE-Z-FLI designs, I was both surprised and delighted when they asked if I'd be interested in building Top Flite's new Gold Edition P-40E Warhawk kit for a product review. I'd examined both the Gold Edition F4U Corsair and P-51 Mustang kits and found them to be very well engineered and packaged, and expected the same for the P-40. I wasn't disappointed!

I found the die-cutting of both the balsa and plywood parts to be excellent. The wood quality was top-notch, with the hardness and grain well matched to the function of the component. Hardwood parts were grouped in individual packages and the router cutting and sanding on the landing gear support blocks and similar pieces was good. The numerous vacuum-formed plastic details were of good quality and go far to dress up the model for the builder who is interested in scale detail.

The clear plastic canopy is outstanding in both detail and fit. A complete decal set is provided for those who choose to finish their aircraft in the Flying Tigers motif. The hardware package is quite complete and of good quality. In all, Top Flite provides an excellent kit of materials, supported by two sheets of computer-generated plans and a 55-page construction manual amply illustrated with over 200 photos and diagrams.

Study the plans and the manual in depth prior to starting construction; this will preclude "painting yourself into a corner" by installing a component or assembly out of sequence. Top Flite's P-40 is a fairly complex building project, and knowing each step ahead of time will do much to keep ol' man Murphy in the background!



CONSTRUCTION

The tail surfaces, the recommended starting point, are of conventional skinned frame construction. The elevators, rudder and ailerons on the full-scale P-40 were fabric covered, so to duplicate the fabric effect the model's surfaces are constructed of ribs on each side of a sheet center with a spar at the front. Sanding the ribs to shape is a bit of work but the results are well worth the effort.

Wing construction is typical rib-and-spar, sheeted top and bottom with 1/16 balsa. Tabs are provided on the ribs to assure they build flat with the required amount of washout. The fit of all components, including the landing gear support boxes, is good and all die-cutting is top quality. The instructions are well illustrated and in most cases follow a logical sequence. Just be sure to install the aileron linkages from the bellcrank back *before* skinning the bottom of the wing, as getting

the Z-bend pushrods into the bellcrank requires considerable working space.

The fuselage is where the computer-designed slot-and-tab system is at its best, providing foolproof alignment and resulting in a straight airplane—no bananas here! Exercise care in the alignment of the forward bulkheads to the crutch and chin plate; these and the firewall positioning determine the thrust angle. Building the upper cowl requires a bit of concentration to get it properly aligned. Again, follow the plans and building instructions carefully.

The fuselage-to-wing fillets are well engineered and build with no problems—a definite plus considering their size! Building the wing belly pan requires a bit of wetting and balsa "stretching." If you plan to hang a belly tank, reinforce the center stringer before applying the skin.

All of the vacuum-formed plastic parts are of excellent quality and are easy to work with. The lower cowl and landing gear pods



Ol' Al really outdid himself in detailing his P-40. That special 4-loch spinner and three-blade prop are options from Top Flite; the markings are self-adhesive decals supplied in the kit, and the panel lines were drawn onto the painted surfaces with black and gray laundry markers. Inside the cowl lurks a Super Tigre .75 fitted with the special header and muffler designed by Top Flite specifically for this model. Retracts are Robart 90-degree rotating pneumatic units. Finish is acrylic enamel sprayed over a light gray MonoKote base; a final coat of flat clear acrylic enamel seals the markings and panel lines. Markings supplied in the kit depict General Chennault's famous "Flying Tigers" P-40E.

are the most complicated but are well covered in the building instructions.

In the event of a ground loop or when operating from rough surfaces, the side forces acting on the tail wheel assembly and steering linkage are pretty severe. Instead of hooking up the tail wheel steering directly to the rudder control pushrod as designed, I suggest running a separate pushrod from the opposite side of the rudder servo arm to the tail wheel tiller. This way, any damaging forces on the tail wheel will be isolated from the rudder system, and you can easily adjust the turning rate on the ground by moving the pushrod attachment in or out on the servo arm.

P-40E KIT OPTIONS

•Retracts

These are a must for scale performance as well as looks. The Robart 90-degree rotating system I used is well engineered and has proven to be completely dependable. There is no mention in the instructions of the Warhawk having a retractable tail wheel with appropriate doors, but this would be a good scale detail to add.

In order to eliminate the requirement for a number of air system quick-disconnects, which are prone to leakage, the complete



TOP FLITE'S GOLD EDITION P-40E WARHAWK

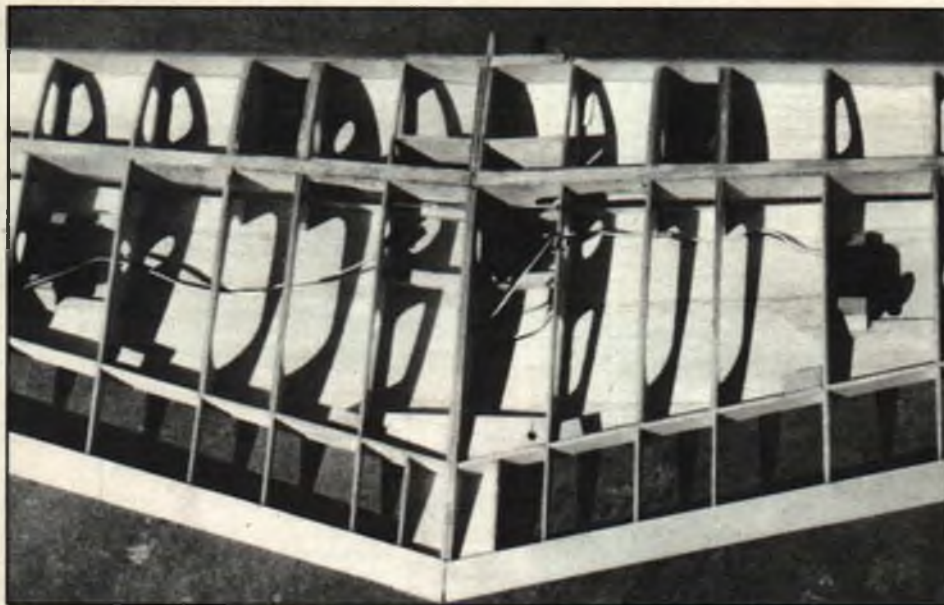
SCALE	1/7.
WINGSPAN	64 in.
WING AREA	680 sq. in.
FLYING WEIGHT	8 to 10-1/2 lbs. (9-3/4 lbs. as tested).
WING LOADING	26-35 oz./sq. ft. (32.5 oz. as tested).
OVERALL LENGTH	54 in.
CONSTRUCTION	Balsa, plywood, molded plastic parts.
RADIO	Four channels required (ailerons, elevator, rudder, throttle); retracts, flaps, bomb drop optional.
ENGINE61-.91 two-stroke, .91-1.20 four-stroke (Super Tigre .75 used for review).
SUGGESTED RETAIL	\$249.99.

Produced by Top Flite Models,
P.O. Box 9021,
Champaign, IL
61826-9021.



Al highly recommends building the optional split flaps as detailed on the plans, both for their great looks and improved low-speed flight performance.





View of the partially built wing with the single aileron servo (center) and two flap servos in place. After everything has been installed and tested, the entire wing gets sheathed with 1/16 balsa.

landing gear air system can be mounted on the top of the wing center section in the same general location as called for in the instructions. It makes for a more tidy system, eliminates the need for air line disconnects and simplifies wing removal.

•Three-blade show prop and 4-inch scale spinner

These are inexpensive options produced by Top Flite and are a must for scale appearance.

•Flaps

Flaps are a definite plus in both looks and flight performance, and are well worth the extra labor involved. They provide additional stability at slow speeds during approach and landing. If your transmitter has a two-position flap switch, using a long control horn on the flaps will allow the linkage to be adjusted for two positions without exceeding the full down dimension of 1.5 inches. The half-flap position works

well for slow fly-bys and touch-and-goes.

•Drop Tank

Another Top Flite option, molded from durable plastic. It looks great, but if you're fighting weight, the optional drop system and added servo can be left out and the tank attached and removed with the manual release provided.

•Custom Exhaust Header and Muffler

Recommended for the Super Tigre .75, these Top Flite accessories are a good design and result in a clean cowl line.

FINISHING

The only way to obtain an authentic Flying Tigers color scheme is to paint it. In the manual, the technique of painting over MonoKote is well covered. It works well if care is taken. The only suggestion I have is to use light gray MonoKote instead of the clear as recommended in the manual, as the gray reveals any imperfections in the surface and also lets you see where you've covered. I also recommend using Coverite's Balsarite in all fillet areas, regardless of the covering material used, for added adhesion—it really pays!

Finishing materials and the method of application are the builder's choice. I prefer automotive gray primer/surfacer for fill, color coats of acrylic enamel, and a top coat of clear acrylic with universal flattener added for gloss control. Automotive finishes can be mixed in any desired color by your local automotive paint store. The most frustrating part of replicating the Flying Tigers paint scheme is obtaining the fuzzy sprayed edge on the camouflage areas. I used a touch-up gun and an airbrush, with lots of practice. Either will do the job.

The supplied decals duplicate the markings on General Chennault's famous "Flying Tigers" P-40E. The decals are a joy to work with except for the shark teeth. The rear few inches of the decal will lay down well, but around the compound curves of the nose the dentures are better painted on. Who knows, you may get your artist's badge!

For those wishing to add details—authentic antenna, pitot mast and head, tail wheel doors, guns, panel lines, etc., the writer recommends the Koku-Fan three-view drawings and the excellent photo documentation packages available from Bob Banka's Scale Model Research, 3114 Yukon Ave., Costa Mesa, CA 92626; (714) 979-8058. Bob has "Foto-Paaks" for seven different P-40Es; #588 depicts Gen. Chennault's restored aircraft.

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The P-40 is pleasingly aerobatic; aileron

rolls are not rapid due to the small size of the surfaces, but seem to be quite axial even with the pronounced dihedral. Loops are good provided you don't tighten them up too much, causing a partial snap. All loop and roll combinations are responsive and smooth. The writer has not mastered knife-edge flight as yet but will blame the inability on his techniques. In the same area, the rudder seems to run out of authority on the second vertical of a four-point roll.

The flaps are just great; little pitch change is noticed when they are lowered. Added lateral stability is apparent as is a

requirement for steepening the approach and the addition of several clicks of power. With power left on right to runway levels the P-40 can be flared and held on the wheels or rotated for a three-pointer. Wheel landings seem to be more natural for this aircraft. Directional control, as the tail comes down, requires a little rudder dance—after all, look at how narrow the landing gear is! All in all, the flight characteristics are pleasing for a scale airplane. The model looks remarkably realistic in flight, and the landing approach, all dirty with the gear hanging out and the flaps

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Fixed portions of the tail surfaces are fully sheathed; the elevators and rudder (and ailerons too) have a sheet balsa core with ribs on both sides, to simulate the fabric-covered control surfaces on the full-size aircraft.

down, is a real eye-catcher!

In summation, the Top Flite Gold Edition P-40E Warhawk is a quality kit at a reasonable price . . . a bit labor intensive in some areas, but the results are most gratifying. Its looks and flight characteristics make the project well suited to the modeler who enjoys building and appreciates the immense scale potential of the Warhawk. The writer recommends it as an enjoyable project with a magnetic attraction for many favorable comments at the flying site! *MB*

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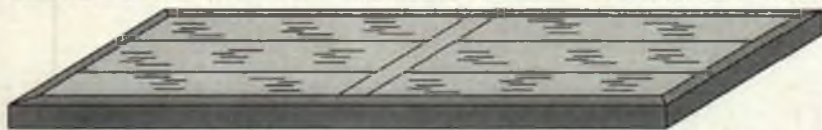
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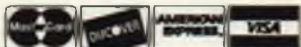
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6 X 2	1	1.59	8.75 X 7.0	5	3.95	11 X 6	2.49	12.5 X 12.5	7	7.95	14.4 X 12	10	12.95	
6.3 X 4	2	3.95	8.75 X 7.5	5	3.95	11 X 7	2.49	12.5 X 13	7	7.95	14.4 X 13	10	12.95	
6.5 X 2.9	2	3.95	8.75 X 8.0	5	3.95	11 X 8	2.49	13 X 7	4.25	14.5 X 14N	10	12.95		
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6.5 X 6.0	3	3.95	9 X 5	16	1.99	12 X 8	2.89	13 X 10	7	7.95	15 X 11	10	12.95	
6.5 X 6.5	3	3.95	9 X 6	16	1.99	11 X 10	7	7.95	13 X 11	7	7.95	15 X 12	10	12.95
7 X 3	15	1.59	9 X 7	16	1.99	11 X 11	7	7.95	13 X 12	7	7.95	15 X 13N	10	12.95
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7 X 5	15	1.59	9 X 9	16	1.99	11 X 12W	7	7.95	13 X 13.5N	9	7.95	15 X 13N	10	12.95
7 X 6	15	1.59	9 X 10	16	1.99	11 X 13	7	7.95	13.5 X 9	7	12.95	16 X 8	12.95	
7 X 7	15	1.59	9.5 X 6.5N	5	3.95	11 X 14	7	7.95	13.5 X 10	7	12.95	16 X 10	12.95	
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7 X 9	15	1.59	9.5 X 7.5N	5	3.95	12.25 X 3.75	8	3.49	13.5 X 12.5	10	12.95	16 X 13N	10	12.95
7 X 10	15	1.59	9.5 X 8.0N	5	3.95	12 X 9	7	7.95	13.5 X 13.3	10	12.95	16 X 14	12.95	
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PLUG SPARKS

BY JOHN POND

•The SAM 21 Annual •Leon Shulman's Banshee •The Pacer's Inverted Tail Revisited

One of the oldest—and best!—RC O.T. contests is staged by California's SAM 21 club every year. This club used to put on three meets a year, but with wear and tear/attrition,

events—Texaco, 1/2A Texaco, LER Class A-B-C, Antique and Pure Antique—and a few special events (Brown Jr., Ohlsson Sideport and Class A Texaco). This arrangement seemed to

satisfy most of the contestants present.

It's interesting to note that SAM 21 has been a leader in staging special RCO.T. events. At one of the early SAM 21 West Coast Champs held at the Merwin Ranch in Sacramento, an event was held just for low-wing models. Very classy trophies and many merchandise prizes were given. Of course, a specialized, one-time event like this does attract fewer entries than the more common established SAM events. Regardless, the meet did attract modelers from all over California.

This year's SAM 21 Annual again featured special events. In this case, emphasis was put on all the possible Texaco events that could be held. The turnout was good but the club had the misfortune to run a meet on a rainy



Photo No. 1. SAM 21 club president Bill Hoffmeister did a nice job on this Walt Good "Guff," evidently built for the Brown Jr. event that's become so popular with the RC guys. Had not yet been flown when this photo was taken.

etc., two of the meets were delegated to SAM 49 for their spring and fall annuals.

With only one annual left, SAM 21, under this writer's aegis, decided to put on a large RC O.T. meet called the West Coast SAM Champs, the first one being held at Fresno. Russ James was appointed the Contest Manager in charge of motel reservations, contest entries, and prize acquisitions. Prizes have been so plentiful that the motto of this meet has been "a prize for everyone."

The latest SAM 21 meet was held at the SACR/C (Southern Alameda County Radio Control club) field located at Fremont, California, a field liberally covered with Astro-Turf—an excellent surface for flying. About the only intimidating factor was the close proximity of San Francisco Bay and the accompanying salt ponds.

This time, the SAM 21 Annual was staged with the standard SAM competition RC



Photo No. 2. Our longtime columnist (left) and Dave Lewis in the process of getting the controls sorted out on John's 1/2A Anderson Pylon. This month's photos were taken at the recent SAM 21 Annual, held at the SACR/C field at Fremont, California.



Photo No. 3. An enthusiastic newcomer to Old Timer RC, George Finato is pictured with his good-flying Cleveland Viking (left) and O&R .60 powered Comet Zipper.

day (in June!). This contest featured fifteen flying events plus one for Spirit of SAM Concours. The boys really enjoy this event as the flying scale fans turn out in force.

Art Watkins showed up with a new Brown Jr. powered Cavalier. Art played it real smart and elected Eut Tileston to test fly the large black-and-yellow model for him. Tileston himself flew in ten separate events and took home five 1st places!

Whew!

Contest Director Steve Roselle reported that despite the brisk breezes beginning at 11 a.m., many good flights were registered. One of the best was Tom Smith's 30+ minute flight with his very reliable Dallaire Sportster. Tom's string of wins makes this writer turn green as he has not placed in a Texaco event since he sold (gave away!) his Dallaire last year. Oh well, experience

keeps a dear school but fools learn in no other!

SAM 21 has been very fortunate in its series of presidents. The latest leader, Bill Hoffstetter, has proven to be not only politic but active in competition. One thing for sure, he

doesn't build Lanzo Bombers! Bill is seen in Photo No. 1 with a Walt Good "Guff." No reports on performance yet.

What would a contest be without Pond and a new model that promptly acts up? Photo No. 2 depicts John Pond (yeah, that's me with the perplexed expression) while Dave Lewis does some first-class trouble-shooting on the 1/2A Anderson Pylon. Of all the darn things, the pushrods swelled up and



Photo No. 4. Rarely seen at O.T. RC meets because it's so difficult to handle with that almost non-existent vertical tail, the Foote Westerner has finally been tamed by Pete Samuelson, who has been working with the design for some time now.

 A detailed line drawing of a model airplane, the Banshee. It features a high-wing configuration, a single propeller, and a tail with a vertical stabilizer. The drawing shows the top view, a side profile, and a bottom view of the wing structure.

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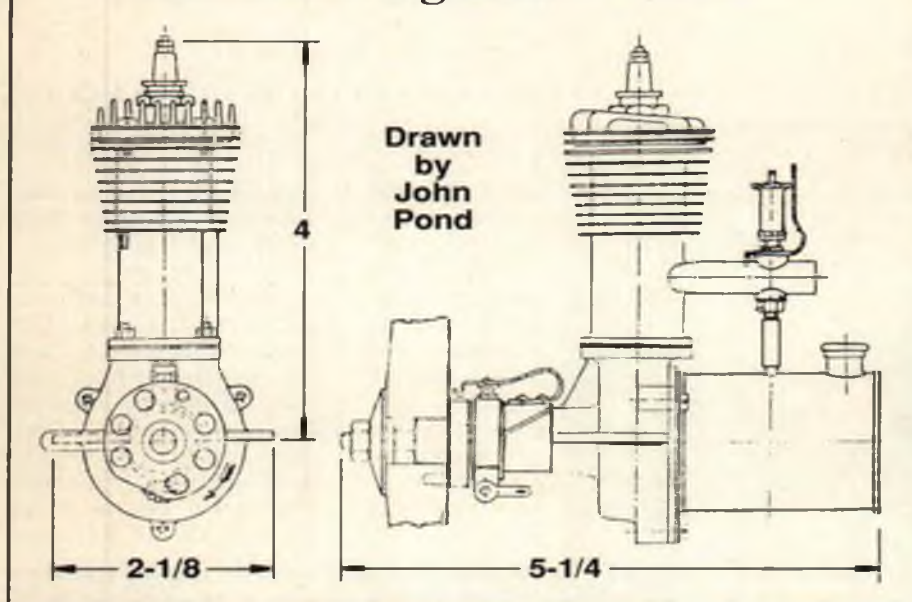
MODEL OF THE MONTH

were rubbing on each other. Oh well, another dumb excuse.

Photo No. 3 shows longtime modeler (but new to the SAM O.T. movement) George Finato with his latest successes, a Cleveland Viking and a Comet Zipper. It didn't take George long to dump his less impressive model, a Modelcraft Pacific Ace. The version he built was the very boxy looking 1935 design—some difference in prize collecting!

See! Photo No. 4 proves that the Foote Westerner can be made to fly by radio control if you are persistent enough. Pete Samuelson is finally getting his Class C Westerner to perform in a stable manner. The small vertical tail is a tough obstacle to overcome as the Westerner, although an excellent flier in FF, has a tendency to "Dutch roll" so badly that it eventually rolls over into a death dive. More

The 1941 Felgiebel — 7.6cc



ENGINE OF THE MONTH

than once, I might add. In free flight, the Westerner must be flown straight away in a steep climb, not allowing the nose to drop. The high aspect ratio wing will readily distort when going into a sharp bank—very reminiscent of indoor microfilm tractors that will spiral in as the wing twists from too tight a spiral.

All in all, a pretty terrific meet was held by the SAM 21 boys. Those contestants who worried about the salt flats and westerly breezes have finally figured out how to beat the hazards. Always keep the models headed upwind. Only one 1/2A model was lost, flying downwind. This columnist rather doubts the high rate of O.O.S. flights

will be reduced by using smaller tanks as proposed in the upcoming rules vote. The boys will still figure out a way to put them higher than ever!

OBIT NOTICE

Herb Greenberg, famous among modelers as the designer of the Scientific Red Zephyr, passed away in his sleep on May 13, 1995. Herb, who liked to be called "Hank" in honor of the famous Detroit Tigers baseball player, was inducted into the SAM Hall of Fame at the last SAM Champs and at the same time was presented with a mint Red Zephyr built by SAM 27 members. To say Herb died in a peaceful and happy state had much to do with the honors given him by SAM.

MODEL OF THE MONTH

When the question of Old Timer eligibility for Leon Shulman's Banshee first came up at the early SAM contests, the model was not considered legal as it did not meet the specified pre-1943 cutoff date, having appeared as a construction article in the September 1943 issue of *Air Trails*.

When Shulman found out his model was not accepted as an Old Timer, he quickly contacted this columnist (who was the SAM Historian at that time) as to what proof was required to get the model qualified. Fortunately, Leon had kept all of the old clippings from 1942 wherein the Banshee was described. This, plus an old photo or two, was enough to re-classify the Banshee as an Old Timer. In no time flat, it seemed, Shulman was out flying and winning with this design.

Most interesting was the effect the Banshee had on British designs appearing toward the end of WWII. The most startling feature was the extreme dihedral put in the tapered outboard wing panels.

Any modeler worth his salt could not miss this latest feature in most all of the subsequent British designs that appeared in the 1944-45 issues of *Aeromodeller*, and which met with considerable success in the British Nationals and other large FF competitions. As *Air Trails* put it, Shulman had rung the bell with his Zomby and then the Banshee designs.

The Megow Corporation, after the success of the Zomby kit, wasted no time in signing up Shulman's Banshee, the kit actually appearing before the cessation of hostilities,

The success of the Banshee kit was due in a large part to the simplicity of assembly. Working from a flat sheet balsa keel, upper bulkheads were added with all the stringers. The attractive portion of this construction was that, when removed from the board to install the lower formers, the fuselage structure maintained its shape and alignment.

Most all of the Shulman models published between 1939-42—the Wedgy,

continued on page 66

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TECH STUFF *cont. from page 14*

apparent-twin ball is dropped from the same height onto the same surface it doesn't bounce at all! When both balls are squeezed between the fingers the one which doesn't bounce feels a little softer. Yet when the balls are dropped onto a table or other sounding-board type of surface, the one which bounces sounds soft, and the "softer" one sounds much harder.

The word "rubber" came about when someone discovered that a lump of semi-dried latex from certain plants of the genera *Hevea* and *Ficus* would "rub" out pencil marks. The technical term for any resilient organic material of this type is "elastomer," but to us common people, "rubber" is the name whether we are talking about a processed natural material or a completely synthetic material.

As "rubber modelers" know well, all rubbers are not the same. There have been many technical papers written on the characteristics of different rubbers for model airplane motor use (aka twisted rubber bands). An excellent paper which I read recently is "Analysis of Large Deformations in Rubber Strip," by Robert Thorsen. It was published in the National Free Flight Society Symposium #18 (1985).

But back to the alike-but-different black rubber balls. Not only is their bounce entirely different, but so is their rolling friction. On a slight incline the "live" one will roll down many times faster. And if I give them both an equal shove on a smooth floor the "dead" one will come to rest in half the distance—the "happy" one just keeps going and going and going.

These "Happy and Unhappy Balls" are available from Edmund Scientific Company (stock #39129), 101 East Gloucester Pike, Barrington, NJ 07008-1380. The dead one, according to the enclosed literature, is molded of polynorborene. Compared to "happy" rubbers it has a very low coefficient of restitution and very high hysteresis. It is not recommended for model airplane rubber motors.

PARTING WORDS

When Steve Fossett succeeded in crossing the Pacific in a balloon in February 1995, a non-technical friend of mine saw the news report on TV before I had heard of the achievement. She told me about seeing "the big bumers." As I was quite sure I would later learn, the balloon was a helium balloon, not a hot-air balloon. (Fossett's balloon could never carry enough weight in propane to cross the ocean.) This reminded me of the time a relative told me about watching the monkeys in a store window swinging by their tails. I later saw them—they were gibbons and had no tails. They swung by their long arms. People tend to see or at least remember what they expect to see.

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R.K. HICKS

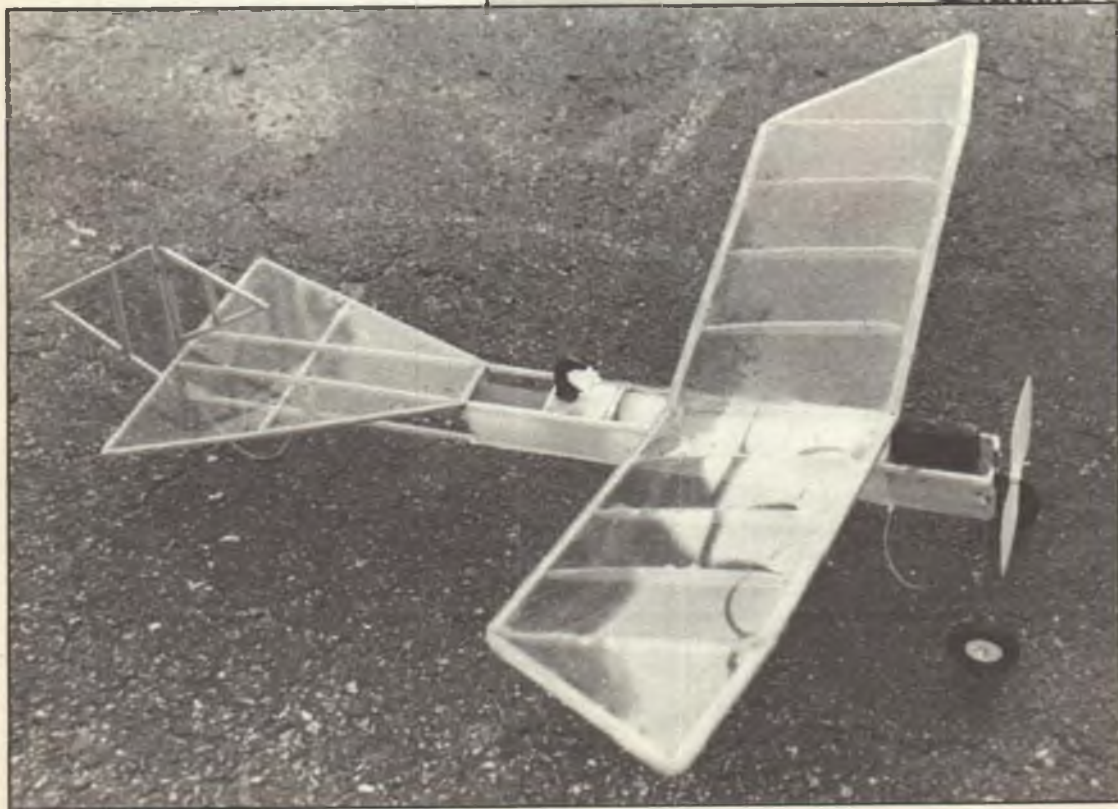
A cute little electric-powered free flight sportster from one of this hobby's most innovative designers.

■ BY ROY L. CLOUGH, JR.

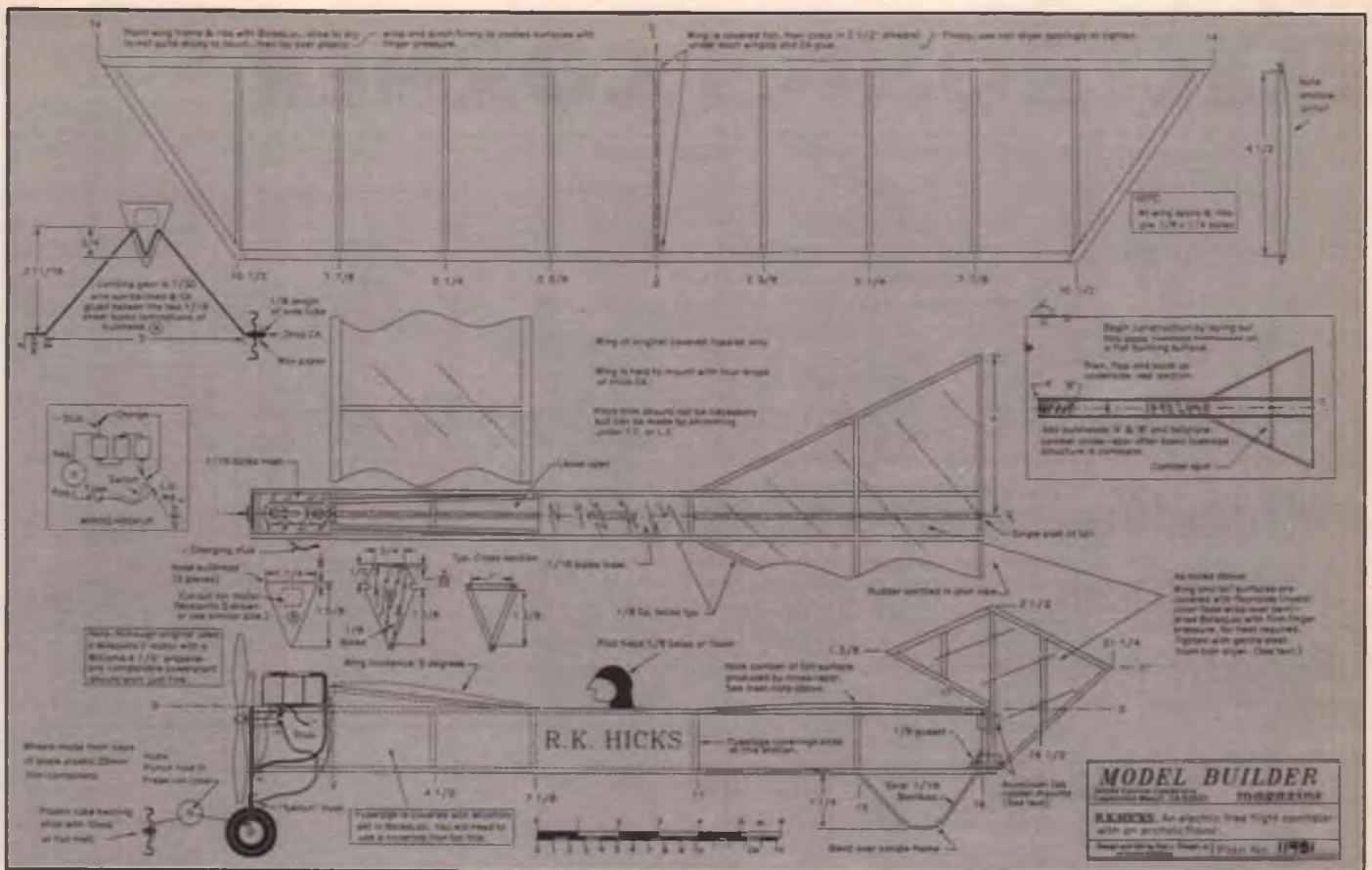
I really love wet-engine RC, but every so often I need a change from filling tanks, hooking up glow plugs, applying starters, tweaking needle valves, checking range, twiddling control sticks, and knowing that whatever happens, I'll have a mess to wipe up afterward.

At those moments it's time to bring out R.K. Hicks, snap a couple of alligator clips to its charging stubs, hook the motor lead over a hot landing gear leg and give it a toss. I can relax, lean back against the van, chew on a straw and watch that little sucker wander around the sky until the battery poops out.

R.K. Hicks, just like Pushcart (*Model Builder*, June '93), was another plane I never really meant to build, but am glad I



■ ABOVE: The author's wife, Carol Chamberlin-Clough, demonstrates the compact size of R.K. Hicks. Model is so simple, even novice builders should be able to crank one out in a weekend. ■ LEFT: The most interesting feature about R.K. Hicks, the reason it came about in the first place, is the novel covering material: Reynolds Crystal Food Wrap, applied with BalsaLoc. This combination is durable, sticks well to balsa and pulls smooth with just a little heat. The Mosquito II electric motor with mounted propeller, less battery, is available for \$10 postpaid from the author at Upper City Lab, P.O. Box 158, Pittsfield, NH 03263. You can also use other motors with results proportional to their weight and output. (BalsaLoc is available from outfits that sell Lifespan covering material.)



did. What got it started was fooling around with all sorts of possible covering materials and the adhesives to hold them. A simple triangle-tipped wing frame was built and successively plastered over with dry cleaner bags, various food wraps, supermarket tote-sacks and transparent gift wrap. These were stuck on with rubber cement, Ambroid, aliphatic and white glues reactivated with a heat iron, and even diluted dope. Got all sorts of results—mostly bad. The glittery gift wrap looked particularly promising until it fell off, leaving the color still stuck to the frame. I stripped it, covered, stripped, scraped, and tried again.

Finally I hit a paydirt combination: Reynolds Crystal Food Wrap stuck on with BalsaLoc. This wrap comes in three transparent colors; yellow, blue and pink. It stays stuck with a thin coat of BalsaLoc using just firm finger pressure—no sealing iron required. A gentle blast from a hair dryer shrinks it to a gleaming microfilm-like surface.

Well, the test wing frame looked so good I grabbed a few sticks of 1/8 square, made up a triangular fuselage with an old-fashioned wedge-shaped stabilizer and a racy 1911-type rudder to match the pointy wingtips. Note the aluminum rudder mounting strips for easy adjustment. You can make them from the soft aluminum tear-off tops that come on cans of snack goodies. I fitted up one of my little Mosquito II motors with a 4-1/4 inch Williams Brothers prop and, wondering where to put the battery, it struck me to make it into a

dummy engine. A few turns of thin paper adhesive tape and black dope over the three-cell 75-mAH pack did the trick. Both battery and motor are glued in place with CA. I wanted a nostalgic, partially covered fuselage a la Bleriot, so I chose opaque Micafilm. (You will need a sealing iron to stick this to BalsaLoc.)

Wheels were easily made from the caps off of a couple of black 35mm film containers. Bearings of plastic or brass tube are centered and stuck in place on the caps with hot melt glue. The hubs are pressure-sensitive "dot" labels. Use a 1/8-inch length of the axle tubing to retain the wheels. Poke a hole in a scrap of wax paper, slip it over the axle, and glue the retainer tube in place with a drop of thick CA. The landing gear, glued between the laminations of the nose bulkhead, is "hot" with the positive battery lead soldered to it. The "switch" is simply a hook bent into the tinned positive motor lead. It's simple, easy and generally knocks loose on landing. The battery is recharged via alligator clips to the positive landing gear and the negative charging stub. The pilot head adds panache. Carve it from balsa or foam.

In flight, the model should bobble up and down in a series of gentle stalls while flying straight away. Then, give it easy tweaks of left rudder until the stalling damps out and R.K. Hicks settles into gentle climbing 100-foot circles. Because of the fairly flat NiCd battery output and gyroscopic lift on the nose by the spinning armature and prop, you can also increase left rudder suf-

ficiently to keep Hicks buzzing around 15-20 feet off the ground until the juice gives out. Just the ticket for aeronautical model voyeurs. Have fun! MB



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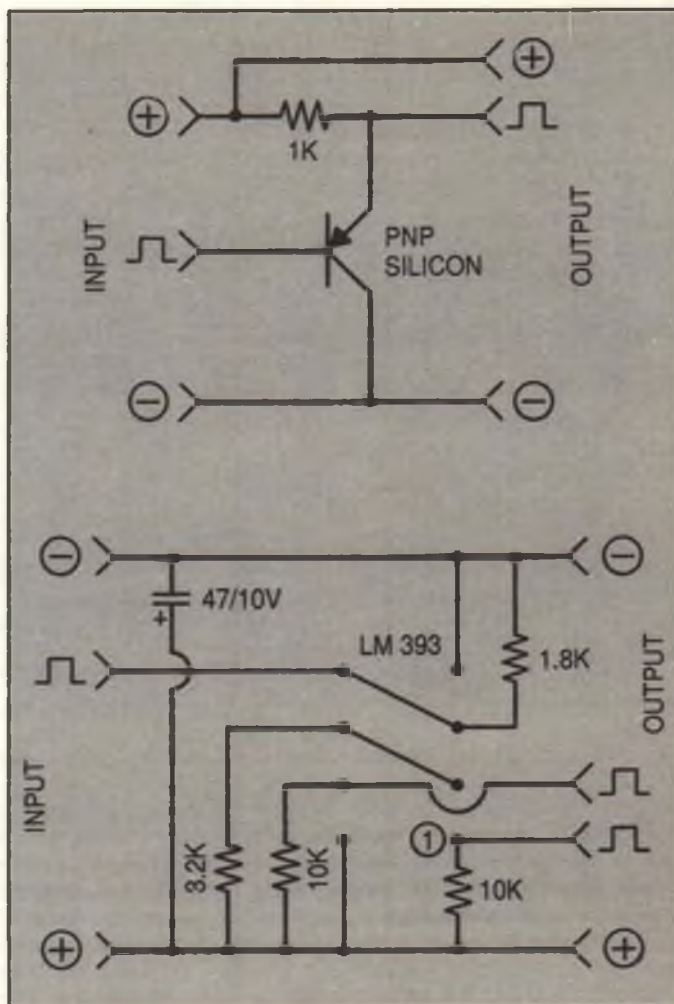
BY ELOY MAREZ

- Futaba Tx Mods
- Receiver Signal Amplifiers
- New Products

Futaba's 9VAP PCM 1024 transmitter (now superseded by the even more advanced 9ZAP), with its many control possibilities, has one feature that is almost universally unused: its "variable [propeller] pitch" control, there not being a whole lot of fliers in the world who use such a thing. The controls for this function are found on the upper sides of the transmitter, a location that can be a source of frustration, primarily for those scale fliers who consider this a logical place for auxiliary control functions, being a natural place for the fore-fingers to rest.

The actual pitch control (CH8), located on the right side, can be operated as a normal proportional channel, with all normal reverse, throw, and some mixing features. However, the left side lever, intended as an "idle-up" control to be used in conjunction with prop pitch, is generally considered to be of little or no use as is, and some have wondered if it could be put to some more useful application. The answer is yes, it can be done, but it requires some internal surgery. With some minor wiring changes, these lever-operated controls can be interchanged with the upper front panel mounted knob-operated channels/functions. (The Futaba 9VAP transmitter's programming doesn't let you assign specific functions to each of the various controls at the push of a button, as does the current 9ZAP and some other brands of computer systems.)

One of the changes I did for a friend was to move the Flap Knob/Flap Trimmer (CH6) function to the left side lever, originally designated as the idle-up control. It is a simple process, requiring only the exchanging of the three color-coded wires from each pot, in the same sequence as originally installed. Additionally, 2.7K resistors need to be added in series with each of the two wires soldered to the outer connections of the knob pot, which now functions



Schematics for buffer amplifiers useful for running two servos or other devices from a single channel on receivers with marginal output signals. The top circuit will work in many cases; others will require the more complex bottom circuit. The latter can be used as a dual buffer; for single use simply omit one of the output connectors.



Astro Flight's Model 204 electronic speed control is one of that company's new series of digital ESCs; it's good for up to 36 cells and 50 amps. A companion unit, the 205D, is identical in size and performance but incorporates a propeller brake for electric sailplane fliers.



Servo installation and testing is now easier and much more reliable with the ElectroDynamics EDR-203 "Servo-Ciser," a modern microprocessor-based approach to this task. Described in text.

as the side lever originally did. This effectively reverses the functions of the two controls, with some reduced output from the new lever-operated CH6, though there is enough throw for most aux operations.

Although this is not a particularly difficult change, getting to the points required is a bit tricky, and is recommended only for those who have some experience wandering around the insides of such equipment. The original wiring is too short to reach the new pot locations, and though normally I do not use splices, getting to the original wire location requires more disassembly than I felt like doing. In this case I put up with splices, which, when well soldered and shrink tubing protected, did the job. Again, if you decide to make this rather intimidating but wholly useful change, proceed with caution, and if you need further info, please write first!

RX SIGNAL AMPLIFIERS

The 9VAP's companion R129DP PCM receiver can be a source of problems in certain cases, due to the fact that the amplitude of the servo control signal from these receivers is lower than the norm. I recently ran into this while helping a

friend install a McDaniels airborne glow plug driver in his airplane. Most receivers, including other Futabas, have an output signal over 4 volts; the 129 has only slightly over 3. Even so, operation is normal until the receiver is called upon to work with more than one servo in each channel. I've seen one that wouldn't operate two servos through a Y-cord, though the most common problem occurs when one tries an add-on such as the McDaniels device. The servo signal drops below the necessary level, and things simply don't work. I knew this, but had forgotten, and it was only after reviewing McD's instructions that I remembered that they offer a special plug-in buffer amplifier just for this application. So keep that in mind when ordering your McDaniels products—or ask if you call them.

Since there are many other devices that you may want to plug in to your R129DP, I've included a couple of simple circuits that will insure compatibility. The IC circuit will work in all cases that I have had tested, however the circuit using the single transistor is simpler to build and is worth a try with your particular installation. Obviously, the one with two outputs is needed if driv-

ing anything more than one servo from one channel. Let me know about your applications—and successes.

SPEED CONTROL NEWS

Astro Flight Inc., the electric power company, needs little introduction, however, we would like to you meet one of its new products, which you may not yet know about. It's the Model 204 electronic speed control, one of Astro Flight's new series of digital ESCs. The 204 specs out at:

Cells — 1-36

Max. Amps — 50

On Resistance — .005 Ohms

Bare Weight — 30g/1.01 oz.

Size — .25x1.25x2.5 inches

The 204 is a BEC-less unit, requiring a separate NiCd battery for the receiver and servos. Neither does it include a brake; for that, you need a different unit, the 205D, which has the same specs as the 204 and of

der about some of those specs—first, the maximum amperage rating. You will no doubt read numbers much higher than these for other brands of ESCs, especially those intended primarily for RC car use. In those cases, the ESC manufacturer is quoting the total rating given for the output MOSFETs by their particular manufacturer. For example, five MOSFETs each rated at 50 amps would give an ESC a theoretical total current capacity of 250 amps. This is a rather ambiguous figure, as such currents are simply not available. In a discussion with a Sanyo engineer, he informed me that at best, NiCds can furnish 100C, that is, 100 times their rated capacity. That means that the common 1.2-AH battery is only good for 120 amps, and according to my calculator, that would be for 36 seconds. Not a very valid figure! There are other considerations, such as



Designed for more comfortable and natural control, Guildart R/C International's global ends are available in standard and extended lengths. The letter for tray mounted transmitters.

course carries a higher price tag. All AFI speed controls are available with your choice of Airtronics, Futaba or JR receiver connectors and come with Astro's exclusive "Zero Loss" power connectors on the battery and motor wiring.

A bit of explanation is in or-

the ESC's ability to dissipate heat, but the 50 amps quoted in this case is a more practical value for the current that can be normally and safely handled.

"On Resistance" is again a MOSFET rating, being the total for those in use, and is the re-

sistance that the ESC will introduce between the battery and the motor. The lower the value, the more efficient the unit, and the less heat it will produce.

The 204 incorporates the latest ESC technology, being based on a computer microprocessor. It requires no adjustments, making its own internal settings after sampling the transmitter's input information. It also includes a safety start feature in that it requires a low throttle transmitter setting before it will command the motor to start.

In effect, if things are turned on with the throttle on high, nothing will happen until the throttle is moved to its lowest possible position and then advanced.

The last spec you'll want to know is the price: \$129.95 suggested retail, but check on that at your local hobby shop!

EXERCISE THAT SERVO!

ElectroDynamics Inc. cannot be accused of exactly flooding the market with products, but the few they do produce are

well thought-out, practical and useful, acceptably priced, and extremely well made. The latest from that source is the EDR-203 Servo-Ciser, a new, microprocessor controlled concept in servo driver/testers. It has two distinct useful applications: 1) to operate servos during installation in the model, and 2) to test their operation before or after installation.

Use of the Servo-Ciser is simplicity itself; you merely plug your system's airborne battery into one connector and the servo into the other one. Using the appropriately marked buttons, you can then command the servo through its normal cycle without having to use your receiver and transmitter. Precise control centering is possible, after which freedom of operation can be tested, either manually or automatically, at either normal or reduced operating speeds.

The servo testing possible, fully described in the instructions, can detect a broken or binding gear train or a weak motor. While it's not always possible to pinpoint a specific problem, comparative tests of all of your servos will definitely isolate any that are working below par, which generally indicate an upcoming complete failure—and who needs that?

ElectroDynamics Inc. can be found at 9557 Crosley, Redford, MI 48239; (313) 534-6514. The Servo-Ciser comes with Futaba and JR wiring; adapters are available for other systems. It's priced at \$49.95 and carries not only a 90 day warranty, but, get this, a 30 day money back guarantee if you're unhappy with it!

TRANSMITTER COMFORT

Fingertip fliers, especially those who favor tray- or strap-supported transmitters because of the extra control precision they are able to obtain, will also like the Guidari Extended Length Gimbal Ends, recently redesigned with an improved grip and matching aluminum locking nuts. Also available are Standard Length Gimbal Ends for thumb fliers who don't find their transmitter's original gimbal sticks comfortable. This is another item that allows you a 30-day trial period with your money back if not satisfied warranty. I like that—maybe it'll catch on!

Guidari Gimbal Ends are available for Airtronics, Aristo-Craft, Futaba, Hitec and JR transmitters. They come with a foam-bedded box for storage and transportation and are priced at \$19.95 per pair, with \$5 shipping and handling. Call or write Guidari R/C International, 170 University Ave. W., Suite 12-103, Waterloo, Ontario, N2L 3E9 Canada; (519) 648-3033.

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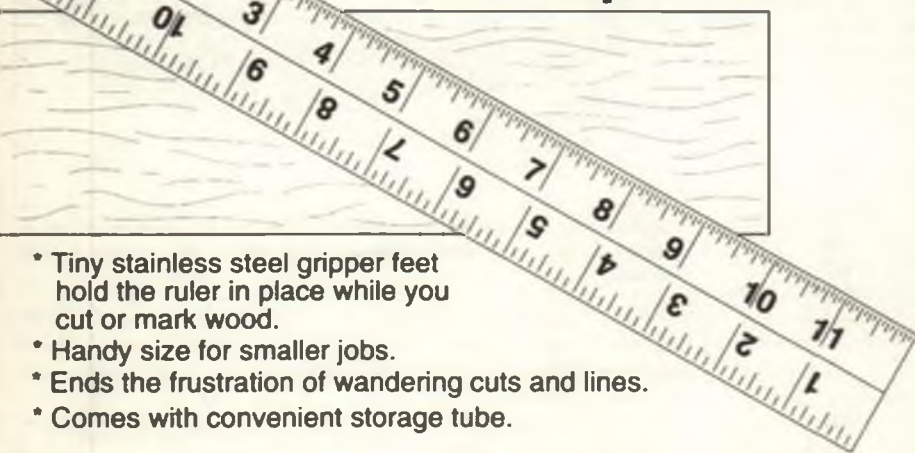
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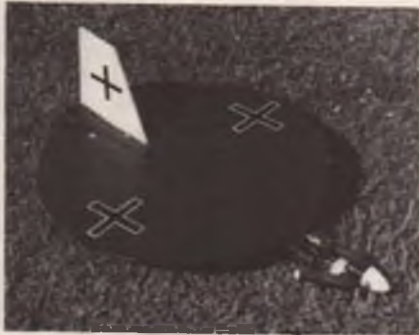
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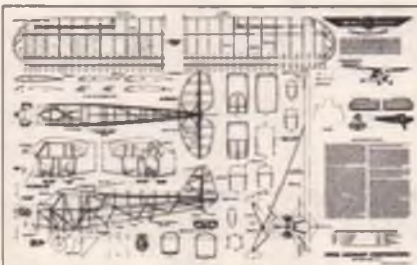
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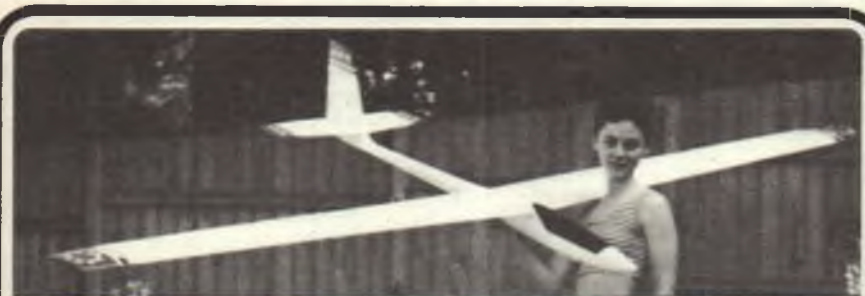
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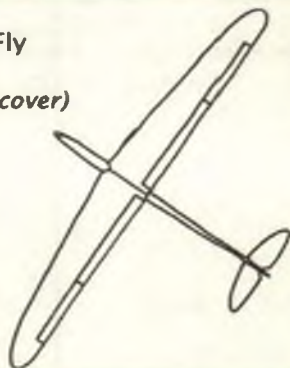
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PLUG SPARKS cont. from page 58

Zomby, Skyrocket and Banshee—were designed for Class A engines, the Bantam .19 being the most popular. A post-war design called the Zoomer came in two sizes, Class A/B and C, again featuring the high dihedral tips. Nothing succeeds like success and this feature was widely copied in other model designs.

THE PACER'S INVERTED TAIL

All these years, this columnist has been telling the anecdote on how the stabilizer came to be reversed on the Pacer. Sal Taibi now offers this rebuttal as printed in the December 1991 issue of *SAM 86 Speaks*.

As Taibi comments, "Necessity is the mother of invention." When Sal attended the 1940-41 AMA Nationals at Chicago, he brought his new Pacer C, powered with a Comet .35. The model climbed and glided well, but the transition to glide after the engine shut off in a climbing position was absolutely terrible. With the normal lifting stab, if the engine quit at less than 200 feet of altitude, the model wouldn't recover before hitting the ground.

After a little headscratching, Sal took out his trusty razor blade and completely removed the bottom bulkhead, stringers and subrudder. The stabilizer was turned upside down and glued back on at a positive angle of attack. Climb was unchanged but the recovery was now nothing short of sensational! When the engine stopped the model would dip slightly, go into a left bank, and recover in about 10 to 20 feet. Best part of all was that the glide was virtually unchanged. The inverted stabilizer did the trick!

ENGINE OF THE MONTH

Having described over 250 engines in this column, the trend of late has been to feature foreign makes—English, Australian, Italian, French, etc. At a recent MECA Collecto this writer was able to obtain a German Feldzibiel engine to make three-view drawings.

When it came to the write-up and description of this engine, the writer was in for a rude surprise, as any background information on this engine is extremely sparse; however the recent three volumes published by Holger Menraud describing prewar and later type model engines was of considerable help. Illustrations show four sizes of Feldzibiel engines being produced. We've selected the 1941 model of 7.6cc displacement (approximately .46 cubic inch). The general three-view shows a considerable likeness to the very successful Brown Jr., and a timer assembly that was apparently derived from the Baby Cyclone starting with the Model C. In short, pick up the best features of the leading engines of their time! *MB*

MM GLIDERS *cont. from page 22*

until they fit), and the pre-cut shear webs, to be glued to the front side of the spar caps, were a bit shorter than the full depth of the spar. Rather than cut new pieces, I trimmed the existing webs and glued them between the caps to form a true I-beam spar. This is actually a superior way to install them, but should be done before the top spar cap is glued in place.

STILL ANOTHER OPINION

The following was excerpted from a fax received by Bill Forrey from one of his modeling friends in Guatemala, Enrique Martins:

Finally I finished my Commoner, let me comment on some things I found on mine. First, I am very happy with the glider, it really floats . . . from the very first flights I have been able to ride thermals, which I cannot say about other models. It is light and sturdy. Construction is very simple, it took me three nights to assemble it and one to cover it and install radio gear, so I was ready in a week. I made two additions that really paid off: I added a .087 carbon strip to the wing spars (peace of mind, since I folded the wings on my Skeeter launching it), and used spruce for all the elevator parts except the tips. I also added 1/8 square to the wing trailing edge for reinforcement and to be able to sand it very sharp.

After flying it for three or four weeks the only change I would suggest would be to replace the fin's tailpost (1/8x1/4 balsa) and rudder leading and trailing edges with spruce, since the covering tends to warp the surfaces.

Everybody that has tried the Commoner is in love with it, it outlasted Jurgon Vogel's Saturn by quite a bit so I am wondering what will happen with mine . . . MB

The ribs simply butt-glue against the trailing edge stock. To make a stronger joint I made triangular gussets out of the extra shear web material supplied and glued one to the inboard side of each rib.

The fuselage sides are 3/4-inch longer than on the plan; the longer length is simply indicated as an "alternate fuselage length." Merrill explains that the Illusion and Commoner share the exact same fuselage side pattern, and that the Illusion really should have the sides trimmed to the length shown on the plan for best performance. This is something that will be clarified on future kit runs.

RADIO INSTALLATIONS

Both of our models are equipped with Hitec RCD 535 FM micro receivers and 270-mAH flat packs. The Commoner uses two Hitec HS-80 micro servos mounted in tandem in the nose with the receiver under the wing, while the Illusion has two side-by-side JR NES-341 servos mounted just forward of the leading edge with the receiver in front—a tight installation, but one that pays off in needing just a tiny bit of tail weight for best balance. The Commoner took 1/2-ounce of nose weight to bring the CG within limits.

FLYING

This is where these two models really

shine!

The Commoner and Illusion both handle beautifully. Stability is there in spades as both have long tail moments and generous tail areas. In both aircraft, the polyhedral angles, poly break locations and areas of the wing panels contribute to good spiral stability that is almost perfectly neutral. Place either in a turn and you'll need to fidget very little with the stick to maintain a perfect circle. These are both ships that, once in high altitude lift, can be flown with just the trim tabs.

The main differences between the two are throw height, penetration and climb rate. The Illusion holds the edge in each

continued on page 82

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MODEL BUILDING 101

BY J.J. LEVINE

**MB101
students
never fade
away—
they go on
to bigger,
better,
more
advanced
model
flying**

Our grandsons, Ryan and Wesley Mueller, built and flew the "Step One Delta" about three years ago. They still have the models and periodically fly them in their home town of Lighthouse Point, Florida. Their dad, Terry, has a fully equipped Great Planes PT40 that I built for him but which he has never flown.

When they came to visit us this past summer, it seemed that every spare moment was taken up with hand-held computer games. It was difficult to tear them away from the tiny screen as my wife Kitten and I kept hearing the beeps, whistles and groans of these electronic time-killers.

"Tell you what," I said during a few seconds of quiet when I got their attention, "I've made arrangements with Don Urch, chief training coordinator at my club, the Chattahoochee Riverside Flyers in Cummings, Georgia, for both of you to get to fly RC." This seemed to raise their interest. "Furthermore," I continued, "using the buddy-box system, you each will have full control of the plane for about ten minutes."

They didn't go back to their beeping machines. "What are the planes, one of those small jobs?" they asked.

"Nope, same size as your

dad's, and they have several of them. They use them all the time. Have at least four qualified instructors. All kinds of great facilities. Air-conditioned clubhouse, sheltered work areas, paved runway and a huge clear space to fly over."

As promised, Don was waiting for us when we drove up. He immediately took over working with both Ryan and Wesley and with a constant, interesting and informative patter, went through the basics of the plane's nomenclature, followed by showing them the fueling, engine starting and control surface testing. I watched with admiration as he got them to focus, with complete attention, on his every move and word.

Finally Don taxied the plane out, took off, climbed to altitude and notified Ryan that he had control. You could almost perceive that he was sitting in the cockpit. As Don talked him through the simple maneuvers, he gradually added more complexity to the flight. Winding up with a few loops and rolls, Don took back the controls and landed dead-stick as Ryan watched in amazement.

Wesley was up next and went through the same procedures with perhaps a bit more dexterity, since he had been watching everything his

brother had done previously. When the plane was finally brought to a landing, Wes had a grin that went from ear to ear.

I thanked Don Urch profusely; he had done Kitten and I a great service. Through his efforts, Ryan and Wesley were determined to get dad to have them join a club, become acquainted with a good hobby shop and continue to learn to fly RC.

When we returned home, they each flew our "Step Two Tennyson" model (designed for seventh grade instruction). Now they want to take one home and build it as part of their excitement over model airplanes in general. Thus, you see, MB101 students don't just fade away, they go on to bigger, better and more exciting feats of learning about aeronautics.

(For those of you within driving range, it would be a great experience in your modeling career to visit the Chattahoochee Riverside Flyers site. Hiram Hagggett is the club president and public relations director; he lives on the site, which is at 3085 Buford Highway, Cummings, GA 30131; (404) 781-8612. After over 45 years in this hobby I seldom rant and rave about the virtues or value of many things, but CRF is really worth investigating! Those who cannot visit, write me for a detailed information kit. Please enclose \$2 for P&H.)



Don Urch (left), chief instructor at the Chattahoochee Riverside Flyers club, finally says "It's all yours!" to an eager Ryan Mueller, who is getting his first taste of RC flying as his younger brother Wesley waits to take his turn. More in text.

Model Building 101's goal is to introduce model aircraft building and flying to today's youngsters through the school system. This we do by training teachers, who in turn conduct classes in aeronautics by using model airplane building and flying. With MB101 guidance, students in grades six through eight build and fly three increasingly complex models as part of their school science courses. Sixth graders build Frank Ehling's great little Delta Dart; seventh graders who complete the Dart then go on

continued on page 70

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MB101 cont. from page 68

to build a modified version of the Tennyson, a 20-inch span pylon rubber stick model designed by John Gomez III. Eighth graders who successfully complete these two models are then qualified to build a unique FF/RC rubber/electric model we call the "RUEL-R/C," which is still in the works. We'll have more about these and other developments in our program in upcoming columns here in *Model Builder*.

In closing, please consider any way that you might be able to assist MB101 to continue the middle school training of our valued youth. MB101 is strictly a non-profit enterprise, yet it does have expenses—kits, classroom materials, telephone bills, postage, etc. Basically we need money, donated in any comfortable amount you can afford. We have applied for and should have a tax deduction certificate by the time you read this column.

In addition, MB101 would welcome anyone who wishes to participate in producing VHS tapes for in-class instructional purposes, to work with us on Standard Operating Procedure manuals, basic and advanced aircraft models to be used, or contribute any general talent and time you may have for this worthy cause. For further information please contact J.J. Levine, c/o Model Building 101, 1891 Branchview Dr., Marietta, GA 30062; (404) 973-3598, Fax (404) 422-2765. **MB**

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PRODUCTS IN USE

■ By Eloy Marez

THE "CETO" SINGLE-CHANNEL MICRO RC SYSTEM FROM HOBBY CLUB

Great news for those intrigued by the possibilities of "Wee RC"—truly affordable micro RC is here at last!

Would you believe a 4-gram (.141 ounce!) radio control receiver? How about a 2-gram (.07 ounce) servo? No, I don't have a bridge I want to discuss with you—the above equipment actually exists, thanks to the miracle of modern micro-electronics and the fact that in spite of computer-based RC and 200+ mph airplanes, there still exist modelers whose challenge lies not in how much or how fast, but how small and how simple. If one is a *real* model builder, not a plastic bomb flier, one can't help but admire the skills, perseverance and patience of these "Wee RCers."

The CETO RC system in question is intended for small, very light rubber and CO₂ powered models, and is now available from Hobby Club, 23141 Arroyo Vista #210, Rancho Santa Margarita, CA 92688; (714) 459-1750, FAX (714) 459-1760. To complete the package, Hobby Club also imports the Gasparin-Microtechna line of CO₂ motors, as well as some beautifully pre-built and tissue-covered airframes that would be perfectly suited to the CETO system; call or write them for further information.

Let's take a closer look at this almost unbelievably small single-channel RC system. This is not a proportional system such as we are used to seeing; neither is it a pulse system, in which the servo—and therefore the control surface(s)—move rapidly and continuously back and forth, control being obtained by varying the time of movement to either side. The CETO system operates as an on/off, or more correctly, left/right (rudder) function, in that the servo is normally at rest in a CCW position, going full throw CW whenever a command is received. It is important to understand that there is no intermediate (neutral) position.

In use, the model should first be trimmed for straight and level free flight with the radio off and the rudder in the neutral po-



Just like the early days, the CETO transmitter is a small unit that fits in one hand, with only one push-button control. The unusual antenna is a helical wound coil only 9 inches long.

sition. With the radio on, the rudder will be deflected to one side and the model will exhibit a continuous turn, the degree of course depending on the rudder area and the amount of throw. Pushing the transmitter button will cause the rudder to move to the opposite side and the model will now



The CETO transmitter's circuitry is seen here, being basically a crystal controlled oscillator followed by a tone modulated power amplifier. Eight AA cells, either NiCds (shown and preferred) or alkalines, are required.

turn in the opposite direction. Straight flight can be obtained by repetitious keying at the transmitter, with equal on and off times. The model could also be set up for straight flight (radio on and the rudder set straight), the radio being used to command a turn in one direction only.

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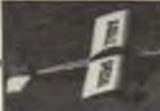
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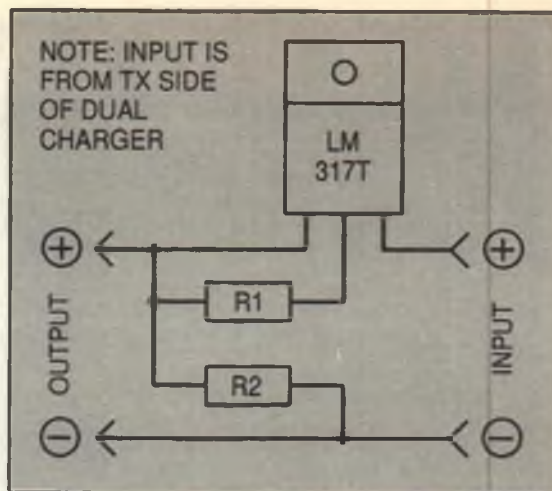
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The CETO transmitter is a small (3.5x6.7x1.5 inches) handheld AM unit, featuring solid-state electronics inside and equipped only with an on-off switch, a keying pushbutton, and a battery condition LED. The transmitter uses a helical wound antenna half-wave only 9 inches long. An au-

Schematic diagram of an adapter Eloy designed for overnight charging 30- and 50-mAH airborne RC packs from a common RC system charger. This setup will both charge the batteries and light the LED on the charger. Resistor R1 is 120 ohms; for charging 30-mAH cells, R2 is 820 ohms; 1200 ohms for 50-mAH cells. Connectors must be added to make input and output. Note that the transmitter side of a dual charger is used.



Probably the world's smallest receiver and servo, seen here with a dime for size comparison. Actual dimensions and weights are given in text, along with battery requirements.

dio tone is generated by the transmitter when the control button is depressed, and while it may not serve a very useful function, it's always comforting to know that something is happening whenever you push a button!

The receiver weighs only .141 ounce, and measures a minuscule .75x.55x.39 inch, with a 23-inch antenna. In true RC system style, it shares the battery with the servo, with a current drain of only 1.5 milliamps—about the same as the daily self-discharge current of the average NiCd battery.

As used here, the word "servo" is a misnomer, as we are really dealing with a magnetic actuator. But it looks just like a servo, though maybe more like one that got wet and shrunk. It's a mere .47x.27x.70 inch in size, and weighs .07 ounce (2 grams!). The arm measures 1/4-inch be-

tween the holes on each side, and moves through an arc of about 30 degrees when actuated.

Connections from the servo to the rudder are made normally—only that in this case the recommended pushrod is a balsa stick only 2mm (5/64-inch) square! I'd recommend a medium-hard 1/16 or a light 3/32 square stick be used. Maximum recommended rudder area is 5cm² (.77 square inch), though the weight and speed of the model and the degree of throw will obviously have some bearing on this.

The transmitter is powered by eight AA NiCds inserted into a spring-contact battery box. A small (3/32-inch) phone jack is provided for battery charging on the lower left side of the transmitter case, however, neither transmitter NiCds nor a charger are furnished. A normal transmitter charger will suffice, though an adapter using the proper



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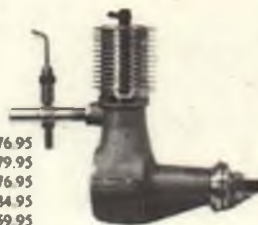
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connector will have to be made. Radio Shack's No. 274-289 subminiature phone plug is just the ticket; wire it with positive going to the tip, negative to the barrel. Typical 500-mAH AA NiCds will provide over six hours of operation between charges—more than enough!

Naturally, the airborne battery pack furnished is small too, measuring only .75x.50x.50 inch, and complete with the smallest slide switch you ever saw, weighs in at .21 ounce. The pack is composed of three 30-mAH NiCd button cells in a small plastic spring-contact holder. Charging this pack needs to be done at the normal overnight rate of 3 mils for 14 hours. For field use, it can be topped off using the transmitter NiCd as a charging source. For this, a cord is furnished, which connects the charge receptacle on the transmitter to the female connector on the battery pack, and charges at just over 4 mA. The flight time on a fully charged airborne pack should be at least an hour.

The receiver NiCds furnished are V30R cells made by Varta, in Germany. They are not classified by the maker as "fast charge," so rather than any attempts at fast field charging, I recommend carrying along an extra charged pack or two. Spare packs identical to the one supplied are available from House of Batteries, 16512 Burke Lane, Huntington Beach, CA 92647; (714) 375-0222. If you can stand the extra weight, you might consider 50-mAH Sanyo NiCd cells, available from Cemark (107 Edward Ave., Fullerton, CA 92633; 714-680-5888); they weigh .12 ounce each and will give a correspondingly longer flight time.

The receiver NiCds can also be charged with a regular system receiver battery charger, but the current will have to be reduced to the required 3 mA overnight rate. All you have to do is insert a 470 ohm resistor in one of the lines. For 50-mAH cells, use a 330-ohm resistor. The disadvantage here is that the LED on the charger will not light, and although this does not affect charging, we all like to see life of some sort while the batteries get revitalized.

Therefore, I have designed a simple circuit that will both charge the battery and light the LED. Furthermore, it can be assembled using all common parts—the appropriate part values are given with the sketch. You can wire it into the positive line of an unused charger, or by installing the proper connectors, use it as a plug-in as required.

Frequency! 27 MHz—27.145 to be exact—but don't panic. The CB craze, both legal and otherwise, is over. In most cases you'll be able to fly interference-free. A large percentage of RC car and boat operation these days is done on 27. Another thing that helps in the cases of cars, boats and wee airplanes is that none of them get too far away and the receiver always gets a good strong signal.

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A lot of experimentation takes place with this type of flying. Please share your experiences with us! **MB**

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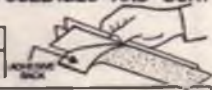
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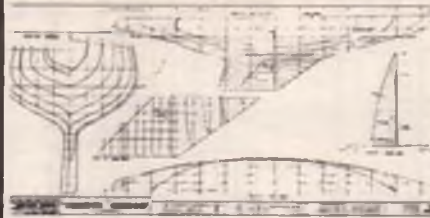
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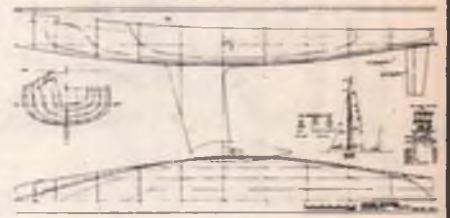


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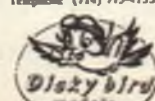
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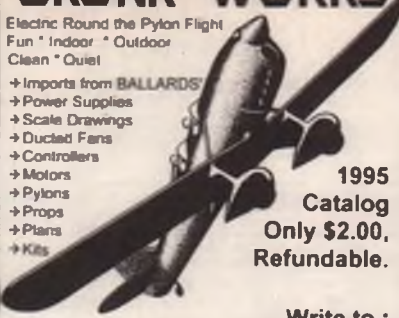
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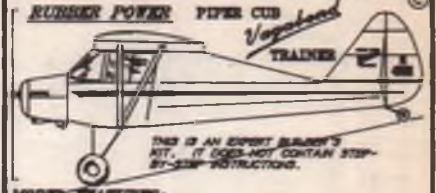
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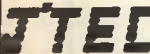
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3/32x3/32	.09	.11	3/8x3/8	.35	.39	1/2x2	.95	1.25
3/32x1/8	.10	.14	3/8x1/2	.35	.49	3/4x2	1.24	1.62
3/32x3/16	.11	.16	3/8x3/4	.46	.58	1-INCH	36"	48"
3/32x1/4	.12	.17	1/2x1/2	.42	.55	1/16x3	.39	.53
3/32x3/8	.13	.20	1/2x3/4	.52	.70	3/32x3	.47	.60
3/32x1/2	.17	.22	3/4	.56	.88	1/8x3	.57	.75
3/32x3/4	.25	.33	3/4x3/4	.72	.96	3/16x3	.68	.90
1/8	36"	48"	3/4x1	.83	1.04	1/4x3	.85	1.15
1/8x1/8	.09	.12				3/8x3	1.02	1.50
1/8x3/16	.11	.15				1/2x3	1.35	2.00
1/8x1/4	.12	.17	1-INCH	36"	48"	3/4x3	1.95	2.45
1/8x3/8	.13	.19	1/16x1	.29	.39	1/2x3	1.35	2.00
1/8x1/2	.17	.24	3/32x1	.32	.43	3/4x3	1.95	2.45
1/8x3/4	.27	.36	1/8x1	.35	.47	1/16x4	.59	.79
3/16	36"	48"	3/16x1	.37	.52	3/32x4	.73	.98
3/16x3/16	.12	.18	1/4x1	.42	.57	1/8x4	.83	1.15
3/16x1/4	.16	.26	3/8x1	.54	.73	3/16x4	.97	1.35
3/16x3/8	.18	.26	1/2x1	.65	.89	1/4x4	1.35	1.55
3/16x1/2	.22	.31	3/4x1	.80	1.03	3/8x4	1.85	2.47
3/16x3/4	.30	.42	2-INCH	36"	48"	1/2x4	2.49	2.90
1/4	36"	48"	1/16x2	.33	.44	3/4x4	2.65	3.85
1/4x1/4	.19	.26	3/32x2	.40	.53	1/4x1/4	.25	
1/4x3/8	.23	.29	1/8x2	.43	.57	3/8x3/8	.30	1.32
1/4x1/2	.25	.35	3/16x2	.50	.65	1/2x1/2	.35	2.32
1/4x3/4	.36	.50	1/4x2	.60	.69	3/4x3/4	.48	2.33
						1x1	.60	3.33
								.93
								1.85
								2.75

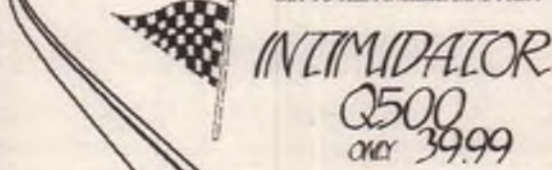
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1/16x12	1.80	3.12	6.12
3/32x12	1.94	3.87	7.74
1/8x12	2.13	4.25	8.50
3/16x12	1.57	3.13	6.25
1/4x12	1.57	3.13	6.35
3/8x12	1.90	3.90	8.50
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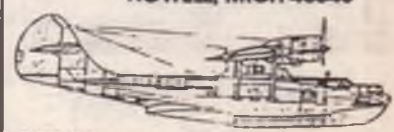
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MM GLIDERS *cont. from page 67*

of these areas, thanks to its almost elliptical (lower drag) wing planform, which is recognized as being most effective at reducing induced drag. The Commoner, by contrast, has a relatively high-drag wingtip design. You can reduce this drag significantly by washing out the tip panels as much as 1/4-inch, but it's still going to have a higher profile drag at any angle of attack. Still, the Commoner is a very good performer in spite of its square-ish wings.

Our first test flights with the Commoner were made on a breezy late Sunday afternoon—poor conditions for evaluating a

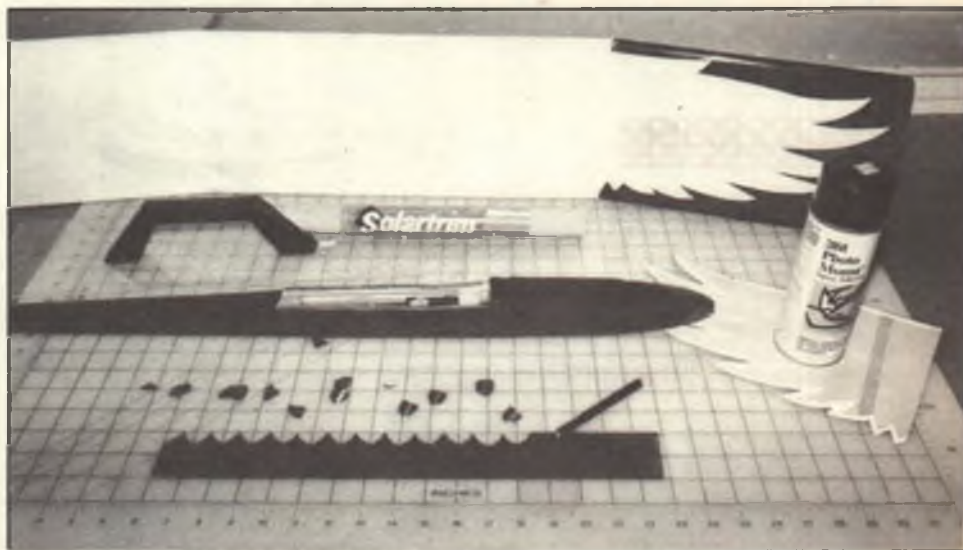
glider's performance. Larry had the Illusion on hand, and from the start it was obvious that his model was launching higher and hanging longer in the wind. Neither plane was staying aloft more than a minute, and both were quickly drifting far downwind.

A week later, on a Sunday morning under overcast skies and with only a light, shifty breeze, we did a little clockwork to eliminate any guesswork about the models' performance. We gave each other 12 launches with each plane. Every six launches we would switch pilots on the same plane to help minimize lift-cycle ad-

vantages and arm fatigue. Every 12 launches we'd switch planes and do six and six again. This was as close to a "blind" approach as we could devise, although it was far from optimum because the lift cycles were quite obvious. If there was lift, "skying out" was no problem. If there was sink, that too was obvious when it became impossible to break 20 seconds!

Not counting the "up and outs" and dropping the high and the low times for each plane, we came up with the following averages for each plane.

With Larry as pilot, the Illusion averaged



To dress up his Commoner's "Plain Jane" rectangular wing, Bill did a bird-feather motif in red Solortrim, applied over a white base covering. That handy self-healing cutting board is sold by Edger Co., P.O. Box 1775, Hemet, CA 92546.

42.8 seconds per throw; with Bill, it averaged 29.4 seconds. The Illusion's combined average based on 19 flights was 35.7 seconds.

With Bill as pilot, the Commoner averaged 26.2 seconds per throw; with Larry, it averaged 25.2 seconds. The Commoner's combined average based on 15 flights was 25.5 seconds. However, the Commoner had more 2-minute "max" flights (five) than the Illusion (one). Counting flights over a minute, the Commoner had seven versus the Illusion's three.

Conclusion: the Illusion has better "hang time" in dead air and in wind than the Commoner in spite of almost identical wing loadings. The Commoner's better max rate had more to do with lift cycles than anything else. If you got lift, you got out—with either plane!

CONCLUSION

It remains for you to decide which of these two excellent sailplanes is best suited to your flying needs. Both are easy to fly for any skill level pilot above the first-time beginner. If you'd like to join in the HLG competition going on all around the country, you can't go wrong with an Illusion, it has the edge! **MB**

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DEAR JAKE

Advice for the Propworn

DEAR JAKE:

Could you please explain onst and fer all why we got time zones and why we gotta keep switchin' from Standard Time to Daylight Savings Time ev'ry year?

Maybe I'm thick, but it sure seems complicated and confusin'. When it comes time to change the clock, there's supposed to be some sayin' to help me remember what to do. But I can never recollect whether it's "Spring Up, Fall Down" or "Spring Aside, Fall Over." Hell, it might be "Spring Tension, Fall Apart" or "Spring Fever, Fall

Asleep" for all I know. Either way, I don't see where none of 'em tells me what to do with the damned clock.

I never know what time it is when I call my cousin out in Oregon, neither. He's on some dang fool Mountain Pacific Left Coast time and he's all the time complainin' that it's 3 a.m. in the mornin' when I call him. Well, not by my chickens, it ain't.

And how come the city of Indianapolis never changes their clocks, but the rest of the state does? Don't that beat all? Supposed I lived in Fort Wayne and had to work in Indy. Why, I'd be a hour late half the year and a hour early the other half.

I seen some scientist on TV tryin' to explain it all. I believe he said his name was Vernon Equinox. The more he talked, the less sense it made. And he plumb lost me when he started jibberin' about diurnal this and diurnal that.

What in tarnation is a diurnal?
Amos in Clintonville, AR

Dear Amos:

I believe I have covered this before, but we have a three-hour difference between the East Coast and the West Coast so people in California can sleep late, and we have Daylight Savings Time so weekday golfers can get in nine holes after work.

I don't see how it's relevant, but a diurnal is one of those porcelain fixtures in the men's room that's wide enough for two people to stand in front of.

Jake

DEAR JAKE:

I've got a finicky engine in my pattern ship. It gets particularly hard to adjust in hot, humid, summer weather.

The experts in the club tell me that when the air gets hot and muggy, I need to tip the nitro can. What do you think?

Doc in Decatur, GA

Dear Doc:

They may be experts, but if I were you,

I wouldn't go messing with any of those American Gladiators. I'd especially stay away from Nitro.

Jake

DEAR JAKE:

The prestigious Institute of Aeronautical Sciences in Cambridge, England has recently published a paper in which they claim that the aerion population of the Earth is declining.

They seem unable to account for the lack of production of new aerions, making only a vague assertion that it is somehow tied to the global cutback of space and aviation funding and research. Citing the radioactive-like decay of existing aerions that you have often discussed and the subsequent finite aerodynamic half-life of flying objects, they expressed a concern for the future of flight on our planet.

They point out with some alarm that, if the decline in aerions continues, many objects will become earthbound with no hope of ever getting off the ground.

Have you heard about this? Should we be worried?

Forrest in Fond-du-Lac, WI

Dear Forrest:

Sadly, the report is true. Naturally occurring objects with no chance of ever rising above the Earth's surface, such as Roseanne, are becoming more and more commonplace.

Building a model airplane creates new aerions, so we can help. But thanks to computer games, fewer youngsters are entering modeling and fewer models are being built, so we are also part of the problem.

Fight aerion depletion. Take a neighborhood youth to the flying field, get him interested, and help him get started.

Otherwise, look for Chris Farley in a theater near you.

Jake

P.S.: If we also run out of buoyons, then nothing will float either, and we'll really be in trouble.

Jake

continued on page 86

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COVERING AND FINISHING

I chose Coverite's 21st Century fabric for the basic overall covering for everything but the rudder, which was done with 21st Century film because I was making the striped 1930s era flag rudder. I used a Woodpecker tool on all wood surfaces under the covering and it worked great. This is the second plane I've used the Woodpecker on, and I've come to consider it an essential finishing tool for getting all brands of coverings down with no air bubbles. The 21st Century fabric ironed right over the Granite State gapless hinges with no problems. The landing gear, wheel pants and cowl were finished with Coverite's companion product, 21st Century paint.

Northeast Screen Graphics (Major Decals) supplied those beautiful star decals—water transfers for the bottom of the wing and pressure-sensitive stick-on decals for the top. All of the other striping and lettering, including the 8-ball insignia, was done with 21st Century film. I used a wood grain vinyl to line the area under the canopy. I didn't have time to install a pilot, so my apologies to our friend in Australia, Neil Hart, who feels all Big Birds should have pilots.

I'm using a Hitec Focus 4 FM radio in my 8-Ball Special. The two aileron servos are Hitec 615 MG metal gear servos, the elevator servo is a Cermark MS-747WB-90, the rudder servo is a Hitec Apollo 15, and for the throttle I'm using a Futaba S128.

A Sullivan Products large single-point refueler gives a very neat looking fueling point on the cowl. The valve will accommodate a tire valve cover cap for keeping out dirt.

I christened my model "Stars and Stripes" for obvious reasons, and after a thorough engine run-up, gave the big plane a final CG check, control check and overall inspection, and pronounced it ready to fly.

FLYING

Our local flying site was deserted the

morning my good buddy Ron McKonly and I arrived to make the first test flights. The 8-Ball Special was assembled and fueled. The radio range checked out and everything looked great.

I fired up the Saito 300 and checked out the idle, mid-range and full power. I taxied around for a couple minutes to feel out the ground handling and then pointed the nose into the wind and applied full throttle. The 8-Ball Special charged down the runway like a scalded ape and rose majestically into the air. I felt out the plane and then made some low passes for Ron so that he could take some flight photos. Unfortunately it was an overcast day and none of the flight shots were bright enough to be usable.

The 8-Ball Special handles beautifully and that chubby wing lets the plane slow down for nice, gentle landings. Aerobatics are as good as you could ask for. If you need a good sport Big Bird, the 8-Ball Special is one of the best! *MB*


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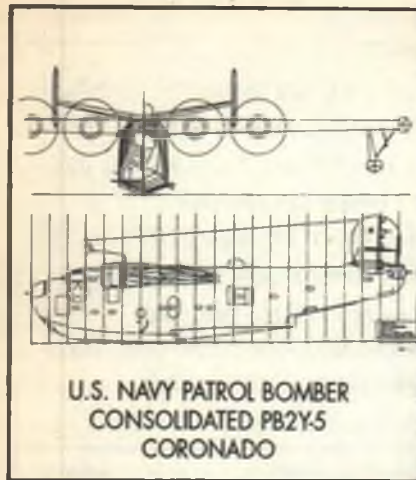


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DEAR JAKE *cont. from page 84*

DEAR JAKE:

As a subject of Her Majesty's British Empire, I must take offense to a recent column in which you tarnished the reputation of one of our nation's finest institutions.

The Royal Academy of Aeronautical Sciences (which you mistakenly referred to as the Institute of Aeronautical Sciences) would never lower itself to the depths of publishing anything on a topic so absurd as the aerion.

Your assertion that the R.A.A.S. published such a paper was a blatant and banal fabrication on your part. You cited neither author, title, nor date, because you knew full well there was none.

The Academy has never officially denied the existence of the aerion, because to do so would elevate the issue to a level of scientific purview that it clearly does not merit. Rest assured, that for the very same reason, no mention of your preposterous aerion ever has, nor ever will appear in the Academy's Journal.

As a gentleman and a scholar, I would expect you to print a retraction and issue an apology. As the miscreant and bounder that I suspect you to be, I remain confident that you shall do neither.

Sir Thomas, Earl of Lennox, Parson's Squab, U.K.

Dear Tommy (or is it Earl?):

If you look more carefully at the column you have brought to our attention, you will see that a letter writer by the name of Forrest from Wisconsin claimed to have seen the aerion article in your publication.

He asked me if I knew about the aerion depletion problem, not if I had seen the article. I was aware of the problem, and I replied to his letter from that perspective. I never made any attempt to verify the existence of the article, nor did I claim to have seen it.

If, in fact, Forrest saw the article elsewhere and inadvertently misattributed it to your Academy's Journal, then I'm sure he is sorry. I am not.

I do feel sorry for you and your country, however, because your sad sack Academy is clearly nowhere near the leading edge of aeronautical research if they don't understand and appreciate the significance of the aerion. Wake up and smell the tea, blokes! It's no wonder you English haven't built a decent airplane since the Spitfire.

By the way, I used to be a bounder, but I entered a program several years ago and was successfully treated. Lately, however, friends have told me that I am slipping back into old habits and may very well be suffering from that affliction again. I guess that makes me a rebounder.

Jake

DEAR JAKE:

I have read with some amusement over the years items in your column about poor fellows who tried to perfect radio controlled model fishing boats. One failed because a hooked fish pulled it underwater, another

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perished because the fish mistook it for the bait, and yet another was deep sixed by an RC submarine.

With the exception of the U-boat's act of war, these model fishing craft all met their demise because the game fish they were after were too large for the scale of the model boat. Consider this: a 26-inch long model cabin cruiser trying to subdue a 7- or 8-pound largemouth bass is the equivalent of sending a 12-foot dinghy out to Australia's reefs to snare a 2000-pound Great White. Unless you're Ernest Hemingway's fictional "Old Man," it's not going to work!

I laugh at your letter writers because I have been successfully RC fishing for years. The secret is to appropriately scale the size of your intended catch to the size of your model boat. Normally, a 14-foot fishing boat with an outboard motor used on a freshwater lake might catch fish in the 10- to 24-inch category. Scaling appropriately would mean that a 26-inch model boat should be equipped with light fishing tackle and should go after fish in the 2- to 4-inch range.

So it's no wonder, then, that when I send my 36-inch model of a flying bridge SeaRay out on Lake Elsinore to catch 5-inch bluegills, I always do smashingly well.

Please, Jake, if you should ever hear from another reader seeking advice on how to fish with an RC model boat, just tell him to keep the size scale correct and he'll have no trouble at all.

Bradley in Ocala, FL

Dear Brad:

I think you're on to something here, and I've followed your lead and taken the next logical step.

Real-world fishing is a nasty affair involving sunburns, smelly bait, bulky life preservers, and weather uncertainties, so I wholly agree that downsizing and simplifying to the model level is a very wise thing to do. And you are absolutely correct about properly sizing your model equipment for your intended prey, but I don't think you took the idea far enough.

I built an 8-inch model of a Grand Banks trawler, complete with outriggers, winches, and nets. It is radio controlled and fully operational. But here's the beauty of it: I run it indoors in my wife's aquarium. No sunburn, no sudden storms to worry about, yet all the pleasures of Sir Isaac Walton's favorite sport. And you should see the haul of guppies so far!

Jake

DEAR JAKE:

One of the most common airfoils is known as the Clark Y. How did it get that name?

Jimmy in Los Angeles, CA

Dear Jimmy:

The Clark Y is so called because its shape resembles that of George Reeves in spandex. (Hint: "Clark, why aren't you ever around when Superman shows up?")

Jake MB

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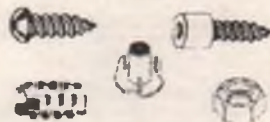
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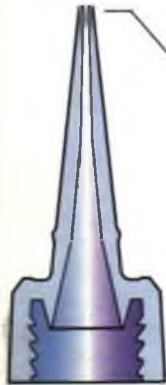


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