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## ON THE COVER

Ready to tackle a real building project? This month we're presenting the first of a two-part construction feature for Steven L. Stratt's outstanding precision scale replica of the graceful 1937 Focke Wulf Fw 56 Stösser, designed for Astro 40 power. In Part 1, the author gives some background on the full-scale aircraft and how he came to build the model; Part 2 will deal with the actual construction and detailing. At 2"=1' scale, the model spans 70 inches, and is of all-wood construction. Article begins on page 50. Photo by Steven L. Stratt.

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## PLANE TALK



Gerry Markgraf must be one of Southern California's most prolific sport electric fliers. Included in the stack of photos he sent us was this one depicting his Davey Systems Heron, a Bill Winter design. Gerry writes: "The Heron is one of the best flying airplanes I own. Power is a Lelsure

### WE WANT YOU IN MODEL BUILDER!

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

Electronics gold label (high performance) 05 with the extended gearbox, swinging a Master Airscrew folding prop. I really enjoy Davey kits and Lelsure motors, as I get excellent performance and the cost of the Lelsure motors is a bargain." The Heron spans 65 inches, wing area is 545 square inches, and the controls are rudder, elevator and throttle. *Gerry Markgraf, 3120 Sunrise Ridge Lane, Hacienda Heights, CA 91745.*

It was way back in 1934 that Conrad Hansen, leader of the Hangar 13 model club in Beloit, Wisconsin, designed a big, good-looking cabin gas job known simply as the "Ten-Footer." Members of the club pitched in to build it, and the first flight took place on August 25, 1935. Now, 59 years later, George Niebauer, one of the original Hangar 13 group and still active in SAM O.T. FF events, has recreated the Ten-Footer in 49-inch span 1/2A Texaco size. At 11.5 ounces and powered by a Cox Medallion .049, George says the model flew perfectly right from the start—including the fourth flight of the day, when he tried an R.O.G. takeoff and forgot to set the engine timer! With 10cc of fuel aboard the ship went O.O.S. in about 4 minutes, but fortunately the famed Las Vegas thermals were not yet out in force and they soon recovered the airplane about a mile downwind. George is now planning to replace the Medallion with one of Larry Jenno's replica Ohlsson .12 spark ignition engines; he also has plans for a 33-inch span, .020 version of the Ten-Footer. *George Niebauer, 1405 E. Vegas Valley Dr., Apt. 281, Las Vegas, NV 89109.*



Pakistani modeler Athar Mirza made the offhand remark one day that a friend's Quicksilver MXL-II ultralight would not be difficult to duplicate in model form. Athar's modeling friends, knowing better, dared him to build one, at which point he began to realize that there was a lot more involved here than he first thought. But he persevered, and after 480 hours of work, unveiled this nicely built and colorful 1/4-scale replica. This is apparently the first such project of its kind in Pakistan. Span is 8 feet, wing area is 12 square feet, flying weight is 18-1/4 pounds, and the power comes from an ASP 1.08 two-stroke. For balance purposes Athar moved the engine from the trailing edge of the wing to the leading edge, but this is really the only major deviation from scale. Test flights have been completely successful, and although he didn't say, we'd bet the model is a slow (and therefore very realistic) flier. *Athar Mirza, 15-A-S-2 Chaudury Park, Amir Road, Bilal Gung, Lahore, Pakistan.*

to duplicate in model form. Athar's modeling friends, knowing better, dared him to build one, at which point he began to realize that there was a lot more involved here than he first thought. But he persevered, and after 480 hours of work, unveiled this nicely built and colorful 1/4-scale replica. This is apparently the first such project of its kind in Pakistan. Span is 8 feet, wing area is 12 square feet, flying weight is 18-1/4 pounds, and the power comes from an ASP 1.08 two-stroke. For balance purposes Athar moved the engine from the trailing edge of the wing to the leading edge, but this is really the only major deviation from scale. Test flights have been completely successful, and although he didn't say, we'd bet the model is a slow (and therefore very realistic) flier. *Athar Mirza, 15-A-S-2 Chaudury Park, Amir Road, Bilal Gung, Lahore, Pakistan.*



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Recently back into modeling after a 30-year hiatus, David Worthington says he's turned out a couple of large gliders and a host of rubber and CO<sub>2</sub> powered stick-and-tissue models, the latest being this nicely built Sig Monocoupe which he modified somewhat to accept the Russian-made DP-03 CO<sub>2</sub>-motor also handled by Sig. Flying weight of the 24-inch span model is 3 ounces. At the time of his writing, David had only had a chance to do some test-glides, as Indiana winters and CO<sub>2</sub> systems generally don't mix well. The Monocoupe should prove to be a fine flier, as the Sig kit was patterned after Tom Stark's 1973 Nats winning rubber ship. *David Worthington, 55805 Cedar Rd., Mishawaka, IN 46545.*



A Pistachio plan by Dave Linstrum served as the inspiration for this attractive little 1931 Farman 250, scaled up to 13-inch span Peanut size by Stan Fink. Stan says the lightweight dummy Jupiter 380 engine was made of black tissue tubes wound with silver thread to simulate the cylinder fins; the pushrods are cut-off straight pins. Lettering was done with black Japanese tissue, while the windows, hinge lines and other details were done with an Itoya fine-point pen. Weight without rubber is a scant 6.8 grams. Stan sells some FF model plans as well as a booklet on scale detailing; see his "DOMEDUSTER PLAN PACKET" classified ad on page 90. *Stan Fink, 1810 Pine St. #2R, Philadelphia, PA 19103-6602.*

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## • Bathtub Aero- dynamics

## • The Effects of Altitude

I received a letter from reader Joe Barkley of Hixon, Tennessee, in which he sent me a copy of "Bathtub Aerodynamics," an article from "an old *Scientific American* volume of amateur science projects."

"Bathtub Aerodynamics" was written by David Raspet, age 13, and his father, the late August Raspet, of the Aerophysics Department, Mississippi State College. The story started when the younger author discovered that he could make little molded plastic airplanes glide well in the bathtub. Father then suggested other tests, and proposed methods by which they made the research quantitative.

Father knew, and David learned, that air is a "fluid," and that aerodynamics is a branch of fluid dynamics. Shapes which will fly in the air will also "fly" underwater; but since water is much denser than air, we have to make some changes. The viscosity of water is also different from that of air, and this will also affect our comparative flight test data; but the big factor is the density of the water.

The wing loading of little molded plastic airplanes is much too high for them to glide in the air, but in water they glide fine, and quite slowly. Water is 815 times as dense as the air at sea level, and the aerodynamic (fluid dynamic) formulas tell us that lift and drag are directly proportional to the density of the fluid; but

that's only one of the reasons why the higher density changes things. Because of the buoyancy provided by the water (due to its density), a molded plastic model will weigh only 5 percent as much in water as it will in air.

The model is gliding in a dense fluid, and is therefore able to generate the required lift at a much lower velocity than in air. Remembering that lift and drag vary as the square of the velocity, the ratio of the gliding speed of the model in air to its gliding speed under water at the same lift coefficient will be the square root of 815, or 28.5:1 if its effective weight is the same; but the effective weight is a small fraction of what it is in air. Both factors lead toward Slow City!

The Raspets found gliding speeds in water of around 1 foot per second. Out of curiosity, I went through the calculations for a typical plastic model and got a theoretical glide velocity under water very close to what they measured.

The best glide ratio the Raspets achieved was 3-1/4:1, with a Spitfire. For an explanation of this disappointingly low glide ratio under water, let's look at the relative Reynolds numbers. The Reynolds number in air at sea level is approximately the speed in miles per hour, times the chord in feet, times 10,000. Raspet said the Reynolds number in water is the speed in miles per hour, times the chord in feet, times

150,000.

Therefore the RN in water is 15 times as great as the corresponding RN in air, not 815 times higher as one might expect due to the higher density. This is understandable when we look at the entire formula for Reynolds number:  $RN = (\text{density})(\text{velocity})(\text{length}) / \text{coefficient of viscosity}$ . (The "length" we use in figuring airplane RN is the wing chord.) The coefficient of viscosity is much higher for water than it is for air; and being in the denominator, its effect is to reduce the RN.

So the RN for a plastic model with a 1/2-inch chord flying under water at 1 mph is only 6,250. By comparison, the RN of a full-scale airplane is usually several million. Low RNs normally mean high drag coefficients. No wonder the bathtub glide ratios aren't anything to write home about!

Mach number is the flight speed divided by the speed of sound in the flight fluid. Instead of 1,100 feet per second (in air), the speed of sound in water is 5,000 feet per second. This, combined with the low flight velocities in water, makes for very low Mach numbers. Raspet observed that their plastic Grumman F9F flew at 1 foot per second under water. It was therefore at a Mach number of 0.0002—well short of the sonic-boom range!

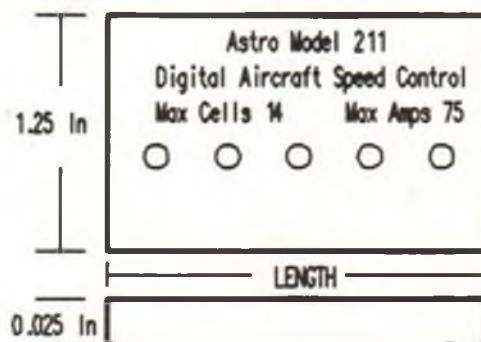
The Raspet-and-Son article had other interesting informa-

*continued on page 14*

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## ONE SLICK TELEMMASTER

According to the folks at Hobby Lobby, the Telemaster 2000 is back and better than ever, now being produced in the Czech Republic. Of the



seven high-wing Telemasters listed in HL's current catalog, the 2000 is by far the cleanest and sportiest looking. It's also quite a big airplane, spanning 79 inches; wing area is 875 square inches, and the engine specs call for a .40-.60 two-stroke or .60-.90 four-stroke. The model comes as a pre-built balsa/plywood airframe, ready for equipment installation and covering. Should make a fine trainer or easy-flying sport ship. An extra element of fun can be had by setting it up with optional flaps as detailed in the instructions. From Hobby Lobby, 5614 Franklin Pike Circle, Brentwood, TN 37027; (615) 373-1444. (Their 124-page product catalog is available on request.)

## ELECTRIC-ASSISTED SOARER

The T-tail "Symphony" from Northeast Sailplane Products is somewhat unique in the electric sailplane market, in that it was designed to perform on a par with contemporary open-class thermal duration ships while at the same time being self-launchable, effectively doing away with the hassle of a ground-based winch or hi-start. The fuselage will accommodate the really big motors and up to 28 cells, but because the emphasis here is on thermal



soaring performance, NSP recommends a geared Astro 15 FAI and 10 cells to keep the weight down to about 73 ounces while still providing three strong climbs to altitude on a single charge. The Symphony's obechni-sheathed foam-core wing, a three-piece design with SD7032/SD7037 airfoils, spans 110 inches and covers 975 squares; the stab is balsa sheeted foam, and the fu-

selage is Kevlar-reinforced fiberglass. The kit is priced at \$374.95. NSP can also set you up with a complete power package—motor, prop, speed control, battery pack, spinner, etc. The Symphony kit and power package are described in more detail in NSP's full 200-page catalog, yours for \$7.00 (sent 1st class mail) from Northeast Sailplane Products, 16 Kirby Lane, Williston, VT 05495; (802) 658-9482.

## MAGNUM'S LITTLE SCREAMER

The new Magnum XL .15 BB/ABC/FSR is a robust-looking little powerhouse featuring



stainless steel ball bearings on the crankshaft, Schnuerle porting, dual-needle RC carburetor, muffler, and true chrome plating (not nickel as used in some other engine brands) on the cylinder liner for an exceptionally long life. Economically priced at \$89.95 list—check it out at your local hobby shop. From Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728-8610; (714) 963-0133.

## GREAT PLANES GOODIES

The P-51D Mustang is the latest addition to Great Planes' Legendary Warbird Series of 90 percent pre-built sport models—ARFs that feature a strong, interlocking all-wood structure skinned with a composite material consisting of a polyfoam base, plastic skin, color layers and fuel-resistant coating. The model is designed for .40-.50 two-strokes or .48-.70 four-strokes; wingspan is 57 inches, wing area 580 square inches, and the flying weight is quoted at 6-3/4 pounds. A fixed gear is provided, but optional re-



tracts (Hobbico's low-profile units are recommended) are easily fitted. Complementing the kit is a full hardware package made up entirely of Great Planes' own line of high-quality



ity accessories. The ARF Mustang carries a suggested list of \$299.99.

Joining Great Planes' line of Pro CAs and epoxies is Pro Wood Glue, a safe, non-toxic aliphatic resin formula that dries quickly, sands easily and cleans up with water. Packaged in 2, 4 and 8-ounce sizes. From Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-3630.

## A HELPING HAND

Avey Shaw is a longtime modeler who, like all of us, has at times wished he had one more hand to help with some awkward modeling task. An



inventive sort, Avey at last sat down with a sketch pad and came up with what he calls his "3rd Hand," a simple and yet ingenious clamping device that is easily operated with one



hand. We received a sample and wasted no time in putting it to the test. The 3rd Hand uses one or more rubber bands to provide the amount of clamping force needed, and is designed such that no matter how far you spread the jaws (up to a full 5 inches), the clamping pressure remains constant. Each jaw has a rotating pad at the extreme end. The jaws and pads are molded from polypropylene—there's no way you'll accidentally glue a 3rd Hand to your model's structure. All in all, a well-designed, well-made, extremely useful workbench tool that performs as advertised. We understand that 3rd Hands are now available both from Tower hobbies and Nick Zirola Models (29 Edgar Dr., Smithtown, NY 11787). A package of two retails for \$5.98.

### "WACKY TACKY"

You'll probably never see this product unless you happen to wander into the RC car section of your local hobby shop, but it has lots of applications for us airplane and heli types as well. Wacky Tacky is a type



of cleaner being marketed under the Dynamite label (Dynamite is Horizon's proprietary line of RC car accessories); it's a black, putty-like substance that you simply press into a dirty spot and then pull away, taking dirt and grime with it. Stretch and fold it back on itself and the dirt magically disappears. Suggested list is only \$4.95. From Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.

### RUBBER SCALE FUN

Tom Herr has been cranking out new rubber scale kits faster than we can write 'em up. The two latest additions to the Herr Engineering line are a 30-inch span Fairchild 24 and 24-inch span Fokker D-VII, both featuring precision laser-cut parts, colored tissue, decals, 9-1/2



inch plastic prop, rubber, computer-drawn plans, complete building instructions, etc. Both kits are priced at \$36.95, at better hobby shops or direct from Herr Engineering Corp., 5648 Kingman Ave., Portage, IN 46368; (219) 759-1940. (Shipping is extra if ordering direct.) A complete catalog is available for \$2.00, and is included with each order.

### A MUST-HAVE CATALOG

"Don't call 'em toys. That's what kids usually break. We put real effort into our ships . . . before we break 'em." Such words of wisdom are typical of what you'll find in the new 1995 product catalog from Ken Sykora's Oldtimer Model Supply—15 pages chock full of FF-related goodies, much of which



is unavailable elsewhere, and every page is heavily laced with artist Otto Kuhn's captivating illustrations. (We're showing Ken's '93 catalog because the new '95 is printed on rather dark blue paper and wouldn't reproduce well here.) Listed is a full line of rubber model accessories, building and covering materials, books, and lots more, in addition to about 500 free flight model plans of all types—rubber scale in all sizes, Old Timer sport and competition rubber and gas, towline gliders, twin pushers, even some scale three-view drawings. To get your copy, send \$2.00 to Oldtimer Model Supply, P.O. Box 7334, Van Nuys, CA 91409.

### SCIENTEXT'S O-46A

For you FF Scale types, ScienText has come out with a new kit for a really pretty 28-inch span Douglas O-46A, designed for rubber power. This is something of a milestone for ScienText in that it's their first full kit, complete with over 70 laser-cut parts, all sheet and stripwood, vacuum-formed canopy, wheels, prop,

full catalog of kits and electric power motors and accessories. Write to ScienText, 48 Whitney St., Westport, CT 06880-3753; (203) 221-1326.

### BRODAK'S NEW STUNTER

Yet another recently introduced CL stunt ship from Brodak is the Tanager, a flap-equipped competition profile stunter that appears to be quite conventional in design and at the same time quite attractive. Specs: 52-inch wingspan, 576 square inches, 37-1/2 inches long, .35-.46 en-



gine required. The kit sells for \$59.95 and comes complete with pre-shaped profile fuselage, die-cut ribs and plywood doublers, pre-bent gear, adjustable leadout guide, full hardware package including one of Brodak's heavy-duty bellcranks, two sheets of full-size plans, illustrated instructions, and more. Produced by Brodak's Manufacturing & Distributing Co., 100 Park Ave., Carmichaels, PA 15320; (412) 966-2726.

### FOR RCHLG FANS

One of several new competition RC hand-launch gliders debuted at the Endless Horizons trade show this past January was the Quest, produced by K&A Models. The Quest sports contemporary design and construc-



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*continued on page 84*



tion. They flew rubber-powered plastic models under water and gained 6 feet or more of altitude (to the top of a swimming pool). They also experimented with powering jet airplane models underwater, using dry ice inside the fuselage for propellant. Some of their molded plastic underwater fliers had over a foot of wingspan.

"Wet" models, formerly meaning fuel-powered jobs instead of electrics, has taken on a second meaning. I wonder if we will one day have underwater AMA events? I'll have to get some plastic models so I can

play in the bathtub too; my present toy airplanes are too large.

Thank you Joe Barkley for sending the Raspets' article, "Bathtub Aerodynamics." (Actually that should have been "Bathtub Hydrodynamics.")

### THE EFFECTS OF ALTITUDE

A few months ago *Boeing News* carried an article on a Boeing 757 landing and taking off from Bangda airport near Changdu, Tibet. "Ground level" at that airport is 14,219 feet above sea level; it's the high-

est commercial airport in the world. Boeing had to demonstrate single-engine capability at that altitude before the airplane could be certified for commercial operations there. This will be a new record for passenger jet certification, although Boeing airplanes routinely fly from La Paz, Bolivia at 13,313 feet.

I once flew a model airplane at Snoqualmie pass in the Cascades. The altitude was only around 2,500 feet, but it was high enough that the performance of the model was noticeably poorer. Being a sea level dweller (make that 50 feet), I have nothing to complain about, but I appreciate the problems of modelers living in Denver, "the mile-high city", and many places much higher.

The Rand McNally *Almanac of World Facts* tells me that Denver isn't the highest point in Colorado; it's actually one of the lowest. The mean height of that state is 6,800 feet above sea level! Idaho, Nevada, New Mexico, Utah, and Wyoming average almost as high. The mean height of the United States is 2,500 feet.

So let's spend a little time studying the effects of altitude (low-density air) on airplane performance. It fits in with our previous discussion of flying in water, a high-density fluid. A prime effect of altitude is that an airplane in the thinner air must either fly faster or at a higher angle of attack in order to generate lift equal to its weight.

An airplane optimized for sea level operation will cruise at roughly L/D<sub>max</sub> (maximum lift-to-drag ratio) at sea level. When it operates at a higher lift coefficient to fly level in lower density air, the drag will increase more than the lift, and the thrust required—and therefore the power required—will increase. If it flies faster to maintain lift, this will also increase the power required.

The second prominent effect is that at altitude, an internal combustion engine (or living bird) can't get as much air to breathe, and therefore generates less open-throttle power—less power when we need more power in order to provide the higher velocity or the higher lift coefficient required to maintain altitude.

Rubber-powered and electric-powered models have an advantage over "wet" powered models in flying at altitude. Rubber bands and electric motors deliver the same power in lower density air as they do at sea level. Actually, if they flew high enough, electric models could get into trouble due to insufficient cooling air, but that problem is unlikely unless the model was already marginal in the cooling department. So electric and rubber models don't lose power with altitude, but may suffer lower lift efficiency there, along with all other flying things.

*continued on page 22*

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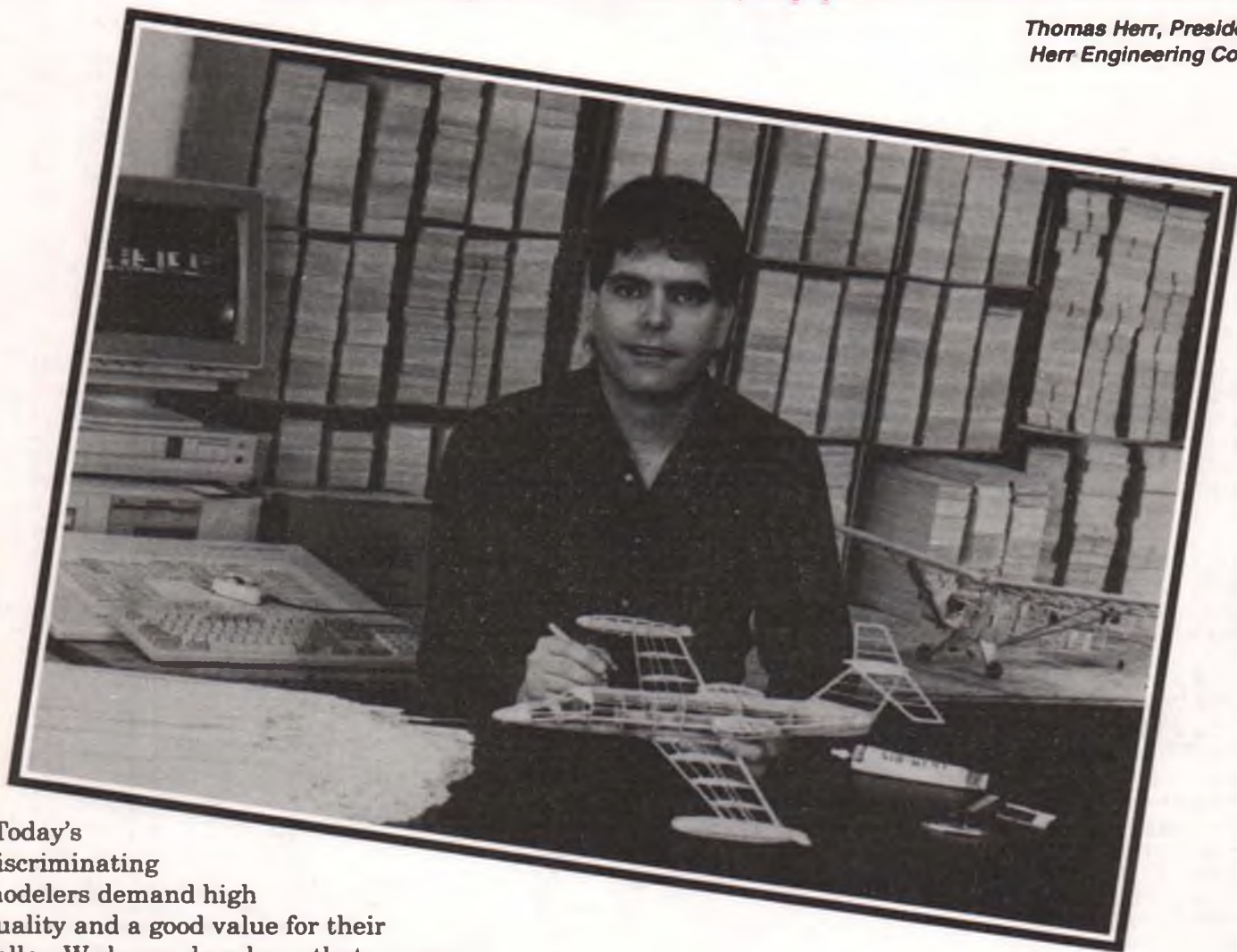
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# AT LAST, A SPECIAL INTEREST GROUP FOR ELECTRICS—THE NEAC

**Electric fliers throughout the U.S. finally have a voice with the AMA in the form of the National Electric Aircraft Council. Also discussed: The BASIC Stamp Module from Parallax, Inc.; and the new DeWalt cordless drill motors as used for electric flight.**

I called *Model Builder's* editor the other day and said, "Hey Phil, if you ever get an electric helicopter for a kit review, please send it to me!" His reply: "Hey Roger, I got one in the mail two days ago—I'll send it to you!"

Sure enough, a Kyosho HyperFly electric helicopter kit arrived at my door a couple of days later. At this writing I'm busily putting it together—stay tuned next month for a kit review.

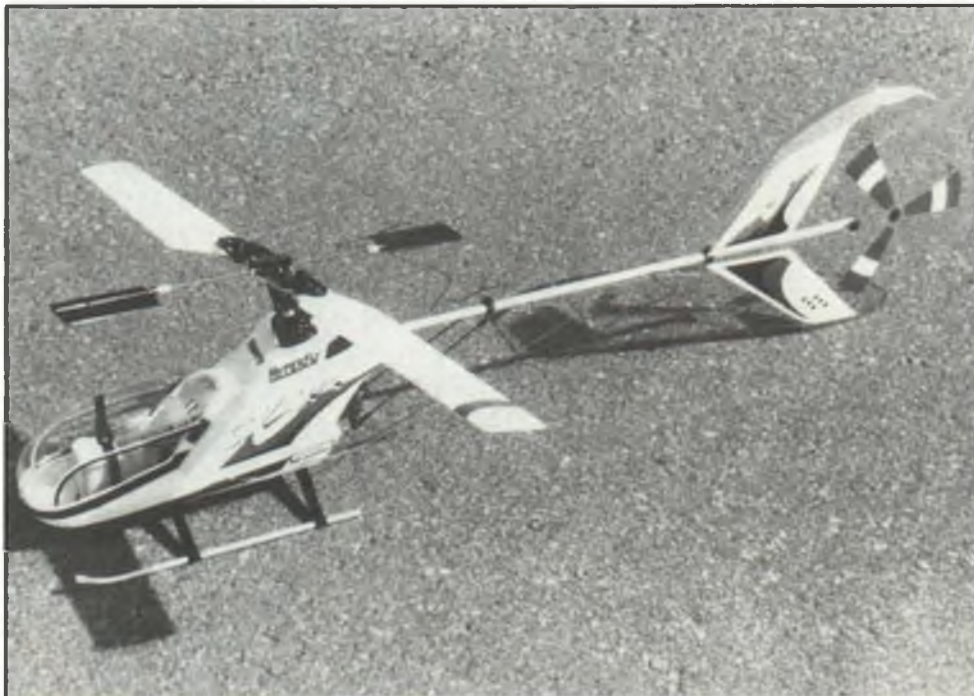
### THE NATIONAL ELECTRIC AIRCRAFT COUNCIL

Larry Sribnick sent me a nice letter introducing the National Electric Aircraft Council, or NEAC. As many of you know, there has been an on-again, off-again electric special interest group (SIG) for a number of years, but the idea has never really taken off like it has for other SIGs.

Larry has asked for our help in getting this one off the ground to represent the electric flight contingent to the AMA. As the AMA's SIG, the NEAC would advise in all matters regarding electric flight competition and thus would become a unified voice for electric fliers across the country.

Larry goes on to show a good example of how the NEAC would be able to help all of us. Originally, the AMA decided not to have any electric events at the 1995 Nationals, probably because of poor attendance in electric events at recent NATS. However, according to my recent correspondence with Larry, the '95 Electric Nats has been saved and the NEAC has been officially designated as a SIG of the AMA.

The NEAC is organized primarily around club participation, not individual partici-



Coming next month, Roger "Reform" Jaffe tries his hand at electric helicopters when he reviews the Kyosho "HyperFly" from Great Planes Model Distributors. Trust us, this is gonna be interesting . . . .

pation as in past SIGs. When a club wishes to participate, they select a club representative whose duty is to act as a liaison between the club and the NEAC. The club doesn't necessarily have to be "electric only"; a wet-power club with a few members who fly electric would qualify for membership. Individuals not affiliated with a flying club would also be invited to participate through a member of the council specifically appointed to handle individual electric fliers.

Larry believes that the key to the success of the NEAC is to keep it simple—"no dues, no power, no politics." Sounds great

to me! Larry is quick to note that although most of us know him as the "SR" in SR Batteries, he is organizing this as a modeler of over 40 years' experience, an electric flier, an AMA CD and as the AMA's District II representative to its Electric Contest Board.

He believes that "modeling companies have no place in the NEAC and their involvement was one of the reasons for the unsuccessful past attempts to form a national SIG for Electric Flight." If this idea is to succeed, it can't be thought of as being an East Coast or West Coast group, or any other perception that might fragment the membership.



Communication between council representatives will be done through an e-mail arrangement implemented by Larry. Using e-mail, NEAC communication is extremely easy and very cheap! Each club representative needs to have a computer and a modem—Larry will arrange the rest.

As I write this (February 1995), NEAC membership is up to 500 and more are always welcome. To join NEAC, first discuss it with your club. If your club wants to participate, send Larry the name of the club, its AMA club charter number, the total membership, and the number of electric fliers in the club. He'll also need to know the name of the club representative, his/her address, phone number and whether that person has access to an e-mail system like Internet, America On-Line or CompuServe.

Larry Sribnick's address is Box 287, Bellport, NY 11713; (516) 286-0079, fax (516) 286-0901, on CompuServe at 74167.751, and on the Internet at 74167.751@compuserve.com.

## MICROPROCESSOR "STAMP"

John Piri contacted me about an exciting new product that deserves some mention. You may remember John as the owner of West Coast Blimps and Electronics, the manufacturer of the blimp I reviewed in my February 1994 column. John has found a nifty little microprocessor-based control unit that can be programmed by the end user (that's you and me!) using a very simple programming language and your home computer.

Being in the blimp business, John needed a speed control unit that was very light, suitable for very low power motors, and which could run a motor in both directions with mid-stick being "off." The blimp unit that I reviewed had an original design speed control unit that fit the bill, however, in the never-ending quest to make things cheaper, lighter and smaller, John discovered the "BASIC Stamp Module," produced by Parallax, Inc. of Northern California. The most expensive unit costs only \$50.

It is a full-fledged computer unit with eight general-purpose I/O lines, a 256 byte EPROM, a 4 Mhz clock in a 14-pin SIP package. There is also an on-board parallel interface. In English, this means there are eight "channels" that can be used to send information to the unit for processing or to control output devices. The stamps can be programmed with up to 80 computer instructions, and the high clock speed



Shawn Hartman shows off his dad Scott's latest electric fan ship, dubbed "Terminator." Scott's electric P-51 was a featured construction project in last month's *Model Builder*. The Terminator is a combat style ship powered by an unspecified 05 "can" motor running on seven cells, turning a Sonic-Tronics folding prop through a Master Airscrew gearbox. At only 33 ounces all-up weight, Scott says the climb has to be seen to be believed, and that the roll rate is as fast as most ducted fan models.

means that timing increments can be as small as 10 microseconds—enough resolution for any type of RC operation. For John's use, it's ideal because it is small (1-1/2x1/2x1/8 inch) and light (1.3 grams) and can be programmed to do exactly the functions that John needs. The penny in Figure 1 gives you an idea of just how tiny this unit is.

Its intrigue for the rest of us lies in the fact that it can receive electronic timing signals directly from the radio receiver and send signals directly to servos or other electronic devices (LEDs, speakers, etc.). Say you have a plane with a V-tail, you don't have enough room in the fuselage for a mechanical mixer, and you don't own a radio capable of electronically mixing the rudder and elevator channels. No problem—you can program a stamp unit through your home computer, send the

receiver's elevator and rudder signals into the stamp as inputs and send the mixed control outputs directly to the two servos.

Figure 2 is a representative wiring diagram for a small throttle control. Notice that there is only one FET; you can piggyback them to drive larger motors. Programming the unit is done in a modified version of the programming language called BASIC.

If you want to program these units yourself, you'll also need to purchase a programmer's kit for \$99. This will allow you to plug the unit into the back of your computer and download the software instructions into the stamp. If you just want one unit for a simple purpose, John has agreed to offer his programming services for a nominal fee.

You can contact John at 713 Cottonwood Dr., Ridgecrest, CA 93555; (619) 375-2108. Be sure to ask him if he has software available to suit your needs. I'll leave it to you and John to sort out the details.

These computer stamps have only been available for a short time, so new things are being learned about them every day. For more information and ordering instructions, call Parallax, Inc. at (916) 624-8333 or fax them at (916) 624-8003. I have a one-page data information sheet that I can send to you if you send me a SASE. I can also fax it to you if you give me your fax number.

## CONTEST CALENDAR

The annual Mid-America Electric Fly is scheduled for July 15-16. Once again it will be sponsored by the Electric Flyers Only and the Ann Arbor Falcons clubs and will be located at the Falcons' field just 1 mile outside of Saline, Michigan. Ken Myers is the CD for Saturday and Keith Shaw will be CD on Sunday. As in the past, there will be several low-key events such as Most Loops, Most Rolls, Best Scale, Best Biplane, Best Multi-Motor, CD's Choice, and of course All Up/Last Down.

In his press release, Ken Myers says: "This is mostly just a fly-in and a learning and sharing experience, with the added bonus of watching The Master (aka Keith Shaw) at his home field." This fun-fly is one of the country's premier electric events, so you should try to attend if you can. For



more information, contact Ken at 1911 Bradshaw Ct., Walled Lake, MI 48390; (810) 669-8124.

## BROWSING AT HOME DEPOT

I first read about this next item in the newsletter of the Westmoreland Electric Soaring Society; the information comes from Herminio Perez.

While rummaging around his local Home Depot, Herminio saw a display for some new DeWalt cordless drills. They have a new custom motor designed for high torque and high efficiency and is rated at 220 watts. Power is supplied by 9 to 12

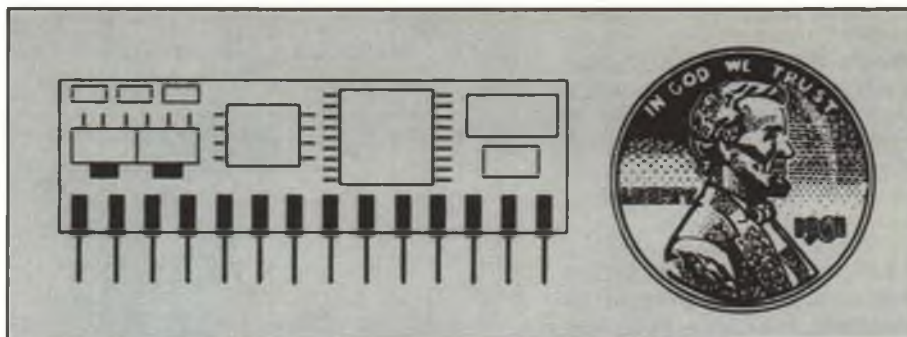


Figure 1. Simplified line drawing of the "BASIC Stamp Module" as produced by Parallax, Inc., shown with a penny for size reference. These little microprocessor-based units can be programmed by the user, assuming you have a home computer, to perform a number of different functions. If you don't have a computer you might be able to get John Pirt of West Coast Blimps and Electronics to program it for you. Details in text.

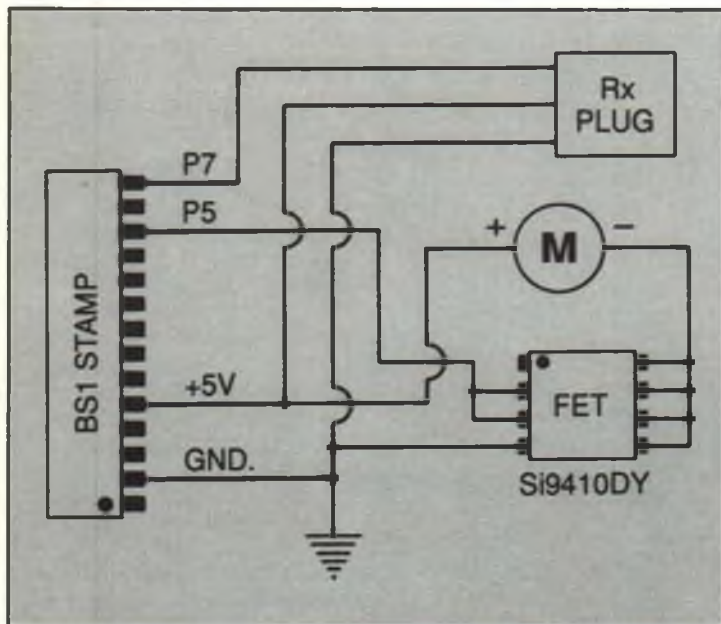


Figure 2. Diagrammatic drawing of how a BASIC Stamp Module could be used in a small speed control.

cells.

The motor is a little larger than a Mabuchi 700, has replaceable brushes, two ball bearings and a built-in cooling fan. Herminio ordered a motor from the DeWalt factory for \$36 and says it's definitely worth the price. Herminio reports 6,400 rpm with a 13x12 prop at 30 amps. The motor needs a 5mm prop adapter and some capacitors to arrest the electrical noise.

If you want to play with one, call 1-800-4 DEWALT for the nearest parts dealer. Ask for part number 798491-xx,

where xx determines the number of winds: "08" is for 12 cells, nothing is for 8 cells. "xx" is something else for 10 cells—Herminio didn't say what it is, so you'll have to ask when you order it.

...

Please keep the letters and e-mail coming—I always enjoy hearing about and seeing photos of your projects. My address is 6462 Sunny Brae Dr., San Diego, CA 92119; (619) 463-4453 (between 8 and 5 Pacific time, Monday through Friday). My e-mail addresses are 74164.3237 on CompuServe; on the Internet, it's 74164.3237@compuserve.com.

As a side note, some of you have asked why I give my work phone number instead of my home number. In my line of work, it's not a problem to call me at my office. In fact, I prefer it because all of my modeling notes are in my office, and besides, calling me at home is usually far more distracting (I have four children under the age of 9). So, I just put my work number down for everything related to modeling. Tune in next month for a review of Kyosho's HyperFly electric helicopter. **MB**

# SIG

## REPORT CARD ON HINGES

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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
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Delayed Cure	A	C	C	F	F	F	F
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# THE CAMERA EYE, PART 2

**The conclusion of our columnist's two-part dissertation on the do's and don'ts of model photography.**

**M**any modern cameras are designed to take the thinking out of lighting, exposure and focus, but even the most advanced automatic camera requires a thinking human to operate it. When shooting pictures of airplanes and fliers on the flying field, pay attention to lighting conditions. With color films particularly, contrast and shadows require some planning.

On overcast days, lighting is less critical than in bright sunshine. It will be flat and less contrast, so that pictures shot without much regard to lighting direction and shadows will look pretty good. In bright sun, however, the photographer must pay attention to lighting direction and shadows.

Normally, the photo should be taken

proper direction, shadows can be a problem.

Note the flier's face. If he's wearing a hat, there may be shadows over his eyes. Parts of the plane that you want to feature may be dark. You may be able to turn the plane to get rid of shadows. You can ask the pilot to take off his hat and perhaps his glasses if they are the kind that darken in sunlight. Another solution is to use fill flash. Some cameras have automatic fill flash settings; with manual equipment, just select an exposure for the ambient light, and use your flash at a low output so that it doesn't overpower the ambient light. The result will be a pleasing photo of a modeler without a black shadow under his hat, and with all parts of the plane well lit.

sharp is what's important.

If you have more than one lens, remember that a wide-angle lens has more depth of field than a telephoto. If you want the whole picture sharp, use a shorter focal length lens (35mm or 50mm). If you want to isolate the subject (just the plane, or just a person), use a medium telephoto lens or set your zoom at a medium length, such as a 135mm. That will throw the foreground and background out of focus.

Pay as much attention to the things in the picture that aren't your subject as to the things that are of interest. A messy background can ruin an otherwise attractive picture. We've all seen a picture of a beautiful airplane undermined by a dismembered pair of ankles and shoes right behind

the plane. If you're composing the picture, ask the person connected to the shoes to step aside so you can get a clean picture.

If you can get the plane owner's permission, remove the clutter of fuel bulbs, pit boxes and tools, so that just the plane shows. Shoot from an angle that crops out the parked cars, lawn chairs, etc. If you can get the pilot to cooperate, take the plane out onto the grass or a clean area of pavement, where there's nothing in the picture but the plane.

Taking pictures at a fun-fly or contest provides opportunities for interesting candid or action shots. Candid photos of modelers can be fun—catch the fliers engaged in animated conversations, working on



The U.S. F2B Precision Aerobatics team at last year's Control Line World Champs in Shanghai, China. From left: David Fitzgerald (8th), Paul Walker (4th), Ted Fancher (5th), Bob Hunt (8th), and Robbie Hunt (3rd in the Junior F2B event). All photos this month are courtesy of Ted Fancher.

with the sun at the photographer's back. Pictures taken the opposite way will be back-lit, and the side of the plane facing the camera—and the modeler's face—will be dark. Even with everything facing the

Depending on your lens and the lighting conditions, you may not be able to get all of the picture in sharp focus. Give some thought to what part of the picture is most important. Make sure that the part that's





Germany's Claus Mielke has a reputation for turning out some truly beautiful stunts, and his China Clipper is no exception. Claus is one of Europe's finest CL fliers and regularly writes for *Aeromodeller* magazine.

their planes, etc. A medium telephoto or zoom lens can help you get such photos unobtrusively.

When the action is under way, the possibilities are limitless; pit crews at work, pilots in the center circle, officials with bullhorns and stopwatches, and even planes in flight can be photographed. The medium telephoto is good for the pit/officials/sidelines photos. Try to get the faces of the people involved. Depending on the timing, you may be able to photograph pits from inside the circle, getting out of the way when the engine starts (this will work for stunt or carrier, but not racing and combat!).

A long telephoto (300-400mm) can really help action photography. You can shoot pits from the opposite side of the circle, and get good close-ups of pilots in the center. Get the racing pilots grimacing as they bump and jostle for position, the combat pilots with their arms intertwined, speed fliers scurrying around the pylon and the stunt pilots in the odd postures they assume in their intense concentration. If you don't have a long telephoto, you may be able to get the pilots and officials to allow you to lay down inside the circle for better close-ups.

Planes in flight offer a special challenge, but the results can be rewarding. Takeoff and landing are good times to catch planes because their actions are predictable. Set up in the right spot and, if your camera doesn't focus automatically, "zone-focus." (Focus on the ground at the

spot the plane will pass, and shoot when it gets there.)

Aerobatics planes can be captured in flight with a medium telephoto. Their maneuvers are predictable, so set up in a logical spot and zone-focus. Pick up the plane in your viewfinder as it approaches and shoot when it's in the right place. If you can get the plane in an unusual attitude with enough background for a frame of reference, you may have a great shot. Remember, fill the frame as much as possible. If you're too far away, the plane will just be a dot in the picture. With a standard lens, you may get an interesting picture by getting close to the circle and capturing both the plane and pilot. (See the picture in the February

1995 edition of this column with David Fitzgerald's stunt plane on the ground, and Ted Fancher and his plane in flight in the background.)

Navy Carrier flights lend themselves to interesting pictures as the planes hover in their slow flight or make their landings. Racing planes in close formation can be a good shot as well. (Tip: shoot with a telephoto from the opposite side of the circle, where it's easier to follow the action.) Scale planes often can be photographed close-up dur-

ing their flights for a realistic effect, because many of them move slowly and fly low.

Combat photography requires some concentration but can result in great pictures. It's easier to shoot slow or 80-mph combat than fast combat, but even fast planes can be captured in action. The trick is to get far enough away that you can keep the planes in your viewfinder—the opposite side of the circle from the action is usually the best vantage point. Use a medium telephoto or zoom at the most close-up that you can follow one plane with. Follow a single plane and snap the shutter when the second plane appears in the picture. You can get close passes and cuts that really capture the spirit of the event. Remember not to get too far away so that the planes are just dots. The picture should be filled with planes and streamers.

The only limit to your model airplane photography is your own creativity. And remember, when you get those great airplane and action shots, send a copy to your favorite magazine's CL column!

## CONTEST NEWS

If you're on the eastern half of the United States or just enthusiastic about Old-Time Stunt, a place to try out your model airplane photography—as well as your old-timer flying—would be a very special contest planned for Sunday, October 8 of this year. The Garden State Circle Burners will celebrate the 24th Anniversary of Old-Time Stunt, "where it all began" at the Circle Burners field in Lincoln Park, New Jersey.

John Miske, "The Father of OTS," who was the contest director at the first OTS meet 25 years ago, will also be the CD of the 1995 anniversary. Many of the original fliers plan to return.

The field will be open for practice all day Saturday, and the contest begins on Sunday at 9 a.m. Old-Time Stunt, OTS II (flaps), OTS Ignition and Classic Stunt (in four PAMPA classes) will be flown. Trophies will be offered for all events and there will be merchandise prizes and several special recognition plaques.

The Circle Burners are recommending advance registration. The entry fee is \$15 at the contest, and \$10 in advance. There's also a reduced rate for rooms at a nearby Ramada Inn and ground transportation for people who fly in. For information, rules and advance registration, contact Rich Peabody, 175 Pinewood Pl., Teaneck, NJ 07666; (201) 837-8607. Fax: (201) 837-6090.

\*\*\*

Questions, club news, contest information, technical tips, photos and other items of interest to control line fliers is always welcomed. Write John Thompson, 295 W. 38th Ave., Eugene, OR 97405. E-mail at 73473.1407@compuserve.com. MB



Kerkko Kehravuo of Finland flew a Walker-designed Impact at the World Champs. He's an exciting young flier who has just a few rough edges to clean up to make him a sure qualifier and potential medalist.



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## TECH STUFF *cont. from page 14*

Air density drops off with altitude because both the pressure and the temperature decrease with altitude. There are formulas to calculate all of this, but let's let someone else do the arithmetic. The following is a very abbreviated version of a table from NACA report No. 218 (I added the percentage of sea level density column):

Altitude (feet)	Density (slugs/cu. ft.)	% of sea level density
0	0.002,378	100
1,000	.002,309	97
2,000	.002,242	94
3,000	.002,176	92
4,000	.002,112	89
5,000	.002,049	86
6,000	.001,987	84
8,000	.001,869	79
10,000	.001,754	74
15,000	.001,496	63
20,000	.001,267	53
35,000	.000,736	31
50,000	.000,361	15

(A slug is a unit of mass. To find the mass of something in slugs we divide its weight in pounds by 32.2, the acceleration of gravity.)

Aerodynamic lift in pounds equals the air density in slugs per cubic foot divided by 2, times the surface area in square feet, times the velocity (in feet per second) squared, times the lift coefficient.

Conveniently, the formula for drag is exactly the same as the lift formula, except that we substitute the drag coefficient for the lift coefficient. (There are those who will argue that the use of an *induced* drag coefficient in this formula is the wrong way to go. We'll discuss that controversy in a month or so.)

As the altitude increases and the density decreases, both the lift and the drag decrease if everything else remains the same. But this won't happen, since an airplane that is flying higher must either fly faster or fly at a greater lift coefficient in order to keep the lift equal to the weight.

We see from the chart that at 5,000 feet of altitude the density is 86 percent of what it is at sea level, so at 5,000 feet but at the same velocity, an airplane must fly at a 1/0.86 or 1.16 times higher lift coefficient than it did at sea level. Or it can fly there at the same lift coefficient but at a velocity equal to the square root of 1.16 higher, or at roughly 8 percent higher speed than it flew at sea level. You can work it out for your local field altitude.

If the object of the flight is to get from point A to point B in the shortest possible time, then it would appear that flying at a higher altitude is an advantage. Jetliners (which are interested in getting to point B) fly at about 35,000 feet, where the chart says the velocity for the same lift coefficient would be the sea level velocity times

the square root of 1/0.31, or at a velocity 80 percent higher than at sea level. Now we're getting somewhere (to point B) in a hurry!

If we fly faster at altitude at the same lift coefficient as we did at sea level, the angle of attack and therefore the drag coefficient remain the same. The drag itself also remains the same, since the increase in its velocity-squared factor exactly compensated for the decrease in its density factor. But to fly higher and faster at the same drag the airplane must use more power. If the drag is the same the thrust required also remains the same; but the power required at higher speeds is higher, because power is thrust times velocity. Fortunately for modern air travel, jet engines don't lose power as rapidly at altitude as non-supercharged piston engines.

Wing area and weight are also very important. Instead of increasing the velocity or the lift coefficient to maintain lift at the lower density of higher altitudes, we could theoretically increase the area to maintain the lift or decrease weight to decrease the lift required.

If the wing loading is high and the power loading is also high, there will be trouble at higher altitudes. Upstairs, with our internal combustion engine developing less power and our dog of an airplane, we wouldn't have power to fly much—if any—faster to maintain the lift, so we would have to fly at a higher lift coefficient (higher angle of attack). We also may not be able to do that without stalling, because of the high wing loading and because the drag will also increase at the higher angle of attack.

My advice to modelers is that to fly well at altitude, increase the wing area or decrease the weight. Both of these objectives spell lower wing loading. Referring again to the density table, if you want to fly at 5,000 feet at the same weight, the same velocity, and at the same angle of attack, you'll need to make the wing area 16 percent larger than for sea level use. Or, to fly there with the same wing, velocity, and angle of attack, the plane needs to be 16 percent lighter.

Also, don't skimp on engine displacement. Again using the density from the table, at 5,000 feet a .60 is going to put out about the power of a (.60x.86) .51 cubic inch engine.

## PARTING WORDS

It's a fact that Plato had Socrates for a teacher, Aristotle was taught by Plato, and Alexander the Great studied under Aristotle. Where would we be if Socrates had never lived?

Francis Reynolds, 3802 127th Ave. N.E., Bellevue, WA 98005-1346. SASE please. (206) 885-2647. MB





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- All tail surfaces are fully shaped and ready for covering or painting. Hinge lines are also cut on all tail surfaces.
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- Complete hardware pack included.

### **SPECIFICATIONS:**

WING SPAN: 85" • LENGTH: 66" • ENGINE: TWO .40, .50 RECOMMENDED  
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*Not Included in kit: Radio, Engines, Wheels, Covering Material, Glues, Props & Floats*

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# ELECTRONICS CORNER

BY ELOY MAREZ

## • "Ultralife" 9-Volt Batteries

## • The Value of Resistors

## • New RC Equipment: The Digi-Set 2000 and Trickle Master

As is often the case here in EC, this month's discussion starts with batteries—not NiCds, but some new developments in the common 9-volt, so-called "transistor" battery, used in much of our support and test equipment.

We're all familiar with Duracells and Energizers, but there also seems to be an almost limitless number of Brand X 9-volt batteries around. All

hand, are claimed by the manufacturer to produce 1100 mAh under the same discharge conditions. Figure 1 shows a comparison between the Ultralife battery and the others mentioned. The company also furnishes other comparisons and "higher up-front cost" is listed as one of the negatives. However, interestingly enough, when broken down to cost per amp-hour, the Ultralife is ahead

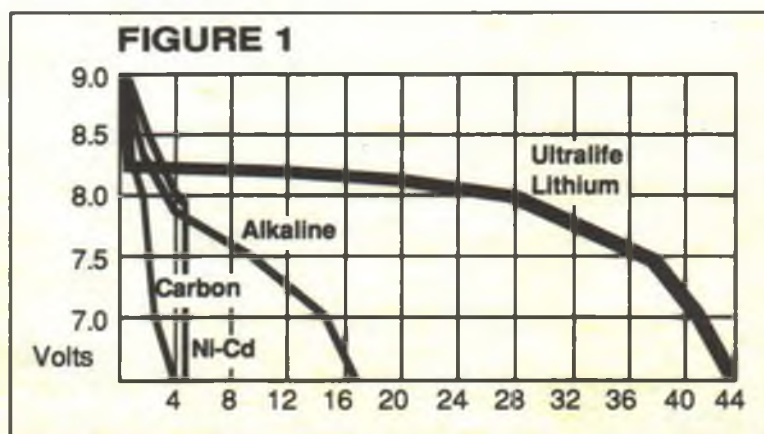
U9VL-FP, is \$6.18 for singles, \$5.78 each by the dozen. For comparison purposes, Mouser also catalogs the Energizer 9V alkaline at \$4.54 and the carbon-zinc 9V at \$1.44.

Complete info can be had from Ultralife Batteries Inc., 1350 Route 88 S., Newark, NY 14513; (313) 332-7100.

### RESISTOR VALUES

These are still an important part of all electronic products, even in this day of highly sophisticated ICs which often contain dozens of them in addition to all the necessary capacitors, transistors, etc. And of course they are equally important to us tinkerers who meet here in the pages of EC. I've often referred to resistor "standard" values; it's time to clarify that a bit.

To start with, all but the most precise electronic circuits will work properly with some variation in the exact values that the



The useful life of the new Ultralife lithium 9V battery, in hours, calculated at 27 mA at 70 degrees F, compared to the other commonly used types. The rechargeable feature of NiCds should not be ignored; nor should its often lower voltage.

are similar in appearance, but vary widely in their internal chemistry, which determines their watt-hour capacity and ultimately, how long they will power your device. Said chemistry ranges from the old-fashioned carbon-zinc to the far better alkalines, and also includes NiCds. (In the latter case, be extremely watchful, as many of the supposedly "9V" NiCds actually produce lower voltages and may prevent some devices from working properly.) Now a new 9-volter has recently appeared: the "Ultralife" lithium power cell—another external look-alike, but with definite energy advantages inside.

To begin with, 9V batteries can range in capacity from some 50 mAh (milliamp-hours) for the carbon cells to somewhere between 250 and about 500 for the alkalines, depending on the brand—and the cost. Ultralifes, on the other

at \$6.32 compared to what I consider the only other logical choice, the alkaline, which is claimed to cost us \$8.33 per AH.

Other features of the Ultralife battery are that it's environmentally friendly, containing no mercury, cadmium or lead, all of which are major no-nos to landfills. It contains a built-in safety mechanism which prevents overheating and leakage. And it has the blessings of Underwriters Labs, the U.S. Department of Transport, and the American National Standards Institute. Plus it's made in the United States.

Cost and availability? So far I haven't seen Ultralife batteries anywhere but at electronics suppliers; maybe that will change in time. The prices I have for you come from one such mail order supplier, Mouser Electronics (800-346-6873 for catalog). Their cost for the Ultralife, Stock No. 526-

appropriate formula will indicate to be necessary. Absolute precision in component values is difficult to achieve, and when available, is very expensive. Since it's not really required, we've learned to live with parts of lesser tolerances.

In resistor values, the most common acceptable tolerance is 5 percent. The actual values are programmed so that, accounting for the 5 percent, the chosen number will always come close to the one desired. The 5 percent resistor values are always sub-multiples and multiples of the following figures:

10	12	15	16	18
20	22	24	27	30
33	36	39	43	47
51	56	62	68	75
82	91	100		

That is, 5 percent resistors



can be obtained in fractions of the above figures—.10, .20, .33, etc., and in multiples—100, 200, 330, etc. Of course, not all suppliers will always have all of them, and you can expect the values below 10 ohms to be a little scarce.

Now comes the cleverness of this scheme! Should you have equipment able to read resistance with decent accuracy, with a handful of resistors at hand you can actually hand-pick one of the desired value. How so? Well, the tolerance provides for some slight overlap from one value to the next. Let's take 68 ohms as an example. (Or 680, 6,800, 68,000 or whatever, the arithmetic works out the same.) Going high, at plus 5 percent, the actual value might be as much as 71.4 ohms. Taking the next higher value, that of 75 ohms, and calculating the low (95 percent) possibility, we get 71.25 ohms. Somewhere in there is that 70 ohms your calculations call for.

Obviously, picking one of exactly 70 ohms will require a good ohmmeter. Don't depend on the \$14.95 one to do the job; you can depend on it only to have some tolerance of its own. There are precision resistors available that can be used to gauge and calibrate meters, but for our purposes, a decent idea of accuracy can be obtained by a far cheaper method. Simply purchase a bag or two of resistors of the same value, say ten of 1,000 ohms. Solder them in a string, which adds them together, for a total of 10,000 ohms. The idea is that the plus and/or minus tolerances will cancel out, and the string should read very close to 10K. The difference visible on our meter is a close approximation of its accuracy.

For closer tolerance requirements, resistors are available in 1 percent tolerances, again at a higher price and not as

readily available. The exact values are too many to print here; check one of the many electronic catalogs for the exact numbers. Should you not be able to locate such a list and require one, an SASE to me will get it for you.

#### NEW PRODUCTS

Taking advantage of the rapid advances in the electronics industry, it seems that new RC products appear almost monthly. One of the latest is the "Digi-Set 2000," available from Aero Scientific Inc., P.O. Box 292, Grayslake, IL 60030; (708) 223-9066. The Digi-Set 2000 is a servo and receiver pulse

tester—but with a difference. Before we get into the details, let's first review what it takes to make a servo perform its task.

Ultimately, after the transmitter, receiver, and those agile thumbs of yours have done the work, each servo is fed a control pulse whose length will determine the servo position and travel. The pulse will vary in length from 1.0 to 2.0 milliseconds (mS), to move the servo from one extreme to the other. A 1.5 mS pulse will then result in the servo being at center. A pulse length of 1.25 or 1.75 mS would cause the servo to travel half the distance be-

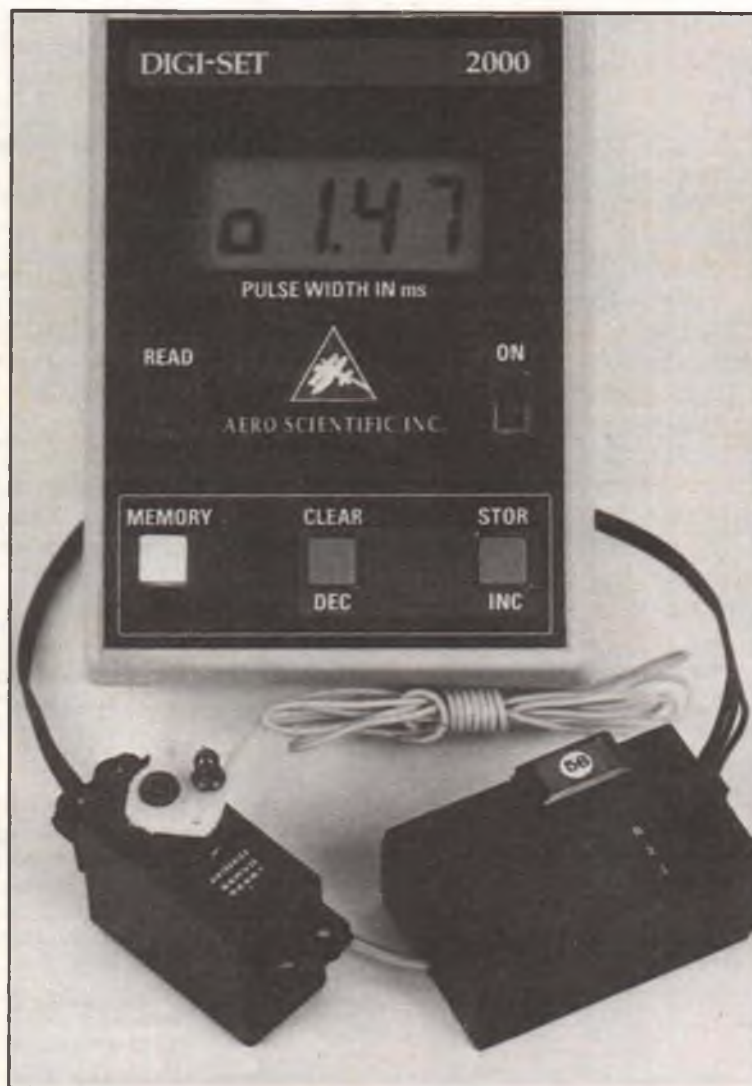
tween neutral and full throw in one direction or the other. All servos, regardless of whether the system is AM, FM or PCM, generate this kind of pulse at the receiver, and all servos require it for proper operation.

It must be noted also that the pulse length as stated is actually something of a starting point, as different transmitter features such as travel adjustments and dual rates will vary it to achieve the proper results at the servo. Also, anytime you move a trim lever, you've changed that 1.5 mS centering.

The Digi-Set 2000 can generate the required servo control pulses from 0.70 to 2.20 mS, which should take care of any oddball situations you might encounter. Said pulse length, variable by .01 mS, is set as desired with a couple of calculator-like keys marked Decrease (DEC) and Increase (INC) and is displayed in mS on a 1/2-inch liquid crystal display readout. A simple setup, using a protractor, is described in the instructions by which you can test servo travel and linearity, and for those dual aileron or elevator installations, you can now pick servos that have exactly the same response to the control signal. Obviously, you can also detect other problems, such as dead spots, over- or undershoot, defective gears, and the general slowing down that occurs when the motor is over the hill.

To save you having to adjust the pulse every time, a store (STOR) function is available by which you can set the limits, and then travel there with one touch of the DEC and INC buttons.

The second function of the Digi-Set 2000 is to read this pulse length at the receiver, as generated by the transmitter. The unit is plugged into the appropriate receiver channel and displays the exact servo centering pulse according to the transmitter settings. As you move the stick, you can see the pulse length decrease and increase, just as when using the Digi-Set as a servo driver.



Aero Scientific's Digi-Set 2000 is a modern servo and receiver pulse tester that can be used to great advantage to test and evaluate servos and to test and accurately set transmitter control functions.



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All NiCd batteries lose some of their charged capacity if allowed to sit idle, but the Trickle Master from SmarTech Engineering can keep up to four transmitter and/or four receiver batteries up and ready to fly at all times.

You can now check the transmitter for proper operation; such things as a dirty control pot will show up as erratic pulse changes. Obviously, this is extremely useful information with non-computer radios, as you can tell exactly what you're changing and by how much, and can easily and accurately duplicate any settings that work for you.

In addition to four AAA batteries, you will need male and female harnesses to match your particular RC system. Complete instructions for these and all functions of the Digi-Set 2000 are included. It is priced at \$89.95, direct from the address given.

• • •

Next on the list is the "Trickle Master" from SmarTech Engineering, designed to keep your previously charged NiCds from self-discharging between trips to the flying

field. The exact amount of self-discharge is calculable, but involves both time and storage temperature, something that most of us don't keep track of. The best advice is to keep your batteries topped off by trickle charging between flying sessions. The trickle rate recommend by most NiCd makers is from 0.01C to 0.04C, stated as a percentage of the capacity. For the common 500 mAH battery, this would be a rate of from 5 to 20 mA. Most often the 0.02C rate is used—10 mA in this case.

And that's exactly what the Trickle Master does: keep a constant 5-10 mA charge rate going into your resting NiCds. The exact rate will vary based on the initial state of charge of the battery; trickling should be done after the normal charge cycle has been completed. No further adjustments or care are necessary. An LED for each battery connected tells you that things are proceeding normally. You need to come back only when you're ready to go flying.

As seen in the photograph, the Trickle Master is a multi unit, capable of maintaining up to four transmitter and receiver batteries at a time. It's powered by your normal system charger, which has to be connected with the appropriate fittings. Similarly, the Trickle Master's outputs have to be configured to match the connectors on your system. Neither input nor output connectors are furnished due to the many possibilities. Complete, clear instructions are provided, including the correct connections for most popular radios.

The Trickle Master is priced at \$19, with no shipping and handling; plus \$1.24 tax for those of you in Minnesota. Order directly from SmarTech Engineering, 17540 Kodiak Ave., Lakeville, MN 55044. MB

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# DEAR JAKE

## Advice for the Propworn

### DEAR JAKE:

My wife is a veterinarian. You might not think so, but many of her veterinary skills come in very handy when it comes to helping me with my modeling pursuits.

I fly RC sailplanes and free flight towline gliders. As a vet, my wife is very experienced in knot tying. Not only surgical knots, but also restraint-type knots for leashes and leads, and even hog-tying for larger animals that must be worked on. So her knot tying skills are a big plus when I have to rig those damn winches, towlines, or bungee assists.

Her basic veterinary skill of treating sick or wounded animals also comes into play occasionally. Our flying field is adjacent to a large farm. When the wind is from the northwest, gliders frequently land in the barnyard. More than one stupid farm animal has been startled into trampling a chicken or injuring itself in some sort of panicked behavior. Cindy helps out by offering the cry-baby farmer her professional assistance free of charge.

Vets must also have people skills, especially in calming or soothing an agitated animal owner. My sailplane glided into a mule last month. By the time the hayseed farmer got done yelling at me, I was convinced that he was a bigger jackass than the one my airplane hit. Cindy intervened, however, and defused the situation by placating the bumpkin with a guarantee that his mule was fine and had not suffered any permanent damage.

So my advice to all you single modelers out there is to find yourself a veterinarian and marry her. She'll make your modeling life easier and keep you out of trouble.

Russ in Richmond, VA

Dear Russ:

Sounds to me like Cindy also has a great deal of experience with horses' rear ends. Not through her veterinary practice, but by being married to one.

Jake

### DEAR JAKE:

What do they call it when a structural beam sticks out from a fixed support at one end, but is not supported at all at the other end? Wing spars used to be supported by struts from the bottom of the fuselage, but nowadays they are unsupported beams and I can't remember what that's called.

Chet in Chancellorsville, TN

Dear Chet:

When unsupported beams were first introduced in the Middle Ages, they were

continued on page 82

## FOR THOSE WHO BELIEVE BIGGER IS BETTER

You live by the credo that bigger is better. Your models are a reflection of this quest for bigger...stronger...faster. Hitec RCD understands your concept of strength, speed, precision and durability. Consider the HS-700BB. A 1/4 scale servo with a top ball bearing on the output shaft, super tough glass filled nylon case and a torque rating of 133 oz./in. @ 4.8 volts. A perfect companion for those giant scale War Birds or that special 1/4 scale NASCAR you've been working on all winter. Too much servo for you? Then try out the HS-605BB which offers 77 oz./in. of torque, cycles in .16 seconds over a full 60 degrees and comes in a case the size of most standard servos. Try this one out in that 1/8 scale gas buggy you've been wanting to launch full bore on the track but were afraid the steering servo might let go on a tight corner. This is one servo built to take the punishment of all out racing.

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

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### HS-700BB

1/4 Scale Servo  
\*1 Ball Bearing  
wt. 3.6 oz  
torque: 133 oz/in  
speed: .22 sec/60 deg  
size: 2.3x1.1x2.0"

### HS-705MG

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



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

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

### HS-615MG

torque: 105 oz/in  
speed: .22 sec/60 deg





# FREE FLIGHT

BY BOB STALICK

## • Keeping track, keeping inventory

## • Bill Burgess' "Slick" for B/C Nostalgia

## • Nostalgia News

Lately I've observed a growing need to work with the surviving families of longtime free fliers as they sort out the vast collections of esoterica collected over the years. As our friends pass on, they leave a large backlog of indescribable equipment, supplies and other unusual materials. Those of us who have been involved in the hobby for many decades are part of a declining number of "experts" who may have insight into the meaning and value of this stuff. Unfortunately, as the free flight population ages, more and more of our friends' families will be affected, and those of us who remain will be called upon to help sort out the estate.

On February 27, longtime friend and Willamette Modelers Club president, Earle C. "Foggy" Moorhead, passed away after a difficult hospitalization. A week later, several members of the WMC worked with Earle's son to determine just what was in his collection of modeling memorabilia. It was a sad and difficult task. What has value? What doesn't? If it does, what's it worth? What would he want us to do with it? Should it be given, sold, or what?

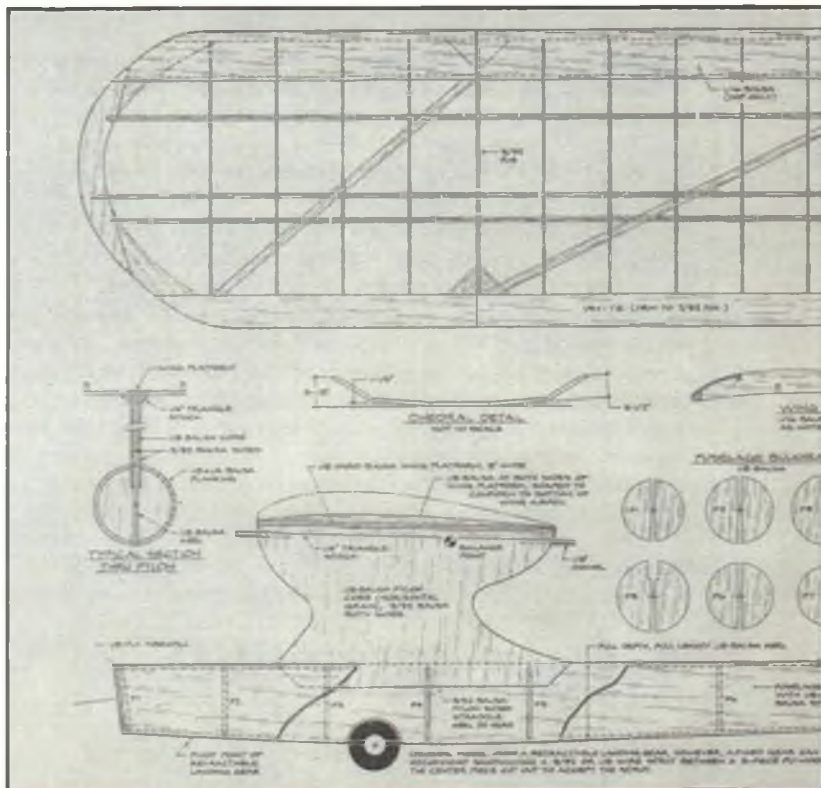
What's the message here for you and me? If you're an aging free flyer who has a collection of the usual oddball items, do your friends and family a big favor. Let them know what you have, what you would like to have done with it, and what it's worth. It may seem like a small request, but those who are left will appreciate your foresight.

### JULY MYSTERY MODEL

From the 1940s through the 1960s, the national model magazines would feature at least one (and usually several) free



Bill Burgess lifts his 1950s-era "Slick 66," recently approved for Nostalgia competition. Looks like a Torp .29 spark ignition engine on the nose. The model is featured as the July Plan of the Month; full-size plans are available from Model Builder Plans Service.



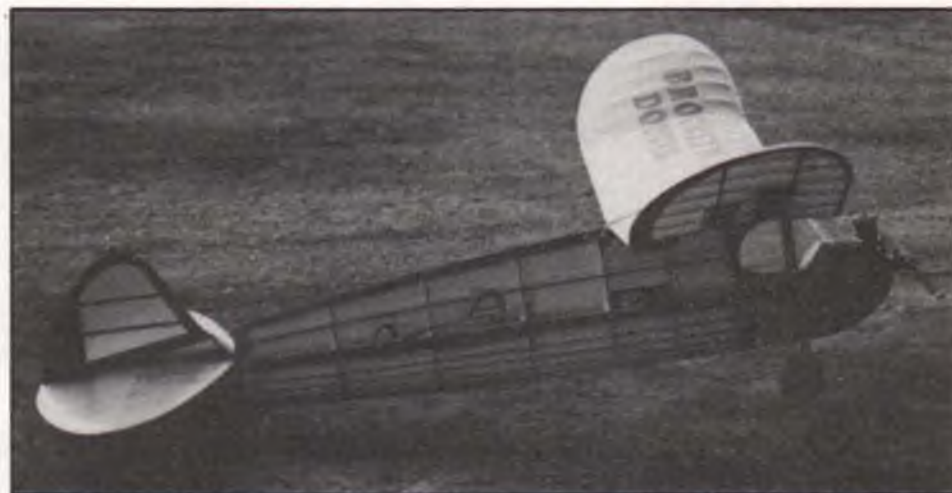


flight designs each month. Many of the magazines had their own stable of writers and designers. Some, however, seemed to be everywhere. In whichever magazine you looked, you could find a FF model by one of these premier and prolific designers.

This month's mystery model was produced by just that sort of guy. The model itself is unusual in that it's built completely of 1/16 sheet balsa and is powered by a Jetex 50 engine, which is side mounted on the fuselage.

If you think you know the name of the design, write it on a postcard or letter and send it to *Model Builder*. In a couple of months, they'll draw a name at random from among the correct entries, and the winner gets a free one-year subscription. It's quite a deal. Oh yeah, don't forget to put your name and address on the card before you send it.

## APRIL MYSTERY MODEL WINNER



Beautifully built 6-foot Brooklyn Dodger by master craftsman Fred Dean, covered in silk and powered by an Orwick .84 spark ignition engine. Plans for the big Dodger are available direct from Sal Taitel, 4330 Conquista Ave., Lakewood, CA 90713.

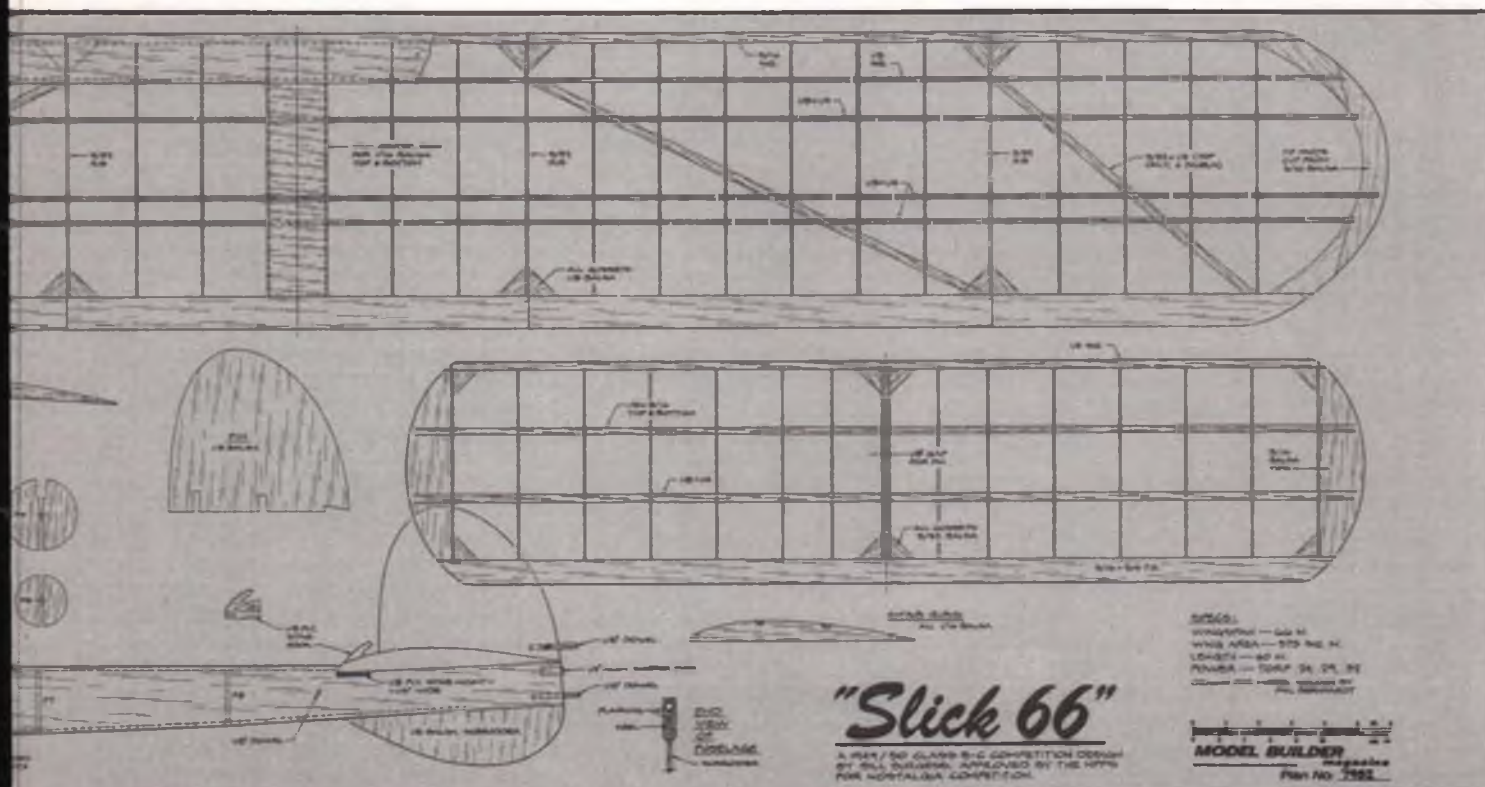
"The April Mystery Model was called an Icicle, as I recall. I built one from an orange crate, when there were such things! Painted it blue, stuck my Wasp .049 on it and waited for Dad's pond to freeze.

"One cold day I took the Icicle to the pond. By the time

I got there the fuel and the battery had cold soaked and I never got the Wasp to fire. My fingers were cold, I was cold, the battery was cold, the fuel was cold! I never tried it again. I don't recall what happened to the model, but I still have the Wasp. It is so worn out that it

will not run."

The above note was received from Kent Pyle of Clinton, Missouri, describing his experiences with the "Icicle" ice boat as designed by Richard Yale and presented as a full-size plan in the February 1952 issue of M.A.N. Kent's



## PLAN OF THE MONTH





Bud Rorrik, who has a reputation for building excellent flying models, showed up the '94 Scamps Annual with one we've never heard of and which could be a real sleeper in O.T. competition: a Stu Bennett designed "MorCal III" from 1941, powered by an Elfin diesel. Word is that it flew great. Photo by Bill Burt.

was one of only two responses received and was the one that popped up as the winner of the free MB sub.

### PLAN OF THE MONTH: THE SLICK

The Slick is a newly approved Nostalgia design by Bill Burgess, who writes:

"I and a few members of the Muncie Gas Hawks Model Club first flew 'Pencil Bombers' in 1947 with Forster .29 engines on ignition. The Slick came about in 1949 for the glow engines. It won several contests during the 1950s in various sizes and classes. I had retractable landing gears on most of my planes then.

"The model was trimmed for a right-hand climb and left glide. The 'A' model had a 59-inch span, the 'B' had 66 inches, and the 'C' had 71. I also had a 1/2A version with a flat-bottom airfoil and a span of 43 inches. All except the 1/2A size were covered with silk."

For those of you who are newcomers to the hobby, the term "Pencil Bomber" may not have much meaning, but it was a major point of contention in the late '40s and early '50s. The term refers to the thinness of the fuselages typical of pylon free flights of the period. Free fliers who preferred realistic looking models called all such thin-

fuselaged ships Pencil Bombers—it was a common term of derision.

Bill Burgess notes that he has recently re-entered free flight after several years hiatus. Seems that the new AMA HQ facility is about a mile from his home, and now he has a place to fly once more.

Full-size plans for the Slick 66 are available from *Model Builder Plans Service*.

### NOSTALGIA NEWS

The NFFS Nostalgia Committee has been busy of late with issues that could have an effect on your enjoyment of this phase of the hobby.

Recently, the committee adopted new rules that permit, with certain restrictions, the use of the Cox Medallion .049 engine. The purpose was to give an affordable, readily available alternative to the Holland Hornets and another choice for those who dislike reed-valve engines. The committee recently eased its restrictive rulings for the Medallion by allowing the following modifications:

1. The stock intake venturi may be opened up and/or the outer diameter of the exposed section of the spray bar may be reduced.
2. The stock Medallion needle valve and spray bar assembly must be retained and

maintained in its original location.

Bob Larsh, who heads up the committee, also indicated that Cox is coming out with an improved version of the .049 reed valve engine, known tentatively as the Killer Bee. The committee expresses some concerns about this new engine, as it allegedly provides dramatically more power than any engine currently approved for Nostalgia use. The committee will be testing this engine to determine whether it will be approved. A word to the wise: do *not* buy this engine with the idea of using it in NFFS Nostalgia events until you hear that it has been approved.

Larsh noted that he had been in conversation with officials at Cox about producing .051 displacement Medallion engines. The company is willing to consider such an engine, provided a goodly number of these engines could be sold. If you'd be interested in a Medallion .051, contact Bob Larsh at 45 S. Whitcomb Ave., Indianapolis, IN 46241.

### NFFS LEADERSHIP CHANGES

Bob Waterman, who has directed the fortunes of the National Free Flight Society for the past two years, has stepped down so that he can once again look to enjoy the free flight hobby. In a recent election, Bob Beecroft was selected to take Waterman's place. Beecroft has a long history in this sport. He's been a leader in the Orbiters MAC, has been Contest Manager for the U.S. FF Champs, and has been an active competitor in numerous AMA events, with special emphasis in free flight gas. Recently, he was honored by the NFFS with its Distinguished Service Award.

So, thanks to Bob W. and congratulations to Bob B. I know that our organization is in good hands . . . after all, anyone named Bob must be capable, right?

### INDOOR WORLD CHAMPS NEWS

Recently the U.S. submitted a proposal to the CIAM to host the 1996 Indoor World Championships at the Kibbie Dome at the University of Idaho. However, recent word from the FAI body indicates that they've instead chosen the bid from the city of Brno in the Czech Republic. Andrew Tagliafico, who has been the driving force behind the use of the Kibbie Dome as a World Champs site, told me that he will continue to offer this site for W/C competition. He noted, "So we missed out on 1996; we'll just plan



to get it in Idaho for 1998."

### LEGAL EAGLE ON THE RISE

The Legal Eagle event made its debut in last month's *Model Builder*, complete with a full-size plan for the "Mistrial Mk. II" from enthusiastic event supporter Dave Linstrom. The brainchild of Dave Stott, the Legal Eagle event gets its name from the basic requirement that the full-size plan must fit on a single sheet of legal size (8-1/2x14) paper. Dave's article included a full set of rules, so we won't repeat them here.

At our most recent indoor contest, Jim Longstreth showed up with his Legal Eagle design, and I was impressed. The model looks a great deal like a Bostonian with a bit more "scaleness" involved. Flight pattern and duration are excellent. This is an event that should stick around for awhile. Try one and see.

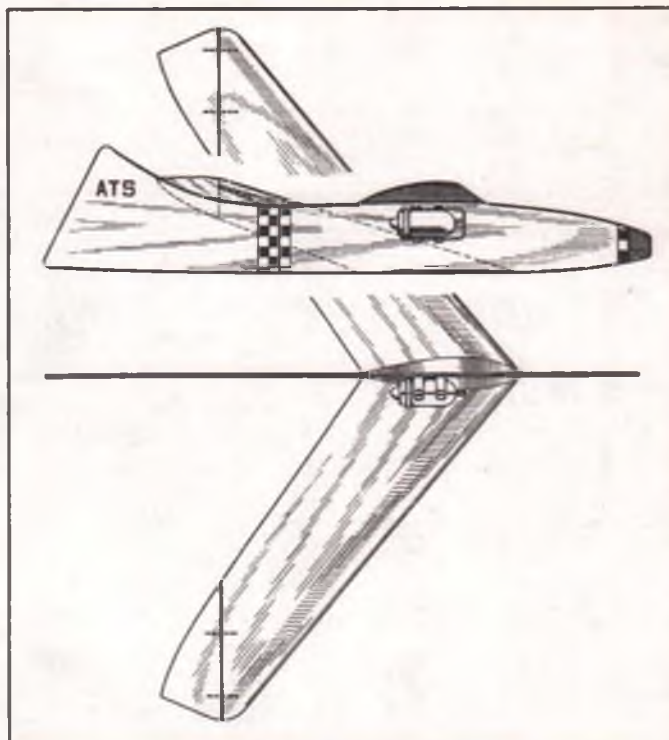
### NOW YOU SEE IT

Fred Guilfoyle, who does business as Plan-It Industries, forwarded a roll of shiny stick-on tape, to be used on leading edges to increase visibility in the air and on the ground. It is very bright and comes in your choice of gold, chrome, red, blue, green or purple. A 3/4-inch wide roll 650 inches long can be yours for the small sum of \$2.85 plus 30¢ postage for each roll ordered. Send your order to Plan-It Industries, 15121 62nd Ave. W., Edmonds, WA

98026, and tell Fred you read about it in *Model Builder*.

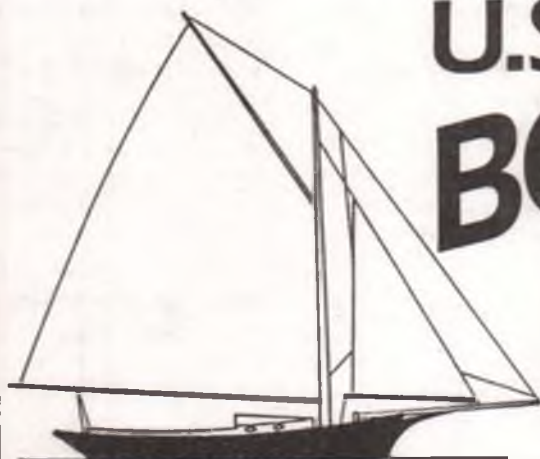
### THE END

Early this year I attended the annual Misery Meet, held at Hart's Lake Prairie, near Tacoma, Washington. This year the weather was truly miserable with rain and wind during nearly all of the two-day contest. What was really impressive was the number of contestants who came from Oregon, Washington and British Columbia just on the off chance that the weather would turn decent. Few flights were logged, but the opportunity to share war stories and renew old acquaintances still holds great appeal to all who were there. I hope to be able to share with you some photos from this meet—notably, Al Borer flying his



### JULY MYSTERY MODEL

Cheapskate A-1 glider and completing all five flights, and a remarkable set of flights with a GHQ-powered Old Timer. You had to be there, I guess. *MB*



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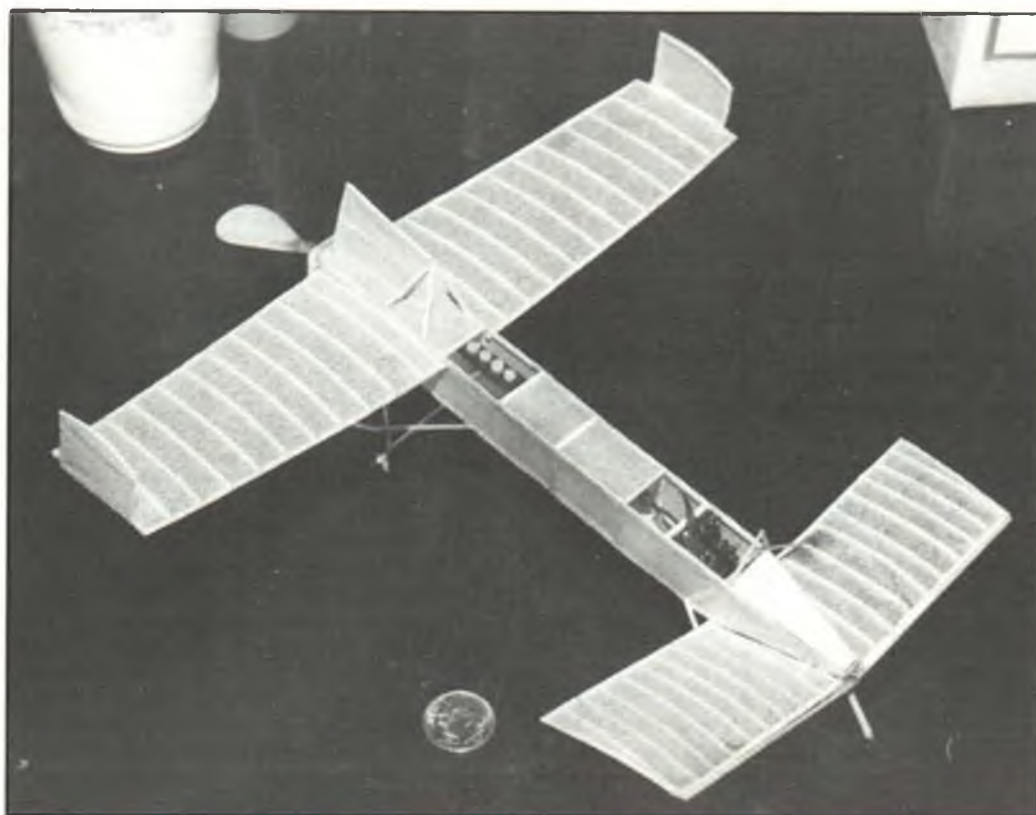


# HANNAN'S HANGAR

.....

BY BILL HANNAN

**"Is not life  
a hundred  
times too  
short for  
us to bore  
ourselves?"**



A great crowd pleaser is famed Florida modeler Dr. John Martin's Pistachio Scale 1912 Drzewiecki Polish canard, which has turned in flights of over 30 seconds indoors. Greg Bates photo.

Our lead-in quotation this month is by German philosopher Friedrich Nietzsche (1844-1900), and raises an intriguing question. Given the almost unlimited variety of designs produced throughout aviation history, why would anyone want to spend so many hours modeling a boring subject? Attend almost any contest or model display and there

seems usually to be a plethora of mundane, terminally dull airplanes represented. Why not break away from the prosaic parade? Forget those monotonous airframes with their dreary paint schemes! Abandon those dry-as-dust designs (you know which ones!) and explore something exciting for a change. Check out the variety of unusual subjects in our photo presentation—don't they make you want to put more freshness in your modeling?

## **WE STAND CORRECTED**

In our April Hangar column discussion of evolving aircraft terminology, we stated that the word "aeroplane" originally had an umlaut over the first "e." Peter Soule, of Palos Verdes Estates, California, wrote in

to explain that those two dots over the "e" in English are not an umlaut, which is employed in the German language, but a "dieresis." I ask you now, which would you rather have for breakfast, an umlaut or a dieresis?

## **CAFFEINE COLOR, ANYONE?**

Speaking of breakfast, *Domeduster* newsletter editor Stan Fink offers his approach to creating that antique tan look for model tissue covering:

Start by brewing a strong cup of coffee, then add a teaspoon of white vinegar. Dip a paper towel into the mixture after it has cooled and gently rub on white tissue which has been taped or glued to a hard balsa rectangular frame (or an old picture frame). The intensity of coloration may be increased with additional applications of coffee, allowing each to dry for an accurate preview of the results. Cut the dried tissue from its frame and apply to



Jacques Cartigny, of France, constructed this unique 1911 Dixon Nipper canard Peanut, which averages about 30 seconds duration. Photo by Alain Parmentier.



your model's airframe, employing the traditional clear-dope adhesive. Avoid water-base glues, which may cause the coffee color to run.

Stan has published many other handy hints, both in his newsletter and other offerings. For subscription rates and a price list, send him an SASE: Stan Fink, 1810 Pine St. #2R, Philadelphia, PA 19103-6602.

### FAC PLAN PACKET III

Lin Reichel, of Flying Aces Club headquarters, has announced the release of the third in the FAC plans series. Included are 16 11x17-inch sheets, which feature construction plans for 10 different flying scale models plus four three-view drawings.

Subjects include the Mitsubishi Raiden, Alco Sport, Southern Martlet, Blackburn Baby, Delgado Flash, Bellanca CD, Cranwell C.L.A. 3, Fokker V-21/V-23, Fiat CR-42 and Polish P.W.S.-11. All are Peanut Scale except for the Bellanca and Fiat, which span 21-1/2 and 20-1/2 inches respectively. The complete pack sells for

only \$10 postpaid, from Lin Reichel, FAC G.H.Q., 3301 Cindy Lane, Erie, PA 16506.

When responding to any of our "plugs," please mention *Model Builder* magazine as the source!

### GONE WEST

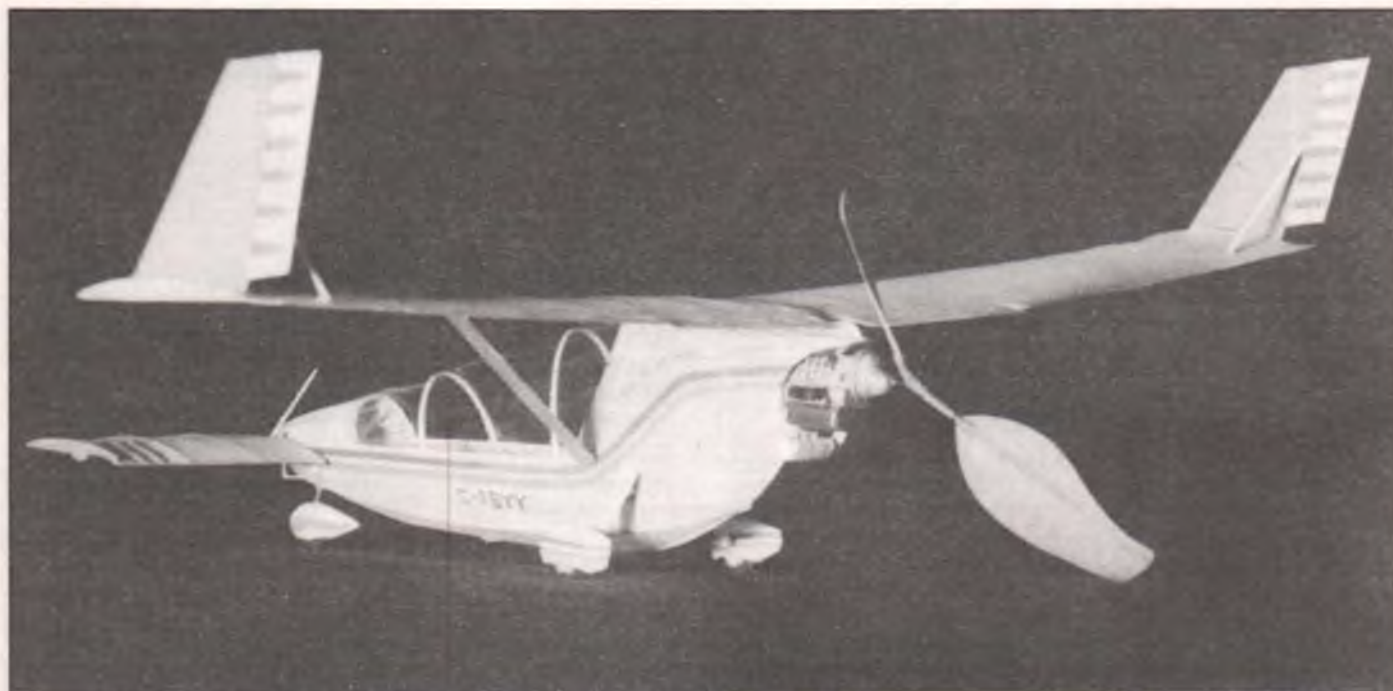
Percival H. Spencer, aircraft designer, aviator and modeler,

passed away in January at age 97. He is thought to have had the longest active flight record in aviation history, having begun flying gliders in 1910, and holding an active license until age 90. Although Spencer was involved in the design of commercially manufactured and homebuilt full-size aircraft, he remained enthusiastic about

his miniatures, especially ornithopters. His "Whamo Bird" toy was marketed in huge quantities, and although not mass-produced, his glow-engined ornithopters were marvels of efficiency and remarkably advanced for their time—circa the 1950s. Our sympathy to his family and friends, and our thanks to Ed Whitten for



This month's Hangar column spotlights the weird and unusual, and we'd have to say this 14-inch span Miles M35 Libellula, by George Benson of Mill Valley, California, certainly meets those qualifications!



Mark Allison's Pistachio Falcon XP canard features a 2:1 gearbox driving its pusher propeller. Photo by Don Fennor.



# HANNAN'S HANGAR

supplying this information.

## THE COMPLEXITY COMPLEX

Why do we assign ourselves complicated projects? Probably because we are "reaching for a star," and let our ambitions get out of hand. Certainly it's much easier starting an involved model than completing it!

Once underway, it is difficult to back out; however, looking forward, the task can seem overwhelming. The solution seems to be to concentrate on only one item or component at a time, regarding each item as a separate project to be completed, rather than only a minor part of a complex entity

which appears to be such a remote, nearly unattainable goal. With careful planning, even the most intricate aircraft can be brought down to manageable "bite-size



Tandem-winged Mignet Flying Flea, by Rainer Gaggli of Austria, is powered by a CO<sub>2</sub> system of Rainer's own manufacture. Ready-to-fly weight of this tiny craft is an incredible 0.9 gram! Walter Hach supplied the photo.

bits."

One might, after completing such an undertaking, be more careful by selecting simpler projects in the future. My personal experience suggests that my attention span is decreasing with the passing years. Have any of you readers found this to be true?

Life seems increasingly complicated, and yet, as writer Denise McCluggage so succinctly put it in *Skiing* magazine: "We are capable of attending to only a tiny portion of this vast universe at any one time." If we persist

in trying to achieve too much at once, the result can be sensory overload. Perhaps we all need to remind ourselves that model building should be a hobby, not an extension of drudgery. The object should be creative enjoyment rather than self-imposed schedule-meeting.

Aviation writer John Underwood once told me that he was often tempted to commence an overly ambitious project, but he found that if he took a nap instead, the compulsion would go away! Let's hear it for more fun and satisfaction in model building!

## CONDENSER PLANE PROGRESS

In spite of (or perhaps motivated by) the Eloy Marez April Fool's article in *MB* about condenser powered models, our mail has indicated a surprising amount of reader interest in this intriguing development. Since no American distributor has shown sufficient interest in marketing these kits, the factory in Japan has decided to sell them direct. For information and pricing details, contact The Union Model Co. Ltd., 3-26-8 Umejima, Adachi-Ku, Tokyo, 121, Japan. Visa and Master Charge availability greatly simplifies ordering.

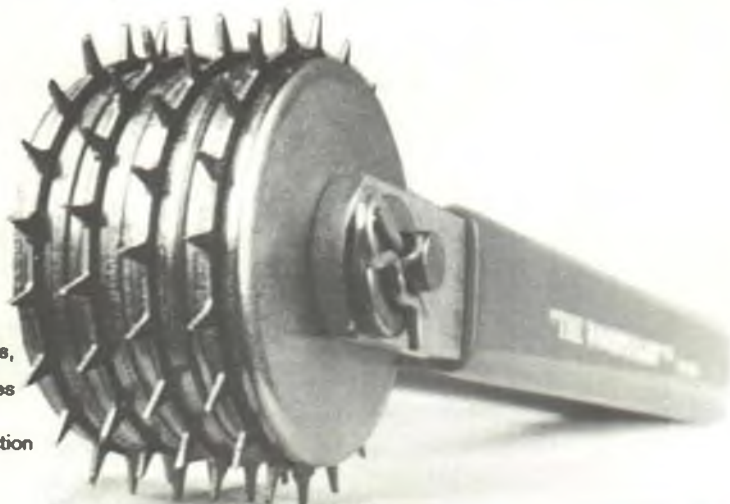
## MEANWHILE IN CO<sub>2</sub>

Fritz Mueller, who is recovering from recent heart surgery, reports that Austrian Rainer Gaggli has continued to develop ultra-small CO<sub>2</sub> powerplants, his most recent example displacing a mere 0.14 cubic millimeter. One of our photos this month shows an example of a Gaggli mini-motor. He also makes larger variations, one of

*continued on page 89*

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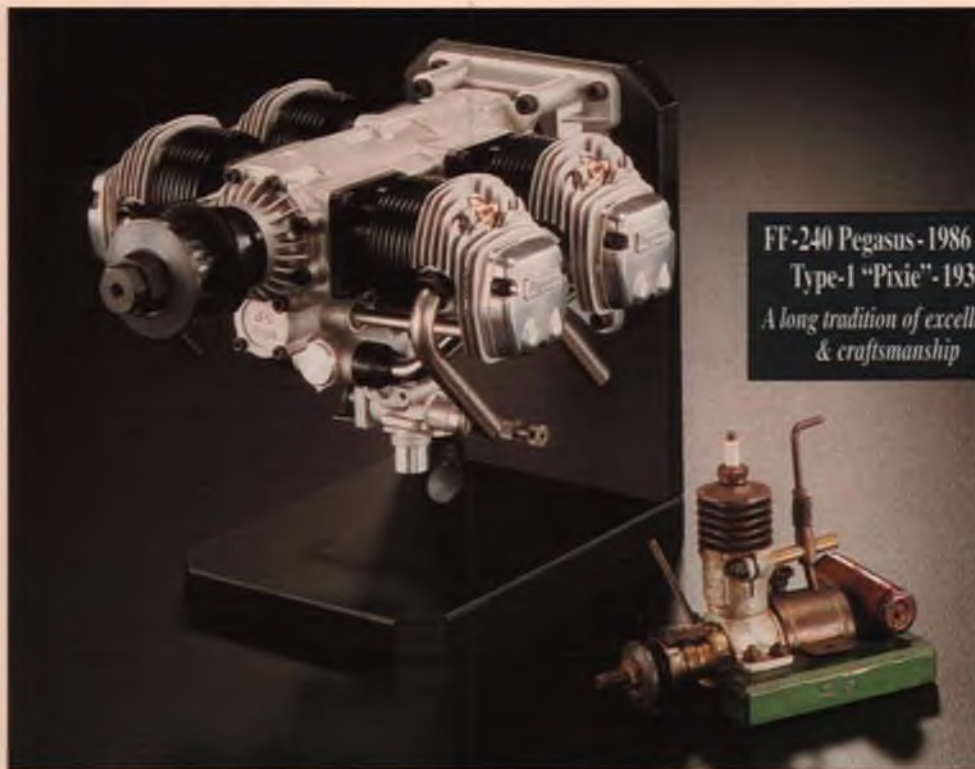
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# THE 1995 INTERNATIONAL MAYAN SOARING MATCH

**Our roving columnist reports on his travels to Central America as a member of the U.S. contingent participating in this most enjoyable modeling get-together. Plan now to attend next year's event!**

I'd like to personally congratulate the *Asociacion Guatemalteca de Aeromodelismo* in Guatemala City for a truly wonderful soaring, social and touring event, which was held March 3-5 in Central America. Everyone who attended (over 100 people including friends and families) had a fantastic time. Of us Norte Americanos, there were about 19 present, from California, Utah, Iowa and New Jersey. Ten of these were pilots.

Although 1995 is officially the first year of the International Mayan Soaring Match, it has been in the works for two years or more. It's the brainchild of Enrique Mertins, who is also its prime proponent and director. Enrique and several other Guatemalan glider guiders have been attending the U.S. AMA Nats and California Fall Soaring Festival for many years now. If you've been to any of these, you've probably met them or seen them. They're a very friendly and enthusiastic bunch.

It was Enrique's idea to invite us all down to "his place" for a change of sky and to have a good time seeing another part of the world. The idea was received very well. This is more than a contest, it's an adventure!

Group photo time! IMSM's airline sponsor, Aviateca, is the national airline of Guatemala and provided the special group discount rates and complimentary tickets that had been promised by another airline that backed out of sponsorship two weeks before the event.



Proof that columnist Bill Forrey really did lug a hand-launch glider to the Mayan ruins at Tikal and then flew it there! Model is a Tosaño, designed by Ed Doppe and published in MB (plan #1881, \$11.50).







■ ABOVE: Perfect form and consistency. That's 1st place IMSM finisher Ben Clerx. Here he shows us his launching technique in gusty winds flying his Mako, the red-hot unlimited class ship he designed and which he produces as a pre-sheeted kit. ■ LEFT: Claudio Roque (team Mayan Show-Offs) launches his beautiful Airtronics Legend in box label colors while a former Brit, Peter Birch, times. Jorgen Vogel's winch and battery trailer in background was full to capacity of gigantic 12V batteries and retrievers.

## RESULTS OF THE 1995 INTERNATIONAL MAYAN SOARING MATCH

1) Ben Clerx (USA)	Mako	4421
2) Loren Mills (USA)	Mako	4203
3) Terry Edmonds (USA)	Calypso	4140
4) Roger Lackey (USA)	Mako	3986
5) Gerald Arana (USA)	O.D.	3935
6) Don Edberg (USA)	Diamant	3890
7) Julio Quevedo (GUA)	Spirit 100/Calypso	3807
8) Enrique Mertins (GUA)	Whisper 2M	3762
9) Mark Mills (USA)	Legend	3573
10) Hector Tchen (GUA)	Apogee	3548
11) Frankie Arzu (GUA)	Prism	3517
12) Klaus Wagner (GUA)	Flamingo	2629
13) Bill Farrey (USA)	Easy Answer	2536
14) Claudio Roque (GUA)	Legend	2512
15) David Chang (GUA)	Sophisticated Lady	2298
16) Wilfredo Alvarado (GUA)	Whisper	N/A
17) Jorgen Vogel (GUA)	Chili/Whisper 1323	(DNF)
18) Donald Raab (USA)	Easy Answer ARC 537	(DNF)
19) Stan Boyd (USA)	O.D. 431	(DNF)
20) Peter Birch (GUA)	(N/A) 48	(DNF)



Hard-working IMSM CD Jorgen Vogel flew a high-performance hybrid dubbed "Chili-Whisper"; the wings were from a Graupner "Chili" electric motorglider, and the tail and fuselage were from an Airtronics Whisper. Its HQ 1.5/8 airfoil was a perfect match for the high winds. Penetration, L/D and riding the lift were never a problem, but his landings needed a little more practice.

### THE FLYING

In keeping with its "first time" status and considering the possibility that the event would attract a variety of foreign and domestic pilots of all skill levels, it was decided to keep things as fun and low-key as possible. The AGA ran four rounds of a rather laid-back AMA T4 Composite Du-

ration (15-minute add-'em-up) with spot landing bonus. That's a dozen flights for everyone over a two-day period, not counting the practice day or the before- and after-contest flying (of which there was plenty!). This is an RC soaring event for those who want to fly as well as party and tour.

A 15-minute add-em-up at 5,000 feet MSL with high winds, fast drifting thermals, undependable wave lift and ground-you-in-a-minute sink was *not* an easy task. Practice day, Friday, saw winds averaging 13 mph with gusts to 27. Saturday was pretty much the same. Sunday, the weather calmed down and became "Guatemala



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normal" with the wind averaging 6-8 mph and gusts to only 15 from the north (actually NNE). Temperatures throughout the three-day meet varied from early morning lows of 57-60 to afternoon highs of 76-80. These are typical Guatemala City readings for the "dry" season, which ends with the onslaught of spring and the increasingly

there was also a German-made proportional power electric winch; the harder you stepped on the pedal, the more power you got.

The batteries used were Rocket Battery Co. 12V/200AH giants which looked bigger than truck batteries. These are used by some Guatemalans for household emer-



Donald Raab (left) and Bill Ferry both flew Balsa Easy Answers in the IMSM. The high, gusty winds proved to be too much for these lightly built fliers and both were retired—one to discretion, one to demise—before the end of the contest.

## ONE FLIER'S IMPRESSIONS

Donald Raab, one of the U.S. fliers who attended the IMSM, wrote a few notes about his and his wife's trip to Guatemala:

"When I read the Soaring column in the February '95 issue of *Model Builder*, my eye caught a sidebar telling about a Mayan soaring meet to be held in Guatemala in early March. That got my instant attention. I am fascinated by all things Mayan and to combine that with a model soaring meet was the best of all worlds.

"I contacted Frankie Arzu and made travel plans. I and my wife would fly to Guatemala City via TACA airlines out of JFK in New York. I built (or covered) a Hobby Shack Easy Answer, built a large coffin to carry it, and we waited in anticipation for the day to arrive.

"When we came to the meet we were overwhelmed by the friendliness of every Guatemalan and the U.S. fliers. The fun we had during the meet was indescribable. To all reading this, plan to come next year. There is nothing like it!"

more frequent monsoon rains.

Launching equipment was as good as what you'd find at a major U.S. soaring meet: two commercially built Rahm 12V winches and two handcrafted, DSC-clone, BMX wheel type retrievers. On practice day

gency power backup and are charged via windmill or solar generators. DC-to-AC inverters make useable 110V/60Hz house current. These monsters were kept topped off on the field by a pair of battery chargers and a gasoline-powered generator.





■ **ABOVE:** When the winds died down a little in the afternoon or before the contest in the morning, there were sure to be hand-launch gliders around. From left, Julio Quaveado (with Dynafilm Skooter), Jurgen Vogel (Super-V HLG), and Bill Farrey (Tosette) compete in an informal all-up, last-down contest. In the stiff breeze, one circle often took you 75 yards downwind! ■ **BELOW LEFT:** Julio Quaveado flew a hybrid design consisting of a Calypso fuselage and tail fitted with Spirit 100 wings. Floating by at a crawl here in the classic "crow" configuration with flaps down and spoilers up.

## SOCIAL ACTIVITIES

If you love to eat, drink and be merry, Guatemala City is a great place to go, especially with the AGA guys and gals. International foods abound here. And on this trip, the company of good friends was tops! Every night was a party night with much laughter and high spirits to enhance an already very enjoyable trip.

Mimi and Jurgen Vogel took me to the Ran restaurant in downtown Guatemala City, where I experienced the finest Japanese food I've ever eaten. It's run by a Japanese restaurateur who was once the Japanese consul to Guatemala before he decided to go his own way and live in Guatemala. Ran is a hard

place to find, but it's worth the effort.

Despite the proximity of Guatemala to Mexico, typical Guatemalan food is not at all like what Americans think of as Mexican food. Guatemalans prefer milder foods. European influence is evident in the better restaurants, and the food is excellent. In the fast food chains, America is the dominant influence. You can have McDonalds hamburgers, Dunkin Donuts, Taco Bell and others if you like—but why? You can get that stuff anytime back home! Nevertheless, for

*continued on page 72*

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# PRODUCTS IN USE

■ By George Voss

## The "V-gilante" Competition Sailplane from Dodgson Designs

**Bob Dodgson has long had a reputation of bucking trends in terms of sailplane design, but there's no denying that his ships have won more than their share of contest hardware. The V-gilante is the latest in Bob's series of builder-kits that are both affordable and capable of serious contest performance.**



The "V" is capable of towering launches. The use of flaps on launch are unnecessary if there's any breeze at all. The "V" seems to prefer a rather spirited launch as opposed to a soft, flat-along ride. Zoom launches are the norm for this ship!



Can't see much of the fuselage profile here on account of the long grass, but believe us, from any angle, the V-gilante is one chary looking sailplane. Fiberglass fuselage features Dodgson's innovative MonoBeam construction originally developed for the 2-molar Sprite. The kit goes together quickly, and you won't waste time making multiple trips to the hobby shop because everything down to the last washer is provided.

**D**odgson Designs, headed up by Bob Dodgson, has a long history of providing high-quality multi-channel sailplanes to the RC soaring community. Back in the 1970s, Dodgson's Maestro and Todi were the only multi-channel thermal duration sailplanes on the market. The later Windsong/Lovesong series represented leading edge technology for its day, with foam core wing construction and Bob's innovative "taco shell" fiberglass/wood composite fuselage. Not only did these ships teach many newcomers the fine art of multi-channel soaring, it was the Windsong,



in 1982, that introduced the control system that has become today's industry standard—ailerons and flaps that could be mixed into the "crow" configuration for landing, as well as rudder and elevator. The 2-meter Pixy, standard class Camano and open class Lovesong each used the Eppler 214 airfoil with camber changing capability and the ability to use a standard (non-computer) four-channel radio, and have won many local, regional and national contests.

In 1990 Bob introduced another open class ship, the Saber. This sailplane represented a change for Dodgson Designs by utilizing a standard-type fiberglass fuselage, the then-new SD7037 airfoil and obechi instead of balsa sheeting.

This past year brought still another new design from Dodgson, the 100-inch span, standard class V-gilante. The "V" is the replacement for the aging Camano. Like Bob's other kits, the "V" kit is complete down to the last nut and washer. New features include the MonoSeam fuselage, V-tail and the ledger-size plans. This puts the plans on a single strip of ledger paper so you don't have to cut up the plans to work on each component.

For those who also like to compete in 2-meter, Dodgson Designs offers the Wee-

this new kit. I won't bore you with the detail of this process since each comment I made was addressed and corrected.

## CONSTRUCTION

I started on the tail surfaces first. These are built-up balsa structures with a 1/8 balsa frame and 1/16 capstrips top and bottom. The stabs are built as one piece per half, after which the movable surfaces are cut free. Fiberglass cloth is used as a dihedral brace on both the top and bottom of the tail. The stabs are designed for lace-type hinges, however I added an additional piece of 3/16-inch balsa to the leading edge of the elevators and sanded a bevel so that I could use a tape hinge. About the only comment I have about the stabs is that the parts count is high for such a simple structure; I would have much rather seen a sheeted foam core. Bob told me that good contest grade sheet balsa is getting hard to find and he didn't want to sacrifice quality in the "V."

I took on the wings and fuselage simultaneously, working on one while the other was curing. Wing construction starts with the spar assembly. The "V" uses 3/32 x 1/4 x 36-inch spruce top and bottom spar caps, with balsa and plywood shear webs in the root and obechi shear webs for

servo installation both with and without the aid of a router. If you don't have a router, the servo well needs to be cut before installing the spar. After doing this, I installed the spar in the foam core with 30-minute epoxy.

The V-gilante fuselage features Bob Dodgson's distinctive MonoSeam design. Whereas most glass fuselages are made in two halves and joined top and bottom with fiberglass tape and epoxy, a MonoSeam fuselage is made in one piece with a single seam on the top of the fuselage from aft of the wing to the tail, forming a "teardrop" cross-section. Glassing a separate molded fiberglass piece in place completes the nose section. The standard V-gilante kit leaves this latter job up to the builder, or you can have it done for you at the factory for an additional \$10.

After glassing the upper nose section in place, I installed the servo rails and the V-tail mount. It's very important to reinforce these joints with glass cloth, especially in the V-tail area since this is where most of the strength comes from. The glass cloth should wrap from one side of the fuselage, over the mount and back up the fuselage side.

Back on the wing, I installed the aileron servo wiring, sub leading edge and the



## DODGSON DESIGNS' "V-GILANTE" SAILPLANE

WINGSPAN .....	100 in.
WING AREA .....	750 sq. in.
FLYING WEIGHT .....	42 oz.
WING LOADING .....	8 oz./sq. ft.
ASPECT RATIO .....	13.33:1
AIRFOIL .....	SD7037
RADIO .....	Four channels required—ailerons, ruddervators (elevator and rudder mixed), and flaps.
CONSTRUCTION .....	Fiberglass MonoSeam fuselage, foam core wing with carbon fiber reinforced spars and obechi sheeting, built-up balsa tail surfaces.
KIT PRICE .....	\$175 (\$185 with fuselage "nose job" done for you), plus shipping.

Produced by Dodgson Designs, 21230 Damson Rd., Bothell, WA 98021; (206) 776-8067.

gilante—basically identical to the V-gilante except that it uses the 2-meter wing from the Dodgson Sprite, which it supersedes. Fliers on a budget can purchase a complete V-gilante kit and a Wee-gilante wing kit and fly competitively in three classes just by swapping wings, as the airfoils and root chords are identical.

I was part of the shakedown crew for

the remainder of the spar; .014 x 5/16 x 24-inch carbon fiber is glued to this assembly top and bottom. My kit contained 36-inch pieces, which I installed full length. The root section of the spar is then wrapped with Dacron thread. The kit includes enough thread to wrap the root area without leaving gaps between the threads.

The instructions guide you through

tubes for the 1/16-inch wing alignment wire. This done, the wing is ready for sheeting. I used West Systems epoxy—roughly 1 ounce per panel—to apply the obechi, and vacuum bagged the wing overnight.

After cutting out the flaps and ailerons, I faced them with obechi. The flap linkage is installed next, along with the root and tip ribs and the spruce leading edge. If you



own a radial arm saw, getting the recommended dihedral angle is easy; if not, it's a sand-and-try procedure.

The V-gilante's wing mounting method is unique in that it connects the wing rod directly to the towhook; no loads are carried by the fuselage even during the hardest zoom launches. The joiner that does all the work is what Bob Dodgson calls a "mount rod," made from a piece of thick-wall brass tubing (refer to the sketch). With the 1/4-inch wing rod installed in one wing half, the mount rod is slid onto the wing rod, followed by the other wing panel. Another, smaller mount rod is used on the rear 1/16 alignment wire. Both mount rods telescope into larger brass tubes mounted securely in the fuselage. The towhook is then screwed into the threaded portion of the large mount rod, securing the wing in place. A most ingenious setup, I must say! The only drawback of the system is that it limits the towhook position to one location.

The builder has the option of using four, five or six servos to operate the V-tail, flaps, flaperons, and/or ailerons. I used two ser-

vos in the wing for the ailerons and three in the fuselage—two for the V-tail, and one for flaps.

After final sanding all of the individual components I covered the wing and tail with Coverite's 21st Century film, and sprayed the fuselage with 21st Century paint. I continue to be impressed with both of these products. The paint's fan spray pattern nozzle gives professional results without the financial investment in professional spray equipment. Coverite's 21st Century film requires a different technique than other heat-shrink coverings, however I followed the instructions to the letter and had no trouble achieving a nice looking finish the first time.

If you've followed the instructions to the letter, you'll be surprised when it comes time to balance the model. You probably won't need to add nose weight at all. I've been told that in some cases, tail weight was needed for balance! Now that's a switch. Bob states that the finished weight of the "V" is 42 ounces. This is actually a very accurate and achievable weight. It's

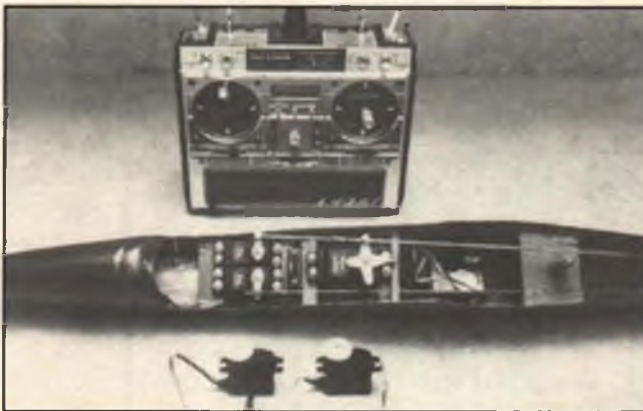
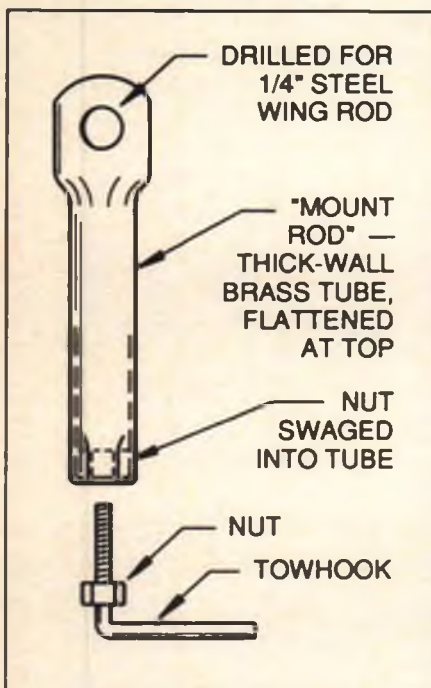
been reported that with very light covering, small servos and batteries, you can get the "V" in at around 37 ounces. This is noticeably lighter than many of today's 600 square inch 2-meter designs, and the "V" has 750 squares!

## FLYING

I have used both a hi-start and winch to launch my "V." Both methods work quite well, and the launches are very steep. With its SD7037 airfoil and light weight, the "V" thermals quite well. Its crisp, responsive handling makes aerobatics a real treat. It needs quite a bit of down elevator to remain inverted, but since we usually fly upright, this is of little consequence. Landings with full 90-degree flaps are, as expected, slow and predictable. Bob has thoughtfully provided enough fuselage below the wing that a skag isn't required to keep the flaps off the ground.

It's nice to see a different approach to soaring. The "V" looks like a sailplane, not merely a "tool" to compete with. It goes together quickly, and builds straight and light. With the purchase of the optional 2-meter wing kit, you can be competitive in all three sailplane classes without having to invest in three separate aircraft.

Bob Dodgson can be reached at Dodgson Designs, 21230 Damsen Rd., Bothell, WA 98021; (206) 776-8067. Bob also puts out a twice-yearly newsletter called *Second Wind*. It contains useful information on general soaring, happenings, tips and reader-supplied text. One buck (\$1.50 for Canadians) will get you a full year's worth. Tell him *Model Builder* sent ya! MB



■ ABOVE: George used a Hitec RCD flight pack in the "V"—two 205 mini ball bearing servos for the tail and a powerful 805 servo for the flaps. Mounted in the wings are two HS 80 micros for the ailerons. Finishing off the package is the RCD Supreme 8 receiver. An Airtronics Module transmitter with ATRCS conversion does the electronic mixing. George says he was very pleased with the performance of the Hitec RCD equipment and recommends it without hesitation. ■ LEFT: Simplified sketch of the V-gilante's unique wing mounting device, which connects the wing rod directly to the towhook so that no stresses are transmitted to the fuselage. A similar, smaller mount rod (minus the nut at the bottom) is used at the rear 1/16-inch wing alignment wire. Both mount rods telescope into brass tubes mounted securely in the fuselage.

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Patent pending



## CONSTRUCTION

# THE PORT VICTORIA P.V.-7 "GRAIN KITTEN"

**A Rare WWI "Ultralight" Fighter  
for Peanut Scale.**

■ BY JOHN BERRYMAN



The minuscule P.V.-7 is one of those early "mini-bips" that lend themselves so well to FF Scale modeling. The author emphasizes the need to get everything in proper alignment for best flight performance. Prop is formed from 1/64 plywood.

A product of the Royal Navy Air Service Experimental Construction Depot at Port Victoria, the P.V.-7 was a failed effort to build a light anti-Zeppelin fighter that could be flown off of torpedo boat destroyers. Weighing 284 pounds empty and less

than 500 pounds with pilot, Lewis gun, three drums of ammunition and 2-1/2 hours of fuel (less than half the weight of a loaded Bristol Scout), the P.V.-7 was hampered both by poor handling qualities and the asthmatic performance of its 35-hp ABC

engine.

After some test flights that began in September of 1917, the Grain Kitten and its competitor, the P.V.-8 Eastchurch Kitten (which suffered from identical powerplant problems), were abandoned. This may have been all to the good, for one wonders about the wisdom of flying over the cold and stormy North Atlantic, taking occasional potshots at a snooping Zep, in an aircraft that weighed less than 300 pounds.

The P.V.-7, with its reasonable nose moment (for a WWI ship, anyway), large tail and generous wing area, has the potential to be a pretty fair Peanut model; certainly a "gumband" powerplant will perform more reliably than did the gasping ABC twin in the prototype!

### WING

The upper wing is constructed "Mooney style" with sliced ribs made from 1/20 stock, while the lower is made conventionally with ribs cut from light 1/32. There should be no surprises here. The technique I use to make the scalloped trailing edges is to carve a semi-circular shape from 1/2-inch soft balsa, glue some 150-grit sandpaper to the shape, and sand the scallops into the trailing edges before slicing them free from the 1/16 stock. I also go to a bit of effort to make secure mountings for the cabane and interplane struts. Alignment is very important on bipes (and sesquiplanes, which is what, strictly speaking, the P.V.-7 is), and anything you can do to assure accurate and secure alignment of the wings is time—and weight—well spent.

### TAIL SURFACES

There isn't much to say about this utterly normal construction. Of course, this is the place to use that light 1/20 stock you've been hoarding.

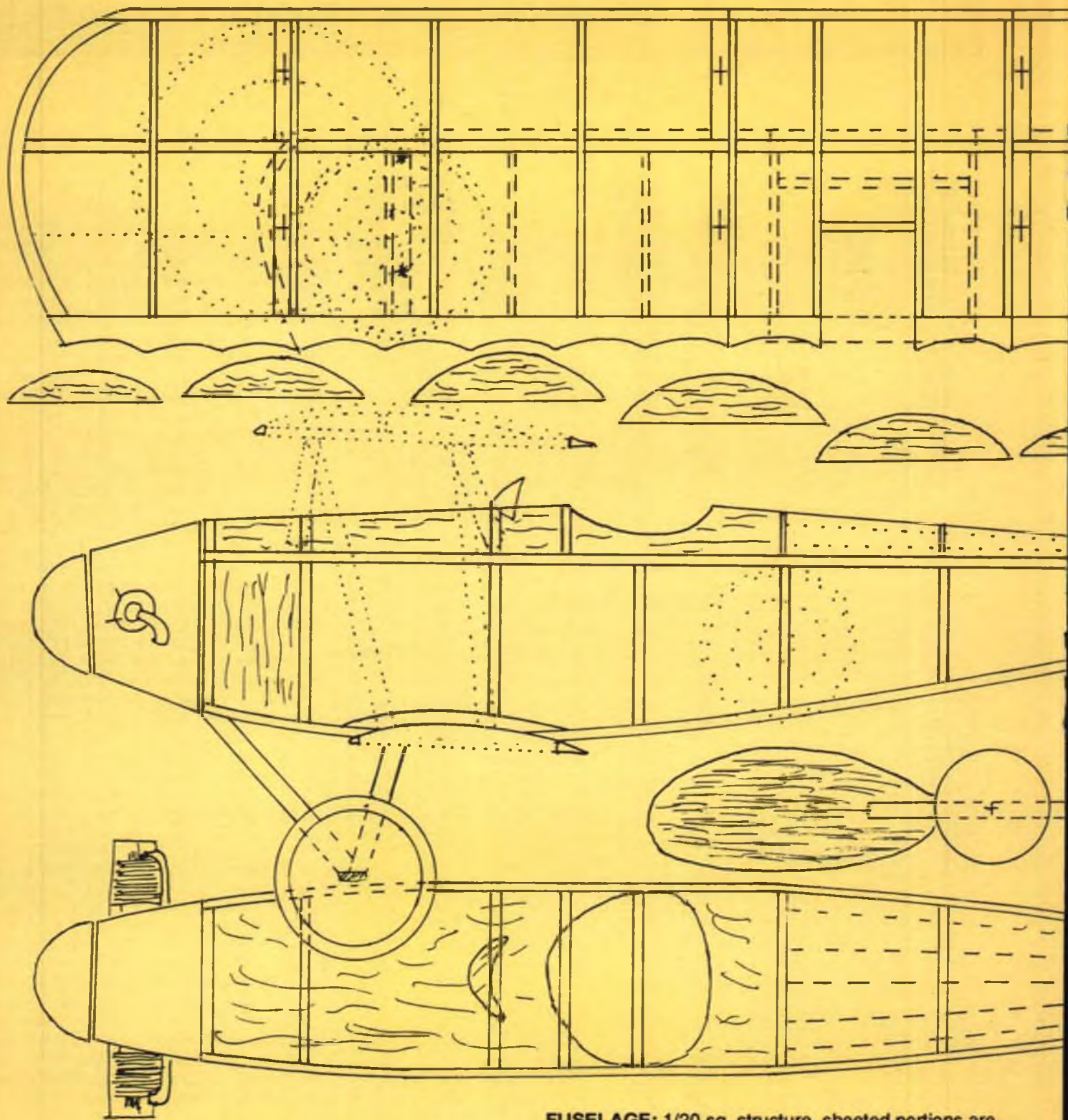
### FUSELAGE

Again, construction is straightforward. As usual, I constructed the fuselage using my creepy "install-temporary-bulkheads-and-build-in-the-air" method. If you have a better system, by all means use it. After the forward formers are installed, and before you sheet the cowl, you'll need to install light (.015-inch) music wire cabane struts at the locations shown on the plans. These will eventually be covered by balsa "false struts." The shape of the struts is determined from the front view of the model.

### MISC. PARTS

The propeller is made from 1/64 ply that has been soaked in hot ammonia water for 15-20 minutes and taped to a 12-ounce beverage can in the manner described on the plans. When dry, the blades are glued





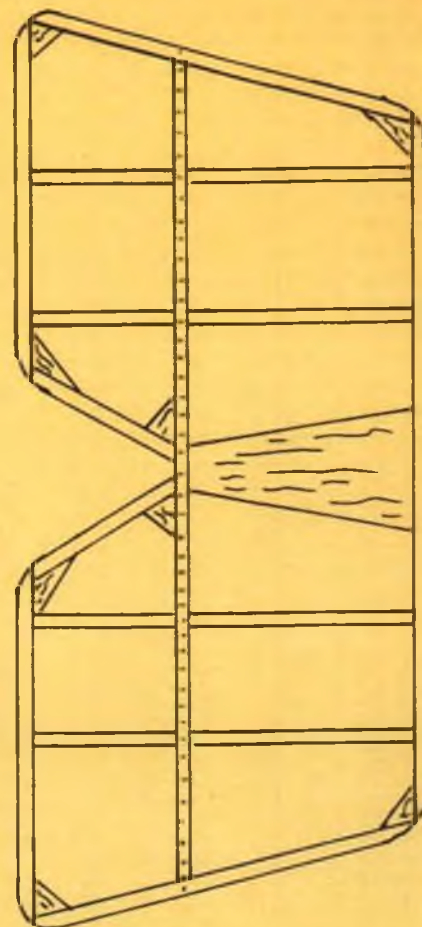
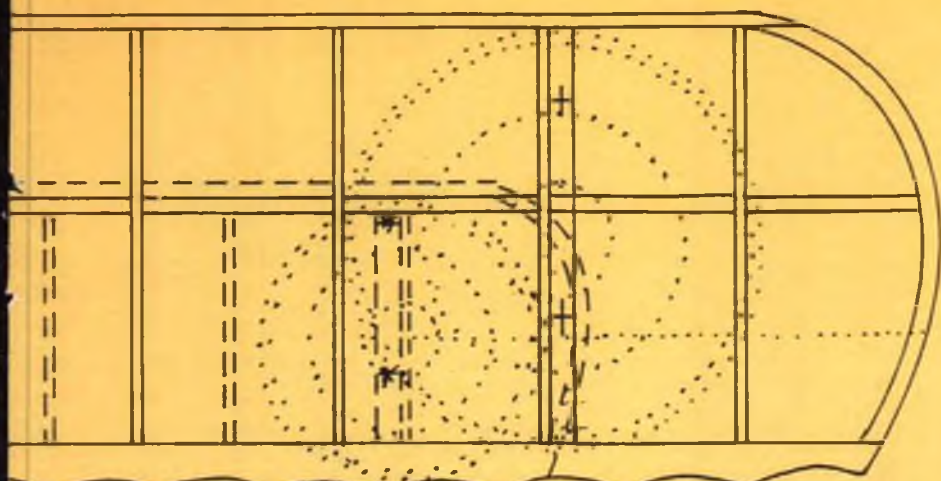
**WING:** (Upper) 1/16 sq. L.E., 1/16x3/16 T.E. (scalloped), approx. 1/20x1/16 spar, 1/20 sheet ribs sliced "Mooney" style, tips are three laminations 1/32x1/20; (Lower) 1/16 sq. L.E., 1/16x3/16 T.E. (scalloped), 1/20 light sheet ribs, tips are three laminations 1/32x1/20. Interplane struts: 1/20x1/8 firm. Dihedral: upper wing 1/2 in. each tip, lower wing 3/8 in. each tip. Incidences as drawn: upper wing +2°, lower wing +1.5°. Airfoil: 12% simplex.

**RUDDER/STAB:** Light 1/20 sq. structure, curved outlines are three laminations 1/32x1/20. Incidence drawn: -1.5°.

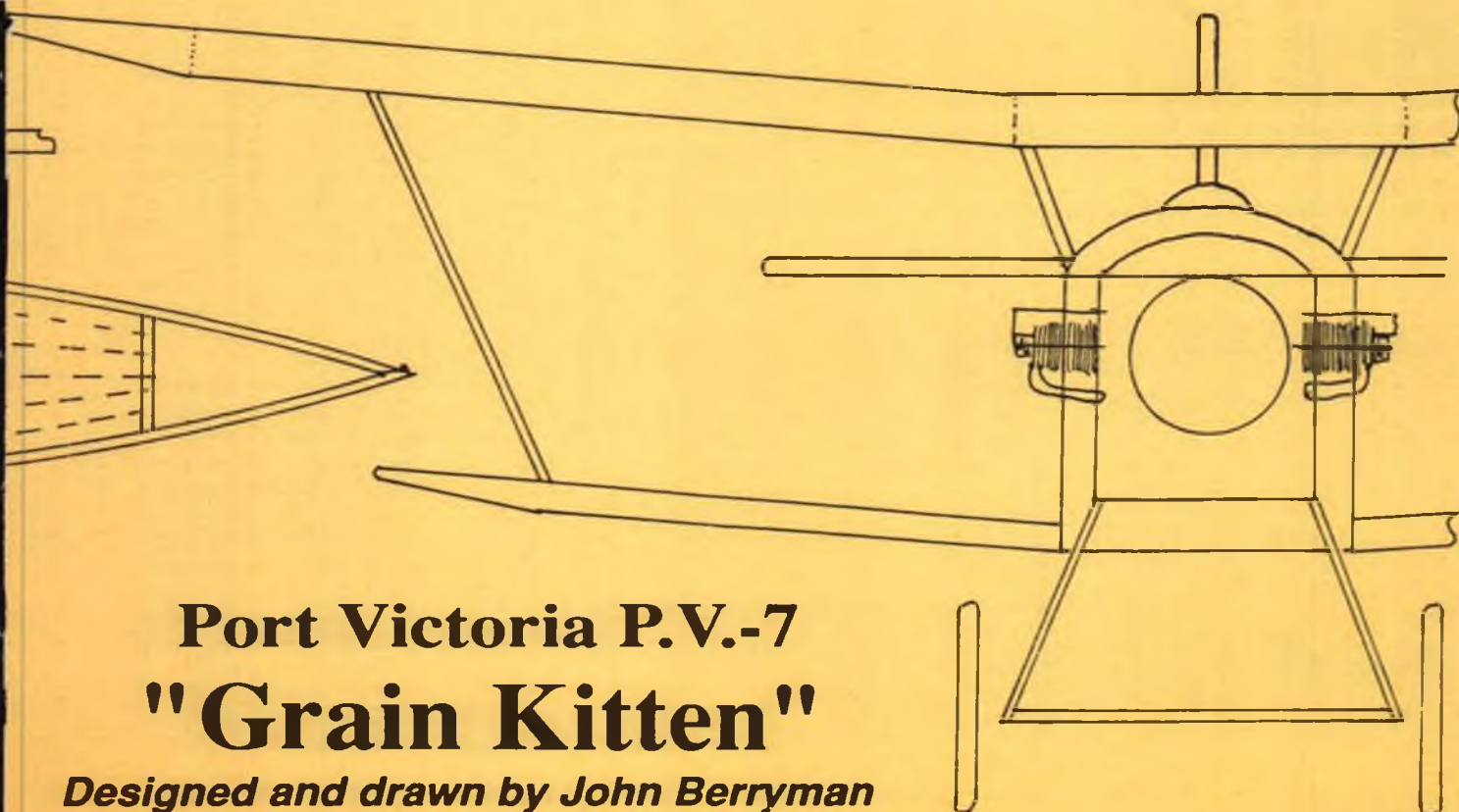
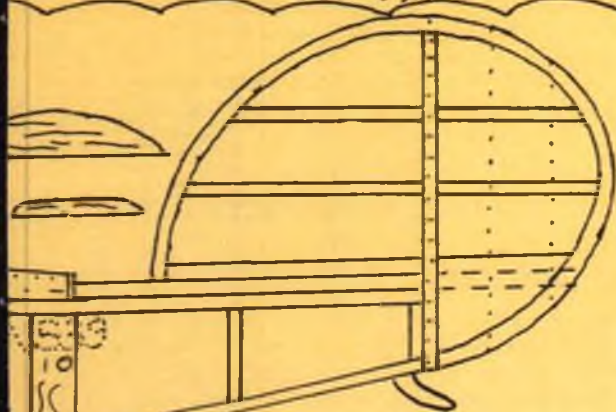
**FUSELAGE:** 1/20 sq. structure, sheeted portions are light 1/32, bulkheads 1-5 are 1/20 sheet, 6-7 are 1/32 sheet. Soft balsa spinner and noseblock. L.G. legs: firm 1/20x1/8. Cabane struts: .015 music wire covered with firm 1/20x1/8. Wheels: three laminations 1/32 sheet, bush with 1/16 dowel. Stringers: 1/32x1/20. Thrust settings as drawn: 2° down, 2° right.

**PROP:** 1/64 ply blades, soaked and taped to 12-oz. beverage can at 22° angle (angle leans left, L.E. of blade to left, hub end of blade to can bottom); blades are glued to hub at 30° angle 2 in. from center. Hub: 1/8 dowel. Diameter: 5 in. Pitch: 7.5 in. nominal.





**COLOR SCHEME:** Peck's Superlight green tissue overall. Spinner, noseblock, cowl aft to first cabane strut, interplane and cabane struts, L.G. struts and wheel discs: silver/gray. Rudder stripes (front to rear): red, white, blue. National insignia: white thin outermost circle, then blue circle, white circle, red center.



# Port Victoria P.V.-7 "Grain Kitten"

*Designed and drawn by John Berryman*

**References:** *Warplanes of the First World War: Fighters (Volume 1)*, by J.M. Bruce, Doubleday & Co., pages 180-182.



to the 1/8-inch dowel hub using a jig to get all the angles right. "Eyeballing" props simply doesn't work; build a jig and do it right!

The landing gear legs are made from firm 1/16 stock or light spruce. The cross-piece is made from two pieces of 1/32 balsa with a piece of .015 music wire sandwiched in between. I bend "springs" in the end of the wire to give the whole affair some shock-absorption capability.

The wheels are made from three cross-grained laminations of 1/32 balsa, bushed with a piece of 1/16 birch dowel. Detail freaks may notice that the wheels as I've shown them don't exhibit the conical "hub-caps" common to many early aircraft; this is per the prototype, and not laziness on my part. Also, you'll note that I've made no effort to conceal the epoxied aluminum disk that keeps the wheel in place. This also is per the prototype.

The noseblock is a bit large to be made from one chunk of balsa, so I built mine up from scraps of 1/8 and 1/4-inch balsa. The

engine cylinders are made from flexible plastic soda straws, while the rocker arms, exhaust pipes, cylinder heads, spark plugs and wires are made from the assortment of thin wire, thread, aluminum tubing, pins, etc. that rattle around in any serious Peanuteer's shop.

## COVERING AND FINISHING

Most British aircraft of this era were painted an olive green (khaki) on their upper surfaces, and featured "natural" (off-white) lower surfaces. However, careful study of P.V.-7 photos convinced me that

this ship was finished khaki overall, and I covered my model to match.

In the photos, the struts, landing gear and cowl/spinner area were all painted the same color—and it was clearly not "natural aluminum." I decided it was gray, and brushed on



Look closely and you'll see the small "spring" bent into the landing gear wire for shock absorption. Small chain-nose or round-nose pliers work well for this task.

some light gray Floquil. The markings were cut from tissue and doped in place, except for the aircraft number (N539) which was hand-drawn using white drafting ink and a drafting pen.

After one—repeat one—coat of thin—repeat thin—nitrate dope was applied, the control surfaces were outlined using a Sharpie fine-point felt-tip pen.

## FINAL ASSEMBLY

Tragically, it's in the home stretch that many carefully constructed bipes become non-fliers, generally because the modeler doesn't take the time to align the multiple flight surfaces carefully. I know of no way to do this reliably and accurately without a jig of some sort, and I've included a photo of the one I used for my model.

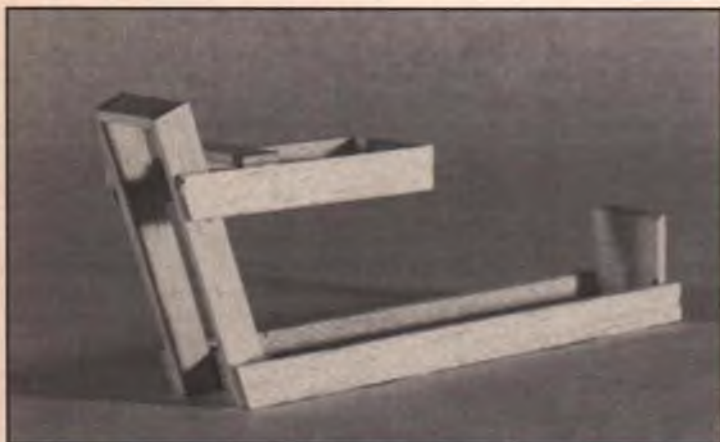
Once the wings and fuselage have been secured in the jig (the landing gear is not installed at this point), you can glue the wire cabane struts in place into holes you've drilled in the cabane strut mounts in the upper wing. I like CA glue for this metal-to-balsa joint. You'll probably have to do some judicious bending of the wire to make things line up properly. Then the interplane struts can be added, taking care not to force anything into place (which, when the assembly comes out of the jig, would result in a warp).

Finally, cover the .015 wire cabane struts with 1/20 balsa and attach the landing gear.

## FLYING

My P.V.-7 weighed just under 12 grams—certainly no lightweight, but not too bad for a bipe. Mine flies (left-left) on a loop of 3/32-inch F.A.I. tan rubber about 11 inches long. If your rubber is tired, or if your ship is heavy, you may need to use 1/8-inch strip. The plans show both right and down thrust. As is the case with a certain credit card, don't leave home without them. Some left rudder is also a good idea. Using clay for ballast, I balanced my model at about 30 percent on the upper wing.

While not a world-beater, the P.V.-7 is a rather unique subject, and is very attractive in flight. Take some time to align things properly, and enjoy your ultralight fighter. **MB**



The author's scrap balsa assembly jig that holds the wings and the fuselage in proper alignment while the struts are being installed.

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For those needing more from their radio system, the Flash 5 offers dual rates for aileron and elevator, a landing gear switch and trainer capability.

Both models are Mode I/Mode II changeable and the nonvolatile memory holds all settings for up to ten years without a back up battery.

Features	Flash 4	Flash 5
End Point Adjust	X	X
Exponential	X	X
Dual Rates		X
Servo Reverse	X	X
Digital Trim	X	X
Mode I / Mode II	X	X
Timer	X	X
Alt/Rud Mix	X	X
Elevon Mix	X	X
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## Flash

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**Flash**





## Fw 56 Stösser

■ By Steven L. Stratt

Airdrome's Steven Stratt made it three in a row when he was awarded top honors in Scale at the Keystone RC Club's annual electric Fun-Fly last year. His magnificent Focke Wulf Fw 56 Stösser, which sported an oversize wing and tail, has now been superseded by a larger and even more impressive project: an exact 2"=1' scale Stösser, the subject of this, the first of a two-part story. Full-size plans are available both from Airdrome and Model Builder Plans Service.



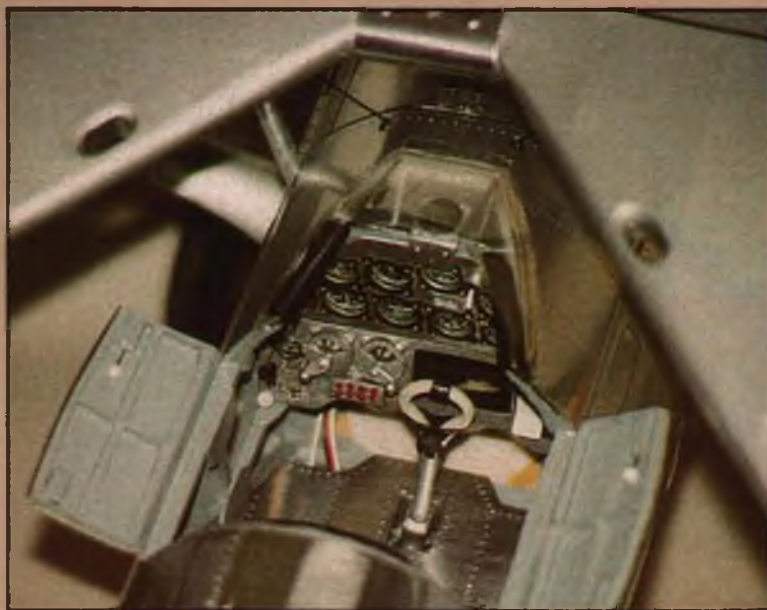
■ RIGHT: Airdrome proprietor Steven Stratt (left) and his trusted test pilot, Dave Baron, with the mixed-scale Fw 56 during tests at Roxbury, Connecticut, prior to KRC '84.







The 330mm (13 in.) diameter 30 mm (1.18 in.) monopropellant aircraft ever designed. D-1A2A was a standard trainer version of the Fw 56; the three-view supplied with the plane depicts D-1G1R, which was also aluminum overall but had a distinctive black scalloped nose trim scheme. This photo clearly shows the open bay, fabric covered aft center section of the wing and the very large (and very effective) ailerons.



## 1937 FOCKE WULF FW 56 STÖSSER

Designed for electric power by Steven L. Stratt

SCALE	2"=1'
WINGSPAN	70 in.
WING AREA	630 sq. in.
FLYING WEIGHT	Approx. 98 oz.
WING LOADING	Approx. 22.4 oz./sq. ft.
POWER	Geared Astro 40 or equivalent.
RADIO	Four channels required.
CONSTRUCTION	Balsa, spruce, plywood.

As you can see here, the author excels at minute cockpit detailing. Floorboard and pilot's seat are removable for access to the elevator and rudder servos mounted directly underneath. Of course, the cockpit could be greatly simplified by putting a removable false floor at the upper fuselage longerons, deleting everything below the instrument panel.

I'd like to preface this article with a few words on the remarkable evolution of Electric Power. Hopefully this will serve to dispel some lingering misgivings as to its efficacy, especially among dedicated scale modelers.

Due to scale's more exacting and costly modeling re-

quirements, I believe it will profit the most from the rapidly developing advantages of electric power. This was made quite apparent to one and all at last year's running of the annual KRC electric meet at Quakertown, Pennsylvania, where the most optimistic expectations of increased scale

model entries were greatly surpassed!

A growing number of scale modelers are beginning recognize the unique advantages that electric power has to offer—no noise, no vibration, no mess, and virtually 100 percent reliability, which makes electric especially desirable for multi-

engine models. The typically heavy battery can often be used to advantage by helping to balance scale subjects with very short nose moments—WWI types, for example—without having to add useless lead ballast. Electric fliers are also coming to realize that the concentrated mass of the motor and



batteries produces steadier scale-like flight and improves rough-air penetration.

### THE AIRCRAFT

I first fell in love with the graceful Focke Wulf Fw 56 Stösser (German for a type of small hawk) in the mid-'30s from photos of it performing at U.S. airshows. Over the years a few models of the Stösser have appeared in the American model press, including the October 1979 issue of *Model Aviation*, which featured Tom Nallen's wonderfully executed free flight scale version. It seemed ideally suited for an Electric Scale RC subject with which I could emerge from my WWI phase for Airdrome.

The Stösser has long been credited to Kurt Tank as his first Focke Wulf design. However, recent information from Germany reveals the actual designer as Rudolph Blaser, a Swiss aeronautical engineer working under the administrative direction of Kurt Tank.

The Fw 56 first flew in late 1933. A sadly familiar scenario for many prototypes repeated itself when D-JSOT crashed, killing its pilot, during an early demo flight. In 1935, after successful modifications, the Fw 56 won over entries from Arado and Heinkel at an Air Ministry competition. This was mostly due to the Stösser's aerobatic ability and rugged strength, and for its 300 mph diving ability—high for that era.

## FLYING THE STÖSSER By Dave Baron



With Dave Baron's expert thumbs twiddling the sticks, the author's mixed-scale Stösser performs a touch-and-go in gusty conditions at last year's KRC meet in Pennsylvania.

▶ **• Ground Handling:** Good control but it quickly gets light on its feet due to its high angle of attack stance—use care with your first couple of rudder inputs. Generally, if there is any wind for it to point into, the '56 will take off beautifully. It helps a lot if the pilot is skilled enough to keep the wings level with his right hand and the nose pointed into the wind with the left.

▶ **• Normal Flight:** The Stösser flies like a trainer. Rudder authority improves dramatically as speed increases, but feels noticeably sluggish whenever the speed bleeds off. I consider it to be a stall warning when the plane starts to skid or slide.

Elevator is solid and consistent at all airspeeds, due largely to the short coupling of the fuselage. Not much throw is needed to give plenty of control.

Ailerons feel very positive and natural. They become effective before the rudder during takeoff, and this can cause you to get the model up on one wheel if you accidentally use the ailerons to correct for ground tracking. An aileron differential of 20 percent more up than down gives good coordinated turns without a lot of rudder input and still leaves the Stösser comfortable in aerobatic maneuvers.

▶ **• Aerobatics:** The Stösser rolls much the same as a Citabria or Decathlon. It needs to be flown all the way through the maneuver, but feels very solid as long as you pay attention to airspeed. A bit of excess speed and a slight nose-up attitude at the entry will minimize the amount of top rudder and down elevator needed, which will tend to dissipate your airspeed. Top rudder in the last quarter of the roll will tend to make the maneuver finish too quickly, and possibly overshoot a wings-level attitude at the finish. Because of this phenomenon, snap rolls are lightning-fast and require much practice to recover with the wings level.

The Stösser spins well, but tends to lose a lot of altitude quickly while doing so. Don't get caught close to the ground or you may find the earth rising too rapidly!

The model has a Clark Y airfoil and therefore requires a high negative angle of attack to maintain level inverted flight. This added drag makes it awkward to climb inverted. If you plan your passes and keep your speed up, much is possible and the plane performs like an Extra 300 (well, almost). If you let the speed bleed off, it will right itself abruptly. It does what I call a "snap roll back to level flight." This is not always wonderful because you still don't have any airspeed when you are suddenly right side up again.

The Stösser is really a remarkable plane. It's the perfect model for a high-performance electric format, with its long nose, good proportions and inherent streamlining. I have a real passion for aircraft of the '30s and this model sums up all of my favorite features into one package. *MB*

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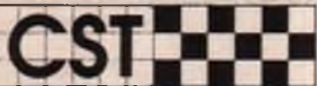
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Powered by a 240-hp Argus air-cooled, inverted V-8, the Stösser had a top speed of 177 mph and stalled at 55 mph. Span was a bit under 35 feet, length was 24 feet. Two 7.9mm guns poked their snouts through nicely shaped troughs on top of the engine cowl. The parasol wing was swept back and had a center section that diminished in thickness toward the center. A symmetrical airfoil, advanced for its time, enhanced prolonged inverted flight.

The great WWI ace, Ernst Udet, along

with famed aerobatic pilot Gerd Achgelis, were both very active in flying aerobatic exhibitions all over the world, often in Stössers. Apparently, Udet was greatly impressed by the U.S. Navy dive-bombing exercises during his trips here. He soon personally tested this idea in the sturdy Stösser, which drew early attention with the fledgling Luftwaffe.

Eventually, the much larger and more powerful Junkers Ju 87 Stuka fulfilled this prophetic role in WWII. By this time the

Fw 56 was obsolete as a fighter, but carried on ideally as a trainer. Over a thousand were built, and although hampered by being a single-seater, its great strength, stressed to a factor of 14, insured its longevity.

The Fw 56 was of

Close-up of the Stösser's tail reveals the pylon-mounted horizontal stab, one of the aircraft's most distinctive features. Note the scale trim tabs on the control surfaces and the sub-fins on the elevators.

mixed construction. The fuselage was a welded steel tube structure that ended in a distinctive raised pylon which supported the horizontal stabilizer. The wing and fixed horizontal tail were built of wood, sheeted top and bottom with plywood and covered with fabric. The aft center area of the wing was fabric covered only (no plywood sheeting), as were the elevators and the elliptical, finless rudder.

### THE MODEL

In 1989 I designed and built my first Stösser in a modified 1.5"=1' scale, geared Astro 05 powered, seven-cell version; the wing and tail were slightly enlarged to 1.6"=1' scale (384 square inches) for better control and lift. Total weight was about 54 ounces, and it flew smooth and slow. It had to be dived to gain speed before each maneuver, just like the full-size prototype.

The model was finished as D-IGIR, a liaison plane used by the RLM Flugbereitschaft, and sported a scalloped black stylization of hawk feathers. I chose this scheme to avoid the panels of the numerous standard trainers' nose sections. Unfortunately, the wing and tail were destroyed in a non-flying accident the following year, and the model was shelved.

Encouraged by my success at the '92 and '93 KRC meets, I began to think of building another, bigger Fw 56 for 1994. My 1993 winning Dornier Zeppelin D.I



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5.7 X 3	1	1.59	8.5 X 7.5	5	3.95	11 X 5	2.49	12.5 X 12	7	7.95	14.4 X 10.5	10	12.95	20 X 8	12	25.00	22 X 16	45.00
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	20 X 10	25.00	24 X 10	55.00	
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	20 X 12	25.00	24 X 12	55.00	
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7 X 4	15	1.59	9 X 8	1.99	11 X 12	7	7.95	13 X 13N	9	7.95	15 X 14N	10	12.95	22 X 16	31.00			
7 X 5	15	1.59	9 X 9	1.99	11 X 12W	7	7.95	13 X 13.5N	9	7.95	15.5 X 13N	10	12.95	24 X 10	38.00			
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8 X 7	4	1.79	10 X 5	2.29	12 X 12.5	7	7.95	14 X 11	17	12.95	14 X 6P	Pusher	12.95					
8 X 8	4	1.79	10 X 6	2.29	12 X 12.5N	7	7.95	14 X 12	10	12.95								
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8.5 X 5	4	3.95	10 X 9	2.29	12 X 14	7	7.95	14 X 13N	10	12.95								
8.5 X 5.5	4	3.95	10 X 10	2.29	12.5 X 9	7	7.95	14 X 13.5	10	12.95								
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CURRENT USAGES

1

049 Free Flight

2

15 Combat

3

10-15 Pylon

4

25 Pylon

5

40 Pylon

6

36 Combat

7

60 Pattern

8

CL Stunt

9

120 Warbird

10

120 Pattern

11

40 Free Flight

12

35 CC

13

70 CC

14

21-25 Free Flight

15

15 Free Flight

16

29 Free Flight

17

VS 91

### CURRENT USAGES

1	049 Free Flight
2	15 Combat
3	10-15 Pylon
4	25 Pylon
5	40 Pylon
6	36 Combat
7	60 Pattern
8	CL Stunt
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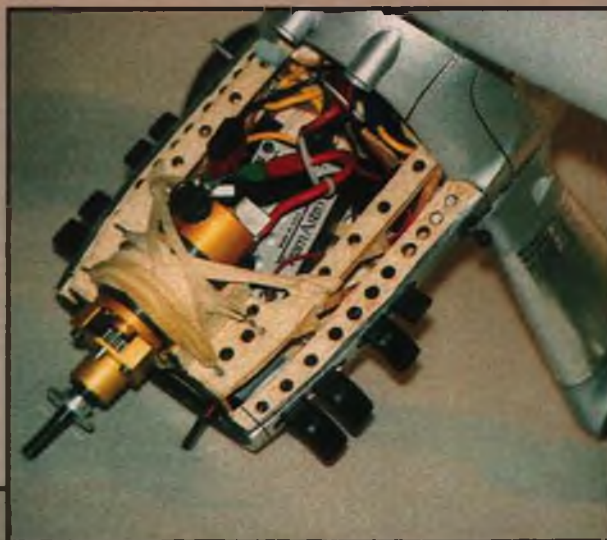


flew so amazingly well in 2-inch scale with an Astro 40 system that this seemed to be the formula to follow; the Stösser's streamlined shape would be an added advantage. As it was too late to design and build a completely new 2-inch scale Stösser, I decided to resurrect my old 1.5-inch scale fuselage and fit it with a larger wing and tail to lift a bigger power package. If this were successful I could later draw up a 2-inch exact scale Astro 40 powered model for Airdrome.

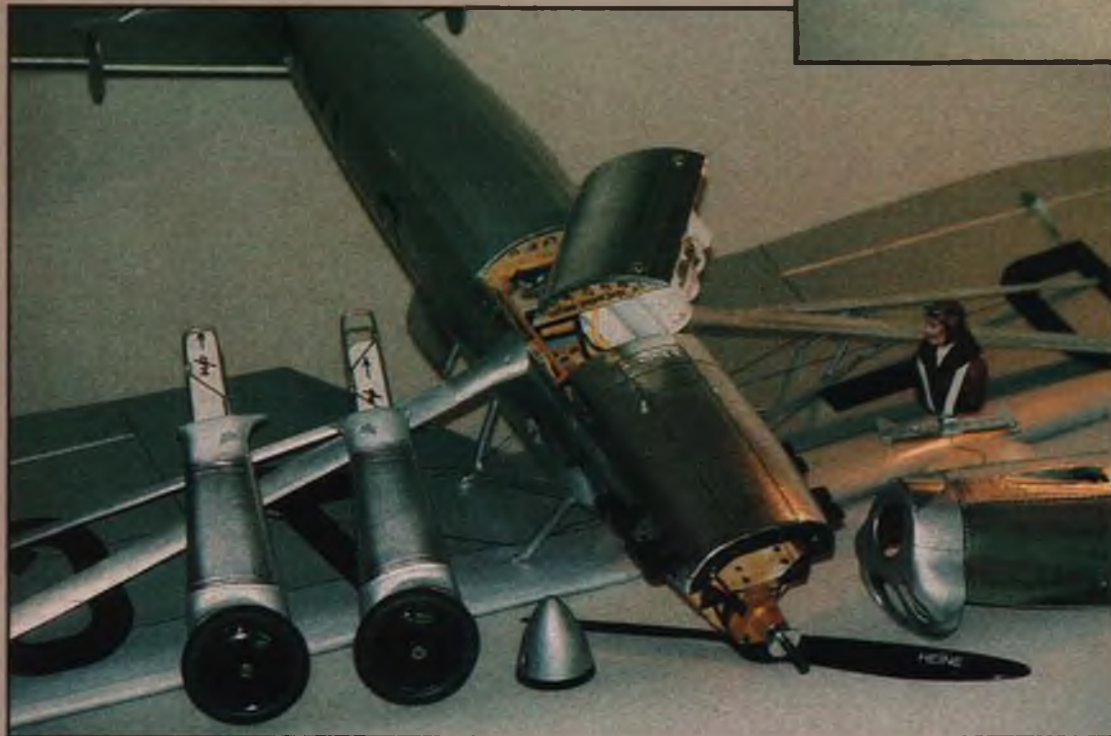
Consultation with Dave Baron convinced me to aim toward a geared Astro 15 system with a 10x8 prop and 14 cells instead of the usual 12. We estimated we needed at least 550 square inches of wing

inches, wing area approximately 590 square inches. Emboldened by my successful "riveting" experience with the Dornier D.I's all-dural nose, etc., I reworked the old Fw 56 fuselage nose to render the dural-paneled and riveted standard trainer version.

This time I decided to model a standard trainer version of the Stösser, D-IAQA, depicted in an excellent three-view drawing by Ian Stair. It originally appeared in the British publication *Air-*



■ ABOVE: Rubber band motor mounting is a trademark of Airdrome design, as they protect the gearbox shaft in the event of a nose-over and also allow you to easily add shim under the motor for thrustline adjustments. Author recommends the rubber bands be replaced fairly frequently, as the heat of the motor tends to dry them out. ■ LEFT: An unusual feature of the model is the removable landing gear. Each strut is a truss made of 1/8 M.W., fitted with a removable helico fairing. .015-inch sheet plastic "jam" strips provide a snug friction fit in the fuselage. Batteries are mounted on a hatch in the bottom of the fuselage.



area. I jump-started myself into a maximum effort wing/tail blow-up in January 1994, and by March, after lots of eyeballing and many rough layouts, I had a very scale-like wing and tail. Both were at about 1-7/8"=1' scale. Wingspan was now 66

craft Described No. 165, *Air Modeler* of August 1967. A more recent issue is *Deutsche Jagdflugzeuge 1915-1945* by Heinz J. Nowarra, published by Podzun Pallas, Verlag 1985 in Germany. In it you'll find our subject's photo, plus the original

D-IGIR and D-IKA and a spec sheet. Four photos appear in *Aero Pictorials No. 6, Luftwaffe in WWII, Part 3*, published by Aero Publishers, Inc., 1980. This and more are depicted in Airdrome's "Pictorial Album."

Redesigning, razor blading and Dremeling at top speed, I finished just a week before the '94 KRC meet. I then flew my '88 Pontiac Bonneville up to the Southbury, Connecticut airfield haunt of Dave Baron and the Fairfield League of Yankee Radio Controllers club (truly a wonderful, very friendly group of modelers) for the first test flight.

The mixed-scale Stösser didn't fly "off the board" as hoped; it merely hopped over the grass, refusing to lift off. A quick confab with Dave and his friend Russ Pribanik—well known as an exceptionally talented machinist and model technician—zeroed us in on a fast three-pronged fix.

First, we installed Dave's geared Astro

*continued on page 76*

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cu in (15-19.5 cc)  
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F4U Corsair Wingspan: 62 in



# PRODUCTS IN USE

■ By Bill Clendenon

## GREAT PLANES' PIPER J-3 CUB

Every modeler should build at least one Cub sometime in his or her modeling career. Great Planes offers this particularly nice and quite accurate replica in 1/5.5 scale, which is just the right size—large enough to perform realistically, yet not so big as to be a nuisance to transport and store.



■ RIGHT: The author added further interest to his J-3 Cub kit by finishing it in a WWII olive drab scheme with U.S. Army markings. Such aircraft, designated the YO-59, were produced by Piper in 1941 and were basically stock J-3 Cubs. The more familiar military Cub, the L-4 with its "greenhouse" aft cabin, was developed shortly thereafter. ■ ABOVE: The Saito .50 in the author's model is at the lower end of the manufacturer's recommended four-stroke engine size range, but still does a fine job of hauling the 8-pound Cub around in a very realistic manner.





**G**reat Planes Model Manufacturing Co. has added yet another gem to their crop of scale airplane treasures, in the form of the classic Piper J-3 Cub. There's no need to take up space here with the history and lineage of the Cub; suffice to say that it's probably the most beloved and recognizable of any airplane ever built.

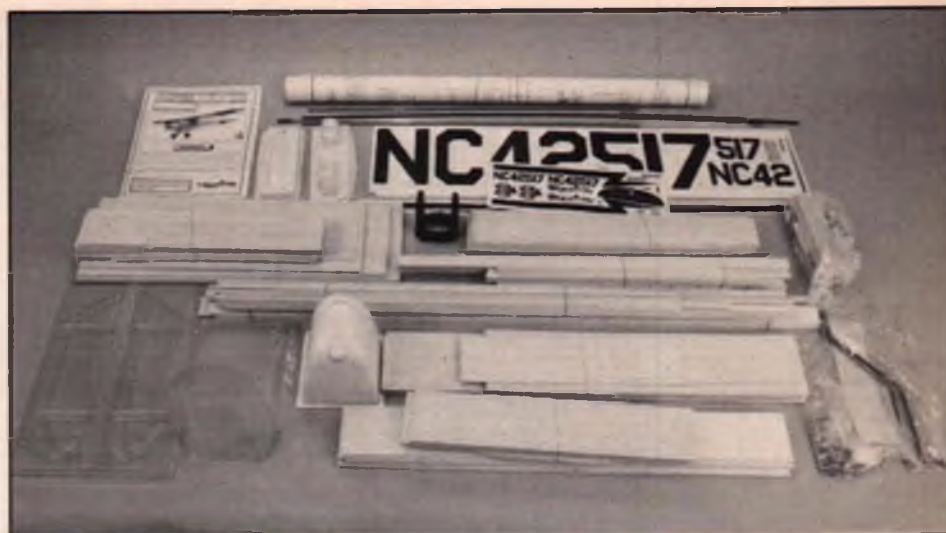
Great Planes' rendition is 18 percent (1/5.5) scale. Since the design work and drawings have been done on CAD, the scale outline is right on the money. Only the airfoil itself has been modified slightly from scale. Scale details are easy to make and Great Planes has thoughtfully provided the harder stuff in the form of vacuum-formed plastic accessories. The standard wingspan is 76-1/2 inches, or 61-1/2 inches for the clipped-wing version. I chose to model the standard version.

Great Planes really excels in their kit presentation and packaging. The Cub features all-balsa construction with some plywood at key points. The cowlings, front windscreen and side windows are vacuum formed plastic, and the fit is superb. There are two full-size plan sheets and two sheets of pressure-sensitive markings for the standard "yellow" Cub, as well as a 52-page instruction manual that has a key for all the die-cut parts, a bill of materials for everything included, and also what you will need to complete the model.

The construction starts with the vertical and horizontal stabilizers, which are die-cut from 1/4-inch sheet balsa. Most of my model was assembled with Bob Smith Industries' Insta-Cure, Insta-Cure Plus and Insta-Set accelerator. This CA glue is great! Combine this with the kit's excellent die-cutting and you will be going on to the wing in a matter of minutes.

The wing is a one-piece design featuring die-cut balsa ribs, basswood spars and plywood dihedral braces. It's a D-tube structure (leading edge sheeting top and bottom) with rib capstrips on the top only. The trailing edge is pre-shaped solid balsa, and the barndoor ailerons are built-up. The structure goes together quite easily, but the key thing here is to follow the sequence given in the instruction book. Great Planes furnishes some excellent hardware for the aileron hook-up—just install it as directed in the book. Both ailerons are actuated by a single servo in the center section. Use one of your better servos here for reliability.

The fuselage is made up of die-cut 1/8-inch balsa sides and 3/32-inch balsa doublers; the bulkheads are die-cut lite-ply. There are areas here where a careless builder could get into trouble, because

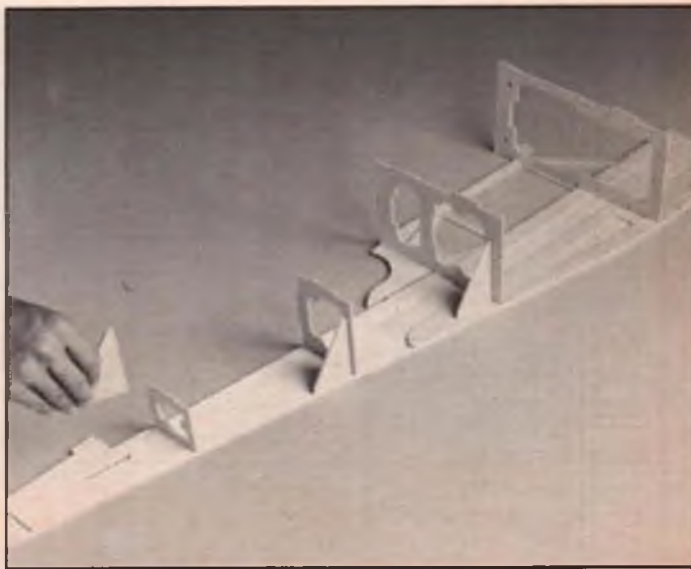
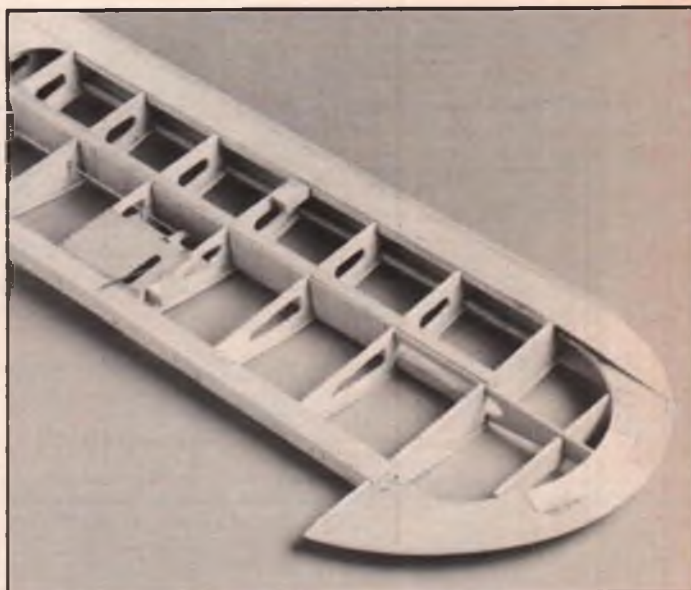


Great Planes has a well-earned reputation for producing very complete, excellent quality kits, and the J-3 Cub is certainly no exception. Kit includes most of the required hardware, decals for a standard "yellow" Cub, molded ABS plastic cowl and dummy engine details, and clear molded side windows and windshield (lower left). Photo courtesy Great Planes.

there is side- and downthrust built into the fuselage. Mark the tank area components top and bottom and also the left and right side parts. This will ensure that you don't go haywire.

A nifty feature here is the use of jigs to position the various bulkheads at the correct angle prior to joining the fuselage sides. I found it necessary to dampen the front of the fuselage sides in order to pull them together. (One note of discovery: I used an ammonia-based detergent to bend the sheeting, only to see the CA come out of the bottle as a blob. The reason is that ammonia is an alkali, and alkalis make CAs cure. Needless to say, I had to let the ammonia evaporate out of the wood overnight.)

Great Planes supplies a simple bent wire tailwheel strut in the Cub kit, however I chose to substitute a



■ ABOVE RIGHT: Boofy wing construction shows up well in this photo. Leading edge is sheeted top and bottom, main spars are basswood. Great Planes photo. ■ BELOW RIGHT: Fuselage construction is a combination of balsa and lite-ply, all die-cut and designed to interlock for ease of assembly and exceptional strength. As pictured here, the kit includes individual triangular alignment jigs that let you glue the bulkheads to one fuselage side at the proper angles before adding the second side. Great Planes photo.





### GREAT PLANES' PIPER J-3 CUB

**SCALE** ..... 1/5.5 (18 percent).  
**WINGSPAN** ..... 76-1/2 in. (standard),  
 61-1/2 in. (clipped).  
**WING AREA** ..... 820 sq. in. (standard),  
 653 sq. in. (clipped).  
**FLYING WEIGHT** ..... 6-1/2 to 7-1/2 lbs.  
 (8 lbs. as tested with standard wing).  
**WING LOADING** ..... 22.5 oz./sq. ft. as tested.  
**ENGINE** ..... .40-.61 two-stroke;  
 .48-.80 four-stroke.  
**RADIO** ..... Four channels required.  
**SUGGESTED RETAIL** ..... \$149.99.

Produced by Great Planes Model Manufacturing,  
 P.O. Box 9021, Champaign, IL 61826-9021;  
 (217) 398-3630.

more scale-like Carl Goldberg Models tailwheel assembly, actuated by springs connected to horns on the rudder. You will need to add a piece of 3/32-inch plywood to the bottom rear of the fuselage if you use one of these great-looking tailwheel assemblies.

All in all, there are no surprises in any of the construction. Again, follow the book!

Very few extra hardware items were needed. I chose to use a Du-Bro quick fueler, fuel filter, and a set of their 3-3/8 inch diameter Cub wheels. A 10-ounce Great Planes fuel tank completed the hardware.

After everything was sanded with 400-grit paper, I gave all areas of covering contact a good coat of Coverite's Balsarite, then covered the model with Super Coverite, which I find to be exceptionally strong and easy to work with. A 15-foot roll was all that was required. Rather than the standard yellow Cub color scheme, I chose to be different and modeled my Cub after a Piper YO-59 (the early military version of the Cub, before the L-4 went into production) that was at Fort Rucker, Alabama, in the summer of 1941. The scheme is different and attractive. The finish on my model is Coverite's 21st Century olive drab spray paint over a coat of 21st Century spray primer. The markings are from Northeast Screen Graphics (Major Decals), and really look great. Finally, the pre-formed side windows and windshield are installed after the model is covered and painted.

I installed a Saito .50 four-stroke on the supplied mount and trimmed the cowl to fit. A Top Flite 12x6 prop and Red Max 10 percent four-stroke fuel were used with no regrets.

The first flight took place on a windy, sunny February afternoon (a rarity here in Tennessee!). Takeoff into the breeze was a bit hairy. The gusts were blowing the Cub around like a leaf. Soon after lift-off I realized I had a considerably tail-heavy airplane on my hands. In my haste to get the model airborne I had neglected to check the CG, which turned out to be well over an inch aft of the position shown on the plans. This was one touchy Cub! After finally getting it down—thankfully in one piece—the airplane was taken home and weight added to the nose to bring it into balance. Now the tail comes right up and she's a docile pussycat.

The Great Planes Cub is a downright pleasure to build and fly. It would make a great introduction to scale modeling, and there are still plenty of full-size Cubs around to use as scale documentation. (*Editor's note: Bob Bank's Scale Model Research offers Foto-Paaks for no fewer than 27 different J-3 Cubs in all colors—including two on floats, one with trike gear and one with a three-cylinder Lenape radial engine—as well as eight different clipped-wing Cubs and ten L-4s.*)

'Nuff said. As usual, Great Planes has done their job and done it well! MB



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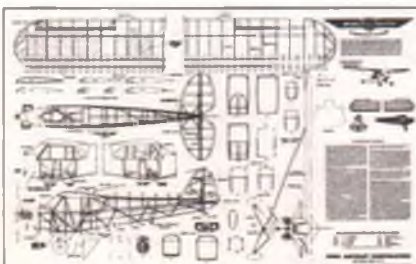
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# PLUG SPARKS

BY JOHN POND

- Frank Zaic and JASCO: The Early Years
- The New Cyclone "Thunder Bird 45"
- The Denny-Berg Engine



Photos of Frank Zaic are hard to come by, but SCIFS member Mik Mikkelsen saved the day by sending in this photo taken at Taft when the English contingent attended the SAM Champs in 1986. Pictured from left are Frank Zaic, his wife Carmen, Bob Oelan in back, noted English O.T. Rler Reg Parham, and Mik Mikkelsen.

This month's column will not be on any particular event or contest. Rather, we'll focus on a well-known modeler who has contributed mightily to the Old Timer cause—Frank Zaic, originally out of New York, now living in Southern California.

This writer first became aware of Frank's activities as a

draftsman and writer in early 1934, when I purchased the first Frank Zaic publication known as the *Model Airplane Guide and Log Book*. This publication was an offshoot of the business founded by the Zaic brothers—Jack, John and Frank—known as Aeronut Supply Dept. By joint agreement this was later changed to Jun-

ior Aeronautical Supplies Co., which formed the acronym JASCO.

Good balsa, especially the type required for indoor models, was not available, and the Zaics set out to remedy that situation. Starting with a capital investment of \$75, balsa logs were obtained from the East River Docks (Monteath Lumber Imports). By trial and error, they learned how to process the balsa into usable sheets and sticks without leaving

saw marks or other rough surfaces. To add to their stock of indoor material, JASCO sold bottles of a good microfilm solution, complete with instructions. Many other small items were added such as prop washers, bearings and their first kit, the JASCO Beam Scale. This was undoubtedly the best seller that Frank Zaic designed. With this simple

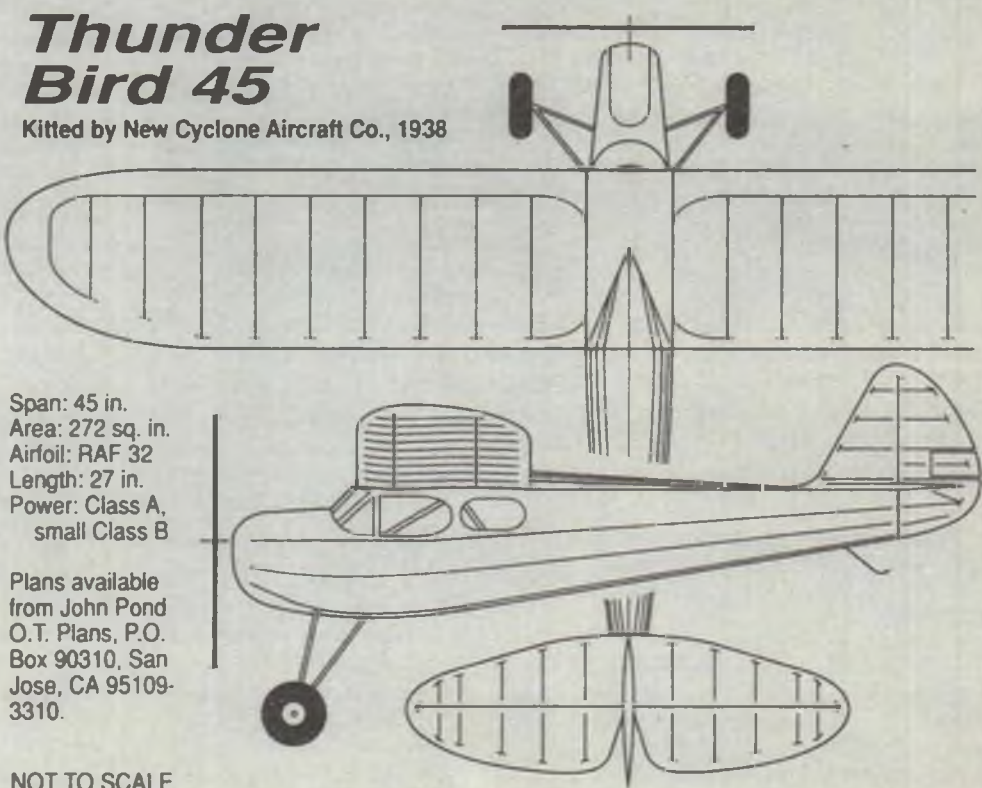
## Thunder Bird 45

Kitted by New Cyclone Aircraft Co., 1938

Span: 45 in.  
Area: 272 sq. in.  
Airfoil: RAF 32  
Length: 27 in.  
Power: Class A,  
small Class B

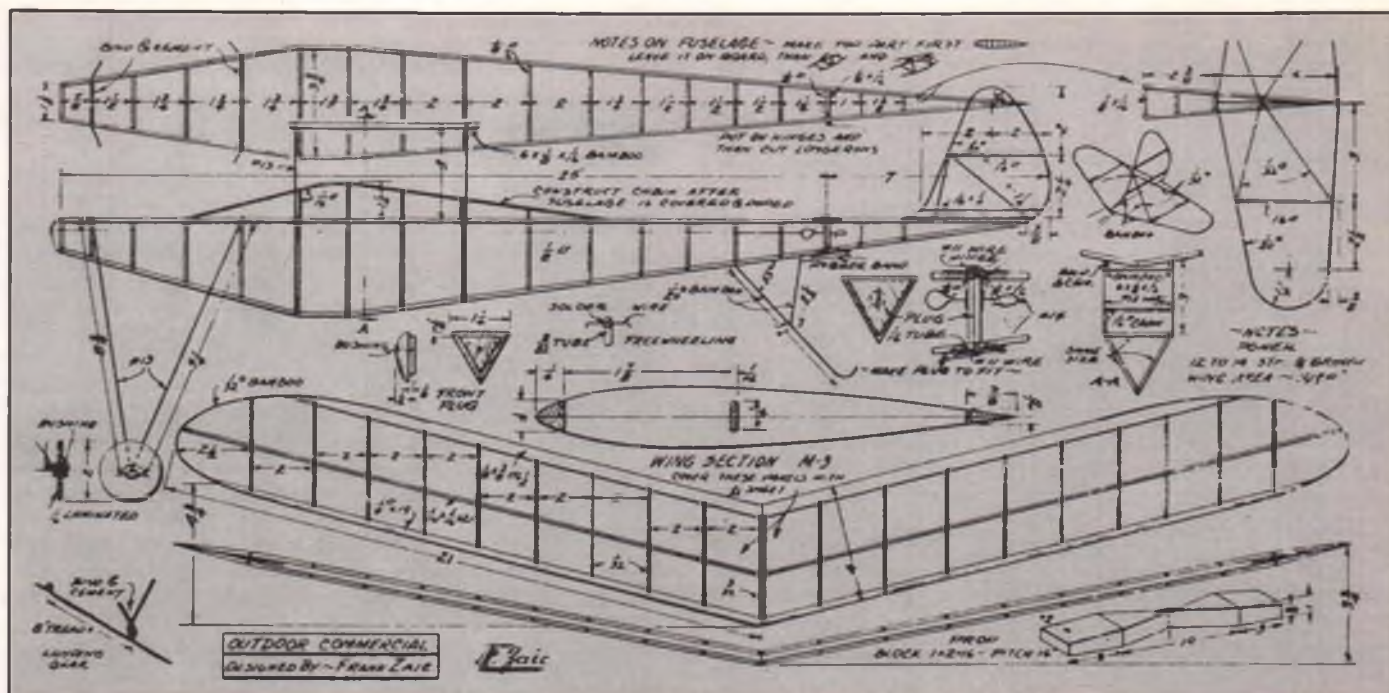
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NOT TO SCALE



MODEL OF THE MONTH





Frank Zaic designed this distinctive commercial rubber model with a triangular cross-section fuselage and cabane-mounted wing; this drawing appeared in the "1933/34 Model Airplane Guide and Log Book," the first of Frank's many excellent publications.

scale, a modeler could weigh parts as light as 1/1000 of an ounce. Priced at 50¢, this item was a good money maker as the metal parts cost less than 5¢ per kit.

In 1933, Frank started what he called the *Model Airplane Guide and Log Book*. Of course, the drawings were an instant success. This writer purchased one of the first copies, which I still have.

In the 1933/34 issue there was drawing of an outdoor commercial rubber model designed by Frank. At the time, this columnist was heavily involved in Junior Birdmen contests. After trying numerous other designs (including the Virgilio Sturiale models appearing in *Model Aircraft Engineer*), I built a modified version of the Zaic model. The Junior Birdmen Cabin rules required a minimum cross-section perimeter of 12 inches—much simpler to process than the NAA minimum of L2/100—and the model's triangular fuselage made this easy to measure.

The redesign consisted of reducing the wing chord by 1/8 inch to qualify for the 150 square inch maximum. The airfoil was also changed to an RAF 32. The fuselage was reduced to a true triangle shape by removing the cabin portion and the cabin wire struts. The tail was next: the tail construction

and shape were junked in favor of a Boehle-type constant chord, rounded tips, lifting tail. Landing gear drag was reduced by eliminating the front strut.

With a 16-inch prop, this "new" design proved to be an excellent performer. The model was entered in the spring of 1935 at a large Junior Birdmen meet staged at the Yountville Medical Grounds. As per standard practice, three events were held: Hand Launched Glider, Rubber Stick, and Rubber Commercial. All sorts of good duration flights were recorded. The longest flight of the day was my "Zaic type" that set a world record of 15 minutes, 10 seconds before going O.O.S.

In their haste to publish a photo of the winner, the San Francisco Wing newspaper photographed a Boehle-type triangular stick model and published it as the "record setting model." Many of the eastern modelers therefore believed that a Vernon Boehle model had won. Belated credit is extended in this column (60 years later!).

Based on the success and demand for additional issues, Frank Zaic started publishing his famous JASCO Year Books, beginning with the 1934 issue. This met with instantaneous success.

Although Frank was a patent

draftsman by trade, he found time to produce yearbooks up to 1939. Frank was also heavily engaged in Wakefield competition. He and Gordon Light were probably the two most noted Wakefield competitors in the U.S. at the time (1933-36).

Both competitors sent models overseas to Great Britain. Tough luck dogged both as Light's 1932 Wakefield win was disqualified by the English ruling body. The next year, Light had a superlative flying model that was literally "rule changed" out of competition. Zaic also had problems, as it rained in 1934 and his balsa monocoque fuselage became soaked, severely limiting his total flight time which, despite all handicaps, placed 3rd. Gordon Light's typically lightweight balsa model was ruined in the rain and wind. He recovered to win convincingly in 1935, but that's another story!

During all this time, JASCO was growing due to the tireless efforts of Frank's brother and sister, John and Christine. The famed Thermic gliders were developed in sizes from 50- to 100-inch wingspan. At first only plans were offered, but demand for kits dictated these be produced also.

Frank was a prolific writer, getting out several catalogs which in themselves were little gems of information. In 1937

he decided to try putting out a monthly publication called *Model Aeronautics*. This enterprising idea was to give modelers an exchange of information, data, and the latest developments in model design. Unfortunately, only a month later the idea folded due to lack of support.

We have a lot more to say about Frank Zaic—too much to include all at one sitting—so we'll stop at this point and finish up next month.

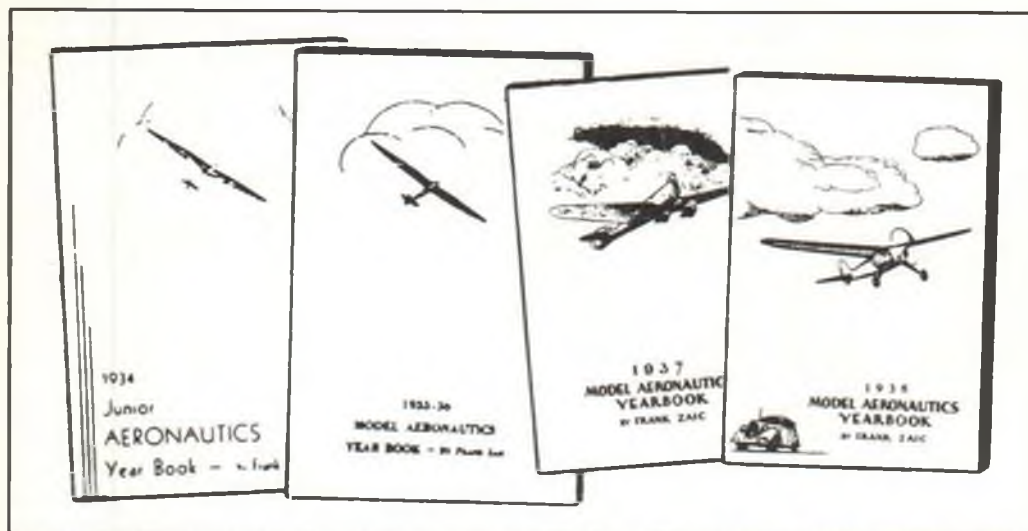
## MODEL OF THE MONTH

In the late '60s, when this columnist used to run the unofficial Old Timer events at the AMA Nationals, Harry Murphy brought to my attention a 4-foot model which we identified as the Thunderbird 45. This design would make an excellent RC 1/2A Texaco model, as its size and shape somewhat resemble the very popular and successful Bay Ridge Mike.

The Thunderbird 45 made its appearance in the September 1938 pages of *Model Airplane News* as a successor to the Thunderbird 72. Produced and manufactured by the New Cyclone Aircraft Co. of Brooklyn, New York, this progressive-thinking concern also produced follow-on designs such as the Lancens (49 and 72) and the XA-1. These models were a



# PLUG SPARKS



Frank Zalc's Year Books were the most famous modeling books of the '30s. All are still available, too; try Ken Sykora's Oldtimer Model Supply, P.O. Box 7334, Van Nuys, CA 91409.

refreshing change from the "hot-shot" type high-performance pylon designs that were becoming popular.

The Thunderbird 45 was designed to accommodate small engines such as the Brat, Pee-Wee, M&M, etc. The sensational Ohlsson .23 engine was a tremendous boon to those who preferred small models for their ease of transportation, storage and cost. The complete kit, at that time, was priced at \$2.95 postpaid and included airwheels, propeller blank, glue, dope, and

covering. For another dollar, the buyer could get colored dope and a finished propeller to a specified size.

## ENGINE OF THE MONTH

Here is an engine this columnist never figured to find, but thanks to the efforts of Karl Spielmaker, we are proud to present the Denny-Berg.

The Berg conversion of the Dennykite came about as a result of the race car boys who wanted an engine that was reliable

and would last. Such an engine was the Dennykite as produced by Walter Righter. This engine, featuring cast iron castings and piston, would stand up beautifully to the demands of a race car.

In no time flat, the Dennykite became quite popular. However, the standard Dennykite couldn't develop the rpm of the newly introduced Super Cyclone. No question about the rotary valve engine being more efficient and effective than a standard sideport. It was then that John Berg decided to produce a rotary valve conversion for the Dennykite.

First advertisements were found in the October 1940 *Model Craftsman*, announcing the Berg Rotary Valve crankcase and crankshaft that included the venturi carburetor. The "Rotarize Your Dennykite" advertisement offered two



The cover from one of several JASCO catalogs put out during the middle 1930s.

crankcases—one with drilled and timed shaft, the other a plain crankcase without crankshaft. Prices were \$8.95 and \$4.95 respectively. Interesting to note is that John Berg was operating out of Los Angeles, the heart of the modeling interest.

continued on page 74

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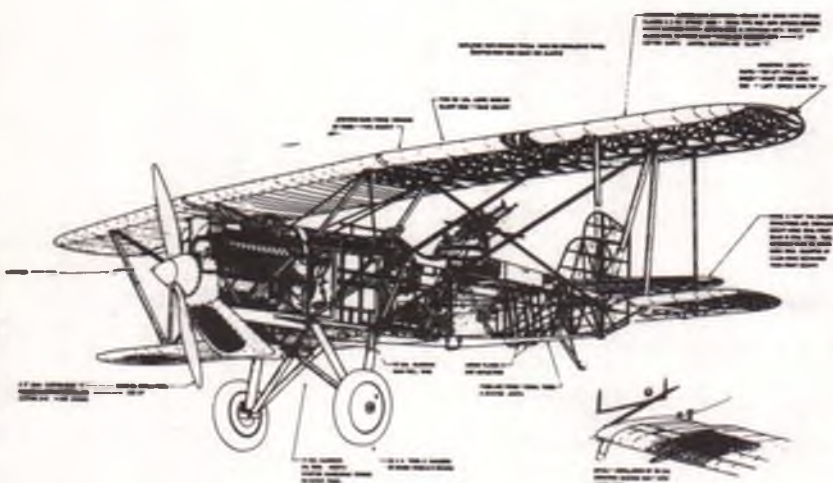
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■ By Eloy Marez

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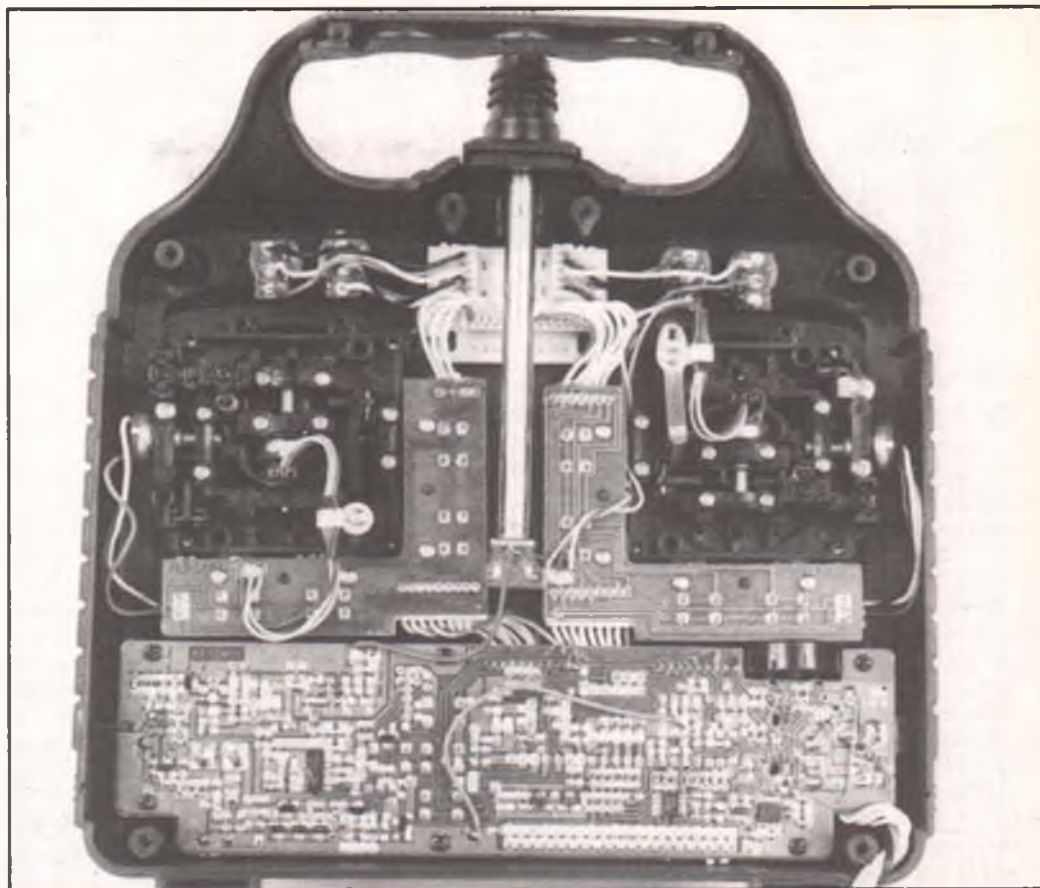
State-of-the-art design and electronics, plus a unique trim system, combine to produce an excellent, many-featured and yet affordably priced sport radio.

The Hitec/RCD Flash transmitter is of average size for a two-stick unit, features raised, ribbed grips on the back which give it a comfortable, positive feel. The quality is evident in the cleanly molded case and all fittings. Programming the Flash is done on the easily readable LCD screen, and in certain cases, also using the power switch and/or trim levers.





Clean one-board design of the Flash transmitter electronics is seen here. Changing modes requires transferring the gimbal ratchet and one spring to opposite sides.



**R**adio control fliers come in two basic classes—those who compete and those who don't. Competition is not everyone's cup of tea, and that's as it should be. But the urge to win demands the best equipment made, and in the case of RC systems, has led to the development of advanced circuitry and techniques that eventually trickle down to us non-competition sport fliers. Such an example is the "Flash," a four- or five-channel system from Hitec RCD, 10729 Wheatlands Ave., Suite C, Santee, CA 92071; (619) 258-4940.

The Flash is what is termed a "computer" radio, having as its predecessors the many-featured, super-complex systems designed primarily for aerobatics competition. Not the Flash—it's a far simpler-to-understand, simpler-to-use system that brings you the more desirable features of the latest in RC electronics, while still allowing you to *pilot* your airplane, not have buttons do it for you!

Obviously, the Flash is in a very affordable class. For many years I was dead-set against the "cheaper" radios, however, new components and techniques have greatly lowered the cost of producing quality electronics. Additionally, the components themselves have come down in price. In the case of transmitters like the Flash, they can be designed around computer components (microprocessors) that are also used for everything from alarm systems to garage door openers, thus they are inexpensive. Even the system's most costly components—servo motors and NiCd batteries—are available at reasonable prices because they are used in great quantities in other products.

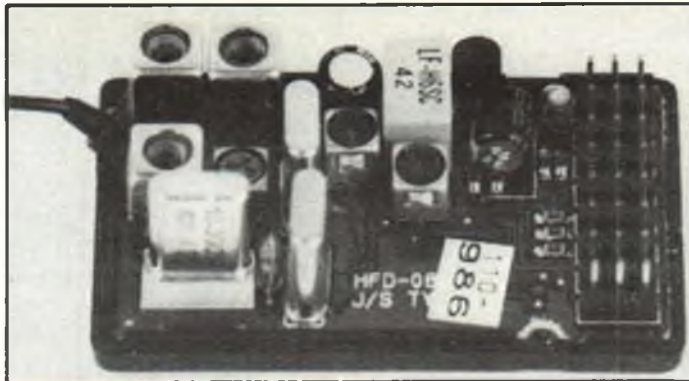
### THE TRANSMITTER

The Flash is an FM system and is available on all 72 MHz "Aircraft Only" frequencies, both transmitter and receiver having easily accessible plug-in crystals. The four- and five-channel versions share many common features, as listed at right.

### Flash 4 and 5 features:

- Microprocessor design with all functions except programmable maneuvers.
  - Two adjustable length sticks, changeable to Mode One or Two.
  - Trims on channels 1-4, throttle trim effective only at low throttle.
  - Trim memory and reset (to factory neutrals) on all channels.
  - End point adjustments on all channels, adjustable from 0 to 125 degrees in 1 degree increments.
  - Servo reversing on all channels.
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  - Three preset mixing functions: aileron/rudder, elevons, V-tail.
  - Two model memory.
  - Large LCD display screen.
  - In-flight timer with audible alarm.
  - Low battery visual and audible warning signal.
  - Master reset to normal factory settings.
  - 650 mAH NiCd battery.
- Additionally, the Flash 5 includes:**
- Channel 5 retract gear switch.
  - Dual rates on aileron and elevator.
  - Trainer system.





■ LEFT: The Flash system's companion receiver is well known to Hitec owners; the HFD-08RD is a narrow-band, dual conversion, FM unit. ■ RIGHT: The insides of the HFD-08RD show a well planned, uncluttered design, using both crystal and ceramic filters. SMT components used throughout.

## PROGRAMMING

This is always an important point in these microprocessor systems and in the case of the Flash, is all good news. I found the instructions clear and concise, and very easy to follow. It helps that the nomenclature used is straightforward RC airplane verbiage, without any of the confusing acronyms or abbreviations based solely on electronic and/or computer-talk and having nothing at all to do with aerodynamics.

The actual settings and modifications to the flight commands are made with three keys to the right of the LCD display, which are logically marked and operate with a distinct "click." In some cases, the power switch or the trim levers are used during programming. I had no problem with the normal settings after the first go-round, though the less-used features such as the mixing functions will no doubt require using the book to arrive at the correct settings.

A most important feature, a break-through kind of feature that we've seen only once before and then on one of those

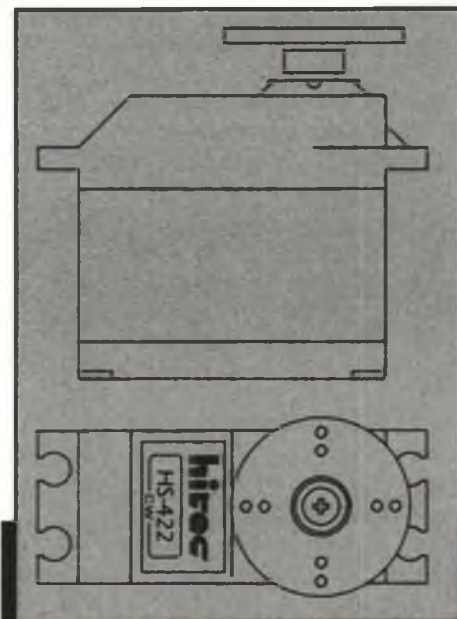
\$1K+ radios, is something I'm really impressed with: the trims. Or more accurately, the trim levers! As those of you who fly high-performance aircraft know full well, finding the exact trim can sometimes be a little difficult with the system we've become accustomed to. It's so easy to over-trim; one often keeps going back and forth until the exact position is found, almost as if by chance.

The Flash does have what appear to be the usual trim levers, but they are actually center-loaded, two-way operating levers of the type often found as selectors on television and stereo equipment. Operation is somewhat the same as the "older" trim levers; you push right for right trim, left for left. Or up or down, as the case might be.

When you actuate a trim lever on the Flash, there is a short "beep" and just enough pause so that the operation stops there when you release the lever and check the effect on the airplane. If you continue to hold down the lever, it goes into high gear, too fast to count, beeping like a cricket on high nitro. You may need that at test-hop time, the same way you sometimes

now need a lot of trim at such times. Otherwise, one or two beeps at a time will suffice until you reach—very precisely—the correct setting.

The question comes up as to just how sensitive—or insensitive—is it? Is this actually a viable system or is it just another way to get too little or too much? The eyeball is not good enough for this kind of test, therefore I resorted to my handy-dandy homeade servo travel tester. I measured 15 degrees of trim travel each side of center—pretty much standard. It takes 50 beeps to go full trim in either direction. This



Full-size factory line drawing of the servos furnished with the Flash, the HS-422 standards. Specs given in text. Hitec RCD offers a whole line of additional servos for all applications.

means that it takes three beeps to put in one degree of travel, and anyone who thinks they can trim finer than that with the old method is welcome to borrow my servo travel tester and prove different to himself.

Your next question will be: Without the old style trim lever, how will I know that the trims are centered before takeoff? That's part of the beauty of the Flash trims—you'll know they are centered because they can-

*continued on page 77*

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**Piper J-3 Cub 40** (GPMA0160) — Wingspan: Standard Wing: 76.5 in (1945 mm) Clipped Wing: 61.5 in (1560 mm) Wing Area: Standard Wing: 820 sq in (52.9 sq dm) Clipped Wing: 653 sq in (42.1 sq dm) Weight: 6.5-7.5 lb (2950-3400 g) Length: 49 in (1245 mm) Engine Required: 2-stroke .40-.60 cu in (6.5-10 cc) or 4-stroke .48-.70 cu in (8-11.5 cc) Radio: 4-channel

**Piper J-3 Cub 20** (GPMA0158) — Wingspan: 61.2 in (1555 mm) Wing Area: 525 sq in (33.9 sq dm) Weight: 3.75-4.5 lb (1700-2040 g) Length: 39.2 in (995 mm) Engine Required: 2-stroke .15-.25 cu in (2.5-4 cc) or 4-stroke .20-.26 cu in (3-4 cc) Radio Required: 4-channel



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# Helicopter World

■ BY JAMES WANG



## The Robbe/Schluter Moskito Expert RC Helicopter

James tackles the top-of-the-line machine in Robbe's series of Moskito RC helicopters.



Our columnist hovers Dave Ramsey's colorful Moskito Expert for the camera. Power comes from a Webra .50H equipped with a SoundMaster SM-1 muffler from Davis Model Products.

**A**t the time we reviewed the Robbe/Schluter Moskito in the September 1994 *Model Builder*, Robbe had just introduced two new variations, the Moskito Basic and Moskito Expert. Both feature improvements over the original Moskito, including a new Bell-Miller mixer, higher gear ratio, new clutch design, hollow 10mm main shaft, lighter clear plastic canopy, lighter fins, and bigger Hiller paddles.

The Basic is the least expensive of the three Moskitos; it has minimal ball bearings and is aimed at budget-conscious beginners. The Expert is the deluxe version and features ball bearings on all moving parts. Although called the Expert, it's not harder to fly. On the contrary, the extra bearings actually make it easier to fly, on account of the more precise controls. This month, let's take a closer look at the Moskito Expert.

The model is simple to assemble. There are few parts, all

parts fit perfectly, the instructions are easy to follow, and there are two large sheets of excellent isometric drawings to help illustrate the assembly. The instruction manual is written in English, German and French.

The Moskito Expert is designed for .40-.50 size engines. My friends and I have successfully used an O.S. .46H, Webra .50H and an Enya .50H. Next to be tried will be the new Thunder Tiger .46H. We've been using the Davis SoundMaster .60 size SM-1 airplane muffler with excellent results. David Ramsey also recommends the new Robbe Moskito muffler (part #50930); he says his Webra .50 with the Robbe muffler makes his Moskito a hot ship.

The gross weight of my Expert is 8 pounds even. It does loops, rolls, even switchless inverted flight. I use +10 to -10 degrees of collective travel (all that the mechanics will allow) to make the



# Helicopter World



■ **LEFT:** Rear view reveals the Moskito's clean, uncomplicated design. The transverse engine mounting setup allows the use of standard airplane mufflers. Tank location makes it easy to keep track of the fuel level in flight.

■ **ABOVE:** Beautifully molded composite plastic frames are similar but not identical to those used on the other versions of the Moskito. Lots of reinforcing webs makes them extremely strong; James has already smashed the ground twice with his Moskito Expert and the frames came through unscathed.

## Throttle Openings and Blade Pitch Angles for the Robbe Moskito Expert

	Collective Pitch Angle			Throttle Opening		
	Low	Middle	High	Low	Middle	High
Normal	-3°	5°	10°	0%	60%	100%
3-D Idle-up	-10°	4.5°	10°	100%	85%	100%
Throttle hold	-6°	5°	10°	Adjust to give reliable idle		

Moskito aerobatic. The old Moskito control geometry has some collective/fore-aft cyclic pitch coupling; the Expert eliminates this coupling by adding two I-arms on the collective control arm.

With the standard paddles that came with my kit, cyclic response was mellow even with the swashplate at maximum throw and the main rotor screaming at 1,800 rpm; the geometry of the new Bell-Hiller mixer is such that the paddles could not rotate enough for crisp, sharp maneuvers. However, when we simply replaced those paddles with the larger Schluter S1588 paddles (the thin, long ones as used on the Champion), the Moskito really came alive! It now does 3-D flips like a bat out of hell. Yet, even in 15 mph gusts, the Moskito remains docile in hover. Pica/Robbe, the U.S. importer of Robbe products, tells me that the new Moskito Expert kits include the S1588 paddles as well as extra shim washers for the rotor head.

The Moskito Expert's docile handling makes it well suited to beginners. Yaw control is very predictable. The Expert has the tail rotor servo mounted next to the tailboom for direct control. When the rate gyro is set properly, the Moskito can hover hands off for 3 or 4 seconds before it drifts away. The tall main rotor shaft gives good static stability and also helps prevent tailboom strikes. By keeping the main rotor at 1,800 rpm and the gyro at a medium level, the machine can perform pirouettes in slow forward flight.

The Moskito's main rotor head is nice and stiff when new, but the O-rings tend to loosen up after about 20 flights. "Stiff" means the blades don't flap up and down easily, providing a more solid control feel in hover. With a softer flapping main

rotor system, the rotor disk can tilt more easily and the model will wander a bit in hover. The Moskito's rotor head is soft enough to give a mellow hover, but at the same time is stiff enough to give good, precise cyclic controls. My advice: Fly with the stock O-rings first and get used to the way the machine flies, then, if you want a quicker and more precise control response, replace the stock O-rings with Robbe's optional thicker O-rings—part #S6000.

Most model helicopters have an engine/main gear ratio of around 9:1 and a main rotor rpm of 1,500 to 1,600. The old Moskito has a 6.92:1 ratio; the Moskito Expert is 7.7:1. This means the main rotor must spin very fast in order for the engine to operate at its optimal rpm. Most heli engines develop their maximum horsepower at 14,000-16,000 rpm; if the Moskito's engine is revving at 14,000 rpm, then the main rotor rpm would be 1,818. That's high! If the engine is running at 16,000 rpm, the rotor would be screaming even faster at 2,078 rpm.

I've flown my Moskito Expert over a period of three months. I find the best hover rpm to be between 1,750 and 1,800. Best forward flight rpm is between 1,800 and 2,000. Below 1,700, control response is slow. Over 2,000, the Moskito exhibits a vertical up-and-down heaving oscillation in hover. It behaves as though the collective pitch mechanism were bouncing back and forth. This is an aerodynamic phenomenon; the blades are encountering the turbulent wake shed by the previous blades, causing the blade pitch to oscillate.

High rotor rpm has been something of a tradition for Schluter's



# Helicopter World

.40 to .50 size helicopters. The Helibaby of 1975, the Miniboy of 1984, and the Junior of 1988 all have an engine/main rotor ratio of around 7:1. The Miniboy brochure states: "Outstanding flight stability with a very precise control response is achieved by the high rotational speed of the main rotor." High rotor speed does provide good gyroscopic stability, but if the gear ratio were raised to 8:1 or 9:1, the engine would be happier. With the 7.7:1 ratio, it's like driving around town in overdrive all the time—it cruises fine, but is slow to accelerate. Still, the new 7.7:1 ratio is definitely an improvement over the 6.92:1 ratio used on the old Moskito. Robbe says one of the reasons a low ratio is used is to keep the engine rpm low to reduce noise, which is a very

strong environmental issue in Europe.

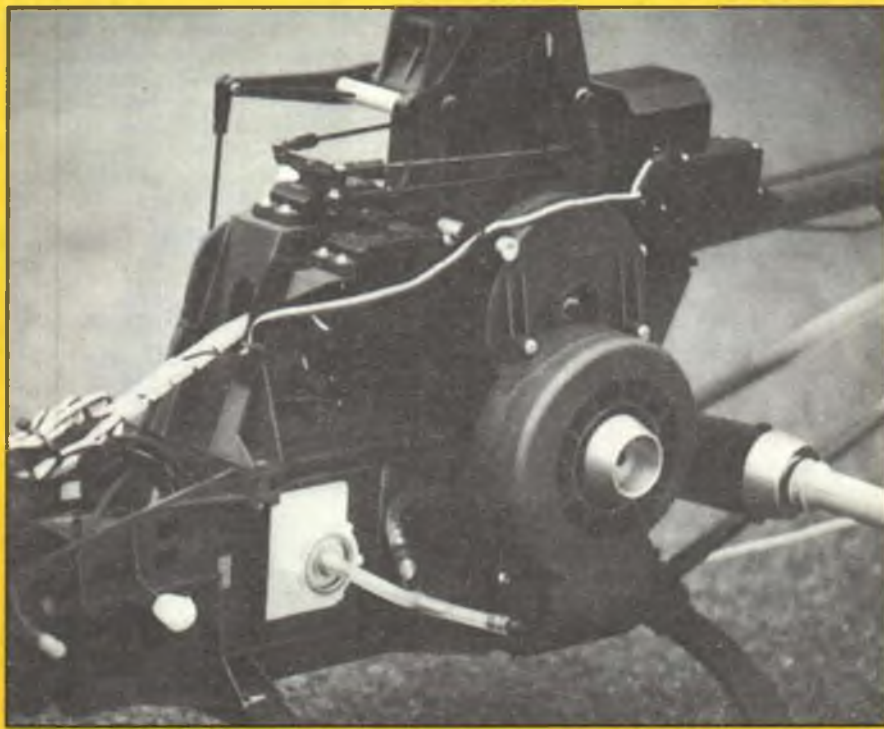
To get the best aerobatic performance out of the Expert, the throttle and pitch curves in idle-up must be programmed to give a constant, high rotor speed. The throttle and pitch settings for my Moskito Expert are included here. We gave a detailed example of how to set up the Moskito using the JR-622 radio in the October 1994 *Model Builder*. That example is suitable for beginners as well as 3-D aerobatics.

The stock wood blades are on the light side, making it difficult to sustain a hover flare at the end of an autorotation. Plan your first autos carefully! The light blades make the Expert an excellent 3-D hotdogging machine, and the thick symmetrical airfoil gives a very stable hover.

Robbe now has symmetrical airfoil fiberglass blades made specifically for the Moskito. I haven't tried them, but their heavier weight should give better autorotations and an even more stable hover.

The Expert's canopy is much lighter than the old Moskito canopy. The new canopy comes as two clear pieces; I used Zap-a-Dap-a-Goo to glue them together. The horizontal and vertical fins are also a new design, made of molded plastic with hollow cutouts to reduce weight. The cutouts get covered with self-adhesive tape.

I like the Expert's compact main rotor head design. There's a flat spot molded on top of the rotor hub; if you like, an X-Cell 60 head button can be mounted there. An innovative feature of all ver-



■ LEFT: The Moskito features a completely closed and sealed transmission. Side-mounted cooling fan and starting cone are a couple of the advantages of the transverse engine mounting. ■ BELOW: The new Bell-Hiller mixer is mounted on one side of the flybar only. Two new i-arms on the collective control arm effectively eliminate the collective/fore-aft cyclic pitch coupling exhibited on the standard Moskito that James reviewed in the September '94 MB.



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sions of the Moskito is that the engine is mounted transversely; this allows the muffler to be mounted at the rear and diverts the exhaust away from the model (use a rubber exhaust diverter to direct the muffler exhaust away from the cooling fan inlet), and also puts the starter cone in a convenient side-mounted location. The two-stage transmission is fully enclosed to seal out dirt.

The Expert has an improved clutch design. The new nylon clutch bell is supported by two ball bearings. The new fan cover allows access to the fan and engine without removing the clutch and starter cone; the large aluminum cone allows the use of a regular airplane starter. The ratchet style autorotation clutch works very well. It has two spring-loaded pins pushing against the ratchet. This system will never fail.

The tail rotor is again a reliable toothed belt drive system. The entire belt drive is enclosed at the front and also at the tail rotor gearbox to seal out dirt. Once the tail boom is pulled out and tightened, no further maintenance is required.



The Moskito features a totally enclosed, zero-maintenance belt drive tail rotor setup of very simple design. Plastic control balls are molded onto the tail blade grips.

The Moskito's molded composite plastic frames are extremely strong. Recently I had two crashes and the frames came through undamaged. I like the hollow 10mm diameter main shaft; it can take a lot more abuse than the 8mm main shaft used on most .30 size models. The servos are conveniently screwed directly onto the plastic frames. The servo hole patterns fit Futaba, JR and Airtronics servos perfectly. Fuel level can be seen from the right side during flight. The new frames also allow easier access to the needle valve.

The Moskito Expert is competitively priced against other similar size helicopters. All parts are well made and the kit is easy to assemble. Although it doesn't have the penetration to do FAI maneuvers like rolling stall turns, the Expert will do good 3-D tumblings, and the docile hovering characteristics and rugged frames make it suitable for beginners as well. All three versions of the Moskito, as well as all other Robbe/Schluter helicopters, parts and accessories, are distributed in the U.S. by Pica/Robbe, 2675 N.E. 188th St., Miami, FL 33180; (305) 932-1575. MB

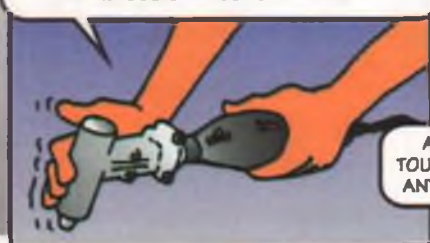
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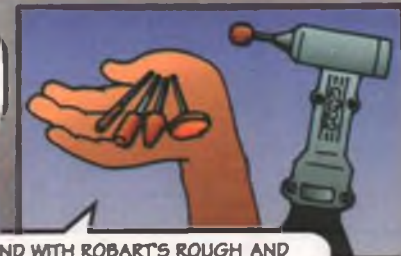
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## SOARING *cont. from page 39*

kids and others afraid to venture out, you do have "safe" culinary alternatives available.

Then there was the trip to Tikal. This was the highlight of the trip for everyone who attended the meet. Monday morning following the contest, about 14 of us crawled into a crowded DeHavilland Twin



Good food and plenty of Pepsi! The Guatemalans provided catering for the pilots and spectators. Fifty-nine dinners were purchased and a few more went away gratis. Menu consisted of barbecued pork ribs and chicken over an open wood fire... yummy!

Otter and headed to a city called Santa Elena in the jungle south of the Yucatan Peninsula. After the 1-hour flight, we jumped on a tour bus and took another hour's drive to Tikal National Park. There we met up with about eight others of our group who had arrived the day before and had spent the night at the Jungle Lodge Hotel.

Tikal is impressive to say the least. Roger Lackey, one of the Californians in our adventurous group, several times indicated that he usually isn't into ancient history and archeological digs and the like, but that he found Tikal fascinating.

Tikal had no underground water, no rivers, and no lakes, and yet it supported a community of 50,000 to 100,000 people. These people built the tallest structures in Mezzo-America at almost 70 meters high. More than 3,000 complete structures have been discovered there. To this day their temples and pyramids rise out of the jungle canopy like islands in a sea. If you remember the jungle moon base ("Yavin") of the rebel alliance in the first "Star Wars" movie, then you've seen three of the four main temples of Tikal.

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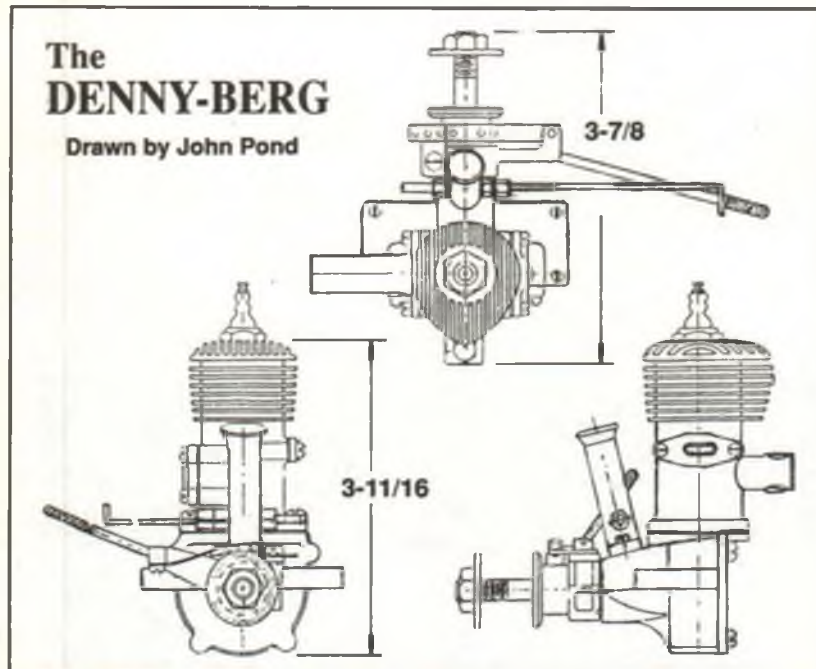
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## The DENNY-BERG

Drawn by John Pond



### ENGINE OF THE MONTH

#### PLUG SPARKS *cont. from page 62*

Timers were another option. The normal Dennymite leaf type timer was generally modified for higher rpm by reinforcing the movable point lead spring. Other optional parts were offered by J.L.S. Engineering of Santa Monica. The most startling was

the J.L.S. rear case rotary valve unit which came ready to install with no re-timing necessary. This was a dead-on copy of the Berg unit.

The J.L.S. concern also put out a combination dual intake system, converting the engine to a two-rotary valve type. Installa-

tion of this unit gave the Dennymite engine the look of an Atwood Champion.

Many other variations were made in small quantities, such as the Dooling rear intake unit. Quite a few casting units were also sold, hence many variations of the Berg-Dennymite are bound to turn up. **MB**

## MODEL AERONAUTICS

MAY, 1937  
15 cents

IN THIS ISSUE

Five Plans—  
Indoor, Glider  
and Gas Models

World Wide  
Model News  
Experimental  
Data

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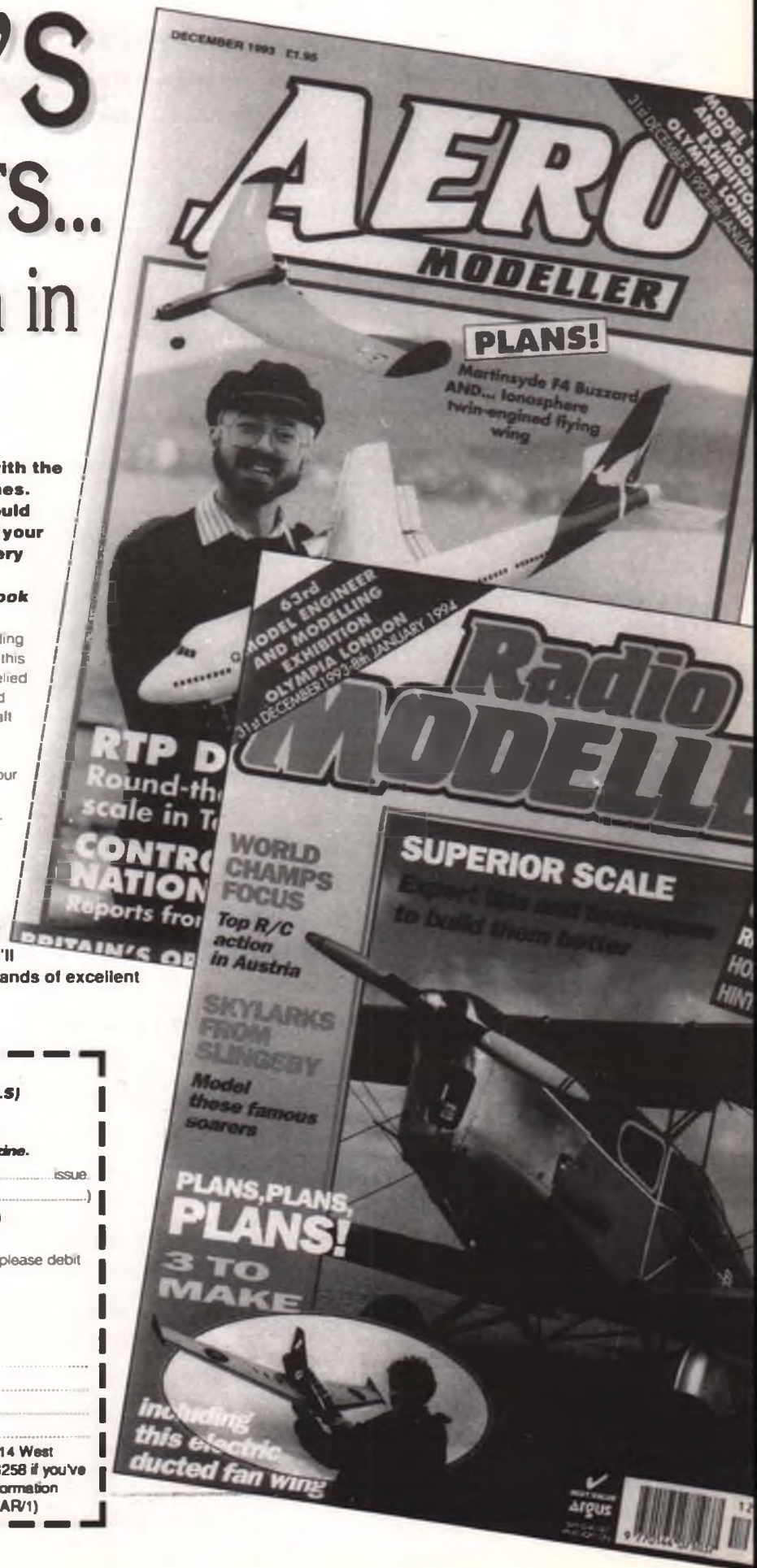
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## FW 56 STÖSSER *cont. from page 54*

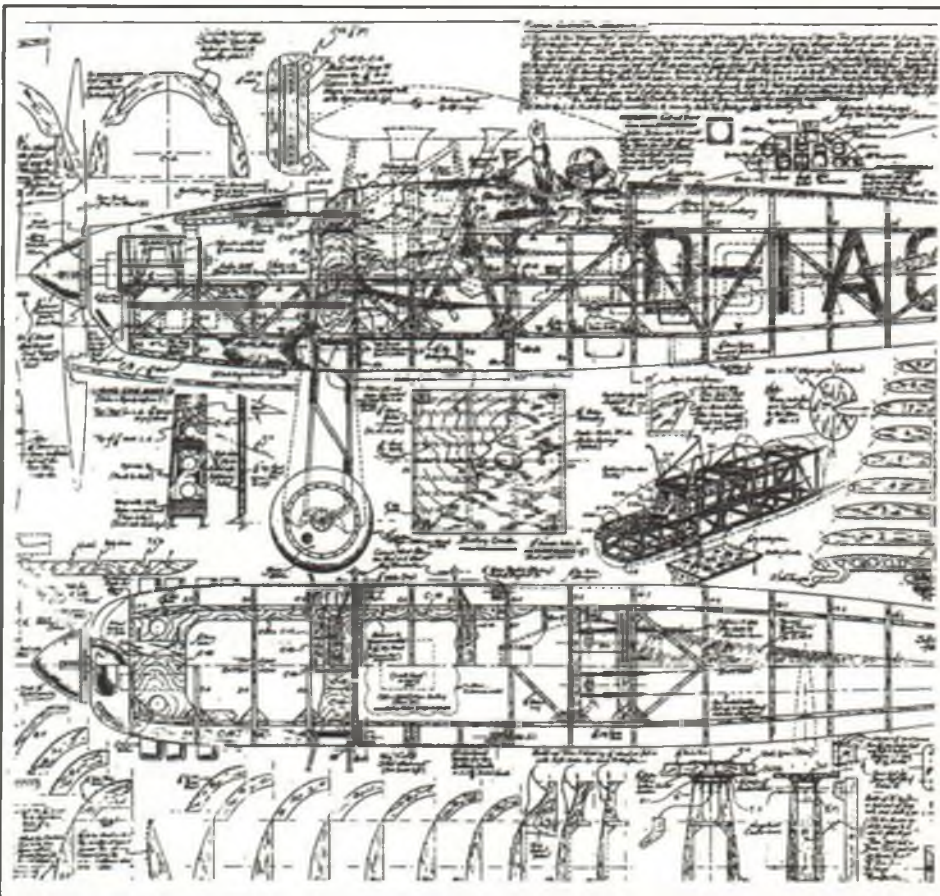
15 FAI motor for greater power. Second, Russ removed two cells to reduce the overall weight. Third, I reduced the excessively high angle of attack (incidence) of the wing. In my haste to assemble the wing, I had carelessly ignored the odd center section's diminishing rib height, which pulled the rear of the wing down too much onto the rear cabane strut. This was easily corrected by adding a shim at that point, giving a flat or neutral angle of incidence.

The next flight test was an immediate and redeeming success. Suffice to say that Dave's hot geared 15 pulled it up fast and steady and with great scale realism.

KRC, Sunday, September 18. Saturday's

doctored, mixed-scale Fw 56 is now dramatically overshadowed by the object of our effort: the Astro 40 powered, 2"=1' exact scale Stösser, plans for which are now available. In addition, we soon expect to offer lightweight vacuum-formed ABS cowls and other parts for most of our plans, as well as partial kits and a video of our models in action.

I personally urge "wet-power" scale modelers to seriously study, and then try, this gentler, cleaner and safer alternative power source. If you still insist on believing that electrics lack the power of "gas," consider what has been repeatedly witnessed at KRC and other events. Although utterly preposterous and unrealistic, we've seen scale multi-engine transports, airliners and bombers zoom up, jet-like, at nearly vertical angles while rolling! Such exuber-



A portion of one of the two large, profusely illustrated sheets that make up the final 2"=1' scale Fw 56 Stösser plans set. Don't be fooled by the "haziness" of the drawing; much of it consists of building instructions, helpful sketches and detailing hints, making the overall construction look a lot more complicated than it really is. Besides these plans, you also get a documentation three-view drawing, a set of simulated instrument faces, and sketches showing the electric power system wiring and also how to hook up the cockpit controls and pilot figure so they move with the servos.

rains had moved on but were replaced with powerful gusting winds. I was surprised and pleased to hear that my Stösser had won 1st in Scale. We patiently waited for conditions to calm down, and finally, at around 4:45 p.m., Dave flew the '56 off the velvety grass into a fast, steady climb. Dave's reassuringly cautious style with all of my models is truly artful, as he carefully proceeds in his measured way to safely extract the model's full potential.

The degree of success achieved by this

ant performance is obviously misplaced, but does demonstrate the awesome power potential of electrics.

I also invite kit-bashers to explore the broad, unlimited and unique horizons offered by scratch-building from plans.

Now, with all switches off, I wish your voltage peak-charges your imagination to what may be many ampere hours of silent flight!

**Next month: Construction and detailing. MB**



## HITEC FLASH *cont. from page 66*

not be moved off-center. The way this works is that after you've trimmed your airplane and landed, before you turn the transmitter off, you enter a trim memory function—the transmitter will record your entries, and that's the trim you'll have the next time you turn on. You cannot inadvertently bump the trims or change them in any way when the transmitter is not on.

If your airplane needs a touch of down for landing, you can "beep" it in, and without having to remember to readjust, you'll be back to normal when you turn the radio on again for the next flight! And you can always display the trim settings in memory—effectively the same as looking at an old trim lever and seeing that you have "a little left." I really think this is the greatest improvement to come along in RC transmitters since the 1 degree displayed control adjustment possible with these micro-processor systems.

### THE AIRBORNE SYSTEM

No startling improvements here, just proven, reliable equipment. The receiver is one that is well known to Hitec RCD users; the Supreme Series HFD-08RD, an eight-channel unit. (This is another cost saving step by this manufacturer, it being cheaper to produce a large quantity of one item than the same quantity of different versions.) HFD-08RD specs: FM, dual conversion, and 10 KHz narrow-band operational spacing is claimed. It measures 2.3x1.4x0.8 inches and weighs 1.34 ounces.

The four servos furnished with the Flash are also established standards, the HS-422. It specs out to 43.4 ounce/inches of torque, 0.20 second for 60 degrees of travel, 1.6x0.8x1.4 inches, 1.6 ounces. For specialized applications, Hitec RCD offers a wide range of servos, many available with ball bearings and/or metal gears. They are also available individually, or in sets of three or four.

The all-important batteries furnished with the Flash are 650-mAH Eveready "Energizer" NiCds. Though not as well known in RC circles as other brands, they are known to be reliable in other applications and are certainly more to be trusted than some of the unbranded types seen all too often. Both batteries in my Flash were capacity tested a number of times with satisfactory results. The transmitter battery is installed with a secure polarized plug, and does not depend on the sometimes troublesome pressure-only contacts found on some transmitters. The usual type of dual LED equipped overnight-rate charger is furnished.

At the time of this writing, the first ads for the Flash are appearing. Prices range from \$160 for the 4 to \$210 for the 5, both being excellent buys. The Flash has all that you could want in this class of RC equipment—and more! **MB**

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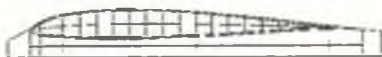
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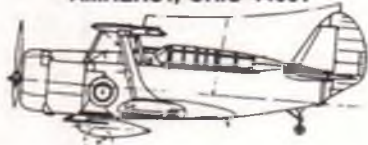
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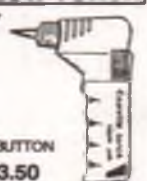
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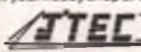
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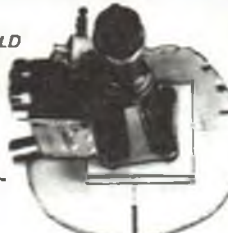
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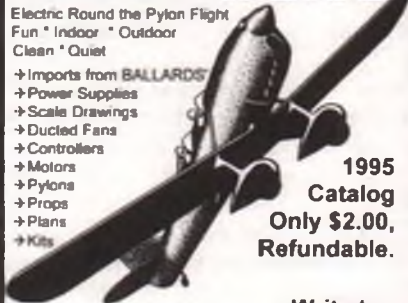
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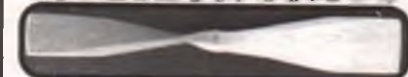
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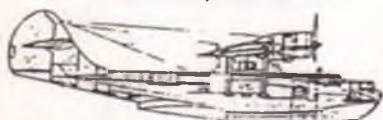


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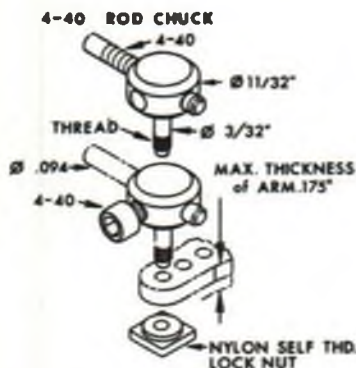
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## DEAR JAKE

cont. from page 27

thought to be the work of the devil and no one would enter such a structure. The beams were eventually accepted, but only after the church began sending out priests to bless each new structure. The modern day terminology for the unsupported beam is derived from the title of the man who blessed more beams than any other—The Archbishop of Cantilever.

Jake

### DEAR JAKE:

You wrote not too long ago that a corollary to one of Galileo's Laws was as follows:

"If you drop a lawyer and a 200-pound sack of manure out a window at the same time, a second lawyer will arrive and file a lawsuit before either object hits the ground."

I feel I must take exception to your remarks. I believe you are being unduly harsh on the sack of manure by implying that it is of equal value as an attorney. Do you have some sort of grudge against manure, or are you just mean-spirited by nature?

Manure has done a lot for this country. Ask anyone in agriculture. And based on our political system, one could even argue that this country runs on manure.

I think you owe manure an apology.

Dale in Dover, Delaware

Dear Dale:

You are absolutely correct. I had no right to slander such an honest and unassuming commodity as manure by suggesting that 200 pounds of it closely approximated the size, shape, and appeal of an attorney.

With all due apologies, let me revise my gravitational corollary:

"If you drop a lawyer and his lawyer

out a window at the same time, a third lawyer will arrive and sue the property owner, the building contractor, and the window manufacturer for negligence before either object hits the ground."

Jake

### DEAR JAKE:

I live in Seattle near the Boeing plant where they manufacture all those jumbo jets. I think they must have had an aerion spill and I accidentally inhaled some this morning while I was out jogging. I've been feeling bloated and light-headed ever since.

How long will the effects of an aerion spill last? Will they pollute the ground water? Should I sell my house and move far away?

Concerned in the Pacific Northwest  
(Note to new readers and those with short retention spans:

Aerions are subatomic lift particles present in aircraft, birds, and insects that are repelled by the Earth's gravitational field and cause flight to occur. The depletion of aerions by emission causes a decay in the host's ability to fly. Hence, all flying objects have an aerodynamic half-life determined by the number of aerions originally present and the decay rate. Aerodynamic half-life is defined as the time it takes for an object to lose half its ability to fly.)

Dear Concerned:

I doubt you encountered an actual aerion spill. The consequences would have been much more dire, such as levitating Buicks and dogs sprinkling fire hydrants from 30 feet in the air. As for bloating and light-headedness, my guess is you probably had a taco and a Corona for lunch.

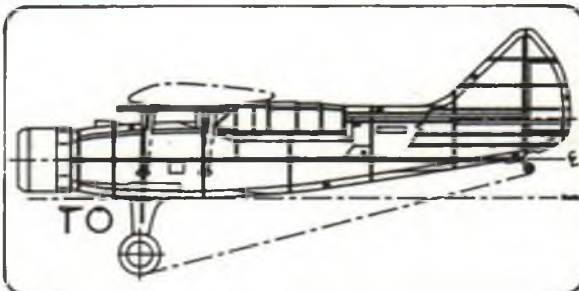
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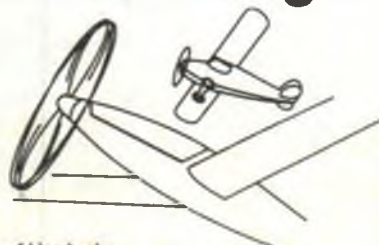
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## OVER THE COUNTER *cont. from page 13*

berglass fuselage, and built-up balsa tail surfaces—and is advertised as coming in at 11 to 12 ounces. At 370 square inches, the wing loading would therefore be 4.3 to 4.7



ounces per square foot. Quest kits are now available in hobby shops; suggested retail is \$84.95 for the wood fuselage version and \$129.95 for the glass. From K&A Models Unlimited, 6059 Faculty Ave., Lakewood, CA 90712; (310) 804-0006.

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\$36.00 plus \$3.00 S&H. Three different photo documentation packs are also available—write for details.

Also new from Bob are plans, various parts kits and various accessories for a re-

ally nice 1/6-scale, 96-inch span Fieseler Storch as designed by Dennis Bryant. Plans, epoxyglass cowl, pre-cut ribs, a full set of laser-cut parts, photo documentation package, three-views, prefabricated landing gear—all of these and more are available in any combination you choose—again, write or call for details. Bob Holman Plans, P.O. Box 741, San Bernadino, CA 92402; (909) 885-3959.

## THE LATEST FROM ALTECH

You heli types will be interested to learn that the new .60-size Hirobo Tsurugi XX is now being distributed in the U.S. by Altech Marketing. The XX is a "next step up" version of the popular Tsurugi, offering more pro-style options as standard equipment:

- Ball bearings on all linkages.
- Newly developed main transmission gear.
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- 11-tooth bevel pinion gear for a faster tail ratio.
- Aluminum main frame bearing holders.
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- Newly designed wood main rotor blades.
- These, of course, are in addition to the many features that made the Tsurugi so popular in the first place—push-pull linkages throughout, straight-sided aluminum sideframes, precision self-aligning fan/clutch system, etc. The Tsurugi XX deserves a good close look by those in the market for a sport/competition machine.



More news: Altech is now also distributing the entire line of English-made Irvine engines here in the U.S., including the new super-quiet Q-Series engines, the Q40 ABC RC and Q72 ABC RC (pictured). Engines,

- spare parts and service are all available right now. Write for a free catalog or technical specifications: Altech Marketing, P.O. Box 391, Edison, NJ 08818-0391, or call (908) 248-8738.



## AM'S SMALL DIESELS

Two new sizes of the English-made AM diesels are now available in the U.S. from Carlson Engine Imports—1cc and 1.5cc (.06 and .09 cubic inch respectively), both sharing the same basic crankcase. Both feature ABC piston/liners and Schnuerle porting, and are supplied complete with spinner nut, muffler, RC carb and detachable backplate fuel tank. All engines are test run at the factory and are backed by a full one-



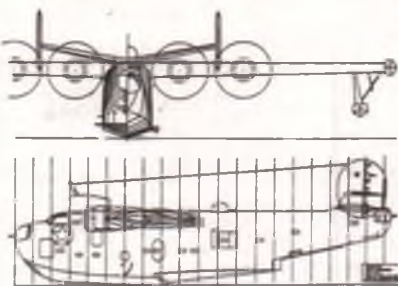
year warranty. CEI's complete catalog of over 250 different imported engines is now 20 pages long but is still priced at only \$1.00; or free with an order on request. Get your copy from Carlson Engine Imports, 814 E. Marconi Ave., Phoenix, AZ 85022-3112; (602) 863-1684.

## MAXCIM BRUSHLESS MOTORS

As Roger Jaffe wrote in last month's "Electric Power" column, Tom Cimato of MaxCim Motors is offering his Max15 series of high-performance, no-maintenance brushless DC motors for RC model aircraft. Features include smooth, low-cogging rotation for low noise and no vibration damage to the optional gearboxes (two ratios



available), samarium cobalt magnets for maximum power and resistance to thermal demagnetization, and aluminum motor housings for light weight and maximum heat dissipation. The companion motor controller is a microprocessor-based unit designed specifically for models; it's rated at 16VDC and 30 amps continuous, and has a list of features far too lengthy to print here. Those interested should send an SASE and ask for full particulars: MaxCim Mo-



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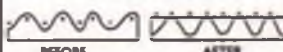
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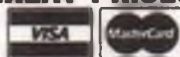
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## GETTING STARTED IN INDOOR

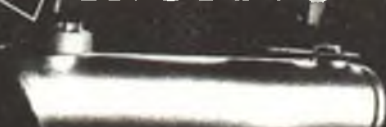
Due for release in September is a new kit from Indoor Model Supply, a 16-inch span rubber stick model called the Salem 6. Based on David Aronstein's popular and well-tested design, the model features a simple flat balsa prop, generous wing area, a cambered (lifting) stab, and stripwood large enough to be easily handled by novices. The Salem 6 would be a great choice for club one-design events or for introducing newcomers to the world of indoor model flying.

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In case you missed the write-up here in *MB* last September, IMS proprietor Lew Giltow has written the definitive book on indoor FF modeling, entitled *Indoor Flying Models*—184 pages detailing all types of



indoor models, from the simplest to the most complex. Several model plans are included, many of which are full-size. The book and the latest IMS catalog can be yours for \$25, which includes two-day airmail postage; the catalog alone is \$2. Order your copy from Indoor Model Supply, P.O. Box 5311, Salem, OR 97304.

### HIGH-PERFORMANCE HOTDOGGER

Aerobatic ace Wayne Handley has become something of a household word among airshow buffs. Flying his distinctive one-of-a-kind Raven, Wayne has been thrilling crowds across the country for some



time now, to the point where he's become one of the most popular airshow acts in the U.S. Now Global Quality Kits has come out with a 62-inch span, .60-size model of the Raven, the first in Global's series of "Deluxe Kits." Included are die-cut wood parts, canopy, cowling, spinner, wheel pants, multi-color Raven decal set, rolled plans, illustrated instructions—the works. The folks at Global say you'll be very impressed with the choice, lightweight balsa used, and the very high quality and precision of the wood cutting. The Raven kit lists for \$184.95. From Global Hobby Distribu-

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## GIANT SCALE ENTERTAINMENT

Number 8 in A.M.R. Productions' series of model aircraft videos is titled "Jumbo Jamboree 1994"—Jumbo Jamboree being the annual Giant Scale fly-in at Imlaystown, New Jersey, sponsored jointly by the Mercer County Radio Control Society and The Heart of Jersey Giant Scale Club. We haven't viewed the tape personally, but A.M.R. says they've "captured the event with as little hype as possible, not worrying about how much special effects are going to be added, but instead shooting the planes and pilots." You can add the tape to your modeling library by sending \$19.95 plus \$3 for priority mailing to A.M.R. Productions, P.O. Box 1813, Toms River, NJ 08754.



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## HANNAN'S HANGAR

cont. from page 34

which has a running duration of about 10 minutes from a 3cc tank. Fritz also learned that two other brands of CO<sub>2</sub> systems are now being manufactured in Europe; one is the Austrian Schaub, while the Botond is made in Hungary. Both are intended for outdoor CO<sub>2</sub> duration contests, which are popular in those countries. Likely the tiny Browns, Gasparins and Gaggls are gaining greater popularity in indoor flying scale models. (And are much less apt to fly away!)

### SIGN-OFF TIME

Jon Zeisloft, of Las Vegas, Nevada, sent us an article by Shigeo Shingo, from which we extracted the following: "Human beings cannot progress unless somehow they do things differently today from the way they did them yesterday. You have to try out new ways of doing things. If you do, perhaps half of what you try will end in failure, but the other half will be linked to progress."

Perhaps significantly, the article was illustrated with an early Wright brothers canard flying machine! MB



Englishman Richard Granger made this asymmetrical rubber-driven Blohm and Voss BV 141, which became frozen in mid-air by the camera's lens. Photo was taken during an international scale model contest held in the Czech Republic.



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**No. 7941 FARMAN F-190F-192 \$10.00**  
Master free flight scale modeler Hurst Bowers turned out this nicely proportioned and great flying replica of a classic French high-wing cabin monoplane from the 1920s. Designed for the HiLine Mini 6 electric power system, the model spans 28-7/8 inches and is 21 inches long. Two different color schemes are detailed on the plan.

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