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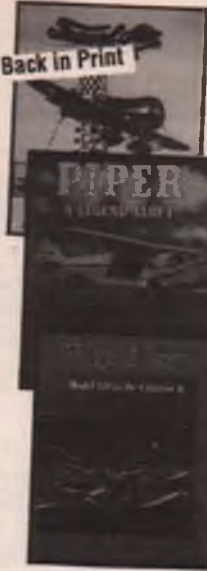
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NUMBER 5



A prime promoter of RC hand-launch gliders, Dr. Paul Clark of Osaka, Japan is seen here with his DCU Viper, one of the current hot tickets in RCHLG. Photo was taken by RC Soaring columnist Bill Forrey at the 1995 CVRC Fall Soaring Festival at Visalia, California. See page 68 for Bill's complete report.

ON THE COVER

As a preview of what's coming next month, we offer these photos of two of the several gorgeous RC scale models built by master modeler Charlie Valentino of Lake Roskonkoma, New York. On top is a ducted fan Grumman F9F Panther, below is a 1/5-scale P-40D done up in Flying Tigers livery. Frank Gudaitis, who took these photos, has done a photo story for us on these and some of Charlie's other outstanding models, which we'll be presenting next month.

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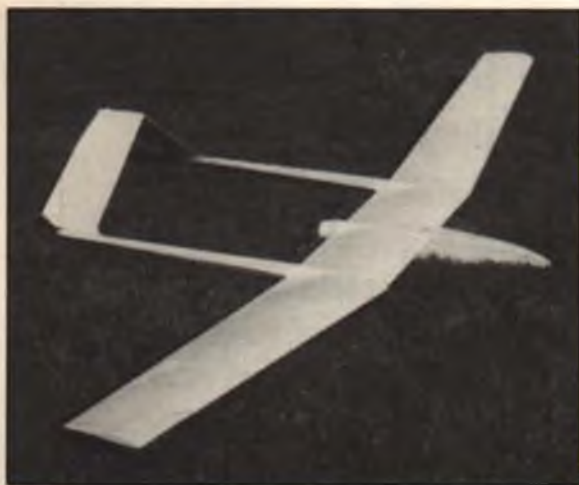
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How about this great little 1/2A RC fun-fly model? Canadian modeler Andy Waitowicz patterned his Micro-Sukhoi after the .40-size "Su-do-Khoi" pictured in the Morris Hobbies ads. Andy's model spans 32 inches and weighs just 12 ounces (7 ounces per square foot), thanks to the use of a five-servo Cannon ultra-micro system, Sig 4-6 pound contest balsa and Lite-Span covering, which he says is really good stuff for small models. Andy writes: "The engine is a Russian-made VA .049, a lightweight powerhouse fitted with a prototype carburetor. Idle, mid-range and throttle response are perfect, much like a two-needle-carb .40 or .60. All standard aerobatics can be done at half throttle. Hand launches are done under-handed and at full throttle, she climbs strongly at a 45-degree angle. Knife-edge loops have been done and standard knife-edge is horizon to horizon. Only the lack of a computer radio is preventing sustained hovering." *Andy Waitowicz, 170 Cedar St. N., Timmins, Ontario, P4N 6J3 Canada.*



Clark Ross of Waterloo, Iowa has been modeling since the early 1950s, and builds mostly his own designs or scratch-builds from plans. A good example of the former is this interesting and unusual inverted V-tail electric-powered sailplane, which he hasn't yet got around to naming. Span is 96 inches, wing area is about 820 square inches, and the power comes from a Graupner Speed 600 motor mounted as a pusher at the wing trailing edge, running on seven 1,000-mAH cells and turning a 12x8 Master Airscrew folding prop through a 2.5:1 Master Airscrew gearbox. The radio is one of Futaba's 4NBL Attack-E systems with the MCR-4A receiver/speed control unit. Covering is Flitecote. Clark says the airplane is a real floater that gets a lot of good comments at the field. *Clark Ross, 2032 Castle St., Waterloo, IA 50701.*

"I have been building and flying model airplanes for 59 years, and what a beautiful trip it has been," writes Larry Katz of Toms River, New Jersey. Of his latest project, Larry has the following to say: "This futuristic looking RC plane is a scratch-built model of a 1941 Bernard Gross Flying Wing. It is a pusher aircraft powered by a Cox Tee Dee .09. The wingspan is 6 feet, and the model is covered with both Ultracote and MonoKote. It utilizes both rudder and aileron controls." The Gross Flying Wing has been built in various sizes and used in Old Timer RC competition with some success; check with John Pond for plans availability. *Larry Katz, 1658 Buttonwood Ave., Toms River, NJ 08755-0815.*



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Seldom do we come across a modeler who is more enthusiastic about this hobby than Ken Park of Ottawa, Ontario, Canada. Ken recently got involved with SAM; the photo shows him launching his 1/2A Texaco Scale Farman F-190 at the Great Grape Gathering in Ganonoque, Ontario this past August. This was his first SAM contest, and from the tone of his letter, it's evident he had a real ball; Ken says he's become a true convert to SAM and wishes he'd heard about them earlier. As for the airplane, it's a 139 percent enlargement of Hurst Bowers' electric powered FF Scale ship, featured as a construction project in the July '94 *Model Builder*. (We offer plans for both—#7941, the FF version, and #7942, the enlarged RC model.) The RC Farman spans 40-1/8 inches and covers 318 square inches; engine is a Cox Texaco .049. Ken flies the Farman with a Futaba 4NBL Attack radio, and leaves off the wing struts and dummy radial engine for competition flying. Ken Park, 102 Irma Pr., Ottawa, Ontario, K1V 0E7 Canada.



Which is better, gas or electric? Don't ask these guys, they're always fighting over that same question. So, to be completely impartial, we'll run a photo of each. The pretty Eindecker belongs to John Nelson, who scratch built it from Nick Zirolli's plans. The model spans 55 inches and carries an O.S. .40FP in the nose. Flying weight is 4 pounds. The fellow in the other photo is John Hintze, one of the group's electric proponents; his Amptique (originally from Leisure Electronics, now being kitted by Spirit of Yesteryear Models) flies with a geared Astro 05 turning a Master Airscrew 11x7 prop, running on seven 1400-mAH cells. John writes: "These planes fly so well that I think we will never decide which is better, but we will always have fun giving each other a hard time!" David Hintze, 146 N. Crosby Ave., Janesville, WI 53545.

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LATEST FROM GREAT PLANES

One of several Great Planes items to be unveiled at the 1995 RCHTA show in Chicago was a new addition to GP's Legendary Warbird Series of ARF models, the Focke Wulf FW-190. This .40-size fighter is supplied 90 percent pre-built, requiring only final assembly and radio and engine installation to complete. Structure consists of an interlocking wood framework surrounded with a "stressed skin composite" consisting of a polyfoam base, plastic skin, color layer and fuelproof coating. Retracts can be installed if desired.

Another new Great Planes release is the HyperFly Apache from Kyosho—essentially the



same as the original two-channel HyperFly electric helicopter (see the review in the August '95 *Model Builder*), but with a semi-scale AH-64 Apache fuselage made of molded polycarbonate. The new chopper is available by itself and as part of a complete set that also includes a charger, Futaba 2VR radio, Hobbico charger, two sets of rotor blades and two six-cell NiCd packs. From Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300.

ACE R/C NEWS

Ace has a couple of new on-board microprocessor-based devices to make your RC life a little easier. The MixMaster plugs between your receiver and servos and allows you to mix any two channels, either bidirectionally (elevons and V-tails, for example) or unidirectionally (flaperons, coupled ailerons/rudder, flap/elevator compensation, etc.).

Any of eight different mixing ratios can be selected.

Ace's ServoMaster is used to slow down servo response for scale realism, particularly for retractable landing gear applica-



tions. Three different user-selectable transit times are featured, and there's also a gear door sequencer output for a separate servo to open

and close the gear doors at one of two selectable speeds. Both of these devices measure 1.5x1.5x.75 inches, weigh .8 ounce, and retail for 439.95 each. From Ace R/C, Inc., 116 W. 19th St., Higginsville, MO 64037-0472.

FOR ELECTRIC BUFFS ONLY

New Creations R/C, a major supplier of high-performance electric RC models and



all related accessories, has just come out with a new 54-page updated catalog that's chock full of every conceivable piece of electric power hardware. Company owner Kirk Massey is a top-rated competition flier and motor man, and offers a range of custom motor rework services for those who want to squeeze the last bit of performance out of their models. Motor rebuilding and special machine work is also available. Simply mention to Kirk that you read about his outfit in *Model Builder* and you'll get the new catalog at no charge. Write to New Creations R/C, P.O. Box 496, Willis, TX 77378, or call (409) 856-4630.

MORE ELECTRIC STUFF

Still more goodies for electric fliers are three new sizes of 2:1 titanium gearboxes imported by Hobby Lobby, sized to fit the Graupner Speed 700, Astro 05-15 and Astro 25-40 motors. These dual ball bearing setups feature a titanium casing, 5mm output shafts, and internal ring gears that allow the motor to turn the same direction as the prop (i.e. the



motors don't have to be retimed). The use of an internal gear makes for less than 1/4-inch offset between the motor and prop shafts. HL's Catalog 26 is available to new customers for \$2.50 (includes a \$6 first-purchase discount voucher), from Hobby Lobby, 5614 Franklin Pike Circle, Brentwood, TN 37027; (615) 373-1444.

NEAT GOODIES FROM FUTABA

Shown for the first time at the RCHTA show was Futaba's PA-1 Pilot Assist Link, a two-axis electronic horizontal stabilizer (autopilot) for airplanes and helicopters. As explained to us, as long as the receiver is getting no control signals from the transmitter, the PA-1 takes over control of the pitch and roll servos to keep the model

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flying straight and level; the unit is overridden whenever the pilot makes a control input. The PA-1 consists of a receiver-size amplifier and an optical sensor that mounts to the bottom of the aircraft. Power requirements are so low that it can safely share the airborne 4.8V radio battery with the rest



of the RC system.

Also debuted at Chicago was Futaba's FP-G501 Piezo-electric helicopter gyro; it has no moving parts and is said to be vastly superior to mechanical gyros in terms of response, sensitivity and longevity. The G501 will be offered both by itself and with Futaba's new S9203 zero backlash servo, which was specially designed for this application and features metal gears, a coreless motor and a ball bearing supported output shaft. From Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718; (714) 455-9888.

DIESEL REPLICA

Carlson Engine Imports is



version features ABC construction and weighs in at only 2.64 ounces. Going price is \$55; an optional 4mm spinner nut is \$4, and S&H runs \$4 for any size order. A complete catalog listing over 250 different imported diesel and glow engines is yours for \$1 or free on request with any order, from Carlson Engine Imports, 814 E. Marconi, Phoenix, AZ 85022-3112; (602) 863-1684.

BOB'S UPDATED SCALE GUIDE

A definite must-have for any true scale buff, the 1996 edition of the Scale Aircraft Documentation and Resource Guide from Bob Banka's Scale Model Research is a 188-page publication listing



over 5,800 different Foto-Paaks (250 new), an astounding 33,000+ three-view drawings, and includes 13 excellent scale-related articles written by some of the top competitors and authorities in the field. We refer to Bob's catalogs almost on a daily basis when answering readers' "where can I get . . . ?" questions. Copies are available for \$8 postpaid (\$10 in Canada and Mexico, \$15 overseas) from Scale Model Research, 3114 Yukon Ave., Costa Mesa, CA 92626; (714) 979-8058.

now handling a Russian-made replica of the Elfin 1.5cc (.09 cubic inch) diesel engine originally produced in England in 1950. This new

GBS & GEE BEES

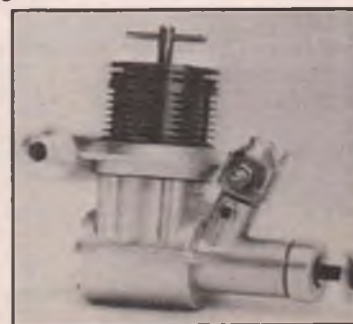
That's the title of Bill Hannan's latest work, a delightful 26-page collection of plans, three-views and air racing history—specifically the early Gordon Bennett (GB) international air races and aircraft, and the later Gee Bee racers with



which we're all familiar. In addition to the several three-view drawings, you'll find construction plans for a Peanut Scale Burgess-Curtis racer, Bill's own all-sheet-balsa 1911 Nieuport and 1912 Rex monoplanes, and Kazuhiro Suzuki's No-Cal Gee Bee Z and R-1 models—and a No-Cal R-1 by Tomishi Nishina that flies backwards! Get your copy of *GBs & Gee Bees* by sending \$10.95 plus \$2.50 S&H to Hannan's Runway, Box 210, Magalia, CA 95954. You can also place Visa/MasterCard orders by phone at (916) 873-6421.

P.A.W.'S BIG 'UNS

The .49 and .60 size P.A.W. diesels, which have been pro-



duced for some time, have recently been revamped so that the .60 now uses the .49 case (reducing its weight by an amazing 5 ounces in the pro-

cess), and the .49 has been refined with better balancing and a few other minor changes. Both of these dual ball bearing engines are now identical in size and weight (17-1/2 ounces with muffler); the only visible difference is the anodized cylinder fins—red for the .49, green for the .60. Both can be purchased with a straight venturi or RC carb. From Eric Clutton, 913 Cedar Lane, Tullahoma, TN 37388; (615) 455-2256.

1/2A TEXACO STÖSSER

Following his Porterfield Collegiate, Cessna Airmaster and Longster, Al Lidberg has unveiled yet another 1/2A Texaco Scale design, the 1937 Focke Wulf Fw 56 Stösser, scaled to 288 square inches. Al is marketing the Stösser both as a complete plan set and as a semi-kit; there are also some vacuum-formed parts available



for those who want to cut down on the building time. An info sheet with prices and ordering information can be had for an SASE; an illustrated catalog of all of Al's plan/kit offerings is yours for \$1.50, from A.A. Lidberg, 1008 E. Baseline Rd., Suite 1074, Tempe, AZ 85283; (602) 839-8154.

NEW FROM BOB HOLMAN

Brian Taylor's outstanding 1/6-scale, 82-inch span F4U-1 Corsair, which took 3rd place at the 1995 British Nationals, is now available in plans form from Bob Holman for \$45 plus \$5 S&H; an accessory set consisting of a fiberglass cowl, wing crank, canopy and prop nut is \$90. Bob says he also plans on offering either laser- or machine-cut parts, as well as main and tail wheel

continued on page 76

MODEL DESIGN & TECHNICAL STUFF

BY FRANCIS
REYNOLDS

•More on Antennas and Radio Range

•The MD&TS Index

After we talked about antenna problems in connection with conductive parts in model airplanes (Art Thoms' Boeing 314 model) in the May 1995 column, I got a letter from Pat Flinn of Dearborn, Michigan, asking for help in deciding what to use for a receiving antenna on a very large sailplane he's designing for cross-country soaring. The model will have a carbon fiber fuselage, and he needs all the range he can get. I wrote a letter to Pat giving him my opinions, and also sent a review copy of that letter to antenna expert Paul Giacherio of Clinton, Michigan. Paul has now responded, and in the meantime I received a letter with some discussion of antennas from Jim Wills of Perkinston, Mississippi. I also received a phone call from George Gurney of State College, Pennsylvania, who experienced some unexpected range problems due to opaque Micafilm covering.

The following is my effort to glean the best and the truth from all of the above communications. If you are seriously interested in this subject, I suggest you reread MD&TS for May 1995 first, since some statements there will be referred to here but not repeated. I am not a radio engineer, but

have a little basic training and experience with antennas. I will repeat what "experts" have told me only when what they say makes sense to me.

Referring to the May '95 column, Jim Wills confirms what I wrote on the bad or unpredictable reflector and director effects of fairly long conductors parallel with and a significant fraction of a wavelength away from the receiver antenna; and he adds some additional good technical stuff. He points out that tall antenna towers, where the tower itself is the antenna, are often guyed for support. These guy wires would seriously degrade the transmission if they weren't electrically "broken up" into shorter conductors by the insertion of insulators in series at intervals throughout the length of the guys. The distance between insulators is usually set at 1/7 of the wavelength transmitted, this length being sufficiently short and non-resonant to minimize parasitic-element reflector and director effects. Thanks Jim.

That is a good number for us modelers to remember. If you're running the receiver antenna parallel to a long conductive part in the model whose length is a seventh of a wavelength or less, don't worry

about it regardless of the distance between the antenna and the long part. And how long is 1/7 of a wavelength? Wavelength in feet is 984 divided by the frequency in megahertz, so for our usual 72 MHz RC model airplane band, the wavelength is 13-2/3 feet. A seventh of that is a shade under 2 feet.

Pat, I am quite sure that your carbon fuselage will be "fully" conductive to radio

waves at our frequencies. If the receiver antenna is placed outside but close to and parallel with the conductive fuselage, the fuselage will be capacitively coupled in phase to the antenna wire and become part of the antenna system, as long as fuselage and antenna wire are only a few inches or less apart. Because of its size the fuselage will tend to BE the receiver antenna.

Paul recommends, however, that you do *not* string the receiver antenna wire *inside* the conductive fuselage. He wrote, "I am leery of putting an antenna inside any conductive fuselage. It could work or it could completely shield the antenna. Consider coaxial cable: the conductor is surrounded by a braided metal shield that is spaced away from the conductor by an insulator (dielectric) to completely 'shield' the conductor. The distance between the conductor and the shield has to be controlled for this to happen. The key is the spacing—proper spacing could couple the conductor and shield into one big 100 percent in-phase antenna, or act 100 percent out of phase, or anything in between. This spacing would be hard to determine in a tapered fuselage, and hard to maintain in flight."

Pat, you didn't tell me how long your carbon fuselage will be; but for a 14-foot wing, I expect the fuselage will be a lot longer than the normal receiver antenna length. That may or may not be bad for the range, depending on the exact length and upon whether the receiver is tuned to the longer antenna length. Let me quote Paul again:

"Your idea of using the fuselage as the antenna itself is great. If one could send the completed fuselage to a radio technician, he or she could tune the receiver to the fuselage antenna for maximum sensitivity. Of course, that receiver would then be dedicated to that aircraft."

To avoid having a dedicated receiver, Paul suggested building a piece of music wire into

TO (D) OR NOT TO (D)?

If you paid close attention (closer than we did, obviously) to the AMA Hall of Fame list included with the MD&TS column in the November '95 Model Builder, you probably noticed that a number of famous modelers who are no longer with us did not have the appropriate (D) after their names, while others who are still alive and well were listed as being deceased. We'll have to share the blame with the AMA on this one; columnist Reynolds merely presented the list of Hall of Famers as sent to him by the AMA at his request, and we admittedly didn't check it as carefully as we should have.

Bill Northrop was the first to bring some of the mistakes to light for us, followed quickly by Dave Abbe and John Tatone—John being one of those listed as deceased! We must say he makes one heck of a lively corpse, as he's still going strong with J'Tec, the model accessory company he founded up in northern California several years ago.

Finally, John Worth faxed us a copy of the Hall of Fame list on which he noted 14 errors, and since we haven't learned of any others, we'll accept his revisions as final. Those modelers who should have been listed as deceased include Lou Andrews, Irwin Polk, Duke Fox, Walt Schroder, Walter Caddell, Frank Neikimken, Lou Proctor, Bill Gough, and Joe Bilgri. Those listed as deceased but who are still very much alive are Dick Korda, Granger Williams, William Phillips, Howard Bonner, and John Tatone. Our sincere apologies to all concerned. *MB*



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the conductive fuselage, sticking 6 inches of it out the rear, and having a technician tune it by cutting this wire; tuning the fuselage antenna instead of the receiver. A connector could be used to plug the receiver into the fuselage antenna.

Paul said, "Our receiver antennas are supposedly 1/4 wave; but 1/2 wave, 5/8 wave, 3/4 wave and full wave will all tune to the receiver well and will increase the range. Longer antennas are less sensitive in regards to tuning and less critical of exact length." I believe Paul is saying the receiver must be differently retuned for antennas of each of these longer fractions of a wavelength.

Another suggestion I made to Pat is to lay up the part of the fuselage forward of the receiver location using insulating fiberglass or Kevlar, blend that into 100 percent carbon at about the receiver location, and blend back out to glass or Kevlar aft at a point where the conductive carbon fuselage section will be the same length as the antenna wire. Then string the antenna wire straight back outside of the conductive section. Paul also agrees with this partly-conductive fuselage concept, suggesting 39 inches of conductive length, with an imbedded wire aft, to be tuned by cutting. "The partial carbon fuselage also solves some other problems. Place the servos outside of the carbon portion. I think having the servos inside the 'antenna' is asking for feedback from the servo leads."

My (Reynolds) gut feel is that a proper-length conductive fuselage will give a higher gain (longer range) antenna than the original antenna wire, because of its much greater surface area.

You could range test the concept in this manner, Pat:

Roll up an open-ended conical tube of aluminum foil and cut it to the length of the receiving antenna, with the forward and aft diameters to be approximately what your fuselage will be at those points. Put the receiver at the big end, and tape the antenna outside the tube, but don't electrically connect it to the tube. Find two accessible hilltops around a mile apart, get a test partner and a couple of walkie-talkies for communication, and run some range tests with and without the aluminum tube.

Also, make another aluminum-foil tube the full length of the fuselage and compare the range it gives to the tube with the same length as the antenna wire. If the full-length tube gives as good or better range than the short one, then you can lay up the entire fuselage of graphite without tuning anything.

To find the relative range of different configurations without changing the actual range, simply extend the transmitter antenna a section at a time. For comparable results you must have the transmitter, the "airplane" and yourself in exactly the same position and orientation during all tests. Small differences in external factors can make major differences in range testing results. Test with the "fuselage" parallel to the line to the transmitter, and again at right angles to it. Record all results for later study, including how many transmitter antenna sections had to be extended for each test.

Also conduct a test with the antenna wire strung straight out from the big end of the full-length tube at right angles to the "fuselage." If this gives good or better range than the fuselage antenna, consider running the antenna out the wing. Test with the antenna parallel with the transmitter direction and at right angles to it. You told me, Pat, that the wing is made of foam and fiberglass. If you change your mind and make a carbon wing, you would have to do still more testing with a wing antenna.

With an all-carbon or all-aluminum airplane which tests show to give poor range, there is another answer: Extend the correct length antenna vertically as a "whip." Normally such a whip is made of music wire and is mounted on top of the fuselage, but for your cross-country work, Paul and I would extend the whip straight down from the bottom of the fuselage, so the receiver can "see" it more of the time. A conductive fuselage and/or conductive wing might serve as a "ground plane" for a 1/4-wave whip, and increase the range. Provide about a 1-inch hole in the conductive fuselage where the antenna must pass through, and an insulating mounting plate to hold the antenna wire at the center of the hole.

A .030 to .050-inch diameter music wire whip would be flexible, but would prob-

ably require a coil spring or hinging mount to prevent bending in landing. Paul also suggests using the original antenna wire as a whip. Let it hang limply straight down, if it doesn't cause too many launching and landing problems and if drag doesn't hold it up too parallel with the fuselage.

Paul likes the Stealth Strip antenna, and thinks it might work well in these situations. He suspects the coiled receiver antenna wire functions as a loading coil on the Stealth Strip. Your carbon fuselage may turn out to be a better antenna than either the Stealth Strip or the original antenna wire, however.

Paul reported on a recent experience of his where he ran the receiver antenna out along an aluminum tail boom and got over 60 meters in his range test—much better than he ever had before. He considers this a confirmation of the desirability of running the antenna parallel with a conductive part of acceptable length as long as the two are several inches or less apart.

Paul further enlightens us with, "Folding or bending does not reduce the effective length of an antenna, but does make it directional in most cases, with the strongest signal perpendicular to the plane of the antenna."

MICAFILM ADVISORY

George Gurney of Michigan phoned me after I had written all of the above. He feels he knows what caused Art Thoms' range trouble. What he said didn't make sense to me at the time, but I remembered it and ran my own tests later—and he's right.

George said that opaque Micafilm can cause major radio range problems. I argued that it couldn't because it is non-conductive. He said he put some in a microwave oven and it "acted up." Later I probed a piece of white opaque Micafilm with a 20-megohm ohmmeter. I was right—infinite resistance. But George said he put it in a microwave, so I did that too. George was right—it sparked, snapped and crackled, shriveled, and ended up full of holes!

In addition, I fired up an RC transmitter, put a field strength meter a distance away from it and took a reading. Then I put a sheet of white opaque Micafilm between

continued on page 86

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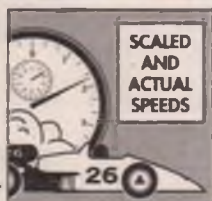
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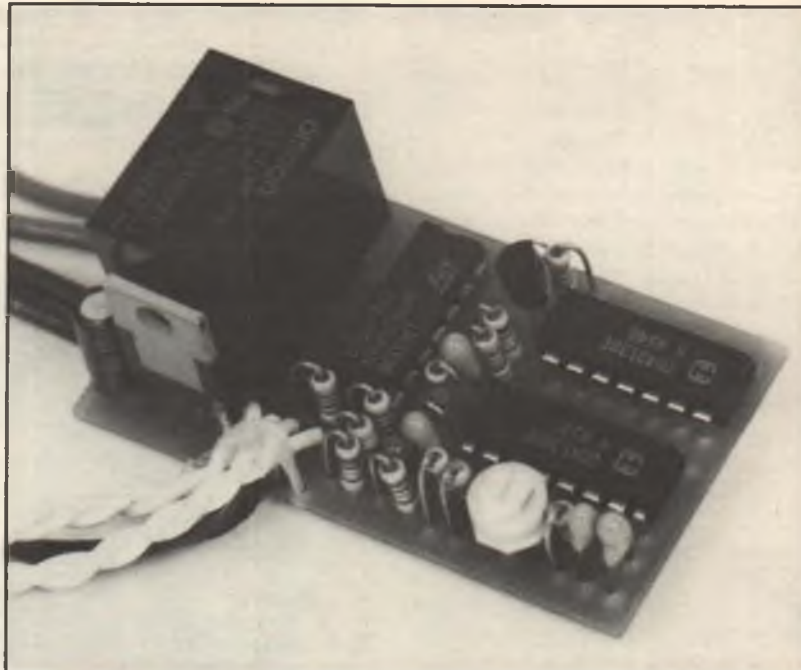
- APT's MC-2 Motor Control Unit
- AeroGauge Mk II
- Low-Cost Digital Panel Meter

To paraphrase Mark Twain's famous saying, "The reports of John Tatone's death have been greatly exaggerated." The Model Design & Technical Stuff column in the November *Model Builder* included a listing of AMA's Hall of Famers, with those who have gone to that great flying field in the sky being identified with a (D). I was greatly shocked to see my friend John Tatone's name as one of those, not able to accept that it could have happened without my knowledge. To the telephone, with the pleasant result that John himself answered! Therefore

I'm glad to report that John Tatone and his company, J'Tec, are still very much with us and producing those super engine mounts and mufflers for which they are so well known. (Editor's note: See the sidebar in this month's MD&TS column.)

That's the good news. The bad news is that in EC for October, I mentioned the success I've had with CaRa Products' sealed lead-acid battery charger, to which I received a letter from a reader that mail to the address I listed is being returned as "undeliverable." To the telephone again, to learn that the number I had for them is now assigned to someone else, and there is no listing for either the company or Ralph Croaning, the "Ra" of CaRa Products.

This does not bode well for my friend Ralph, and I hope to get better news about him from some reader in or around Canton, South Dakota. In the meantime, there are a lot of CaRa chargers out there, some of which will need service sooner or later. I smoked mine once with reverse connections and traced out the enclosed



The American Precision Technologies MC-2 electric motor on-off controller is recommended for six and seven cell motors operating at less than 30 amps. Easy, foolproof installation.

schematic for the 12V unit, which I hope will help some of you. The charger is relatively simple and not difficult to troubleshoot. If you experience any problems getting yours to work, let me know and I'll try to walk you through it.

APT'S MC-2 MOTOR CONTROL UNIT

Electric motor controllers have been developed from the simple servo-operated switch to the extremely complex timed-pulse units required by brushless motors. However, the majority of electric powered RC airplanes need nothing more than a reliable way of turning the motor on and off at the pilot's command. Such a task is the one assigned to the Model MC-2 motor controller from American Precision Technologies.

The MC-2 is a small, lightweight on-off controller designed for medium powered electric models, being rated for 7.2 volts (six cells) to 8.4 volts (seven cells) at a maximum motor current of 30 amperes. It is both BEC (battery eliminator circuit) and auto-cutoff equipped. In this case, the BEC

is rated at 5.0 volts nominal for 1 amp continuous—more than enough for the average three-channel powered glider. The automatic motor cutoff is set at 4.5 volts, giving you more than enough time—some 15 minutes—to escape the clutches of even the most playful thermal without fear of running out of radio power before you make it back to terra firma.

Motor current control is done with a relay, so there is no significant loss or heat build-up to worry about. There is a prop brake feature included and also—very important—an arming pushbutton switch which must be depressed each time the airborne system is turned on before the motor will operate. It's always a good idea to keep the throttle stick in the low- or off-motor position prior to turning on the radio switches, but the inclusion of the arming switch assures that the motor will not operate should you ever forget. A fuse is included, logically installed between the controller and the motor, so that in case of an amp-eating motor malfunction blowing the fuse, power to operate the radio will still be

available.

There are some precautions and troubleshooting hints included in the instructions, but as I reread them, I realized they are all basic information, intended not so much to protect you from the equipment, but actually the other way around. Still, the basics can't be repeated too often—review those with your APT MC-2. For information as to availability, pricing and other APT products, contact Brenda Huettner at American Precision Technologies, P.O. Box 53, Nutting Lake, MA 01865; (508) 667-2023.

FOR EXPERIMENTERS ONLY

S.G. Corp., 1780 E. Chase Ave., El Cajon, CA 92020; (800) 431-9002 has been running some full-page ads that are sure to have caught your eye. They describe a two-channel, two-stick transmitter and a twin turbo fan receiver, showing them installed in and apparently operating a variety of balloons, boats and cars. At \$12.95, it's hard to keep from mailing off a check just to see what they're talking about.

What your 13 bucks brings is somewhat in the gadget class, but a very clever gadget indeed—and definitely radio control equipment. The transmitter measures 5x3.75x1.5 inches, is powered by a 9V "transistor" battery, and contains two miniature center-loaded sticks, in a common configuration. It transmits a normal looking AM signal, with the pulse length varying from 0.5 to 4.0 milliseconds, non-proportionally.

The receiver and motor control unit are housed in the dual-shroud housing seen in the ads. Each shroud contains a 10mm flat-sided motor driving a very clean looking paddle bladed prop some 55mm (just over 2 inches) in diameter.

Now comes the electronic black magic . . .

With both sticks at neutral, both motors are off. Moving one stick will cause one motor to run; reversing that same stick will reverse the same motor. Obviously, you can command both power and direction by proper manipulation of the sticks: full forward or reverse, or maximum turn (one prop forward, one reversed) or minimum turn (one prop on, other prop off). We used to do loops and rolls with rudder only; think about the possibilities with this setup!

The airborne unit requires 3 to 6 volts for operation, its best performance being obtained with a 3V DL128 lithium battery. Total weight is then 55 grams, with a thrust stated to be 4 grams for 30 minutes. Using three 50-mAH NiCds, at a weight of 49 grams, the thrust is 5 grams but the time is reduced to 6 minutes.

Anyone for a contest?

AEROGAUGE MK II

Back in the June '94 column

I told you about what I consider one of the most useful RC electronic devices to come along in years. Called the AeroGauge, it connects between your airborne battery and the rest of your equipment, and keeps close tabs on your use of its electrical energy, with a visual display of the amount of charge remaining. And as I explained at the time, although the ESV (expanded scale voltmeter) is claimed to do the same thing, it cannot perform that task with any accuracy—definitely not well enough to gamble "one more flight" on.

The ESV reads the voltage curve of the NiCd battery, which is almost flat to begin with and affected by many outside influences. The AeroGauge, on the other hand, does not depend on battery voltage for its information; it uses a 100 percent accurate system that measures and remembers the amount of electrical energy put into the battery during the charge period, then deducts the proper amount as you take it out. And

it's made right here in the USA!

Now there's a new and improved version called the AeroGauge LCD (Liquid Crystal Display). In the original AeroGauge, the current sensor and the display were an integral unit, and both rode around in the airplane. In the LCD version, only the sensor, looking somewhat like a switch harness, has that fun. The now larger display stays behind and can be plugged in anytime its information is desired.

The AeroGauge measures and remembers the amount of charge in the battery; obviously you have to start with a discharged battery for it to get a true reading. With the original system, discharging the battery is left up to you, but the AeroGauge LCD now handles this task as well, not starting the charge until the battery has

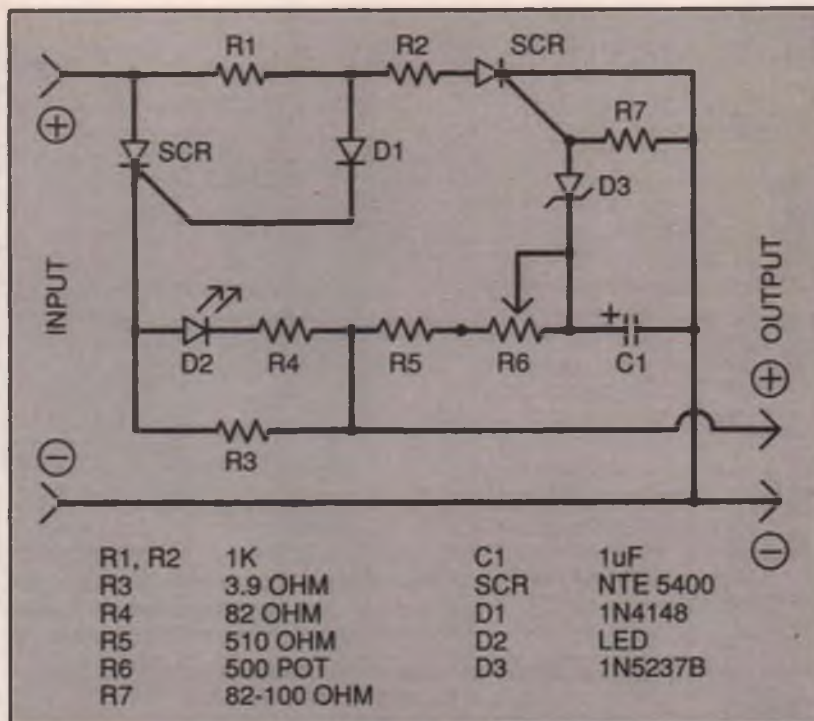
been discharged down to 4.2 volts, after which charging should be done as normal. It is recommended that this process be done at least twice in order to establish the necessary information firmly in the system's memory.

When plugged into the memory module in the airplane, the unit will sequentially display all of the pertinent battery information, including voltage and remaining capacity at that time. Figuring mAH per unit of time and total flight time is then a matter of mathematics usually not even requiring a calculator.

Check with the manufacturer, Measurement and Control Products, 16027 Brookhurst St., Suite G-224, Fountain Valley, CA 92708; (714) 775-7991, for the latest price and the source closest to you.

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other measuring devices are built, are often too expensive to be used in the average tinkerer's projects. Most cost close to \$40, and have often precluded me from publishing a circuit or a project developed around such a meter. Well, I'm happy to report that said barrier has now been breached, and I've located a source of good quality basic digital instruments for your pet projects. Not only that, but there's a special price for us EC'ers.



Measurement and Control Products second generation of its battery capacity reading "AeroGauge" now requires that only the sensor be installed in the airplane, and more battery information is shown in the external plug-in display.

The instrument in question is a 3-1/2 digit device; that is, it will read three 0-9 numbers and one 1 on the left side, the highest possible reading being 1999. By programming the decimal point, one can read whatever values one desires within those basic numbers.

Electronically, the meter is rated at 200 mV full scale, at plus or minus 0.5 percent accuracy. The digits are 13mm (9/16 inch) high and the overall size is 1-7/8x2-5/8x7/8 inches, including the furnished bezel. It requires a 9V battery for operation, and the

current drain is around 1 mA.

The good news is that not only is this meter available, but is priced at an affordable \$17. The best news is that for the next couple of months, if you mention that you read about it here in EC, this catalog #PM-1 digital panel meter is yours for only \$9.95. P&H is \$4, and don't forget the governor's share if you live in California. Order yours from Black Feather Electronics, 645 Temple Ave. #7, Long Beach, CA 90814; (310) 434-5641.

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Delamination Strength	A	D	D	C+	D	C+	D
Slots or Holes	A	A	A	A	A	D	D
Glue Action: Wicking	A	A	B	F	F	F	F
Delayed Cure	A	C	C	F	F	F	F
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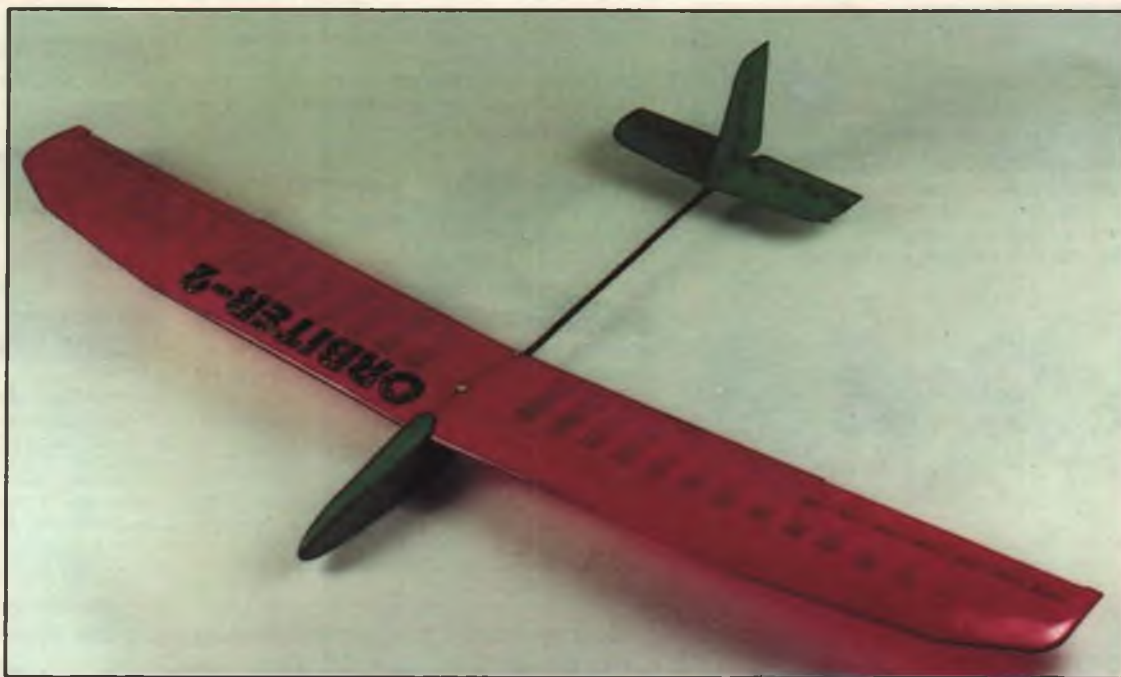
■ By Dennis A. Tyson
Photos by J.P. Godwin

Dodgson Designs' "Orbiter-2" Hand-Launch Glider

The "next generation" version of the original Orbiter HLG, this pod-and-boom aileron model is the equal of any Class A competition sailplane on the market. Steve Cameron flew one to a 1st place win at the 1995 AMA/LSF Nationals.

The original Orbiter hand-launch glider was designed by Eric Jackson in 1987 and kitted by Dodgson Designs in 1989. In its original form it had a full fuselage, flaps and full camber changing capabilities, and weighed in at about 17 ounces with three micro servos and mini receiver. The first Orbiter I built from scratch was of this type, and I still fly it today. Due to the intense parts count and the cost of production, Dodgson ceased kitting the original Orbiter in 1990. I suppose at that time people were just not willing to pay what he had to charge for a 60-inch built-up glider.

Today it's a different story. Hand-launch is the fastest growing part of our sport and people are paying twice what this kit costs. However, if you're looking for performance and you're not afraid to put a little effort into the construction, there's no need to pay more. The new pod-and-boom Orbiter-2 as developed by Steve Cameron has everything you need to win serious hand-launch competition. It is lighter and slimmer than its predecessor, and the kit is of the same excellent quality that we've come to expect from Dodgson Designs. I built mine dead stock and it came out right at 12 ounces, which gave me an incredible



Twelve ounces of all-out competition hand-launch glider. To keep the weight to a minimum, Dennis did the fuselage pod and tail surfaces in balsa and dope, and covered the wing with Goldberg's new Transparent Ultracote Lite. Wing construction features a 1/32 balsa D-tube leading edge with 3/32x1/4 spruce spars, the tail is 3/32 sheet balsa, and the fuselage is a built-up balsa pod with carbon fiber tail boom. At 432 square inches, the Orbiter-2 has more wing area than most HLGs, allowing it to work at higher-than-normal Reynolds numbers.

4 ounces per square foot wing loading.

THE KIT

When you open the box and wade through the Seattle Times, lying in the bottom is a stack of 1/32 sheet balsa, a bundle of miscellaneous balsa and spruce, a complete hardware set that has everything you will need right down to the last screw, and even aileron pushrod fairings. Then there is the carbon fiber boom, aileron, rudder and stab pushrods, a bag of hand-cut ribs,

fuselage sides and formers, computer-drawn plans, and one of the best sets of instructions you will find anywhere. All of the wood is of the highest quality and appeared to be the lightest stuff available. The best part is that you get all this quality at an unbelievably low price. Bob Dodgson is definitely offering the most bang for the buck here!

CONSTRUCTION

Since my kit was one of the first off the



Our author proudly displays his 12-ounce thermal-eating Orbiter-2. Dennis has been flying RC since about 1980 and has flown all types of models, but Rode RC sailplanes the most challenging.

assembly line, there were a few inconsistencies between some of the parts and the plans. I brought these to Bob's attention and he couldn't wait to get me off the phone so he could correct them. I gave this kit a good shakedown and I can verify that after Bob made his corrections, you are getting the best parts fit there is. The only addition I made from the plans was to put a piece of the 3/32x1/4 spruce spar material across the fuselage under the wing leading edge to stiffen this area torsionally.

A good place to start is with the wing, and I suppose there are a lot of different

ways to approach it. Personally I found it easier to glue all of the bottom sheeting and capstrips together, put on the bottom spar, glue the ribs at the leading edge and trailing edge only, add shear webs, the top spar, and then remove the panel from the board. Since the S4061 ribs have undercamber, you then press the bottom trailing edge and capstrips against the ribs and glue them. At this point the tip section seems a bit flimsy but have no fear, the strength comes in having everything locked together. I've launched my original Orbiter on a heavy-duty hi-start without incident, so you can rest assured that this is one strong wing. The rest of the wing construction is straightforward and not at all difficult.

The fuselage pod has 3/32 sheet balsa sides with a solid nose block and 1/8 sheet bottom. This part of the construction goes quite fast and easy. You'll want to make sure you have everything straight before you install the wedge in the rear of the pod that the boom rests on, as this will lock the whole thing in place. After this wedge is installed you simply sand a groove in it with a piece of sandpaper wrapped around a dowel and lay your boom in there, all the while checking its alignment against the plans. There is ample room inside for most small radio gear and the integral servo tray is removable.

The tailfeathers are 3/32 sheet balsa and have a little 3/4-ounce fiberglass reinforcement. Two brass tubes are imbedded in the vertical fin and threaded for the 4-40 nylon bolts that hold the whole tail assembly onto the boom. This makes for an extremely portable fuselage. The tail pieces are usually the first things to get beat up, so I guess we can thank Bob for protecting our tails! A builder looking to save a bit more weight could build up the tail and probably have the model balance right on the money with a 150-mAH battery in the nose. Mine balanced 1/8-inch nose heavy with a 270-mAH pack.

RADIO

I'm using a Cirrus five-channel PCM system with a Cirrus micro receiver; I removed the case from the receiver because I like a little foam around it and prefer

DODGSON'S ORBITER-2

WINGSPAN	59 in.
WING AREA	432 sq. in.
FLYING WEIGHT	12 oz.
WING LOADING	4 oz./sq. ft.
ASPECT RATIO	8:1
AIRFOIL	Selig 4061
RADIO	Two channels required (aileron with coupled rudder, and elevator).
CONSTRUCTION	Balsa built-up fuselage with carbon fiber boom, balsa built-up wing, and sheet balsa tail surfaces.
PRICE	\$75 (full kit); \$15 (plans and instructions only).

Check with Bob Dodgson for shipping costs.

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

not to shoe-horn it into the fuselage. (Hitec RCD's 535 micro receiver is a bit smaller than the Cirrus and may fit better.) I have a 270-mAH battery in the nose.

I thought that since I was building a new model, it would be a great time to try out some of the new DAD Tina micro servos, and ordered two of them from George Voss of Soaring Specialties. I'm quite impressed with this little servo's centering ability. I put some pressure on the linkage and no matter what I did, they tried their best to recenter.

Another thing I tried that was new to me was to use a phone jack for the radio switch. This plug also doubles as a charging port. When the plug is in, the radio is off; pull it out and it's on. No longer do you have to remove the canopy to switch on and off! Radio Shack has everything you need for this installation and it all weighs practically nothing.

The aileron pushrods are your basic steel cable inside a plastic sheath; the elevator and rudder pushrods are 1/32 music wire that run inside the boom. The rods are supported at the rear of the servo tray by two clever eyelets made of 1/32 music wire. Bob Dodgson found during his testing that the elevator became sluggish while pulling out of a high-speed dive; the pushrods were bowing under the stress. These eyelets solved the problem. Be sure to file the groove in the rear of the boom carefully so the pushrods don't bind. With a little effort, this isn't a problem. I did have to fill the holes in my servo wheels and redrill them for the 1/32 wire.

FINISHING

Not being especially attracted to the



Coming in for the catch. How about that incredible Montana seed farm flying site? And when the wind is blowing 30+ mph, as it often does, Dennis has some great hills nearby to fly slope. Some guys have all the luck!



Despite the thin fuselage, there's still plenty of room for a Cirrus receiver (case), a 270-mAh battery in the nose and two DAD Tins micro servos. Aileron cable pushrods are connected to the aileron/rudder servo and the wing is bolted in place. Also pictured is the phone jack that serves both as the radio switch and charging plug—lighter and more compact than the typical slide switch.

color of natural balsa, I decided to dig into the roots of our hobby and cover my fuselage and tailfeathers with Japanese tissue and nitrate dope. I wasn't sure what to expect, but you know, besides the smell, I really enjoyed working with this stuff. It's quite simple and I'm thrilled at how light and attractive it is. I brushed two coats of dope (mixed 50/50 with thinner) onto the structure and sanded it, then I wet the tissue with water, laid it on, and brushed on some thinner; this reactivates the dope and attaches the tissue. I then brushed on two more coats of the 50/50 dope and that was it. I would definitely recommend this method of finishing. It looks great and it's something different. Why not broaden your horizons and give this a try on your next project? I think you'll like the results.

The wing covering is Goldberg's Ultracote Lite, which weighs about .13 ounce per square foot. This can save you up to an ounce and a half compared to some opaque coverings. I can't say enough good things about this covering. It's extremely easy to work with and shrinks fast and tight. I set my iron at 250 degrees

which attaches the covering very well. In fact, don't plan to pull it up without taking some balsa with it. It goes around curves easily and sticks to itself without creating too many bubbles. I'm not sure where you can get it yet, but Goldberg will be glad to direct you to the nearest retailer.

FLYING

A great kit and ease of assembly is meaningless if the plane doesn't fly well. There's no worry of that with this gem. Boy, does it ever fly! This was my first plane that had a 4-ounce wing loading and it seems to float for days, and launches extremely

high for being so light. This was some concern for me at first as I seem to be able to fling the heavier planes higher. You know, like the difference between throwing a ping-pong ball and a baseball. The Orbiter-2, however, seems to have excellent low-drag qualities. I can launch it just as high as my first Orbiter even though it's 4 ounces lighter. It has no tendency to pitch up. It launches straight as an arrow and is practically as fast.

One of the first things I noticed was how well it would range. I was tossing it in dead air and floating around all over the place for better than a minute! Then I got a little more comfortable and flew a little farther away in search of a thermal. When you find one, the Orbiter-2 will let you know right away. It responds positively to lift and climbs in tight circles without even the slightest tendency to tip stall. I thermaled out three times during my initial test flights! This was an achievement for me considering the air had a touch of fall in it and the boomer thermals had all gone south for the winter (those lucky southerners!).

I've put my Orbiter-2 through some



Extreme close-up of the bottom of the tail shows the pushrod hook-up and the two 4-40 nylon screws that hold the tail assembly to the carbon fiber boom. Dennis is also running his receiver antenna through the boom—usually a no-no, but he lets several inches of it hang out the end and reports no problems with radio range even at steep altitudes.

rigorous testing and even inadvertently tested its durability by hitting my photographer with it (sorry John). This ship will take nearly anything you can dish out. I've done loops, rolls, inverted flight, high-speed passes, flown right on the edge of a stall, and thermaled out many times. As you know, with a hand-launch you have to be able to gain some altitude first to do some of this. "Look mom, no towhook!"

The Orbiter is a plane that was originally ahead of its time. I'm grateful that Steve Cameron has continued to advance this design, and that Bob Dodgson was once again willing to offer this great kit to the soaring community. If you're looking for the next season championship or are just a beginner looking for a good aileron plane to move up to, the Orbiter-2 would make an excellent choice, and is an exceptional value. *MB*

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GLIDERS



ELECTRIC

700E and 1000XE

Tightly Wrap a MINIMAX around the WAR TURBO 10 MOTOR, connected to a 6 to 1 SUPER BOX, controlled by the FX15 PROPORTIONAL controller and driven by up to 16 cells. climb straight up out of sight three times on one charge. In other words, fly till your neck aches on one charge. The MINIMAX is specially designed to ignore the added weight of motor and batteries.

700E ready to fly.....\$402.
Wing loading.....4.66 oz. per sq. ft. @ \$46.00

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TWO METER CLASS

Wing Span.....78 in.
Length.....42 in.
Weight, ready to fly.....19 oz.
Wing Area.....719 sq. in.
Wing Loading.....2.8 oz. sq. ft.
List \$84.00.....Now \$51.00



MINIMAX 1000E

THREE METER-TWO PIECE WING

Wing Span.....119 in.
Length.....45 in.
Weight, ready to fly.....29 oz.
Wing Area.....1055 sq. in.
Wing Loading.....3.8 oz. sq. ft.
List \$126.00.....Now \$82.00

MINIMAX 1750

Wing Span.....14 ft.
Length.....58 in.
Weight, Ready To Fly.....42 oz.
Wing Loading.....3.4 oz. per sq. ft.
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LAUNCH ANY GLIDER high enough to catch the lightest Thermal. Orange frame and 500' of nylon 708 test tow twine. Complete as the picture shown above, with 100' of 5/16 pure LATEX. List \$84.00.....Now, \$54.00
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AT-6 TEXAN

The easy way to earn your wings in scale modeling.



Wingspan: 89.4 in (1763 mm)
Wing Area: 713 sq in (46 sq dm)
Weight: 7.5-10 lb (3402-4536 g)
Wing Loading: 24-32 oz/sq ft (73-98 g/sq dm)
Length: 49.25 in (1250 mm)
Engine Required: 2-stroke .61-.91 cu in
(10-15 cc) or 4-stroke .91-1.20
cu in (15-19.5 cc)
Radio: 4-6 channel with 4-7 servos

The 52U version of the AT-6 shown here is covered in Top Flite Monokote® Aluminum, Maroon Red, Cub Yellow and Black. The kit includes the parts and decals to build either the Air Force AT-6 or Navy 52U.

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

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The AT-6's ability to fly easily and well with a common .61 engine tops the list — a choice that allows you to maximize authenticity by totally enclosing the engine and routing exhaust to a true-scale exhaust port location.

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For a free brochure and the location of the dealer nearest you, please call 1-800-682-8948, ext. 034H.



Three-dimensional CAD engineering of the AT-6's complex wing ensures precise fits and exceptional assembly ease.



Molded-in frame detail outlines a vacuum-formed "greenhouse" canopy. Parts and decals for a two-place cockpit are included.

Gold Edition Warbirds Roster



P-40E Warhawk Wingspan: 64 in



P-51D Mustang Wingspan: 65 in



F4U Corsair Wingspan: 62 in

ELECTRIC BIG BIRDS!

Bruce shares his experiences with what to the vast majority of Big Bird modelers is a completely new way to power their aircraft.

Your Big Birds columnist has been threatening to do an electric-powered Big Bird for several years, but it was only just recently that I managed to get an electric model in the air. Here, at long last, are the results of my Electric Big Bird experience.

My friend Bob Benjamin is a well-known proponent of electric power and has been after me for a long time to give big electric powered planes a try. Bob introduced me to Bob Boucher, owner of Astro Flight, Inc., and I worked with both of these gentlemen putting together my plans for a Giant Scale electric plane. It's been an on-again, off-again sort of thing for the last few years, but recently the electric bug bit hard and I decided to carry the project through to completion.

Much of my electric power equipment was purchased several years ago, when this project was first conceived, and some of it has since been expanded upon or otherwise improved. For instance, Astro Flight's biggest motor at the time was a Cobalt 60 (which is what I bought) and no prop speed reduction drive was available for large, slow-flying models. Astro Flight has since introduced a larger Cobalt 90 and now has 1.6:1 gear drives available for both the 60 and 90 motors.

The Cobalt 60 is designed to run on a total of 28 NiCd cells. I originally bought two 14-cell 1200-mAH Sanyo NiCd packs (the largest capacity quick-charge NiCd cells then available), to be connected in

series. Nowadays there are higher capacity cells available; I recently purchased two new 14-cell 1500-mAH packs from Larry Sribnick of SR Batteries (Box 287, Bellport, NY 11713; 516-286-0079), and I understand he now has 1700-mAH packs available, which will give an even longer motor run.

The motor control unit I originally pur-

direct-drive setup, this would have limited me to about a 14-inch prop. In order to swing a scale-size 18-inch prop, and to better match the prop speed to that of the kind of slow-flying Big Bird I had in mind, a gear or belt reduction drive was needed. Bob Benjamin suggested I try the new H-1000 adjustable ratio belt drive unit from Modelair-Tech (P.O. Box 12033,



What better subject for an electric Big Bird than the venerable J-3 Cub? Bruce picked up this frame-up but unfinished Bob Hoover 1/4-scale Cub at a local hobby shop and with the help of a couple of buddies, successfully converted it to electric power. Cow! is from Fiberglass Specialties and has the dummy Continental engine cylinders milled in. Bruce says the most difficult part of the project was the windshield, as he had no patterns to work from.

chased is an Astro Flight #207, which is what I'm now using and which has proven to be an excellent unit. This particular controller is no longer in production, having since been superseded by Astro's new 204D digital speed control—basically the same size and weight but with more advanced digital circuitry and a "safe start" feature that prevents the motor from suddenly coming on at full throttle when turning on the radio, regardless of the throttle stick position.

The Astro 60 delivers its best performance when drawing 25-30 amps; with a

Hauppauge, NY 11788-0818; 516-979-1475). Tom Hunt at Modelair-Tech suggested a 2.15:1 reduction drive to start with. The neat thing about this unit is that the reduction ratio can easily be changed merely by changing the pinion pulley and belt.

To charge the motor batteries I initially purchased an Astro Flight Model 112 charger, which was good for up to 28 cells but was not a peak voltage detection charger like most of the ones in use today. Astro followed up the basic 112 with the current Model 112PK, which can charge



Astro Flight's Cobalt 60 electric motor fits nicely into Modclair-Tech's H-1000 belt drive unit, which is here is mounted to the firewall via homemade fiberglass brackets. The speed reduction ratio on this particular unit is 2.15:1; other ratios are available to fit a variety of model requirements. On the bottom of the housing are the battery charging plug and the all-important arming switch.

EQUIPMENT USED IN BRUCE'S BIG ELECTRIC CUB

Power System

Motor Astro Flight 60 Cobalt.
 Prop Drive Modclair-Tech H-1000,
 2.15:1 ratio.

Batteries Two 14-cell SR 1500
 packs in series,
 Two 14-cell Sanyo 1200 packs
 in series.

Speed Control ... Astro Flight Model 207.

Connectors Sermos.

Charger Astro Flight Model 112
 and 112PK.

Radio System

JR Max 6 transmitter and matching
 receiver, DAD Pro Series servos.

up to 36 cells, monitors the charge and shuts off automatically when the pack reaches peak voltage. I bought a 112PK and find it to be an excellent charger. Bob Boucher tells me that a new follow-on unit, the Model 112D (digital), will be available in a couple of months.

THE AIRFRAME

The next question was what plane to use for my electric power system. I wanted a light, strong airframe, a big wing for a low wing loading and a plane that would be considered Giant Scale.

I walked into Hobbytown, one of our local hobby shops, and there hung a bare-

bones 1/4-scale Bud Nosen J-3 Cub. Close examination revealed the Cub had all of the attributes I was looking for, and at \$75, the price was as low as I was going to find. A light airframe is one of the most important aspects of a good-flying electric, so my good buddy Ken Rowe went through the entire structure, removing a lot of the excess "beef" needed with a gas engine but which is unnecessary with vibration-free electric power.

I covered the Cub with Carl Goldberg's new transparent Ultracote. I really enjoy this material because it shrinks tight and stays that way. The transparent covering lets me and my flying buddies enjoy the Cub's

framework, too. I didn't want an all-yellow Cub, so I covered the wing with transparent orange and the fuselage with transparent orange and yellow with white trim stripes.

As my Cub had no cowl, I ordered one from Steve Durecki of Fiberglass Specialties. My steady-handed friend Ron McKonly painted the cowl and dummy engine.

The motor/belt drive setup was mounted to a couple of lightweight fiberglass brackets and then the whole assembly was bolted to the firewall so that the prop shaft exited the cowl at the proper place. I made a very simple plywood-and-foamboard duct to direct cooling air over the motor, motor controller and batteries and out an exit point just behind the rear landing gear strut.

The first propeller I tested in my shop was a Zinger 18x6, which only drew 11 amps—nowhere near the motor's optimum power output. I experimented with several other props and decided on an 18x8x14 prop for the initial flights even though it was only drawing about 15 to 17 amps. The last and biggest one I tested was a 22x12 Forte, which raised the motor current draw to about 23 amps. The 2.15:1 reduction ratio is probably a little too high; with a lower ratio (say, 1.75:1) I could probably use a smaller propeller.

THE MOMENT OF TRUTH

The initial flight took place on a nice calm October Sunday

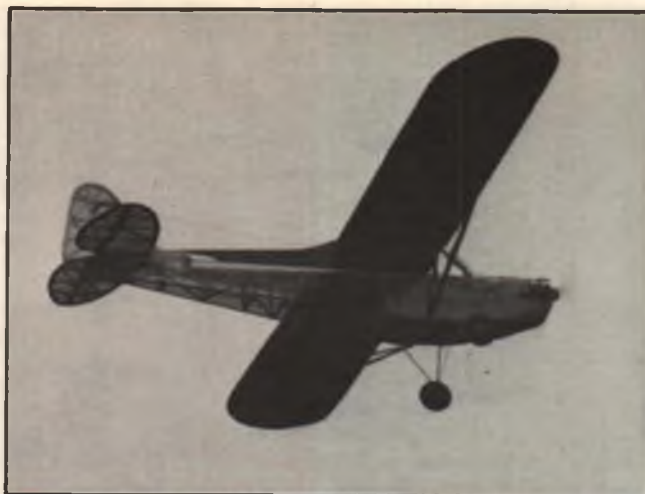


Bruce wanted something other than the standard all-yellow Cub livery, so he used Goldberg's new transparent Ultracote, orange and yellow, with white trim tape separating the colors. Unusual and attractive. Final flying weight is an even 18 pounds.

afternoon. With the prop turning at about 3,600 rpm at full power the acceleration was very realistic—similar to a 65-horsepower Cub. After a run of about 50 feet I pushed in some down elevator to bring the tail up, the 16-pound plane rolled about another 30 feet and rose gently into the air.

The climb was gentle with the 18x8x14 prop, so I just cruised around. At seven minutes into the flight I brought the Cub in for a very scale-like landing and had plenty of power left in the batteries. The other fliers commented on the realistic performance and said it was nice to see a Cub fly like a Cub instead of a Saturn Rocket.

For the second flight I installed the 1200-mAH battery pack and climbed to a higher altitude, doing horizontal figure 8s and just enjoying cruising around at a reduced throttle setting. At



The transparent covering emphasizes the Cub's lightweight built-up framework. Looks real pretty in the air, and its slow, realistic flight characteristics are most impressive.

5-1/2 minutes into the flight I landed with the batteries almost completely exhausted—there wasn't even enough power to taxi the plane off the runway. Several

years on the shelf hadn't done the 1200 packs much good, but with use they are improving. The SR 1500 batteries were new and work very well.

The SR 1500-mAH batteries give me about 65 percent longer motor runs. I'm currently experimenting with propellers to get a 25 to 30 amp current draw, which will mean much livelier performance. The best prop so far has been the Forte 22x12.

CONCLUSION

I won't rush out and sell all my internal combustion engines, but will continue to enjoy the advantages of electric flight on various projects I have in mind. I like the cleanliness of electric flight and the fact that I didn't have to spend time or money fuelproofing everything. I like the turbine-like smoothness of the Astro Flight motor; I had only to balance the propeller to achieve vibration-free flight. And it wasn't necessary to wrap the receiver in an inch of foam rubber to protect it from vibration.

One of the first things I learned about electric is that you can't take it for granted just because there's no liquid fuel used. It is absolutely essential that you use your electric equipment safely. The NiCd battery pack, if shorted or otherwise mishandled, can release a tremendous amount of energy in the form of heat. Use your equipment carefully and with common sense and you'll have an enjoyable experience.

My electric Cub is just starting its flying life, and as I become accustomed to the new equipment and experiment with props and model trim, performance will improve. I'll probably try for a plane with more zip for my second electric plane, but a nice big puddle jumper like the Cub offers some relaxed flying.

Bruce Edwards, 8304 53rd St. Ct. W., Tacoma, WA 98467-1816. MB

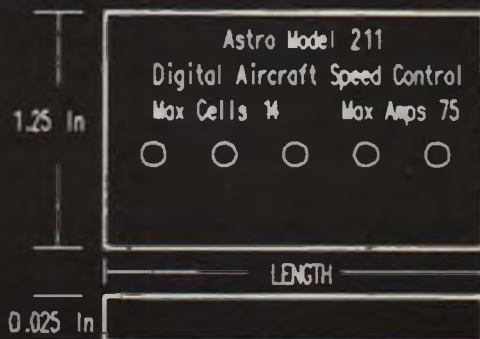


Here the Cub is coiled up and an Astro Flight Model 112 charger is in the process of charging the two series-connected 14-cell NiCd battery packs. Cutout in the cowling just below the prop is for cooling air for the motor and batteries—a necessity for any sport electric model. The Zinger 18x8x14 prop used for the initial flights has since been replaced by a Forte 22x12.

Astro's New Digital Micro Speed Controls for Electric Planes

The smallest, lightest, most efficient and most affordable Digital Electronic Speed Controls ever made.

Model	204	205D	210	211
Max. Cells	36 Cells	36 Cells	16 Cells	14 Cells
Max. Amps	50 Amps	50 Amps	45 Amps	75 Amps
MOSFETS	4-IRFZ48	4-IRFZ48	3-SMP60	4-SMP60
On Resistance	0.005 Ohms	0.005 Ohms	0.003 Ohms	0.002 Ohms
Brakes	No	Yes	No	Yes
Switching Rate	2800 Hz	2800 Hz	2800 Hz	2800 Hz
Heat Sink	Yes	Yes	Yes	Yes
Connectors	Zero-Loss	Zero-Loss	Zero-Loss	Zero-Loss
Length	2.5 Inches	2.5 Inches	1.6 Inches	2.0 Inches
Bare Weight	30 gm	30 gm	20 gm	25 gm
Retail Price	\$129.95	149.95	\$84.95	\$109.95



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GETTING STARTED IN CL COMBAT

Ready to try your hand at combat? Our columnist explains why he feels that the new 80-mph combat event is the best way to get involved, and talks about some of the engines and airplanes that have proven to be good starting points.

On a recent Sunday morning, my local club was having its monthly fun-fly. The event was 80-mph combat. There was the usual brief seminar on what the planes look like and how the event works, then a couple of fliers with some experience in combat began flying matches.

As often happens, other club members held back. They helped out and enjoyed watching, but declined to fly—"too fast," "too hard," "I don't have those kind of reflexes," etc., etc., etc.

But after the "experts" had flown a couple of matches, I used my persuasive powers and a little cajoling to drag one of the spectating club members into the activity. I directed him to the handle of the plane I had been flying, an old Dox Generix Hornet with a detuned Fox Combat Special.

After some standard protestations ("No, I'll just crash it") I persuaded the club member to hang on while we launched the plane for a match with another combat flier who was on hand.

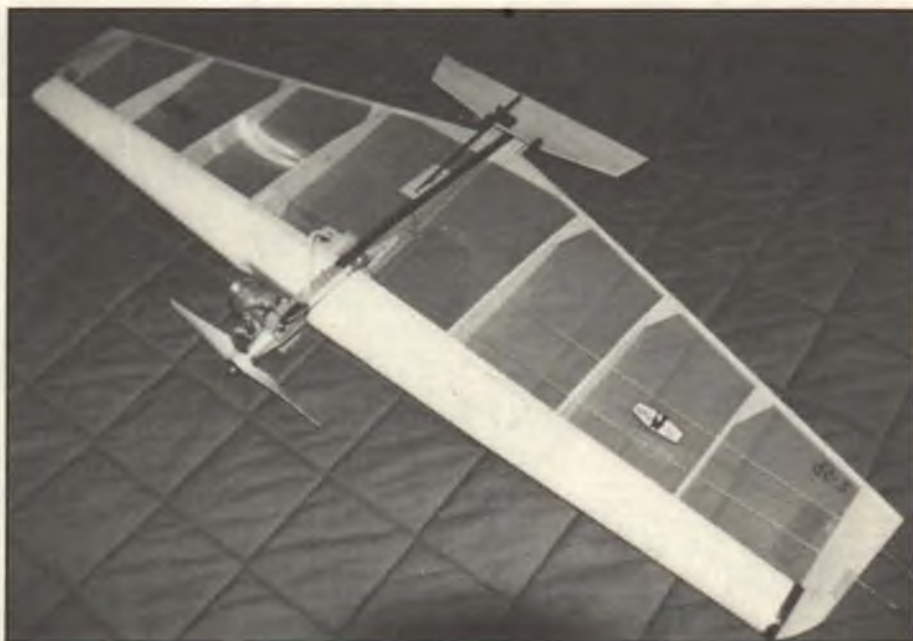
What followed was two excellent—and long—combat matches. The reluctant club member, a reasonably competent sport flier, had no trouble keeping the Hornet aloft, and in fact flew fairly intelligent combat—in his first matches ever!

"I can't remember when I last had my heart pumping like that!" exclaimed the exhilarated—and somewhat winded—new combat pilot when it was all done.

He had not only experienced the fun of combat, but had been able to do it reasonably well because of the type of combat we were flying: the new and rapidly growing 80-mph event.

Combat is an event that offers a thrill unlike any other activity in model aviation . . . and perhaps in all of sport. AMA combat, or "fast combat," offers the ultimate excitement.

But, notwithstanding the rapid learning



Here's the easiest way to get into 80-mph combat. A ready-to-fly Falsov Fast from Meizlik Modelbau, powered by O.S. 36 FP-S, with a Talpan 6x6 prop. It even has a flyaway shutoff!

curve of those incredible teenagers that keep buzz-sawing through the old-timers on pure reflexes, it takes several years for the average CL flier to become competent flying the unlimited combat event.

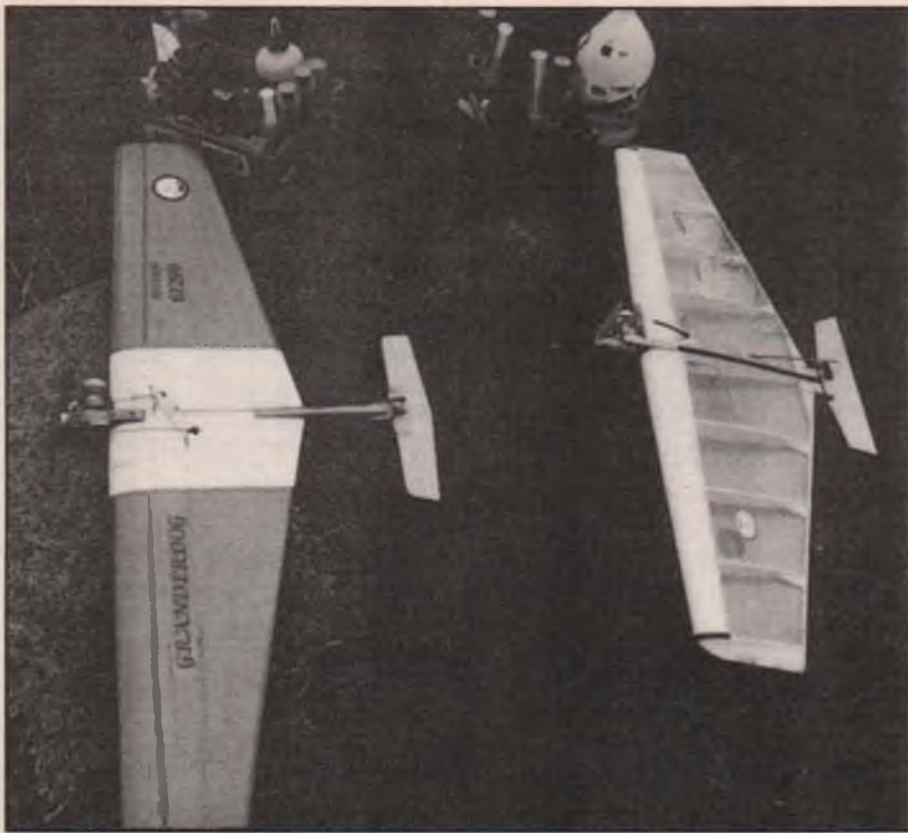
The 80-mph event, on the other hand, makes combat immediately accessible to any reasonably competent CL flier. It also provides an excellent starting place for anyone interested in progressing toward the faster events such as slow combat, 1/2A combat or fast combat.

The 80-mph event has emerged in various forms around the United States over the past couple of years. Though local procedures vary, the one constant is the 80-mph speed limit, which is just about a perfect speed for several reasons. At 80 mph, the planes are going fast enough that they will fly well and maintain good line

tension, but are flying slow enough that any average flier can keep track of the action.

The rules generally place no restrictions on the airplane design or fuel system. This avoids the chief pitfalls of slow combat, which was an early attempt to provide an "easy" combat event. In fact, the requirement that slow combat planes be of certain dimensions made it more difficult to design good-flying planes. The requirement of a suction fuel system made slow combat doubly difficult because combat conditions make suction fuel systems very tricky to operate reliably. Finally, slow combat rules evolved in a way that allowed some very fast engines to be used. The result is an event that is not much slower than fast combat, but which requires large, complex and demanding-to-operate airplanes.

The 80-mph event solves all those prob-



Two approaches to 80-mph combat. The Russian-designed ready-to-fly plane from Mezlik Modellbau (right) powered by O.S. .35 FP-S, and a standard American combat plane, a Grauderdog (built by Gary Harris) with a detuned Fox Combat Special Mark VI.

lems. Since any airplane design is allowed, a standard flying-wing combat plane can be used. This is an easy-to-build, good-flying style of airplane that will keep good line tension under combat conditions even at the slow 80 mph (or less) speed. Removing the restriction on the fuel system allows use of standard combat bladder systems, which are much more reliable than the mysterious suction feed systems required by slow combat.

And there's no need to spend a lot of money. Any engine that will haul your airplane at 70-80 mph can be used. Here in the Northwest, we allow any engine up to .40 displacement, which opens the door to a wide selection. Most common engines seen on the contest field are the O.S. .35, detuned Fox Combat Specials of various marks, Fox .35 stunt, K&B .35, Super Tigre .35, etc.

Though a standard combat plane is the logical choice, a beginner in combat could bring out just about any airplane that might happen to be hanging around the workshop. An old Ringmaster could be as good a starting place as any. In a recent contest I attended, there were all kinds of designs in use—standard new fast combat planes, old slow combat planes, even a Flite Streak.

Another thing that can be used to keep the building time required down—which could be a local option for clubs sponsoring contests—is a limit in the number of airplanes. In the Northwest, our regional rules allow only two airplanes per contest

for the contest. The idea behind that rule is to encourage the type of flying that avoids collisions without the need for special rules and penalties, which create a headache for officials. The airplane maximum can be waived for big contests when the entry is likely to be high, but experience in this region suggests that most fliers bring only a couple of planes even in that case; because the speed is so slow, collisions are much less common than in fast combat, and planes tend to last a lot longer.

The rules for 80-mph combat vary by region. Here in the Northwest, we have kept them exactly the same as for fast combat except for the speed limit and, at most contests, the airplane maximum. We've retained the kill, which can extend the life of airplanes by ending matches cleanly, not extending them with long battles after one or both planes have very little target left.

Spontaneously, many of the Northwest fliers have begun using flyaway shutoffs on their 80-mph planes. Most of the expert fliers already have shutoffs on hand for their fast planes, and have found that they work just as well on the 80 planes.

• • •

With that introduction into the concept behind the 80-mph event, here's a little primer on how to prepare for your first 80-mph combat flying.

In selecting an airplane, remember that the only requirement is that it has to be capable of flying on .018-inch by 60-foot lines

at a speed under 80 mph. Speed enforcement procedures vary, but they involve some sort of timing early in the match. In the Northwest, the planes are timed for two level laps at the beginning of the match. A two-lap time of 6.43 seconds is 80 mph, so any time of 6.43 seconds or more for the two laps is a legal speed.

What kind of airplane/engine combination should you use?

Though you may use anything in your shop for your first attempt at 80-mph combat, you probably will want to eventually build planes just for the event. Here are some suggestions based on observations of what's been successful in the first couple of years of the event.

You want an engine that you can run at a peak setting that will go fast enough (70-79 mph) but not too fast. The engine should be working at its top performance at that speed; just slowing down with a needle valve setting is an unreliable way of staying under the speed limit. You can slow a too-fast engine's peak performance down with mild fuel and some experimentation with propellers.

If you're going to go out and buy an engine for this event, an excellent candidate is the O.S. .35 FP-S, the stunt engine, because it just naturally hauls a combat plane about 70-79 mph. A Fox .35 stunt will be a little slow (in the 70-mph range) but can work. If you can find one, a Series 71 K&B .35 is a good choice. Happily, none of these are expensive engines, and running them at 80 mph should allow them to last quite a while.

For an airplane, you can build any contemporary combat design from plans, or try any of several kits that are available by mail order. The state-of-the-art Allenplane is available by mail from Carter's Custom Cores in California, and the Gotcha is available from the Corehouse in Pennsylvania. Both would work well for 80 and are reasonably priced. Any other standard combat plane used by any of your local fliers probably will work just as well.

(For information on the mail-order kits, write Carter's Custom Coring, 912 E. Sandra St., Arcadia, CA 91006; or The Corehouse, 1249 Jill Dr., Hummelstown, PA 17036.)

Another possible direction for 80-mph could be the ready-to-fly route. Tomás Mejzlik's Modellbau, in the Czech Republic, manufactures Russian-designed combat planes in a variety of styles. These are available by mail order either in kits or in very nearly ready for competition, and the price is reasonable.

My own first efforts at 80-mph combat were with Faisov fast models from Mezlik Modellbau. Equipped with the O.S. .35 and a 9x6 Taipan plastic prop, the Faisov weighs 22 ounces. On its first flight, using 10 percent Sig stunt fuel, the plane went the two laps at 6.8 seconds, or 75.6 mph. It flew pretty well upwind and downwind, turned plenty tight and was stable enough in level flight. A little tinkering with props and fuel

puts the speed right in the correct range.

For information on the Mejzlik products, write for a catalog: Mejzlik Modellbau, Jurkovicova 19, 638 00 Brno, Czech Republic.

After your first contest or two, you'll discover that combat can be flown by average CL fliers without an unreasonable amount of workshop time and without tearing up too many airplanes. You'll get a lot of flying fun for the time spent, and you may find that you want to move on to a faster style of combat.

If you're an old pro at combat, you may find that the 80-mph event allows you to analyze your flying style; you may learn some things about flying that will transfer over to fast combat.

If nothing else, you'll have a lot of fun doing it!

CONTROL LINE NEWS

On the product news front, we recently learned that Golden State Models is back in business under new owners Jim and Karen Rettick. For information about their line of stunt and old-timer kits, send an SASE to Golden State Models, 986 N. River Oaks Ct., St. Marys, GA 31558.

• • •

Fall team trials resulted in the following 1996 U.S. World Championship Teams:

- Aerobatics: Paul Walker, David Fitzgerald, and Bob Hunt. Alternate: Ted Fancher.
- Combat: Mark Rudner, Richard Stubblefield, and Don Cranfill.
- Racing: Lee/McCollum, Ballard/Lambert, and Ascher/Ascher.
- Speed: Will Naemura, Tommy Brown, and Billy Hughes. Alternate: Bobby Fogg Jr. or George Brown.

• • •

A CL racing club has started up in Southern California. The Southern California



The first in a new series of WWII profile 1/2A models from Martinflight Mfg. are an Me-109 and Spitfire, due to be joined by several other WWII types, including some twins. The kits are complete with hand-sawn balsa parts, hardware, decals and instructions, for US\$22.50 plus \$4 S&H (or CAN\$20.95 plus applicable taxes and postage), from Martinflight Mfg., RR #1, S-Y, C-65, Peachland, B.C. Canada V0H 1X0; (604) 767-2761.

Association of Team Racers plans to have a contest on the first weekend of each month of 1996. Class I Mouse Race will be run every month along with three other racing events. FAI Team Race, B Team Race, Foxberg and Clown Race will be held six times. AMA Scale Race, Sport Goodyear, Texas Quickie Rat and Mouse II will be held four times. The site is Whittier Narrows in the Los Angeles area. For information, con-

tact Kenn Smith at Smith's Model Products, 521 Jansen Ave., San Dimas, CA 91773.

• • •

Don't forget to send contest flyers, contest results, club news, photos, questions, technical tips and other items of interest to CL fliers to the *Model Builder* CL column. Write John Thompson, 295 W. 38th Ave., Eugene, OR 97405. E-mail at johnT4051@aol.com. *MB*

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High performance in a small package. Experts only!

For the expert pilot, performance is the key. The Obsession. This sailplane has all the attributes you look for, starting with light wingloading and low sinkrate. Its low drag planform and new Selig S4083 airfoil provide startling improvements in glide ratio, speed range and launch height.

The Obsession is a no-compromise competition handlaunch. A very slim composite pod and boom fuselage has a carbon fiber rod anchored perpendicular to the fuselage. The rod facilitates an unusual two-fingered launch, so you can bring much more force to the launch. Minimal frontal area, along with the superior properties of the S4083 airfoil,



gives you the ability to launch the Obsession very high. At high speeds, the S4083 provides a 15% improvement in L/D over the SD7037. This means greater penetration and the ability to work the broken lift typically found near the ground.

In the hands of an experienced pilot, the Obsession launches higher, ranges farther and thermals better than any other HLG we have seen!

WINGSPAN: 59"
AIRFOIL: S4083

Introductory Price **\$159.⁰⁰**

Avocet

The future of high performance is available now!

Introducing the very competitive Avocet. We took the great flying characteristics of the Sparrow and added new technology and improved turning capabilities for racing—all in a 60" package. With its S7012 airfoil and light airframe, the Avocet is a wonderful light lift performer. With its generous control surfaces it has a very quick roll rate and performs aerobatics with ease. In light lift and on dual rate it is an armchair flyer an intermediate can easily fly.

The Avocet is a no-compromise composite performance sailplane consisting of carbon fiber skinned foam wings and fiberglass skinned Spyder foam tails. The Kevlar/fiberglass fuselage is designed to have the longer



tail moment need to give smooth pitch response and no loss in the turns. The long nose moment requires little or no weight nose weight to balance the plane.

Sody inch slopers don't get any better than this! If you are looking for a fast composite slope ship that's capable of lots of fun, or maybe kicking butt at the next slope race, look no further.

WINGSPAN: 60"
AIRFOIL: S7012 MODIFIED AT TIP

Reg. 300.00
Introductory offer: ARF Kit **\$269.⁰⁰**

Dove II

Sets a new standard in two meter sailplane performance.

It took three years of testing and research to attain the performance we could be achieved in a two meter sailplane.

Its high aspect ratio and very low weight and wingloading, coupled with an extremely low drag planform, result in a sailplane that offers a distinctive, superior glide ratio. The Dove II has over 20% less frontal area (read: drag) than any of its competition.

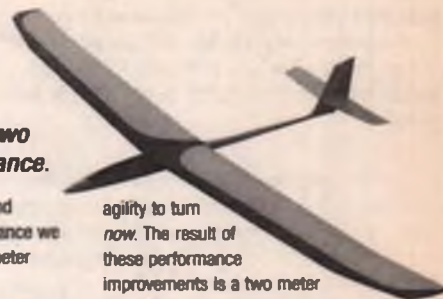
The Dove II has a light wingloading for a very low sinkrate; its high strength airframe will withstand severe winch launches and a sustained 45-degree dive with no damage to the airframe. Maneuverability is one of the Dove II's high points. Ample flaps and ailerons combined with lightweight tips and tails, give it not only control authority, but the

agility to turn now. The result of these performance improvements is a two meter that will out-turn and out-thermal anything in its class.

Landing speeds are brought to a crawl by the light wingloading and generous flaps, making the Dove II unbeatable in the winners circle. The Dove II is without a doubt the highest performance competition sailplane available today. If you need the best, the Dove II is it. Period.

WINGSPAN: 78.75"
AIRFOIL: SD7037 MODIFIED AT TIP

Regular \$239.95
Special while in stock lasts **\$219.⁰⁰**



Victory

...can be yours!

The Victory not only has the looks we all crave, but its sure to be in the winners circle in competition and in the heart of the intermediate sport pilot.

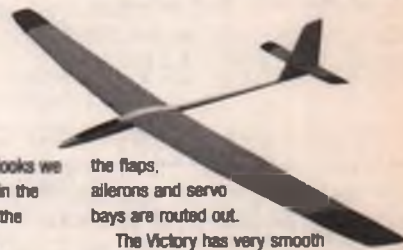
This beautiful open class sailplane has a Kevlar reinforced FG fuse with a long, slender tail boom, and a sleek nose to slice through the air with minimal drag. The wings are triple tapered, with a strong spar. The airfoil is specially designed to maximize L/D, so handling is a dream. Manufactured strong but light to aid in its low wingloading,

the flaps, ailerons and servo bays are routed out.

The Victory has very smooth handling characteristics, good penetration in windy conditions, will float like a butterfly and the price won't sting like a bee.

WINGSPAN: 121"
AIRFOIL: SPECIAL SD7037

Reg. \$350.00
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Sparrow

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AIRFOIL: S7080 OR RG15 OR SD8000

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PLUG SPARKS

BY JOHN POND

•The Beginnings of Modern Old Timer RC

•The 1.38 cu. in. Avion Mercury

•Sidney Struhl's "Chickadee"

There is nothing like a few photos to bring back memories of how Old Timer RC flying started on the West Coast. Many thanks are due to Tony Italiano, former president of the NFFS, who sent in a couple of photos of the first O.T. RC events held in an adjoining field to Glenview NAS, site of the AMA Championships. They were taken by Dick Stouffer, a professional photographer who came to view the new style of flying Old Timer models.

To back up a little, the Old Timer Eagles was a club devoted primarily to promoting RC O.T. flying. At the 1962 Nationals held at Oshkosh, Wisconsin, Woody Woodman and Joe Beshar spearheaded a movement to start Old Timer events at the SAM Champs being held at Bong AFB. Demonstration flights were made to show the practicability of RC-assisted free flight O.T. models. Of course, this met with quite a bit of resistance from the free flight groups. To help things along, it was decided the categories would be flown at separate locations. This way, the "new" events could be introduced at the "unofficial" Old Timer events annually staged with the AMA Nationals by this writer and his ever-faithful partner, Bill Bowen.

Having secured approval of the O.T. events through efforts of Joe Beshar and Woody Woodman, a field was selected near Glenview and information disseminated by Pond in his Plug Sparks column and the newly created SAM publication known as *SAM Speaks*.

Photo No. 1 shows a general view of the activity of Old Timer RC models held the day following O.T. FF events at Glenview. Seen in the photo is John Pond with New Ruler conversing with Art Thoms, who brought a Comet Clipper seen next to Woodman's hot-powered Playboy Senior. Also seen in the background is Joe Beshar's Sailplane (in the weeds) along with Joe himself, starting up his S.T. .60 powered Playboy Senior with son Fred



Photo No. 1. Photo taken by Dick Stouffer shows the action at the first RC O.T. (called "RC Assist" in those days) contest, held at Glenview NAS sometime in the early 1960s. See text for a rundown on who's who.



Photo No. 2. Pond's Merco .80 powered New Ruler being launched at Glenview by his longtime buddy, Bill Bowen. This was long before the 225 sq. in./1 cu. in. displacement loading we have today—that .80 would be way too big!

Beshar (in bib overalls like his dad) ready to hold on the end of his dad's model.

In those days, there were only five to seven radio frequencies available. This meant flying by the rotation system. As a practical joke and to better identify Pond's frequency (blue and white flag for 72.160 MHz), Pond wore a blue and white cap, blue and white shirt with matching jacket, blue pants and white shoes, and flew a white New Ruler trimmed with blue. Believe it or not, this writer was still queried as to what frequency he was using!

Photo No. 2 shows Bill Bowen launching the Merco .60 powered New Ruler on its first Nationals O.T. RC flight, Pond with transmitter and Art Thoms on the watch. Although the model flew well, the performance did not compare with the high-powered Playboys by Beshar and Woodman. This was due to almost a pound weight difference.

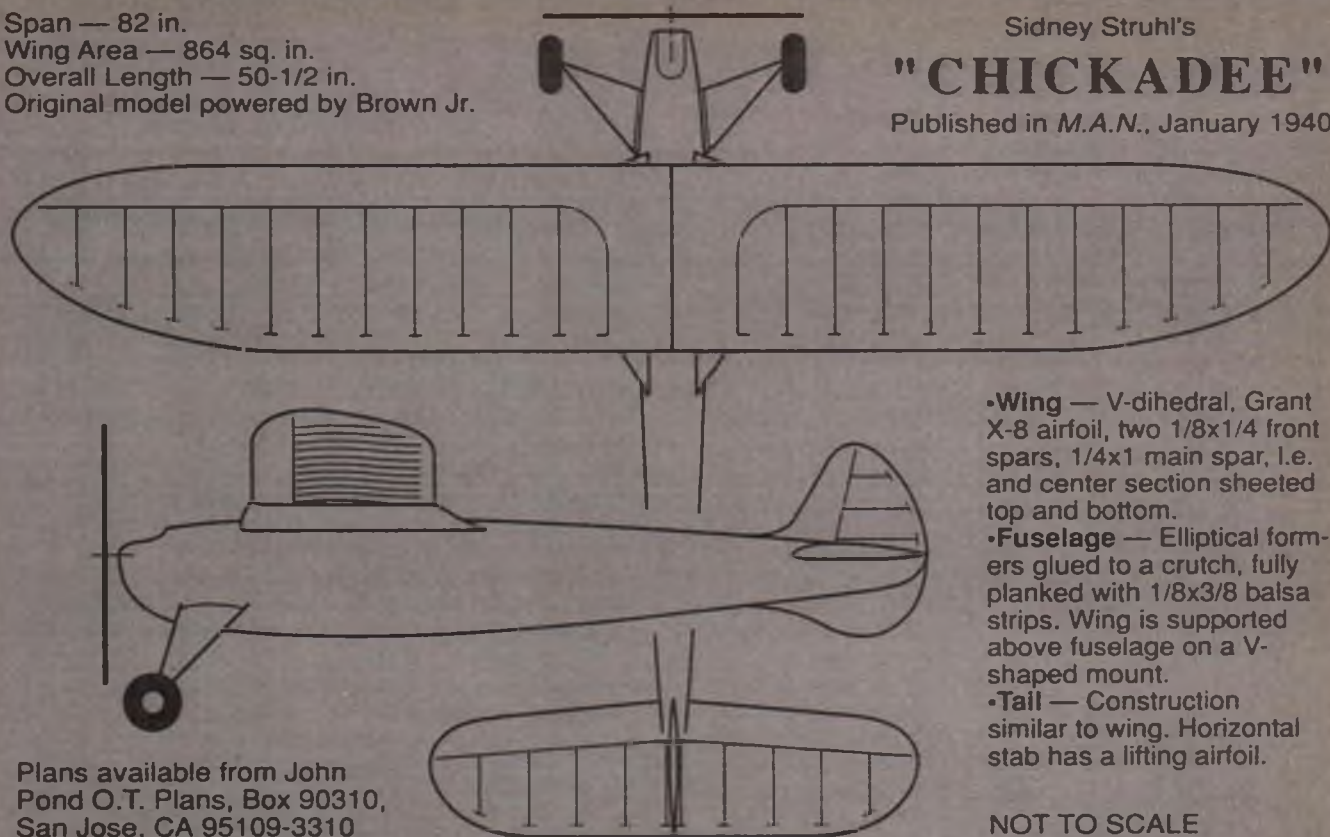
(When Red Barrows and this columnist started building models together, we reckoned that the original structure should be strengthened. Balsa fuselage longerons were changed to basswood and the

Span — 82 in.
 Wing Area — 864 sq. in.
 Overall Length — 50-1/2 in.
 Original model powered by Brown Jr.

Sidney Struhl's

"CHICKADEE"

Published in M.A.N., January 1940



•Wing — V-dihedral, Grant X-8 airfoil, two 1/8x1/4 front spars, 1/4x1 main spar, i.e. and center section sheeted top and bottom.

•Fuselage — Elliptical formers glued to a crutch, fully planked with 1/8x3/8 balsa strips. Wing is supported above fuselage on a V-shaped mount.

•Tail — Construction similar to wing. Horizontal stab has a lifting airfoil.

Plans available from John Pond O.T. Plans, Box 90310, San Jose, CA 95109-3310

NOT TO SCALE

MODEL OF THE MONTH

wing and tail were also strengthened, resulting in a 4-1/2 pound model. Comparison of the eastern models built by Beshar and Woodman certainly changed our ideas about using hardwoods. In its place, balsa of 8+ pound density was employed in future construction with much better results.)

The biggest credit for introducing O.T. RC should be given to Woody Woodman and Joe Beshar. Joe's enthusiasm is

reflected in the number of O.T. SAM chapters on the East Coast that sprang up like weeds.

One must remember that most all of the early models converted to RC used glow engines as no one had solved the problem of ignition interference in the radio receiver. As pointed out, a considerable number of changes occurred at Lakehurst: 1) The establishment of a Texaco event as sponsored by Pond, and 2) A shielded ig-

nitition system as developed by Red Barrows that was employed in Pond's Ohlsson powered Dallaire Sportster. It was still noticeable that the glow powered counterparts were out-climbing their ignition competition but not economy wise!

Once ignition powered O.T. RC models were introduced, the following SAM Champs, the next year at Denver, showed Pond with a Veco .50 glow engine converted to ignition. This proved to be the winner in Texaco as ignition power was much more economical. It was not until the next Eastern SAM Champs that Pond introduced the O.S. .60 four-cycle in his Dallaire. This convincing win started the rage for four-cycle power in the Texaco event. Wasn't long before the only thing that beat an O.S. .60 four-cycle powered Dallaire Sportster was another Dallaire with the same type power! Photo No. 3, taken in Australia in 1985, shows Pond with Tymell's Dallaire. Good flier but got ruined by a switch-off flight.

A READER WRITES

Just received an excellent photo, No. 4, from Fred Emmert, a SAM 32 (AMPS)

member who sends in a shot of the exquisite construction of the Comet Sailplane by Goldberg.

Fred writes to say this model was scratch built from John Pond plans. Of note is the fiberglass cowl made up by Fred that is formed to accept an Anderson Spitfire. Spitfires, of late, are coming out of Marvin Miller's production line slowly but surely. The casting work is excellent, having been formed from the original die casting pressure dies. Miller did an outstanding job of repairing and updating the old Anderson dies. Well worth your money!

ENGINE OF THE MONTH

Many thanks are extended to Doc Richard Nichols for the use of his very rare engine, the Avion Mercury, a little-seen engine nowadays. This engine is truly an old-timer as advertisements for the Mercury appeared in the early 1930 aviation magazines such as *Popular Aviation*, *Aero Digest*, and numerous pulp airplane fiction magazines.

The early ads generally featured the engine being held in the palm of a hand. However, this engine was the largest pro-



Photo No. 3. Columnist Pond photographed in Australia in 1985 with an RC Texaco combination that's as potent today as it was back then: a Dallaire Sportster powered by an O.S. .60 open-rocker four-stroke.

"What makes our spinners so easy to install?"

"First, if you need to enlarge the engine shaft hole from the predrilled 1/4" size, our spinner backplate's stepped guides help you stay perfectly centered.

"Second, our spinner cone locks onto the backplate with screws—a much more secure method than the "snap together" style of other manufacturers.

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Don Anderson
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PLUG SPARKS

duced for model airplanes, hence, the engine was shown considerably smaller to be accommodated on a standard-size hand. Proportionately, you would have had the hand of the Jolly Green Giant!

As the gas powered model airplane craze came on heavily after the introduction of Bill Brown's sensational Brown Jr. and the record flying of Maxwell Bassett, most all of the old engine producers (Wall, Power Boat, Knight, etc.) endeavored to get on the bandwagon of gas model enthusiasm. Avion Mercury, with its somewhat successful engine, introduced a package deal with a giant kit called the "Oriole" (previously featured in this column). This combination for early radio control was an excellent deal at \$21.50 for the prefabricated deluxe kit (complete with dope) and the Mercury motor for \$25. Counting the cost of a \$3.50 laminated propeller, one had an excellent head start for \$50.

However, when competition rules committees got into the act, their first look was at engine sizes and the problems of

engine was probably the most powerful at 3/4 hp at its time but suffered the drawback of 21-3/4 ounces and price of \$25.

In looking back at this large engine, the Avion people were three decades ahead of "Giant Scale" models. The fact of the matter was that the average modeler was not ready for radio control, its complicated wiring and poor radio transmitters and no proportional servos. The modern modeler doesn't know how lucky he is today with all parts that work!

ZAIC REVISITED

The recent articles on Frank Zaic evoked considerably more response than this columnist had expected. The most surprising reaction to the write-up was the number of people who were not aware of all of Frank's accomplishments. In a nutshell, most write-ins expressed gratitude for Zaic's lifetime dedication to reporting and drawing of all important designs indicating the trends of those times.

Such is the case of Sal Fruciano, who

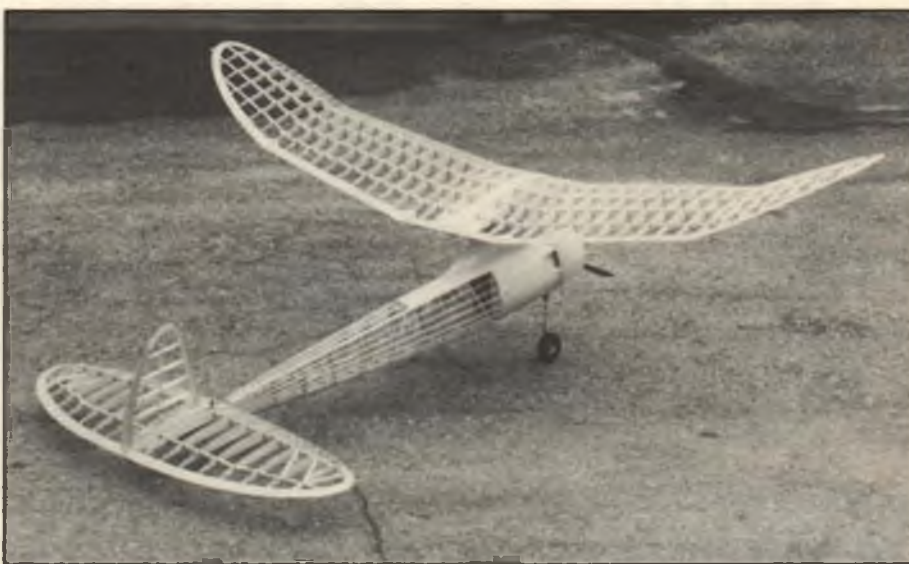


Photo No. 4. An exceptionally nice scratch building job on this free flight Goldberg Sailplane by Fred Emmert. Power is an Anderson Spitfire .65.

harmful large propellers. The committee, in its infinite wisdom, decided the largest engine to be used was the Forster Twin at 1.20 cubic inches. This effectively shut out the Mercury, rated at 1.35 cubic inches and 3/4 horsepower. For this reason, many of the larger RC models in those days were seen with a Forster .99.

In those Depression days after 1929, the biggest problem was wages (1938 established the minimum hourly wage at 25¢ per hour). Not too many modelers were that well heeled. Just another reason for poor sales of the Mercury. As late as the June 1939 issue of *M.A.N.*, the Mercury was produced by Avian Aircraft Manufacturing Co. of Woonsocket, Rhode Island. This large

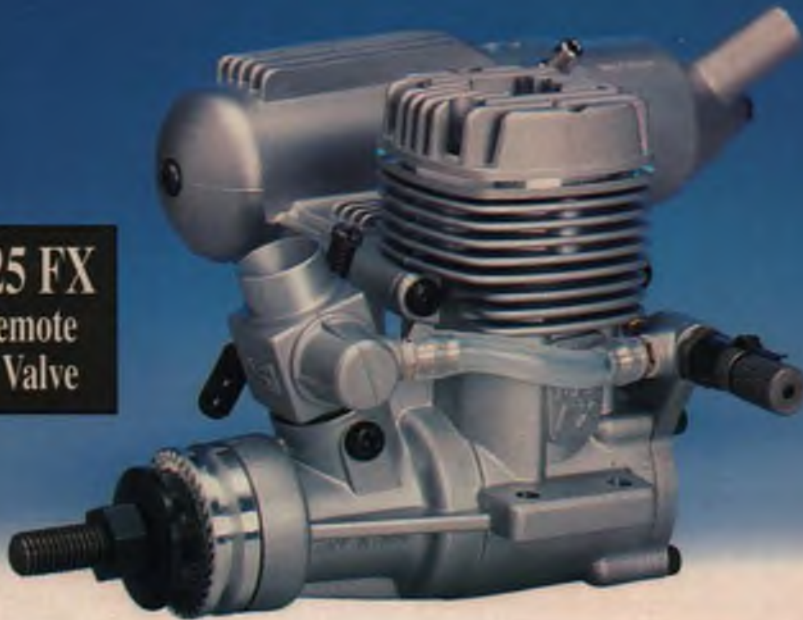
writes to applaud the work Frank Zaic has done on behalf of modelers. In that same line, John Zaic, Frank's younger brother, was rather overshadowed by Frank's activities. What most modelers don't know is that John was very active in competitions and to this day, flies competitively in the indoor events.

Sal sends in Photo No. 5 showing John with an advanced state-of-the-art Wakefield model. Seen is a Wakefield type he flew in the team trials at New Brunswick, New Jersey in 1948. Note that the model is a low-wing, retractable gear streamliner complete with plastic canopy (to add cross-section to meet the rules). A great flying low-wing

continued on page 84

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THE 1995 F5B TEAM TRIALS

A look at some of the extremely high-powered electrics flown for a spot on the U.S. F5B team. This coming August, the top three will be traveling to Eastern Europe to compete in the World Champs.

This past August, the Silent Electric Flyers of San Diego, California hosted the two-day F5B qualification contest at their field in Mission Bay, to select the three pilots who will represent the United States at the 1996 World F5B Championships, to be held during the summer in the Czech Republic. Six outstanding fliers competed for the team honors: Reigning World Champ Jerry Bridgeman, Roger Lackey, George Joy, Steve Neu, Thomas Pils and Bob Sliff.

Unfortunately for George and Bob, if they didn't have any bad luck, they wouldn't have had any at all. George's ship, a French-built all-composite model called a "Clash," crashed midway through the speed portion of his first flight—the wing spar joiner failed and airplane pieces went everywhere. Bob had a mishap during the speed portion of his go-for-broke flight in the seventh and final round—his wing twisted and failed. Fortunately the rules allowed the contestants to drop their lowest score, so Bob's overall score wasn't as bad as it could have been. Bob ended up in 4th place and will probably serve as U.S. Team Manager at the '96 Champs.

The final standings were as follows:

- | | |
|--------------------|-------|
| 1. Steve Neu | 3,674 |
| 2. Thomas Pils | 3,615 |
| 3. Jerry Bridgeman | 3,614 |
| 4. Robert Sliff | 3,535 |
| 5. Roger Lackey | 3,447 |
| 6. George Joy | DNF |

Note that there are only 60 points separating 1st and 3rd places. Out of 3,600 points, this represents about 1-1/2 percent and shows just how closely matched the pilots were.

Steve Neu, Jerry Bridgeman, George Joy and Bob Sliff were the old hands in the contest, as they've been involved in F5B and F3E flying for many years. Although they have tremendous experience with RC gliders, Roger Lackey and Thomas Pils are newcomers to F5B. Roger is a top-rated thermal duration flier (*Editor's note: There's more on Roger in this month's RC Soaring*

column), and Thomas is considered one of the USA's best slope racing pilots. Thomas started flying F5B only eight weeks before this contest and had to come up to speed on electric power very quickly. For him to come in 2nd place on his first F5B outing speaks well of his talent and ability as an RC pilot.

One additional comment I think needs to be made is that although the flying competition was fierce, all of these pilots worked together to make the entire contest a team effort. The contestants helped each other with equipment, charging, timing, calling, launching, etc. None of the bad things that you hear happening at RC contests happened here. We truly are one big happy family!

Steve Neu and Jerry Bridgeman will return to the World Championships next summer accompanied by Thomas. Best of luck to them, and I'll keep you informed as to their progress.

THE COST OF ELECTRIC VS. GAS

People have often commented about the cost difference between gas and electric power. I've always thought that while the investment required to break into electric power is more than the outlay needed for gas, the operating costs are less. The Winter '94-'95 issue of *Electric Flight—UK*, the quarterly magazine of the British Electric Flight Association, published a short article by Ken Nixon, one of its regular contributors, about this very subject, and I thought it would be interesting to do the same sort of analysis (albeit a bit more conservative) for *Model Builder*.



Bob Sliff has been on the U.S. F5B team a number of times in the past; this time around he placed 4th, and will most likely be attending the W/C as U.S. Team Manager.

The accompanying table summarizes the initial outlay and operating costs for one year for a typical .20-size gas powered model and for a similar 15-size electric powered model. You say an electric 15 is not comparable to a typical .20 gas model? Not true! There are a number of kits available for both gas and electric that are of equivalent sizes (notice I didn't say weight) that can be flown with a gas .20 or a cobalt 15 electric motor. Many of the gas kits on the market can be converted to electric with some imagination and attention to weight reduction.

As you can see, the cost difference between electric and gas is substantial—almost \$200. There's no question that the initial investment for electric power is much more than gas. In his *Electric Flight—UK*



Bob Sill's ship gets a hearty heave from eventual meet winner Steve No. 1. These airplanes are incredibly fast, have very light airframes and are sized so that the surface loading comes out right at the FAI maximum of 24.87 ounces per square foot.



The big surprise of the meet was the 2nd place finish by Thomas Pitts, a top-rated slope racer who had only eight weeks of FSB flying time before the team trials.

article, Ken Nixon came to the conclusion that after you factor in the operating costs for gas power over three years, electric power becomes significantly less expen-

sive. But he also assumed that one would realize eight flights per week, 50 weeks per year for three years, which I feel is unrealistic for the vast majority of fliers. I don't know anyone that flies that much—I'm lucky to get out once a month! With my more conservative approach, it's obvious that from a dollar standpoint, electric does cost more than gas.

For a growing number of modelers, however, the advantages of electric outweigh the extra costs involved. There's no question that a plane built for electric power can be structurally simpler and use a wider variety of construction techniques. Obviously, an electric plane is quiet, and personally, that's one of my favorite reasons for

flying electric; gas engine noise quickly gives me a headache—it always has. The lack of noise also opens up many new urban and suburban flying sites that would otherwise be off limits to gas models. And of course, cleanup is a breeze—there is none!

Don't get me wrong—many of the electric fliers I know also fly gas, and I have nothing but respect for these pilots and those who fly gas exclusively. But if you feel as I do that electric power has much to offer about new construction techniques, electrical circuits and wiring and motor operation and theory, the extra \$200 you'll spend can be thought of as just another cost of the hobby. Spread it over a couple of years and it's only a few dollars a month. Most of us spend at least that much each

START-UP AND OPERATING COST COMPARISON— .20 GAS VS. 15 ELECTRIC

GAS

12V starter battery	\$33
12V battery charger	11
Glow plug igniter	18
Electric fuel pump	9
Electric starter	25
OS .20 FP ABC engine	68
Fuel costs (assume 4 ounces per flight, 4 flights per session, 2 sessions per month for one year), at \$15 per gallon	45
Total	\$179

ELECTRIC

Direct drive Astro 15 cobalt motor	\$98
Astro Flight 205 speed control	105
Astro Flight 110D digital peak charger	105
Four six-cell 1400 SCR battery packs (connected in parallel as two 12-cell packs)	80
Total	\$388

Notes:

- 1) Operating costs for the electric model are zero on the assumption that the flier will use his car battery to recharge the motor batteries.
- 2) Prices were obtained from ads for discount mail-order hobby supply houses.



Another view of Pitts' FSB model. He designed his own glass/foam wing and stab around one of the older Bridgeman/Neu/Sill fuselages and used a Plebenberg "Evolution" motor, which many now consider passé in light of the phenomenal performance being realized from the Avax brushless motors. Even so, to our eyes Thomas was climbing as fast as anyone, he flew the course aggressively and consistently (his slope racing experience really helped here), and two of his seven 5-minute thermal flights were made without any extra help from the motor.

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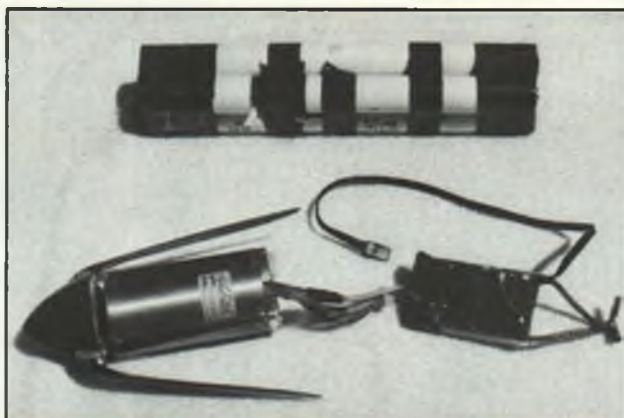
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Avocax brushless motors have taken the F5B world by storm; this direct drive 1817-2Y motor/controller and 27-cell 1000-mAH battery pack are typical of the hot power setup used at the trials. And even this isn't the ultimate; we understand that the Europeans are doing even better with Avocax 1412-2Y motors (nominally designed for 10 cells) fitted with Robbe "Planeta" inline gearboxes, 15-inch props and running on 27 cells! Power output is the same but the whole setup is about 6 ounces lighter than pictured here, which allows a smaller (faster) airframe.

time we go to the hobby store—which for me is a lot more than once a month!

DURATION CONTEST RESULTS

Remember back in the November '95 column where I discussed Jerry Smartt's postal duration contest? Jerry has just returned from a vacation and has sent me the results. First place went to Hardy Benson and Phil Pearce with a phenomenal time of 3 hours, 23 minutes and 19 seconds! You may know these Arizonians: Hardy manufactures a line of electronic speed controls and Phil is a distributor of various model supplies. Hardy and Phil were assisted by George Tallent and Kip Merker, and the flights were held at Tallent's field in Picacho, Arizona. They flew a 1937 Lanzo Bomber with the wing stretched to 82 inches and the landing gear removed.

10 1700-mAH cells. Third place went to Jerry Smartt with a time of 52:18. He flew the same plane that won the KRC's duration contest—sort of a mix-and-match aircraft. The fuselage and tail are from an Explorer ARF sailplane and the 85-inch wing is from a Freedom ARF sailplane. The plane uses a Swiss Maxon motor, a 6:1 gearbox and swings a 16x16 Schöberl prop. The Maxon is a coreless motor and draws only 1.5 amps of current. The motor run for Jerry's flight lasted approximately 50 minutes—no thermal benefits here!

The complete results were as follows:

- | | |
|-------------------------------|---------|
| 1. Hardy Benson & Phil Pearce | 3:23:19 |
| 2. Watts Up Electric Flyers | 1:02:11 |
| 3. Jerry Smartt | 52:18 |
| 4. Karl Benson | 50:58 |
| 5. Wayne Fredette | 37:20 |



One of the drawbacks of F5B, undoubtedly one of the reasons it isn't more popular, is that it requires lots of manpower. Here Thomas Pils is flying the duration part of a flight; with him are his two timers, and the two fellows on the right are the timers/callers at Base A of the distance course. Two more guys are 150 meters away at Base B.

The ready-to-fly weight was 45 ounces, and the power was supplied by a Graupner 7.2V Speed 400, a Graupner 6:1 gearbox and a lightened 13x10 Master Airscrew non-folding electric wood prop. The battery pack was made up of four parallel three-cell packs of 5-AH lithium cells. The motor run time during the flight was 1:44:11.

Coming in 2nd was the team from the Watts Up Electric Flyers in San Bernadino, California with a time of 1:02:11. Bob Boies and company flew an 80-inch wingspan Lanzo Bomber powered by an Astro 15 running on

6. Glen Poole 34:48
7. David Hintze 12:12

Jerry did get a complaint about the contest; one of his friends thought the competition should be limited to NiCd batteries only. Jerry's response was that the contest is to see how long one can get an aircraft to stay in the air, not how long it can stay up "using only NiCds," or "using only certain size batteries." The only restriction on these contests is your imagination—if you implement an innovative idea, you should be able to reap the rewards.

Next year's postal contest will be run over nine days, from June 15 through June 23. Starting with a weekend, running through the week and into the next weekend will allow many more people to compete and will eliminate weather problems. Jerry has asked Dave Dumford, former editor of *Electric Flight*—UK, to publicize this contest in Britain. Dave is a fine choice with his extensive British electric modeling contacts. There will be two perpetual trophies awarded, one for the longest U.S. flight and another for the longest UK flight.



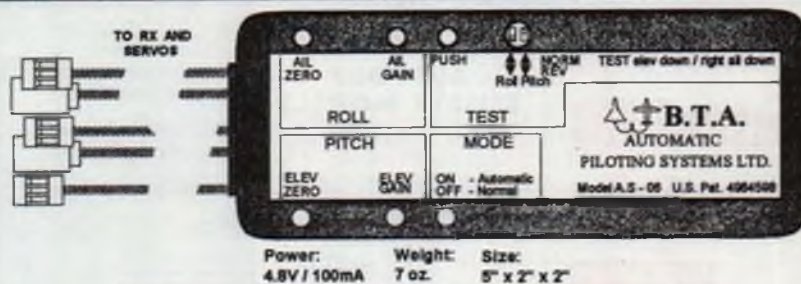
Another newcomer to F5B is Roger Lackey, an extremely talented RC soaring pilot. Roger's thermal flying at the trials was as good as anyone's (in fact, he made three of his seven 5-minute duration tasks without running the motor at all), but a relatively low lap count (24-25 laps) kept him down in 5th place. His model is a Bridgeman/Neu/Silff "hand-me-down" with a Plettenberg motor.

If you're looking for a modeling challenge, this could be a magnificent opportunity to try something new. Jerry reports that German modelers are averaging duration flights of over 3 hours and they believe that motor run times should be 98 percent of the flight time. It can be done, so if you try, you know that you're not just spinning your wheels experimenting with an idea that won't work.

Roger Jaffe, 6462 Sunny Brae Dr., San Diego, CA 92119; (619) 463-4453 (between 8 and 5 Pacific time, Monday-Friday), or by e-mail to 74164.3237@compuserve.com. **MB**

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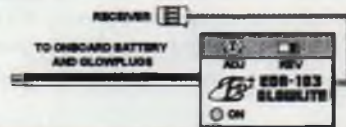


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BY BILL HANNAN

“Electrons control RC models; wires control CL models; but FF models fly by divine guidance!”

Our lead quotation is from the pen of by Dr. Phillip Dzus. Wonder what he builds?

SUPPORT SIMPLE MODELS

In this sophisticated “high-tech” world, it is reassuring to see so much reader interest in elementary model airplanes. Even dedicated scale modelers seem to appreciate a change of pace now and then from their complicated, work-intensive projects.

Jack Larson, of Florida, builds many types of models, but remains enthusiastic about novelty gliders. Some of his creations are inspired by fictional spaceships with strange configurations and bizarre markings. Yet they perform well enough to impress jaded young videogame operators.

Even aerospace engineers from such companies as McDonnell Douglas, Northrop Grumman, Boeing, and Lockheed Martin continue to be fascinated by small gliders, and have been taking part in Long Beach, California contests for about 18 years. Entries are made from a single sheet of 8-1/2x11 bond paper, glue and ballast. Jerry Peck, brother of the late Bob Peck, of Peck-Polymers, has been a frequent

winner in past events, and he still competes with a glider almost as old as the contest!

Meanwhile, in Texas, John McElroy arranged an informal folded paper glider contest for his grandchildren, Lizzy, age 5, and James, age 3. The straight-line speed event was conducted in a 36-foot long screened-in porch. Frustrated by his sister's superior launching technique, little James finally won, after wadding his glider into a ballistic ball and throwing it with all his might!

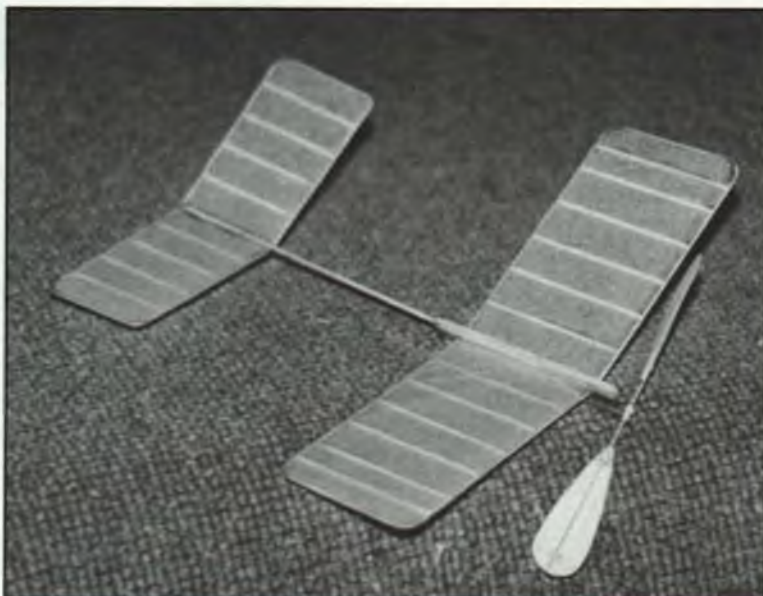
Thomas Ogden, of Norwich, New York, enjoys flying midget gliders, and has been building them since his school days. (He was once sent to the principal's office for tossing balsa gliders in class, while the unsuspecting teacher's back was turned.) Now a grandfather, he shares his building skills with youngsters, and offers some guidelines for designers. He feels that shapes are not too critical, and

prefers to let his imagination, rather than formulas, determine appearance: “Just pick a design that appeals to you and build it.” The result? Maximum fun with minimum effort.

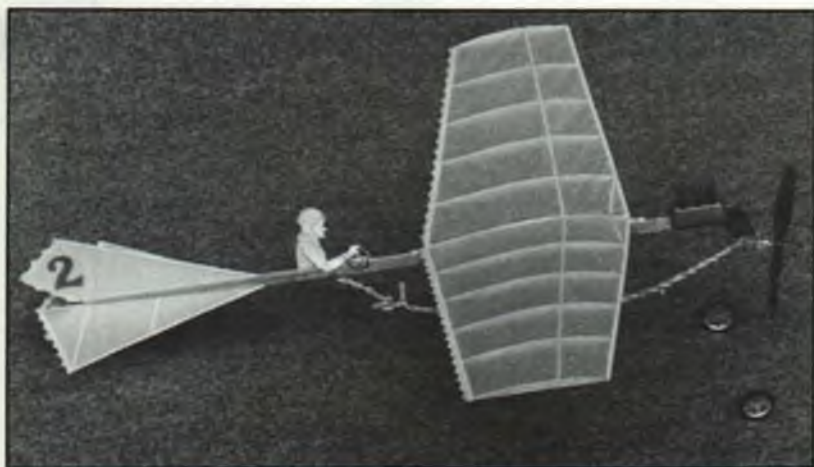
Bob Wright, of San Diego, California, sent us an article from *Good Old Days* magazine entitled “The Penny Glider.” Written by John Larson, it gave a nostalgic look back at the 1930s when he flew toy gliders. (Yes, they cost only one cent then!). The 6-inch span pine and balsa fliers featured a sliding wing to permit easy flight adjustment, and John became quite adept at it. When he attended a neighbor kid's birthday party where a penny glider contest was held, he won so easily that he was accused of cheating and was disqualified! He didn't really care though, as the prizes were only cake slices, and he was already full. More importantly, he was able to keep his new glider, as his previous one was stuck on his roof at home.

SMALL IS SCINTILLATING

There is something inherently enticing about small models. Herb Weiss recalls a colleague at NACA during the 1930s who carved miniature



How's this for simple? Don Munn's 1911 “Jersey Skender” mail-order model reproduction is currently displayed in the San Diego History of Model Aviation Museum. Photo by Jim Alaback.



George Benson's modified AM/FM (Antique Model Flying Machine) spans 20 inches and has a flight duration of 50 seconds. Note the profile pilot, dummy engine and spoked wheels.

tables and chairs from wooden matchsticks, which were small enough to fit atop the head of a pin. Although intriguing to examine, the furniture did nothing but just sit there.

Then there were the old-time flea circuses, with actual live fleas dressed in costumes, pulling flea-sized wagons. However, as Herb put it: "Building tiny flying models seems much more civilized than fitting jumpsuits to fleas." He suggests that interest in sub-miniature models might be increased by prescribing simple rules. For example, the finished aircraft might be required to fit within a commonly available package, such as a matchbox or Sucrets container. Events for minuscule models were conducted years ago. Perhaps this is the time to revive the idea?

THE CAT'S MEOW

Dick Baxter, who designed the "Pussycat" featured in one of our photos, has since evolved an even simpler version with a motor stick rather than a built-up fuselage, which he calls the "Starved Pussycat." This development is the result of Baxter's extensive experience in teaching model-building classes. He estimates more than 500 kids have built these Cats, which are now being kitted by Peck-Polymers.

Dick laments that when kids

successfully complete one of his classes, they are eager to advance, but face difficult logistics problems. They are short of money and too young to drive. Thus they cannot afford engines or RC stuff, and often can't find low-cost model supplies within walking or bicycling range of their homes. Also, they generally don't have a place to fly even small free flight airplanes, nor do they have easy access to anyone knowledgeable about models for advice.

Dick suspects that few of them surmount these problems, and simply give up trying. Only a few may have parents willing to chauffeur them to distant hobby shops or flying fields; and even fewer actually send off to mail-order suppliers. He includes himself when he says that most kids are too impatient to order their supplies through the mail.

If they cannot obtain materials, how long can kids be expected to stay interested? How much of this could you put up with?

Dick continues: "It seems to me that all of the youth activists are missing the follow-up problem. I suggest that some-



This fine flying copy of Dick Baxter's "Pussycat" was built by Steve Wilke from the full-size plans in the July 1989 Model Builder. Photographer George Benson has an 8-inch span version he calls a "Pussy Kitten."

body ought to be thinking about delivering affordable supplies and accessible flying areas to kids. When I grew up in Detroit, Michigan, the Department of Recreation ran a program where they opened local gymnasiums to indoor fliers for two hours one night each week. They also sold balsa, tissue and plans (probably at cost) to people attending these flying sessions. This made it easy for me to build and fly models at age 11. Nobody has anything similar going now, to my knowledge.

"People now who run big Delta Dart programs usually get lots of takers, but never seem to have a follow-up. Somebody should be compiling a list of people and places with flying sites and a desire to encourage recruits (insiders) and a matching list of modelers (outsiders) willing to staff such activities. If these "speaker bureau" type lists existed, then the insiders and outsiders could be paired up easily.

"P.S.: I have about 20 to 30 percent girls in my classes and they win 50 percent of the prizes even though outnumbered 2:1."

SPEAKING OF DETROIT

The Cloudbusters model airplane club, with the aid of "auxiliary members" from as far away as Canada, Louisiana and Florida, recently completed 23 World War II identification models for the National Museum of Naval Aviation. The aircraft, skillfully crafted from

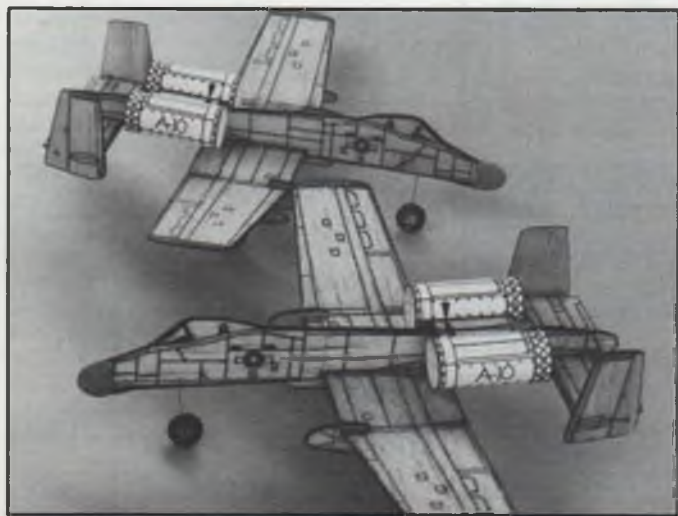
white pine, bass and mahogany, conformed to the same plans used by thousands of teenagers who built I.D. models for the armed forces some 50 years ago.

A special presentation was conducted by the Cloudbusters to display their models before sending them to the museum. Project leader Don Campbell reported that he couldn't detect a single gray hair, pot-belly or wrinkled face in the room. "Everyone had miraculously turned into 14-year-old kids again. Well, at least for a little while."

PLAY BALL!

Norm Rosenstock, of Florida, shared a story with us. While manning a county-fair model airplane display booth, he had noticed that some visitors regarded the models as pleasant reminders of their youth; others showed enough interest to be considered possible converts; while a few took a depreciating attitude about the hobby: "For years I have heard and tolerated comments by sports jocks that modeling is a 'kid's pastime,' implying that anyone who 'plays' with model airplanes is childlike, immature, in their second childhood, etc.

"The basis (and logic) for this response is: 'I built models as a child, and now that I am grown up, I no longer do that!'" Norm encountered one of these people some years ago, a mature gentleman wearing a T-shirt emblazoned with a ball-team logo. He explained that



These profile A-10 Warthogs are from a series of Ray "Frontroom Flyers" glider kits produced in Canada—see text for more info.

HANNAN'S HANGAR

he had built models a long time ago when he was a kid, and enjoyed it then, but that he had gotten married, raised a family and "grew up."

Trying to remain calm, Norm asked the fellow: "What holds your interest today?" "Well, I'm into sports, especially baseball," he replied, pointing to the team logo on his shirt. Norm asked: "Do you play?" "Well, not really," he said, "But I'm a great fan of this club."

Norm thought about this for a moment and responded: "When I was a kid I was into sports, especially baseball." "Yeah, do you still follow it?" inquired the man. Norm's reply: "No, not since I grew up!" Then he walked away, leaving the fellow scratching his head and trying to sort it all out.

ATTENTION STAMP COLLECTORS

Aviation-oriented philatelists have a treat this month, with the U.S. Post Office release of a 60¢ stamp paying tribute to Eddie Rickenbacker and his famous Spad. Printed in full color, it offers a refreshing change from the usual mundane political

productions.

NEW PRODUCTS

Herr Engineering has announced two new rubber-powered model kits. One is a 28-inch span P-51D Mustang, designed by well-known Flying Aces Club member Tom Nallen, while the second is a 24-inch span Gee Bee R-2. Both kits contain laser-cut balsa parts, computer-drawn plans, colored tissue, markings decals, molded canopies, rubber, hardware and complete instructions. If not available at your local hobby dealer, see the Herr ad in this magazine.

Steve Ginter has published his 29th naval aircraft book, this one documenting the giant Martin Mars flying boats. Originally conceived in 1935, the 200-foot span aircraft first flew in 1942. Each required 60,000 pounds of aluminum, 25,000 pounds of steel, 3 million rivets, 7-1/2 miles of wiring, and 300 gallons of paint! Amazingly, two of these huge machines still serve



Don Campbell's solid wood Boeing B-17 is part of a fleet of 23 WWII I.D. models recently produced by the Detroit, Michigan Cloudhoppers club for the National Museum of Naval Aviation. Photo by Stephen Kanyusk.

today in Canada, as fire fighters. The book includes well over 100 photos, three-views, detail drawings, specifications and descriptive text. Priced at \$13.95 plus \$2.50 postage, the volume may be ordered directly from Steve Ginter, 1754 Warfield Circle, Simi Valley, CA 93063; (805) 584-9732.

At the opposite end of the size spectrum are a series of 6-1/2 inch span profile gliders called "Frontroom Flyables" designed by Karl Brown, who quite literally got into the model manufacturing business by accident. During the recovery period following a car crash, he began designing small gliders, more or less as therapy. They were quickly recognized as great fun to fly by his children, and soon a hobby shop owner decided to try marketing them. By now the line includes, in addition to the "Warhogs" shown in our photo, a Spitfire, Mustang and an F-14 Tomcat, which features functional swing-wings. More kits are planned, however Karl points out that even with seemingly simple gliders, considerable research and development time is involved, especially since each new type must satisfy his young sons and neighbor's children, who are a very fussy bunch! The Spitfire, Mustang and Warhogs sell for \$4 each while the more complicated Tomcat is \$5. Shipping is \$3 for any quantity, from Frontroom Flyables, 861 E. 20 Ave., Vancouver, B.C. V5V 1NR Canada; (604) 872-8640.

WHY DO WE DO IT?

Vic Nipper, editor of the *Wing Tips* newsletter, was asked "What's the point in building models?" and arrived at the following: By dictionary definition a hobby is "a subject or pursuit of absorbing interest, undertaken primarily for pleasure during one's leisure time; an avocation." Adds Vic: "So why do we do this pastime in the first place? Easy. We get pleasure out of it."

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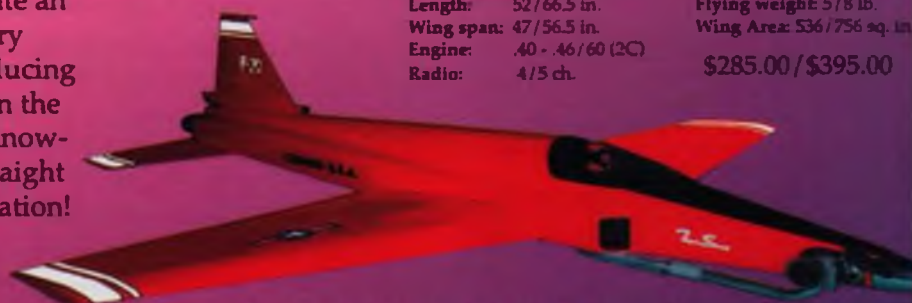


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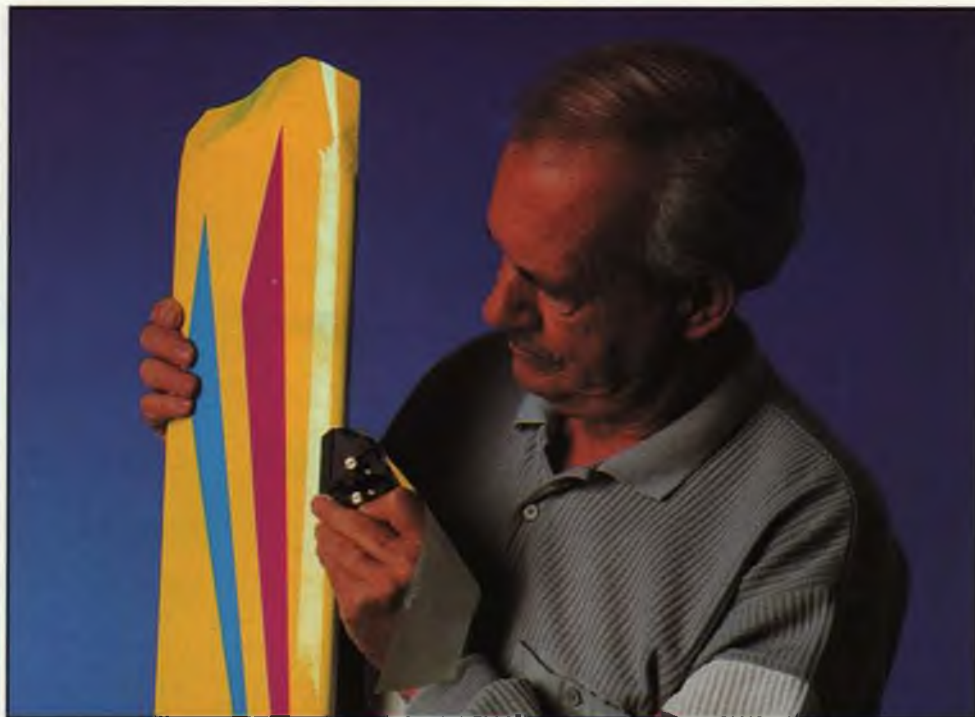
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Patent pending

A RUBBER-POWERED

F-100!

Getting involved with rubber-powered jet models couldn't be easier than with this "imagination scale," Peanut-size copy North American's famous supersonic fighter.

Jets make difficult free flight flying scale models, but this semi-scale fighter is easy to build and fun to fly. Most people recognize it as a caricature of an F-100. If you like the semi-scale concept you can take lots of liberties with details and have a lot of fun without too much effort.

Building this F-100 is about like building a Bostonian. Being intended to fly well, you can leave off a lot of stuff to keep the weight down and increase performance and simplify construction. The model uses a trapezoidal fuselage cross-section and single-surface wing and tail covering. The trapezoid gives the fuselage a lot of shape without using formers or lots of stringers. The single-surface covering saves weight. The prop shouldn't be there, of course, but

is sort of hidden by using transparent plastic blades which are hard to see when the plane is 50 feet up.

There are only a few things to look out for in the construction.

The fuselage width is specified at four stations: the nose, tail, and leading and trailing edges of the wing. Make the cross-braces for these four stations 1/8-inch shorter than the dimensions shown on the plan, then cut the rest of the cross-members to fit.

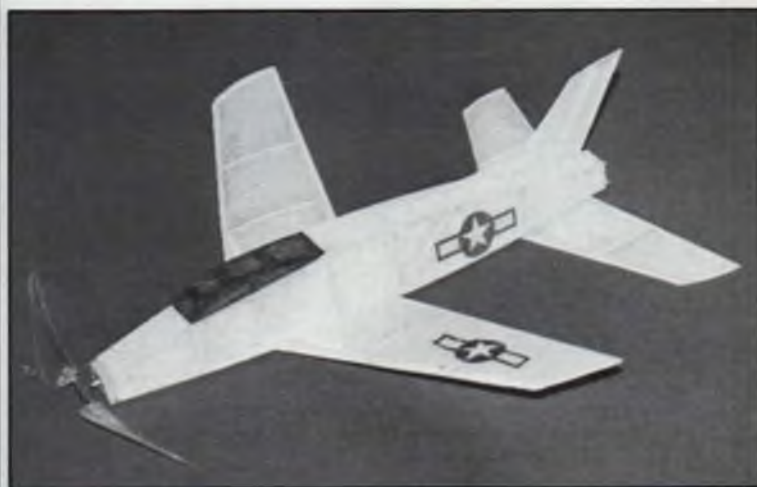
Make the prop from a transparent plastic drinking cup. Take care to keep it clean during gluing to keep from spoiling the appearance. Don't choose one of the acrylic plastic cups; although they are wonderfully clear, they're too brittle for this application.

I used a plastic cup that came from the grocery

store, where it was intended for packaging salad. Don't use a commercial plastic prop—the airplane will be nose heavy.

If you use a thin plastic (.015-inch or so) for the blades, you will probably need to add a doubler starting at the blade root and extending out about 3/4 of an inch to avoid blade cracking. I used CA to attach the prop blades to the hub. I had some trouble with the prop blades getting knocked off the hub using the CA, so be sure to abrade the mating surfaces where the plastic contacts the hub.

The prop hub is 3/32- or 1/8-inch hardwood dowel or bamboo. The prop pitch is set by making the blade angle about 30 degrees about 1/2-inch in from the tip. A prop jig is very helpful in matching the blade angles, which is really necessary for good performance. Make the nose block



Yes, if you look long and hard enough, the resemblance to the real F-100 does begin to come through. The trapezoidal fuselage cross-section adds some interest to the model and also makes the construction a bit more challenging. Note the clear plastic "stealth" propeller—virtually unnoticeable in the air. Dick says his model will do close to a minute indoors in a 30-foot gym on a loop of 1/16 rubber; outdoors, using a loop of 1/8, the F-100 goes up like a banshee, but the non-free-wheeling prop keeps it from going O.D.S. In all but the strongest thermals.

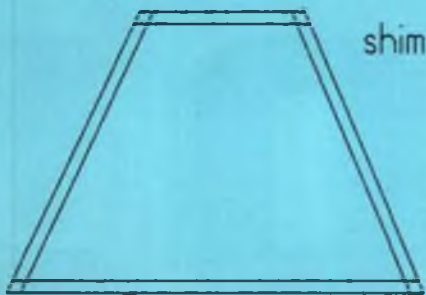
semi scale
P nut size

F 100

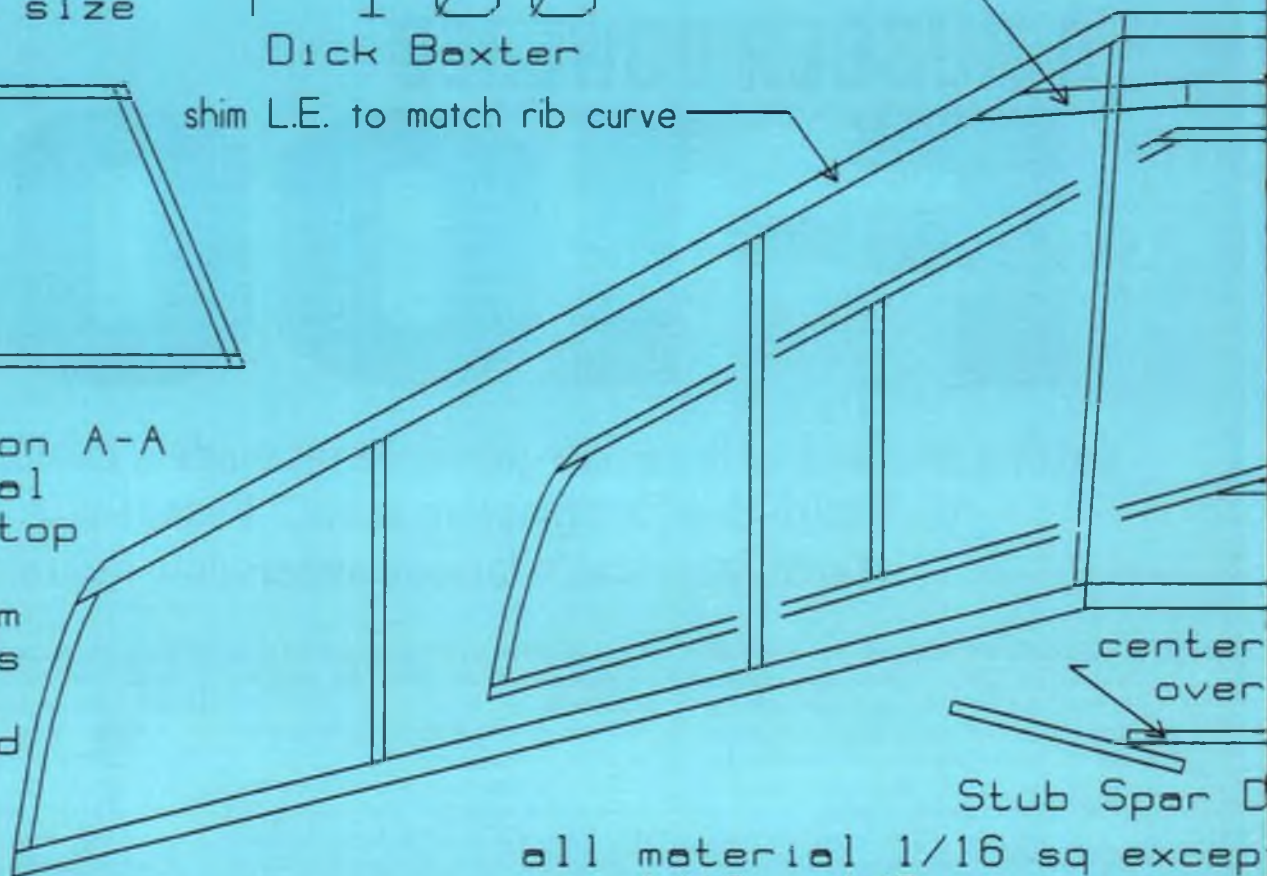
Dick Baxter

shim L.E. to match rib curve

stub spar...ins



section A-A
typical
make top
and
bottom
widths
as
marked



center
over

Stub Spar D

all material 1/16 sq except
are 1/16 x 1/8

prop is transparent plastic
cover wing on top, stab on

1 3/8 dihedral

30 deg blade angle

canopy cross braces 3 places

9/16" wide

11/16" wide

1/16 sheet

1" wide

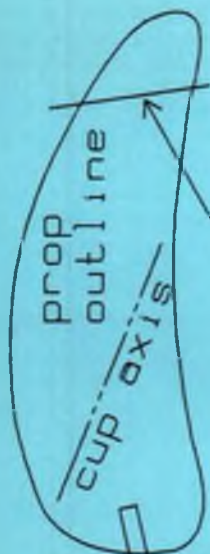
1/16 al tube

1 11/16" wide

notch for trailing edge

notch for spar

notch for leading edge



tall after wing is assembled
see stub spar detail

trim from rear

sliced rib
1/16 sheet
16 needed for tips
canopy and wing and
stab ribs

piece
laps stubs

detail rear view
wing L.E and T.E which

from cup
bottom rudder on left side

7/8" wide

9/16" wide

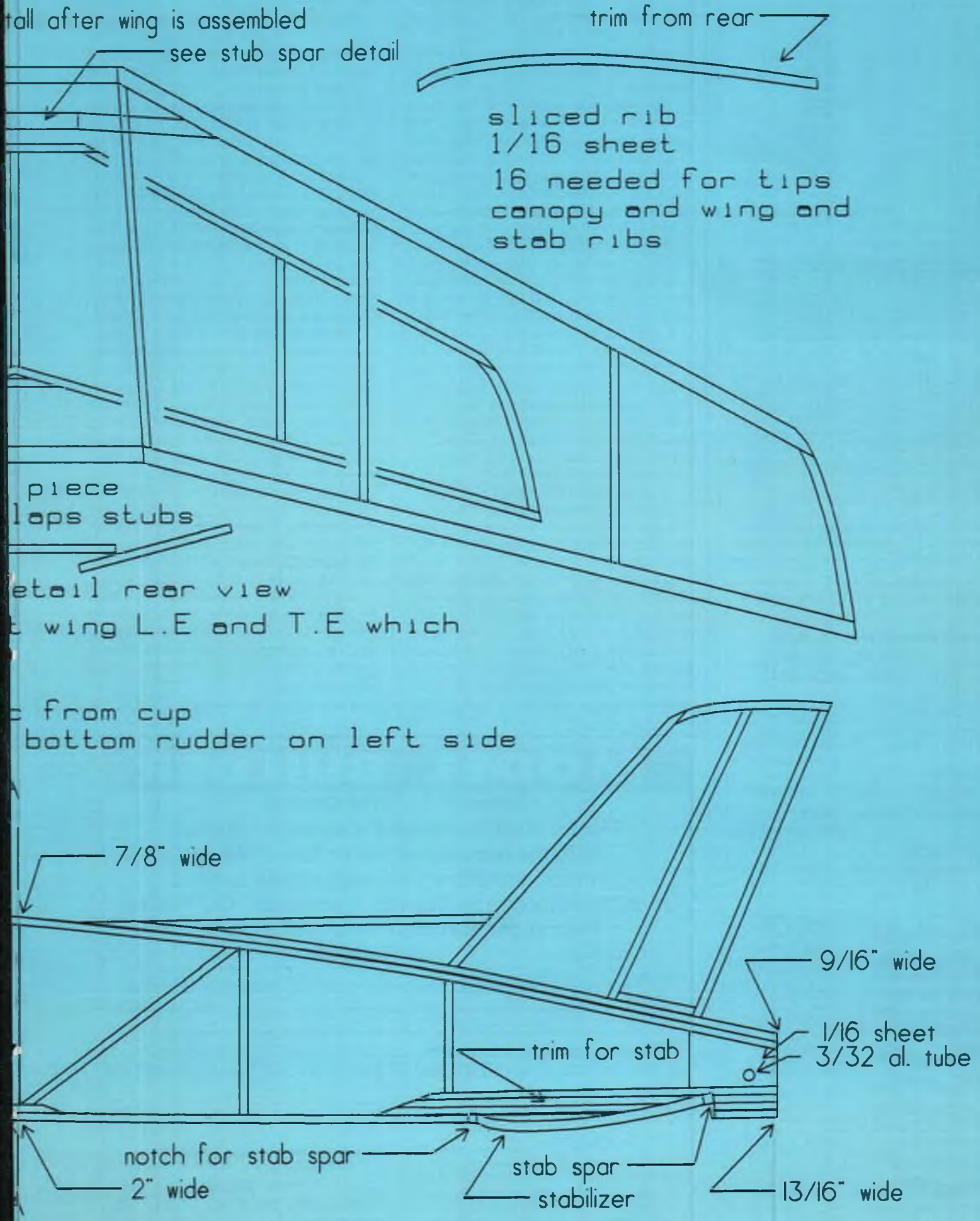
1/16 sheet
3/32 al. tube

trim for stab

notch for stab spar
2" wide

stab spar
stabilizer

13/16" wide



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out of 3/32 sheet glued to a cross-grained 3/32 plug that fits snugly inside the nose. Keep the front end light. Use .025 wire for the prop shaft and don't bother with a freewheeler. This is a sport airplane and the locked prop helps bring it down out of thermals.

The stub spar in the wing is in three pieces: one on each wing and a third that bridges the gap between the wing stubs inside the fuselage. See the stub spar detail on the drawing. Finish the wing structure complete with dihedral but without the stub spar, then cut the notches in the fuselage lower longeron doublers to fit the wing leading and trailing edges. Glue the wing in place, then add the spar stubs to each wing half. Last of all, install the center cross-piece. Do *not* omit this spar, as it adds a great deal to the ruggedness of the model.

Cover the wing on the top and the tail on the bottom. The tail is covered on the convex side of the airfoil, just as you would expect, but is flipped over for installation. Don't dope or water-shrink the tissue—this will avoid warps and save a little weight. I use intentionally wrinkled paper myself, but a lot of people can't stand the thought of doing this. The wrinkles do really cut down on warping problems, though.

Cover the fuselage top and sides before you glue the covered wing in place. Cover the bottom of the fuselage last, after the stub spar is in place.

Check for warps as you install the wing. Wash out the left wingtip about 3/16 inch and the right tip about 1/8 inch. The wash-out provides a combination of roll trim, up elevator effect and wing twist to discourage tip stalls. The up elevator effect is caused by the wing's sweepback. (This assumes the airplane will fly right/right—

more on that later.) The washout is really necessary—don't omit it!

Notch the fuselage for the stabilizer spars and tack-glue the horizontal tail in place for test flights to verify that the incidence is correct. Offset the rudder about 1/32 inch for right turn and tack-glue it also. Glue these permanently after you get the model trimmed to your liking. Don't be surprised if you have to add a little up elevator or tail weight to get good pitch trim.

Most of my conventionally configured Peanut Scale models like to fly left/left, but the swept-wing jets are different and want to power stall unless flown right/right. They also tend to be nose heavy, not tail heavy like most Peanuts. The F-100 should balance at about 3/4 inch forward of the wing trailing edge where it enters the fuselage. Use ballast to control this if needed.

Test-fly the model with a loop of 3/32-inch rubber and try for a right/right pattern. If the airplane stalls or dives on low power, adjust the stabilizer incidence, or, as a last resort, add ballast to fix things. If there is a spiral dive problem, increase the left wing washout. Don't use washin in either tip or the stall will get really nasty. After low-power trim and circle size are adjusted, increase power and do all high-power trim with thrust adjustments. You may need downthrust and possibly some left thrust if the power circle is too small. Go easy on the thrust adjustments, a 1/32-inch shim is probably too much when you get close.

My F-100 flies well outdoors on a loop of 3/32 rubber and climbs spectacularly on a loop of 1/8. I can fly it indoors on a loop of 1/16 and scrape the rafters in a 30-foot gym for close to a minute. Flying weight is about 1/4 ounce.

Have a great time with your F-100! **MB**

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THE ELECTRIC SCOUT

Noted electric designer Scott Hartman is back with yet another good-flying model, this time a simple rudder/elevator sport trainer for six- or seven-cell power systems.



From any angle, the Electric Scout is a fine looking model. Author's prototype is covered with a combination of MonoKote and Ultracote. Keep it as light as you can for best performance.

Imagine being able to fly a sporty high-wing electric model at the local schoolyard or vacant lot. I've been doing this for the past several years with good results.

Many times during my flying, fellow gas modelers have shown an interest in electric but didn't want to have to invest in the kind of small, lightweight radio system best suited to electric models. The Electric Scout is designed to bridge that gap. The ideal weight appears to be around 44 ounces, however it flies fine with standard-size radios at an all-up weight of 48 ounces. A flying weight of 44 ounces or even less is easy to achieve when using micro servos and a small receiver battery or BEC-type speed controller. The main difference is that the heavier model climbs slower and glides a little faster.

If you look closely you can see the influence of several other electric designs. I recently built a Bob Kopski "Revolt," which I used to carry a small camera for aerial photos. I was impressed with its ability to carry a fairly big payload, so I used the wing and tail incidence based upon his design. The Scout's airfoil is a relatively thick flat-

bottom section based on Mitch Poling's "Seagull" design. This airfoil is one of the best I've used for general slow-and-easy flying.

The Electric Scout is nominally a seven-cell design intended to fly on inexpensive ferrite magnet motors such as Great Planes' "Gold-Fire" motor with an 8x4 APC or Tor-nado propeller. It has been flown with

Sanyo SCR packs from 900 to 1400 mA capacity. I personally prefer the 1400 cells as they provide a longer motor run. The smaller cells should be used if your model is on the heavy side, or if you want to try catching a thermal or two.

The first few flights were over 6 minutes with a seven-cell battery, a full-size receiver, two standard servos, a speed con-

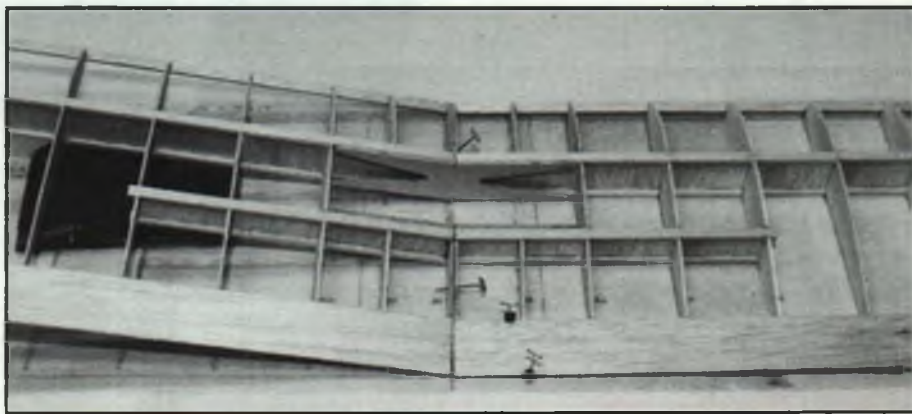


Photo of the framed-up wing before the center section is sheathed shows the plywood dihedral doublers in place and the short center rear spar. Spars are 1/2x1/4 spruce with 1/16 balsa shear webs.



troller, and a receiver pack aboard. The model took off from a dirt road in about 20 to 30 feet. I reduced the power after it reached about 200 feet of altitude. Some power was added when doing loops and rudder rolls. The motor ran about 5 minutes by reducing power when not needed. It glided surprising well in spite of the extra radio weight. The glide can add more than a minute to the length of the flight. The model flared nicely and touched down lightly on landing.

We later tried flying this same model on six cells, but found the climb rate to be too slow for comfortable flying. This same model was later flown with a lighter airborne system and six cells with good



The Scout's fuselage is a simple box structure built mostly of 1/16 sheet balsa, with doublers in the wing saddle and nose areas only. An intermediate sheet balsa floor separates the cabin area into upper and lower compartments—the servos, receiver and speed control go on top, the motor batteries below.

performance, although there appears to be no advantage over seven cells. The flying weight should be less than 42 ounces when flying on six cells.

So, if you've ever thought of building an electric model but don't have a small radio, consider trying the Electric Scout. Its high-lift wing flies well even when flying at around 48 ounces with a full-size radio; if you have a small, light radio the model flies even better. Try the Electric Scout and enjoy some easy, relaxed flying!

CONSTRUCTION

Begin by cutting out all wood parts to make a kit. I used medium to hard balsa for most sheet pieces and hard balsa sticks. The prototypes used CA glues for all wood joints.

Tail

Pin down the plans on the working surface and cover them with waxed paper. Pin and glue the dorsal fin to the front of

the vertical tail surface.

Build the horizontal stab out of 3/16-inch thick balsa pieces as indicated on the plan. Build the elevator by pinning the two halves to the plans and gluing the 3/16-inch dowel in place.

Fuselage

Mark the locations of the doublers and formers on the fuselage sides. Glue the 1/64 plywood doublers to the sides. Glue on the 3/32-inch thick landing gear doublers over the top of the plywood doublers. Glue on the 3/32 doublers at the top of the fuselage. Glue the 1/8 square balsa sticks to the tail. Glue a piece of 1/8 square balsa to the top of F3. Glue F2 and F3 to the right fuselage side. Remove the side from the plans.

Make F1 from 1/8-inch lite-ply and drill the holes for the blind mounting nuts. Push the blind nuts into the lite-ply and add a bead of glue around the outside edge to prevent them from coming out. Glue the 3/8 triangle balsa stock to F1 to fit the motor (see section view on plan).

Glue the fuselage sides together at F2 and F3. Glue F1 between the two sides. If you use a physically smaller motor such as an Astro Flight 05, F1 will have to be raised; a small piece of sheet balsa should also be added below F1 to support the motor mount. Glue the 1/8 square sticks on top of F1 and between F2 and F3. Attach the 1/8 lite-ply landing gear plate.

THE ELECTRIC SCOUT



Designed by Scott Hartman

TYPE	High-wing taildragger, all-wood construction.
WINGSPAN	48 in.
WING AREA	396 sq. in.
FLYING WEIGHT	40-48 oz.
WING LOADING	14.5-17.5 oz./sq. ft.
OVERALL LENGTH	33-1/4 in.
POWER	Six- or seven-cell electric.
RADIO	Three channels required (rudder/elevator/throttle).

Install the 3/32 hard balsa floor on top of the 1/8 square sticks between F2 and F3. Install the 1/8x1/4 mounting rails to fit your servos, then cut out the balsa between the rails and test fit the servos.

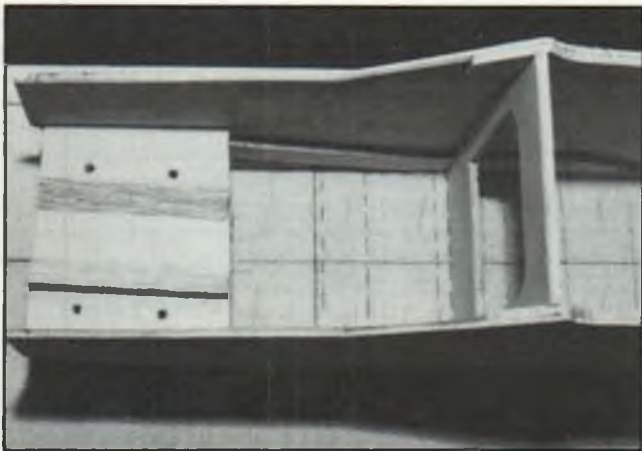
Glue the two sides of the tail together and install all of the 1/8 square balsa crosspieces. Trim the nose of the right-hand side about 3/16-inch to match F1. Sheet the bottom of the fuselage, the windshield area and rear half of the fuselage with 1/16 light balsa.

Install the 1/8 square balsa stick at the nose between the fuselage sides. Glue on the 1/2-inch wide piece of 1/16 plywood at the nose. Tack-glue the 1/16 balsa hatch to the nose and sand the edges flush with the sides. Use a sharpened piece of brass tube to drill the holes in the fuselage sides for the wing mounting dowels, but don't glue the dowels in place until after the covering has been completed.

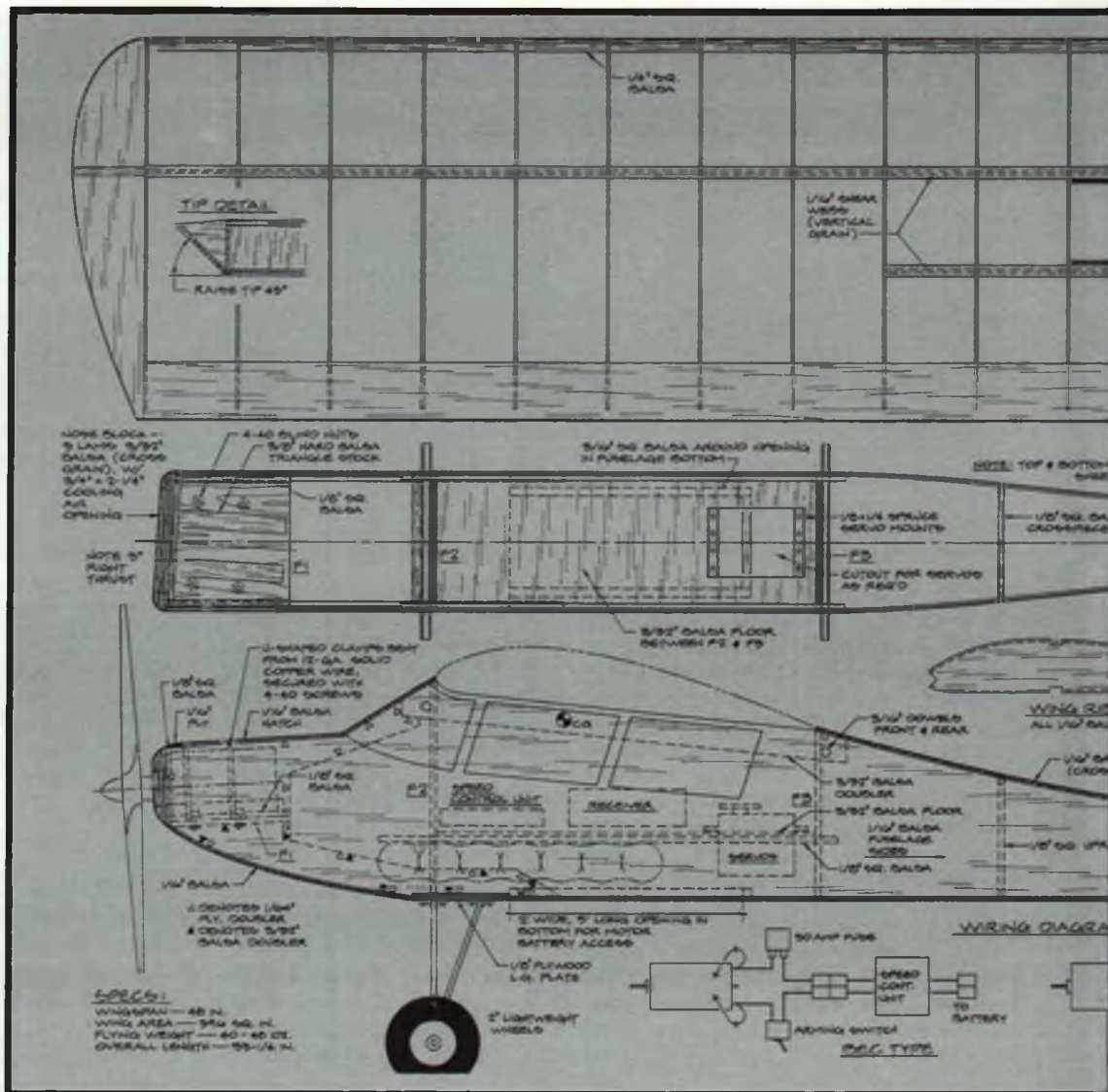
Fabricate the nose block by gluing three pieces of 3/32 balsa sheet together to form a 9/32-inch thick block. The grain should alternate to make "balsa plywood." Glue it to the nose of the fuselage and sand the nose to shape. Finish up by making an oval-shaped cooling air opening in the nose block, 2-1/4 inches wide by 3/4-inch high.

Cut a 2-inch wide, 5-inch air exit hole in the bottom of the fuselage behind the lite-ply landing gear plate. Reinforce the hole with 3/16 square balsa sticks. Plan out the installation of the motor and radio components.

Sand the vertical stab and hinge the rudder. (I used 1-inch pieces of iron-on hinge material.) Hinge the elevator the same way.



Close-up of the partially completed nose. The motor mounting plate (F1) is 1/8-inch thick plywood with balsa triangle stock glued on top to stabilize the motor. Note the built-in right-thrust.



Wing

Lightly sand the edges of the 1/16 balsa trailing edge pieces with a sanding block so that they make a good fit. Position the left wing spar and bottom trailing edge on the plans using a couple of ribs to align.

Glue the R1 and R2 ribs to the bottom spar using the 90-degree alignment template. Use a piece of scrap 1/16 balsa to temporarily raise up the R3 ribs during construction.

Glue on the first two R3 ribs. Glue on the center rib using the angled side of the template to allow for dihedral. Install the top spars, checking for alignment before gluing. The middle section of the R3 ribs will later be removed, so use only a small amount of glue in that area. Install the top trailing edge sheeting using slow CA glue.

Glue on the leading edge.

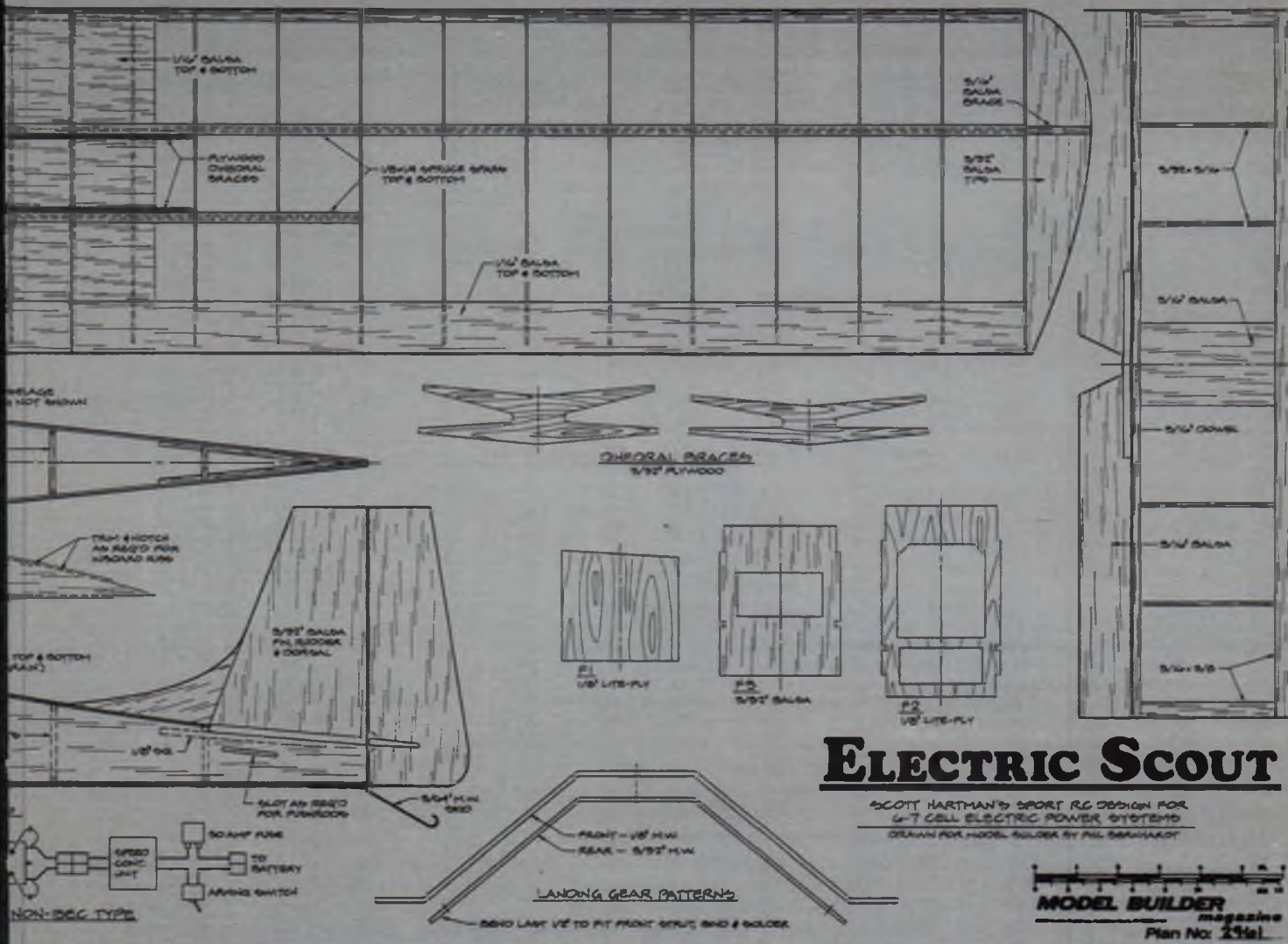
Build the right half of the wing the same way.

Install the 1/16 shear webs between the top and bottom spars. Trim the spars at the center section for a good fit. Remove the middle section of the R3 ribs, but don't throw them away. Pin down the right wing panel and block up the left wing panel to 4-1/2 inches. When satisfied with the alignment, open the joint and apply glue, close the joint and allow to dry thoroughly.

Glue the plywood dihedral braces in place. Trim the edges of the R3 rib center pieces you removed and glue them back in place at the center of the wing. Sheet the top and bottom of the wing center section. Glue on the wingtips at a 45 degree angle. Install the 3/16 balsa brace and sand the tips as required. Round the leading edges of the wing using a coarse sanding block.

Covering

Sand all parts using a sanding block and sandpaper. Start with 100 grit sandpaper and finish up with at least 150 grit sandpaper; for a better finish, sand down to 400



ELECTRIC SCOUT

SCOTT HARTMAN'S SPORT RC DESIGN FOR
4-7 CELL ELECTRIC POWER SYSTEMS
DRAWN FOR MODEL BUILDER BY PAUL BRADSHAW

MODEL BUILDER
magazine
Plan No. 294e

or 600 grit sandpaper. Clean all parts using a tack rag and/or a vacuum cleaner.

The prototype model was covered with Ultracote on the fuselage and MonoKote on the wing and tail surfaces.

Landing Gear

The gear is made of 1/8-inch wire in the front and 3/32-inch wire in the rear. The wire parts should be pinned to the building surface to hold them in proper alignment prior to soldering. Clean the wire thoroughly, wrap copper wire tightly around the joint, and solder (be sure to use flux). Tape the finished landing gear in place on the fuselage and secure it with nylon landing gear clips and screws.

Remove the covering where the tail skid attaches. Bend and glue on the tail skid using CA glue and fiberglass cloth.

Motor/Radio Installation

Use Velcro to mount the receiver, speed controller and radio battery in the fuselage. Wire up the power system using 14-gauge high-flex wire, a 30-amp fuse, spade lugs, arming switch, and Sermos or Astro connectors. The plan shows wiring diagrams for both conventional and BEC-type speed

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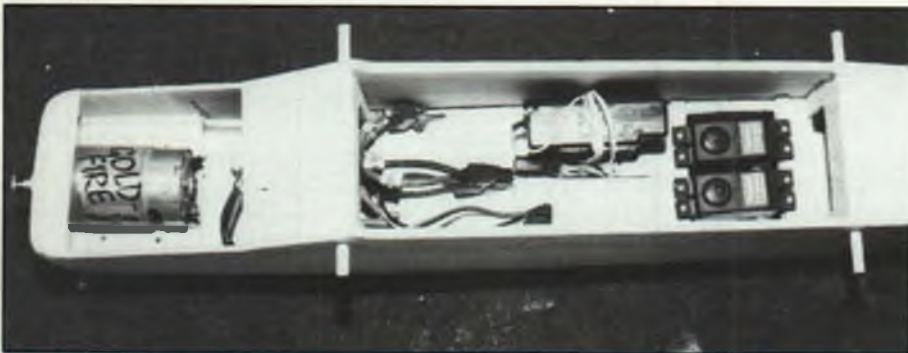
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After the top and bottom of the fuselage are sheathed, a 2x5-inch opening is cut into the bottom for installation and removal of the motor battery. The pack is held to the bottom of the intermediate sheet balsa floor inside with Velcro.



A peek inside the fuselage reveals the Futaba receiver and S-148 servos in place; the bottom of the servos protrudes down into the motor battery compartment. Motor in the author's model is an inexpensive Great Planes "Gold-Fire" 05, held in place with a couple of U-straps bent from heavy-gauge copper wire.

controllers.

Cut 1/16-inch wide slots for the rudder and elevator pushrods. Build up the pushrods using 3/16 square hard balsa sticks, threaded rod, 1/16-inch wire at the servo end, thread, and CA glue. Leave about an inch extra of the 1/16-inch wire to allow for adjustment in pushrod length. Install a long control horn on the elevator and a short control horn on the rudder. Make Z-bends for the servo attachment, install clevises at the tail end and attach them to the control horns. Turn on the radio and adjust the elevator throw to about 3/8 inch each way and the rudder throw to about 1 inch each way.

Make a pair of motor mounting clamps out of 12-gauge solid copper wire. Attach some foam seating tape to the motor mount area on F1 and attach the motor using the wire clamps and 4-40 bolts. Install the speed controller, switch, and propeller.

Install four pieces of Velcro in front of the servos using CA glue to attach the tape to balsa. Install a double width of Velcro to the flight batteries.

Finish

The addition of details like windows and numbers make the Electric Scout look more like a full-scale aircraft. The windows on my model were cut out of MonoKote trim sheet, and the numbers are 1-inch stick-on type.

Do the normal pre-flight checkout including a thorough range check with the motor running. Turning the motor on or off should not significantly affect the range.

FLYING

If everything checks out, your model should be ready for a test flight. If you're not a competent RC pilot, find someone who is and have him make the first flight.

The Electric Scout is capable of most rudder/elevator maneuvers. To do a loop, apply some power and pull back on the elevator stick. Ease up on the elevator after the loop has been completed. Rudder rolls are a little harder. I normally apply some power, dive the model a little, pull the nose up some, and apply full rudder. When the model is upside-down, some down elevator is added to keep from losing altitude. The controls are brought back to neutral after the roll is completed.

When full power isn't needed the motor should be throttled back to extend the motor run time. When the batteries are about exhausted and the motor starts to slow down, it's time to land. Cut the throttle and make your landing approach. When the model is about 10 feet off the ground I normally cut the power completely and glide in. Just before the wheels touch, apply up elevator to flare the model.

I hope you have as much fun with this design as I have. Electric models, because they're so quiet, make it possible to fly in areas that would otherwise be off limits to engine-powered models. Have fun flying electric! *MB*

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550TL	5-1/2" (140mm)	1.700"	43.18mm
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Sure, I'll Take a Ride in a

P-51!

Sometimes a person will wait years for a thing that they wish for. For our author, the event of riding in a Mustang falls in that line. And as he says, it was worth the long wait.

By Stephen E. Kanyusik

The throttle was eased forward, the 12 cylinders of the big Allison responded with a roar and we were rolling down the runway. We lifted off as if we were on a greased track, effortlessly cleared the ground and started a gentle left-turning climb that took us through a small veil of clouds and into blue sky.

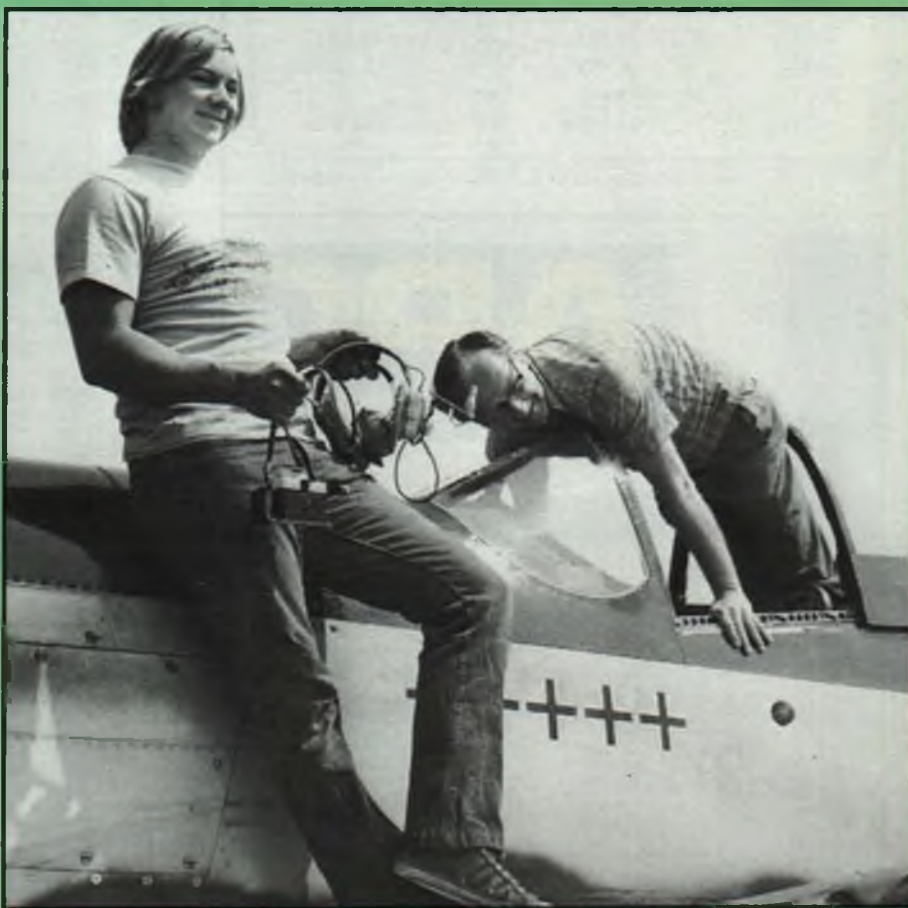
I couldn't believe that after some 30 or 40 years, I was at 7,000 feet in a P-51 Mustang. *Hot Damn*, I thought to myself, *Is this real, am I really flying in this WWII fighter?*

For many years, I was one of the millions of enthusiasts who buy the monthly aviation magazines and read with envy the writers who tease us with articles about "how I got into the front seat of a P-51" or "how I got to sit in the left seat of a B-25." We've never been capable of qualifying for such envied feats, let alone economically able to afford such an experience of getting off the ground in a warbird. But that's what dreams are made of. I made up my mind that one day, I would fly in a Mustang.

• • •

I've enjoyed aviation photography ever since I lay at the end of the runway at the Pittsburgh-Allegheny County Airport, photographing a Douglas DC-2 taking off. This was in 1937, and I was using a Kodak Brownie box camera. It was a TWA plane taking off for a trip to faraway places. I still have that print, slightly yellowed, but the NC number is still evident on the lower side of the wing.

Later, in WWII, I was photographing U.S. carrier-based aircraft. I was on the U.S.S. Ranger CV-4 in the Atlantic; in the Pacific, I was shooting the Kamikaze planes



The dream of a lifetime is about to be realized as the author slips into the rear seat of Ed Maloney's P-51; the young fellow on the left is Ed's 20-year-old son, Jim, the pilot for the flight. Photo taken by Steve Hinton.

that were after the U.S.S. Manila Bay. My weapon was a K-20 camera. Even our own planes seemed to be trying to do us photographers in; sometimes they would miss

the arresting wires and hop over the steel wire barriers and crash into parked planes on the forward area of the flight deck.

I had an interesting experience on the

U.S.S. Antietam CV-36 during the Korean conflict. I was ordered to photograph the task force with the snow-covered mountains of North Korea in the background. My photographic station was a helicopter. My camera was the Fairchild F-56 that took a 7x7-inch size negative. No one was shooting at me this time. I simply gave the pilot instructions: "A little higher, no, not too much, back a little, a few feet over to the left. Now inform the Flag that it's time for the task force to make the turn." For one moment, I was in command of the task force. Admiral Kanyusik, Photographers Mate First Class U.S.N.R.

• • •

The years went by, and my chances of ever seeing the big birds again grew slimmer than my waistline. Then, in the mid-1970s, I began making annual trips to California to visit relatives. Every February or March I would fly out from Minnesota for a few days to partake of some sunshine and let my bones thaw out. My relatives knew that one of those days would be reserved to spend at Chino Airport—the Disneyland of restored, flyable WWII and earlier vintage airplanes.

Each year I would return to Chino with the photographs I had taken the previous year. This was my passport to the hallowed hangars that house these majestic examples from the past.

It was exciting to be able to see the magnificent aircraft that were being restored and flown. Not only were there military planes, but a great variety of interesting private aircraft—Stinson Gull Wings, Fairchild 24s, an immaculate Spartan Executive and a Fokker Triplane sit like a memory from the past. A fellow could be buried at Chino Airport and he surely would feel like he had gone to heaven, you betcha.

• • •

I ran into my ticket for the P-51 ride by chance—it most certainly was my lucky day.

After spending a day at Chino, I was getting ready to leave when I spotted an FM-2 Wildcat being restored in one of the hangars, and decided to take a few photos. As I was setting up, a man in coveralls approached; I asked if he wouldn't mind me taking a photo of the FM-2. He gave me a look and asked me how I knew it was an FM. "Oh, I saw many of these in the Big One," I told him. It turned out that I was talking to the airplane's owner, Jim Nunn. We talked about the plane and I explained that the squadron on my carrier, VC-80, flew FMs and TBMs. When I told him about the photographs I had from that squadron he *really* became interested. He wanted to paint the plane as a replica of an operational squadron that was in combat. When I returned to Minnesota I sent him photographs that he later used in finishing his plane in the markings of VC-80.



The author waves hello as Jim fires up the big Allison V-12 and prepares to taxi out. This unforgettable flight took place at Chino Airport in Southern California, a mecca of restored, flyable aircraft of WWII and earlier vintage. Steve Hinton photo.

Jim was elated and wanted to pay me for the use of the photographs that I had lent him. I said that if he could get me a ride in a P-51, that would be more than enough. He informed me that the next time I came to Chino, I would get the ride. My dream was getting closer!

The following year I was back at Chino, where Jim Nunn made the arrangements for my P-51 ride. My pilot was to be Jim Maloney, son of Ed Maloney, founder and owner of the Planes of Fame Museum and whose collection of warbirds is legend. When introduced to Jim Maloney, I was taken aback. I had never given much thought as to who would be the pilot for my ride; since it was an old fighter, I just assumed it would be flown by an older person. Gee, I thought, *He's just a kid of 20! Can he handle a plane like a fighter?*

I also got to meet another renowned pilot by the name of Steve Hinton. These two, I found out later, were superb fliers and knew how to handle these big machines. In WWII they were all young; I was young also, for that era. We handled big responsibilities, so I put my fears behind me and let's let 'er rip!

Steve took a couple of shots of me climbing in while Jim did a pre-flight. It was a little awkward getting in the tight quarters of the back seat, but I managed and soon we were firing up the engine. Blammm, a big puff of smoke engulfed us momentarily and it was soon swept clear from us by the big four-blade prop.

At first a couple of shakes, then things smoothed out. I removed my ear cups and could hear the din of the engine—a very powerful sound that sends confidence through the airplane and its passengers.

What a song this machine sings!

Jim released the brakes and slowly and positively the P-51 moved out. We threaded our way through the parked planes. But by the time we were on the runway, the old bugaboo hit us: fog. California fog had engulfed us to such an extent that the tower informed us that we could not take off. It would be like this the rest of the day. Jim apologized and suggested we try again the next day.

"I can't make it tomorrow, Jim" I informed him, "We'll have to wait for next year." He commented that I didn't seem too sad about the cancellation. I informed him that I'd waited many years for this—a couple more wouldn't be that far out of line. So it was back to Minnesota for the winter.

The following spring came soon enough. When you go over the 50-year mark, not only do the days, weeks and months go by fast, the years also whiz on by. On that February day we were greeted by blue skies and wisps of clouds, and the plane was ready to go.

The noise of the engine made it emphatic that we were doing it again. The big four-bladed prop assured us that we were on the go; this time there was no threading through parked planes, it was giddy-up and Go Baby Go! It was flying time in the skies over Chino. The blue sky was a backdrop for our aerial ballet. Jim tried a four-point roll—super sharp. He glanced back in the mirror and saw my ear-to-ear grin. That North American P-51 Mustang, under the leadership of its expert pilot, performed a rolling, looping, diving ballet in the sky.

I can't write about manifold pressure, roll rate, stall warnings, Gs pulled or how heavy the controls feel—all that technical

stuff that the more learned individuals write about. All I know is that for us WWII types who are fast becoming a memory, we just go for the sensation and the excitement of the ride. Like the airplanes of that past, our times are passing from the scene. In the not-too-distant future, the aircraft from our generation will rarely be seen in flight. Time is taking its toll on the airworthy aircraft.

After scorching the sky, we dropped down on the deck. South of Chino is Prado Dam, and this setting affords us a thrill that many pilots have experienced—buzzing. Many times when a cadet would do this, it would be with the awareness that he could be washed out or at least reprimanded. Buzzing the countryside was a way that a pilot could let it all hang out, as they say. Flying low and fast is a sensation that must be experienced—no words can describe it. We flew over the small hills, around them and between them. We chased our shadow on the ground and would lose it on the shadow side of the hills; when we burst out into the sun, there would be the P-51 shadow racing along with us. We would zoom over a small hill and a roll would have the sky and ground change places for a moment. Then on our backs, inverted, we would buzz over the water. I could see ducks scattering as we zipped past them, water shimmering and sparkling as the sun danced on the surface.

Then one last burst of speed in a zooming climb and we were headed back to



It gets pretty windy in a P-51 cockpit with the canopy open! The author dedicates this article to the memory of Jim Maloney, who lost his life in an aircraft accident some 12 years after this memorable flight took place.

Chino. Jim throttled back and let the plane slow down so he could dump the gear and flaps, into the pattern, a nice turn into the wind and the slight jolt followed by a screech that signaled our wheels had touched down. The flight of joy was over and is now only a memory that I will savor in my private moments.

Jim shut down the engine and I climbed

down after he left the cockpit. As I crawled out I noticed that a small group of local folks greeted me. "How was it?" asked Steve Hinton. Looking up to the sky, I said, "It was great; if I were to die now, Saint Peter would notice the smile on my face."

Yes, it was worth the many years that I waited for this ride. I fly it many, many times, over and over. **MB**

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The Airplane People

<h3>MB IOI</h3> <p>A revolutionary new program that provides a phased introduction to modeling. The non-profit Hobbies Building 101 corporation provides training, materials and support for educators and group leaders. To help defray their expenses, they also make the materials available to the general public. For larger quantities of the materials or for more information on the program, contact Mr. J.J. Levine at 1891 Branchville Drive, Marietta, Georgia 30062.</p> <p>Step 1 - Beginner's Set</p> <p>Includes building board, pins, glue, complete Delta Dart kit and motor blade. The video is an excellent training tool for the educator or individual. It takes the viewer in real time through the complete construction of the Step 1 kit.</p> <p>MB101A1 Step 1 \$9.95 MB101A1 Construction video \$19.95</p> <p>Step 2 - Tennyson</p> <p>A cute, 20" span model featuring a nylon mounted built-up fuselage, covered wing and tail feathers. Graceful slow flight!</p> <p>MB101B1 Step 2 Tennyson Kit \$6.95</p> <h3>TOOLS</h3> <p>A nice starting set at a great price. Set includes 12" multi-scale triangular ruler, 12x18" plastic leveling guide (set of 4), 8" semi-pass, 6" divider, 10" 30/60° triangle, 6" 45/90° triangle, 6" protractor, 6 3/4" french curve, soft pencil eraser, lead holder, mini-lead holder, erasing shield, 3 packs of 0.2 mm lead.</p> <p>ALBOK's Drafting Set \$37.95</p> <p>Precision ground and polished stainless lenses of scratch-resistant plastic, designed to converge at 14" from your eyes. Worn over the head with an adjustable soft plastic headband. It leaves the hands free to work. Lessens tension stress and fatigue. May be worn over prescription glasses.</p> <p>AL734 Headband Magnifier \$16.95</p>	<h3>RADIO CONTROL</h3> <h4>Airsail</h4> <p>AS-RC01 Volkovna 51" \$108.95</p> <h4>Ben Buckle</h4> <p>NBS proudly announces it is now the US representative for this line of world class free flight and R/C assist old timers.</p> <p>AG-0304 Curtiss Jenny 36" \$30.95 AG-0309 Chipmunk 21" \$21.95 AG-0301 Auster J-4 23" \$21.95 AG-0302 Wuth Minor 24" \$21.95 AG-0303 Eastbourne 19" \$18.95</p> <h4>easy built models</h4> <p>EB-FF13 Skatetrain 30" \$8.00 EB-EB06 Aeronaica 22" \$10.00 EB-FF03 P-30 Aircobra 35" \$12.00 EB-FF06 PT-19 35" \$12.00 EB-FF04 Fokker Ranger 50" \$25.00 EB-FF33 Fairy Fox 20" \$8.00 EB-FF69 Avenger 28" \$10.00 EB-FF75 Stuka 30" \$11.00 EB-FF53 Sin. Voyager 50" \$25.00 EB-FF70 Corsair 28" \$10.00 EB-FF56 Lysander 48" \$28.00 EB-FF59 S.E.5a 50" \$30.00 EB-FF52 Taylorcraft 50" \$25.00</p> <h4>Herr Engineering</h4> <p>Amazing LASER cut kits</p> <p>HE-K101 Scout 30" \$29.95</p> <p>HE-K100 Piper Cub 36" \$38.95</p> <p>HE-K104 Ryan ST 30" \$36.95 HE-K105 Fokker D-VII 24" \$36.95 HE-K102 Fokker D4 30" \$36.95</p>	<h3>FREE FLIGHT</h3> <h4>AERO GRAPHICS</h4> <p>AG-7554 Jodel D-7 25" \$24.95 AG-7555 Fokker E.III 22" \$30.95</p> <h4>IGRA</h4> <p>IG-7553 Miss Magister 24" \$22.95</p> <h4>WEST WINGS</h4> <p>WW-01 Dornier 308 25" \$24.95 WW-03 Sea Fury 22" \$21.95 WW-04 Spitfire 22/24 25" \$22.95 WW-06 F-117 Stealth 18" \$18.95 WW-08 Puss Moth 24" \$19.95 WW-09 Hawker Hart 25" \$24.95 WW-10 Wildcat 24" \$18.95</p> <h4>Jodel D-7</h4> <p>JD-7554 Jodel D-7 25" \$24.95 JD-7555 Fokker E.III 22" \$30.95</p> <h4>KEIL KRAFT</h4> <p>KK-029 Fokker D-8 18" \$12.95 KK-036 S.E.5a 18" \$10.95 KK-037 Nieuport 18" \$10.95 KK-038 Camel 18" \$10.95 KK-040 Spitfire 18" \$10.95 KK-041 Hurricane 20" \$10.95 KK-043 Stuka 20" \$10.95 KK-044 F1X 190 18" \$10.95 KK-045 Mustang 18" \$10.95 KK-046 ME 109 17" \$10.95</p> <h4>LSM Aviation</h4> <p>LSM-001 Phantom Jr. 20" \$12.95 LSM-002 Jagger Jr. 22" \$15.95</p>	<h3>POWERPLANTS</h3> <p>Free light ducted fan anyone? The gorgeous little fan unit was designed as a model powerplant. Includes electric motor, shroud with built in stator, impeller, tailcone, etc. Unit has a 2.4" diameter at shroud flange with an impeller diameter of 2.25" and weighs 1.4 ounces. Produces 1.8 cc. of thrust with 3 cells and 2 cc. with 4 cells. For models weighing 5 oz or less ready to fly.</p> <p>EDF1 Electric fan 2.25" \$19.99</p> <p>The Morley electric fan unit is intended as a powerplant for RC use. Features a molded shroud with motor mount and stators, 2.5" nylon impeller and motor shaft adaptor. For 20-22 turn electric motor (not included) on 7 cells. Produces 12-14 cc. of static thrust at 20,000 rpm with an efflux velocity of 100 mph!</p> <p>MORFAN Morley Jet-Elec \$24.95</p> <p>Veron</p> <p>VO-503 Boffin Junior 23" \$14.95 VO-502 Clabria 23" \$14.95 VO-705 Deacon 53" \$39.95</p> <p>VO-953 Aeronaica C-3 21" \$16.95 VO-950 Vagabond 23" \$16.95 VO-951 Dart Kitten 23" \$16.95 VO-952 Spirit St Louis 24" \$16.95</p> <p>Ordering Information</p> <p>Phone Call us at 404-974-0843 between 10:00 am and 7:00 pm (EST) Monday thru Friday, and between 10:00 am and 5:00 pm on Saturday. Phone orders must be paid by credit card. A \$3.95 shipping & handling charge will be added to your order total.</p> <p>Fax Fax your order to 404-974-6243. Please include credit card number and expiration date. Add \$3.95 postage and handling.</p> <p>Mail Mail your order to 5000 Glade Road, Acworth, GA 30101. Please include credit card number and expiration date, check or money order. Add \$3.95 postage and handling.</p>
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READER SURVEY: We want your help in making **MODEL BUILDER** a better magazine. By answering the questions on this survey, we'll have a better idea of what you like or dislike about the magazine and how we can improve it. In appreciation for your efforts, we will award a **FREE Hitec RCD Flash 4** (four channel radio) by drawing a name from the survey responses received by Feb. 15, 1996. If you don't want to cut out this survey from your magazine, it's OK to make machine copies. **MAIL TO: Model Builder Reader Survey, P.O. Box 2459, Capistrano Beach, CA 92624-0459.**

1. Age: Under 20 () 21-30 () 31-40 () 41-49 () Over 50 ()
2. Sex: Male () Female () 3. Married () Single ()
4. Education: In School () High School Diploma () In College ()
College Degree () Some College () Graduate Degree () Trade School ()
5. Occupation: Student () Professional () Sales () Service ()
Labor () Self-Employed () Other _____
6. Occupation of head of household: Student () Professional () Sales ()
Service () Laborer () Self-Employed () Other _____
7. Head of Household Income: Under \$15,000 () \$15,000-\$24,000 ()
\$25,000-\$34,000 () \$35,000-\$49,000 () \$50,000-\$74,000 ()
\$75,000-\$99,000 () Over \$100,000 ()
8. In which models are you interested? If more than one, indicate preferences in numerical order (1-4): FF___ CL___ RC___
9. In which categories are you active? FF___ CL___ RC___
10. How long have you been active in your categories?
- | | FF | CL | RC |
|-----------------|-----|-----|-----|
| Less Than 1 yr. | () | () | () |
| 1-2 years | () | () | () |
| 2-5 years | () | () | () |
| 5-10 years | () | () | () |
| Over 10 years | () | () | () |
11. Do you build you own models (not including ARF's)?
All () Most () A few () None ()
12. Do you design and build from scratch? All () Most () A few () None ()
13. Do you scratch build from plans? All () Most () A few () None ()
14. Do you build from kits? All () Most () A few () None ()
15. Do you assemble and fly ARFs? All () Most () A few () None ()
16. How many model aircraft have you built? FF___ CL___ RC___ Static___
17. If you build and fly RC, what types? Sport () Scale () Pattern ()
Helicopter () Glider () Pylon () Old Timer () Other _____
18. If you build and fly FF, what types? Sport () Scale () Gas ()
Rubber () Glider () Old Timer () Other _____
19. If you build and fly CL, what types? Sport () Scale () Stunt ()
Carrier () Speed () Racing () Combat () Other _____
20. How many model aircraft do you have that are entirely or nearly flyable?
RC___ FF___ CL___
21. How many radio control systems do you own? _____
22. How often do you fly? _____ days per week _____ days per month
23. How many hours a week do you spend on your aircraft hobby? _____
24. To what model aircraft organizations do you belong? Include national, regional local (club), special interest (initials such as AMA, SFA are okay)? _____
25. Do you plan on joining any organizations this year? Yes () No ()
26. If so, which ones? _____
27. In what organized model flying activities do you participate?
Competition () Fun-Flys () Both () Clubs () None ()
28. If competition, what levels? Club () Local () Regional () National ()
International ()
29. Are you a subscriber to Model Builder? Yes _____ No _____
30. If subscriber, how many years? _____ years
31. If not subscriber, how many copies of Model Builder do you buy a year? _____

32. Where do you obtain your copies of Model Builder? Local hobby shop ()
Newsstand () From friends () Subscription ()
33. How many hours do you spend reading an issue of Model Builder? _____
34. How many friends also read your copy of Model Builder? _____
35. Do you save back issues of Model Builder? Yes _____ No _____
If so, how far back? _____ years
36. How often do you refer to a back issue? Weekly () Monthly () Yearly ()
37. What other hobby magazines do you read? Flying Models ()
Model Airplane News () Model Aviation () Radio Control Modeler ()
RC Report () Scale RC Modeler () Other _____
38. Model Builder is . . . Better Than: Same As: Not As Good As:
- | | | | |
|-----------------------|-----|-----|-----|
| Flying Models | () | () | () |
| Model Airplane News | () | () | () |
| Model Aviation | () | () | () |
| Radio Control Modeler | () | () | () |
| RC Report | () | () | () |
| Scale RC Modeler | () | () | () |
39. What percentage of advertising in an issue do you read in its entirety? _____ %
40. What influences your decision on what to buy for your model aircraft hobby?
Advertising () Articles () Fellow Modelers ()
41. Does information in Model Builder help your decision on what products to buy?
Yes _____ No _____
42. How much money do you spend on your hobby each year? _____
43. What major RC related products do you plan on purchasing this year?

45. Where do you purchase most of your model aircraft supplies?
- | | Most | Some | Very Little |
|---------------------|------|------|-------------|
| Hobby Shop | () | () | () |
| Mail Order | () | () | () |
| Mail Order Discount | () | () | () |
46. Do you own a personal computer? Yes () No () Brand _____
47. Which MODEL BUILDER regular columns and features you like or dislike:
- | | Like | OK | Don't Like |
|---------------------|------|-----|------------|
| Big Birds | () | () | () |
| Control Line | () | () | () |
| Dear Jake | () | () | () |
| Electronics Corner | () | () | () |
| Electric Power | () | () | () |
| Free Flight | () | () | () |
| Hannan's Hangar | () | () | () |
| Helicopter World | () | () | () |
| Model Design & Tech | () | () | () |
| Over the Counter | () | () | () |
| Plane Talk | () | () | () |
| Plug Sparks | () | () | () |
| Products in Use | () | () | () |
| RC Soaring | () | () | () |
| RC Construction | () | () | () |
| FF Construction | () | () | () |
| CL Construction | () | () | () |
| Peanut Construction | () | () | () |
48. What would you like to see in Model Builder in addition to the present content?

Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Mail to Model Builder Reader Survey, P. O. Box 2459, Capistrano Beach, CA 92624-0459. Surveys received by Feb. 15, 1996 are eligible to win a FREE Hitec RCD Flash 4 (four-ch. radio). Winner's name will be published in a later issue.

FREE FLIGHT

BY BOB STALICK

•Cox Killer Bees Revisited

•Phil Smith's "Freeze Still" HLG

As the Nostalgia movement has grown, manufacturers have determined that a market exists for new eligible engines. Such is the case with the recently released Cox Killer Bee .049 and .051 engines. These reed-valve engines have the same exterior appearance, other than cosmetics, to the old Cox 290 engines. However, when you take a good look inside the Killer Bee, you notice a number of subtle changes.

It's these changes that make the engine run so well. As noted in the December column, these engines perform as well as the current hot setups in 1/2A Nostalgia—the Homet and Space Hoppers, and they are available at your local hobby shop at a price that anyone can afford.

The holdup on the approval of the Killer Bee was that it took time to obtain the engines from Cox and then it took time to properly break them in and then run the tests. Early results are generally promising, so the NFFS Nostalgia Committee has provisionally approved them for use.

A couple of caveats are noted. First, to be eligible for competition, the engine must be flown with the #325 head, not the competition head that comes with the engine. Second, the committee will reconvene at the end of the 1996 contest season to determine whether the

engine has performed as anticipated. If so, the engine will undoubtedly remain on the approved list. If not, then the committee will have to decide whether to remove it from the list.

Apparently, some of the Killer Bees have produced excellent rpm numbers. Using a 5x3 prop and 50 percent fuel, a couple of tests have shown the engine to exceed 19,000 rpm, which is an excellent number for Nostalgia. My experience with the engine was much more modest, and I ended up donating my engine to a raffle drawing held at one of our local contests, since it appeared to give me no advantage over the engines I currently use.

At any rate, this is your chance to be a part of the national test to determine the applicability of the Killer Bee to Nostalgia. I suggest you give the engine a try. Do some test running, put it on one of your Nostalgia models and keep track of its performance. After you've had some time to get used to the engine, write down your impressions and send them to Bob Larsh, who is the

committee chairman. His address is 45 S. Whitcomb Ave., Indianapolis, IN 46241.

FEBRUARY MYSTERY MODEL

I first spotted this month's mystery model at the Harts Lake Prairie flying field in Washington two or three years ago. Little did I realize that it had appeared many years earlier in the pages of a major model magazine—I thought it was a much more recent development than it turns out to be. This HLG is a trailblazer because it was one of the pioneers in innovative design, featuring a built-up tissue-covered wing and a swinging weight dethermalizer. Mark Sexton, one of the Northwest's premier HLG fliers, claims it is an excellent model and will thermal at the drop of a hat.

So, if you think you know the name of the model, send it to *Model Builder* magazine. Be sure to include your name and address. After a couple of months, they'll draw the winner at random from among the correct entries, and that person will receive a free 12-month *MB* subscription. Is this a good



George Perryman shows off his "Cossymer Speckled Bird"—a huge and incredibly light unlimited rubber powered model. Wing and stab have lots of speckles which don't show up in the photo. More details in text.



Northwest free flier Dick Williamson has had really good luck flying a Tochi Matsuda "Zero" in Nostalgia competition. He uses a Medallion .049 for power. Dick says the model also flies well with a Cox TD .049 for AMA classes—just faster.

deal or what? Do it now.

OCTOBER MYSTERY MODEL WINNER

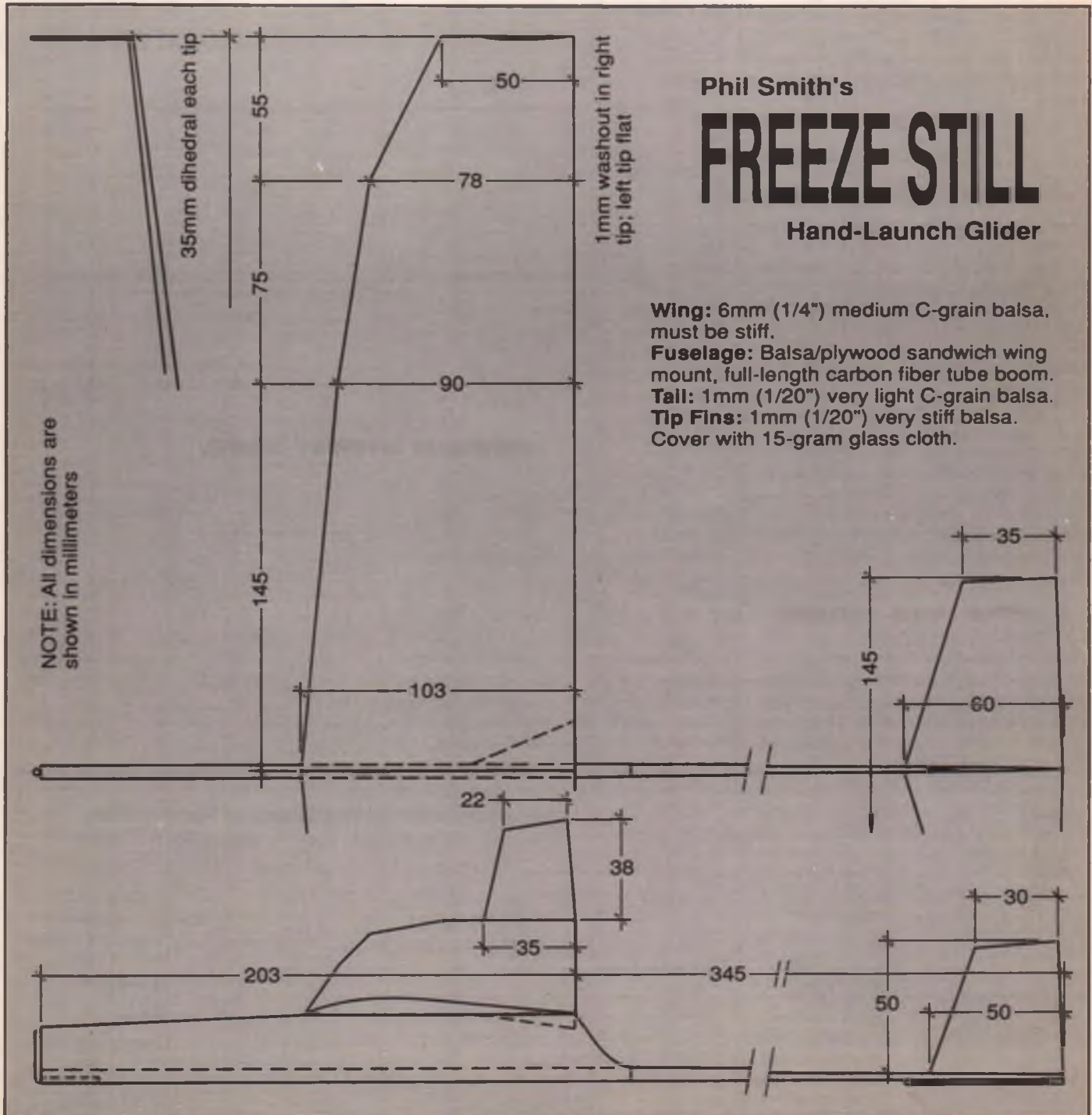
Joe Bilgri's 1951 Nats winning "Duster," published in the February 1952 M.A.N., is one

of the best examples of the trend at the time toward ultra-long Wakefield fuselages—over 5 feet in this case. Other unusual features include a retracting wheel and a bottom-mounted plastic bubble to

bring the fuselage cross-section up to that required by the rules. Of the six readers who wrote in, the winner of the free one-year MB sub turned out to be Gene Schaap of Palmdale, California.

PLAN OF THE MONTH

Phil Smith is one of the free flight stalwarts from New Zealand, and we have corresponded now and again during the past several years. Recently,



PLAN OF THE MONTH

FREE FLIGHT

he forwarded a drawing of his "Freeze Still" hand-launch glider to me for comment, and I thought I would share it with *Model Builder* readers.

Several features of the model draws one's attention. Most obvious are the tipllets at the end of each wing. Also, it uses a carbon fiber boom for the tail, and is not dethermalizer equipped.

Phil notes in his text the following:

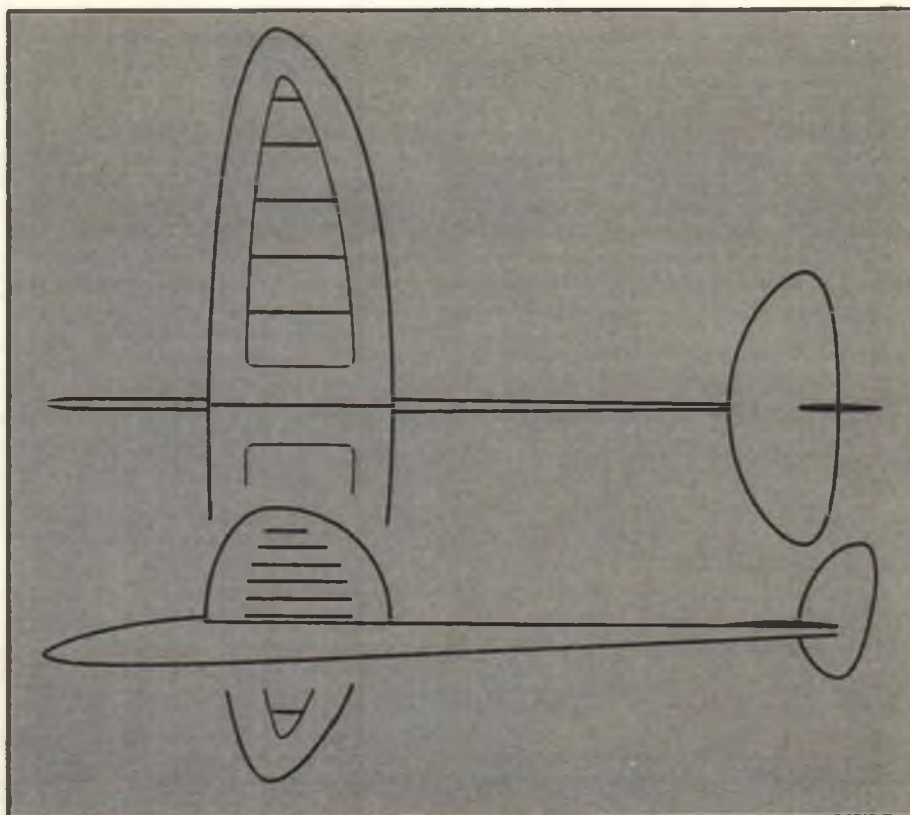
"This layout was my starting point in trying to get a 65 second or better still-air HLG. I find the climb to be straight, fast and consistent, as if on rails. The glide is very slow and flat, no bank in the turns, but the transition is not very reliable. With our rules (in New Zealand) of six flights of 60 seconds each, all of which count, and a 10 second attempt, getting a really bad transition usually means being down on the ground in 8 to 9 seconds and another chance.

"After a lot of tweaking and bending with the tip fins, I now have a model, at 38 grams, that will do, on a good throw, 70 seconds in still air! However, the average over six flights is more like 55-60 seconds, and if it's during a contest, it's probably less (such is life!).

"There is much more to come from this layout. My next move is to increase the span but keep the area the same. I feel the tip fins will allow this, although stiffness in the wing will have to be increased. To this end, I'm looking at Rohacell 31 wing cores with glass/carbon skins. I am also keen to try Pete Buskell's stepped airfoil. Lots of things to try and so little time."

A LETTER FROM GEORGE

Model aviation has a number of well known characters who seem to pop up now and again to keep us all in good humor and focused on what this hobby is supposed to be about—having fun! One of my favorites is George Perryman. I don't see



FEBRUARY MYSTERY MODEL

George too often, since he seldom makes the trip into my area and I don't ever get to his, but every once in awhile a nice letter appears from him. I delight in reading them and sharing them with you. Here's the latest:

"The October Mystery Model you featured (Joe Bilgri's Wakefield) brought back fond memories of the powerful Wakefield ships of 40+ years ago. Upon consulting with my teammates, we decided on a fun event. I would never have thought of this except for your 'blast from the past' mar-

velous mystery model.

"I hope this event will evoke good response and we may do it again next year at Muncie.

"The hi-tech Wakefield ships of today are really wonderful but have passed me (and lots of us old timers) by due to their cost and complexity. Since Nostalgia gas is really booming, maybe this will be the start of something for us old rubber modeling cats.

"Enclosed are pictures of my best modeling effort in 57 years of competition, my



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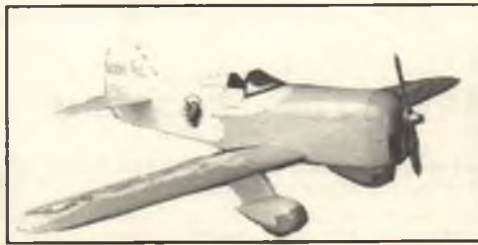
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Free Sunday admission for Static Competition participants
Separate entrance gate for static models

Registration Hours:

Friday 8:30am - 6:00pm
Saturday 8:30am - 1:00pm*

All models must be operable and radio controlled, and remain on display through 3:00pm Sunday.

*Late entries may be displayed but will not be eligible for awards.

Planes: WW I, Post WW I Military, Post WW I Non-Military, Stand-off Scale, Giant Scale, Pattern, Old-Timer, Sport (Non-Scale,) Glider, Helicopter.

Boats: Scale Military, Scale Non-Military, Racing Deep Vee, Racing Hydro.

Cars: Smaller than 1/4 Scale, 1/4 Scale or larger

To obtain pre-registration forms for the Static Competition, send a self addressed stamped envelope to: John Sbare, P. O. Box 26, Mahopac Falls, NY 10542

SWAP SHOP

The WRAM's Swap Shop is one of the major show attractions with thousands of individual items changing hands. To reduce the "registration crush," the Swap Shop will provide pre-registration forms.

There will be a separate entrance gate for Swap Shop merchandise.

To receive forms, send a self-addressed stamped envelope to: John Isbister, 4 Devon Road, Larchmont, NY 10538.

ADVANCED GROUP SALES

More ticket booths have resulted in shorter ticket lines. Advanced ticket sales limited to groups of 10 or more. Send a check or money order and a self-addressed stamped envelope to: Ed Alexis, 21 Pamela Road, Peekskill, NY 10568

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DARE DESIGN

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new dawn unlimited ship, 'Gossymer Speckled Bird.' (Spelling is not a strong suit with me.)

"The wing area is 652 square inches; it weighs 1.42 ounces. The stab area is 175 square inches; it weighs .42 ounce. The fuselage length is 61 inches; it weighs .84 ounce. The prop is 26Dx24P and weighs .81 ounce. The total airframe weight is 3.49 ounces (98.9 grams). It uses 24 strands of 1/8-inch FAI tan II rubber 43 inches long and weighs 3.16 ounces, for a total weight ready to fly of 6.65 ounces (188.4 grams). I put 1,200 turns in the motor for each flight.

"The lower the wing loading, the lower power is required for desired performance. The 'GSB' has a wing loading of 1.02 ounces per 100 square inches. Compared to modern Mulvihill ships of 2.4 to 2.6 ounces per 100 square inches and 3.25 ounces per 100 square inches for Wakefields, you can see it is considerably

angioplasties in the past several years, but like a Timex watch, I've took a lickin', but am still a-tickin'."

Well, you get the picture. George is one of those people you may not see for several years, and when you see him again, it's as though you just left each other yesterday. One of George's traits that doesn't come through as well in his letters is his unique southern drawl (or maybe it's an accent). Something about it cracks me up!

NEW ADHESIVE

Recently, while cruising the on-line free flight message board, I came upon an announcement by Sid Miller for Weldbond adhesive. Since I hadn't seen such a product in my area, I responded and received a sample. What I found, when I used it, was a safe, non-toxic, odor-free, strong and sandable adhesive. It has the appearance of a white glue, like Elmers, but it dries



The "BoombBox 33" is one of the first two kits to be released by a brand new company, JCI International, located at 655 State College #19, Fullerton, CA 92631. It and the "Buntingford Beagle 33" are .020 fus filers, span 33 inches (obviously), and feature a sheet balsa fuselage and built-up wing and tail. The kits are complete with all materials and sell for \$35 each plus \$5 S&H, direct from JCI. An SASE will get you full particulars on these kits and on JCI's line of colored Japanese tissue paper.

lighter. With a 65-inch span and 10.5-inch chord, this gives a good Reynolds number even though the model glides real slow. I have test glided it in a gym and the sink rate is approximately .75 foot per second.

"The model isn't a flimsy one-shot job since it has eight spars in the wing. The main wing and stab weight reduction is due to covering both with condenser paper from Old Timer Model Supply. Since there is approximately 1,670 square inches of covered surface, a significant weight savings can be realized. One plus for condenser paper is that it only requires two thin coats of dope to finish. Even though the condenser paper puckers badly on humid early mornings, it doesn't absorb moisture like Japanese tissue. One minus is that you have to handle the condenser paper very carefully.

"I will give you a report on the Mr. Universe Ultimate Wakefield Shootout, which should be an equivalent blast to when the volcano Krakatoa blew up in Indonesia long ago.

"P.S., I am now 71 and have had three

faster. It has a slight flexibility to it, but it sands as well as Titebond. It dries perfectly clear. It can be thinned with water and can be used as an adhesive for iron-on coverings. It can be used for any application where you need to glue porous materials together. I understand that Weldbond is commercially available at several hobby shops in the Chicago area. If your dealer is interested, have him contact HST Materials, at 815 Bonnie Lane, Elk Grove, IL 60007-2224, or fax them at (708) 228-9764.

I used Weldbond almost exclusively in constructing a Top Banana Nostalgia model last month, and it is super stuff. I like it because it dries so quickly, is clear, and sands well. As the old adage says, "Try it, you'll like it."

THAT'S IT DEPARTMENT

Thanks for sending all the cards and letters. I'm still looking for action photos from your flying fields. Please send them (along with full caption info) to Bob Stalick, 5066 N.W. Picadilly Circle, Albany, OR 97321. MB



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MODEL BUILDING 101

BY J.J. LEVINE

There are all types of clubs and fields, and they're not all equal . . .

It was 2 p.m. on a sunny afternoon and there were half a dozen modelers flying . . . on a Wednesday! This much activity on a weekday is considered normal at the Chattahoochee Riverside Flyers field in Cumming, Georgia.

You have to admit, there aren't that many clubs which can attract even this small number of enthusiasts on an equally perfect Saturday or Sunday. You have to know Don Erch and Hiram Hagggett, chief honchos at this site, to even begin to understand the magic they've created within this quarter million dollar facility.

Envision acreage sufficient to contain a fully paved runway, room for a double-wide, extra-long, air-conditioned mobile home; raised, self-standing pilot platforms; work stations under vast covered areas, self-contained barns that have full machining and building equipment for emergency repairs, and a billiard-like field of closely clipped lawn so vast that it takes a full-sized tractor dragging a double row mower 16 hours to cut! Beginning to get the picture?

You may have read something about the field in my November column in *Model Builder*. You'll be reading a great deal more in future issues. The reason is that the men who have the vision needed to put this project together also perceive the value of adopting the Model Building 101 program as their civic obligation.

At a luncheon conference, Don, Hiram and I agreed the CRF club will allocate a room within its facilities to MB101, the area to be dedicated to instructing schoolteachers and all other interested adults in the MB101 sixth, seventh and eighth grade aeronautics program. CRF members will be invited and in fact urged to actively participate, after being trained by MB101 as instructors and associates. We have also been allocated some storage area to keep our kits, building boards and instructional videotapes.

There will be no salaries or other remuneration to those

connected with this program. However, if past experience is any indication, participants will acknowledge that the experience is substantially rewarding.

All funds that MB101 collects are used to offset costs for student material and other operating expenses. Our financial statement is always up to date and available to any associate within a reasonable time.

Thus we have established the first statewide headquarters for the Model Building 101 program. Georgia now has a central location from which to get accurate information pertaining to the operation and performance of this valuable educational program. We are thrilled and excited about the possibilities for the children who will directly benefit from this alliance. Future MB101 columns will have photographs and reports on events that take place.

With Georgia now covered we have one down, 49 more states to go! Come join us, our phone and fax numbers are noted at the end of this article. We will enjoy communicating with you.

• • •

Almost 700 middle school children are participating in MB101's program this semester!

As you read this, the following schedule at our favorite training ground, Simpson Middle School in Marietta, Georgia has been in progress since November '95. From November 13-21 and November 27 to December 5, about 200 students in the seventh grade built and flew our Step Two Tennyson. Students must have completed our Step One Delta to qualify for this course. This class taught basic aerodynamics and the application of principles to the building and flying of models.

During March 4-12 and April 22-30, 1996, about 200 students in the eighth grade will build our new "RUEL-R/C" convertible. This plane is designed to convert, in the field, from rubber power to electric motor and finally to RC. Although still in development, we have per-

fectured it sufficiently to conduct a class in the eighth grade. All students are required to have completed Steps One and Two to qualify.

During March 11-15, March 25-29 and May 13-17, approximately 300 students in the sixth grade will build and fly our Step One Delta. This introductory craft was created to provide instruction in aircraft nomenclature.

Model Building 101 is *not* a baby-sitting service, an after-school activity or a one-day-a-week program. Each student has a hands-on building and flying experience with teams consisting of no more than two students. MB101 has developed a comprehensive course built around our three models, each of which becomes progressively more complicated and intricate. Each student has the option, in the eighth grade, to design and build a plane of their own as a homework assignment.

Participate in Our National Educational Program

MB101 is a not-for-profit organization with an IRS 501(a) status, dedicated to assisting teachers to instruct students in the building, flying and understanding of the principles of basic aeronautics, nomenclature, physics and mathematics through model airplanes.

Your tax deductible donation of \$25 or more gives you a one-year subscription to our new *Propwash* newsletter. This monthly publication outlines the latest developments in our program of working with children in the sixth, seventh and eighth grades.

Or, if you wish, order our starter package for \$40; it consists of a one-year subscription to *Propwash*, a one-hour instructional videotape "Building the Step One Delta," a Step One Delta model kit, a building board and all supplies needed to successfully build and fly the model. The equipment furnished will also act as a base to build our other two models.

Please address all orders to Model Building 101, Inc., 1891 Branchview Dr., Marietta, GA 30062; (770) 973-3598; Fax (770) 422-2765. **MB**

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The World's Largest Soaring Meet: THE 22nd ANNUAL CVRC FALL SOARING FESTIVAL

Every year this meet grows in attendance and popularity within the soaring community. The '95 event attracted a whopping 258 registered pilots, making this the biggest single sailplane contest in the world for the second or third year in a row.

Two hundred thirty-four pilots made flights and recorded scores at the 1995 Fall Soaring Festival (FSF) at Visalia, California. The pre-registration count was an all-time high—258 pilots! The AMA/LSF Nationals, which allows multiple-class entries per pilot and many more events than just the Unlimited Class, may at times draw more actual entries, but not more people. The FSF is unique.

Even people who don't fly in the meet come in astounding numbers. If you ask people if they're enjoying the Festival, the answer is always YES! And the CVRC members are such professionals at running this meet, they still manage to wrap up the contest at one o'clock Sunday afternoon. With this track record, CVRC can expect the 1996 turnout to be higher still—if they allow it to be!

THE FLYING

Pilots can count on at least seven flights during the two-day meet. Counting re-launches, that's about 1,000 official launches on Saturday and about 800 on Sunday! If you count Friday (the practice and setup day), these winches can see almost 3,000 launches per meet. They get such a full-throttle workout that they need to be rebuilt after every FSF contest and put into storage until the following year.

This many flights from only four winches seems impossible, but it's true. Part of the



This year's FSF winners (bottom row, from left): 1st, Joe Werts (Altronics Sapphire prototype, 2511 points); 2nd, Roger Lackey (Mako, 2511); 3rd, B.J. Welsman (Super-V 110, 2407); 4th, Greg Johns (Super-V 100, 2400); 5th, Mark Tribes (Prism, 2485). Top row, from left: 6th, Mike Aguirre (Mako, 2455); 7th, Gordon Jennings (Blackhawk, 2453); 8th, Keith Kladrick (Sapphire, 2448); 9th, Ben Clerx (Mako II, 2442); 10th, Mark Luvoo (Super-V 100 stretched to 114 inches, 2430). Joe Werts won a 1st place flyoff with Roger Lackey by only 3 points; flight times were identical, landings were 98 and 93. Mark Luvoo's 10th place win made him the winner of the first annual Western States Triad competition. He had the highest points total for the three biggest two-day meets in the western U.S.: the Central Arizona Soaring League's winter meet, the Pasadena Soaring Society's spring meet, and the Central Valley RC's fall meet.

reason the CVRC can handle so many flights a day is that they use super heavy duty winch line supplied by Mike Ratner. The line which runs along the ground during launch is 420-pound test braided nylon; that part of the line which goes up with the plane is 300-pound test! The 300-pound line is the same diameter (3/32-inch) as last year's FSF line, which was rated at 195 pounds. There were no towline breaks, very few towline knot breaks, and only a dozen or so retriever line problems during the whole meet. That's what I call reliable. If you come to fly, fly you will.

Reliable winches, a sharp winchmaster pacing the launches, flight order called by alphabetical groups, and a transmitter impound area run like a little Fort Knox assures the maximum number of planes in the air at any given time. No transmitter is handed out without a frequency pin, and they are gathered in just as efficiently. This kind of control on the ground and in the air means that the skies are always full of sailplanes. You can count on at least a dozen sailplanes, sometimes as many as 18 or 20, to help you find good air. Even if you're not an experienced pilot, just look



Winner of the 55 and older class (new this year) was Ron Widel, shown here with his Airtronics Paraglider. Ron was also a very respectable 12th place overall.



For the first time since 1979, the USA has won both the Individual World Championship FAI/F3B Heisterberg Trophy and now the Team Trophy too! Meet three of the four living U.S. World Soaring Champions, from left: Joe Wertz (1981), Darryl Portides (1986), and Skip Miller (1979). Joe has the distinction of having earned 1st, 2nd and 3rd place FAI W/C models, earned in that order!



Sal DeFrancesco of Northeast Sailplanes Products (NSP) is pleased to offer what he feels is the best pair of Unlimited Class competition ships ever, the Bird of Prey (left) and the Victory C. The two models share the same fuselage and it looks like they might even share the same wing. Call NSP for particulars as these models are brand new.



The annual hedge-hopping, buzz-the-field fly-by always draws a crowd of onlookers and club banners and provides just the right wake-up call for anyone with eyes half closed. Twin-engine Beechcraft Barons are fast enough to have a steady approach, but noisy enough to give you a jolt if you're unprepared! Note the many canopies in the pit row and model expo area—and this is only about 1/3 of those present!



Dr. Paul Clark, of Osaka, Japan, came from the other side of the world with this DCU Viper HLG, which has signatures of all the big international name hand-launch glider builders; he's painting at the one who started it all, Dave Thornberg. Dr. Clark is one of the hobby's biggest HLG promoters.



We love to see youngsters getting involved in the hobby! This is Scott Peterson, age 12, of Los Altos, California, and his 2-meter Spirit from Great Planes. This is his third (!) FSF, each one flown with a Spirit. Check out the great looking MonoKote job!

THE 22nd ANNUAL CVRC FALL SOARING FESTIVAL



Talk about celebrity, meet Dr. Michael Selig, who came out from Illinois to fly the FSF. (Is there anyone out there who hasn't yet flown one of his computer-designed, tunnel-tested airfoils?) His model is the Opus, a design which was created by Selig for Northeast Sailplane Products exclusively. Features his proprietary 80037 airfoil and a minimal drag, drooped nose fuselage. Span is 100 inches, wing area is 750 square inches, weight is 46 ounces. Call MSP for availability.



The raffle to end all raffles! Every year the CVRC's George brothers (Chris and Steve) hunt down hundreds of items for the richest raffle in hobbydom. There were even Aviatex tickets, barbecues, fancy dolls, cases of motor oil, and more non-hobby goods so that everyone could take an interest. Top winners took home Airtronics computer radios, a ready-to-fly Super-V model, and many other expensive competition ships.



Team Airtronics (Specialty Division) is always improving their product line. Now for 1998 is the Sapphire, with a span of 118 inches, area of 868 square inches, and 87037 airfoil. What sets this one apart from the 1995 Peregrine is a new triple-bay planform, new fuselage with slip-on nose cone and all holes pre-drilled, 1/2-inch diameter CF joiner rod, built-up stab, and a molded fiberglass fin post. From left: Joe Wurts, Strip Miller, Tim Renaud, and Bob Renaud.



Fourteen-year-old Ricky Rohlfing of San Jose, California flew his Airtronics Olympic II with spoilers to the highest score among the under-15 group.

around the sky and you can see where the lift is. That's what makes this meet fun to fly!

When it's time to land, this meet gets tough, *fast!* Every year the landing task seems to get more difficult—or as in some years past, just plain weird. Of late, the long, skinny, rectangular runway landing has been favored. This year it was only 2 feet wide with the center bonus a 2-foot square. When you take into consideration the hard-packed dirt and hybrid Bermuda grass surface, sometimes even the "shark teeth" and skegs weren't enough to stop you on target. Land with one wing even a little low or dork your landing even a little and you were just as likely to miss because

your plane bounced or turned sideways into the zero zone. If the landings were graduated circles (using measuring tapes), the top ten winners might be very different.

As if the FSF didn't offer enough to satisfy the most hungry sailplane pilot, this year the CVRC added a hand-launch glider event. Word was given on relatively short notice that a HLG meet would be held Saturday after the official flying was over. Cash entry was something like a buck or two for a winner-take-all cash prize. Each plane had to be on a different frequency and almost every possible frequency was taken! The tasks were 25-second "blind" precision duration with a measured spot landing, and a limbo task. Believe it or not, a

polyhedral ship won the limbo.

The FSF features what must be the hobby industry's most lavish raffle. Estimates of value range from \$5,000-\$8,000 worth of hobby and non-hobby merchandise, full-size soaring lessons and international travel tickets. You name it, you can win it. In past years, even vasectomy surgeries were given away with much hooting and laughter.

Then there is the Midway. This has become a sailplane modeler's wish-list mini trade show. Dozens of cottage industry and mainline model manufacturers set up booths to display their latest hardware and kits. You can buy everything you need here, from the latest contest ship and all the ac-



Ben Clerx now offers an upgraded Mark II Mako. The primary differences between this and the original Mako are: 1) the "Joe Wurts F3B wing planform," which has a little less tip area for higher aspect ratio and more elliptical lift distribution; 2) carbon wing skins replace the obuchi skins; and 3) carbon spar and joiner rod system. Mako II's will be available by early 1998.

cessories, to raw composite materials, to travel and storage bags for model protection. Always bring plenty of cash to this meet!

SAILPLANES AT THE FSF

This year, more so than in the past, there was a delightful mix of models flown. Older designs like Olympic IIs and Sailaires were flown as well as the most modern ships. Polyhedral models, wood kit planes, fiberglass and carbon composite ships—they were all here. In fact, so impressed was I over the variety that for one complete round I sat at the "Transmitter Out" table and recorded what models were passing by to the flight line. Here's the result of my poll:

- Original designs—27
- RnR Genesis—21
- Airtronics Thermal Eagle—19
- Ben Clerx Mako—18
- Airtronics Falcon 800/880—12
- Ron Vann Prism—12
- Airtronics Peregrine—10
- Airtronics Legend—8
- Mark Levoe Super-V 110—7
- Mark Levoe Super-V 100—7
- Ron Vann Spectrum—7
- Airtronics Sapphire—6
- Layne/Urwyler Saturn 2.9T—6
- Mark Allen Skyhawk—4
- Airtronics Legend SC—3
- Competition Composites Blackhawk—3
- Mark Levoe Super-V 2M—3
- Pierce Aero Paragon—3
- NSP Opus—3
- TEKOA Shadow—3

The list tapers off to designs where only one or two were present, but that list is an incredible 33 models long, all kit aircraft—an accounting of 215 models! Obviously, a few got by me in the crowd, or a few models went around the other side of the transmitter impound area where I couldn't see them, but there you have it. I find that

the 27 original designs, which included models with scratch-built wings and tails on existing fuselages, or multiple "parts" planes (conglomerations), is proof that there are still creative/inventive minds at work out there. I for one am glad to see it!

Bill Forrey, 3610 Amberwood Ct., Lake Elsinore, CA 92530; (909) 245-1702 (voice or fax), e-mail at bforrey@aol.com. MB



The most unusual original design was Jerry Robertson's 2-meter "Sisu" (Finnish for gutsy). The 35-ounce model featured a most unique aileron which spanned the outer two wing panels and tapered to a point on the T.E. nearest the wingtip in a kind of "rectangle/triangle" shape. This was done to eliminate any tip vortex (i.e. drag) formed by aileron deflection. Other performance-optimizing features included tiplets to increase L/D and a drooped nose to minimize fuselage drag. The 585 square inch, 34083 wings are custom cut from a combination of gray and Spyder foam, then vacuum-bagged inside carbon fiber skin by Fred Sage.

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Helicopter World



BY JAMES WANG

CHOPPER CHATTER

James outlines some of the more interesting models that showed up for the 1995 West Winsor Fun-Fly in New Jersey, and talks about some of the new helicopter accessories on the market.

This past summer I attended the West Winsor Club Fun-Fly in New Jersey, which attracted only about 30 fliers but brought out many interesting helicopters. Phil Thayer of New Jersey brought two unique models. One was a Hirobo Shuttle powered with an Astro 25 Cobalt electric motor and 16 1700-mAH NiCd cells. There is a 2:1 gear reduction on the electric motor, then the output shaft is connected to the stock Shuttle clutch bell.

On a full charge, Phil looped and rolled the electric Shuttle for a full 5 minutes. The performance was better than my Whisper or EP Concept. The acceleration was about 3/4 as fast as a gas Shuttle, but there's no noise at all! It was impressive.

Phil makes and sells the electronic speed controller that he uses. The \$65 unit has a microprocessor, can handle 60 amps continuously, and is designed for 6 to 20 cells. This excellent speed controller can be ordered from Phil by calling (609) 584-9409.

Phil also brought an X-Cell 60 powered by a YS .91 Air Chamber four-stroke engine. Four-stroke engines are becoming more popular because they're quieter and give better fuel efficiency. The flight time is half again as long as that of a regular .60-size two-stroke. Also, the sound is more muffled and has a lower pitch.

I'd say the performance of Phil's four-stroke X-Cell was about 90 percent that of a standard .60-size X-Cell. Currently, four-stroke engines cost about twice as much as comparably powerful two-strokes. Another drawback is that the carburetor faces the bottom of the helicopter, so it's prone to sucking up dirt. If the price of the engines drops, four-strokes may become more popular in helicopters.

Ken Blankenburg brought a highly modified Shuttle with an O.S. .46H sitting inside Rave's Manufacturing's G-10 sideframes. The stock rotor head and the 8mm rotor shaft were replaced by an X-Cell 60 head and a 10mm shaft. A Shuttle metal Super-Radius arm is used to prevent the swashplate from rotating. Ken says the X-Cell 10mm bearings fit perfectly in the old Shuttle bearing block. This is a hot and fast Shuttle!

Talking about speed, Wayne Hildebrand brought an X-Cell 60 powered by the new Don Chapman/Nelson DC-60 heli engine. This engine costs over \$400, but seems to have great potential. It's powerful and smooth. Wayne did low passes over the field at close to 90 mph. The 680mm Zig-Saw GP-9 fiberglass blades on Wayne's X-Cell also contributed to the high speed.

Tom Donnelly flew a Ninja 30 at the fun-fly and did very well. Tom flies his Ninja from a wheelchair. Hando Homann helped push the chair around as Tom maneuvered the helicopter.

The fun-fly maneuvers were copied from the Schluter Cup novelty event in Germany. Each pilot must fly his helicopter in a figure 8 pattern around two tall poles located 10 feet apart. The more figure 8s the pilot can complete in 2 minutes, the higher the score. Another task is to see how many soda bottles the pilot can knock over from a card table in 2 minutes. A third task is to use the landing skid to pick up a triangular ring from an 8-foot high platform and then drop the triangle on the ground; just repeat it as many times as possible in 2 minutes. The highest total score wins the event.

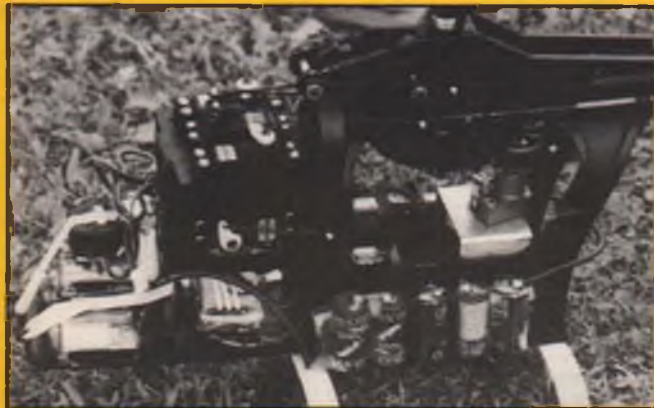
By luck, yours truly won the contest with a score of 23. In 6 minutes, I did 17 figure 8s, knocked over four bottles and picked up the triangle twice. You may want to try these events at your club fun-fly. To find out more about how to set up these events, you might contact the West Winsor fun-fly contest director, David Ramsey, at (908) 297-5828.

Jim Davey, a contributing editor from *British Helicopter World* magazine, showed up with a



English heli enthusiast Jim Davey flying his .30-size Shuttle at the New Jersey fun-fly. Model has Hel-X sideframes and an Augusta A-100 fiberglass fuselage from Yellow Aircraft. A very smooth and scale-like flier.

Helicopter World



Phil Thayer's homemade electric Shuttle, powered by a geared Astro 25 Cobalt motor running on 16 1700-mAH Sanyo SCRC cells. More in text.

pretty Hirobo Lama and a Shuttle fitted with a Yellow Aircraft Augusta A-109 fuselage. Even though Jim did not perform any aerobatics, everyone loved the smooth and scale-like flight of his two models. Both models were quiet and scale-like because he uses a low rotor speed.

NEW GOODIES

Now let's take a look at some new heli accessories. The first one, and one of my favorites, is the digital tachometer from Miniature Aircraft USA. This new unit is much easier to use than the older Skytach. The new tach has a large, easy-to-read liquid crystal display that shows rotor speed from 1,000 to 2,000 rpm. The little window on the tach is for the user to peep through. There's an electric motor inside that turns a disc with holes in it; the motor speed is controlled by a switch on the left. You simply look through the window and bump the motor speed up or down until the blade image appears to freeze. The rotor rpm is then displayed on the screen. The unit costs slightly over \$100, but it can help you fine-tune your helicopter setup, or check out what rotor speed other people are using.

There are many new accessories from Horizon, distributor of popular helicopter products from Kalt, JR, KSJ accessories, NHP blades and their own Revolution line. One of the many nice upgrade items from KSJ is a machined aluminum throttle arm, available for the O.S. .32 (#KSJ1279) and the O.S. .61 (#KSJ1262). These arms have a split-collar clamp designed to securely grip the throttle barrel without marring it, and they extend the linkage mounting by 15mm to allow proper linkage clearance.

Another well-made item from KSJ is an aluminum exhaust diverter for the popular KSJ N-30RS muffler. The diverter is machined from aluminum bar stock and attaches to the muffler with screws. Its adjustable



Miniature Aircraft's optical tachometer—handy for measuring a helicopter's rotor speed. Safe, accurate and easy to use.



A bit of body English seen here as Wayne Hildebrand performs a switchless inverted hover. His X-Cell 80, with a Don Chapman DC-88 engine, was doing close to 98 mph.

rotation allows you to aim the exhaust away from the aircraft for a cleaner model.

Horizon's Revolution line features two new heli hop-up items for the .30-size Kalt Enforcer. There's a machined aluminum lever bracket (RVO1031) which improves the pitch and roll control rigidity; and a purple-anodized aluminum cooling fan (RVO1029), also machined from bar stock, which is more precise and better balanced than the stock molded plastic unit.

A third item that's not heli-specific is the neon-colored Lightning Line fuel tubing. These 3-foot long, tough silicone fuel lines are available in neon red, orange, pink, yellow and green. They make the helicopter look vibrant. They have good elasticity and I use them on all my models.

Finally, let's talk about the NHP rotor blades made by Dave Whitney in England and distributed in the U.S. by Horizon Model Distributors. Dave has always been hooked on speed and blade design. In fact, he still holds the official FAI world speed record of 87 mph for a model helicopter. It was set eight years ago with a streamlined Kalt Baron 60.

The original NHP blades have a white self-adhesive film attached to the top surface only. The white tape covers only the rear 80 percent of the blade—the leading edge is exposed. The idea is to aerodynamically trip the thin boundary layer on the airfoil from laminar flow into a turbulent flow. In theory, this can allow an airfoil to stall at a higher angle of attack. This in turn can reduce drag on the retreating side of the rotor disc (that's where high blade pitch angles occur) and make the model helicopter fly faster.

Dave has kept this design and produces the blades in 660mm (#NOH660F) or 680mm (#NOH680F) lengths with a semi-symmetrical airfoil. The suffix F stands for FAI. NHP recommends these for FAI-style flying because of the increased flight speed and the fact that the semi-symmetrical airfoil gives excellent lift for autorotations. Because of the semi-symmetrical airfoil, these blades are not recommend for extended inverted flying.

NHP also has three other series of .60-size main rotor blade designs: standard symmetrical airfoil blades (with suffix S), 3-D hotdogging blades with the symmetrical airfoil but less weight (with suffix D), and the Curtis Youngblood Special 680C.

The standard symmetrical airfoil blades are available in 640, 660, 680 and 710mm lengths. They all weigh 180-190 grams

Helicopter World



KSJ's machined aluminum throttle arm, available for the O.S. 32 and O.S. 61.

A couple of new additions to Horizon's "Revolution" line of proprietary aftermarket helicopter accessories. These being produced for Kall Enforcer, Futura: a machined aluminum lever bracket (left), said to provide increased pitch and roll control rigidity; and a machined aluminum cooling fan, which is better balanced than the stock plastic fan and therefore reduces vibration.

each. The symmetrical airfoil gives a nice stable hover, and good right-side-up or inverted flight characteristics. The 3-D blades are available in 660 or 680mm lengths only and average 155 grams each. Even though they're light, the lead weights are inserted close to the blade tip, which makes the rotating inertia very high. Therefore, the 3-D blades still give good autorotations.

Another feature that makes the NHP blades inherently stable and also makes the helicopter stable is that the lead weights are glued close to the leading edge. This keeps the chordwise center of gravity forward. NHP blades typically have their CG near 27 percent. Full-scale helicopter research has shown that if the chordwise CG can be moved to ahead of 20 percent, the helicopter can become inherently dynamically stable.

The Curtis Youngblood Special Blade (#680C) was developed by Curtis and his father in conjunction with Dave. These are the blades that Curtis used on his X-Cell to capture 1st place at the 1993 World Championships and 2nd place

with his Futura at the 1995 World Championships. The 680C looks similar to the standard symmetrical airfoil NHP blades, but differs slightly in airfoil and is available in 680mm length only.

I've tested the 680C and the standard symmetrical NHP blades on my X-Cell and Futura, and they do fly very well. They give excellent hover and autorotation, but the forward flight speed is not as fast as some other blades.

All NHP blades, including their .30-.40 size blades and tail blades, are made from unidirectional carbon fiber, making them much stiffer than traditional fiberglass blades.

I am very impressed by NHP's workmanship. The different main and tail rotor blades that I've used all came perfectly balanced in the spanwise and chordwise directions. There have been no problems with blade flutter

or tracking. And I think their tail blades are among the best you can buy. I have replaced the plastic tail blades on all of my .60-size machines with NHP tail blades. Just be careful when you do autorotations, because these carbon tail blades tend to split if they happen to ding the ground. Minor tip damage can be repaired using CA glue, but you'll have to balance them again. These blades are more expensive than wood blades, but I think you will like them!

James Wang, 7365 Main St., Suite 106, Stratford, CT 06497. MB



Some of NHP's high-performance carbon fiber rotor blades. From top: 660mm symmetrical airfoil standard blades, 680F high-speed semi-symmetrical airfoil FAJ blades, and 680C Curtis Special symmetrical airfoil blades. Just a few of the many sizes and types available.

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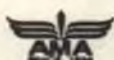


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OVER THE COUNTER *cont. from page 13*

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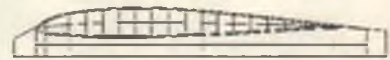
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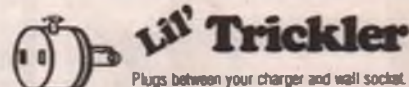
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PLUG SPARKS *cont. from page 34*

that failed to place.

BROWN JR. REPORT

With the Brown Jr. event becoming so popular, it was inevitable that our aerodynamic specialist, Dick Huang, of SAM 29, the "Planesmen," would work up a chart showing the Brown Jr. did really live up to its claim of 1/5 horsepower. The chart shows that the maximum horsepower of about .26 hp at 6,000 rpm is indeed proof of the pudding.

Space does not permit us to show all the work, research, and factors that went into the production of this most interesting study. This columnist notes a 14x6 propeller was used while he (back in 1935-37) used hand-carved 16x4 propellers. The rpm figures were about the same but a considerable increase in thrust was noted. However, the graph is extremely usable as who carves gas model scimitar props these days?

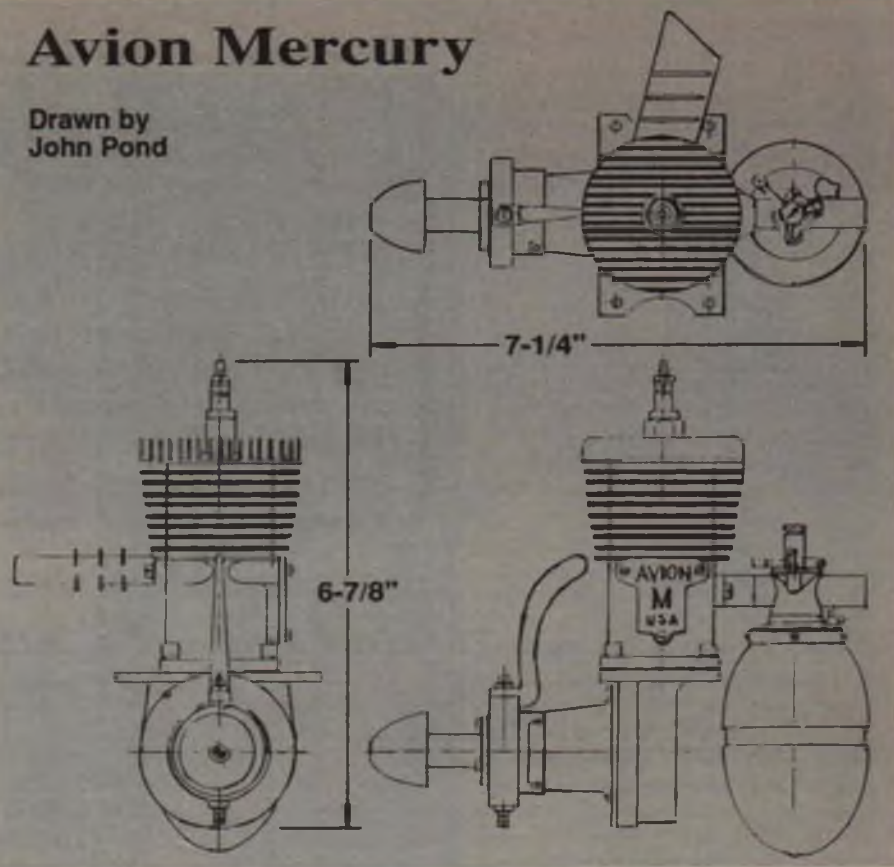
MODEL OF THE MONTH

This month's model marks the transition of model design from the huge soaring models developed under the Texaco Fuel Allotment event to the newer, faster, limited engine run type models.

Such a model is presented this month,

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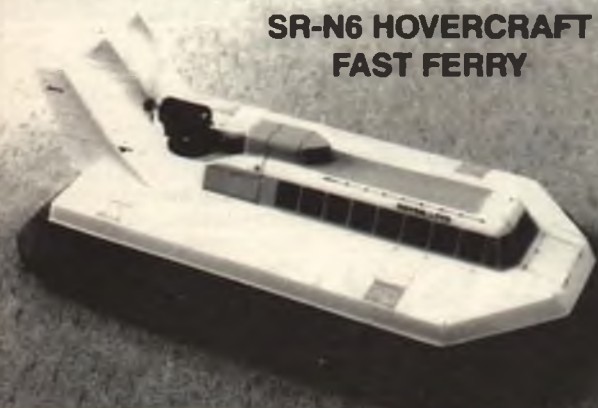


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known as the "Chickadee" as designed by Sidney Struhl, one of the mainstays of *Model Airplane News* in rubber power flying scale models. As can be seen in the drawing, the wingspan has been held to 6 feet 10 inches. Of course, the Brown Junior was still the competitive engine and this size model seemed to suit the output of horsepower.

As Struhl describes the flight test measures, he mentions that with the engine ticking over in a slow four-cycle, the model would readily take off. Due to its nice streamlined fuselage, the model demonstrated a startlingly steep climb, spiraling up with the best designs at its time.

The wing mount, consisting of three plies of 1/8-inch balsa sanded to a semi-streamlined shape, was a very popular way of mounting the wing to the fuselage in the early days. Wing mounts such as these were run in the Atwood California Champ, Chapman's Five Foot Model, Berkeley Courier Sportster, and a host of other good-looking flush-wing designs. The blocks made for a steady, vibration-free platform that allowed for some adjustment for balance and proper wing incidence. The airfoil used was the Grant X-8 which was a compromise section to allow a snappy climb and good glide. At that time, to relate an anecdote, the best way to have your latest "hot" design published in *M.A.N.* was to use one of Charlie Grant's airfoils. Hence, you will note the use of these rib sections in some of Taibi's designs. This is not



Photo No. 8. Photographed by Sal Frusiano at the 1948 Wakefield team trials at New Brunswick, New Jersey, John Zalc (Frank Zalc's younger brother) shows off his low-wing streamliner, complete with retractable landing gear.

intended as a "knock," but editor Grant felt if the modeler had no other preference, why not select one of his numerous airfoils that had been proven in the competitions?

No question about design, when the K-C (Grant's design) first appeared, gas model designs made a quantum leap in design. Careful inspection will reveal most of these proportions and moments were retained although cleverly designed in other forms in so-called follow-on "original" designs.

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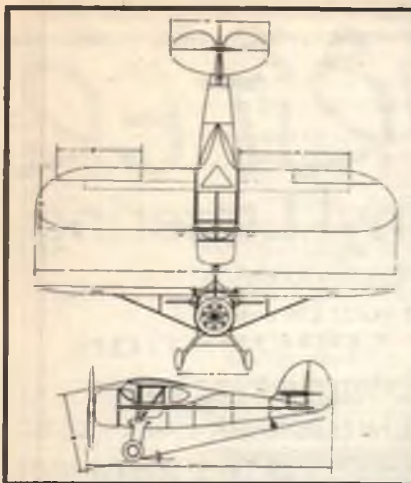
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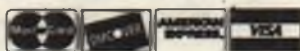
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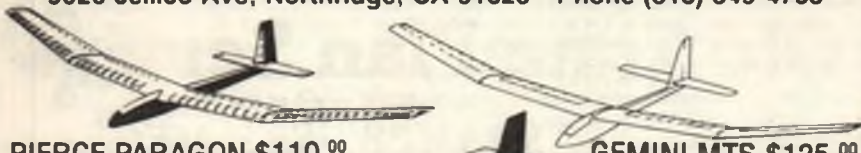
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the transmitter and the meter. The reading changed drastically. George is right; opaque Micafilm is conductive to RF, even though it is non-conductive to DC, and it therefore can affect radio range. Transparent and translucent colors of Micafilm showed no reaction in the microwave oven and no effect on the field strength meter readings. Neither did non-metallic colors of MonoKote and other non-conductive films and coverings.

I then called Jeff Troy, a technical man at Coverite, the marketers of Micafilm. Jeff had never heard of the problem, and didn't know what was in opaque Micafilm that would conduct RF. My son Greg later offered a possibility which makes sense. Greg says he believes that aluminum flakes are used below the surface in some opaque finishes to enhance the opacity. That's consistent with the appearance of the piece of opaque white Micafilm I put in the microwave. Before cooking, it looked pure white and non-metallic, but now the shiveled remains have a matte aluminum or metallic white color.

Dear readers, this is a lot more depth on antennas than I ever intended to get into here, and it won't interest everyone; but when sources of good and useful information come my way, I must share them.

COLUMN PRESSURES

I apologize to those of you who were promised some particular thing in MD&TS long ago and have yet to see it.

I have a big file in my computer of items already written for use in future columns. I just added up the bytes in it and find there is enough material there for over a year of MD&TS columns of the maximum length which *Model Builder* allows me. Some of those items have been waiting there for three or four years, because new material, both from you and from my own brain, is added to the file faster than I can use it.

Interestingly, I get more letters from technically-educated and/or experienced people who want to correct me, correct other people I have quoted, or who want to make contributions of their own, than I get from modelers who have questions or need help. That's fine with me. I'm sure there are thousands of readers out there who are learning useful things from MD&TS; but like students who seldom raise their hands, those readers don't make themselves known to me as often.

I started by observing that I have plenty of good material for the column; but the more I yammer away in this vein, the less space I will have left in which to use the stuff; so 'nuff said.

MD&TS INDEX

Yes, I keep an alphabetical listing of all of the items that have ever appeared in

MD&TS, but I don't often find the time to bring it up to date. This is a red-letter day; the index is again current. I maintain the MD&TS index mostly for my own use in writing the column, and refer to it frequently; but, as I did once some years back, I am making it available, for a price, to any of you who want a copy. The MD&TS index goes back to the June 1988 start of MD&TS, and is now up to eight pages, with 360 subjects listed, and about 800 references. It's yours for a dollar plus a business-size or larger self-addressed envelope with 55¢ postage; or \$5 if you make me address the envelope and put on the stamps. Write clearly.

THE POWERED POGO STICK

I guess we could say that all pogo sticks are powered during use; usually human powered. But this one is gasoline powered.



The lazy man's pogo stick, the gasoline-powered "Hop Rod" as owned by our columnist. Explained in text.

I don't know who invented it, but the patent number is 2929459, if you want to look it up. It was made by Chance Manufacturing Company, of Wichita, Kansas, under the trademark "Hop Rod." Chance is one of

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My Hop Rod is still in hopping condition, but Chance hasn't made them for about 25 years. I suspect they were withdrawn from the market because they are a little dangerous to use. Mine threw me and bruised my elbow, and son Greg got a broken foot from it. No company could continue to live with that potential for accidents in this age of rampant liability suits.

The Hop Rod is easy to ride. The engine runs at about 60 hpm (hops per minute), and it gets good gas mileage. It lifts passive adults three or four inches on each hop, but light kids get much more altitude. If the rider jumps with the machine, he or she can go a lot higher. By locking the knees and letting the machine do all the work, the rider only needs to steer, by leaning in the direction of desired travel. It can only "fly in ground effect" and it makes one "touch and go" for each power stroke. (I haven't tried looping it!)

The gasoline engine itself is unusual. It is strictly linear and has no crankshaft or other rotating parts. It is a two-stroke type and uses oil in the gasoline. The bore is 2 inches and the stroke is 4 inches—definitely a "long stroke" engine. The whole engine travels up and down, except for the piston, which stands still all the time the tip of the stick is on the ground. The engine is a linear equivalent of the old WWI rotary engines, where the engine rotated with the propeller and the crankshaft did not move.

Ignition is by a primitive system which was used on some regular gas engines around 1900. The tubular upper post of the pogo stick has eight C-size dry cells in it. These are connected to the coil and to the spark plug. There is no condenser, and no breaker points in the usual sense. The coil has only a single winding; it is not a step-up transformer as modern spark ignition coils are. The spark plug has only a center electrode, and that consists of a long spring wire which extends into the cylinder.

To operate this unorthodox collection of parts, the rider jumps on the foot pads, and the weight forces the cylinder down to compress the mixture against the stationary piston. At the top (actually "bottom") of the stroke the spark plug electrode makes electrical contact with the top of the piston, and the battery energizes the single-winding coil. As the cylinder leaves its lower position the electrical connection between piston and spark plug electrode is broken. The magnetic flux in the coil core then rapidly collapses and induces a high voltage in the winding, which causes a spark across the widening gap at the spark plug electrode, which ignites the mixture. BANG, BANG, BANG. I should try a glow plug and glow fuel in it some day. Nah—it fires at such a slow rate the glow plug would never stay lit.

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