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Harold H. Carstens publisher

Robin W. Hunt editor

Frank Fanelli associate editor **Robert Aberle**

technical editor Robert O. Cosgrove

director of advertising John A. Earley advertising manager

David R. Case advertising production manager

Agnes Clark editorial secretary

Judy Lovas office manager/bookkeeper

Phyllis M. Carstens assistant to publisher

Circulation Manager: Henry Carstens Circulation: Jeanne Sipley, Vickie Bohley, Rose Gervasi, Carole L. Olinger

Advertising Production: Joann McMickle, Faith Henderson

Advertising Secretary: Mary Ann Lengle Advertising Billing: Rosanne Gervasi

Reader and Plans Service: Maryann Germann Dealer Service: Cathy Streeter

Shipping and Plans: Dominick Bianco, Thomas Heaton, Michael Heaton, Ronald J. Gardner

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On the Cover: While a Yellow Aircraft F-14 Tomcat departs Mountain View Airport in Belleville, Canada, Eric Baugher's colorful Viper gets ready to taxi to the active. Eric's plane comes from the Bob Violett Models' kit and was seen at the Quinte '88 Jet Rally along with the big, impressive swing wing Tomcat. Photography: Frank Fanelli



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OTO NEUK FARUKH

Down and dirty, Dennis Crooks makes one low pass down the runway with his big F-14 Tomcat before coming around for a landing at the Sixth Annual Greater Southwest Fan Fly. This 1/sth scale ducted fan plane comes from a Yellow Aircraft kit and with its swing wing mechanism shows they really have come a long way, baby

ention the names P.E. Norman, Roy Clough, Henry Struck, or Bill Effinger and you're talking about the ducted fans of thirty years ago. Their crude-by-our-standards creations were certainly triumphs of ingenuity then but they probably were filed away as "merely interesting" by a majority of modelers. I wonder if, in what must have been a sometimes lonely endeavor, they ever envisioned the present "future" they helped start and we now enjoy.

It certainly is a glorious future. Swing wing fighters, big twins, sophisticated radios, powerful engines and fan units, blazing speeds, a growing variety of kits, composite materials, even a real gas turbine engine here and there-it's a dazzling variety and wealth that probably would bewilder those pioneers of old. Judging from the turnouts at the three fan flys on our International Tour more and more modelers are sharing the wealth. Fans are no longer idle curiosities in a backwater of specialization.

But even while ducted fan models have achieved a much broader status they're still not an "everyman's" type of airplane yet. That hopefully will be our "future" and it may come a lot sooner than the future of the early pioneers. Fortunately, we have our own present day visionaries who are now turning their attention from the successful quest for speed, performance, or complexity to the broader needs of noise reduction, simpler airframes, and less than supersonic speedspriorities that can help put a ducted fan plane in the hangar of many an average modeler.

When will that be? Sorry, the crystal ball is on vacation, but at least I'll stand up and say that it will only be a few years, not thirty. The pool of ingenious, dedicated fan modelers is still growing and there are a lot of people who have more than a casual interest.

For now, though, sit back, strap in, forget the future and enjoy our intercontinental safari through the world of fascinating fans. -FRANK FANELLI Œ

AIR SHOW



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WALT MOUCHA MODELS, P.O. Box 112, Menomonee, MI 49858, is proud to announce the release of their new ^{1/4} scale replica Marquart Charger, winner of the prestigious Oshkosh Grand Champion Award. The model has a 74 inch wingspan (both top and bottom wings), a 12 inch chord and a fuselage length of 60 inches. Total wing area is 1,776 square inches. The prototype model is powered by a stock Quadra 35, and weighs 16^{1/4} pounds. The deluxe kit features high quality die-cut ribs, formers, fuselage doublers, etc. Cabane wires are pre-bent for quick and easy installation along with pre-bent aluminum landing gear. Vacuum formed cowl and pants are included along with mylar decals. A generous hardware bag is included with over 100 pieces of assorted bolts, kwik-links, blind nuts, etc. (Note, the hardware package does not include hinges and pushrods.) There are two (2) large sheets of full-size plans (total of 38 square feet), and a complete instruction book showing framework shots and completed model. The construction of the model is of all balsa and plywood. Both wings are one piece, making for easy transportation and quick set-up at the field. For more information.







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3) Apply a few drops of CA glue . . . and you're done!

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FUTABA CORPORATION OF AMERICA, 555 West Victoria St., Compton, CA 90220, announces the 5UAP/5 Channel PCM 1024 Aircraft System. Under a flip-up front panel on the transmitter is a full array of programming controls, including ATV adjusters for aileron, elevator, throttle and rudder, dual rates for aileron and elevator, and servo reversing on all channels. In addition, the 5UAP tuning panel lets you select PPM(FM) or PCM 1024 signal generation and preset Fail Safe. The 5UAP transmitter is ergonomically designed for a comfortable grip. Other transmitter features include adjustable, open gimbal control sticks, fine trim adjusters, built-in Nickel Cadmium battery pack and carrying handle. The 5UAP includes a built-in trainer system. Using the optional trainer cord, control can be instantly switched from student to instructor. The receiver for the 5UAP system is the R129DP. This is the same 9 channel, PCM 1024 receiver used in Futaba's 9UAP professional systems, and is fully 1991/20 KHz compatiz ble. The 5UAP system is equipped with four S148 servos, which are assembled using wireless SMT (Surface Mount Technology) to eliminate vibration related damage and failure. For more information, please write to the address above, or call: 213/537-9610.



GREAT PLANES MODEL DISTRIBU-TORS, PO Box 4021, Champaign, IL 61820, has announced their entry into the ARF field with the introduction of the O.S. Ryan. This model is a faithful reproduction of the great trainer plane built during the 1930s. The model is 90% complete right out of the box and features a specially designed four layer covering technique that is both durable and beautiful. The Ryan also comes with most of the necessary equipment to get this plane fly-

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GREAT PLANES MODEL DISTRIBU-TORS COMPANY, P.O. BOX 4021, Champaign, IL 61820, announces that the Kyosho KS-88 servo is now available for use in your R/C plane, boat, or car. This is the same servo that is standard equipment with the Pulsar Pro 2000, Pulsar EXP 2001, and Impulsa II radios. The KS-88 delivers 34.0 ounce/inches of torque, and measures $1^{9}/_{16}$ inches $\times 1^{7}/_{16}$ inches $\times 3^{1}/_{4}$ inches, and weighs 1.6 ounces. For more information, please write to the address above, or call: 217/398-6300.



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AIR FLAIR, Box 2075, Fairborn, OH 45324, has added the Express to their expanding line of big birds. The Express features a constant chord wing, conventional landing gear, and midwing design in a sport plane for 1.2 four cycle to 1.5 two cycle engines. The fuselage, cowl, wing and tail surfaces are of builtup construction with the front of the fuselage skinned with 1/32 plywood. The kit includes

wing joining hardware and 1/4 wire landing gear. The Express has a wingspan of 81 inches and a wing area of just over 1100 square inches. The kit for the Express is available direct for \$125.00 plus \$5.00 for shipping and handling. Payment may be by check, money order, or Visa/Mastercard. For more information, please write to the address above, or call: 513/878-7487.

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IKON N'WEST, P.O. Box 306, Post Falls, ID 83854, announces the 1/5 scale Waco Taper Wing, one of the most successful aerobatic biplanes of the "Golden Age" of avviation. This model features a wing span of 72.7 inches and a suggested finished weight of 12 pounds. The kit features plans from inked drawings, select balsa and spruce, hand cut parts, fiberglass cowl, pre-bent wire parts, instructions with photos, large hardware package, optional rigging kit, and more. The kit for the Waco Taperwing is priced at \$180.00 plus shipping. Write to the above address for more information, or call: 208/773-9001.



PRENTICE HALL PRESS, One Gulf+Western Plaza, New York, NY 10023, introduces Modern Fighters, a new book in the Combat Arms Series. Included in Modern Fighters are all of the fighters currently in operation from around the globe. These are presented in a highly detailed and illustrated manner, and in full color. More than 60 action photographs, and over 50 color illustrations with precise diagrams bring these fighters to life. An introduction highlights the details of modern fighter design, the state-of-the-art weaponry and technology, and even plots future developments in fighter design. There is also a section on the armaments, such as guns, missles, and bombs, that are carried by the fighters. Modern Fighters is priced at \$14.95. For more information, please write to the address above, or call: 212/373-8141.

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ZENITH AVIATION, PO Box 2, Osceola, WI 54020, has recently released a new addition to the Osprey Air Combat series of books on modern military aircraft. Grumman A-6 Intruder presents a detailed look at this important but little understood aircraft. The book examines both the ground attack Intruder and its electronic warfare version, the EA-6B Prowler. Nearly 200 photos, drawings, and detailed text completely profile the design, development, and operational use of the A-6. Part of the American front-line firepower for over 25 years, the A-6 has flown 35,000 combat missions. Included also are testing, cockpit, weapons, and other photos. The book, which retails for \$19.95, is available from Zenith at their address above.

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BP INDUSTRIES, P.O. Box 176, Canby, OR 97013, is featuring their Boxes Plus line of DB models for the upcoming season. The DB is available in both a four drawer model, the DB-4D; and a six drawer model, the DB-6D. The suggested retail price is \$74.95 and \$79.95 respectively. These models are durable, lightweight, and cost less than comparable kits. The boxes come presanded and ready for paint or stain. Features include lockable latches and heavy duty hardware. Overall dimensions are 17 inches tall by 10 1/2 inches wide by 22 inches long. The DB-6D has a five inch deep top compartment and six drawers in three assorted sizes. The DB-4D has a top compartment that is deep enough to hold two 1/10th or 1/12th scale cars and still have lots of room left for accessories. The DB-4D can also be used for gas powered hobbies with the addition of their P-10, one gallon fuel container. For more information, please write to the address above, or call: 503/263-6281.

SQUADRON SIGNAL PUBLICATIONS, 1115 Crowley Drive, Carrollton, TX 75011-5010, has recently published No. 87 of its Aircraft in Action series. The new book, O-1 Bird Dog in Action, was written by Al Adcock and illustrated by Joe Sewell with color illustrations by Don Greer. It uses the series' standard format of text, black and white pictures, line drawings, and color illustrations to present the history of Cessna Aircraft's widely used and long lived liaison/forward air control aircraft. There are well over 100 photos and many line drawings in the softcover book's 50 pages that show all the models, variants, and many of the paint schemes employed on the aircraft. The book is now



avaialble at local hobby dealers or from Squadron Signal at their address above.



MONOGRAM MODELS, INC., 8601 Waukegan Rd., Morton Grove, IL 60053, has announced the Mini Masterpieces series. Offered in the series are models of the Huey Cobra, P-51 Mustang, F-101 Voodoo, and P-40 Warhawk. Each kit is detailed with fine engraving and contain a similar number of parts to bigger scale kits. Each selection in the Mini Masterpieces line holds an important place in the history of combat aircraft. The P-40 Warhawk was America's first massproduced fighter, and the P-51 Mustang was the best fighter of World War II. In the modern age, the Huey Cobra changed the structure of ground combat, and the F-101 Voodoo set new limits for jet aircraft speed and range. Each selection in the Mini Masterpieces series is priced at \$3.00, and are available at your local hobby retailer.

TWINN-K, INC., PO Box 31228, Indianapolis, IN 46231, has introduced a sheet of carbon fiber blank that measures 5 inches \times 15 inches and is .090 inch thick. This blank can be cut and drilled for any high strength-toweight application.





Winds of War

I never thought I would ever have cause to write to a model aviation magazine on the subject, of editorial judgement or political motivation, but Dick Sarpolus' feature, "German T-6's..." in your February, 1989 Edition prompts this letter. I enjoy your magazine, and have always admired Sarpolus' excellent designs and wide interests in various facets of our hobby, so it pains me to write this critical letter.

As we both know, AT-6's were not employed by the Luftwaffe. So the swastika adorned airplanes pictured are not so decorated for historical authenticity. Also, the swastika is not simply a symbol of German ethnicity. It is actually of Indian origin, and adapted by the Nazi party as their symbol. Prior to Hitler's ascent, and following his demise that symbol has not been used to symbolize German nationality.

So why are these AT-6's carrying the chosen symbol of the Nazis. It can only be that the owners wish to make a pro-Nazi political statement.

This is America, and they have a right to do so. As for Mr. Sarpolus and you, I prefer to believe that you are insensitive to the political message these members of the Condor Squadron are promulgating, and that you failed to see that by publicizing their message you are aiding their cause of hatred. For to believe that you knew what you were doing in publishing the article, is to say that you share their Nazi ideology.

If I am correct, then you owe an apology to Jews, Slavs, Gypsies and others who were the targets of Nazi genocide, and to the relatives and descendants of the more that 50 million who lost their lives in World War II.

If you are not yet convinced of the truth of what I've written, ask yourself whether a German magazine would publish this article.

Incidentally, I find nothing wrong in owning and flying a Messerschmidt with Nazi insignia. It is actually and historically correct, as a model of it would be. Sincerely.



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FLYING MODELS



Rattle those old brain cells, shake the dust off those old time building skills, and relive the "thrilling" yesteryears of modeling. The author's *Silk Stik* is a tribute to the olden times of Ambroid glue and dope/silk finishes with the modest performance of a modern R/C sport ship.



By Dan Reiss

Silk covering, strong and beautiful, is seldom seen. Here's a chance to try it with this .60 sportster.

ith today's modern high performance radio controlled models being made from foam, plastics and resins, it's hard to believe that at one time these materials were not only not used but weren't even words in a modeler's every day vocabulary. Models were constructed with balsa, silk, and dope and held together with model airplane glue (or as the tube said, "cement"). They were the only staples in a modeler's workshop and there just wasn't anything else available.

My beginnings in modeling were meek and juvenile during the forties but my skills and techniques developed as the technology available improved. Over the years, as I found myself diverging even further from those simple and basic roots, I began to wonder if I had lost those skills I had grown up with. To alleviate those fears, I designed *Silk* Stik just to give me the opportunity to build a model in the old manner and restore my confidence that I still knew how to do it. If you want to reacquaint yourself with some old and familiar techniques you haven't used for a while and surround yourself with those odors from the past, start building away.

Get out the tools

Start with the wing. I have designed it with a constant chord to make life easy. Cut an aluminum plate to shape and use this as a pattern for all the ribs. You can stack a few 1/8inch sheets together and use a jigsaw to cut several at the same time. Cut six, 1/8 inch plywood wing rib doublers to shape, for the landing gear supports, and epoxy them to the forward portion of six balsa ribs.

Pin the forward bottom $^{1/4}$ inch square spar to an absolutely flat surface. Elevate the rear bottom spar about $^{3/8}$ inch from the surface and secure it in place. Glue the wing ribs to the front and rear spars. Accurately line up all the ribs, making sure that the three ribs with the landing gear block support doublers are in their correct position. Glue the top forward and rear spars in place along with the $^{1/4}$ inch square leading edge. Notch the $^{1/2} \times ^{5/8}$ inch balsa trailing edge accordingly and glue it to the rear of all the ribs.

Once all the joints have dried, you can remove the assembly from your work table and start on the other wing. Be sure to make a right one and a left one. Epoxy the landing gear blocks in place. Use a very long sanding block to even up the edges of the ribs to achieve as smooth and as continuous an airfoil surface as possible. Glue the top and bottom $\frac{1}{16}$ inch leading edge sheeting in place. Use plenty of pins and make sure you don't introduce any warps in to the structure.

Continue with the 1/16 inch trailing edge sheeting. Glue on the 1/16 inch balsa cap strips and then the wing tip blocks. Carve and sand the wing tips to shape along with the leading edge. Prop up the wing tips an inch and sand the dihedral joint to the correct angle. Cut the rear and forward portion of the center rib from 1/4 inch sheet balsa. Glue them in place in one of the wing halves with 1/8 inch protruding from the sheeting. Glue the wings together at the dihedral joint with the wings properly aligned. No twists, please. Support the tips until the joint dries. When dry, epoxy the 1/8 inch plywood dihedral braces to the spars. Notch the leading edge for the 1/8 inch plywood forward wing dowel support and epoxy the support into the notch.

When cured, drill a $\frac{1}{4}$ inch diameter hole from the wing dowel support to the forward dihedral joint and epoxy the $\frac{1}{4}$ inch diameter wing dowel to them. Cut the servo mount rib from $\frac{1}{8}$ inch plywood and secure your aileron servo mount to it. Epoxy the rib to the dihedral joints. Add the center portion of the $\frac{1}{4}$ inch sheet center rib. Make sure that it resides in each wing half by about $\frac{1}{8}$ inch. Sheet the remainder of the dihedral joint. Wrap the top and bottom of the dihedral joint with 4-inch fiberglass tape and brush resin through it. The ailerons are carved to shape form $\frac{1}{2} \times 1^{\frac{1}{4}}$ inch balsa.

Now's the time to resurrect all those latent skills you had and start on the fuselage. Every single piece of the 1/4 inch square balsa sticks has to be cut and custom sanded for a perfect fit. Nothing less is satisfactory in order to achieve maximum strength from this type of structure. To speed things up and for strong butt joints, I used five minute epoxy throughout. When both sides are complete, sand them with a large sanding block to remove any irregularities. As a concession for strength to insure that the screaming .60 up front stays where it belongs, I used a large single sheet doubler of SIG Lite Ply glued to the interior of the fuselage sides. In this manner, I was able to gain the strength I wanted without degrading the aesthetic appearance I was trying to maintain. Just like the wings, don't forget you need a left one and a right one.

A similar doubler of $\frac{1}{32}$ inch plywood is used at the tail section to strengthen that area as well. A small plywood insert is epoxied to this doubler to be used as a tail wheel mount. Glue the $\frac{3}{8}$ inch and $\frac{1}{4}$ inch triangular former supports to the Lite Ply doubler. Epoxy F1, F2, and F3 in place. When cured, epoxy the tail section together.

Install the 1/4 inch square balsa cross braces between the fuselage sides cutting and sanding each piece to its required length rather than using the length shown in the top view of the fuselage on the plans. Glue all the upper fuselage formers in place. Add the 1/4inch sheet balsa cockpit floor with the grain running crosswise. String the 1/4 inch square balsa fuselage longerons from the forward FT1 all the way to FT5. Trim the formers where necessary to get the longerons to fit. Use your large sanding block again to FLYING MODELS



A K&B .61 sits in the nose of the author's *Silk Stik* but one of the more powerful schneurle .50s or .45s could fly the seven pound plane. With a slightly lengthened chin block and recontoured sides, an .80-.90 4-stroke could also fit comfortably. A 23/4 inch spinner, in this case a CB Associates, seems to be the right size.

smooth out the curvature of the upper portion of the fuselage.

Line the inside of the longerons between the two forward FT1's with $\frac{1}{8}$ sheet balsa to strengthen this area and to provide a surface for the fuel tank to rest on. Epoxy the $\frac{3}{8} \times$ $\frac{3}{4}$ inch maple wing screw blocks to the fuselage doublers. Position the wing on the fuselage very accurately and secure the $\frac{3}{8} \times \frac{3}{4}$ inch maple wing dowel fuselage block to F2 with five minute epoxy. Drill through the bottom of the wing into the wing screw blocks with a $\frac{3}{16}$ inch drill.

Needless to say, you have to do this very accurately. Thread the blocks with a $\frac{1}{4-20}$ tap. Open the holes in the wing to a little over $\frac{1}{4}$ inch. Replace the wing and realign it. Spread five minute epoxy on to one side of

the wing screw supports. Using the supports like large washers, screw them snugly against the wing, making sure of the wing alignment prior to the curing of the epoxy. Sheet the bottom of the fuselage between F1 and F2 with $\frac{1}{4}$ inch sheet balsa. Glue soft balsa blocks to the front of F1. Carve and sand the blocks to shape.

The same techniques are used to assemble the horizontal and vertical stabilizers. The elevators and rudder are made from solid sheet.

Use pins and tape to temporarily assemble the entire model. Align the empennage relative to the wing and fuselage. Mark the areas that will have to be kept clear of dope and silk in order to achieve a good strong bond joint. Cover these areas with masking tape.



The "open bay" look is all over the airplane, on the wings, on the fuselage, all enhanced by the translucent silk covering. The generous tail area requires an open framework made from $\frac{3}{8}$ inch square balsa.



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MARCH 1989

Silk Stik

Dope all the surfaces that will come in contact with the silk covering with three heavy coats of clear dope sanding lightly between each coat. Due to the popularity of the plastic covering materials and the expense of pure silk, the latter is difficult to locate. But don't despair. Although they don't advertise it, Royal Products has a virtual bottomless pit of silk in every conceivable color you can imagine. Write to them for a listing of the colors.

You will need five yards to cover the plane. Cut all of the silk panels with plenty of overhang to make pulling the silk as tight as possible as easy as possible. Use the wet silk technique to apply the covering, doping through the silk around the boundary of the panel where you want it to adhere. Have plenty of fresh razor blades available to trim off the excess.

Once the silk has dried, carefully remove the masking tape protecting the bonding surfaces. Permanently epoxy the tail feathers in place. When cured, coat the silk with as much clear dope as you please. Obviously, the more the better. Hopefully you have chosen a silk with an attractive color that will result in a beautiful translucent effect permitting all those little pieces of balsa to show through. Don't use any of those plastic iron-on coverings. They don't provide the stressed skin



If you look closely at the planform of the Silk Stik you can see a close resemblance to one of the all-time classic R/C planes, Joe Bridi's Kaos. The plane's looks harken back to the days of reed radios and escapements.

structure that this type of construction is so dependent on.

SIG's 13-inch World War II canopy looks pretty neat sitting on top of the fuselage. It seems to enhance the overall translucent effect by being so transparent itself. Hobbypoxy II adheres well to both the canopy and the doped silk. The joint between the canopy and fuselage needs to be reinforced with a narrow strip of silk about $^{3/8}$ inch wide. Brush epoxy through the strip and make a band of it all around the canopy.

The main gear is $5/_{32}$ inch piano wire prebent and available commercially. Royal Products metal tailwheel is utilized for the third wheel.





Besides lending an air of an older R/C ship, the tall tail of the *Silk Stik* adds a lot of directional stability (above left). The landing gear, which is 5/32 music wire, plugs into conventional trunnion blocks (above right) and is held in place

by clips. Any large commercial tail wheel bracket would work well. To dress up the plane a little, Dan added a 13-inch SIG World War II canopy (**below**). A 3/8 inch wide strip of silk holds it in place.



FLYING MODELS

Silk Stik



The translucent effect of a good silk finish testifies to real craftsmanship and with different shades can be really stunning.

Hinge your surfaces, install your radio and mount the engine. Your bird is now done and you should be noticing one of the benefits of this type of construction. The model is very, very light. It weighs about seven pounds which is extremely light for a plane of this size and power.

Once you get the plane to the field you'll be

amazed at the attention it will attract. It will become more than obvious just who migrates over and starts asking questions about the plane. It's the "over-the-hill-gang", those guys with the receding hairlines and distended waistlines. Yes, it's the more ancient modelers who not only appreciate the work and skill that go into this type of construction but probably remember doing it that way themselves.

Although the construction techniques may be archaic, *Silk Stik's* performance is not. The generous wing area and large tail surfaces make for an airplane that is stable yet maneuverable. Give *Silk Stik* a try. You'll be amply rewarded from start to finish.



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ADVANCED TICKETS may be ordered by sending a self-addressed stamped business size ($4\frac{1}{8}x9\frac{1}{2}$) envelope to: TICKETS, 38235 Castle, Romulus, MI 48174.

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Include a check or money order in U.S. funds made payable to the 'Weak Signals R/C Club.' Ticket prices are: \$4.00 per day for adults and \$1.00 per day for children, 12 and under. (Please specify number of each.)

Deadline for ticket orders is March 31, 1989. All sales are final and non-refundable.

TICKETS ARE ALSO AVAILABLE AT THE DOOR.

Exposition information is available by contacting Wayne Yeager, co-director, at the ticket address or by phone — (313) 941-6661.

Bring your latest completely finished models to display and enter the competition for exciting awards. R/C radios will be awarded to the first, second and third place winners in the following classes: NON-MILITARY SPORT SCALE PLANE (AMA Rules) MILITARY SPORT SCALE PLANE (AMA Rules) PRECISION SCALE PLANE (AMA Rules) PATTERN PLANE SPORT MONO-PLANE (non-scale models only) SPORT BI-PLANE (non-scale models only) OLD TIMER FREE FLIGHT R/C ASSIST R/C SAILPLANE (non-scale models only) (No Engines) HELICOPTER R/C CAR COMPETITION BOAT MILITARY SCALE BOAT PLEASURE POWER BOAT WORKING VESSEL-UNARMED

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...out of the box and climbing high in no time!

The leader in electric R/C flight, Kyosho has taken the lid off superior electric performance and opened a whole new world of flying satisfaction to beginning pilots.

With a pre-built design and easy flying qualities, Kyosho's new 1/9 scale electric Cessna Cardinal will be out of the box and flying high in no time! You simply can't make building mistakes when so much of the assembly has already been done for you. The pre-built design also means that the Cardinal is strong. The special blow-molded fuselage provides incredible strength, and the balsa-ribbed wing and tail are pre-covered with a resilient polyester film. In just one evening, you can have the Cardinal flight-ready, and because it's built for survival, the plane will be soaring long after the training flights have ended.

The only electric trainer combining fast assembly with flying simplicity.

The high wing design of the 47" span Cardinal gives it the smooth and stable flying qualities needed for easy beginning flights. It's also virtually impossible to stall, and with the included electric motor and matched prop, you'll have enough power for off-the-ground launches. Take a spare 6-cell battery with you to the field, and you can enjoy practically nonstop piloting with effortless replacement of the used pack.

Kyosho has put its expertise in electrics to work in the new Cessna Cardinal, resulting in a unique ARF that's durable, easy to fly, and above all else, lots of flying fun. Out of the box, it's magic.

If you've already experienced exciting gas-powered model flights, you'll love the Cessna Cardinal. It goes together fast, is great fun to fly, and provides a thrilling transition from gas to electric



An FM Product Review:

Futaba Corporation's 1024 PCM

By Bob Aberle

First of the new wave of future computer radios, this 9-channel PCM/PPM system can be customized to any requirement.



PHOTOGRAPHY BOB ABERLE

Like most other radio systems, the sophisticated Futaba 1024A PCM comes with the,usual assortment of accessories, including a neck strap. The battery

charger is still the type with the single LED that lights up red with one pack connected and green when both packs are being charged.

his review features the new Futaba 1024A (model FP-9VAP) FM/PCM R/C system. It is a full 9-channel system intended for F3A F.A.I. R/C aerobatic competition. A second version is also being offered specifically for the helicopter enthusiast. The figure "1024" is the designation given to Futaba's new 10-bit servo resolution circuit. Their existing PCM systems, that have been on the market for the past couple of years, employ 5-bit resolution (512). These "512" systems have been characterized by a slight "stepping" motion as the servos are rotated through their normal travel. The new 1024 circuit eliminates that "stepping" effect (which is ever so slight), producing a very smooth control response. Top aerobatic competitors asked for this improvement and now they have it. By the way, the new 1024 system is not compatible with the older 512 models.

In a recent telephone interview with Steve Helms of Futaba, I learned that they have had a private testing laboratory perform all of the tests as outlined in the AMA R/C technical guidelines (AMA Membership Manual for 1988, page 11). This 1024 PCM R/C system meets these guidelines for operation now and after January 1991 when we go to the full complement of 50 R/C aircraft channels spaced at just 20 kHz. Steve also indicated that Futaba has every intention of providing all 50 channels for sale in 1991. They do not support any current move to limit the upper portion of the R/C aircraft band to the present 40 kHz channel spacing. I applaud that stand as I do another popular manufacturer who has taken the same progressive marketing position.

The 1024 system is an absolute state-ofthe-art, top line radio. This particular model, and its helicopter counterpart, are probably the two most expensive R/C systems available on the R/C market today. The traditional use of many tiny switches and pots has been greatly reduced by the introduction of a new microprocessor circuit that features an LCD screen and computer type cursor controls for inputting and storing control system data. It will take initially a considerable effort on the part of the modeler to learn fully all the features of this system and how specifically to make the best use of them. Because of the overall complexity of the 1024 I will only be able to hit the highlights and still stay within my page limitation.

General 1024 system data

The basic Futaba 1024 PCM R/C system, intended for fixed wing aircraft control, includes the following items: a transmitter, receiver, full Ni-Cd batteries, battery charger, four S-5101 servos, neck support strap, frequency flag set, DSC cable and fuselage mount jack, switch harness with charging jack mount, aileron extension cable, servo mounting trays, servo mounting hardware and an instruction manual. Just for info, the helicopter version comes with a fifth servo and 1000 mAh capacity battery packs (for longer duration operation).

My evaluation transmitter weighed close to three pounds, which is on the heavy side. Since the neck support strap is provided I think you ought to give it a try, even if you haven't used one up till this point. The eight cell transmitter Ni-Cd battery pack is easily accessible by removing a rear panel cover. This makes it convenient to substitute a fully charged second (spare) pack while at the flying field. The tachometer optical sensor is mounted on the side of the transmitter case, not at the end of a cable as it is on the older "512" PCM systems.

The RF module plugs into the rear of the case. Futaba provides four small storage compartments for extra transmitter crystals. My personal feeling is that the modeler should not be encouraged to swap crystals in any narrow bandwidth R/C system (regardless of the brand involved!). Each crystal will require a slight retuning and a check of the FM deviation (as a minimum). In fact many R/C professionals are now advising modelers to have their systems (Tx and Rx) retuned every other flying season.

All of your normal flying controls are activated in flight by the usual array of switches (dual rate ON/OFF, snap roll, flap or spoiler deploy, etc.) and in several cases some pot controls (spoiler or flap position adjustment). However, the programming of the internal computer system of the Futaba 1024 transmitter is all done with the help of an LCD screen that measures $4^{1/2}$ inches wide $\times 1^{1/8}$ inch high. The intensity of the LCD screen image can be adjusted with a small control located on the side of the case. I found that even the most intense setting did not provide sufficient contrast (to suit me). But it is still quite readable and the letters/numbers are of a good size. You will never need a magnifying glass, that's for sure. Although there was no caution in the manual, I wouldn't subject the LCD screen to direct sunlight for any length of time. I ruined an expensive LCD digital multimeter by leaving it in the top of my field kit, exposed to strong sun rays for the better part of a day.

To help you in the computer style program-



Located at the bottom portion of the FP-T9VAP, the large LCD screen is the window to all the capabilities of this new transmitter. The control stick assemblies are fully adjustable for length, tension, and angle.

ming of this system, Futaba has added a very helpful instruction placard to the bottom of the transmitter case. With this you can easily make program alterations at the flying field without ever having to resort to the instruction manual. One other point mentioned is that the use of RF chokes is unnecessary when employing long length extension cables, as is common with the large scale models. Apparently this PCM system is not affected by extra cable lengths.

Computer controls

The basic computer operation of this transmitter is handled by a series of menus which permit the modeler to select and store the necessary control information. When the transmitter power is first turned on, the initial menu appears on the screen which contains the "EDT" or edit functions. This first screen presentation will lead into the following functions: "TIM" (timer mode); "TAC" (tachometer operation) and finally two timer reset buttons. Timer modes include: up timer, down timer, rhythmic (a buzzer sounds at each set alarm interval) and an integrating timer that records the total transmitter operating time (until you physically reset it). This can be especially helpful when determining battery power remaining (as a function of operating time). With a total transmitter current drain of 235 mA you should still expect over two hours of operating time from a fully charged battery pack.



Despite all the control information stored in the computer there are still some pots and switches to activate the various functions while the model is in the air. These more familiar controls, like dual rate switches. retract switch, snap roll buttons, etc., are located in their usual places (for Futaba equipment).

Futaba's 1024 PCM R/C System



Located under the power switch, the small "sub-trimmer" panel (above left) contains eight adjustment pots for settings that can later be stored in memory. When you power up, the basic "EDT" screen appears on the LCD display (above right). The input and cursor controls for screen are just below it. With



all features available this handy chart on the bottom of the case (below left) can help remind you of the sequence of the computer program input without always resorting to the manual and dragging it to the field. Snap roll, retract, and some mixer switches are on the top of the case (below right).







Midway down the left side of the case, note the small hole which is the optical sensor for the built-in tachometer which displays RPM on the LED screen. Panel at bottom is an access hatch.

This initial menu also contains a readout of the transmitter battery voltage and the receiver battery voltage (when the DSC cable is connected between the transmitter and the special jack on the receiver end). The integrating timer reading is displayed in the lower right hand corner of the screen.

In addition to the continuous monitoring of transmitter voltage (on the display) there is also a transmitter low battery warning system. When the transmitter voltage drops below 8.5 volts, the warning "LOW BAT-TERY" blinks on the screen and a buzzer sounds. I personally would have selected a more conservative level of 9.0 volts as the warning point, since most Ni-Cds drop off rapidly below 1.1 volts per cell (8.80 volts in this case).

If at any time the words "BACK UP" appears on the screen, you have lost all of your stored control information. The system will return to all of the original factory settings. When this happens there is either a system error or the special internal lithium back-up battery has died (it is rated for five years service life).

Now let's get into the three sub-routine menus. Pressing "EDT" (edit) from the basic menu will get you into sub-routine 1 which covers: "REV" (servo reversing); "F/S" (fail safe); "ATV" (adjustable travel volume); "AFR" (adjustable function rate which is something new for modelers); "D/R" (dual rate control) and "END" (the command you evoke to store all of your control input data).

The sequence of operation goes something like this. First press the "REV" button, located just below the screen (extreme left side). The "REVERSE" menu (actually a sub-sub routine) will appear on the screen. It will identify all nine channel functions (e.g. AIL. EV. THR. etc.) and whether the servo is set for the "NOR" (normal) or "REV" (reverse) rotation. You use the cursor or "arrow" buttons, to move from channel function to channel function. In each case you depress the NOR or REV to set the servo direction of rotation. When finished setting all the channels to your personal preference, depress "END" and these commands will be permanently stored in the computer's memory (unless you change them at a later time). As soon as you store this information the No. 1 sub-routine menu reappears on the screen.

If you want to go through the entire program in sequence (which is advisable the first time through), select "F/S" (fail safe) next. A new screen will then appear which specifically relates to all of the choices available with regard to the fail safe function. On this system you have a choice of F/S or HOLD. In the hold mode the servo will remain in its last



Both the removable RF module and the removable battery pack are at the rear of the case (above left). To increase flying time with a single transmitter, a second battery can easily be substituted. This excerpt (above right) comes from the rather extensive manual that details all the functions and their pro-



gramming. You'll have to get used to abbreviations. Futaba claims that their new dual conversion FM/PCM 9-channel receiver (below left) meets all the "1991" AMA technical guidelines. Inside the Futaba FP-R129DP (below right) there's a tight, neat package. The crystal is removable.





position prior to the loss of signal (or in the presence of major interference). In the fail safe mode the modeler can pre-set eight of the nine channels to specific positions. Upon loss of signal the servos will move to these pre-selected positions within one second. Because of the nature of the 1024 computer chip you can actually set some channels for HOLD and others to pre-set positions (F/S). To me this is a real advantage and allows the modeler complete flexibility of choice.

There is also a third fail safe option offered, called battery fail safe. This affects only the throttle channel (no. 3). When the battery hits a certain (low or minimum) value, the throttle servo is cycled to a pre-set position, presumably to idle, as a warning to the modeler that it is time to land and recharge. The battery fail safe feature can be turned off by the modeler. As best I can tell the regular fail safe (hold and pre-set) can not be inhibited (you must live with it all the time!).

Next on the No. 1 sub-routine menu is "ATV" or adjustable travel volume. This is really what modelers refer to as end point adjustments. It is available on eight of the nine channels. Adjustments can be made from 30% to 110% of normal (full) servo travel. The important thing to note is that end point adjustments (or ATV) also affect the limits of trim throw and the dual rate "ON" (cut back position) on a percentage or proportionate basis.

The next control function is called "AFR" (adjustable function rate). This is something that many modelers will really appreciate. It is a form of end point adjustment except that it does not affect either the trim position or the dual rate cut-back position. AFR can also be helpful since more than one channel can be adjusted simultaneously. If you use two aile ron servos (in the Ch-1 and Ch-7 positions) for aileron differential operation, the AFR will permit adjustment to both servos (like a coordinated setting).

Last item of choice on this No. 1 subroutine menu is the dual rate function. Dual rate can be employed on the aileron, elevator and rudder channels. Each of these channel functions can be adjusted from 100% down to 30% of normal control throw. Dual rate cut back can be set differentially (one side different than the other). In other words you could reduce the up elevator cut back to 50% of normal and have the down elevator position at 75% or normal control throw. That option, to my knowledge, was never possible before. Auto dual rate is also available. This circuit will turn the dual rate function on or off depending on the throttle position. You can also change the direction of the dual rate switch (on and off positions) if you like. That

possibility is covered in the No. 3 sub-routine menu. Pressing the "END" key will return you to the EDIT (basic) screen again.

Use the cursor (arrow) to move down now to line 2 of the EDIT screen which will place you into the No. (2) sub-routine. This next lower level in the program covers the following functions: "EXP" (exponential and variable trace ratio control); "MIX" (a wide variety of control mixing options); "TRM" (trim adjustments and cross trim possibilities); "PAR" (special parameter settings); "MDL" (selecting up to six different model programs) and "END" (to store all the data inputted).

After all the years of debating the merits of dual rate, exponential rate or VTR control, Futaba has made it possible in this 1024 system to offer the modeler a choice of all three. Several variations of expo and VTR (a stepped or abrupt form of expo) are possible. A curve or graph depicting the amount or degree of expo or VTR selected appears at the right side of the LCD screen. You can even establish desensitized control around the neutral servo position or at the full travel position (that has to be a first!). The Expo and VTR are available on eight of the nine channels, if you can believe it!

There are so many mixing variations offered that I think it would be better to just mention the various possibilities rather than

Futaba's 1024 PCM R/C System



A closer look at the receiver shows its "heart", the central processing micro-chip at the center of the top P/ C board. The receiver operates in the PCM mode only but the transmitter works with PCM or PPM.

get into the details. In the mixing program mode Futaba provides the following choices: PROGRAMMABLE MIXING (the combination of any two channels such as: AIL/ RUD; FLAP/SPOILER; THROTTLE/ FLAP: THROTTLE/SPOILER; ELEV/SPOILER and many others); SNAP ROLL (four snap roll directions can be set with individual control of the aileron, elevator and rudder); WING TYPE (aileron differential; flaperons; elevons and V-tail); AIR BRAKES (to deploy flaps, spoilers and elevator trim at a flip of a switch); PITCH-MIX (for use with variable pitch R/C propellers) and ELV-FLP (flap coupling with elevators to help on square cornered loops).

"TRM" (or trim) will allow you to set the sensitivity of the trim levers (more or less). You will also be able to set up your transmitter for cross trim which means that the location of the throttle and elevator trim levers can be swapped at the modelers choice. Trim settings for each model can actually be stored in the computer memory, allowing the trim levers to be returned to neutral.

The "PAR" (or parameter) section of the program has some interesting side features. You have the ability in the servo test mode to operate all of the servos in the system simultaneously to check control surface move-



Included with the 1024A system is the new Futaba S5101 servos which use a "10-bit" resolution which eliminates the slight "stepping" motion of the older "5-bit" resolution servos which can still work on the 1024.

ments (for a pre-flight check at the start of the flying session). The "MIX-MODE" will let you inhibit (turn off) most of the mixing circuits (a good idea for the sport flyer when first learning to operate this system!). You have a choice of PCM operation or the regular FM mode. So it is possible to operate an older Futaba FM airborne flight pack from this new "SUPER" transmitter. The dual rate switch position can also be altered in this part of the program.

"MDL" (model select) will let you store control data for up to six models. Any one of the six can be selected when desired. There is also a copy function that allows the stored control surface and trim positions of one model to be duplicated for use in another.

The final level (third) of the sub-routine menus covers: "NAM" (naming the individual models); "SRV" (servo positioning analysis) and "RES" (reset). The naming of the model is really part of model select. SRV places a graphics representation of each channel on the screen (eight of the nine channels all on the LCD screen). A small bar changes appearance as the servo is moved. This function enables you to "see" all of your control settings in one place. And finally the RES (reset) button will allow you to return any or all the channel functions to the original factory settings. As I wrapped up this review I hit "ALL" cancelling out all of my stored test settings prior to shipping this particular radio on to its intended owner, Editor Bob Hunt.

Besides all of the computer program controls there is a small "sub trimmer" panel located on the front of the transmitter, just above the neck strap hook. There are eight small pot controls provided for making convenient adjustments while at the flying field or possibly even when the model is in flight (with the aid of a friend). These trim pots provide end point adjustments, dual rate cutbacks and flap/elevator mixing proportions. After using these trimmers you should try to incorporate the "field positions" into the computer memory and then return the subtrimmers to their neutral positions. If a trimmer is not returned to neutral, it could affect the control throw when switching to another model. The instruction manual was a little weak in this one area, but I think common sense will prevail in this regard.

FP-R129DP Receiver

This is a new dual conversion 1991 capable FM/PCM receiver. It is the first time in years (not since the old reliable Contest 7) that Futaba has gone to a dual conversion circuit. The 455 kHz I.F. is on the high side of the operating frequency, which means that the first I.F is actually at 11.155 MHz (not 10.7 as in most other D/C receivers). Current drain is 35 mA. The receiver case measures $2^{7/16}$ inches long $\times 1^{1/2}$ inches wide $\times 1$ inch thick and weighs 1.6 ounces.

I wasn't able to obtain any performance parameters for this receiver. As stated at the beginning, Futaba claims complete compliance to the AMA recommended guidelines. My personal field testing of this system indicates more than adequate performance capabilities. That means you should experience solid R/C control, even when we get to the 20 kHz channel spacing in January 1991. I would still, however, recommend that the modelers separate by at least 20 feet (30 is better) between transmitters on the flight line. I also feel quite strongly that local field rules should not permit modelers to taxi their model in and out of the pit area. Have a helper do the handling for you. It's not as realistic for the spectators, but it's much safer in the long run.

Summary

Futaba's instruction manual for this system is over 50 pages in length. It's more like a book and that is understandable when you consider the overall performance capabilities of this system. There is even a computer program flow chart included for the real computer buffs. I'll have to admit I was fascinated going over this system in every detail (hour after hour). If you are into computers in any way, you will really enjoy this new concept in R/C. However, if you are intimidated by computers (like people who hit the carriage return at the end of each line when using a word processing program) then this system might prove a burden to your patience and hence, reduce your enjoyment of the hobby.

Futaba has just announced a variation of their 1024 PCM system that appears to be less complex and also less expensive. An R/C sport or Sunday flyer might want to look into these new systems (Model 7UAP and 7UAF) as a sensible alternative.

No question, this type of technology will totally dominate the R/C hobby in the next few years. For a detailed brochure and price



Here's the standard flight pack. Because the transmitter can store the trim data for up to six separate models, only one transmitter would be required for six flight packs. Makes the system more cost effective.

schedule you might care to write to Steve Helms or Ron Hieb at Futaba (555 West Victoria St., Compton, CA 90220). By the way, I might also mention that Futaba is in the process of relocating to a brand new and much larger facility in the Irvine, CA area. The exact new address and phone numbers will be announced shortly.



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Ducted Fans International

Dateline: Swinderby

Our international fan tour begins with the first British fan fly of the year.

By Ron Sweeney





Smooth and fast, that's how the author describes his F-20 *Tigershark* which he built from Thorpe Brother's plans. It features a Thorjet fan turned by a K&B 7.5 and weighs in at 81/2 pounds with a glass/resin finish.

other nature tested both the mettle and the grit of British fan flyers at the 1988 Swinderby meeting by subjecting them to almost intolerable weather conditions. Having tested their fortitude and not found it lacking, she partially relented and gave her reluctant blessing to the efforts of Graham Preston and fellow members of the Lincoln club for the 1989 event. Not finding absolute empathy with the raucous intruders into her domain, she provided a warmth which raised both the spirits and the enthusiasm. There was some sun to remind even the few tolerant but disinterested wives and girl friends who attended "that aeromodelling wasn't such a bad hobby", but tempered this euphoria with a stiff breeze which the experts shrugged off, the "average Joe" treated with respect and caution, and the foolhardy disregarded. The individual approach to the prevailing conditions both rewarded, disappointed and devastated those who treated the situation in whichever manner they felt most suitable.

Being the first event of the season, new models abounded. The limits that modellers will go to to produce new and untried designs is boundless and Swinderby, although not patronized by all the notables, did produce a



Like many British fan models, Reg Smith's trusty F-8 *Crusader* rests on a dolly undercarriage and lands on grass. His own design, the model uses an O.S. .46VR-DF to turn a Micro-Mold fan and flies well at 8 pounds. 36

much improved attendance on last year with most of the "celebrities" appearing. I'm sure that those who didn't, defaulted for legitimate reasons. By now they will have been made aware that their absence was noted and no excuse will be accepted for next years's meeting.

An amusing anecdote was spurred by a comment during the pilot's briefing when Graham Preston apologized for the relocation of the flight area from the previous year's position by explaining that a request had been made to locate us at the extreme end of the airfield in order to avoid interferring with band practice, taking place near the barrack quarters. One wag commented "if the music interferred with his engine tuning, he would lodge a formal complaint!"

Fan flying was what Swinderby was all about and that is what we got, in abundance! It's a pity that Northrop didn't have the Thorpe brothers on their sales team. If they had, the sales of the F-20 *Tigershark* would by now do justice to the design of this superlative aircraft. There were no less than five examples of the marque present. The model flies in a superb and predictable manner and outstrips many of its contemporaries in the air. The Thorpes brought their now aging second prototype which not only challenged, but defied Mother Nature's reluctant acceptance of our mortal intrusion.

Their F-104 Starfighter equally flew throughout the day finally giving notice to Peter Thorpe that it was tired and "wanted a rest" by denying itself of the usually dependable thrust of the Thorjet/OPS power unit and quitting over a small wooded area. Realizing its loyalties at the last moment, the model proceeded to cascade gently down to earth in a manner only the Thorpes can get away with and probably performed a landing equal to several announced "arrivals" earlier in the day making its protest felt with the minimum of repair work necessary to have it back on form for Abingdon, late in June.

It would be unfair at this point to dismiss the usual run-of-the-mill models and concentrate on the new and more adventurous offerings, however, this is necessary since original prototypes were there in profusion, most of these silencing the skeptics, exhilirating the crowd, and providing immense pleasure and satisfaction to fellow flyers. The palms of my hands still tingle from the almost endless rounds of applause following the successful completion of a prototype's flight that "hadn't a hope in $h \ldots$ " of getting off the ground. What an acute and perverse pleasure
there is in being proven wrong.

A long standing favorite aircraft of mine was the ill-fated and governmentally plagued British English Electric TSR-2 of the sixties. I remember as a lad in the R.A.F. at that time being given the rare treat of being shown around the prototype. Sadly, Reg Smith's model of it, after completing some exceptionally impressive flying followed the fate of its full size counterpart. The original was the victim of parliamentary ineptitude and American sales pressure (we bought the F-4 Phantom). The model met its fate in a spectacular way and through orientation problems, courageously admitted by Reg, impacted at full throttle with terra firma. This ended the career of an incredibly bold concept and one that warmed the hearts of the over forties and attracted the curiousity of the younger generation-please build another one Reg! It was like meeting a lost childhood friend.

Alex-Cornish Testrail, a devotee of the smaller fan models came with a varied selection including two new and extremely wellperforming offerings. His little Kress *Tommycat* never flew simply because he never had time. His A-10 *Warthog* powered by two self-developed Kress fans astounded everybody by its performance. Since the model did not possess an undercarriage of any description, Paul Leighton, Alex's pilot, was charged with flying the model. To describe Alex's hand launch would be difficult. To the innocent bystander he merely discarded the aircraft at shoulder height and left Paul to ably recover from the situation. The A-10 performed superbly.

A wry comment from a spectator brought general agreement when he likened the flight pattern to that of a control line model. It certainly flew in a very small area of sky, and when one engine flamed out, Paul, unperturbed and without any noticeable trim charges, proceeded to continue aerobating the model, the only noticeable difference being a slight reduction in speed and decibels. The performance of this model was extremely impressive and in my mind at least matched by his latest creation, a diminuitive twin-engined F-15 Eagle amply powered by two very well prepared O.S. .25s and RK-720 fan units. This model equipped with a steerable dolly undercarriage (work that one out for yourself) flew like its full size counterpart being very fast and highly maneuverable.

John Richards brought along his incomplete SAAB JAS 39 Gripen which he promises will be ready for Abingdon. John and I engaged in some spurious theoretical discussions on the merits of canard foreplanes as applied to models, a subject dear to my heart as my X-29 approaches completion. Mother' Nature will need to be in her most benevolent mood and to have received the "nod" from our Creator for the test flight of this one. A "remote scale" (could this be a new category?) version of the X-29 appeared and flew in a workmanlike manner and I will be swapping notes with the pilot prior to my test flying. It gave me a good deal of confidence and boosted my flagging spirits.

A very nicely sized EAP was demonstrated extending the knowledge of foreplane



A hand launch gets Alex Cornish-Trestrail's little A-10 *Warthog* flying (above). The model flies very well even on-one fan and uses two modified Axiflo fans and Cox TD 09s. Built from Thorpe plans, the author's F-1 *Mirage* (below) uses a Micro-Mold impeller turned by an O.S. .46VR-DF inside a Turbax shroud.



technology and the different approaches to the use of this control surface and its aerodynamic effects. John Richards, in an attempt to cover all eventualities, has the foreplanes of his *Gripen* coupled to the elevons and through some home-made electronic circuiting can also use these either as flaps or to fix the neutral or stable incidence angle for trim purposes. The X-29 was powered by an O.S. .25 driving a $4^{3/4}$ inch trimmed Micromold fan which turned this in a homemade shroud at 20,000 RPM and provided ample power for some flying best described as "busy". The *Gripen* has an O.S. .46 turning a Thorjet unit.

A fractured carburetor or coupling

grounded my K&B powered Thorpe F-20 on the point of take-off and may have saved the model from an awkward and unplanned landing. My *Mirage*, also a Thorpe plan, completed two very fast and successful flights and at the end of the day, having been disappointed with the failure of my F-20, I opted for a third flight with my F-1; this proved to be one too many. After several very fast passes with declining elevator response in each turn I elected to land and wished I had made the decision one circuit earlier.

A combination of pilot error and poor control response allowed me sufficient time to resign myself to the models's fate and watched helpless as, at full bore the model hit the run-



Reg Smith's old MiG-25 weighs 18 pounds complete as a balsa/ply model. Using a "potpourri" fan (Turbax shroud, trimmed 7-blade Thorpe impeller) it's a pretty stable flier that can safely stay airborne on one fan.

Ducted Fans International



One of the Thorpe brothers gets their all-wood F-104 ready for another flight **(above)**. Both of them put in flight after flight all through the event. Two Kress RK-720 fans power Alex Cornish-Trestrail's medium size F-15 **(below)** was flown by Paul Leighton. The model weighs 6¹/₄ pounds and flies off a dolly.



Designed by Phil Endean, this fan model recreates the twin-engine British *E.A.P. (European Advanced Prototype)*. The model weighs 41/2 pounds and uses a modified Micro-Mold fan with an O.S. .25VF-DF.

way, reducing itself and the radio to small fragments. Mercifully the motor and fan escaped, unscathed. From an emotional standpoint I found myself strangely untouched by the loss. The model had been a treasure to me. Previous mishaps with models in the past have devastated me with the prospect of intricate repairs taking up valuable time. In this instance, the model being completely written off, allowed me to clear my mind and concentrate on other matters.

My first really successful fan model was the Peter Nye Hawk which, while not a slow model, wouldn't break any speed records. The Mirage followed and its flight profile was completely different, flying at a far greater speed and requiring a far larger area of sky. My failing eyesight taxes all my powers of concentration when flying at extreme distance. I have dusted off my Hawk and hope to compare my own piloting skills with this and the much faster F-20. I may be kidding myself since on reflection, it was probably the awkward wind and unfamiliar surroundings that produced my discomfort rather than the F-1's speed since I have felt at home in other circumstances and I yearn to construct another one. I might try a smaller, scale wing next time.

Returning to Reg Smith's endeavours: he is obviously a prolific builder and in addition to his TSR-2, Reg returned with his twin O.S. .46 powered *Foxbat* which in my opinion flew better than last year's Abingdon appearance and, propelled by Micromold fans looked very realistic in the air. His third offering, his own design of an A-7 *Corsair* also flew with some style powered by an O.S. .77 and Boss combination. Reg employs a lot of foam in his construction and the lightness of his airframes was evident from their flight performance.

Pim Smith turned up once again and proceeded to fly throughout the day with an unhurried and professional style that we U.K. fan flyers have come to expect. His Folland *Gnat* powered by a K&B/Turbax combination flew consistently and extremely smoothly throughout the day, and earned him a small prize in recognition for his professionalism. His veteran Jet Hangar Hobbies *Mirage* looked as though it was fresh out of the box—also K&B/Turbax powered.

The usual clutch of MiG-15's and F-86 Sabres rounded off the flying inventory with Ted Cooke's complete but untried SR-71 whetting the appetite and promised its first airing at Abingdon. Last year's event had obviously spread the word and several new faces and models were present.

This bears well for next year. It's a pleasure to see new faces and while not claiming any particular credit for his success it was with some satisfaction that I witnessed young David Appleton's progress. David lives a few miles from me and approached me some six months ago to give him an insight into fan flying. He then went off and bought himself a fan, a motor, and built himself an F-20. This, he flew with great enthusiasm and some considerable skill and will be a force to be reckoned with in the future. So ended another excellent fan event with Abingdon to follow. Keep 'em flyin' guys!

Dateline: Belleville

Fan flying is alive and strong in our Canadian neighbor with plenty of exciting aircraft. By Frank Fanelli



anadians are serious about ducted fans.For the third year in a row and under the direction of C.D. Dale Summers and with the help of Peter Sant, the Bay of Quinte Aeromodellers organized and ran an impressive, enjoyable fan meet on the weekend of June 4-5 that continues to draw more of the North American fan world's notable manufacturers and modelers. Except for a pesky crosswind that eventually shut flying down by Sunday afternoon, everything seemed to go right at the Belleville, Ontario site-comfortable weather, good runways, nearby accommodations, lovely scenery, and the warm hospitality of club members.

There is no doubt that a good part of the event's success is also due to the prodigious modeling labors of Jack Tse and his group of modelers. They have now become a major kit manufacturer of ducted fan aircraft under the Yellow Aircraft title. With eight different airframes and numerous examples of each on display, the meet could have been a one man show.

On the minus side, the number of scratchbuilt aircraft continues on the decline owing to the increasing variety of kits available. Though few scratchbuilt models were present at Belleville, each was a distinctive aircraft with some notable features. In performance terms it was a toss-up between Eric Baugher's *Performance Phantom* which graced FM's pages in the September and October '87 issues (look for Plan CF-757 in the Carstens Plans) and Terry Best's little *Invader* (which we hope will be gracing FM's pages in the future).

Both showed blistering speeds but could be easily slowed to a very stable "jog". Neither gave the other any aerobatic advantage since both could roll, loop, and knife edge with crisp precision all day long. The pilots are the ones who show what a plane can really do and Eric and Terry both pushed their respective planes to the limit.

In the realm of scratchbuilt scale, Ian Ward's CF-101 Voodoo and Hal Parenti's Ryan Fireball were some interesting aircraft. Parenti's Fireball may seem a propeller oddity at a jet meet but the real plane sported both a recip engine and a true turbojet engine to get the best of short takeoff and high speed cruise worlds. The model follows the full size and it too houses a regular prop glow engine and a ducted fan powerplant, in this case a Kress Jets RK-740 with an O.S. .46VR-DF.



PHOTOGRAPHY: FRANK FANELLI

On hand for the Quinte 88 Jet Rally, Ian Ward's CF-101 Voodoo (above) was appropriately dressed up in Canadian colors. The 11¹/₄ pound model uses a Viojett and spans 53 inches. Yellow Aircraft's first kit (below), the A-4 Skyhawk, showed that it is a quite capable flyer with the Dynamax fan.



One of Bob Parkinson's Blue Hornets rotates for take-off. This model, an F-18 lookalike, uses the same Byro-Jet power system as his slightly larger Regal Eagle but it flies slightly faster than its earlier cousin.

Ducted Fans International



Petite but potent. Terry Best's small *Invader* (above left) is about to flare for landing after another of its scorching performances. Bob Fiorenze is a master on the sticks which really helped add to the flying demos (above right) of Yellow Aircraft's single Dynamax F-5E *Freedom Fighter* prototype hot rod. Duelling



it out with Best's *Invader*, Eric Baugher flew his spectacular single Dynamax *Performance Phantom* (below left) through an abbreviated AMA Pattern. Powered by two Dynamax/O.S. .77s Yellow Aircraft's big 91-inch F-15 *Eagle* (below right) flies like it was on velvet smooth rails in the sky.





Among the other 66 registered modelers Dave Penchuk brought a very nice little F-4 *Phantom.* This small jet was built from Ziroli plans and was very nicely done. Dave spent some extra time installing a scratchbuilt fiberglass inlet system for the Kress RK-740 fan/OPS .40 engine so that he could eliminate the design's cheater hole. This 740 by the way used the newer fiberglass shroud which has eased some of the aggravating assembly process of the older tin shell. For those who consider the RK-740 for one of their own projects a new single piece seven blade molded impeller is now available.

Manufacturers were well represented with both Canadian kit manufacturers well equipped with their products. Bob Parkinson has enjoyed good success with his Regal Eagle design over the past few years. This allwood F-15 lookalike is an all-wood plane that was designed around a single Byro-Jet with a choice of a .60, .65, or .77/.80 engine and a fairly straightforward box fuselage. Any of the hard-to-do complex curves are taken care of by fiberglass parts and this design philosophy has won some following from sport modelers who dislike fiberglass and welcome less than blistering but respectable speeds. With a Byrojet and .77 it showed some reliable, consistent performance which could serve as

a good enntry point to fans.

Fellow Canadian Jack Tse has adopted a different approach to the ducted fan aircraft he now manufactures. His models are scale planes and offer higher performance. Most of the aircraft he plans to market in the next year and a half were on display and most of those flew.

Headlining the parade of planes was Yellow's A-4 Skyhawk, an almost exact size duplicate of the long popular Jet Hangar A-4. Yellow's A-4, a one-piece airplane (the wings don't come off) does not have a cheater hole on the bottom. Instead it uses a four inch square "assist" hole cut cut into the center of the intake liner which helps the fan breathe better during takeoff rolls. With a standard Dynamax/O.S. .77 combo takeoff roll on pavement runs about 150 feet and rotation is positive with no pitch-up tendency. Rolls are pretty crisp and under the able thumbs of Ronnie Kemp the plane showed it handles quite well in the air. If you want more info on the A-4, Ron has signed on as part of Yellow Aircraft and is one of the U.S. distributors. He lives in Puyallup, Washington and his phone is 206-845-8195.

The big twins which Yellow now manufactures, the F-15 *Eagle*, the F-18 *Hornet* and F-14 *Tomcat*, all continue to wow everyone with their great flight performance. They are definitely not for the average modeler, but with Bob Fiorenze, Don Kinch, and Dennis Crooks flying them, they looked as rock solid as a Sunday sport plane (at Mach speed!). Blazing low passes, inverted flight, swinging wings—they really can fire up the building juices to jump into a project like this. There's no appearance of any kind of sensitive handling from slow take-offs to high speed flight.

The one Yellow plane which really caught my attention, though, was the prototype of a single fan F-5 *Freedom Fighter* flown by Bob Fiorenze. The 76 inch long plane was really lightened up to 8³/₄ pounds and that helped its impressive short takeoff roll. In the air, it was rock solid and the landing approach was slow and stable. Bob, who has taken this as his own project, attributes much of the docile flying characteristics to the fact that the fuselage acts as a lifting surface, contributing a significant amount of lift. There's plenty of thrust from the single Dynamax/O.S. .77 and there's even room to gain a few ounces and still fly very well.

It's a plane that has probably been on many modlers minds owing to the high interest levels in the F-20 *Tigershark* and the first version that will come out will be the elegant long nose T-38 *Talon* jet trainer. Bob will be working on the plane in-between the chores of setting up a new hobby shop in Winter Springs, Florida where he will now be one of the U.S. distributors for Yellow Aircraft. His phone there is 407-327-6353 if you want to "encourage" him to hurry up the T-38 project.

No recent fan products have come from Byron Originals but Karl Hibbs and Terry Malcom brought along some of the Byron Bullet sport planes introduced a year ago. Designed for the sport flyer, these little planes show a very healthy performance envelope with the O.S. .77 and the Byro-Jet. Both Terry and Karl ran the planes in stock condition with a paint scheme based on the European Alpha aerobatic demo team colors. By this time next year, there may be a new Byron plane out, rumored to be a single fan F-18 Hornet.

Though Bob Violett couldn't make it to Bellville, he was still well represented by a contingent of his U.S. East Coast dealers and his lovely daughter Patty. Though the eagerly anticipated F-86 didn't show up, some of the very versatile carbon fiber spin-offs from that project did. Long committed to the use of composite materials, there was quite an assortment of hinges, latches, keepers, and servo mounts accessory products which Patti displayed that can address some of those nagging but persistent small gaps in hardware items suited for fan applications, or any application for that matter.

Surrounding her display were the assorted Bob Violett Vipers and Sportsharks brought by Eric Baugher and Dave Latsha. Both featured absolutely gorgeous paint finishes as can be attested by the cover shot of Eric's Viper. Both pilots put their respective planes through impressive low-level and sweeping routines that reinforced the already excellent performance reputation which the Violett models have deservedly gained.

Tom Cook of Jet Model Products has been concentrating on tuning his product line up another notch with three not so visible but significant items. Like some other fan manufacturers, Tom has been working on the noise problem and brought a *Starfire II* equipped with his prototype quiet pipe. Compared to some of the other Dynamax powered planes his *Starfire II* was noticeably quieter. Its performance was also slightly improved with the prototype of the Dynamax II fan which has added some design improvements to engine mounting for a cleaner, less turbulent airflow.

If you're an avid fan modeler or just really curious about fans, there isn't a much better place to spend an early June weekend than Belleville. You're guaranteed some of the finest fan flying you can see and some really interesting aircraft. Joe Sant who serves as the information man for the Jet Rally says that this year's event will take place at the same site, Mountain View RCAFB on the weekend of June 10-11. From 5PM till dark on Friday June 9, early comers will be able to test fly any unflown aircraft so that they can fly in the rally. Call him at 613-966-5160 if you want to register or write to him at 1631 Colonial Road, Bellville, Ontario K8R 1B9 Canada. Œ



Nicknamed the Latshark, Dave Latsha's Violett Sportshark (above) features a highly distinctive and visible finish that has won it some awards. Newest Jet Model Products kit on the market is the Starfire II (below) which Tom Cook flew with prototypes of his new "quiet" pipe, inflight adjustable needle valve, and Dynamax II fan.





Terry Malcom lifts his Byron Bullet off for another zippy flight (above). This pug-nosed little sport plane really can pour on the speed with its Byro-Jet fan and an O.S. .77. The wind grounded Dave Penchuk's very nice, newly completed Ziroli Phantom (below). Neatly installed is a complete fiberglass inlet to an RK-740.



FLYING MODELS

Ducted Fans International

Dateline: Copeland

With a wide variety of aircraft and comfortable weather, this sixth annual Texas event was the best yet.

By Frank Fanelli





Modified somewhat from the original George Miller plans, Ed Couch's big Turbax powered A-10 *Warthog* sat on the ramp (above) at the sixth anuual Southwest Fan Fly. Before a radio glitch finished it, Dave Escobar's beautiful 45 inch span F-18 *Hornet* (below) managed quite a few impressive flights powered by a Viojett.



t was the best one so far. Well run, plenty of flying, very few crashes, loads of new and different planes, and this time—*real* comfortable late September weather as promised! With the help of two clubs, the Greater Southwest R/C and the Mid-Cities R/C clubs, CDs Ed Couch and Dawn Buckley really did a superb job all the way around on the Sixth Annual Southwest Fan Fly-in, even down to arranging some very comfortable 80° temperatures and a Friday evening tour of the monstrous General Dynamics airframe plant for the September 24-25 event.

Some of the manufacturers present at the

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earlier Belleville meet came to this fly-in, held for the third year in a row just north of Ft. Worth at the Copeland Ministries airfield. All brought the same planes they had at Belleville. Tom Cook had the *Starfire II* with his quiet pipe and the prototype of his Dynamax II. The pipe is now available and brings the decibel level over a hard surface down to the 92 dB range at a distance of nine feet.

Bob Violett had a whole contingent of his Shark family including the new refined Ag-gressor II and the long awaited F-86F Sabre. The newer Aggressor II is a refinement of the older version with plenty of subtle changes to the planform to tweak the perfor-

mance and also improve the strength of the plane with more Kevlar "doublers" in the fuselage. The wings are now Magnacore, a composite of foam, balsa, and carbon fiber, since the wing is slightly thinner and the composites really help strengthen it. Injection molded carbon fiber mounting hardware is also used for the wing, retracts, and servos.

All has been quiet on the Byron Originals front in terms of new fan products but the venerable MiG-15 and scores of F-16s were present to show that these have really helped a lot modelers try ducted fans and still do. To really emphasize the Byron fan products Ron Ables put flight after flight on his big oneyear old Byron F-15 *Eagle* which is still going strong. With speed brake deployed the landings were graceful.

As the lone representatives of Yellow Aircraft Dennis and Linda Crooks had a three plane sample of the line. The big, impressive swing-wing F-14 Tomcat, the twin Dynamax SR-71 Blackbird, and a prototype of the F-16 Falcon were all parked in Yellow's pit area. Dennis really wowed everyone there with some spectacular flights of the F-14, enough so that he came away with Model Airplane News Technical Achievement award. He also got everyone's attention with some flights of the SR-71 but a gust of wind that ballooned the plane just as it flared and then left it hanging in the air brought the inevitable hard landing and a cracked fuselage.

Two newer manufacturers showed up. Steve Korney of Hurricane Fans really proved without a doubt that his fans work and well at that. He had a six inch diameter Hurricane with eight blades and a Rossi .90 in a pre-production airframe which he calls the Cobra. The 62 inch long plane which he will eventually kit has a conventional planform with something of the lines of the popular F-20 Tigershark. It's no slouch and opened more than a few eyes with some excellent vertical performance and quite stable handling. The primary design goal is reliability and simplicity and Steve's plane did not use any inlet system or cheater hole. Only three bulkheads go in the fuselage and the wing is a traditional all-wood build up.

Steve is still tweaking the airframe and will be probably be introducing the *Cobra* at one of the winter trade shows. Following the *Cobra* will be a delta version of the plane with the same fuselage but called the *Dart*. While Steve is understandably partial to Hurricane fans, he claims that a five or six inch fan with a .77.90 engine will fly these planes quite well with lesser vertical performance if you use the lower displacement engines.





Piloted by Dennis Crooks, a Yellow Aircraft SR-71 climbs out after take-off (above left). The twin engine plane stretches 104 inches and spans 551/z inches. Another carefully engineered beautiful aircraft from Mike Kulczyk, the F-105 *Thunderchief* (above right) uses a complete scale inlet to a Viojett/O.S.



.77 powerplant. Ron Ables put flight after flight on his one-year old Byron F-15 *Eagle* (below left). The big plane performed flawlessly all weekend. George Miller's 72-inch long F-8 *Crusader* (below right) spans 55 inches and uses a Byro-Jet/Rossi .81 to fly quite nicely. Weighed in at 10 pounds.





George Miller has long been involved with the design of ducted fan planes and ads for his kits from Custom R/C Aircraft have been appearing for over a year now but it was the first time he showed up at the Southwest with some of his planes. His 1/10 scale F-4 *Phantom* and his 1/8 scale F-8 *Crusader* both put in quite a number of some very nice flights using a single, trusty Byro-Jet fan unit in each.

The *Crusader*, his latest kit, does not use any sort of inlet liner and gets around the need for a cheater hole with some well placed and inconspicuous blow-in doors. Extra air for slow speed flight like take-offs is provided by the open gear doors. Spring Air retracts are used and a one-piece removable wing gives plenty of access to the Byro-Jet fan.

Almost all of the planes present sized in at the upper levels but Bob Kress of Kress Jets brought along the prototype of a small, scale F-15 that incorporates some ingenious, simple ducting for a single Kress RK-709, a soonto-be introduced fan unit for a Cox TD .09 or an Enya .11CX. It also features a hinged nose compartment to allow easy starting. Pre-cut light weight foam blocks serve as the duct system and total weight for the 32 inch span plane will go 39-41 ounces depending on the engine used. There haven't been any FLYING MODELS flight tests yet so the flying characteristics are unknown but the design concepts in the little plane are ingenious and could work in larger afrcraft.

When you get to the Southwest Fly-in, you, of course, get to meet the rowdy "Austin crowd" of Mike Kulczyk, Tom Sewell, Bobby Zeiger, Russ Eppright, and Mike Krizan, not to mention other "assordid" pilots. From the fertile imaginations and craftsmanship of this group have come a wealth of scratchbuilt designs. The little BD-40 and its smaller brother, the BD-20, which have shown up in FM's pages in the past came from the collaboration of Sewell, Zeiger, and Eppright with a dash of help from Fan Facts columnist Kulczyk. Both planes, the 20 and the 40, are some of the nicest flying fans around and keep generating a ground swell of demand that they be kitted. So far, no good news in that department.

Mention the Austin crowd and their fan endeavors and you also have to mention Mike Kulczyk and the unique one-of-a-kind projects he has accomplished over the years. Last year he brought his beautiful Sea Vixen with twin Axiflo fans. This year he brought the almost complete F-105 Thunderchief which has been occupying his time as a retiree. Like all of his projects it showed a well-researched and carefully designed airplane. Not too much nor too little.

In this one, which is $^{1/10}$ scale and a pretty hefty 13 pounds, Mike has placed a Viojett fan system and an O.S. .77 with a complete scale inlet/intake system. There are no cheater holes. Some flecking problems and the absence of a canopy kept him from flying the plane (which has successfully flown a number of times since then) at the Fly-in. A number of design problems have kept modelers from doing the *Thud* and one of those problems was the landing gear. It's long, it has to rotate some on retraction, and the wing is thin. Mike, with the help of Lynn Mc-Cauley, fabricated a set of legs for the 105 that copied the design of the original.

Lynn is one of those rare individuals who can continually turn out successful design after successful design. He's a designer and builder who has teamed with Ed Couch as his pilot to produce an air force of ducted fan models out of his own creativity. Among them have been the Dynamax powered F-84F *Thunderstreak*, the F-104 *Starfighter*, the *Stealth* fighter, and collaborations on a number of other projects. All of these were on display at the Fly-in. None flew because each was in a different stage of completion being second generation examples of proto-

Ducted Fans International



Not exactly whisper quiet, but noticeably more quiet than the other fans at the Southwest, Tom Cook's *Starfire II* (above left) sported his new "quiet" pipe. Steve Korney turned quite a few heads with the excellent all-around performance shown by his Hurricane-powered *Cobra* (above right) with a Rossi .90.



Lynn McCauley is a master craftsman, clearly indicated by his smoothly graceful all-wood *Stealth* (below left) fan model. The plane has flown but still has some bugs. Many hoped Bob Violett's long-awaited F-86F *Sabre* would be ready to fly but the completely scale plane still needed some work.



types that had already flown successfully. Since then, the F-104 and the F-84 have flown quite well, but the radical planform of the *Stealth* still needs a bit more head scratching before the final bugs are worked out.

Another BD showed up, this one the BD-5J that Jim Barrett brought to the Southwest years ago and which seemed to start the whole BD fever. Jim's plane, a much larger model, uses a Byro-Jet. Those louvers on the sides were added a few years ago to help direct the flow of incoming air to the face of the Byron fan. Originally there were simply rectangular cutouts in the foam shell fuselage that just weren't letting the air flow freely. Jim's BD was one of the most frequently flown planes there attesting to the proven reliability of the design and docile handling of the plane.

Successful simply by the amount of numbers and the amount of flying that took place, this Southwest Fan Fly-in had really proved that fans are gradually spreading to more and more modelers. New faces show up and more new designs appear, a an indication of some healthy growth. The emergence of a movement (the Jet Pilot's Organization, or J.P.O.) to represent those interested in fans also points to a faith in the future of fans. According to CD Ed Couch, next year the Copeland field is going to get another crack at being the biggest and best Southwest Fan Fly-in ever. Date for the event looks like the the third or fourth weekend in September. The Greater Southwest Fan Fly-in has always pointed out new directions and this year was no exception.



Many exotic planes show up at the Southwest but there's still plenty of the more sport oriented plane's like MiG-15s or Parkinson Regal Eagles such as Joe Pasztor's Eagle which pulls up and away on another flight.

a trophy stalking Cougar!

Challenge the supremacy of Fikes and Laceys.

By Perry Peterson



PHOTOGRAPHY PERRY PETERSON

Even though the Cougar spans only 25 inches, its low aspect ratio wing and boxy fuselage make this a bigger plane than some jumbo rubber models.

he Nesmith Cougar, like the Tailwind it emulated, is one of the more flyable designs available to scale builders and I think it looks better than the Fike E or Lacey M 10. Fike's and Lacey's have a lot more wing area, but for some reason, I often see them out performed by the Cougar which has a much higher wing loading. My own personal experience has shown that my old, tired, nine year old peanut *Cougar* has never been out flown by a *Lacey* and the only *Fike* to do it belonged to Bob Willey's Nats winner (my *Cougar* came in second).

One of the nice things about modelling a home built plane is the freedom of colors and



Even with a higher-than-normal wing loading, the author claims the plane flies "like a home-sick angel." The trophy hardware next to it, from the Rocky Mountain F/F Champs seems to vindicate the author's claim.

color combinations that can be used to finish the model. The freedom to alter aircraft design can also be available to the modeller. Often full size *Cougars* were built with different window and cowl treatment to suit the builder. Also many different colors and color combinations were used. If you are not building for a contest, the sky is the limit to color selection and minor design variations. As you build, imagine you are building the full size plane and do your own thing!

For this project, I chose a Cougar built in the late 1950's by C. Warren Cronce of Lockport, NY. The project was finished in 1960 and flew for the first time on July 27, 1960. According an article found in Cougar Stories, which accompanied a Cougar 3-view I purchased from EAA several years ago, the paint job on the Cronce Cougar was designed and tested on a scale model by a friend of the builder. About ten years ago I purchased a color photo and several black and white photos of this plane from two of the now defunct companies selling aircraft photos. The 115 HP Lycoming powered Warren Cronce Cougar is quite striking with it's Halloween colors of orange, black and white.

My model of this *Cougar* was built just prior to the annual Rocky Mountain Free Flight championships held Labor Day weekend, 1988. It was flight tested two days before the contest in winds too gusty to properly evaluate the glide. The day of the contest was not as windy; only about 5 to 6 miles per hour. After one more test flight, I put two officials "in the bank". As it turned out, the *Cougar* won first place and the big travelling trophy. In spite of a wing loading a little higher than I like in a rubber model, this plane flies like the proverbial homesick



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a trophy stalking Cougar!



The large fuselage is framed up mostly from 3/a2nd square balsa while the tail feathers use smaller 1/16th square stock in the interests of weight saving. Add-

ing the cross pieces to the fuselage side frames is a little tricky since the bottom of the fuselage is narrower than the top.

angel! Like the full size plane, the wide fuselage acts as a lifting airfoil section.

Fuselage

Even though this plane has a wing span of less than 26 inches, the fuselage is wider and almost as long as most jumbo rubber scale models. Use very firm balsa strips for the longerons and cross pieces. If you leave out the "holding block" gussets shown on the side view, the nice graceful curve you put in the lower longeron will probably not stay and part of that curve will be transferred to the top longeron when unpinned from the plan!

The basic box fuselage is built with 3/32square balsa over the plan side view, with one side built over the other and separated after the glue is dry. Adding the cross pieces to form the fuselage box can be a little tricky because the bottom of the fuselage is a little narrower than the top. I solved this problem by using a template cut from poster board using the fuselage top, shown on the plans, as a pattern. Glue the fuselage sides together at the tail post and pin down over the plan top view. Add the fuselage top cross pieces (bottom cross pieces will be added later) working from the tail post forward using the template as a guide.

I let the side frames trap the template about half way up on the sides. Make sure the sides are at 90 degree angles with the building board. When the top cross pieces are dry, carefully remove the partly built fuselage and turn it upside down and pin it back on the plans. Remove the template and add the remaining cross pieces making sure that the side frames angle in the same amount on each side at the top (which will eventually be the bottom of the finished fuselage).

Add the fuselage stringers and fill in around the windows following the "Typical Molding" illustration shown on the plans. Also fill in at places between longerons and stringer where tissue pieces will meet during the covering process. Use medium weight balsa for the sheet fill in areas in the forward section. Don't forget to add the sheeted area between the base of the windshield and the top of the instrument panel area. Most *Cougar* models I have seen do not have this area sheeted. If you leave this out, your model will have less character and the windshield will not be protected from rubber lube spatter marks.

Drill the nose block for about two degrees of right thrust. Down thrust is built into the model. Key the nose block, as shown in the front view, to prevent inserting upside down when flying which will reverse thrust adjustments.

The curved portion of the windshield side frames and the outline of the rear side windows are made from laminated basswood available from Peck-Polymers. The angled "headache bars" behind the windshield are 1/16 dowel.

Bend the landing gear wire from .040 music wire. If most of your flights will be R.O.G. from anything but ideal take-off surfaces, you will want to use a little heavier wire to give a little better stability during take-off. Use the lightest balsa you can find for the wheel pants. Use medium weight balsa discs glued cross grain for the wheels. Glue a short length of aluminum in the center. After the wheels are sanded and painted, trap them inside the pants with the landing gear wire pushed in from the back side. Apply quick set epoxy sparingly to the short vertical portion of the wire where it is recessed in the back of the wheel pant as shown on the plan.

Cut the motor retainer peg from $^{1/4}$ inch OD aluminum tubing. If you use smaller diameter tubing, switch to copper tubing. The fuselage is still quite wide at this point and the stress of a well-wound motor requires a lot of strength. Drill the motor peg holes and strengthen the entire balsa anchor posts with CyA glue. When the glue has completely dried, test fit the tubing back in the holes and make sure there is a nice snug fit.

I used the plug in shock mounted wings as shown on the plans. Usually I don't use this wing mount method on scale planes less than 30 inch wing span, but this is a very large 251/2 inch wing span model. If you choose not to use this wing mount method, I would recommend building the center section integral with the wing and attach the whole thing in' one piece rather than gluing each wing separately to the sides of the fuselage. The Robart hinge points I used to anchor the wing strut bottom needed to be slightly modified. It requires too much force when separating the points and could cause damage to a model this size. When I started using the Robart hinges, I would reduce the male end by shaving down slightly with a razor blade. It is easier to ream out the other end carefully with the tip of a sharp hobby knife. Strive for

a trophy stalking Cougar!

Eight-year-old Allen Peoples, the author's grandson (above left) pre-flights the Cougar. Pulling the nose block out (above right) Allen shows the "braided"

motor which the author describes in the text. Lubing the rubber motor properly will yield many flights from the same motor.

just enough snap remaining in the points to ` a past issue of The Winding Stooge, the hold the strut during flight. Please remember the struts are definitely functional.

Flying surfaces

Cut the wing ribs from light weight 1/16 "C" grain balsa sheet. I used upper and lower diagonal wing spars to separate the colors when tissue covering. If you use the same method, wait until the wing is otherwise complete before notching for the angled spars. Make a notching tool by gluing a ¹/16th strip of 180 garnet paper to the edge of a $\frac{1}{16} \times 2$ inch sheet of hard balsa. Glue a 1/32 balsa strip on each side to help act as a handle as well as keep the tool straight and true. Make the tool as long as you need for the size models you like to build. Two or three different tools of different lengths is ideal. Paint these notching tools a flashy color or they will get lost with building materials on your work bench. Tom Winter showed how to do this in newsletter of the Nebraska Free Flighters.

The horizontal stab was built with a slight airfoil. After the stab was removed from the building board, I made mini-ribs by adding soft 1/16 strips to the top and sanding to an airfoil shape with a sanding stick. Using a flat bottom airfoil on the stab has let me balance many a scale model a little further aft than normal requiring less clay nose ballast. I have used this method for years with good results even though some experts have told me the stab, on scale models, should be flat on both sides or air-foiled on both sides.

Covering and finishing

Brush on a coat of thinned dope to the longerons, fuselage cross pieces, flying surface outlines, and anywhere else you will need to brush on the thinned white glue tissue adhesive. Use about half white glue and half water. Brush this solution on the outside frame-

For easy storage and transport, the Cougar's wings plug into the fuselage and are retained by a rubber band. Two locator pins, one fore and one aft of the retaining hook on each wing panel, maintain the incidence.

work of the area to be covered by a piece of tissue. Lay the tissue over this area and gently pat down and carefully pull out any wrinkles. Keep your fingers moist as you go.

Tissue grain should run span wise on the flying surfaces and fore and aft on the fuselage. Some of the heavier domestic tissues have no grain. If you are using a good grade Japanese Tissue (I used Japanese tissue from Oldtimer Models) you can tell grain direction by tearing a corner. It will tear straight with the grain but not against the grain.

Shrink the tissue by spraying on a mist of water. I use a squeeze trigger sprayer found at garden supply counters. Adjust the nozzle for the finest spray. Spray into the air and wait a second for the heavier droplets to fall before letting the fine mist fall on the tissue. Don't get the tissue saturated. Just enough to sag the tissue. I hurry the drying process with a blow dryer. Brush on non-shrink dope thinned 50 percent with dope thinner. Use two or three coats on the flying surfaces and three or four coats on the fuselage.

The black and white color separation on the fuselage was accomplished by changing color at a stringer. The white and orange on the wings met at the angled wing spars. The Orange on the fuselage must be doped over white tissue. Cut pieces of orange tissue in the proper size and shape and lay in place. Brush on dope thinner, allowing the dope underneath to soften and create a bond. Again, if you are not building for a contest, most any colors would be appropriate.

Use a good light acetate for the windows. I used the very excellent light material from Micro-X. Glue in place with RC/56 glue. Clean the acetate, removing all finger marks, etc. Apply the glue sparingly at one end, lay the acetate in place and carefully add glue, applied with a toothpick, working to the other end. The RC/56 glue will dry clear, but if you smear a little, remove it with a cotton swab because it will show. Don't be afraid to cut a new piece of acetate if you goof. When someone looks at your model, the first thing they usually see is the window area, so do your best work here.

Rubber motor

This model loves to fly, so let's make up a motor and head for the tall soft grass (if you find it tall and soft, let me know and I may move there). Make a 30-inch long motor using four strands of ${}^{3}\!/_{16}$ inch FAI rubber. If you use SIG rubber, you will need to use ${}^{1}\!/_{4}$ wide because it is not as thick. Lube the rubber with something that does not contain castor oil. A castor oil-based lube will force you to wash off the motor after every flying session or risk damage as the rubber will deteriorate much more quickly. I have used rubber lube from Peck-Polymers for years and have had no problem after many flights from the same motor over a period of several weeks (and I don't remove from the model to wash and re-lube after each flying session).

Install this motor in your Cougar and hold one loop with your little finger while you wind in about 75-80 turns backwards one loop. Switch loops and wind in the same number of turns backwards in the other loop. Make sure these turns are in each loop separately and wound backwards. Put both loops on the winder, without letting the previous turns unwind, and wind as if to fly. Let the motor unwind and presto - braided motor! Well, not really braided but pre-tensioned and it will look and act like a braided motor. If the motor is too tight and will prevent the prop from free wheeling, undo the motor and do the pre-tensioning again using fewer backwards winds in each loop. If the motor ends up too loose, go back and use more backwards winds during the pre-tension process.

Flying

Crank in about 200 winds and lock the prop with a pin in the rear of the nose block. Balance the plane at the point shown on the plans. Don't give this plane a toss to test the glide; it is not a Nordic, so don't try to make a Nordic out of it! Launch the plane with about 100 to 150 winds-just enough power to let it come back down on its own so you can properly evaluate the glide. Adjust for as flat a glide as you can with horizontal tail adjustments. Add a few more winds to get the Cougar a little higher to adjust the glide turn. The glide turn should be very gentle. A steep gliding turn will let your plane spiral down too quickly and will rob you of flight time.

When you are happy with the glide, add another 75 turns to begin evaluating the powered flight pattern. You used tail surfaces to trim the glide so leave them alone and trim powered flight with thrust adjustments only, if you can. If you need to use tail surface

With a launch like that, Allen is going to make it to the F/F "major leagues" some day. The author uses a careful series of controlled power flights to gradually trim the plane to a right hand flight pattern.

movements for powered flight, you will need to go back and trim the glide all over again somehow. When you are satisfied with the last flight, add another 75 to 100 turns and fly again.

Each adjustment should be slight and make only one adjustment at a time. It took a long time to build the model; so take a while longer to get it to fly well. I have seen too many models damaged because too much power was applied before proper testing.

I like to have a right turn (unless the plane has a low wing configuration, in which case it must fly left for best results) in both the power and glide portions of the flight. A right power pattern will gain more altitude and will also give a straighter, more realistic take-off during rise-off-ground flights. I like the glide path to be in the same direction as powered flight because there is a betterchance the model will land closer to the launch area and my weary old legs will not have as far to walk during a long flying session.

Take your time during the flight trimming process and you will have a plane that you can depend on for hundreds of flights. I have had dozens of models that have each given me several hundred dependable, satisfying flights. Experience the thrill of watching your big fat-bodied *Cougar* spiral up into the sun!

Part of the model's excellent flying characteristics (above left) come from the wide fuselage that acts as an airfoil. Take the time to trim the model properly,

and it will consistently give gorgeous flights (above right) time after time. A right hand pattern seems to give the most altitude.

An FM Product Review: COX Hobbies' **Electric Malibu**

By Dick Gibbs

A first taste of electrics for novice and experienced flyers alike.

ox Hobbies Inc. (1525 East Warner Ave., Santa Ana, CA 92705) advertises the Electric Malibu as suitable for novice R/C pilots as well as experienced flyers. For beginners the model is available with a two channel radio, as Cox catalog No. 90461, whereas those who already own a radio can purchase the model only as Cox catalog No. 90460. this review covers the Electric Malibu model with the Cox Cadet two channel radio (No. 90461).

The kit

Everything necessary to assemble and fly the Electric Malibu is included in the kit box except batteries for the radio system. This is a "dry" system which requires eight AA alkaline pen cells for the transmitter battery pack and four AAA cells for the receiver battery pack. Regular pen light cells are not suitable! Use only alkaline cells. Experienced R/C flyers who normally use Ni-Cd batteries and chargers could use individual Ni-Cd cells of the sizes listed above but the beginner would do well to avoid any further complications and stick with the alkaline cells recommended by COX in their radio manual.

The wing panels, tail elements, and most of the fuselage is formed of molded expanded bead foam. The forward section of the fuselage is molded of hard plastic. All required hardware, pre-bent wire landing gear (with wheels attached), Mabuchi RK-370 electric motor, gear reducer, prop, power system Ni-Cd battery, and battery charger are included in the kit box as well as a large sheet of pressure sensitive decals for final decoration. As I said earlier it's all there in the box except for the radio batteries.

Assembly

The only tools required to assemble the Electric Malibu are a small Phillips screwdriver and a 5/16 inch open end wrench or nutdriver. It all seems too simple but it's true and it works! The first item in the assembly process is applying the cabin window decals in place on the fuselage, necessary because the left side decal has cutouts for the power switch and radio switch which are installed in the next step. The radio receiver, battery box, and servos (one for rudder and one for elevator), are factory installed and wired to

For the Malibu, the Cox two channel radio (above left) works well but it has the rudder stick on the right and the elevator stick on the left, the reverse of the usual layout. Some might prefer the Cox three channel which incorporates the 50

rudder and elevator on a single stick. Eight AA alkaline cells snap into the battery holder (above right) which then loads into the rear of the transmitter. Battery cost would run about \$9.00.

the switch. The receiver is a snug press fit in a molded pocket in the fuselage, the battery box fits less snugly (for easy removal to insert batteries), and the servos are retained in their pockets with a dab of epoxy.

At this time, according to the wellillustrated instruction sheet, the batteries are installed in the battery box and the two switches (motor power supply and radio) are mounted through holes in the fuselage side. The switches are supported only by foam and it is possible to crush the foam by drawing the mounting screws too tightly; tighten only until the switches are firmly mounted and then stop. This is especially true of the receiver switch which may become intermittent in operation if mounted too tightly. As a check, after mounting the receiver switch, turn on the transmitter and receiver and operate the transmitter sticks a few times. If the servos move everything is fine. If they don't react to the transmitter sticks loosen the switch bolts about one turn and try again. Continue the process until the servos work properly every time you turn on the receiver. In my case it was necessary to back off the mounting screws about two turns for positive action of the switch.

The electric motor, gear reducer, and prop come assembled to a plastic mount which fits into grooves in the forward fuselage hard plastic shell half. The second shell half is fastened to the first with four sheet metal screws which firmly holds the motor mount in place and covers the receiver battery box. A dummy engine snaps into place over the motor and finishes off the front end with a scale-like effect. The wire landing gear fits into a slot on the bottom of the fuselage and is secured in place with a plastic wedge.

Control surfaces are factory hinged with plastic tape and the only assembly involved here is adding the control horns which are a push, click, fit requiring no mounting screws or bolts. After the control horns are in place the entire tail assembly is fastened to the fuselage with two 6-32 nuts. Control pushrods are the proper length, have Z bends at the servo end, plastic clevises at the other and are easily fitted into place.

The wing is supplied in the kit as two separate panels and must be joined by the buyer. Heavy duty transparent tape is supplied in the kit for joining the wing halves. It is a pressure sensitive tape which is simply wrapped around the center section joint and I suppose it would work but I took advantage of a note in the instructions to the effect that epoxy could be used for a stronger joint. I used a small amount of Loctite E-POX-E and applied the tape over the joint after the epoxy cured.

Finally the decals are removed from their backing and applied to the model using the kit box artwork as a guide. Be careful when applying the pressure sensitive decals; once in place they cannot be lifted off and relocated. Frankly it took me about as long to apply the decals as it did to do all of the other assembly work on the model, which gives some idea of the simplicity of the entire project.

I did experience a problem with the wing decals in that they tended to pull away from the curve of the leading edge of the wing thus destroying the integrity of the airfoil shape. Rather than attempt flight with this condition I removed them. The decals would probably remain firmly in place if applied a bit farther back on the wing so as to avoid the sharp spanwise bend over the leading edge. FLYING MODELS

Individual flight pack items like servos and receiver fit snugly into pockets molded into the foam fuselage (above) and are secured with a dab of epoxy. Four AAA alkaline batteries snap into a battery holder which fits in the foam cut-out in the forward fuselage (below). A 10 amp fuse is just above it.

When all the work is done, the *Electric Malibu* has a wingspan of 55 inches and the total weight is $28^{1/2}$ ounces.

With the model finished and ready to go the beginner should take time to read the radio manual and the booklet covering flying which are included with the kit. The radio manual fully describes the system and its use, while the flying booklet provides a very basic course on R/C flying. Obviously it is best for the beginner to have some one-onone instruction when learning to fly R/C but if an instructor is not available these texts can be helpful.

Preflight

The motor battery, furnished with the kit,

is a six cell (7.2 volt) 450 mAh pack with a Molex connector which plugs into the mating connector that is part of the motor wiring. The battery pack fits into a molded recess in the bottom of the fuselage and is retained by a rubber band. For charging, the battery pack is removed from the model, disconnected from the motor wiring and plugged into the charger. The charger is intended for use with only six cell 450 mAh packs and uses a fifteen minute timer to stop the charge cycle. The charger's input plug is the type that inserts into the cigarette lighter receptacle in your car.

When the charge cycle is completed the battery is disconnected from the charger, plugged into the motor wiring jack, inserted

Both the motor switch and the receiver switch are mounted in pre-drilled holes in the fuselage side. Use care when you install them so the foam isn't crushed. When ready to launch, be sure both switches are on!

COX Hobbies' Electric Malibu

Plastic wedges, pressed into the landing gear wire slot, hold the wire gear in place (above left). The 7.2 V motor battery pack aft of the gear fits in a foam pocket and is held in place with rubber bands. The motor mount, motor, gear

into the fuselage recess and secured with the rubber band. The positive side of removing the battery for charging is that during the charge cycle the battery can be picked up to check for heat; if it becomes warm to the touch the battery is going into over charge and should be disconnected from the charger immediately to prevent damage to the battery. If the battery does not get warm it should be left on charge for the entire fifteen minutes until the timer shuts off the charger.

FLYING

Flying the *Electric Malibu* consists of two parts, the radio and the model. The radio, as mentioned earlier, is two channel with two sticks. The right stick controls the rudder and the left the elevator. For the complete R/ C beginner or someone with R/C car experience this should not be a problem but for someone (like me) who flies single stick radios it is a very, very interesting experience! At any rate my radio is reliable, without glitches, and responsive to the limit of model visibility. For those who prefer a three channel radio with rudder and elevator on one stick and a separate throttle control COX sells the CADET III (Catalog No.8230D).

In the air the *Electric Malibu* can be fun for anyone and is really, in my opinion, the best entry level trainer I've seen yet. With control throws set up for minimum deflection, as suggested in the assembly instructions, the model responds well to control inputs without being twitchy, whether under power or in the glide, which is a big plus for the beginner.

The model flies fairly slowly and I have flown entire flights, including landings, using only the transmitter trims for control. On a fresh charge my model will climb, with neutral elevator, to an altitude of over four hundred feet until power drops off after about three minutes. At this point four or five clicks of up trim establish the best glide and about a minute later the *Electric Malibu* is on landing approach.

With its polyhedral wing, 11 + ounce wing loading, and undercambered airfoil this model should thermal... and it does. On our last outing (in November) I was able to work a small thermal for a total time of nine minutes. To date I have flown the *Electric Malibu* in breezes ranging from 2 to 12 miles per hour (indicated on a hand held Dwyer velometer) and it handled well under these conditions but I wouldn't want to attempt any flights beyond 12 MPH. The model is too light to penetrate higher velocity winds. Certainly the beginner would do well to stick to calmer weather.

Without any form of motor control the motor operates throughout the flight and landings usually occur with the prop ticking over slowly. In the event the prop is prevented from turning because of a bad landing, or landing in tall grass, the motor wiring is fused so there should not be any damage to the motor or battery. A spare fuse is included

reducer, and prop are furnished in the kit as an assembled unit (**above right**). Because of the gearing, the prop rotates clockwise instead of counterclockwise as is conventional for most models.

> in the kit. All of my flights have started from a hand launch because it's easy and launches can be made directly into the wind. A gentle toss toward the horizon is all that's required to get the model airborne.

Summary

COX Hobbies offers a splendid package for electric flyers in the *Electric Malibu*, with only an hour or so required for assembly and great potential for enjoyable flying. In my opinion it is ideal for the newcomer to radio control and a great change of pace model for the more experienced R/C'er.

No need to glue the tail assembly on since two 6-32 nuts retain it (above). The parts are keyed for proper alignment and fit perfectly. During average 4-5 minute flight time the *Electric Malibu* (below) can get up to four hundred feet. Very gentle and easy to fly, it's at its best in breezes less than 10 MPH.

Seaplanes on Lake Washington

A visit to a floatplane base gives details for your next float project.

By Dick Sarpolus

Workhorse of the bush country, the DeHavilland Beaver and floats are almost inseparable. Author Sarpolus came across this brightly painted example and a whole host of other assorted aeronautical acquanauts at a seaplane base in Renton, Washington. Looks like Dick is ready for a seaplane project.

ff-water flying has been a part of R/ C aircraft activity for many years now. Modelers have found out that it's fun, not difficult, and offers yet another dimension for our enjoyment. Primarily practiced by sport fliers, there hasn't been much competition yet over the water. And for the scale enthusiast, many, many interesting aircraft over the years have been operated on floats, up to and including the DC-3. Now that would be a sight; the Ziroli DC-3, two Quadras, on floats. Most light aircraft and a scattering of warplanes have been used for off-water operations. When it comes to flying boat types, or amphibians, there's another whole group of subjects for scale modeling fun. Even the pylon racers have an off-water event to emulate, the Schneider

Cup racers from the 1920s and 30s.

I've flown R/C models off the water for more than twenty years, but never had the opportunity to see any full scale seaplane operations close up. For scale modeling information, and to see what we can learn about off-water operations from the big ones, a look at the people-carrying seaplanes can be helpful. I was glad to have my camera with me on a business trip to Seattle recently, as I had the chance to look around a seaplane operations base at the lower end of Lake Washington, in Renton. With all the lakes in this part of the country, it's ideal for seaplanes, and it was obvious that they were popular here. With many good restaurants located on the lakefronts, it's common to see seaplane ramps provided for the fly-in customers.

I was able to look closely at the Piper Cubs, a variety of Cessnas, and the big DeHavilland Beavers, all fitted with floats. There's no variety in float design; they seem to differ only in size. All of aluminum construction, a number of the floats were brightly painted, in color schemes to match the airplanes they supported. I was impressed with the obvious strength of the float supports, and the attention paid to making the float mountings rigid and stiff. Diagonal mounting struts, cross bracing, criss-crossing support rigging wires, all made it obvious that no flexing at all was desired.

Dual rudders on the ends of the floats for water steering were standard, with steering linkage handled by flex cables and pulley systems to the aircraft. The rudders could be

Float planes are pretty common here and almost any light single can "grow" a pair. This Piper Super Cruiser (above left) sports what are probably the most

common floats around a pair of Edos. From the amount of bracing (above right) it's apparent these floats must be rigid.

Seaplanes on Lake Washington

Cessna 180s and the later more powerful Cessna 185s (above left) were naturals for float conversions because of their excellent lifting capabilities. Note the wide cargo door on this *Beaver* (above right), a graphic indication of what sort of loads this plane can carry. Designed as a flying taxicab, the Cessna 206

Stationair (below left) is another natural for floats. Note the large sub-rudder, necessary for stability with the bulk of the floats. A big Jacobs radial powered the Cessna 190/195 Airmaster series (below right). Note the sub-rudders on the horizontal stab.

Republic Seabeas were part of the post-World War II move to put a plane in everyone's hangar. Powered by a Franklin opposed recip, the big amphib is

built like a tank and inside is like a living room since they were designed for personal travel. But are they noisy inside!

pivoted up and back, for moving about on the ramps and the ground. I saw a lot of float setups in a short time, but only one amphibious arrangement, with wheels under the floats. The wheels were mounted just behind the step of the floats and right up at the very front end of the floats; front wheels were steerable. I don't know if they were retractable into the floats; I assume so, at least retracting enough for water use.

Float equipped planes apparently aren't kept in the water any longer than necessary; most of the aircraft I saw were up on land or up high on ramps, tied down with large concrete blocks to hold them in place. A uniquely modified pickup truck was used to get the planes in and out of the water. The pickup had no cargo bed and no rear wheels—a much extended chassis went out from the front of the truck, with wheels up front and a lifting arrangement to raise the float equipped aircraft off the ground for moving them around.

This device served for use on a ramp, to bring the aircraft out of or into the water. While scale float designs can be made for our use, many R/C modelers have learned that much simpler designs work perfectly fine. Rather than vee bottoms and curved forward sections as on the full scale floats, simple flat bottoms and shapes capable of being easily cut from foam with a hot wire will do the job. Rigid float mounting, as on full scale, does seem to be the best way to go on our R/C

Note the triangular arrangement of cross braces and struts and the diagonal bracing that give the floats so much rigidity. Note also the very beat-up look of those steps on the braces. This plane is no hangar queen.

aircraft. Good water rudder setups are needed for our use also.

While R/C off-water flying can be less complex than the full scale type, some of the sea-

planes I saw looked awfully good, and I look forward to having an R/C project in the future based on a *Cub* or Cessna, with scale Edo floats and rigging.

Even an Aeronca Champ gets some floats (above left) even though some parts are missing because of an overhaul. Maintenance on seaplanes, as you can guess, is more demanding. Water rudders (above right) are hinged on the back of floats so they can be retracted during take-off and landing. This Cessna

180 or 185 has Edo amphibious floats (below left) which probably cost more than the plane itself! Even a Cessna C-172 *Skyhawk* (below right) can get floats although it's not a heavy hauler. Probably just used for personal travel.

FLYING MODELS

More news from the gang. By Earl VanGorder

Ole Van (in the center) looks like he's lived there all his life- England that is. Our cosmopolitan columnist visted the famed model shop of Henry Nichols Jr. (the smilin' chap next to Van) during a trip to London.

reetings, fellow balsa-bashers! Well, last month I told you that I was just about ready to leave for a little vacation in England. Well, I did just that and now I'm back here in the good old U.S.A. again. I had a great time and saw a lot of things I hadn't seen before. Oh yes, I also managed to catch a cold but the U.S. Customs people didn't charge me any duty on it when I imported it back into the States!

Now, I know what you're gonna ask "How about it, Van, did you get to any good hobby shops?" Well, I'm here to tell you that I spent some time in one of the best I've seen and that is the famous "Henry Nicholls and Son" shop in north London. Troops, this is the complete hobby shop and I do mean complete! There are R/C kits of every description along with scores of engines and radios ... but this shop hasn't forgotten the free flighters! Nor, have they forgotten that there are still plenty of good ukie kits as well as just about anything in free flight from kits for lots of the old-timers (replica, of course) to scale free flight kits for rubber, CO2 and even Jet-X power.

Did I come away with a few kits? You can just bet your full bottle of cyano that I did! There are racks and racks of magazines, too, and from all over the world. The U.S. section contains every model mag put out in this country on aircraft, boats, and cars. Yes, there were plenty of copies of FM there and, I gotta tell you that our little get-togethers are pretty well known to our British friends.

Couldn't resist having my photo taken with Henry Nicholls Jr. and I'm gonna show it to you so you can see just a small part of this very well stocked shop.

Well, gang, I now have my copy of the new Don Ross book that I've been promising to tell you about, and it is everything I expected and more! This has just got to be the definitive book on the subject of free flight modeling and stick and tissue building. There are 168 pages covering rubber powered models from the simplest beginner type to contest types. Every aspect of modeling is covered with simple, fully illustrated instructions for things like construction, covering, props, rubber, winding, flight trim, and even a whole chapter on designing your own. Conventional biplanes, canards and flying wings are discussed.

There are scores of photos and drawings describing techniques from raw beginner to expert as well as all sorts of hints and "how

PHOTO: BARNEY FROMMER

Barney Frommer did some neat work on the bones of his SIG Cabinaire (above left). He says that after a little more practice, he'll be ready to challenge 56

the "big guys". Mark Allison's Pistachio model of the military version of the French Flying Flea (above right) doesn't fly too bad.

The appendix lists over 50 sources of kits, materials and supplies as well as modeler's organizations and publications.

Here's how you get your copy: do not order from Don Ross! The book is available from : Motorbooks International, PO Box 1, Osceola, WI 54020. The single copy retail price is \$12.95 plus \$3.95 for postage and packing. The title of the book is *Rubber Powered Model Airplanes* and you're gonna want this one in your library. You'll love it!

The huge bag of mail that was awaiting me on my return from overseas also revealed that a lot of our favorite sources have made additions to their lines and have also updated their catalogs.

Hannan's Runway has added loads of new books to their line and you can also get your copy of the Don Ross book from this source. Joan Hannan has also located a new line of those unusual postcards that the "Runway" has become famous for. This is a real nostalgia set featuring aircraft of the "good old days" as depicted on reduced reproductions of old California orange crate labels some are actual and some are satire, but all are great! You get a set of eight of these full color postcards for \$4.80. If you already have your Runway catalog, send a SASE and ask Joan Hannan for the update sheets. If you don't have a catalog, as yet, send \$2.00 and you'll get the works! The address is Hannan's Runway, PO Box A, Escondido, CA 92025. Go for it!

Airman's Supply Co. have also added new items to the line and have a new catalog out. Just a few of the new additions to the line include the kits of Fresno Models, Dave Diels Engineering, Midway Models, and the allpaper line from Blue Swallow Models. Believe me, people, if there is a free flight kit being produced in this country, you'll find it in this catalog. Not only that, but in many cases, you'll find discounted prices, as well. I can't find a price on the catalog, but it is a self-mailer and mine came with a single 25¢ stamp so, send such a stamp and request your copy. The address is: Airman's Supply Co., PO Box 1593, Norfolk, NE 68701.

Bryan Cole who operates that great plan service down Florida way has also added to his line of very nice scale flying model plans and now offers a total of 18 drawings. Some of the additions are the more unusual types, too, like the experimental Curtiss Triplane of 1917 and the Timm N2-T1 Navy trainer of WW II vintage. As a matter of fact, I'm gonna show you a photo of the "bones" of Bryan's own Timm. He builds all his models before releasing the plan just to make sure that all is well.

DTO: COURTESY MOTORBOOKS INTERNATION

This got to be one of the best and most practical books on rubber powered models. It's Don Ross' new book *Rubber Powered Model Airplanes.* Everyone will learn something from this gem, even the ole Fledgling himself.

All models are in the span range of 20 inches to about 28 inches and plans sell for \$5.00 each postpaid. This is an excellent buy for well-done and very professional drawings. Send an SASE and request your own plan list by dropping your request to this address: Bryan V. Cole, 1312 NE 35th ST., Ocala, FL 32670.

One more update that I want to give you before we go to the mailbag is from Roger Teagarden at Flying T Model Co. Roger has released more new plans for some of those rare old-time scale jobs ... Hey, how about this one for all you "Flying Aces" types who want to do something different than the next guy? What is it? Nothing less than the rare early type German Gotha bomber of World War 1, the Gotha *Ursinus*. Wow! What an unusual type and wing area that just won't quit! This is the strange looking one with the upper wing mounted mid-wing and the lower slung well below the fuselage and carrying the twin engines. The drawing is well detailed even to color information and very professionally done. If you've never gotten around to getting the Flying T catalog sheets (which

"Wow! That was a short flight but man was it exciting!"

Flyin' Things for Fledglings

PHOTO: BRYAN COLE

Recognize this rare WW II trainer (above left)? It's the Timm N2-T1 built by Bryan Cole from his own plans which he sells though his plan service. A tre-

PHOTO JOHN MORROW

mendous amount of research went into John Morrow's 36 inch span model of the rare Mercury Chic (above right). The Curtiss Museum has the last one.

are illustrated).. send a large SASE to this address: Flying T Model Co., 1234 No. Edgemont #204, Los Angeles, CA 90027.

Okay, let's get to the mailbag and I've got some good photos for you to look over. John Morrow, of Watertown, NY, sent a shot of his 36-inch span model of the Mercury Chic. This aircraft was built by the Aerial Service Corp. of Hammondsport, NY and was intended as a primary trainer. Only one example of the aircraft still exists and is in the Curtiss Museum in Hammondsport. John visited the museum to do his research for his model. I am a supporting member of the Curtiss Museum and have visited on numerous occasions and I can assure you that John's model of this old Velie-powered bird is plenty accurate. Beautiful work, John, and thanks for sharing it with the gang.

Ted Kowalczyk, of Chicago, tells us that he is back in the hobby after a seven year layoff and is having loads of fun. He sent us a "bare bones" shot of his Dornier *Pfeil* built from a Dave Diels plan. Looks like Ted didn't lose his touch during the seven year hiatus. Nice goin', Ted and we're glad to have you back.

Barney Frommer, of White Plains, NY, also sent a bare bones shot of his SIG *Cabinaire*. Barney says that he may not be a Mike Midkiff, or a Don DeLoach, but he plans to keep working and start "pushing" them in the near future. Way to go, Barney. Keep the old sights high. Judging from the workmanship on the *Cabinaire*, I think the gang will agree that you're well on the way!

Mark Allison, of Bishop, CA, sent us a whole batch of photos, but I'll only have room to show you one this month... more in the future. Mark tells us that he's only been on the modeling scene since May 1985, but he has certainly done well in competition having to his credit several first places in the Miami Pistachio Intergnats as well as a first place in peanut scale at the US Free Flight Championships at Taft!

The photo I'm showing you is of Mark's Pistachio version of the Henri Mignet Flying Flea (military version). Real one was used by the French resistance during German occupation. Mark's model has done 45 seconds and weighs just a shade over 3 grams without rubber. Since he's only been in the hobby for a bit less than four years, the mind boggles at what Mark will be accomplishing in the future! Oh yes, musn't forget: we have a request from our good friend, in Canada, Jim Moseley. Jim is into power free flight and he's got a big thing for old K&B Greenhead engines. He asks if any of the gang might have an old Greenhead, or two, and might be interested in selling or swapping. If you can help Jim, drop him a line at this address: James Moseley, 2000 Sheppard Ave. W., #406, Downsview, Ontairio M3N 1A2, Canada.

Al Lidberg also wanted to remind any of the gang who might be interested, that the Southwest Regional Model Airplane Championships will be held in Arizona on February 4 and 5 in 1989. You can get all the scoop on events, site directions, etc. by writing to Al. As a matter of fact, if you're in the area, I'll give you his phone number. If you write, he requests that you indicate activity areas (F/F, C/L, R/C, OT, R/C Soaring or MECA). This contest has been expanded for 1989, and, according to AMA, this is the oldest continually running contest, other than the Nats. You can write Al at this address: SWR c/o A.A. Lidberg, 614 E. Fordham, Tempe, AZ 85283. If you want to give him a phone call, it's 602-838-4743.

Well, troops, we've come to that time again and have to think about closing the old hangar doors on another session. Sure has been good "yakkin'" with all of you and, don't forget to let me know what you're doing and send along a B&W, or two ... address is still 2 Holley Lane, #7, Tonawanda, NY 14150.

Œ

So-long for now.

PHOTO: TED KOWALCZY

Those bare bones outline a Dornier *Pfeil*. Ted Kowalczyk framed this one up from a set of Dave Diels plans after a seven year "vacation" from the hobby. Van's lookin' forward to a picture of the finished plane.

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BUILDING AND FLYING CONTROL LINE MODEL AIRCRAFT

by Dick Sarpolus

Dick Sarpolus' Building and Flying Control Line Model Aircraft is a complete how-to manual on the popular mode of flying developed by the late Jim Walker in 1939. A history of control-line flying is followed by chapters on control mechanisms and hardware, flight training, engines for control line, aircraft construction and finishing, kits and scratchbuilding, competitive flying, building instructions for four 1/2 A models and three larger models, and a listing of control line organizations and suppliers.

This is a comprehensive manual for anyone who would like to get involved with control line flying., as well as for those who already are accomplished ukie experts.

Dick Sarpolus is a regular contributor to Flying Models magazine and other publications on a wide variety of model flying subjects and is a well known designer of model aircraft.

\$7.95

DECADE OF DESIGN 2

Here are over 50 different aircraft designs of the 1960 era compiled by Bob Buragas from the pages of Flying Models. Includes radio control sport, multi and single channel, control line stunt, speed, combat anbd sport, free flight gas, free flight rise of water, rubber, towline gliders and sailplanes and indoor models.

This collection of plans is a valuable addition to any model builder's library, providing needed information, brings back the joy of by-gone days, and is fun looking in moments of relaxation. See how other guys have overcome design problems.

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giant scale.

By Frank Costello

PHOTOGRAPHY. HENRY HAFFKE

This beautiful model of the Kinner Sportwing which came from Woody Franze plans, was built by John Krohn. A Saito five-cylinder FA 325 R5 powered the 25 pound airplane. Wing span stretched 97 inches.

ast month's column on engine test stands left out one very important fact that I didn't have room for and that's the aspect of safety. Somehow, when running an engine on a test stand in your back yard, it doesn't seem as intimidating or as dangerous as running it on an airplane out at the field. After all, it's bolted down securely and won't go anywhere. You don't have to worry about the plane slipping and hitting you and the fuel system and the ignition system is right out in the open and easily accessible.

This tends to lead to a lulling sense of security and relaxed operation with the confidence that you're absolutely sure you know what you're doing. Well, I'm here today (with all ten fingers, fortunately) to tell you that this is a *false* sense of security and that these engines demand a hefty amount of respect in running, no matter where you run them.

I tried out the Air Wynn test stand with a Quadra, a SuperTigre, and a Gemini Twin, in that order, all in the same afternoon. With the Quadra, a good amount of respect was used but by the time I got to the 1.20 Gemini, an indifference and casual manner of operation had set in which went unnoticed and that became more than just potentially dangerous.

As the Gemini started up, I noticed it was too lean so I reached around the 16-inch prop to the needle valve to richen it up. Apparently I imagined it was a 12-inch prop so my thumb and forefinger went through the last two inches at the tip of the prop. I won't go into the gruesome details except to say it hurt a lot(!) and took two hours of plastic surgery with skin grafts and over 100 stitches inside and out (broke the prop too!).

This is the worst I have ever cut myself with a model airplane propellor in 30 years of modelling and it need not have happened at all if I had been following my own rules about running engines like I do at the flying field. So please troops, learn from my experience. Use a healthy respect for these big engines. Remember the power is the same whether on or off the field.

A good prop guard is an excellent idea when running in the back yard and can save you much pain. I remember seeing in one of the recent model mags a test stand prop guard made from the metal frame and mesh of a lawn chair. An excellent idea and one I would like to implement myself. Unfortunately I can't find the picture and thus cannot credit the innovative inventor. If you read this and recognize your design, please send me some info on your idea so we may all benefit.

Waste not

IMAA Secretary Bob Blaney is a computer systems analyst by profession and a giant scaler by hobby. His dedication to the giant scale movement is total and his computer expertise is legendary. Combining the two surely has to be a rewarding experience for anyone and that's just what Bob has done with his new computer program. Called Pattern Master, the program has nothing to do with aerobatics but deals with covering. Building our big planes is sometimes expensive and keeping costs down is something we all like to do. Well, Bob's computer program will allow you to develop cutting patterns for all of the pieces of covering needed for your big ship regardless of size or complexity. Cutting waste to a minimum and utilizing every possible square inch of that valuable covering material is certainly economical.

Pattern Master is available as a full computer software product in a vinyl portfolio. Inside is the diskette, full instruction manual, and registration form. Pattern Master is currently available for IBM PC's or compatibles (MS-DOS 2.1 or later). It's user friendly (I love that term!) and requires no prior experience to use. You should have access to a computer, though. It's pretty hard to use without it! Price is \$24.95 and is available from Bob's company, Chandero Systems, 14

From the relative size of pilot and ground crew, it's apparent that Jerry Van Heeswick's Piel *Emeruade* is about 1/ard scale. Jerry is taxiing the big plane out for another smooth flight.

62

There's no lack of beautiful aircraft at a QSAA meet and John Dalton's O.S. 120 powered Proctor *Nieuport 28* (above left) certainly was one of them. There have to be warbirds at any meet and Sam Stauffer's P-47 (above right) and Rich Maida's F4U Corsair were impressive examples. Both used Sachs-Dolmar

5.2 powerplants. Master builder Noel Hess built this beautiful Waco YKS-7 (below left) and left the flying chores to his friend Noel Johnston. The military bipes of the late 30s were pretty colorful planes and Allan Kass' 96-inch span Boeing F4-B2 (below right) does them justice.

Parkview Rd., Long Valley, NJ 07853. Shipping and handling is included.

A first

The Quarter Scale Association of America is the original giant scale group formed to promote the building and flying of large model aircraft. Based in Las Vegas, they run a "gigantic" scale fun-fly every year that is especially noted for its introduction of unique models that are innovative, and advance the state of the art of model aircraft technology. Past meets have included a pulse jet Me-163 Komet, YB-49 Flying Wing, Wright Brothers' Flyer, and many impressive multi-engine beauties to tickle our fancy. This year's most unique offering was a U.S. first: the flight of a true turbo-jet engine in a model. Fellow giant scaler and Gee Bee expert Henry Haffke was there all weekend so I'll turn the column over to him for his report.

A gathering of eagles

"Anyone who has ever attended any of the annual QSAA meets in Las Vegas is aware of the fantastic gathering of exceptional models which that meet features. I had never had the opportunity to attend the meet before so I was in for a very pleasant few days. I arrived on Thursday and found the many models on hand for the meet on static display in the "Showboat Casino" which served as the official headquarters for the meet.

"While viewing the models on display, I

heard the sad news of the passing of Eddie Morgan just before the meet. Morgan was the founder of the QSAA and the drive behind the annual meet in Las Vegas. The meet was dedicated to him and he will be missed by the modeling world. "After spending the entire afternoon studying the beautiful craftsmanship on the many outstanding models on display, I wondered if I would get any sleep during the night with the excitement of the anticipation of seeing these outstanding models perform-

Dennis Crooks taxies the big Yellow Aircraft SR-71 *Blackbird* back to the pits after one of some very impressive flights. The ducted fan model has no problem getting attention wherever it goes.

R/C Giant Scale

It was a first for the R/C American scene, the flight of a true turbine powered R/C model (**above left**). Bob Wall, the person behind the plane, was part of the engine design team. Say, that looks like a Rearwin *Speedster* doesn't it (**above right**)? And so it was, with a trial paint job to be used later by Bill Hempel on a

super scale JU-87B. Another example of Bill Hempel (assisted by four others) handiwork (**below left**), this big C-5B *Galaxy* weighed 52 pounds, and was flown with four Webra .61 Blackheads. Don Westergreen's giant NASA 747 (**below right**) flew quite impressively.

ing in the morning. Fortunately I did get a good nights sleep and got up early to meet Dick Phillips and John DeVries for breakfast before we went out to the flying site.

"I had left the Philadelphia Airport early Thursday morning with the temperature near the freezing mark. As we drove out to the flying field on Friday morning it was a little different, with the temperature in the mid-70s already and predictions of getting into the high 80s later in the day. Certainly a great day for flying.

Rich Irwin's 1/ard scale J-3 Cub looked so realistic you could almost step in it yourself and go flying or so our guest this month, Henry Haffke says. He knows, because he's had his share of time in real J-3s.

"We arrived at the flying site about 25 miles away from the Showboat and some models were already in the air as well as some full scale aircraft which flew in to the flying site. The site was a flat area that reached out for miles in all directions.

"We met many friends as we worked our way to the pit area and then out to the flight line. I was glad I had brought a lot of film with me as there was a lot to shoot. Among the many announcements that were made during the morning was one of extreme interest. It was announced that around noon time there would be a demonstration flight of a new turbine powered aircraft, the first-ever public showing of this remarkable powerplant. It was a busy morning as there were beautiful models to watch in flight and hundreds to capture on film on the ground. It didn't seem long before the flight line was shut down for the demonstration flight. It was announced that the flight line was being shut down for this historic flight specifically so everyone could hear the sound of this remarkable engine.

"A very talented three man crew was responsible for the development of the first model turbine engine. They were not just talented model builders, but each is a very experienced expert in his field. Brian Seegers is the designer and builder of the turbine en-

gine. He holds various degrees in his field and he works with full scale turbine engines every day so you can well understand his ability to design and build such an engine. Jim Allen Jr. designed the test aircraft and is the pilot for the project. He has a degree in aviation mechanical engineering from Parks Aviation Institute and has been very successful in Quickie racing. His designs have been published in various aviation publications and his designs have also been kitted. Third member of the team is Bob Wahl, a fuel specialist engineer who works full time designing electronic fuel controls on full scale commercial turbine engines. Bob designed the very important fuel control unit for Brian's turbine engine which is a very critical part of the system. The three men on the team are involved in the aerospace field as design and quality control specialists.

"The test aircraft is built of light poplar ply with a foam wing which is covered with the light poplar ply and then fiberglassed. The model, when fueled with ¹/₄ gallon of Texaco's best unleaded gas in each of its two stainless steel tanks has a takeoff weight of 27 pounds giving it a wing loading of 40 ounces per square foot. The fuel tanks are pressurized to evacuate all of the fuel at a constant pressure. The craft has a tricycle gear which incorporates a steerable nose gear with brakes. The main gear is constructed of carbon fiber and glass-covered plywood.

The flight line was shut down and all was ready. The crew fired up the turbine and the pilot taxied the model into position for takeoff. He held the craft with the nose gear brake while he got the turbine spinning to full power, then he released the brake and the model picked up speed for a smooth takeoff. The surprising thing about the entire operation was the quiet sound of the craft. There was no loud sound whatsoever, just the

Another very nicely done warbird, Dwight Warner's FW-190. This short nose version of the potent WW II fighter was a fairly big plane since it used a Zenoah G-62 to pull it around.

sound of a rapid air passage as can be heard from a full scale jet aircraft as it goes by. The entire flight was very smooth and Jim performed several aerobatic maneuvers.

"Being up close to the flight line with my camera, I could hear the team talking during the flight, and as the pilot performed some maneuvers one of the other crew members could be heard saying "there's another first". He was obviously doing maneuvers he had not attempted with the craft before. It was a very exciting flight and it was concluded with a very smooth landing and taxi back to the starting point. All those at the field had been witness to the first public turbine powered model flight before a public audience ever in the United States. It was a historic moment for everyone.

"Having given a little detailed information on the crew and their creation, I will let the photos of the other models speak for themselves. If anyone of you readers ever get the opportunity to attend a future QSAA meet at this Las Vegas site, do not pass it up." @

There was no lack of unique, outstanding models. Addie Naccarato's big 112 inch span B-36B flew fantastically with its six electric motors.

By Dean Pappas

ello again. This month I had promised to discuss pipes, pipe pressure, fuel pump arrangements, and maybe more about props.

First, though, I would like to make some sort of an observation here: you'll probably have noticed that this column always seems to contain some sort of spiel of either a political (as it relates to the event) or philosophical nature. This month, it strikes me to talk about the nature of the industry as it relates to our very specialised event.

The Hobby industry is big and getting bigger all the time, and along with all of this, the nature of R/C is changing from the "hobbyist only" arrangement that I grew up with as a child, into a "sport" where equipment is all but "golf club ready". Now, this is taken as quite positive by some people, and as the "ruination of Aeromodelling" by others. I refuse to get into this argument anywhere past my elbow, because although I was raised as

PHOTOGRAPHY MIKE HARRISON

If only we had color! Mike Harrison's original design, the *Marquis* (above and below), has a beautiful and colorful trim scheme. This FAI Turnaround plane is primarily wood but uses a foam top block, inside which runs the tuned pipe. The increasingly popular O.S. Long Stroke .61 powers the plane and is connected to the pipe via a big "S" header pipe. A Futaba PCM provides the guidance.

something of a modelling purist by my dad, beleiving very strongly in designing and scratch building my own craft, I recognize that no one in their right mind would suggest that professional golfers make their own clubs, or that Bjorn Borg isn't a real Tennis player because he didn't personally hand craft his racquet.

Back to what I really wanted to talk about, though. As R/C gets bigger, it is entirely natural that bigger manufacturers are getting involved, and the Pattern market becomes a smaller piece of the pie. To some extent, they take care of the competitive flier, but we are a specialty group, and no one knows how to take care of the competitor like other competitors.

Enter the "cottage industry". There are a lot of small operations out there that cater to the competitive flier and without them we would be a lot worse off. Some of these operations are part time jobs, either because they are literally second jobs for the owner, or because they exist in the slack moments at their regular jobs. A very few are full time operations, and these are mostly kit builders and airframe builders.

Let me give you an example of just how big a part of the competitive scene they are. Without Precision Built Airframes, literally eleven out of the twenty TOC fliers would have had to have done something drastically different for the contest. When the "quiet' requirements first hit in '83, the only firm out there capable of responding quickly to help the competitor was DW Products, another garage (or more properly basement) operation. As Turnaround designs came out in the beginning, most of them were offered by the small businesses. Now, with the advent of soft engine mounts for noise control, four out of five commercially available mounts are made by cottage industries. I could go on about this, but I think you've got the idea. By the way, talk to a control line Stunt flier some time; the situation in their event is even more dramatic.

Most all Pattern engines are piped, and the trend is such that in a few years, some manner of fuel pump is almost going to be mandatory. The tuned pipe has always provided more pressure than we were used to when mufflers were the rule for Pattern. This is especially true because the mufflers used then were of minimum back pressure design. That meant less pressure in the fuel tank. It was a good tradeoff, less back pressure meant more horsepower, but the engine leaned out just a bit more in a vertical. With the tuned pipe, this all changed; the pipe produces power by re-packing the cylinder under relatively high pressure. The tuned pipe produces more back pressure than any muffler, and the quieter muffled pipes produce enough so that with all but the largest diameter carburetor venturis, there will be almost no leaning in the maneuvers. The most consistent pressure is obtained when the pressure tap is put in at or just in front of the high point of the pipe. Why, I just don't know, but it works.

Most pipes have the threaded holes in them already, but if it doesn't, try this method, as it prevents the strip-out problem that plagues many people. First drill a hole that is definitely undersize, say a sixteenth of an inch or so, then "dimple" the hole with a shallow taper like the back end of a drill bit, or a center punch. Then tap the hole for the pressure tap. Dimpling the hole gives you more than just the thickness of the metal for threads, and as the tap is tightened, it tends to flatten the aluminum and crush around the pressure tap tightly.

I had stated before that only the largest venturis require pumps, these carbs (typically those with 75 square mm of effective choke area or more) are used in order to get just a bit more horsepower out of our piped engines. The reason is that the pipe boost allows us to utilize the extra airflow into the engine as the RPM rises in the air. Without the pipe boost, these engines would be badly overcarburetted, and we would suffer poor mid-range throttle transitions, and would notice a very non-linear throttle response: half throttle would produce much more than half power. Nothing is going to fix the throttle non-linearity, but the poor transition can be helped with a properly adjusted fuel pump that will get rid of the fuel draw problem that causes it. The solution is not 100 percent, but the tradeoff is good. It has to be said that nowadays, both new computer radios have provisions to make the throttle response linear anyway.

1, 2, 3, & 4

There are four basic types of pumps in use for Pattern engines; the first type is the crankcase driven diaphragm pump with a pressure regulator. The Perry P-30 and its predecessor backplate mounted version are about the most popular, with a variation of this pump being used by O.S. on the long stroke engines. Single stage regulated pumps like this are easy to set the needle on, and require setting a little rich on the ground. O.S. has solved this by using the induction vacuum to adjust the regulator set point as the engine unloads in the air. More RPM equals more fuel demand equals more vacuum, richening the mix ture. Voila! no leaning out in the air.

The gear pump used on the new series Enya uses a bypass regulator much like the one in the Perry, and behaves much the same. By the way, I shall be doing a review of the new Enya real soon. It looks to be very good so far. Unlike the diagphragm pump that works like the fuel pump on most cars, the automotive oil pump serves as a model for this one.

The vibrator pump, made by Perry, works on engine vibration, and while it is not at all popular among Pattern fliers, it is effective.

Last is my personal favorite, the YS system of crankcase pressure in the tank and a crankcase driven pressure regulator. This is a fuel-as-demanded system, but instead of changing the pressure at which the fuel is delivered, the pressure remains constant, and the portion of each stroke that the fuel supply is turned on is varied by the fuel demand of the engine.

These pump systems have allowed YS, O.S. and Enva to sell engines with carburettors having between 100 and 105 square mm of choke area. We all know what kind of horsepower they produce.

I didn't begin to discuss all of what I wanted this month, so we'll keep going next time. I am spending a lot of time on powerplants, and eventually we will take a look at where to work on your engine with a Dremel tool in order to make more horsepower, but I'd like to bore you with this stuff first. 📼

Charlie Reed, flying in the Expert class at the '88 Nats, built this highly visible LA-1 with red and white rectangles decorating its surfaces. O.S. powered,

By Herk Stokely

ae Fritz from Pensacola FL has the best flying site in the country (so argue with me!). Rae, who was the organizer and CD for the first US F3B R/C soaring team selection finals, has access to a Navy field that's about a mile square of pure grass with no obstructions. I remember it well, I learned to fly helicopters there in 1959. It has good thermals too! Why don't we go there for a National soaring fest? Doesn't have to compete with the Nats, we could easily have both. It could be a lot better than the Nats though. By better, I mean focused exclusively on soaring with fun flying and demonstrations, as well as some serious contest flying. Who knows, the NSS might be interested, and the manufacturers and trade people might even put together a bit of a show for us. What do you say Rae? We could have a lot of fun.

Oh well, the idea of a National Soaring gettogether is nothing new. It does take a bit of effort, a good team of people, and some money up front to get everything ready. It has been done before, and believe it or not, Pensacola isn't bad as a central location. It's as far west as Chicago, and it has much better weather.

Double hinged rudders

When your plane doesn't turn well enough to suit you, the fix is often to modify the control system to get more rudder movement when you move the control stick. Unfortunately that doesn't always work as well as you'd think. When you deflect a control surface, it acts like a flap and increases the lift of the surface in the direction opposite the way you've moved it. As you move the control further, the lift increases proportionately:

PHOTOGRAPHY: HERK STOKELY

Rae Fritz looks like a happy man and why not, he has the best R/C soaring site in America—or so says columnist Stokely. This "perfect" site is near Pensacola, Florida and could be used for a national soaring fest.

but only to a certain point. After that, more control movement gets you into an area of non-linearity, where more deflection doesn't make much more lift; just lots more drag.

A much better solution can be to install a larger rudder. Sometimes that can really detract from the plane's appearance, and it also increases the vertical tail area so that the tendency to drop into a spiral dive during turns is stronger. For some planes, a bit more dihedral might work better too, but that's usually a lot harder to do.

One solution to this kind of problem is to make up and install a double hinged rudder. This is usually a rudder of the same size as the original, but with two sections. The front section is hinged to the fin just like the original rudder, and the rear section (which makes up about half of the moving area) is hinged to the front section, just like another rudder. The Douglas DC-10 has this kind of system, as do some other planes that for one reason or other need more rudder power than a standard rudder will give them.

The double hinged rudder is connected so that as the forward unit moves in one direction, the rear section moves in the same direction; only farther. According to an article by Hewitt Phillips in Soartech #4, the double hinged rudder should develop 44 percent more maximum force than a single hinged rudder of the same total area. Think of that: almost half again as much turning power with no increase on overall size.

How to do this is simple. Just cut the original rudder in half from top to bottom, and hinge it there again. To get the movement right, you have to connect the control horn on the rear rudder to a fixed (non-moving) horn on the opposite side of the rear part of the fuselage or vertical fin. The rod connecting these two control horns must either go through a slot in the forward rudder, or must be arranged to go under the forward rudder. As the control system moves the forward rudder to the side, the rod pulls the aft rudder over even further. Two other methods of

Rae also happens to be a master modeler and here displays two of his original creations, very clean, light models with all-moving horizontal *and* vertical tails. He brought them to the '88 Tidewater Nats.

making a double hinged rudder work are also illustrated.

Would double hinging make the elevator control, or the ailerons more powerful in the same way it affects the rudder control? The answer is absolutely - Yes! But, remember that on a fast flying sailplane, a double hinged control is going to be more likely to flutter than a conventional one. An all moving stab can have an elevator added and geared to work like a double hinged control. This would increase the power of the stab to control the model as well, but that's not something you'd be inclined to try. All moving stabilizers usually have too much power already. Still, if a person is doing something unusual-like a model with a F-14 style variable sweep wing-the nose heaviness that you get with the wings swept back could make extra elevator power necessary.

AMA distance task

I had a conversation with Randy Reynolds from Colorado recently. We talked a lot about F3B and then he got on the subject of his club's AMA distance competitions. I hadn't realized that AMA had its own set of rules for soaring distance tasks, and here is Randy's Pikes Peak club running them regularly. Because of the way the rules work, Randy says that almost any kind of model can enter and fly competitively. I've asked him for more information and some pictures for a future column. Meanwhile check the AMA rule book and try it at your club. The Pikes Peak group say that it has really added a lot of interest to their regular get-togethers.

FAI/F3B news

The US R/C Soaring Team has established its fund raising programs, and has begun practicing and tweaking its model designs for the next World Champs which will be held in France during the summer of 1989. Needless to say, fund raising is beginning. The team fund is selling patches at \$5 each, and pins and decals are \$2 each. Donations in much larger sizes are needed, and all correspondence should be sent to PO Box 19608-489, Irvine, California. Address checks to the US R/C Soaring Team. The team support group is also publishing an F3B USA Newsletter at \$12 per year. Order it at the same address, but make the check for this out to F3B USA. They expect to get out 4 or 5 issues per year; a must for anyone who is interested in what is going on in the world of FAI class R/C Soaring.

CIAM reverses itself

A couple of months back I wrote a bit of a bitter editorial about the arbitrary decision of Mr. Sandy Piminoff (Chairman of CIAM - the FAI modeling committee) to go back to unrestricted winches for this championships. The R/C Soaring subcommittee had elected to go with a reduced power winch rule, and it had been advertised that this was what would be used at the Championships. Then

Double hinged rudders have been used in a number of full-size aircraft quite effectively to give more rudder power than a standard rudder. Models could use them too and the diagrams show three mechanisms.

came the arbitrary 11th hour decision by Mr. Piminoff to reverse that decision. Now the full Committee has reversed that decision again, and the December meeting of the CIAM has ruled that the reduced power winches will be the only ones used.

That is a very good ruling (in my opinion) and I welcome it very much. Too bad that we have these changes and reversals all the time. It seems that F3B can never achieve any real stability as year after year some new controversy arises. No wonder the British are pushing for a separate, duration only, World class soaring championship event.

Selig/Donovan update

The fantastic news from Princeton is that John Donovan and Michael Selig are going to give us all of their test results together. As I wrote a few months ago, they told me that they planned to give me the results of their tests of older airfoils for Soartech #8, but that they wanted to publish the data on the newly designed airfoils in a regular scientific journal first.

That would have certainly been the best procedure for them of course, but it would probably have delayed getting the information to modellers for quite a while. I was really excited when I received a letter from Michael, telling me that they were going to send me all of the data for Soartech as soon as they are finished, and that I'd be free to publish it immediately. *Wow!*—that is really good news for us.

What it means also is that Soartech #8 is going to be twice as big as I thought. Right now we're estimating 180 pages instead of about 90. That means that it'll be two volumes instead of one. For those of you who've ordered Soartech #8 already, you'll get both volumes together; and with them, a request for another \$5 to cover the extra cost. For those of you who haven't ordered it yet, the Selig/Donovan data will cost you \$10 total for the two volumes.

Michael says that they expect to have all testing done by mid-January, and that he hopes to have a manuscript to me by the end of February. If that works out, I'll begin sending out Soartech #8 within a month after I get the data. What's even better, is that with the grant Michael has for his low Reynolds number graduate research work at Penn State; this may only be the beginning of the story.

xposure to other types of aeromodelling can often provide new ideas for new projects. I've always enjoyed R/C, C/L, and F/F modeling, and have found that techniques from one form of the activity apply just as well to the others. I attended my first control line aerobatic contest in some years recently, and took along the camera to record anything interesting. C/L aerobatic models have long been noted for their beautiful, finely detailed finishes and most of the planes at this meet were impressive. The one that really blew me away was Windy Urtnowski's new Cardinal; its rubbed-out lacquer and dope finish was superb. The lines, the design, the styling were great. To see this aircraft flying, powered effortlessly by its SuperTigre .60, performing all the maneuvers while under the direct control of its pilot, never higher than 70 feet from the ground, going through the aerobatic pattern only an instant away from possible disaster, is shocking and impressive to any R/C'er not familiar with C/L flying.

The aerodynamic requirements for R/C and C/L flight being naturally quite different, many of the C/L model's design features cannot be carried over into R/C. The control line designer can do with little or no vertical stab area, uses a much shorter tail moment arm, a lower aspect ratio wing planform, and can

PHOTOGRAPHY DICK SARPOLUS

Dural aluminum gear, though pretty strong, do have a way of bending. The gear on this Byron Christen *Eagle* shows a method of reinforcement with ¹/₄ inch music wire and B&B Specialties' retainer kardware.

use wing flaps to improve the tight-turning pitch response. Even so, some of the styling of the C/L stunters could be borrowed to advantage for an R/C project. I liked the overall design approach of Windy's ship so much that I'm sure some of its lines will show up on my next R/C effort. Now if I could only get him to paint the finished model....

Landing gear reinforcement

The landing gear pictured is a neat combination of music wire and aluminum, to get a good combination of strength and shock action. The aircraft is my Byron's Christen *Eagle*; I knew from seeing a number of the Byron bipes in action that the *Eagle* aluminum gear was already better than the Pitts gear. I've seen a number of the Pitts bipes converted to the *Eagle* landing gear. Even so, since I was using a Quadra 50 in my *Eagle*, I thought the gear could use some help with the added weight. I like sheet aluminum landing gears, but for larger, heavier models quite thick tempered aluminum is needed. If

If you want to learn about model aircraft finishes, turn to C/L Stunt aircraft. Beautiful style and finishes are as much a part of this event as good flying. Both Rich Posekus' *Conquest* (above left) and Windy Urtnowski's *Cardinal* (above right) are perfect illustrations of style and finish. Sport fliers can't leave

a good thing alone; they have to make it better! That's the theme with these two sport canard creations (**below**, **left and right**). Forgive Dick, but he lost the modelers' names who built them but does remember that adding the front and rear engines make these simple-to-do planes fast!

you use a larger engine than is called for, or the aircraft turns out a bit heavier than intended (don't they all?) the standard gear may be inadequate for rough use. I've heard that titanium would make an excellent sheet metal landing gear, but never considered it as the material is too difficult to obtain, and probably too expensive. I've read about laidup fiberglass and epoxy landing gears, but that seems like a lot of trouble to go to. There is, however, an alternative to using thicker and heavier aluminum. I had used music wire in the past to beef up an aluminum gear, by fitting the wire inside the aluminum and having the ends go through the aluminum for the axles; it wasn't

through the aluminum for the axles; it wasn't particularly successful. Now a neat machined gadget is available to make the job easy. B & B Specialties, 14234 Cleveland Rd., Granger, IN 46530 offers their "Landing Gear Reinforcement Standoffs" for the job. These machined aluminum fittings bolt to a sheet aluminum gear and have a $^{1}/_{4}$ inch hole in them to accept the $^{1}/_{4}$ inch wire reinforcement piece. The wire is bent to fit in place below the aluminum gear; on the Byron *Eagle* the wire was made to clear the fuselage bottom. The machined standoffs are slipped over the wire, put through the holes in the aluminum gear, and held in place with elastic stop nuts. The added wire doesn't look bad and really does a job.

To go a bit further with the landing gear, B & B also offers several sizes of stainless steel tempered axles to bolt to the sheet aluminum gear. For wheel pant mounting, they have a combination wheel collar and pants mount of machined aluminum. Two 6-32 set screws located at 90 degrees to each other provide plenty of holding power onto the axles, and two 4-40 stainless steel bolts hold the wheel pant to each mount. A nice, rugged setup.

Photos of your aircraft

I've said before that we all learn from viewing other modelers' projects; I'd like to use more of the photos I receive in this column, but many of them cannot be reproduced in the magazine. Here's a few basic tips on picture taking for magazine use. For printing, the photos work best if they're black and white, not color. They don't have to be expensive enlargements; 5 by 7 prints are preferred, but standard size prints can be used. They should be clear and sharp, and should show off the aircraft, with a plain, uncluttered background.

Pose your aircraft on a black, paved parking lot surface if it's finished in light colors find a concrete surface if the model is done in darker colors. Take several shots, from different angles, heights, and perspectives. Watch out for shadows; keep them out of the photos. Don't put the plane in front of a flower bed or otherwise confusing background area; we want to concentrate on the aircraft and its detailing. Tell us a little about the aircraft and how you like it. Send the pictures in, and I'll try to get them in print.

FLYING MODELS

HOTO; DICK GIBBS

Lloyd Williams' STOL cruises along lazily (above left) at half throttle. With its 15 cobalt conversion it has performance equal to a glow powered version. Dick's Ole Reliable (above center) was easily converted to electric power and,

PHOTO: JOHN MOUNTJOY

using a speed controller, handles like a glow powered ship. Put glow or electric in ACE R/C's 4-60—either way it's aerobatic and friendly like John Mountjoy's 60 cobalt electric (above right).

very month I receive letters from readers who are interested in flying electric models with more power than the 05 sized kits widely marketed today. The common question in these letters is "What's available?" As far as electric kits for the larger motors are concerned the answer is, unfortunately, not much. AstroFlight offers the Porterfield Collegiate, a sport scale model intended for either the 200 watt Astró Cobalt 15 geared motor or the 300 watt Cobalt 25 geared motor. Retail price of the Porterfield is \$79.95. Astro's kit line also includes the Partenavia P-68 Victor Twin, designed for two 125 watt 05 cobalt direct drive motors, with a retail price of \$89.95. There are several sailplane kits available which use the larger motors but my mail comes from sport flyers who are presently flying with glow engines ranging from .15 to .60 cubic inches so let's stick with that type of model for now.

Obviously if you want to build and fly a Porterfield, or the Partenavia, you've got it made because the kits are available. If you prefer something else the "what's available" list is about as long as your arm, and then some, because it includes a great many of the kits sold for glow engines. In last month's column I outlined *one* method of matching an electric power system to an existing glow design; this month I want to give you some idea of the variety of successful electric conversions accomplished by several of our readers. This is not 100% nuts and bolts stuff but there is a lot of useful information in the material provided by those who contributed.

As noted last month my conversion of a .20 four stroke glow powered *Ole Reliable* was satisfactory with a geared Astro 05 cobalt (135 watts). It flew rather sedately with that arrangement but really came alive with a geared Astro 15 cobalt propped for 215 watts. Flying weight was $4^{1/2}$ pounds, wing loading 16 ounces per square foot, and the flight performance equalled that of the glow model. The final version used two 6-cell, 900 mAh battery packs from SR Batteries (connected in series) and the Robart HQ 500 motor controller.

Lloyd Williams, Spring Grove, PA, recently converted his .20 four stroke powered STOL to electric with no loss of performance whatsoever. The STOL was designed by Pete Russell and originally appeared in the British *Aeromodeller* magazine almost fifteen years ago. With a wingspan of 48 inches, Lloyd's electric STOL weighs 4 pounds, 6 ounces and carries a wing loading of 18 ounces per square foot. He uses an Astro 15 cobalt at 215 watts with a 10x6 Master Airscrew prop. Two series connected 6-cell, 900 mAh battery packs and a Jomar SC-4 motor control complete the conversion. On the bench Lloyd's setup is good for six minutes of full power before the motor RPM begins to drop off and in flight, at less than half throttle, that time is almost doubled.

From North Carolina

John Mountjoy, Winston-Salem, NC, mailed a list of his more recent electrics from which I have selected only those which are glow/electric conversions or using larger motors than a single 05. His latest is from the popular ACE R/C 4-60 kit which was designed for .60 size four stroke glow engines. John's 4-60 weighs 9 pounds, 10 ounces resulting in a wing loading of 26 ounces per square foot. He uses Astro's Sport cobalt 60 which, I believe, is rated at 1200 watts and 28, 1200 mAh cells. Micafilm covers the wings and Coverite's new Presto on the fuselage. A 13.5 x 8 prop does the pulling.

Second on John's list is an Old Timer, the *Playboy*, with a wingspan of seven feet, built from a P&W partial kit from Hobby Horn. Flying weight is 6 pounds, 4 ounces with a Robbe 50 GSE motor, 15x8 Midwest folding prop, Jomar SC-4 speed controller, and 18,

PHOTO: KEN MYERS

Not only is Keith Shaw's 60 sized Stearman aerobatic, it also has smoke! He's demonstrating it (above left) to a group at the Skymasters' club meeting in

PHOTO: JOHN MOUNTJOY

Rochester, MI. John Mountjoy converted this 83 ounce Peashooter (above right) to 40 electric with no structural changes.


No cylinder heads protrude since four 035 cobalts power Woody Blanchard's B-17F Memphis Belle (above left) with ample power for take-offs. The plane's

PHOTO WOODY BLANCHARD

distinctive shape is hard to miss in flight (above right) and looks even better because the model features retractable landing gear as well.

900 mAh Sanyo SCR cells. Nothing mentioned about performance but then Playboys always fly well!

No.3 is the Pronto, from the Tidewater Hobby Enterprises kit, originally designed for .15 to .25 glow engines. Converted to electric with a Keller 25/12 motor, Jomar SC-4 controller, and 12, Sanvo 900 SC cells.

Fourth on John's list is the Partenavia, mentioned earlier, with two Astro cobalt 05's, 14 Sanyo 900 mAh SCR cells, Robart HQ500 motor controller, and 8x4.5 props. The model finished out at four pounds, two ounces and performance is quoted as "fast and aerobatic!".

Last on the list is the *Peashooter* from the Coverite kit. This one is covered with Black Baron film, uses an Astro Cobalt 40 (direct drive), 10x5 prop, and 18, 800 mAh Sanyo cells. Total weight 5 pounds, 3 ounces and John says it "flies great".

From Virginia

Woody Blanchard, Hampton, VA, takes a different approach to the problem of electric power; instead of using one larger motor he uses several smaller sizes (would you believe eight! on one model?) and rather than convert existing kits he designs his own scale models. I haven't enough space for all of his photos with this column but there will be more next month. Woody's efforts, like John Mountjoy's, certainly put to rest the idea that electric powered models are underpowered midgets!

R/C beginners (at least many of them) dream of building a B-17 for their first R/C model but usually give up the idea rather quickly after their first white knuckle training flight. Woody Blanchard is, obviously, not a beginner, did not give up on the idea, and does have a B-17. Four direct drive Astro 035 cobalt motors turning 7x4 props supply adequate power and the model flies "very realistically" at half throttle. Finished as the B-17F Memphis Belle, with retractable landing gear, this beauty spans 74 inches and weighs 6 pounds, 3 ounces.

In 1916 Capt. Geoffrey De Havilland designed a twin engined biplane bomber, the D.H.3: it never went into production because

the British War Office decided that strategic bombing of Germany was unnecessary. Official minds were changed when, in 1917, the Germans (using twin engined biplane bombers!) successfully dropped bombs on London and along the east coast of England. The D.H.3 was hurriedly redesigned as the D.H.10A, primarily to accept larger engines, and entered production, but by the end of the war only eight planes had been built. That, of course, was a long time ago but now there is another D.H.10A and Mr. Blanchard's got it. At approximately 1/14th scale Woody's model spans 54 inches and is powered with two Astro 035 cobalt motors which provide plenty of power using 7x4 props on direct drive. Flies in a scale-like manner at half throttle.

Another piece of aviation history flies the Virginia skies on eight electric motors powering Woody's Maxim Gorki. It's fairly large at 74 inches, takes off and climbs out realistically at full throttle. The motors? Six VL's (usually used for small free flights) and two Astro 020's.

Imaginairing?

Even a quick glance at the specs and types of models listed above will show that electrics have indeed come of age. Monoplane, biplane, single and multi-engined, they are all there and flying successfully with electric power. From the simple conversion of a glow powered design kit to multi-engined scratchbuilt scale replicas in miniature we are limited only by our imagination. Think about your particular interests in model building and try some "imaginairing" of your own. It can be an electrifying experience (Sorry ... I · just couldn't help myself!).

As usual

Words and photos of your latest electric project are always welcome here. My address is 2570 Edgewood Lane, York, PA 17403. œ



Three micro-servos and a speed controller contribute to make Great Planes' Electrostreak fast and aerobatic. The manufacturer recommends a 7-cell, 1200 mAh motor battery for best performance.



By Larry Kruse



PHOTO: MAC MCJUNKIN

Expecting some lateral stability problems with all the area ahead of the C.G. (above left), Mac McJunkin found his 36-inch Bell Aircuda pusher rock stable.

everal months ago I read a thoughtful piece written by Dr. Will Nakashima which dealt with matching the size of the aircraft we select to some intangible "yardstick" within each of us. This unnamed dimensioning device causes most of us to be much more comfortable with a certain size aircraft than with one a great deal larger or a great deal smaller than the ones that fit our "comfort zone".

In thinking through Dr. Will's comments, I discovered that I was indeed limited in what I usually built, as far as the size of my planes was concerned. Even back when I was flying non-scale stuff it seemed to make a difference. I built everything from HLG's to "C" Gas, but in retrospect was much more comfortable with a 1/2A size ship like Jim Clem's Country Boy or Taibi's Orbiteer than say a little .020 Replica or a big Witch Doctor with a honkin' S.T. up front.

Within the last decade, as I moved almost exclusively to Scale competition, the same thing began happening. The ships I've designed, built, and published over those years typically are within a 20-30 inch wingspan size. Only rarely have I ventured into smaller sizes like Peanuts, and never to this point into the micro-minutia world of Pistachios. At the opposite end of the spectrum, I can count the number of Jumbo Scale ships I've built and flown on the fingers of one hand and some of them not too successfully, I might add.

As a way of greeting the new year, I resolved to expand the envelope of my modeling existence by building both a Jumbo Scale and at least one Pistachio before coming back to "comfort zone" aircraft. What's been accomplished so far is illustrated in the photo of the semi-completed Glenny-Henderson Gadfly Jumbo Scale, designed by Dave Rees. The Pistachio is next on my building board and will be completed before I tackle next month's column.

The reason I mention all of the above is that I want to spend a little time at that point sharing some very important things



The bare bones of Perry Peterson's caBInaire biplane belie its SIG Cabinaire heritage. Snazzy wheel pants and classic Golden Age lines should make it an outstanding-looking sport ship.



PHOTO: LARRY KRUSH

The author's 36-inch Glenny-Henderson Gadfly (above right), a Dave Rees design, came out at 92 grams without the rubber motor.

> I've learned or re-learned about building better models, just by building a couple of ships removed from what I usually do.

> In the interim, I want to challenge you to analyze your own "comfort zone" - and then push beyond it into a realm you've wanted to explore, but for one reason or another have not yet entered. Exchange your inner "yardstick" for a more flexible tape measure. Now's the time to begin your new project the one at the top of your "going to" list. Move it to your "will do" list and I'll guarantee you that what you discover will benefit all aspects of your future modeling efforts.

Tissue Decals

Those who know Mac McJunkin, the editor and moving force behind the excellent Flightmasters Scale News and Views newsletter, are aware of how multi-faceted he is, Designer, innovator, experimenter - Mac shares his creative talents with us each issue. From CO_2 jet propulsion to a better way to make fuselage formers, Mac's curiosity consistently advances the hobby.

Apparently, I can add "clairvoyant" to the list of Mac's talents, because just as I was in the throes of trying to figure out some way to deal with the tiny lettering on the rudder of my latest project, a Bellanca Aircruiser, the latest issue of Scale News and Views arrived. Inside was a complete "how-to" that Mac had developed for making tissue decals. Let me summarize it briefly.

The first requisite is to obtain a pane of glass as a flat working surface and cover it with waxed paper. Tape a piece of tissue large enough to allow several attempts at making a satisfactory decal over the waxed paper, and coat it with full-strength nontaughtening nitrate dope. Make sure all wrinkles are stretched out of the tissue while it's still wet. Follow the first coat of dope with a second, and brush down a background color (if needed) using the appropriate shade of Floquil. If no background color is needed, or



you are using tissue the same color as your model, simply omit the above background color step.

Next, practice your forging technique, copying on a plain piece of paper the needed shape or lettering using a "Sharpie" permanent marking pen. Either fine or medium tipped can be used, depending on your needs. Once you're satisfied that you have the hang of it, make several attempts at your needed decal on the doped tissue, cut out the best one with a sharp modeling knife, and carefully peel it away from its waxed paper base. The new decal can now be placed in position and held there as you bleed thinner under it to hold it down. The decal's doped surface should provide more than adequate adhesion.

As an example of the success of this technique, look at the photo of Mac's Bell X-1, *Glamourous Glennis*. It was done in the prescribed manner using white Floquil as a background color and a medium-point Sharpie. The dope and the Floquil seal the tissue so it doesn't bleed as the Sharpie is wont to do.

Saints be praised

The popularity of Bostonian and Manhattan Cabin airplanes in the U.S. gives rise to the thought that a class called the "Saint Formula" (La Sainte Formule) flown in Europe for the last decade may gain some acceptance here.

Originally created by Rene Jossien to serve as an introductory class for Peanut Scale, it has become an exciting and popular event in its own right on the Continent. Looking a bit like a shrunken Manhattan Cabin, a Saint Formula ship must have a minimum weight of two grams with a maximum prop diameter of 150 mm, a maximum blade width of 25 mm and a two-wheeled landing gear.

The plan presented here (Fig. A) is Jossien's first design, the P'tit Saint which can easily be built by a beginner without using any special techniques. While the call-outs on the plans are in French, most of the components and materials are recognizable even if not translated. The complete "Formula" rules are as follows:

General: Rubber powered model for indoor flying. Motor enclosed by the fuselage. Single skein, no gears. Covering - paper or other materials, except microfilm.

Fuselage: Total maximum length excluding propeller 330 mm. Minimum cross section 3 cm \times 4 cm over a length of 5 cm (volume 3 \times 4 \times 5 cm). Transparent surfaces such as cabin, windshield or cockpit cover minimum total 2 sq. cm (viewed from the front and side).

Wings: Maximum projected span 330 mm. Maximum chord for monoplane 80 mm. If biplane maximum sum of chords 100 mm, with one chord 40 mm minimum.

Stabilizer: Maximum span 150 mm; maximum chord 60 mm.

Undercarriage: Two legs obligatory and two freely revolving wheels, minimum diame-ELYING MODELS ter 18 mm.

Propeller: Maximum diameter 150 mm. Maximum blade width 25 mm.

Weight: Minimum weight of airframe; i.e., without motor 2 grams.

Motor: Rubber, length and section unrestricted.

Contests: Contests to be flown over 4 or 5 flights, of which at least two must be Rise-Off-Ground. Scoring to be the total of the two best flights. Attempt: less than 10 seconds.

Unabashed plugs

The low-volume specialized nature of our favorite portion of the hobby does not permit the discerning entrepreneur to take out a fullpage four-color ad and still stay in business next month. However, were it not for such folk who are trying to provide a service to other modelers on at least a break-even basis, many of those supplies and specialized items would vanish from the scene and we would be the lesser. I want to mention at least some of those businesses this month while at the same time thanking Carstens Publications for having an advertising/editorial policy which permits giving a small boost to these garage enterprises, whether they advertise in FM or not

Just such a venture is Airmen's Supply Co., Box 1593, Norfolk, NE 68701 which specializes in kits by Easy Built, Flyline Models, Gene Dubois, Fresno Model Airplane Co. and Diels Engineering, to name much of their product line. A dollar to their address ought to get you their 14-page catalog by return mail.

Another firm that ranks high on the list of providing essential kits, supplies, and materials to modelers is Penn Valley Hobby Center, 837 W. Main St., Lansdale, PA 19446 which has an unusually large array of freeflight offerings. Unique to their line are the built-up catapult jets (F-16, F-14A *Tomcat*, F-18 *Hornet*, and F-5E *Tiger*) by Todays's Hobbies, Inc. And the Aristo-Craft Jetex kits and Jetex supplies for those tired of winding gumbands and looking for a little excitement.

We would be remiss in not mentioning Joan Hannan's Runway as a purveyor of books, cards, rubber stamps, kits, plans and accessories for the modeler. Items of an unusual nature carried by Joan are a series of Peanut Scale planes by Uruguayan architect, Ulises Alvarez, remarkable for their light and delicate structure, and having exceptional performance capabilities. Also new with the Runway is bulk ¹/₃₂ inch FAI strip rubber for the Pistachio builder and flyer. Joan's new fully illustrated catalog is now out and is available from W.C. Hannan Graphics, PO Box A, Escondido, CA 92025 for \$2.00.

Next month we'll talk about better ways of building your next project, and have some great photos of scale ships from the Northwest. My address for correspondence is Larry Kruse, Box 1137, Liberal, KS 67905.



PHOTO MAC MCJUNKIN





By Phil Cartier



PHOTOGRAPHY PHIL CARTIER

"Bub" Reese helps Mike Underwood do crash repairs on his Slow *Sly Sir* at the HAMS Five Round Contest. The hand holding the streamer belongs to Joe Harris, the patriarch of the Sky Lancers of Washington club.

as the weather broken yet? I'm writing this on a record cold day in central Pennsylvania. I hope that by the time it reaches print we can get out flying again. This month we are going to go into trimming combat planes, and maybe trimming the pilot. This time of year we have to tune things up and get the man and equipment into flying order.

Begin trimming the planes while they are being built. It should be no secret by now that with a little care a combat plane can fly right off the board. Take a few extra minutes during building and build the plane right. Make sure it duplicates the design, however you've modified it, exactly. Make sure the spars are straight, the tail boom is the right length, the bellcrank moves the right distance, and the wood is good.

Hopefully last year at least one plane flew really well. Carefully locate the balance point on it and add nose and wing tip weight to the new planes so they balance the same. I have two ways of doing this. By one method, stick heavy pins into each tip at the balance point. Then add weight to the tail or nose until the plane balances level. Adjust the tip weight more or less by eyeball. I haven't figured out a good way to put pins into the leading and trailing edge to check the side-to-side balance point.

The second method takes more time, but checks the balance point out in all directions. Hang two plumb lines from the ceiling about a foot apart. Hang the plane up between them by one leadout. Gently stop everything from swinging and position the plane so you are looking directly at the top with the plumb lines lined up, one behind the other. Use a magic marker and mark where the front plumb line crosses the center of the plane. Next, hang the plane up by the pushrod and do the same thing. The two lines you marked cross at the balance point. Again, add weights to the nose or tail and wing tip and recheck the balance until it ends up where it ought to be.

Next set up the controls. Carefully measure how much the leadouts move. This really gets determined when the bellcrank gets bolted in place. There may be a little wood in the center rib that can be trimmed away if you need a little more travel. Also make sure the pushrod was put in the right hole. Next, make a jig to check the stabilator travel. I make a template from a piece of balsa or ply that will fit between the wing and tail. Glue a couple of short pieces of spar stock at the tail end that will allow the stabilator to swing 15-20 degrees. Use your best plane to set up the gauge. I find that 20 degrees and a fairly nose heavy plane works well. Other people like planes to be more tail heavy with less elevator travel. Find out what setup works best for you and use the tail travel jig to duplicate it on all your planes.

Finally, before leaving the shop, make sure the planes are straight. I get the best results just by looking at the wing from behind. Line one eye up with the boom and look out along the trailing edge on either side. Slowly swing the nose up and down and watch how the trailing edge blocks out the top and bottom surfaces of the wing. Then flip the plane over and make sure it looks the same upside down. A warp show up when more of the top shows on one side than the other. Gently twist the wing against the warp and re-iron the covering. Other people stick pins into the front and rear of each tip rib. Put the plane down on a *flat* surface with a soft drink can under each pin. Twist the wing and re-iron the covering until all the pins rest evenly on the cans. As a double check, measure the height of the trailing edge off the board on either side of the boom and make sure it measures the same as the height of the pins at the cans.

Now take the planes out to the field. Use a well-broken-in engine and fly each one. With a little bit of luck, they won't need any further trimming. Here are a few tests to really give them a workout. First, try some large loops, inside and outside. The line tension should be the same both ways. If it isn't, correct the warp. Light on outsides means the plane is trying to roll to the right. Bend the outboard trailing edge down. Light on insides means it is trying to roll to the left. Bend the inboard trailing edge down.

Next, try some overhead figure eights with



Chip Giordano shows the remains of one of his Slow planes at the SLOW club's Fall meet. Even a Bear Models' Slow *Sly Sir* will break if it hits hard enough.

the wind at your back. Do them with the inside loop on the left and then with it on the right and gradually tighten them up. A good combat plane will do overhead eights like this without a wimper. A small warp will make the wing stall and the plane will snap in some on the lines. Make sure the major warps are taken care of first. A badly warped plane will cut right across the circle. If the plane snaps out of the inside half of the eight it means it still has a bit of left roll built in. Snapping out of the outside half of the eight means a bit of right roll. Consistently snapping out of the eight in both directions usually means more tip weight is needed.

Carefully watch the line tension during the eights. As the plane slows down in maneuvers it will tend to turn in slightly. If it turns in more than you are comfortable with, move the leadouts back a quarter inch or so. The overhead eights are also good for checking tip weight. Lack of tip weight shows up when the plane tends to roll in during both halves of the eight. Too much tip weight will make the outboard tip hang down and the plane may go out of control when going from the inside to the outside loop.

This final checkout maneuver will give both the plane and pilot a good workout. "Walk" the plane around the circle by doing full control loops, one and a half inside followed by one and a half outsides. Try and do the loops as low as possible. If you get into trouble on inside loops the plane still has some left roll. Trouble on outsides means some right roll. This trick can be a lot of fun with a good fast ship. It gets the adrenaline flowing and peps you up really quick. Of course, be careful so you don't check out how hard the ground is.

Tune up the pilot a bit as spring rolls around. Flying all day in the hot sun requires some physical stamina. A little jogging, swimming, tennis, or raquetball will build up a little endurance and make those days less taxing and more fun. Five minute miles or marathon runs aren't required. Just a little something to keep in shape.

Of course, combat flying makes the best training for flying combat. Notice I said fly combat, not combat matches. Fly practice matches with other flyers. Try to warm up to the season by practicing some basic skills instead of just busting up airplanes helter skelter. Put a little method in the madness. Take turns locating the the other fellow visually and getting in behind him. Practice moving around the circle. Try doing consecutive loops and eights without tangling the lines. Try following each other. The leader tries to shake the follower. The follower tries to stick with the leader. The first one to make a mistake buys the drinks.

That's all for now. See you in the combat circle. Send me a note with news or pictures from your area, care of the magazine, or to Phil Cartier, 760 Waltonville Rd., Hummelstown, PA 17036.



Pat Wilcox runs away from Tim Sobolak at the HAMS Five Round contest. Pat and Louis Lopez managed to get nine matches out of one rattle-trap plane before they had to call it quits. Pat won with some cagey flying.







Plans are an important tool in your Stunt repertoire. They give you the knowledge to build some of the best Stunt planes created like John Miske's Old Time Stunt Curtiss *Swift* for which John sells plans.

Plans are available for many of the worlds finest stunt designs, and you should use them as a tool in your stunt program. Comparing the best designs will aid you in coming up with that "Supership" you've dreamed about for so long.

Unfortunately, many pilots overlook the value of plans and the roll they play in the history of the event. Suppose that plans were never drawn for the *Barnstormer*, the *Nobler*, the Genesis, the Patternmaster—no plans at all. Without plans we would all be busy reinventing Provolone cheese. Plans make it possible to reproduce a ship that has proven to be a capable performer.

But good quality plans serve even a greater purpose, by allowing you to compare dimensions of the great planes of years gone by without ever having to see the plane. In some cases the plane is lost forever, the designer passes away, yet the plans live on.

I've spent countless hours evaluating plans to the worlds finest stunt ships. I love to look at how different pilots engineered a nose section or a wing spar. There is a whole world of ideas in a good plan collection.

Making a top quality set of plans on inked mylar is a job for a professional like Steve Buso. Accuracy is a must. Rib shapes and areas must be drawn accurately if the plans are to have any lasting value. When Steve drew the *Cardinal* plans we incorporated all of the latest updates and made literally hundreds of notations and tips for building a replica. One important note when buying plans is to ask for the most updated version of that particular ship.

Obviously plans sold by magazines including FLYING MODELS are top draw quality with top level lettering and accuracy. A set of magazine plans should go hand in hand with the copy of the magazine the design appeared in. A set of *Genesis* plans and a copy of the magazine article will give you a good basis if you wanted to build that ship.

Other sources of magazine quality plans include John Miske, 415 Clifton blvd, Clifton, NJ 07013 and his prices are reasonable. He has all the ships that qualify for OTS and some newer ones like Lou Dudka's *Matrix* and Glen Meador's *Eagle*. "Big Jim" Greenaway sells complete sets of plans to his fine *Patternmaster* design. These are top quality and should be part of anyone's collection if they are serious about .60 ships. Jim can be reached at 111-23 130th street, Ozone Park, NY 11420. This plan has evolved over ten ships which were built in the past fifteen vears.

I save all my plans for future reference. In most cases I have $\frac{1}{16}$ inch plywood templates of all the critical parts. When I built the video *Nobler* I kept templates of all the parts shown on the plans. John Miske has copies of all the parts not shown on the original Aldrich *Nobler* plans. He can supply you with a *Nobler* plan with every part and rib traced out individually. Without these aids a lot fewer Aldrich *Noblers* would have been built.

I love to look over the plans to the late Harold Price's *Valkyrie* and *Crusader*. Harold was meticulous, and if you build from his drawings every piece fits perfectly. His drawings were a true labor of love.

Saving quality plans is becoming a collector's event in itself. Do you have an original set of *Juno* or *Ares* plans in your collection? Do you want to trade for a *Stiletto* and *Stingray* originals? Many times it is comforting just knowing that you have a piece of stunt history in your home. Like Lionel trains, they connect you to a past long paved over by our complex lifestyles.

I like comparing my *Cardinal* with the moments and areas of other designs. Airfoil thicknesses, thrust lines, gear placements, and all the technology that goes into a killer



Bob Lampione's F-86 *Sabre* Stunt ship was the first foam core wing model to win a Nats ('69). The Fox .35 powered plane (an FM plan listed as CF-197) used the traditional silk and dope finish to help win the title.

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ship. Without a collection of plans you're throwing darts in the dark.

When a ship evolves into something better you want to know why, and without written documentation of changes you're back in that room with the lights out, throwing darts in the dark. Any good stunt flier will keep a notebook of changes he incorporates from one ship to the next. Information such as nose and tail moments, wing root and tip, weight, center of gravity, vertical Ç.G., stab dimensions and percentage of wing area are all necessary things to keep track of. Make cardboard or paper patterns of all key parts.

Years ago literally hundreds of plans appeared in print and many plans complete with back issues are still available. If you are just coming into the hobby, you may want to start your collection while this material is still commercially available.

What's important to remember is that there is more than one way to build an outstanding ship. From I-beam techniques like the Stingray, D-Tube designs like Bob Baron and I use, to the unstoppable wave of foam ships. They all work well and have advantages as well as disadvantages. Maybe you don't know how to build an I-Beam wing like the original Sweeper, the plans are still available along with the classics like the Ares, Cobra, and the Juno. Dave Cook amazed me with all of the fixtures and jigs he keeps in his shop which he has used to create literally dozens of those beautiful I-Beamers. Plans for ships like Dave's will show you how different approaches in technology are used to engineer an airframe.

A final point to using plans is not to modify them randomly. If a designer used $^{1/16}$ inch ply doublers, don't second guess him unless you have a degree in model aviation aeronautics hanging on your wall. Stick to the basics that have proven to be bulletproof. You will probably do more harm than good if you stray too far from the basic plan moments, areas, and construction techniques. More good *Noblers* became mediocre *Noblers* as soon as they were modified.

Another side note is always store plans in a tube, never fold them. This will extend the life and the quality immeasurably. Treat them with respect and take the time to preserve them. Years from now you will be able to look back at plans preserved today and know that the extra care given them was worth the effort.

Bob Baron used to keep a tape measure in his tool box, and every time he saw a ship that impressed him he'd measure it and keep a record. Obviously it paid off for him and his hard charging stunt program. Tom Nieburh has a collection of plans in pristine condition and its worth the trip to his country home just to check them out.

Obviously, not every great stunt ship has been published, but that doesn't mean plans are unavailable. Brian Eather's awesome *Firecracker* was published in an Australian magazine not all of us have seen on the news



One of the classics, one-time Nats Champ Les McDonald's .35 size *Stiletto* used an O.S. .35 turning a Grish 10-4 3-bladed prop. *Model Airplane News* published the plans for this plane and they may still be available.

stand, but if you try hard enough plans are available.

With the tremendous growth in Stunt over the past two years, I'm sure that plan services will dig up some nostalgic material and make it available. Interest in OTS has never been greater. Plans are available for this event, and I'm sure more will be comming

out soon.

Years from now, when today's ships are nostalgic relics you'll be glad that you kept a splinter of stunt history alive in that roll tube. Never underestimate the value of preserving Stunt history, it is one of the strong points of the event and one reason we are all a special family.



Another of the classics, Bill Werwage's *Juno*. This SuperTigre .46 powered stunter used "I-beam" construction in the wing and the flaps. It was published back in January 1980 as FM Plan CF-528.







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With some thoughtfully designed features, the new Great Planes' Wildcat is a bonafide ARF (almost ready to float). The hull and deck are molded is molded ABS plastic and trim decals are included.

An FM Product Review: Great Planes' Wildcat

By Ward VanDuzer

Mild or wild. Take your pick with this pre-fabbed electric cat hull.

have built a number of planes and boats in the past, but I must admit to having somewhat more of an idle curiosity about the Great Planes' *Wildcat*. Perhaps it is because I built "another" electric cat for a customer at the hobby shop where I work. No, this is not going to be a comparison test, but some subtle comparisons will no doubt slip in.

Open the box

This boat was packed in the usual manner, with small parts bagged, and the major parts bagged and protected with foam and rolled newspapers. All parts were clean and undamaged. What I did notice right off the bat was that three of the most fearful (and time consuming) steps of the construction process had already been attended to. The ABS plastic hatch cover had been trimmed and fitted! Nothing can ruin your day more than slipping with the model knife and slashing the hatch cover in half!

Next I noted that the transom had already been drilled to accept the rudder and fin hardware. While this step is less fearsome, you can subtly destroy the performance of your new rig by having these parts mounted off-center, or crooked. The third nicety that scares most entry level hobbyists, is the electric wiring and soldering for the motors and speed controls. Already done! This is truly an ARF (Almost Ready to Float) that nearly guarantees success to the beginning modeler. Another feature of this boat that eases the construction process is the included boat stand. I did find that the stand needed some reinforcement (see photos), but you can't build a model boat without one.

Let's put it together

I would suggest that you empty all of the parts bags into small plastic cups, and check the parts list to be assured that you have everything you need before you begin. Read the instruction booklet from cover to cover, and highlight the key points *before* you start! The instruction booklet is good, but there are some tricky steps. We'll get to that as they show up.

Begin assembly as per the instruction book, by installing the transom equipment. Be very careful bending the trim/spin fins! The instructions are correct but if you look at the two stampings you may be tempted to bend up two left parts! The instructions would have you screw the fins and the rudder brackets to the transom now. I spooned a thin layer of silicone sealer on the mating surfaces with a piece of scrap balsa before I attached these parts. (See photos). Guaranteed waterproof!

Onto the radio installation. Since I used Futaba S-29 waterproof servos in my set up, the servo holes had to be cut a little oversize. No real problem. If you're going to use a hobby knife, as I did, don't rush the cutting. Three or four strokes with the knife will assure you a clean cut. Shave away the edges of the holes carefully for a clean servo fit. Leave



Some clear silcone sealer, applied with a scrap piece of balsa (above left) will help fix the rudder supports and the trim/spin fins to the hull. After fitting the rudders in their supports then screw the rudder assemblies and trim/spin fins



into the pre-drilled holes in the hull **(above right)**. That bit of silicone will serve a double purpose and help seal the screw holes from water seepage. Be sure to bend a left and a right trim fin.



Great Planes' Wildcat



The servo tray is molded into the hull and the servo opening must be cut (a few careful passes with an X-Acto knife does it) to suit your servo. Then mark the holes for the mounting screws and simply drill.



"steps" in the hull.

Before installing the completed prop shafts (above), coat them with grease and then slip a small piece of fuel line over the end of the shaft so you don't lose the nut and the prop if they loosen. Another small piece of tubing on the motor end of the shaft (below) will keep it from departing the hull if it loosens.



a small notch for the wires to exit. After you have mounted the servos, install the push rods, and trim to fit. I installed a Bru-line antenna tube (soft plastic tubing) and stuffed the receiver antenna wire through it. Neater, cleaner, and safer.

The motor speed controller switch was installed on the servo according to the instruction booklet except that I glued the sweeper arm to the servo wheel *before* I re-installed the servo wheel.

Notice the fuel tubing that I put on *two* places on the prop shafts. (See photos). The piece behind the prop nut will save your prop should the prop nut loosen up. The second piece between the motors and the brass bearing tubes will save your entire shaft should the set screw attaching the shaft to the drive shaft connectors loosen up! Grease the prop shafts, and install. Since I work on full size boats, I had some hatch cover sealing tape on my shop wall to seal the joint between the cover and the hull. (See photo). Model airplane wing tape will work just fine.

The finishing step is always the most fun so let's get started! The decal set provided is accurate and attractive, but you may want to customize your boat some so that you can positively identify your boat as it rounds a buoy with others during the excitement of racing. Sponsor decals and numbers available from your local hobby shop would not be out of place on a racing catamaran. Trim and fit the decals to the hull before actually sticking them down. Ready to go?

Hold it! Mix up a slippery mixture of dish detergent and water in a small bowl. Now, with your finger, apply this mixture liberally to the area where you're going to place the decal. This will allow you to pick up or slide the decal into its final (accurate) position. When you have it placed exactly where you want it, rub the decal down on the hull, pressing out all the liquid and bubbles. Wipe it dry with a towel. Continue this process with all your decals. I painted the exhaust port tubes with Testor's flat black enamel, as recommended, but I preferred to paint the windshields with light blue instead of the gloss black.

Charging and testing

I called on my friend Walter Sznerch of Micro Precision Plus to provide me with a pair of his new 1700 mA matched racing battery packs. Walter rewinds and repairs electric motors and will provide all kinds of information on all types of electric propulsion. The 1700 mA packs will provide more power, and longer run time than the standard 1200 mA batteries. Since your *Wildcat* will run on 6- or 7-cell packs, I had Walter make up two 6-cell packs *and* an additional cell that can be plugged into the 6-cell packs to make a 7-cell power supply. Your boat will run faster (and hotter!) on seven cells. With this setup, I'll be able to test with 6-or 7-cell packs.

Walter also provided me with two rewound (faster) 550 motors. While not mentioned in the battery charging instructions, new Ni-Cd batteries should be trickle-charged for approximately 16 hours on the initial charge. Follow the instructions included with the charger you purchased.

Now, you will need to "break in" your motors. Attach each motor *directly* (not through the speed controller) to a 3 volt D.C. power

hten them securely against



In deference to showing the simple, clean radio installation Ward left off the waterproof bag for the receiver, a vital necessity. If the servos aren't waterproof, dab some silicone around any seam and as an additional water proofing, put paper towelling in the hull to soak up any water and keep it from the radio.

source and run them for 15-20 minutes. A simple way to produce the power source is to connect two $1^{1/2}$ V."D" cells in series to each motor and let them run until the batteries are dead. If you do not break in your motors this way (slowly, with low voltage) you will cause arcing between the motor brushes and the commutator, which causes these parts to burn and that causes terminal power losses, accompanied by severe disappointment!

Let's do some final water proofing and race prepping before we put the *Wildcat* in the water. Have you waterproofed your receiver? Waterproof bags are available at your local hobby shop or you can enclose your receiver in a sandwich bag! Close off the opening with a wire 'twisty' or a rubber band. Place some paper towel scraps inside the boat, behind and under the batteries, and over your electronics. The toweling will attract water away from the electronics! If you are not using waterproof servos, wipe the servo case seam, and the screws on the bottom of the case with a thin coat of silicone sealer. Wax your hull. Petroleum or silicone wax is faster, but any auto wax is better than none.

Running

O.K. We're waterproofed, waxed, and our batteries have been peak charged. Let's go! Oh, oh. Our battery packs have Tamiya connectors and the *Wildcat* is wired with the Kyosho standard. That is to say that both the battery and the speed control each have female connectors. Same style, but the male/ female ends are reversed. Take your pick as to your solution. I changed the connectors on the speed control since I'll run the batteries in Tamiya style R/C cars.

This rig is fast with the 6-cell packs! Mark Schimmer, the electric maven from B.J. Hobbies, came over to assist with the photo session. We trimmed out the radio to assure the boat ran straight in the neutral steering position. Hit it! Around the buoys, wow ... easy does it! This rig turns quite sharply, (due to the spin fins, no doubt) so we moved the steering push rod one hole closer to the center of the servo wheel. That suited us better. While we were on land we added the seventh battery cell.

Mark hit the throttle and our *Wildcat* popped to the surface and literally skipped across the surface of the lake. Beautiful! With a little trimming on the trim tabs and balancing (by moving the batteries forward about an inch and half) we were "flying".

Great Planes has produced a great boat. It is simple enough for the entry level hobbiest, and sophisticated enough to be souped up to provide terrific high speed thrills as your skill level grows.

Try your luck on the water. The *Wildcat* is easy and great fun!

Products used in this test were provided by:

Great Planes Model Manufacturing Co. P.O. Box 788 Urbana, Illinois 61801

Micro Precision Plus 50 Mount Pleasant Ave. Wallington, N.J. 07057

Bru-Line Industries, Inc. P.O. Box 3786 Center Line, MI. 48015









Thorodian III. Doit bleakt

Ni-CD battery maintenance has always been a primary concern of R/C flyers but boaters can profit too from a little care. A potent battery maintenance tool,

the automatic CaRa Cycler/Charger uses a digital display that keeps track of capacity while the battery is discharged during cycling.

ou know, the airplane guys have been beat up for years about taking care of their radio batteries and how important it is to cycle them to break "memory". You and I, as boaters, have had a little education on this but I still think, in general, we don't pay too much attention. I know that I've been pretty lucky over the last years not to have had a boat destroyed because of battery failure but I also knew that my time was coming. Because of this I decided to start using a battery cycler/ charger.

In my opinion, the best one on the market is the one made by CaRa Products, PO Box 221, Canton, SD 57013. It will charge, test and maintain battery packs more reliably than any previous system and will operate just as well at home or at the lake. Proper use of this unit will enable the battery packs to be kept at full charge at all times and ready for instant use. It can find weak, shorted or open cells before they cause problems. It can also detect corroded or partially broken wires or switches.

Operation

The simplest operation of this unit is recharging. Once the unit is plugged in all you basically have to do is push the Reset button to start the charge sequence. There are three lights on the unit. The colors are red, yellow and green. When you push the Reset button the yellow light illuminates indicating charging is taking place. When the pack reaches full charge the yellow light will turn off and the green light will illuminate indicating the unit has switched to trickle. The battery pack(s) may be left on trickle indefinitely without damage. I really like this because when I get ready to go to the lake I don't have to worry about a battery pack not being up to 100% charge. I just unplug a pack from the unit, even if it's been on trickle for two months, put it in the boat and go.

Cycling the batteries is the most important single thing you can do for your radio system. With this unit you select which battery pack will be cycled. Push the reset button to get the yellow light on and then push the Cycle button to start the discharge sequence. The red light and the digital display will illuminate. The battery pack will be placed under a 300 mA load and discharged to 1.1V per cell. This is as low as you want to take any battery pack. At this point the red light will turn off and the yellow light will illuminate indicating that recharging is taking place. The digital display will remain illuminated and will retain the capacity reading of the pack that was discharged until the Reset button is pushed. If you can number the battery packs you cycle and keep track of the capacity readings you can determine the condition of the packs.

Let's talk a little bit about the switches and indicators found on the unit. There are six standard and two optional switches or indicators. They are; Hi-Lo switch, Select switch, Cycle push-button, Reset pushbutton, Traffic Lights, Milliamp-Hour display, and the optional Dual Voltage switch and 100 mA switch. Their operation is as follows:

HI-LO Switch: The receiver switch controls output current supplied to the receiver battery pack. Lo setting is about 300 mA and Hi is about 500 mA. The transmitter output is fixed at about 300 mA and the switch controls the trip point voltage only. These switches control only the front outputs and only during the Charge cycle. They have no effect on Discharge or Trickle operations.

SELECT Switch: This determines which battery pack will be cycled. Slide the switch to the side closer to the Traffic Light of the desired pack (left for Rx and right for Tx).

CYCLE Push-button: This starts the cyclerecharge sequence on the pack selected by the Select switch. The yellow light must be lit when Cycle is pushed for proper operation.

RESET Push-button: Programs the unit to its starting configuration and enables it to accept other commands, such as Cycle. Reset must be used to tell the unit to start. Packs will not be charged unless Reset is pushed. Reset can also be used to cancel an incorrect command.

TRAFFIC LIGHTS: Indicate operation currently being performed. The red indicates battery pack is being discharged. Yellow shows that charging is taking place, and green indicates that charging is complete and the pack is being maintained by a trickle charge.

MILLIAMP-HOUR Display: Indicates capacity of the battery pack being cycled. It is illuminated by the Cycle push-button and is turned off by the Reset push-button. It reads directly in milliampere hours and will retain a reading until Reset is pushed.

DUAL VOLTAGE Switch (Optional): This enables the use of the output to which it is attached (Rx or Tx) with battery packs containing two different numbers of cells instead of only one as on standard units. This way you can use battery packs with four or five cells.

100 mA Switch (Optional): Enables use with Rx battery packs of less than 300 mAh capacity.

As stated earlier, the Hi-Lo switches control output current supplied to receiver battery packs. The Hi-Lo switches are necessary because of the different charge curves of some of the new low internal resistance batteries such as the SR900 and Sanyo 800 cells. They enable the automatic features of the CaRa charger to be adapted to either type of battery pack. The following procedures will enable the proper settings to be found without any chance of damage.

The following applies to both Rx and Tx packs unless otherwise indicated. Packs made up os SR900 or Sanyo 800 mAh cells require Hi setting. Most packs less than 1200 mAh will use Lo rate. Packs over 1200 mAh should use Hi rate. For Fast Field Charging of Rx packs of 600 mAh or more, particularly at higher temperatures (above 80° F), Hi setting may be used. For the majority of original equipment battery packs, Lo setting should be used.

If you need to determine the Hi-Lo setting for a new or unknown battery pack there are two way of doing this. The first assumes that you have a voltmeter and can use it so let's look at how we do this if a meter is not available. Connect the pack to the charger. The pack must be out in the open and room temperature (at least 70° F). Run Cycle sequence with Hi-Lo switch in Lo position. Note the time at which the unit switches from Discharge to Charge. Calculate the approximate time in hours to full charge by dividing the rated capacity of the pack in mAh by 300. After the time calculated has elapsed, check the Traffic Light and pack temperature (with finger) about every 10 minutes. If the unit switches to Trickle during this period, Lo setting is proper and should be used. If the unit remains on Charge and any increase in pack temperature is noted, it indicated that Hi is proper for that pack. Repeat Cycle sequence with the switch in Hi position to verify proper operation.

A few things that you need to be aware of are that when the unit is in operation, considerable heat is generated by the regulators. It is important that air flow to bottom, back, and top of the unit not be impeded. The battery packs should not be left plugged into the unit without power being applied because they will be slowly discharged. In the event of a power failure the unit will automatically Reset upon power restoration so packs will be recharged. The unit should be left under power whenever possible. This allows everything to stabilize and will result in longer unit life. The power used in standby mode is only about 5 watts. Battery packs should be left on Trickle whenever possible. This will tend to equalize cells and result in longer battery life. Battery packs in normal use need to be cycled only about once every six months. A pack which has been stored on Trickle all winter should be cycled in the spring. A pack stored without Trickle or a new pack, should be cycled at least three times at 24 to 48 hour intervals (left on Trickle between cycles) before being used.

1989 Spring Nationals

Just a little advanced information about the Spring Nationals in Atlanta this coming spring. The race will be, as it was last year, a two day event. The entries were limited this year to allow a full four rounds of racing to be completed. There was a lot of heated discussion in the Atlanta club about going to a three day race this year because of the enormous popularity of the race. The decision was made, because of individual time restrictions, to go with the two day format this year and, quite likely, next year to three days. Any of you that have been to this race know that it is fabulous.



On the back of the Cycler/Charger case is the dual voltage switch which can customize the unit for four or five cell packs and the charging current Hi-Lo switches for the transmitter and the receiver charging cycles. The smaller cord next to the AC power cord is the the trickle charge cord.



From direct drive electric R/C boats to 30cc gas powered R/C model boats, there are 24 Octura competition proven "X" series metal propellers available. Ranging from the X427 up to the X482 there is an Octura "X" series propeller for any engine class and boat class legal under IMPBA and NAMBA rules.

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letter Hp_



GREAT PLANES MODEL DISTRIBU-TORS, PO Box 4021, Champaign, IL 61820, has introduced the Jet Stream 800 is the new electric racing speed boat from Kyosho. In addition to being excitingly detailed and large enough to handle rougher water, the Jet Stream features a unique prop drive system in which the prop pivots with the rudder, giving the boat exceptional stability and maneuverability. Other features of the 35 inch long Jet Stream include a stainless steel drive shaft and heavy-duty rotary speed control. With its unique gear system, the Jet Stream can easily be outfitted with twin motors for high speeds. Check for the Jet Stream 800 at leading retailers throughout the country if need more information or contact Great Planes at the address above.

M.A.C.K. PRODUCTS MODEL MARINE, 390 Warburton Place, Long Branch, NJ 07740, announces High-Performance, Twin Engine, Running Hardware and Power Package, complete with speed control, for Dumas' #1210 40 foot Coast Guard Utility Boat. The package includes twin #3150 Marine Motors, motor mounts, precision universals, ground stainless steel propeller shafts, propellers, brass three bearing "O" ring sealed stuffing boxes and rudder stuffing boxes, all brass two bearing struts, polished stainless steel rudders, rudder tiller arms, #4403 speed control, Nickel Cadmium battery "Y" harness, plus installation instructions and building suggestions. Order M.A.C.K. Kit #407. For more information, please write to the above address, or call: 201/870-2966.



PRENTICE HALL PRESS, One Gulf + Western Plaza, New York, NY 10023, has released Modern Carriers, featuring all the major types of aircraft carriers in operation from all of the fleets that have them. Carriers from the United States, Russia, England, Italy, France, and Spain are profiled and captured in full-color illustrations, action photographs, and diagrams. The carriers role in warfare, the various classes of carriers, their technological and design developments, communications systems, sensory and electronic devices, weapons, and even other aircraft carrying ships are described. The author of Modern Carriers is Ray Bonds, the creative force behind dozens of military books. The price of Modern Carriers is \$14.95. For more information, please write to the address above, or call: 212/373-8141.

SATELLITE CITY, P.O. Box 836, Simi Valley, CA 93062, has introduced new Hot Stuff[®] "UFO"[®], User Friendly Odorless cyanoacrylate instant adhesive. For those modelers who are sensitive to cyanoacrylate fumes, this is great news. Why? Because Hot Stuff







pages. Included are chapters on Tools and Materials, Hard Chine Hulls, Round Bilge Hulls, Other Types of Construction, Super-



structures, Fittings, Yacht Fittings, Finishing, Internal Combustion Engines, Steam Engines, Electric Motors, Hydroplanes and Special Models, Operation, Radio Control, Model Yachting Classes, Power Boat Classes, M.Y.A. Clubs, M.P.B.A. Clubs, and Propeller Suggestions. Also included is a glossary of modeling terms as they relate to model boating. Vic's book is very well illustrated with over 200 line sketchs and many B&W photographs. For more information, please write to the above address.

THE FOREDOM ELECTRIC COMPANY, Rt. 6, Bethel, CT 06801, introduces the BLK-2 Polishing Kit, which is said to be ideal for model craftsmen who do a lot of polishing and buffing. The kit contains the Foredom BL-1, a powerful, variable speed lathe in a compact size for use at the workbench. It operates on 110-130 Volt AC current, and comes equipped with two precision tapered spindles for cotton, felt or chamois buffs and a wheel mandrel for holding brushes and rubber bonded abrasive wheels. The lathe fea-





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tures a high torque 1/6 HP permanent magnet motor in a sealed dust proof housing, variable speed from 1,800 to 7,000 RPM, and permanently lubricated ball bearings. The unit can perform a full range of buffing, cleaning, deburring, polishing, and texturing jobs without having to change buff diameters. Along with the BL-1, the kit contains the No. 4000 Buffing and Polishing Compound Kit, featuring individual bars of Emery, Tripoli, Red Rouge, and White Rouge. These compounds enable the user to buff and polish on



various types of materials. Completing the kit is an assortment of 15 different buffs and wheels which includes: three inch and four inch Coarse and Fine Cotton Buffs; three inch and four inch Yellow Treated Buffs with Pin Hole Shellac Centers; three inch and four inch Canton Flannel Buffs with Pin Hole Shellac Centers; three inch and four inch White and Yellow Razor Edge Buffs with Pin Hole Leather Shellac Centers; 21/2 inch Rock Hard Knife Edge Felt Wheel, and three inch by 1/2 inch and four inch by 1/2 inch Square Edge Felt Wheels. For additional information, please write to the address above, or call: 203/792-8622.



THOMAS ROBINSON IMPORT-EXPORT. P.O. Box 80583, Seattle, WA 98108, introduces the Mini-Drill, a hand operated drill that makes perfectly round holes from 1 mm to 7 mm. It is simply pressed into any leather, paper, plastic, light metal, etc., and quickly produces a clean hole. The drill rotates as it is pressed into the material, giving a clean cut while removing the drilled out material. The Mini-Drill is made from high quality materials with hard steel blades and will stand up to hours of hole punching. Each drill is guaranteed and retails for \$19.95 each. Seven punch heads (bits) are included. Replacement punch heads are available at \$8.95 pet set of seven, from 1 mm to 7 mm in size. For more information, please write to the address above.

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CB-7 Day Cruiser

S earching for high-speed sport boat hull configurations, water skiers and high performance boat lovers naturally adapted the popular drag type to leisure time activities. A number of manufacturers heard the plea and began producing different size hulls of this type, many sporting a low cabin to allow extra room for storage, and privacy for the passengers.

Jerry Dunlap recognized the trend early on and produced this model which was influenced mostly by Spectra Marine Company's Day Cruiser called the Spectra 24. After seeing an example of the Spectra 24 compete in a full-scale offshore race, and inspecting it up close, Jerry adapted much of the full-scale technology in respect to tank and equipment placing. The result is an easy to build and very, very fast Deep Vee funster.

Full-size plans for Jerry's Day Cruiser are available from Carstens Flying Plans Service. Order plan number CB-7 (The "CB" stands for Carstens Boat plan) which is priced at \$4.00. There are a number of other easy to build fun, performance, and scale boat plans available from this service, and you can read about them all in Carstens Flying Plans Directory, which is priced at \$1.00 direct from Carstens Publications, P.O. Box 700, Newton, NJ 07860.





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