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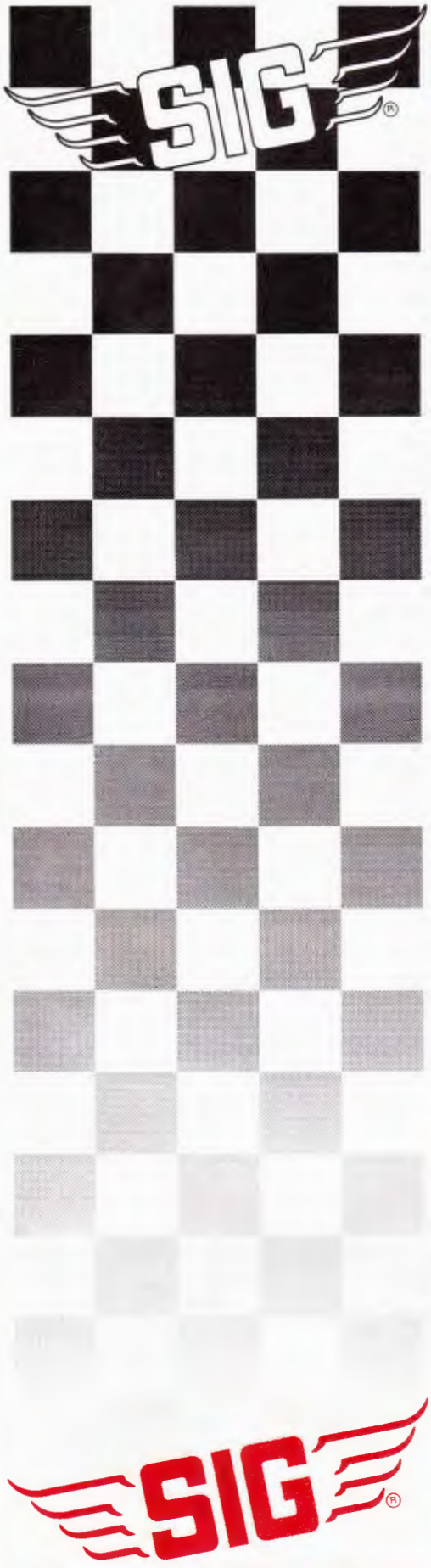

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# May 1996 Vol. 101 No. 5/665



## Departments



**On the Cover: That's a man-sized airplane, mister! Dave Hollander displays his Dick Sarpolus designed *Fancy Cut Plus*. This is an enlargement of a previous Sarpolus design, and it is intended for the larger Giant engines. Photo: Dick Sarpolus**

# editorial

PHOTO: DICK SARPOLUS

**Dave Hollander's rendition** of Dick Sarpolus' new *Fancy Cut Plus,* Giant sport design has the appearance of a full-scale aerobatic design. A Sachs 4.2 engine gives the big ship plenty of vertical go power!

It's funny how trends and styles in this hobby change over the years. In the 1970s, the Pattern ship was king. Just about everyone who flew R/C, whether for competition or sport, knew all about the latest hot Pattern designs and those who flew them. The various magazines would publish each successful design, and performance standards of even the sport designs which were kitted in the era were judged by Pattern flight standards. Aerobatics were king, and those who flew aerobatics best were celebrities.

Times change, however, and the 1980s rode in on the proverbial horse of a different color. It was probably a *Mustang*, because that was the decade of the Scale Modeler.

For whatever reason, Pattern ships fell out of vogue, and the buzz word was realism. This was also the beginning of the era of the Giant Scale model. Big was in, and bigger yet was better yet. Giant Scale Fly-Ins were being held in every section of the country. Note, these were not contests. They were gatherings of modelers who shared a love of flying behemoth models. There was no pressure to be a hot aerobatic pilot, and certainly no pressure to have to win at anything.

Most of the Giant Scale models were not what you would call great performers, anyway. Their forte was flying around the sky in a scale-like manner, which for the more conservative designs—like for instance a Piper *Cub*—meant level flight with an occasional dipsy-doodle loop, or lazy stall turn.

There must have been something to it, because record numbers of modelers turned out to non-compete in this new form of modeling togetherness. They still do!

As hard as I try, I just can't seem to shake the need deep down inside for competition, and all out airplane performance. I still love the Pattern birds, and revel in the spectacular vertical performance afforded by a light model coupled to a strong engine. I'm a performance nut... Yes, I know that the Pattern

*continued on page 6*

models are not executing maneuvers in a scale-like manner, or at scale speeds. But, the truth is, I don't see them in my mind as just models of what might have been full-scale designs. I see them as cursors on a big blue screen, and the only criteria I judge them by is their perfection in scribing a set line or shape. No, Giant Scale isn't really my cup of tea. Giant Sport—now that's another story!

Somewhere around the turn of the decade (1990) a number of Giant Scale modelers began to experiment with original design Giant Sport models. Essentially these were just blow-ups of .40 size sportsters to accept the modified chain-saw engines. Many of these Giant Sport designs were loosely based on the lines of Full-Scale aerobatic craft like Leo Loudenslager's *Laser 200*. Perhaps the Las Vegas TOC contests were in large part responsible for this. Whatever the reason, the word Giant and the word Aerobatic had come together, and even the word Competition had once again snuck in there.

Even today's pure competition aerobatic models are growing in size. This was predictable, and I see it as a good thing, providing the extra costs involved don't keep people away. The reasons why the size of all these models has indexed up a couple of magnitudes is manifold. Certainly the most obvious reason is that the average age of the modeler is getting higher, and the combined eyesight of this group isn't getting any better. Bigger planes are easier to see, whether their pilots are just steering them around the field for fun, or clawing for points in trick contests. Many have said that the larger models are not safe. If their pilots can see them better than they can see a smaller model, I contend that they are safer! Of course, this is assuming that the model in question was built with care and with the knowledge of the extra stresses involved. Everything being equal, they don't seem to pose any more of a safety problem than does a .40 size speedster sport design. That debate will go on for years, I'm sure.

Will we begin to see gargantuan competition aerobatic models? I doubt it, because the rules makers for those events are fairly conservative in nature. Will Giant Scale Fly-Ins turn into Giant Sport Aerobatic "Can you top that affairs"? I hope not, but I've been told several already have. Can Giant Scale and Giant Sport co-exist? They'll have to! This is still all one sport, and what we are seeing are simply manifestations of individuality.

Having said all that, I'm going to ask you to turn to page 22 and have a look at Dick Sarpolus' latest original, the *Fancy Cut Plus*.

Dick is an unusual type of modeler who loves virtually every aspect of the hobby, and he flies both Giant Scale and Giant Sport airplanes as a part of his normal routine. He also builds and flies everything from ½A all sheet balsa, profile C/L designs to super-hot .40 powered hot rods. He has always liked high performance models, and when he made the move towards Giant Sport designing, it was natural for him to try and extract as much raw performance from his models as possible.

Dick is also well known for designing models which are very easy to construct. He uses box-like fuselage crutch structures made from simple sheet balsa, and gets form and shape from sheeted foam blocks which sit atop the crutch structure. This type of construction allows him to build models extremely fast, as well.

The *"Cut"* series of Sarpolus designed Giant Sport models (*Prime Cut, Choice Cut, Fancy Cut, Double Cut*) has become as popular in the Giant Sport field as his *Hammer* series was for the .20 to .60 engine crowd. With the availability of even bigger engines for the Giant Sport models, Dick simply enlarged one of his most popular *"Cut"* series offerings, and produced yet another bench mark design, the *Fancy Cut Plus*.

The *Fancy Cut Plus* really does have the looks of a prototypical competition aerobatic craft. The one that graces our cover this month was built by Dave Hollander, and I would only suggest that a pair of wheel pants could be added to complete the illusion that it is actual scale model of a full-size ship.

Dick's designs are also practical. Everything is accessible and easy to work on. In fact, any of his Giant Sport or Giant Sport Scale designs would be an ideal choice for a first project of this type. For those of you who like to fly Giant models, but still want that all out performance, consider building this design with built-up wings and tail surfaces., covered with shrink film to keep the weight to a minimum. Install the most powerful engine you can find, and "go ballistic!

### Out of the pack

In any competition event, there is a bell shaped curve of talent. At the beginning of this curve you will find the beginners, and those who are not blessed with outstanding natural talent. As you continue down the curve, the bell starts to form, and this is

where you will find the average competitor with average skills. On the far end of the curve are those with true inspired talent coupled with fierce desire. These are the individuals who will be remembered as the movers and shakers of a particular competition event. From this last group will come the winners.

The above description sounds a bit elitist, but, let's face it, that's exactly what we're talking about when we talk about the best in anything. This is not to suggest in any way that these individuals are better human beings. Sadly, many who reach the top of their craft or sport start to believe their own "propaganda", and become classic primadonnas. Fortunately, there are also many who reach that level and still keep the better part of their humility.

Because of the nature of the bell shaped curve, it's not too often that someone breaks out from the crowd and serves notice that he or she is about to become a "player". In most competition modeling cases only two or three fliers per five year period (at most!) will show that "right stuff".

I was very fortunate this past year to be on hand when one of these "breakthroughs" occurred. The scene was the Cleveland Area C/L Stunt Championships, held at the Cleveland Model Airport. This is a beautiful field, but one which can get treacherous when the wind blows. The first round was flown in near ideal conditions, but by the time the second round started, the wind was howling across the trees at the edge of the field, causing extreme turbulence.

I had observed a gentleman flying a very cute, small model in the first round of the Advanced class event, and noted that he was performing some excellent maneuvers. When it was his turn to fly in the second round, I was sure he would pass because of the weather conditions. After all, a small model like his would surely get tossed around badly, and he would not be able to improve his first round score. Boy, was I wrong!

The performance that followed was one that will forever stand out in my mind as one of the great, rotten-air flights I've ever witnessed. That small plane cut cleanly through the bad conditions, and easily powered to the top of the circle without being pushed around. The pattern wasn't perfect, but it was by far the best flight flown by anyone, in any class, in those conditions that day.

What was so special about that plane, and who was the pilot? If you'll turn to page 50 you can read all about Mike Starrett's original design, the *Eliminator*. Why was it so

good in bad air? Mike had built an extremely accurate, light, and well powered model.

Mike's *Eliminator* is powered by an OS .25 VF (rear exhaust) Schneurle engine, fitted with a carbon fiber tuned pipe. Not only does this combination produce gobs of power, but it is also well mannered and runs in the typical two-four break, albeit at a high rpm.

Mike served notice that day that small airplanes can be very competitive in almost any level of competition, that small tuned pipe set-ups can work very well indeed, and that he's arrived as a threat at any C/L Stunt contest. Pretty good day's work I'd say!

It pleases me even more to report that even though he's a hard charger, Mike Starrett is also a genuinely nice guy, and one who will probably never become one of the aforementioned primadonnas. If I were flying C/L Stunt in the Mid-West, I'd get out and practice very hard... Mike is!

### Belt way

In case you haven't noticed, electric R/C flying has taken several giant steps recently. No longer are 05 motors the only way to fly. In fact, if you attend the electric fly-ins, you will probably see more 15 and 25 size motors in use, and many of them will be nestled in a gear or belt drive system. These systems multiply the power of the motor, and allow it to swing very large propellers and fly impressively large airplanes.

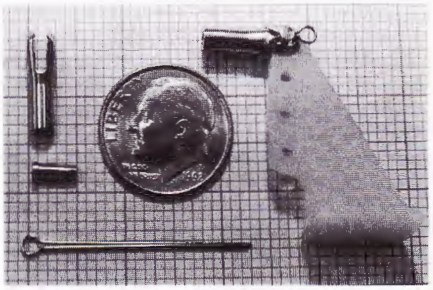
Don Abramson installed a ModelAir-Tech H-1000 belt drive unit in ACE R/C's *Cloud Dancer*, and has written a review of both the outstanding kit for the model (which was originally designed for .40 glow power), and the belt drive system. If you are looking for a new modeling experience, and haven't tried electric yet, then this combo may be just right for you!—BOB HUNT

# flying report

**GLOBAL HOBBY DISTRIBUTORS**, *10725 Ellis Ave., Fountain Valley, CA 92728*, announces a glow powered, pre-built and sanded version of their popular P-51 Slope Glider. The Model Tech P-51 25 BHP

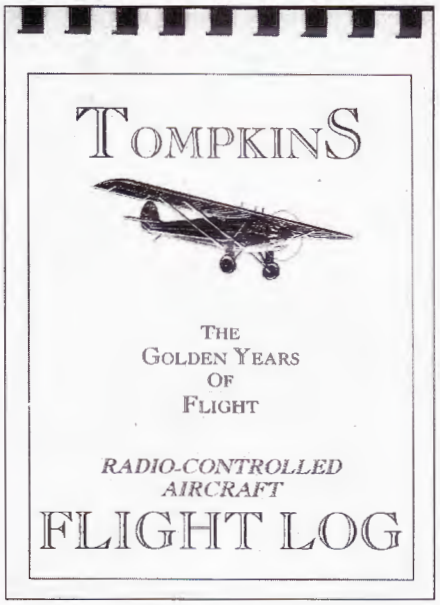
is a completely Built-up Handcrafted Plane (BHP) that is meticulously hand sanded and comes virtually ready for final assembly and covering. The wing construction is lightweight D-tube balsa sheeting over ribs. The fuselage and tail construction is all balsa. The Model Tech P-51 25 BHP requires a .21 to .28 size engine, which is mounted inverted to preserve the clean lines of the "Stang". This model comes with complete hardware (less fuel tank), pre-bent landing gear, wheels, clear canopy, molded scale exhaust stacks, scale fiberglass "chin" cowl, spinner, and a photo illustrated instruction manual. The Model Tech P-51 25 BHP has a wingspan of 50 inches and 428 square inches of wing area. It requires a four channel radio control system. For more information write to the address above or call 714-963-0133.

**NELSON AIRCRAFT CO.**, *21550 N.W. Nicholas Ct., Unit D, Hillsboro, OR 97124*, announces that their scale subminiature aircraft type Clevis Ends are now available in an adjustable version with a 2-56 thread, or with a 1/32 inch diameter hole. The overall length is approximately 1/2 inch. The cut-out slot width is 1/16 inch. The clevis pin diameter is .079 (5/64 inch or #47). The clevises feature a scale-like removable clevis pin that is held in place with a 1/32 inch cotter pin. The units are nickel plated and look similar to full-scale aircraft clevises. Made from steel, the units will take any linkage or flying wire flight loads encountered with R/C models, including most giant scale aircraft. The adjustable clevis units feature a precision 2-56 thread that can be adapted to common rod ends. The fixed clevis has a 1/32 inch full length hole that will accept 1/32 inch diameter wire or cable that can be easily soldered in place. The 1/32 inch diameter hole can be drilled out for use with 1/16 diameter wire pushrods. These realistic clevis assemblies can be used for many kinds of scale-like, push, pull, or push/pull, wire/cable control system applications and for low cost, yet realistic, 1/32 inch to 1/16 inch diameter wire/cable flying wires. They are packaged with two (2) assemblies per bag (two adjustable or fixed clevises, two removable clevis pins, and two 1/32 inch cotter pins). The adjustable clevises are $5.95 per pair, and the fixed clevises are $5.50 per pair. For more information write to the address above or call 503-629-5277.



**TOMPKINS**, *P.O. Box 54, Pennsburg, PA 18073*, is now offering a Radio Controlled Aircraft Flight Log. This log can be used to record the history of four aircraft, and has enough pages to keep records of 100 plus flights for each of the four models. Each

flight entry has space for information on the date, location, site conditions, skills practiced, number of flights, and the ESV battery reading at the start and ending of the flight session. There are sections in which you can list your flying buddies' addresses and phone numbers, vital battery statistics for each pack you use (including charging and cycling records), places you've been and flown in a diary type format, equipment pur-




chase records, detailed description of each of your models along with information on who designed the model, wingspan, wing area, wing loading, length, weight, construction materials, coverings, retracts (make), glues used, engine make and type, muffler, fuel, prop, radio type and frequency, battery information, number of channels, and more. The Flight Log also contains a prop chart for 2-stroke engines and one for 4-stroke engines, an engine size conversion chart from cubic inches to cubic centimeters, medical notes, an article on proper battery care, and radio and airplane identification labels. For more information write to the address above or call 215-679-3988.

**USR&D CORPORATION**, *P.O. Box 753, Hackettstown, NJ 07840*, announces Aero*Comp software which is used to analyze the performance of gas/glow-powered model aircraft. You input physical charac-

*continued on page 11*

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teristics of the airplane, propellers, motors, and fuel. The program estimates takeoff rpm, motor power, thrust, rate-of-climb, air-


speed, glide ratio, and other performance characteristics. The predictions are usually accurate to within plus/minus ten percent. Aero*Comp predicts how well your aircraft will perform before you build it. Use Aero*Comp to match motor, gearbox, prop, fuel, and aircraft design to obtain optimal airspeed, rate of climb, or glide performance. Aero*Comp works with scratchbuilt models as well as with kits. It features a database of 53 airfoils and more than 200 motors. It also features easy-to-use pull-down menus and detailed help screens that explain the inputs and results. The Horsepower Calculator feature enables you to determine the peak power and rpm of your own motor. Aero*Comp runs on all IBM-PC and 100% compatible computers. For more information write to the address above or call 908-850-4131.

**GLENNIS AIRCRAFT**, *5528 Arboga Rd., Linda, CA 95901*, has added Struts, Wheels/Tires, and Brake Systems for the Mark Frankel Lear Jet to their Ultrascale

brand of landing gear systems. The shock absorbing struts feature aircraft grade steel, and stainless steel construction. They extend to scale length to fit into the scale wheelwells, and include hardpoints for at-

*continued on page 12*

tachment of scale accessories such as gear doors. The Glennis Aircraft Wheels/Tires are exact scale, including scale tread and a chine sided/water deflecting nose tire as on the full size aircraft. Four Disk Brakes insure full stopping of the aircraft under any conditions. To complete the Ultrascale package, molded plastic disc brake rotors, calipers, scissor links and landing lights, with optional lighting kit yield an extremely realistic landing gear. For more information write to the address above or call 916-742-3957.

**DUBRO**, *480 Bonner Rd., P.O. Box 815, Wauconda, IL 60084*, is now offering their TL Series of lightweight wheels which fea-


ture a foam interior and a tough exterior skin. The first wheels available in this series are their Large Scale Treaded Lighweights. They are available in 4-inch diameter (Cat. No. 400TL), 4½-inch diameter (Cat. No. 450TL), 5-inch diameter (Cat. No. 500TL), 5½-inch diameter (Cat. No. 550TL), and 6-inch diameter (Cat. No. 600TL). For more information write to the address above or call 1-800-848-9411.

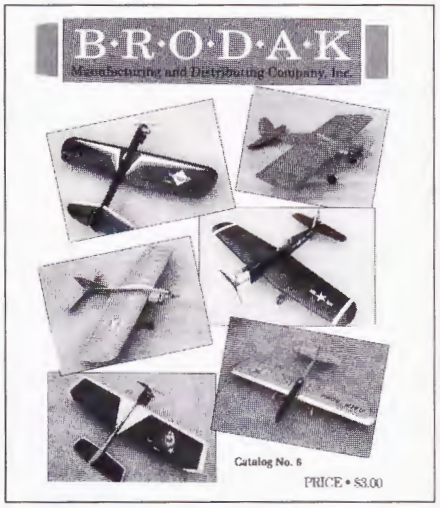
**HOBBY SHACK**, *18480 Bandilier Circle, Fountain Valley, CA 92728*, says that "If you can use a screwdriver, you can build this plane!" They are referring to their Flying Start R/C trainer which is a very stable flying high-wing design that is powered by a supplied Magnum XL .15 BB/ABC/FSR glow engine. It comes complete with everything needed to complete the project, except a radio control system. Three channels are required for this model. It has a wingspan of

52 inches, a wing area of 410 square inches, and has a suggested retail price of $119.99. The Flying Start (Kit No. 211040) is said to be "hands-off" stable in flight. For more information write to the address above or call 714-964-0827.

**BOB DIVELY MODELS**, *38131 Airport Parkway #206, Willoughby, OH 44094*, is now offering large vacuformed plastic Dummy Radial Engines. The ¼ scale engine is a seven (7) cylinder model, and measures 10.5 inches in diameter. The ⅓ scale engine is a nine (9) cylinder model, and measures 12

inches in diameter. Both of these engines are molded from .040 ABS plastic, and both come complete with the back sides of the cylinder banks for models with cowlings that don't completely cover the engine. The ¼ scale Dummy Radial Engine (DE-502) retails for $14.95. The ⅓ scale Dummy Radial Engine (DE-503) retails for $18.95. For more information write to the address above or call 216-953-9254.

**BRODAK MANUFACTURING AND DISTRIBUTING COMPANY, INC.**, *100 Park Ave., Carmichaels, PA 15320*, has released their Catalog No. 6. This catalog, which is priced at $3.00, contains a listing of the many and varied types of Control Line




kits that are available from Brodak. Also listed are products from dozens of other manufacturers that are distributed by Brodak. As a bonus, there are several articles written by recognized experts in Control Line. These articles are basically introductions to the various types of Control Line flying. Included are "Secrets of Control Line Flying" by Brodak. This article gives the beginning modeler pre-flight instructions, and a guide to making a first solo flight. It also covers learning to perform maneuvers, and lists the various Stunt patterns which are flown in competition. Noted C/L Carrier expert, Dick Perry explains the Carrier event, and how to get involved in it. John Thomp

son, columnist for *Model Builder* magazine also wrote an article for this catalog which deals with trimming a C/L model. C/L Combat and C/L Racing are also covered with dedicated articles. Brodak's C/L kit line is extensive, with offerings for models powered by ½A engines up to .60 engines. Hardware items, finishing materials, engines, props, building tools, and field equipment for C/L flying are also listed in this 60-page catalog. For more information write to the address above or call 412-966-2726.

**MODELAIR-TECH**, *P.O. Box 12033, Hauppauge, NY 11787*, is now shipping their 1996 catalog. Among the items listed in this catalog are the single and dual motor belt drives which the company is famous for, plans for their stick series electric designs, plans for built-up electric sailplane designs, plans for electric old timer designs, and plans for electric sport aircraft designs. Also listed are the Semi-Kits for several electric scale designs. One of the recent additions to the Modelair-Tech catalog is a new, scaled down, Defiant electric sailplane. It is called the Defiant-430, and has 430 square inches of wing area. It is designed to be powered by a geared Speed 400 (6-volt) motor and 7 cells (500 mAh). The Defiant-430 sports a new

*continued on page 16*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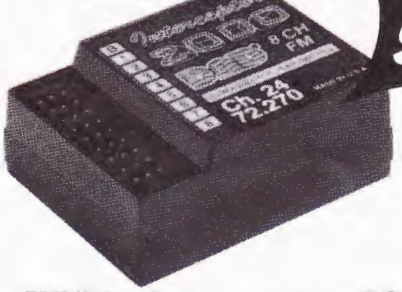

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and very light weight custom fiberglass fuselage. The Defiant-430 is intended for the proposed Class ½A Electric Sailplane event to be tried for the first time at the 1996 E-Nats. Please send a double stamped, large business envelope to the above address for your free copy of the Modelair-Tech catalog.

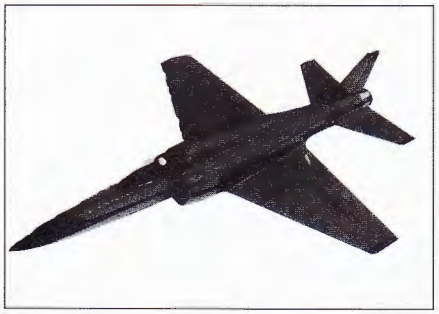
**HOBBY LOBBY**, *5614 Franklin Pike Circle, Brentwood, TN 37027*, introduces their Precedent T180, six foot wingspan design in both foam and built-up wing versions. The T180 features a flat bottom airfoil for relatively slow flying speeds and it generates hugh amounts of lift. The foam wing version

features an obechi sheeted foam core, complete with sheeted leading edge, and cut-out ailerons. The pushrods are pre-installed. The interlocking, ceiba light ply, fuselage construction allows this component to be built in hand. Either version comes complete with an extensive hardware package which includes wheels, pilot, fuel tank, hinges, pushrods, control horns, clevises, spinner, fuel tubing, engine mount, and more. The T-180 builds up to weigh approximately seven pounds, and requires a .40 to .46 two-stroke or a .50 to .60 four-stroke engine. It has also been flown with a Mega S-7 motor equipped with a belt drive. The electric version flying weight was nine pounds with 14 cells. The T-180 has a wingspan of 71 inches, and a wing area of 720 square inches. It requires a four-channel radio control system. The conventional wing construction T180 Precedent (PR122) retails for $137.60, while the foam wing version (PR122F) retails for $138.90. For more information write to the address above or call 615-373-1444.

**DAVIS MODEL PRODUCTS**, *P.O. Box 141, Milford, CT 06460*, has, by popular demand, brought back to their line a Spring Starter for the COX Tee Dee .049/.051 engines. This Spring Starter was first developed back in 1977, and it eliminates the cuts that can result from hand flipping the propeller. The suggested retail price of the Spring Starter is $5.95. Note that in the accompanying picture, the Spring Starter is mounted on a COX Tee Dee engine which has an unusual looking knob where the glow head is usually located. This is the new, im-

proved, Davis Diesel converter that turns your .049 into a motor with the power of a .10. Fitted with this conversion, a COX Tee Dee .049 will turn a 7–4 propeller at over 13,000 rpm. The dieselized .049 will run for 12 minutes on only one ounce of diesel fuel. The conversion head for a Tee Dee .049/.051 complete with the Spring Starter retails for $19.95. For more information write to the address above or call 203-877-1670.

**DL AÉROMODÈLES INC.**, *4500 Kimber #8, Saint-Hubert, Quebec, Canada J3Y 8K5*, is convinced that their Cyclone is the perfect first jet model for experienced flyers who want to try their hand at ducted fan modeling. It has a wide envelope of speed so that

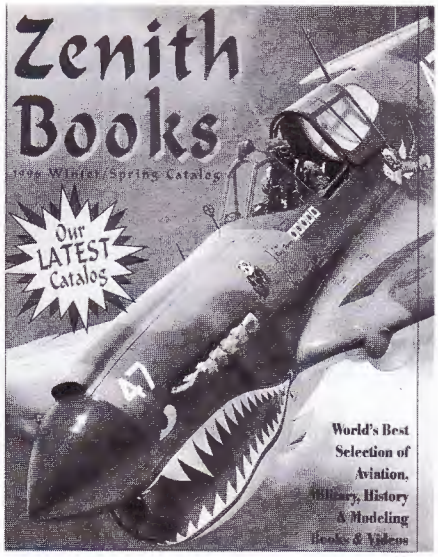


the new jet pilot can experience the feeling of jet flight at lower speeds, while at the same time offering the experienced pilot steady flights at speeds of 160 plus mph. The kit features lightweight epoxy-glass components, balsa planked foam wings and stab, a molded-in vertical fin, plug-in wings for easy transportation, unique design, one-piece split inlet for easier assembly, high-quality plywood parts, a clear canopy, soft mount system for the fan assembly, and a big access hatch for easy maintenance. The Cyclone uses standard retract systems and radio control systems. The Cyclone is 70 inches long, and has a wingspan of 50 inches. It is available in two versions for Dynamax/Ramtec or Violett propulsion systems. The Cyclone has a suggested retail price of $599.00. For more information write to the above address or call 1-800-797-2376.

**BOB FIORENZE**, *P.O. Box 953042, Lake Mary, FL 32795*, is now producing Gear Door Hinges which are extremely light in weight, and strong. These large scale, heavy duty hinges eliminate flexing, which is the

most troublesome area of gear door fabrication. Flexing changes critical alignments. Bob's Gear Door Hinges are machined from lightweight aluminum, and are priced at $2.75 each. For more information write to the address above or call 407-330-1448.

**ZENITH BOOKS**, *729 Prospect Ave., P.O. Box 1, Osceola, WI 54020*, is now offering their Winter/Spring catalog of books and videos on civil and military aviation, military history, weapons, modeling, warships,




militaria, and more. Aviation enthusiasts will find everything they are looking for on a variety of subjects including classic warbirds, aerobatics, civil and light aircraft, and high tech military aircraft. Modelers, too, will find books and videos listed on every facet of the hobby from designing to finishing. For ordering information, please write to Zenith Books , or call them on their toll free 24-hour number, 1-800-826-6600.

PHOTOGRAPHY: FRANK FANELLI

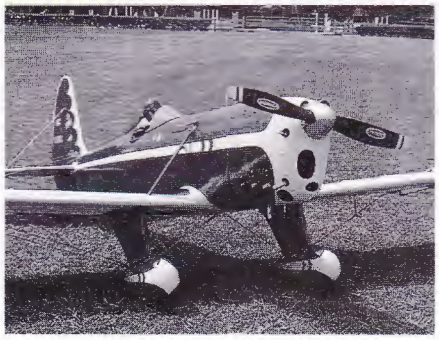
**Of all the planes that** compete at Top Gun, Nick Ziroli giant scale designs **(above)** like the T-6, B-25, DC-3 and D-18 are perennial contenders in both the Expert and Team categories. In 1991 Diego Lopez fielded an AD-6 *Skyraider* **(below left)** from an Accu-Scale kit that had folding wings, scale gear, and bomb drop. Dick Hanson's beautiful Albatros DVa **(below right)** came from a Proctor kit. The 23-pound plane used an Enya VT-240 four stroke with an 18-6-10 prop

When some of scale's best modelers compete, it's ...

# Top Gun Time

**by Frank Fanelli**

**Chuck Fuller's** Sukhoi SU-26M **(above left)** put on a beautiful visual ballet in the bright blue sky, thanks to the power of his Sachs 3.7 and the model's smoke system Drama was very much a part of Dennis Crooks third place finish in 1993 with his Lear 31 **(above right)**, a highly modified version of the Mark Frankel design



**Bob Pinckney's** C-45 was a Ziroli design **(above left)** that Dino DiGiorgio flew to a first in Team Scale during the 1992 event. Irv Searl's big Ryan STA **(above center)** was one of two that competed in the 1993 event. Richard Crapp brought this monstrous Antonov An-2 **(above right)** all the way from Britain in 1992 and '93. The plane lumbered magnificently through the air. With its functioning crop dusting gear David Hayes *Thrush* ag plane **(below)** kept the bugs away!

About three weeks after you read this, some of scale modelling's best craftsman and flyers will gather again at the Polo Club in Palm Beach, Fla. for the 8th Top Gun Tournament.

To whet your appetite, and give some idea of the caliber of models that appear there every year, we've put together a montage of models from years past, plus a little information about each. Some will once again be there. Other, newer designs will also make their appearance.

It has become a real celebration of all modelling since the "half time" show during the lunch break presents all kinds of models other than scale to entertain the 10,000 people strong crowd that gathers every day of the event.

Mark your calendar: Thursday, April 25 through Sunday, April 28. It's a treat!

# air mail

### It's high-tech

I just finished reading C/L Stunt Part IV in your FLYING MODELS magazine. I feel the need to comment on it.

I have over 30 control line planes from .049s to ST 60s. Many times I change motors and c.g. to find the best flight. Some of my .049 Combat planes are so unstable that level flight is up and down by about 10 feet. I cannot afford to have this with my new Cardinal (that cost $800+ and one and a half years to build and finish. You can be sure I will use your formulas to double check all my Stunt planes.


Control line flying is no longer a profile kit put together in a couple days and played with. It has evolved into a hi-tech sport many R/C flyers do not start to understand. Lightweight, strong, no throttle 2/4 cycle runs, tuned pipes, maneuvers 3–5 feet above the tar, etc., etc.

It's good to have some articles for beginners, but with so many in Stunt we need the high tech information as in C/L Stunt March '96.

C/L Stunt is the major part of FLYING MODELS that I read. With my Pro-Stunt videos, *Model Aviation,* and Pampa I was thinking of dropping my FLYING MODELS subscription. With hi-tech info like you are giving, I will surely continue with your fine magazine.

I would like to see more on paint schemes and art work. Do's and don'ts that accent the model. Most of us can get an excellent finish but the art work is very hard.

JAMES G. VARNO
Detroit Lakes, Minn.

### A "wrinkly" rang

I am a FLYING ACES/FLYING MODELS fan from way back and have managed to put together the best collection of model aero mags in Australia, perhaps in the world, some say. I am still short of a few pre-war FLYING ACES, and have numerous swap copies if anybody can help, but that's not what this letter is about.

Yesterday a "wrinkly" (yeah another one) rang me and asked if I could help him find a FLYING ACES with an all-balsa glider that looked like a commercial transport plane with twin-fins. He had built that, and McCullough's Piper Cub Coupe rubber-powered, and knew that both were about September-October 1939.

Well he was right of course. So I was skimming through the October "Piper Cub Coupe" issue and a couple of pages before I got to it, my eye just fell on the one word "Killara" in the Flying Aces Club News by Clint Randall, National Adjutant of the Flying Aces Club. "Killara" was the end word of a paragraph which is the only reason I saw it. That made me re-read the "Club News" article fifty-seven years after it was written, and see there the young fellow's name and address.

Mayne isn't rare as a name, nor is it all that common. There in the Sydney phone book was a Mayne in Killara. Not S. Mayne, and the wrong street, but worth a try, even after fifty-seven years.

I phoned. A lady answered. I asked her if she knew of a Steve Mayne who would now have to be in his seventies who lived in Killara before WW II. Pay dirt. It was her brother-in-law, aged seventy-two, not listed under S. Mayne, and not living at Killara since the war ended.

So I phoned Steve Mayne and it all came flooding back. As a result of his letter in FLYING ACES, he had very shortly after struck-up a pen-friend correspondence with another **FA** reader in Orangeburg, South Carolina.

The war went on, Steve joined up, and not only lost contact, but to his shame he says he can't recall his pen-pal's name, only the fact that he was in his teens in 1939, and lived at Orangeburg, and he would very much like to establish contact again.

Here's where I hope FLYING MODELS can help by publishing at least part of this letter, and if that pen-pal modeler is still alive, putting these two old-timers in touch with each other. If, sadly as well may be the case, the Orangeburg lad is no longer with us, Steve would be grateful for the knowledge.

Isn't a love of aviation and things aeronautical a wonderful thing to span time and space as it has in this case? And isn't it good that **FA/FM** has endured more than two-thirds of a century, to make re-union for these two at least a possibility?

Anybody out there who can help please write to: Steve Mayne, c/o P.O. Box 11 Doonside, NSW, Australia.

IVOR F.
Doonside, NSW
Australia

*The love of model aviation certainly has inspired some enduring friendships, and we would be happy to help two old "wrinklies", as Ivor F. terms them, rekindle an old and valued friendship. As for the enduring quality of FLYING ACES/FLYING MODELS, we promise to keep improving it so it endures for at least another 60 years.*

# Fancy Cut ... Plus!

**By Dick Sarpolus**

The original design was easily built and a popular Giant sport design for smaller gas engines. This enlarged version mounts the bigger Zenoah G-62 or Sachs 4.2.

My *Fancy Cut* design was published in the January 1994 issue of FLYING MODELS. It was designed for power by such engines as the Quadra Q-42, Zenoah G-38, SuperTigre S-3000, Sachs 3.2, etc. Two good friends of mine had a couple of larger, more powerful engines (a Zenoah G-62 and a Sachs 4.2) that needed planes behind them, and asked what I thought about using those engines in the *Fancy Cut*.

Obviously, the larger Zenoah G-62 would provide a good deal more power with its 50% displacement increase—but it would also bring along close to two pounds of additional weight. That weight, added to a Quadra Q-42 powered *Fancy Cut*, would increase the wing loading from 30 ounces/square foot to about 34 ounces/square foot. Still not too bad, but I felt a larger airframe would be better suited to the larger, more powerful G-62. And the Sachs 4.2, while lighter, could certainly handle a larger aircraft.

Just how would you take an existing design and enlarge it a bit for a bigger engine? You could blow up the plans by a percentage—say 5% or 10%—increasing every dimension of the original design; that would be pretty easy. But some of the design features shouldn't be enlarged; there's no reason to make the fuselage wider, or higher, or go to a different cowl and plastic canopy.

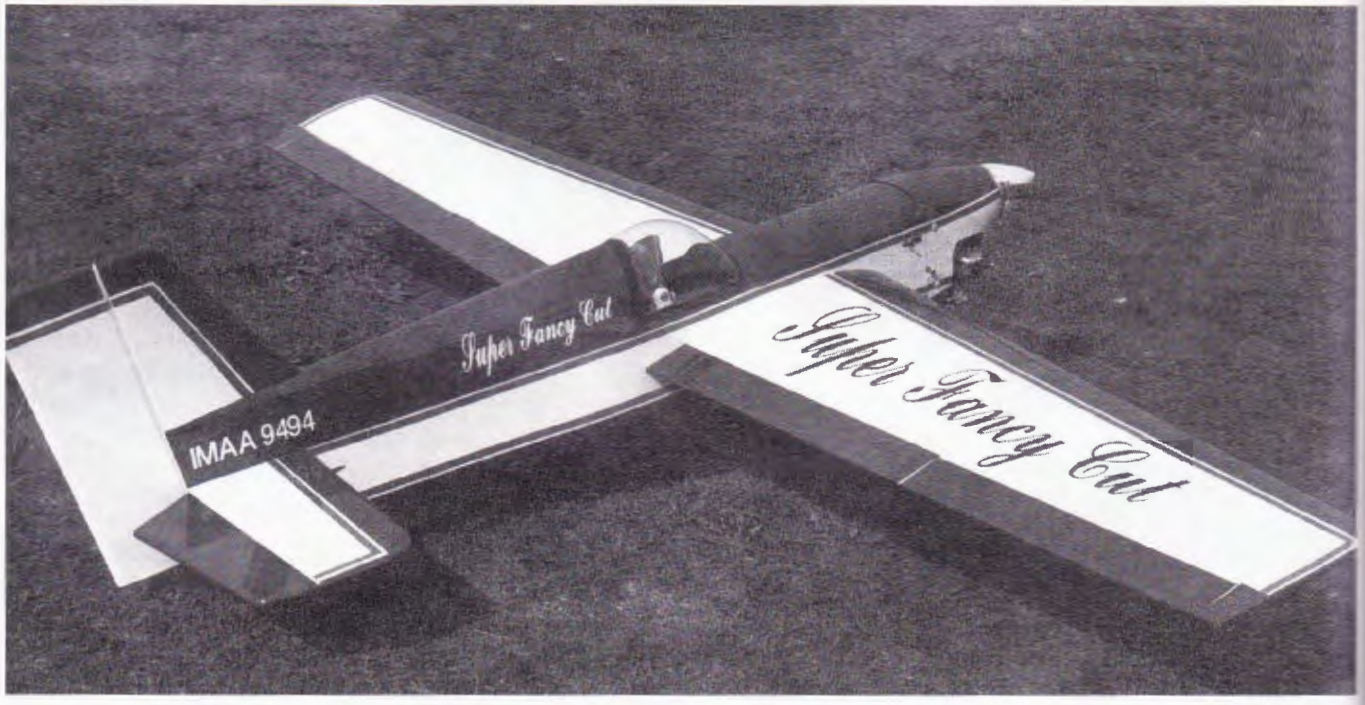
I enlarged certain portions of the design by the "eyeball" and experience method; if it looks good, it'll probably fly good. The wing span was increased by 2 inches, or 2%. The wing root chord was increased by almost 2 inches, or 12%. The tip chord was also increased, by 15%. The aspect ratio was lowered, to keep the wingspan down. This all resulted in a new wing with a span of 92 inches and an area of 1540 square inches, compared to the original's 1300 square inches.

The larger wing area would easily handle the increased engine weight and keep the wing loading down. Now, with a larger wing, a larger horizontal stab area was needed to keep the stab/wing relationship the same, so it was blown up with a size increase. The vertical fin and rudder area was also increased. The fuselage, while it didn't have to be widened, was lengthened overall a few inches, about 3%. The nose length was actually shortened a little, for balance with the heavier engine.

Even if the overall weight was increased by three pounds with the heavier engine and more structure, the wing loading would remain the same. The same plastic canopy and fiberglass cowl was drawn in, although a different cowl was actually used on one of the prototype aircraft for a change in appearance. With all these changes, a new set of plans was drawn up incorporating new foam core templates, etc. It's still the same design, just a little larger in areas and moments. So the name change; now it's a *Fancy Cut Plus*.

It worked. The larger aircraft flies well with the bigger engine and handles as easily as the original plane does. Two aircraft have been built to the new *Plus* layout, one powered by the Zenoah G-62 and the other with a Sachs 4.2. Both fly well; the Zenoah powered version did end up with a heavier wing loading due to a fiberglass covering and a paint job, while the Sachs powered machine (lighter engine) came out lighter with a plastic film finish. That one weighs 18 pounds, which works out to a wing loading of only 27 ounces/square foot. So if you've got or prefer a larger, more powerful, and probably a heavier powerplant, for a quick building, easy handling sport/aerobatic project, consider the *Fancy Cut Plus*.

The plug-in wing panels make for easier transportation and enable the mid-wing design without having to cut deeply into the fuselage. The swept back vertical fin, turtledeck, and large canopy give a bit different appearance. With the thick, fully symmetrical airfoil, the plane is aerobatically capable for sport use. This isn't a contest machine;




**Dave Hollander's *Fancy Cut Plus*** sports the original name, *Super Fancy Cut*, in computer cut vinyl script lettering. It certainly adds to the visual appeal!


PHOTOGRAPHY: DICK SARPOLUS

**Dave's model is powered by a Sachs 4.2** engine, fitted with a Davis remote muffler. This yields a very quiet, yet powerful set-up. Neat pilot, Dave!

it's an easy flying fun job. Foam core wing panels, fuselage top blocks, and tail surfaces for easy building.

The fiberglass cowl, plastic canopy, and fiberglass wheel pants are available from Fiberglass Specialties (38624 Mt. Kisco Dr., Sterling Heights, MI 48310). The aluminum landing gear is by ACE R/C. One of the prototypes used Byron's large Sukhoi aluminum landing gear for a different appearance and more prop clearance; it worked well. Rather than the cowl shown on the plans, Fiberglass Specialties' TR-260 cowl was used on the Zenoah powered aircraft, again for that different appearance. It also worked out well; builder's choice.

The aluminum tube wing joiner system is becoming more common as more mid-wing aircraft designs are being modeled. The plug-in wing panels for a plane this large are convenient to transport and the fuselage is easier to build without a deep cutout for a one piece wing. The aluminum and phenolic tubing is available in sets from Gator R/C Products. You do have to make a removable bottom section on the fuselage for access to the interior, but that's an easy task.

As mentioned earlier, fiberglass cowls and wheel pants are available from Fiberglass Specialties and the aluminum landing gear is a product of ACE R/C. Other cowls and landing gears could be utilized. Get the plans from FLYING MODELS, have the foam cores cut by someone in your club or a commercial supplier, and there's not too much more work to build up this design.

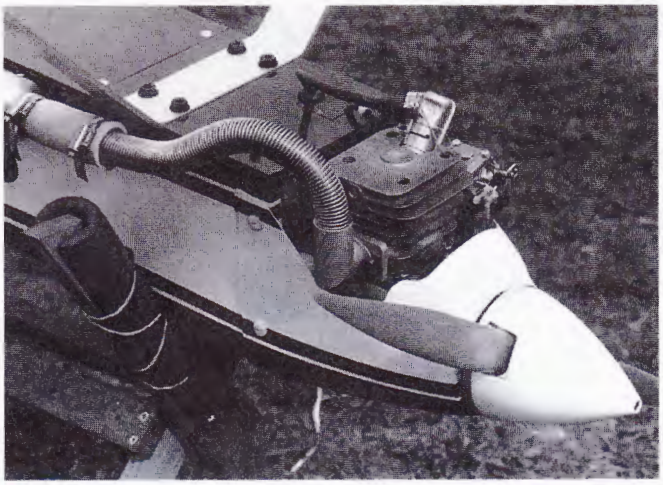
With this basic construction, you might just cut out the parts and begin building in your usual manner. I'll go over the procedure and techniques that I use. Starting with the fuselage, select firm to hard balsa for the two sides, edge gluing and splicing as needed to get the size required. Glue the 1/16-inch plywood doublers, 1/4-inch plywood landing gear block doublers, stab saddle doublers, and balsa lower edge strips to the two fuselage sides. I like a 3/8-inch plywood firewall for the large engines, and usually laminate a piece of 1/8-inch and a piece of 1/4-inch plywood together.

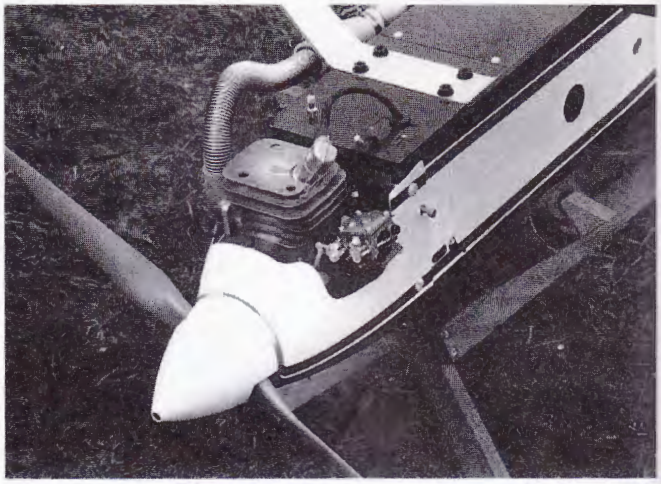
With one fuselage side flat on the workbench, add the firewall and the next three bulkheads to that side, installing them perpendicular to the side. Glue the second fuselage side to these bulkheads; the sides are parallel from the firewall to the wing trailing edge position. Add triangle stock and heavy fiberglass cloth behind the firewall to reinforce its joint with the sides. I also put several small screws into the firewall through the fuselage sides for extra reinforcement.

Pull the tail end together, installing the rear bulkheads. As this is done, be sure the fuselage sides taper in a straight line to the rear so the straight-cut foam top block will fit correctly. I trial-fit the foam rear top block as I install the rear bulkheads so I can trim or move those bulkheads if needed for the foam core to fit.

**With Dave holding onto it,** you can easily see the relative size of this great looking bird. It has a wingspan of 92 inches, and a very generous 1540 square inches of wing area. Build it light, and it will perform well.

# Fancy Cut ... Plus!





**Here's a close-up of the Sachs 4.2** in the nose of the *Fancy Cut Plus* **(above left)**. It's neat and clean, and, above all, simple. Note the thin prop tips. Use extreme caution when starting and setting the mixture! The other side of the fuselage reveals the carburetor **(above right)**. Note the landing gear mount.

Before sheeting the foam fuselage top blocks, check to see that when sheeted they will line up flush with the lower fuselage assembly; the foam can be sanded if necessary for proper alignment. Sheet the foam blocks; I recommend Dave Brown's Southern Sorghum contact cement. Other adhesives would be thinly spread epoxy or any other contact cement you prefer.

Before gluing the fuselage top blocks in place, I fit the 1½-inch I.D. phenolic tube through the fuselage sides to accept the aluminum spar, but don't glue it in. When the wing panels are later fitted to the fuselage, the tube can be glued in place after checking to be sure everything lines up correctly. A slot must be cut through the rear of the top fuselage block for the vertical fin installation; do this before gluing the block in place. Add the plywood landing gear mount to the fuselage. I wait until the engine is mounted to the firewall, then add the plywood forward bottom piece to the fuselage. Before sheeting the fuselage bottom, cut holes in the rear bulkheads and fit the elevator and rudder pushrods.

Before sheeting the foam wing cores, decide if you want to carve shaped wing tips from balsa blocks, leave the tips squared off, or cut the cores off at an angle. I cut the core tips at an angle with a hot wire and a plywood jig. Doing the tips like this is easy and saves the weight of wing tip blocks plus the work of carving tip blocks to shape.

Further work is necessary on the cores before sheeting. A ⅛-inch plywood rib is fitted to the root of the core, and the core is then cut 12 inches out from the root for the installation of a second ⅛-inch plywood rib. Before gluing the plywood ribs to the foam, sand them, if necessary, to get a good fit flush with the core. Also sand the root end


**Two-piece plug-in wings** make the *Fancy Cut Plus* very easy to transport and maintain. The pieces are easier to finish this way, too!

of the foam core so it will fit flush to the fuselage side with the top wing surface at a right angle to the fuselage; this isn't critical as it can be shimmed with balsa and sanded to fit later. Be sure the second plywood rib is in place correctly; the hole in it for the spar tube establishes the dihedral. We want the aluminum spar to be parallel to the top wing surface, making it flat. All the dihedral angle is in the bottom surface of the wing. Mark the top of the plywood rib so it is installed toward the upper wing surface.

The foam can be removed for the spar's tube by first using a heated metal rod to put a hole through the core and then inserting the cutting wire, hooking it up to its bow, and cutting the hole with the plywood ribs as the templates. It could also be done by using a large, round file. The spar tube is epoxied into the foam core, through the plywood ribs.

Another hole is needed through the foam core from the root to the location of the aileron servo. I heat the end of a metal rod with a torch, and push the hot end through the foam, melting a hole for the aileron servo cable. A ⅜-inch dowel locating pin is glued into the wing panel, through the root plywood rib and a short plywood rib further out in the core.

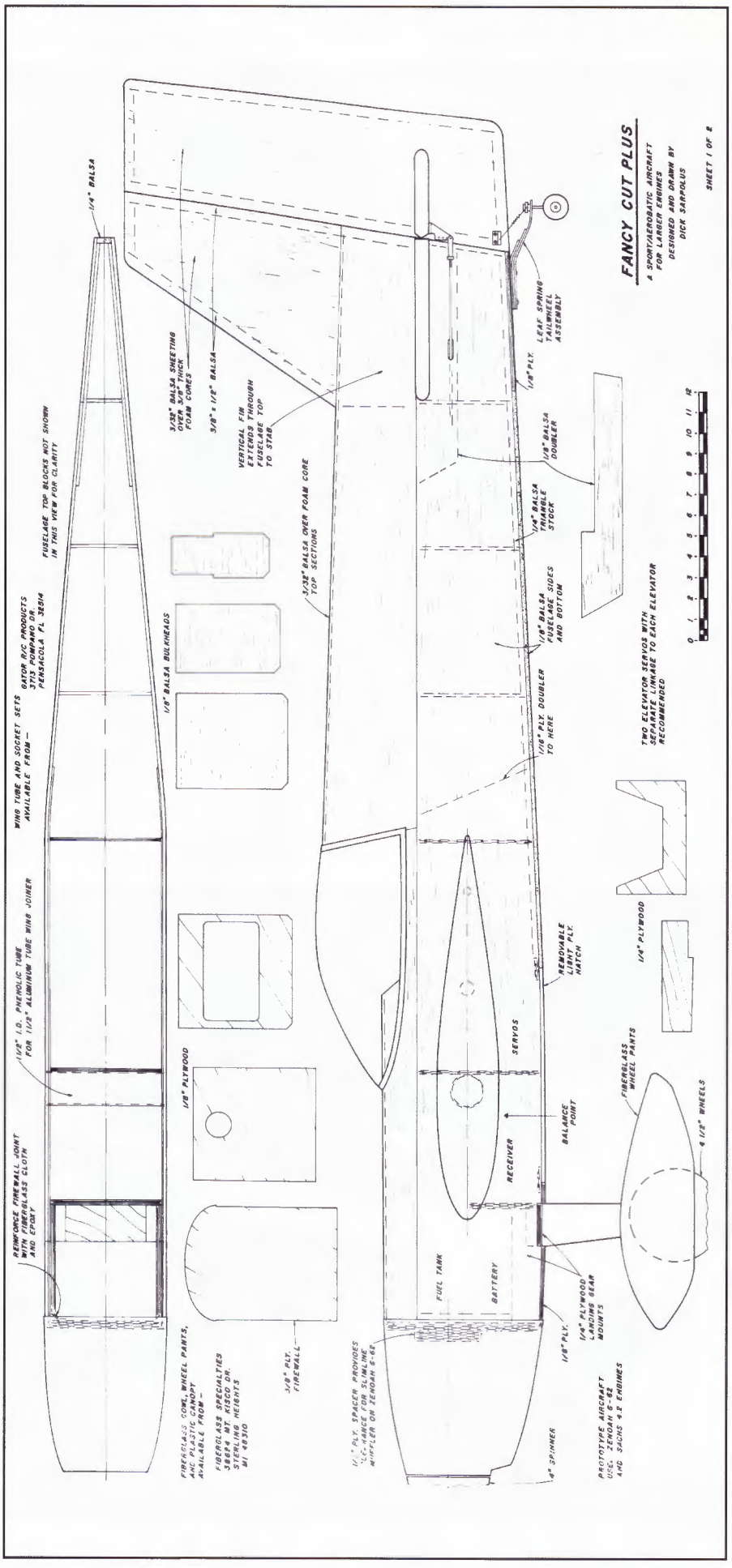
The cores are sheeted with 3/32-inch medium weight balsa, edge glued as necessary for the needed width. Edge glue the sheeting by taping the joints together with masking tape to make up the size needed, then flip the wood over, open the taped joints over the edge of the work bench, and apply the glue to the edges of the wood. With the sheeting flat on the bench, scrape the excess glue off the joint with a putty knife and weight the wood down until the glue dries. Peel off the masking tape, and use the taped side as the outer surface of the sheeting. I sand the inside surface of the sheeting with rougher paper to speed up the work, and use finer sandpaper to finish off the outer surface.

The toughest part of edge gluing the sheeting is getting a tight fit between the individual sheets; most cut balsa doesn't have good straight edges. I used to use a long sanding straightedge made from a piece of aluminum right angle stock. Now I use the Balsa Edge Sander made by Precision Model Products, a great item for the shop. I use the aliphatic resin type glues for this work, finding them easier to sand for a smooth joint.

With the core sheeted top and bottom, trim off the leading edge and block sand it square. Add an oversized leading edge strip, and plane and sand it to shape. Cut and sand the sheeting to match the trimmed tip angle, and add the sheeting there.

The ailerons are cut from the sheeted wing, trimmed down to allow for the balsa edging which is glued in place, and sanded to shape. Hinge the ailerons along the center line, using large, sturdy, freely moving hinges, whatever type you prefer. Recesses are cut into the lower wing surface for the aileron servo mounting; epoxy plywood mounting pieces in position to suit your servos, having them protrude from the wing surface just enough to hook up the aileron pushrods.

For extra reinforcement, I suggest fiberglass cloth and epoxy be applied around the inboard ends of the wing panels, extending

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# Fancy Cut ... Plus!

**The Davis muffler** and the APC prop combine to keep this big bird extremely quiet and neighbor friendly! This photo also shows to good effect the very robust aluminum gear. Wheelpants would help dress it up.

about 10 inches out from the wing panel roots.

With the phenolic tube section in the fuselage but not yet glued in, slide the aluminum tube spar in place and add both wing panels. Check to see that the dihedral angle is the same on both sides; the top surface of the wings are straight, all dihedral is in the bottom surface. Also check to see that the wing panels fit closely to the fuselage on both sides.

To get a good fit, you might want to add a layer of balsa to the wing root surface and sand that; it's easier than trying to sand the plywood root rib. Elongate or shim the holes in the fuselage sides if required. With the wing panels lined up properly, leave everything in place and epoxy the phenolic tube into the fuselage, working through the open fuselage bottom area. Be sure both wing panels are at the same zero angle of incidence; the panels are lined up by the ⅜-inch dowel stub in the wing roots protruding into their mating fuselage holes. Move and/or shim those holes to align the wing panels.

To retain the wing panels on the spar, use a hardwood block glued into the wing, flush with the wing surface, and drill and tap the hardwood for a 10–32 steel retaining bolt. The bolt will extend down into the aluminum tube spar. Do one wing first, and with the bolt in place, drill the other wing panel. For easy alignment, I leave the tube spar in place in one wing panel when the plane is disassembled. The access hatch on the bottom of the fuselage can be removed for the aileron cable hookup when the wing panels are mounted.

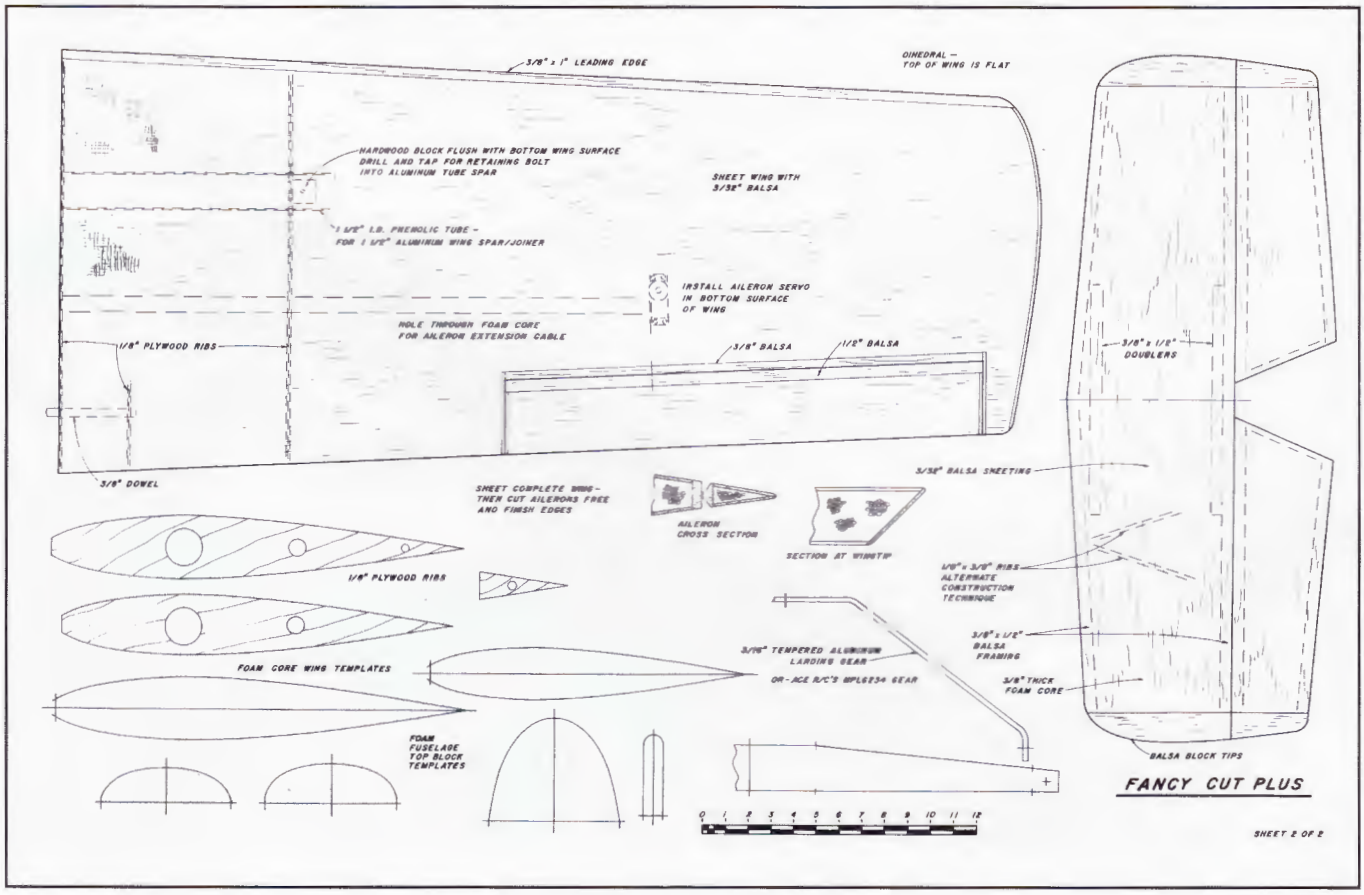
The tail surfaces are built flat on a work bench surface. The ⅜-inch thick hot-wire cut foam sheets are cut to shape, with ⅜- by ½-inch balsa edging added, then sheeted with 3/32-inch balsa as was done with the wing cores. Tip blocks are added, and all edges shaped. With the wing mounted on the fuselage, I add the horizontal stab, aligning it with the wing. The vertical fin is added, aligned perpendicular to the stab. A plywood section on the bottom rear of the fuselage is used to mount a leaf spring tail wheel assembly.

Whatever type of hinges you use—either the various molded nylon flat hinges or the hinge point style—cut the slots or drill the holes into the surfaces and notch the control surfaces as appropriate to permit a close fit of the surfaces for a small hinge line gap, still allowing proper movement. I use ¼-inch plywood for control horn mounts, recessing and epoxying the plywood into the tail surfaces. The horns are mounted with self tapping screws.

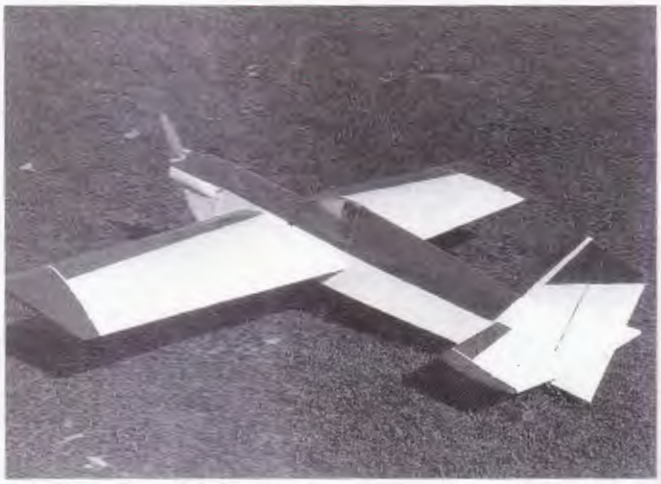
I use ¼-inch plywood for the servo mounts in the fuselage, and recommend only the larger 4–40 threaded rods and clevises for

**Large planes require** more robust control linkages and servos. Don't skimp at this point, or the results could be a very large hole in the old flying field...or worse

**Dave Hollander (L) and Lou McGuire** show off their respective *Fancy Cut Plus* models. Lou's featured a Zenoah G-62 for power.



# Fancy Cut ... Plus!



**Here are two more views** of Lou McGuire's *Fancy Cut Plus* **(above left and right).** Lou glassed and painted the surface of the model. He prefers wooden Zinger props, and a more Sukohi-like landing gear arrangement. This is a model that you can customize to suit yourself. Just don't change the aerodynamics.

all linkages. Fiberglass tube pushrods are used for the elevator linkages. Using separate servos for each elevator, each with its own pushrod, allows the pushrods to be perfectly straight from the servo arm to the control horn. Since the pushrods cross over within the fuselage, one of the elevator servos is mounted slightly higher than the other to keep the two pushrods from rubbing together. The tail wheel steering is tied to the rudder with small springs; the actual linkage from the servo to the rudder can be done with a pushrod or a twin cable pull-pull setup if you prefer.

A long Y-harness is needed for the two aileron servos mounted in the wing panels. A 1200 mAh battery pack is used, wrapped in foam rubber and positioned beneath the fuel tank. If necessary, for proper balance, the battery pack can be relocated, even behind the wing if needed.

The exact engine mounting must be done to suit the engine used. The Zenoah G-62 needed a ½-inch thick plywood spacer behind its mount to provide clearance for a Slimline muffler. The Sachs 4.2 was mounted with a plywood spacer block, and an exhaust tube connected the engine to a remotely mounted very quiet muffler arrangement by Davis Model Products. Quite a bit of the fiberglass cowl was trimmed away for the Sachs' carburetor and exhaust connector. The cowl used on the G-62 powered plane was a TR-260 type, and with its wider shape, more of the engine was enclosed.

Either cowl will probably be long enough to overlap the fuselage, and can be held in place with four nylon bolts; drill and tap the fuselage sides for the cowl mounting bolts. If the cowl must be butted to the front end of the fuselage, hardwood blocks are glued to the firewall for the cowl mounting bolts. The plywood landing gear block is drilled and tapped for the nylon bolts which hold the gear in place. I like to mount the ignition switch on the front of the firewall, and cut a slot in the cowl for the switch handle. A 4-inch spinner is required. The fiberglass wheel pants are mounted to the axles on the aluminum landing gear with brackets by B&B Specialties or Sig.

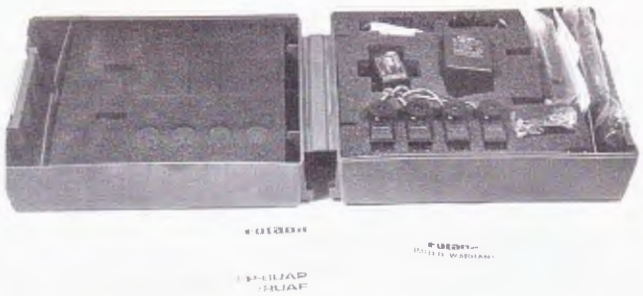
For the covering and trimming, you'll probably use one of the iron-on plastic films. They're easier and faster than painting, and save a lot of weight. If you prefer a glassed airplane with paint, go for it. One of the two prototype aircraft was painted and although heavier, it flies just fine.

We didn't expect any excitement when test flying the first *Fancy Cut Plus*, and we had no trouble at all. I did want to be sure the plug-in wing mounting system was secure, and did plenty of snap rolls, right, left, inverted, spins and full throttle flight and the wings stayed right where they belonged. This thing is large, but the two-piece wing does make it easier to transport.

If you're thinking of a larger aircraft to use that larger engine, for some sport and aerobatic flying fun, consider the *Fancy Cut Plus*.


**Giant Sport flying** is becoming one of the most popular pastimes in the hobby. Planes like the *Fancy Cut Plus* are perhaps the reason why. Try one and find ou


PHOTOGRAPHY: BOB ABERLE



**This is the way the new Futaba** System Eight Model 8UAF R/C system is shipped **(above left)**. The transmitter, at left, is in a foam block, while the airborne components are inside a small molded plastic carrying case. Once the components are removed, it can be used as a transmitter case **(above right).**

## An *FM* Product Review:

## Futaba Corporation's

# System Eight Model 8UAF R/C System

**By Bob Aberle**

Impressive in capability and performance, this computer radio is aimed squarely at the experienced flyer.

Let me give you a brief "heads-up" on this new Futaba System Eight. After several days of operating this particular system, I found it both impressive in capability and performance. It did take me some time to get comfortable with the new programming techniques, mainly because there are so many control options offered. So initially some patience is required. This was true for me, even though I have actively used a Futaba Super Seven system for the past five years.

The biggest problem I had in preparing this product review is reporting on the various system and component variations that are being offered. If I failed in that regard I can only suggest that you request a Futaba catalog or detailed brochure of this system. You might also want to speak with the technical or marketing people at Futaba for other detailed information.

### About the system

The Futaba System Eight employs a new operating system. If you are currently using a Futaba computer type transmitter, you will have to learn some new techniques to operate the System Eight. The system itself is claimed to have evolved from their popular top-of-the-line 9Z series. A single new transmitter is capable of broadcasting signals on both PCM 1024 and the more common FM (or FM/PPM as it is called with the regular Futaba designation). The internal microcomputer chip is completely programmed to allow you to fly fixed wing aircraft (ACRO) helicopters and sailplanes (pure and electrics).

You will notice in their catalog that four basic system model numbers are offered. The difference in each of these systems is strictly with the airborne components, namely a PCM or FM receiver, the types and quantities of servos and the capacity of the airborne battery packs. It is this choice you must make at the time of purchase. But be advised that the same transmitter is used throughout.

One thing I liked in particular was Futaba's choice of their micro, dual conversion, eight-channel receiver model R-148 receiver for all four systems. In some cases this will be the R-148DP (for the PCM 1024) or the R-148DF (for regular FM) This little gem of a receiver weighs just 1.1 ounces, yet has full eight-channel capability. The lightweight and small physical size make it a perfect choice for the helicopter and sailplane enthusiasts. Futaba has also been thoughtful to provide these receivers on the six-meter amateur radio service channels, as well as the regular 50 channels on 72 MHz. I mention this fact because one major R/C supplier has never offered their micro receiver on six meters.

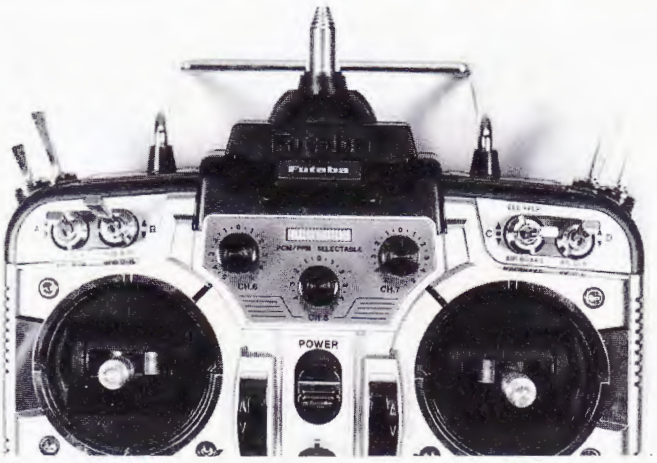
Another thing to point out is the fact that the new System Eight is capable of operating all previously offered Futaba 1024 (on PCM) or any regular FM Futaba receiver. With the expanded memory available, you could easily operate your entire "fleet" of Futaba equipment from this one new transmitter. Think of it; only one transmitter to ever take to the flying field.

In line with that comment let me mention that the basic System Eight transmitter has eight model memory positions for storing aircraft control data. Each of these memory positions can be identified by a name or number (that you select). But there is yet another feature. You can purchase as an optional accessory an expandable memory disc, known as the CAMPAC, which provides eight additional memory positions, for a total of sixteen. You can use this same CAMPAC disc to transfer stored control data to another Futaba T8UA transmitter. The CAMPAC does not require any separate power source and can store data indefinitely.

You may be surprised also to see a new type of all-electronic (digital) trim control on the Futaba System Eight. The time-honored mechanical levers, with clicking detents, are gone. In their place are four pairs of microswitches. These new switches are physically located in the traditional places at the sides of the control stick assemblies. But instead of moving levers up or down, right or left, you now just push on one side of a switch or the other. Each time you do you will hear a confirmation "beep" and at the same time you will note some control surface movement.

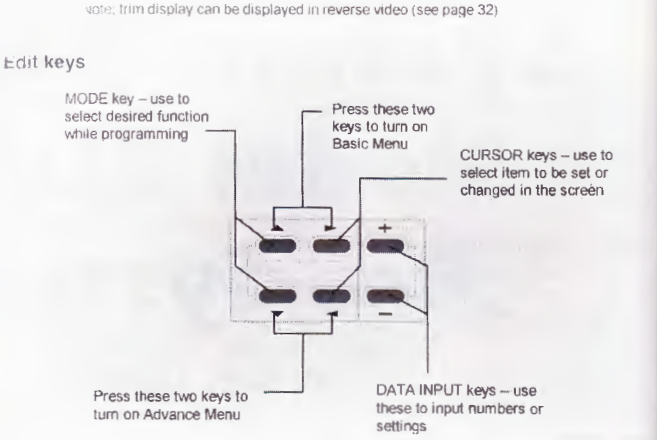
On one existing R/C system, employing this kind of new trim, it is impossible to determine a reference point for the position of your control surfaces. In other words, you can't look at the position of the trim lever to

# Futaba System Eight 8UAF R/C System





**The switches and control pots** on the front panel of the 8UAF transmitter are neatly grouped and easily identified **(above left)**. The transmitter is capable of operating both PCM 1024 as well as FM/PPM receivers. Removing the dust cover exposes a slot where you insert the new CAMPAC expanded memory disc **(above right)**. This shot of the lower portion of the transmitter shows the LCD screen, and the controls for data storage in the computer **(below left)**. This is a typical graphic in the instruction manual **(below right)**. It gives a basic explanation of the six edit keys that operate the computer system.


determine where the control surface is actually at. What Futaba has done to alleviate this concern is to place a graphic display of each trim position on the LCD screen. Each trim function is represented by a small bar graph. As you beep in trim, the control surface will move and in unison, so will the bar graph. If you select full up elevator trim, the indicator will be at the top of the elevator bar.

Yes, you still must take your eyes momentarily off the model to read the bar graph. You won't any longer be able to do this strictly by feel (of the trim lever position). But the benefits of this kind of electronic (digital) trim is precision as well as the ease with which you can save trim locations for each model. When you have up to sixteen memory position capability, this new type of trim feature is important.

## Our 8UAF review system

When I first opened the Futaba shipping carton I was greeted with a surprise. Instead of one big chunk of foam I found half of the box to be foam and the other half a neat molded plastic case with a handle. Right away I thought to myself, what a great idea to supply a carrying case for the transmitter. The foam block contains the transmitter, while the carrying case holds all of the airborne components. Once these components are removed and installed in the aircraft, you end up with a permanent transport/storage case for your transmitter.

My 8UAF system included the T8UA transmitter, R-148DF dual conversion micro FM eight-channel receiver, four of the standard Futaba S-148 servos, a four-cell 500 mAh receiver Ni-Cd battery pack, dual output battery charger, aileron extension cable, switch harness, neck strap, frequency flag set, servo trays (two types), extra servo output arms and mounting hardware, and an excellent 86-page instruction manual. That manual, by the way, was prepared for Futaba by the noted flyer, competitor, and magazine columnist, Don Edberg.

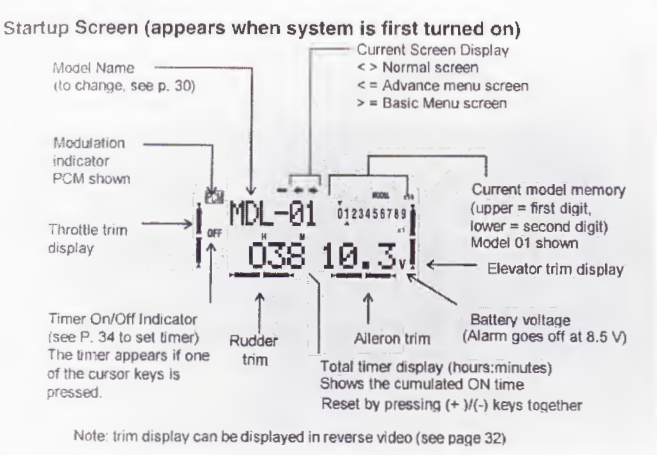
I said this once before in a recent radio system review; there just isn't enough space in a single article to cover every aspect of a super radio system. Things like detailed menu items can all be learned from informational brochures provided by the manufacturer. My intention here is to give you enough of an overview so that you can get to the next step in your final system selection process. There are competitive radio systems like this one out there in the hobby market place. It is worth your while to learn which has the best features to suit your particular flying needs.

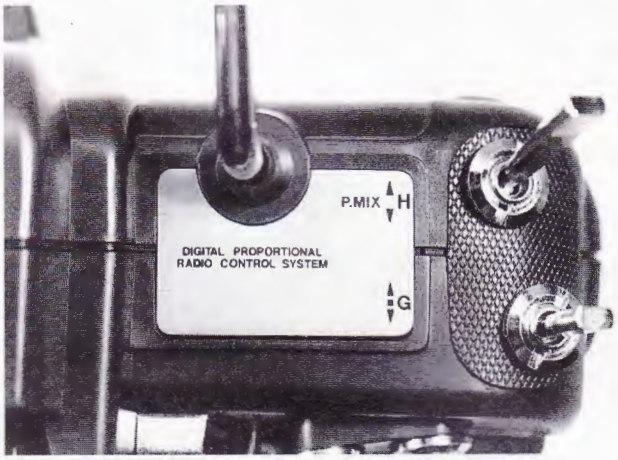
## About the transmitter

The Futaba T8UA transmitter is very comfortable to hold. At 33 ounces total weight it is comparatively light in weight. You probably can get away without the need for a neck strap or support tray. Control stick feel is smooth and precise. Both the stick length and spring return tension are adjustable in the usual manner. One of the things you will notice is that most of the control switches located around the transmitter case have both a functional name (in small print) as well as a letter (A, B, C, etc. identifier. This is done because of the multifunction use of the transmitter (e.g. can control, fixed wing, helicopters, and sailplanes). You can actually change many of these switch functions to suit your personal style of flying.

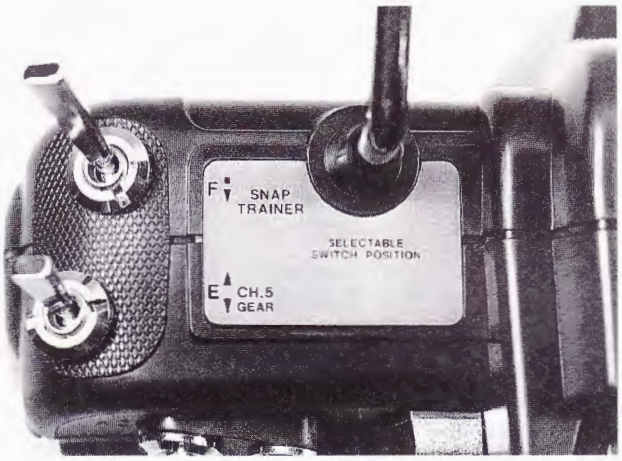
At the top, left corner, rear of the transmitter case is a long handle, momentary contact switch (spring return). This switch can be used for snap roll operation or for the trainer system (which requires the purchase of an optional cable). If you plan on using a trainer cable be advised that this new T8UA transmitter can be successfully connected to the following other Futaba transmitters: the Skysport, the Super Seven, or the 9Z.

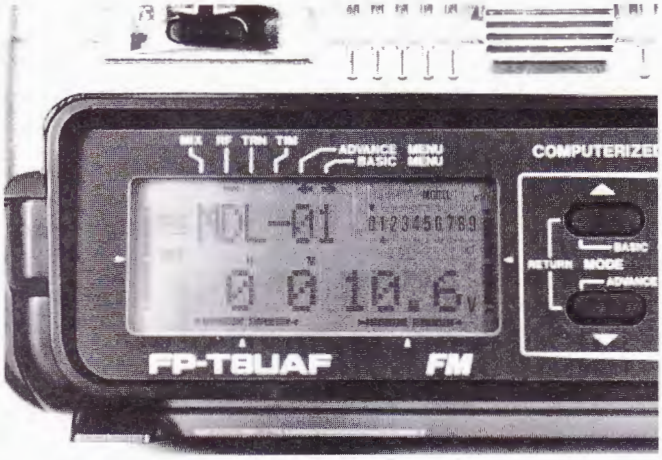
Just below the antenna mount, you will find a small slot with a dust cover containing the word, "Futaba". You must remove this cover to insert the CAMPAC memory storage disc or module. That disc slot is ba-




**This is an explanation** of the start up screen **(above left)**. It appears every time the transmitter power is turned on. Both of these switches on the top right corner of the transmitter have letter designations **(above right)**. One has a function call-out. Functions can be easily assigned to these switches. Again, the switches at the top left corner of the transmitter have both function and letter designations **(below left)**. This is helpful when your transmitter is capable of flying fixed wing models, helicopters, and sailplanes. This is the start up screen **(below right)**. The big 10.6 represents the transmitter battery voltage.




sically in the same position where one would expect to find a meter. Be advised, there is no meter. However, there is an RF indicator on the LCD screen, much the same as it is on their Super Seven system.

Several forms of alarm systems were thoughtfully built into this system for your convenience and safety. If the transmitter battery voltage goes below 8.5 volts a beep type alarm sounds continuously and the words LOW BATT appear on the LCD screen. The remaining alarms or warnings involve potential errors that might occur with the memory back-up, or the model select if your RF module is not in place or to alert you that some form of program mixing is currently active. You would best learn all of the details of these various alarms since their primary purpose is to warn you of potential problems.

At the rear of the transmitter is the removable RF module and the battery compartment. By removing a small plastic cover you can gain access to the eight-cell 500 mAh Ni-Cd battery pack. This pack has its own cable and connector and can be easily removed, for swapping or replacement, even at the flying field. At 250 mA total transmitter current drain, the maximum operating time you should expect from this capacity battery pack is under two hours. Keep in mind, it is a very simple job to swap battery packs at the flying field. So you might consider having a spare pack with you when you plan on doing a lot of flying. Before I forget, there is still no battery voltage at the charging jack, so you will have to access the battery directly for testing purposes.

I did not see a direct servo control cable function on this unit. Usually this type cable allows for the operation of the controls without the transmitter actually being on the air. The function is provided by a special cable connected between the transmitter and the aircraft.

Likewise there is no switch on the transmitter that allows you to operate the computer and display, for setting up controls, while the transmitter RF section remains off (not sending a signal that might shoot another modeler out of the sky).

## Computer operation

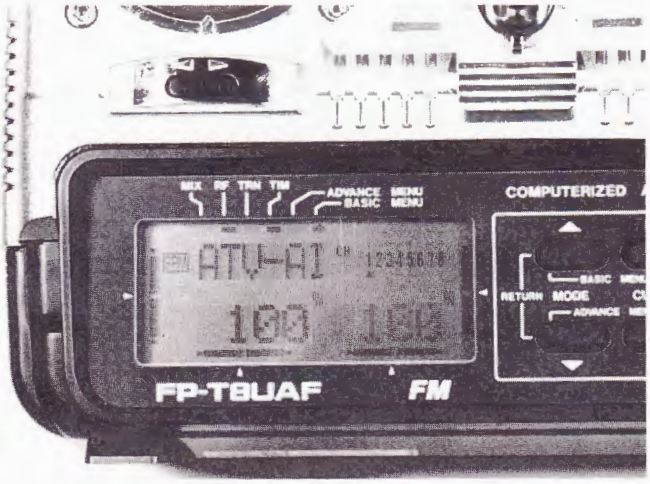
The main display screen is located at the lower left front of the transmitter. It measures 1 inch high × 2¼ inches wide. There is no cover over this screen, which is as it should be since you will have to refer to it quite often. Be smart and don't let this screen sit out in direct sunlight all day long. Liquid quartz displays don't take kindly to excess heat.

When the power is first turned on, a start up screen display will appear. This screen includes the four trim position bar graphs as previously discussed, model name (six alpha/numeric characters maximum) to identify each of the memory positions, an integrated timer that provides total transmitter "on" time (you reset this to zero after each battery charging or you could also program this function as a stop watch), model memory position number, type of modulation (PCM or FM), transmitter battery voltage, RF indicator (to confirm that you are on the air), an alert that tells you if any mixer programs have been turned on and the type of menu being displayed (basic or advanced). Admittedly, this is a lot of data to be displayed on a single, small screen. But it is arranged logically, with the more important data in bold print and the less important information in smaller size numerals.

To the right of the LCD screen are the controls that allow you to input control data into the computer and store it for future use. These controls involve a total of six push button switches. In some cases these switches must be pressed simultaneously to effect a command. The labeling of these switches, as you will see in the photos, does an excellent job of explaining the functions.

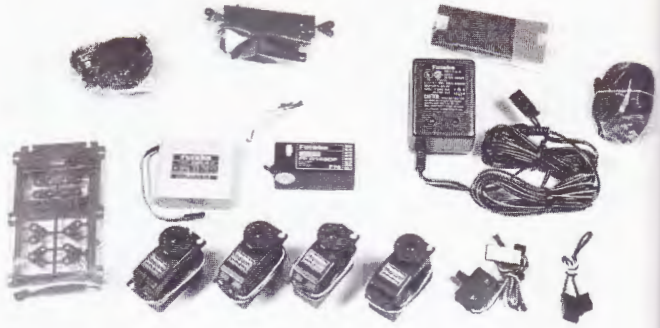
Pressing the two buttons or keys (as they are referred to in the manual) marked BASIC MENU, will call up the basic and most used portion of the computer menu system. The BASIC MENU actually applies to all three

# Futaba System Eight 8UAF R/C System





**Here's a portion** of the basic menu, specifically for the ATV or adjustable travel volume (end point adjustment) **(above left)**. The *AI* is for aileron, and the 100% indicates the nominal full throw control in each direction. The word *WARNIN* flashes on the screen as part of a built-in safety alert system **(above right)**. Here's the rear of the transmitter with the battery compartment cover removed **(below left).** The battery can be replaced easily since it has its own cable and connector. The RF module can also be seen just above the battery compartment. These are the airborne components as supplied **(below right)**.



flight control functions, aircraft (ACRO), helicopter and sailplane. Included in this menu are the basic control items like: ATV, dual rates, expo rates, servo reversing, model type, model selection, trim, and additional items totaling 24 in all.

There is one item I should mention, because it involves the use of the new digital type trim. Many modelers like to set their throttle control so that the bottom stick position brings the engine to almost a dead idle position, but will keep running. Then after landing and taxiing off the flying strip, they like to move the trim lever down to fully cut off the engine. With the new digital trim switch that would not be convenient.

Realizing that concern Futaba has introduced a "throttle cut" feature. You can set up a switch of your choice to close off the throttle barrel of the engine completely, thereby shutting it down. Throttle linkage adjustments to do this can be made electronically and stored in the computer.

Let's say I was in the BASIC MENU and wanted to make a control change for aileron dual rates. Press one of the MODE keys until *DIR* shows on the LCD screen. Next press either of the cursor keys until you get to *AI* (for aileron). Final step is to press the data input keys to shift the cut-back position when the aileron dual rate switch is thrown on the top, right front of the transmitter case. Be advised that the aileron can be set from 30% up to 140% of normal full travel (which is stated as 100%). Pressing the two return keys gets you back to the START UP screen. Your control inputs are automatically saved at that point.

The same techniques are employed when going into the ADVANCED MENU items. There is one advanced menu for regular fixed wing aircraft (ACRO) that includes such things as programmable mixing, flaperons, aileron differential, elevator flap mixing snap roll pre-sets. It should be noted that in the ACRO advanced menu items you might want to consider operating certain types of sailplanes, such as aerobatic or slope soaring types. This is especially true if you want the snap roll feature, since it is only available from the *ACRO* menu.

The SAILPLANE ADVANCED MENU is broken down into two main categories, one when using one or two aileron servos and a single flap servo (or two flaps servos connected to a "Y" harness to a single receiver port). The other portion of the menu is dedicated to the use of two separate flap servos that can work oppositely as ailerons (for butterfly or crow operation). The advanced sailplane menu items include such things as butterfly crow mixing, flap/aileron mixing aileron flap mixing, start launch pre-sets and speed pre-sets.

As in the case of the sailplane, the helicopter advanced menu has two types of categories classified as *HELISWH1* (where one servo operates the swash plate) and *HELISWH2* (two servos are mixed to operate the swash plate). I have to tell you for the life of me I couldn't understand this portion of the manual. The main reason for that is the fact that I am not, nor have I ever been, a model helicopter pilot. The advanced helicopter menu items, for those interested include, throttle curve (normal), pitch curve (normal), revolution mixing (normal), inverted settings and throttle cut function. The choices of special helicopter control functions appears extensive to say the least.

## Airborne components

I've already mentioned that little gem of a receiver, namely the Futaba R-148DF or DF. Airborne weight of this receiver, four S-14 servos, switch harness and a 500 mAh battery pack was only 10.5 ounces. The use of the new Futaba micro servos (that replace the popular S-133) would further reduce the weight and volume, making them perfect for

sailplane and electric power applications.

The optional S3001 servo is much the same as the S-148 model, except that it has a ball bearing supported output shaft. It has essentially the same weight, size, output and transit time of the S-148. I was also given two new Futaba servos to look at for this review, although I believe these would be for extra purchases. The first is their FP-S9001 which is a coreless motor, ball bearing, standard servo. It measures 1.59 × 0.78 × 1.42 inches and weighs 1.70 ounces. Output is claimed to be 54 ounce-inches and the transit time, 0.22 seconds for 60-degree rotation. The other new servo is their model FP-3003 which is classified as a "lightweight standard". It measures 1.59 × 0.78 × 1.42 inches and weighs 1.31 ounces. Output claim is 44.4 ounces-inches with a transit time of 0.23 seconds for 60-degree rotation.

I certainly recommend that you get a catalog which contains the details of the new System Eight radio. The address is: Futaba Corporation of America, 4 Studebaker, Irvine, CA 92718. As I said at the beginning, there is a tremendous amount of control capability provided with this new Futaba 8UA system. It will take time and a little patience on your part to use most of the features. But once learned, this one transmitter could operate all of the Futaba airborne packs in your personal inventory. If you are lucky enough to get to one of the major hobby trade shows this coming season, visit the Futaba booth, get your hands on this System Eight transmitter and try it.


**This little gem**, as Bob calls it, is the Futaba R-148DF micro dual conversion 8-channel receiver. This receiver is supplied with all of the System Eight variant models. Bob thinks that's a wonderful idea!



**All of the airborne components** weighed a total of only 10.5 ounces **(above left)**. The servos are the standard Futaba S-148 models. Weighing in at 1.1 ounce, the Futaba R-148DF receiver is very compact **(above right).** A natural for electric and sailplane designs with slim fuselage cross sections.

**An *FM* Product Review:**

# Ace R/C's Cloud Dancer

**By Don Abramson**

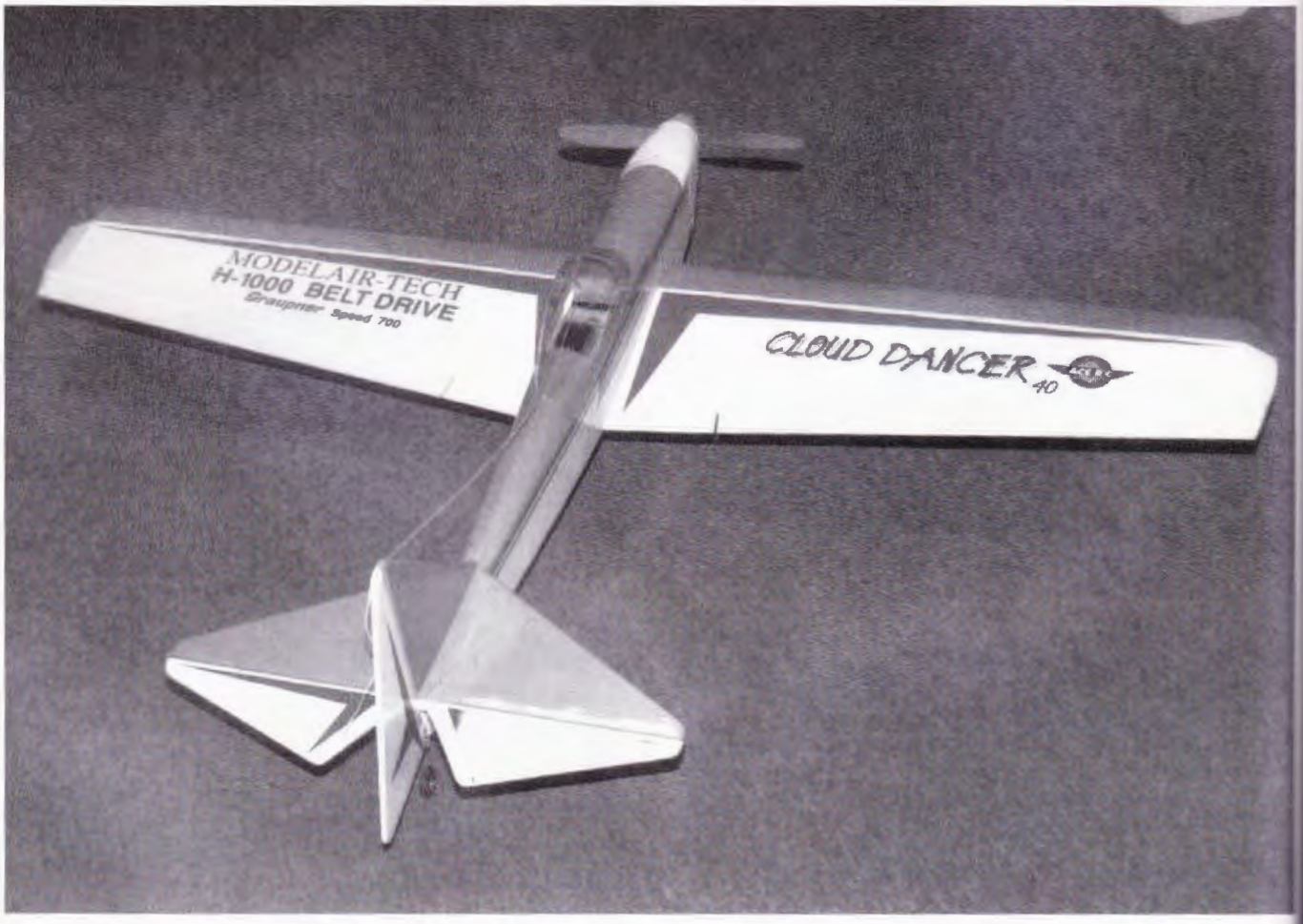
Tapping the design talent of Fred Reese, this company offers a kit of a lightly constructed .40 size sportster. The author modified the kit for the ModelAir-Tech H-1000 belt drive.

By now most of you must have seen the advertisements for the new Fred Reese design being kitted by ACE R/C Inc. (116 W. 19th Street, Higginsville, MO 64037-0472) called the *Cloud Dancer 40*. It is a low wing sport/pattern tail dragger intended for .40 glow engine power. The wing span is 60 inches, with an area of 625 square inches and an overall length of 46¾ inches. ACE recommends .40 to .46 two-cycle glow engine power or .40 to .53 four-stroke engines. Weight is stated at 4 pounds total which works out to a wing loading of approximately 15 ounces/square foot (quite light!).

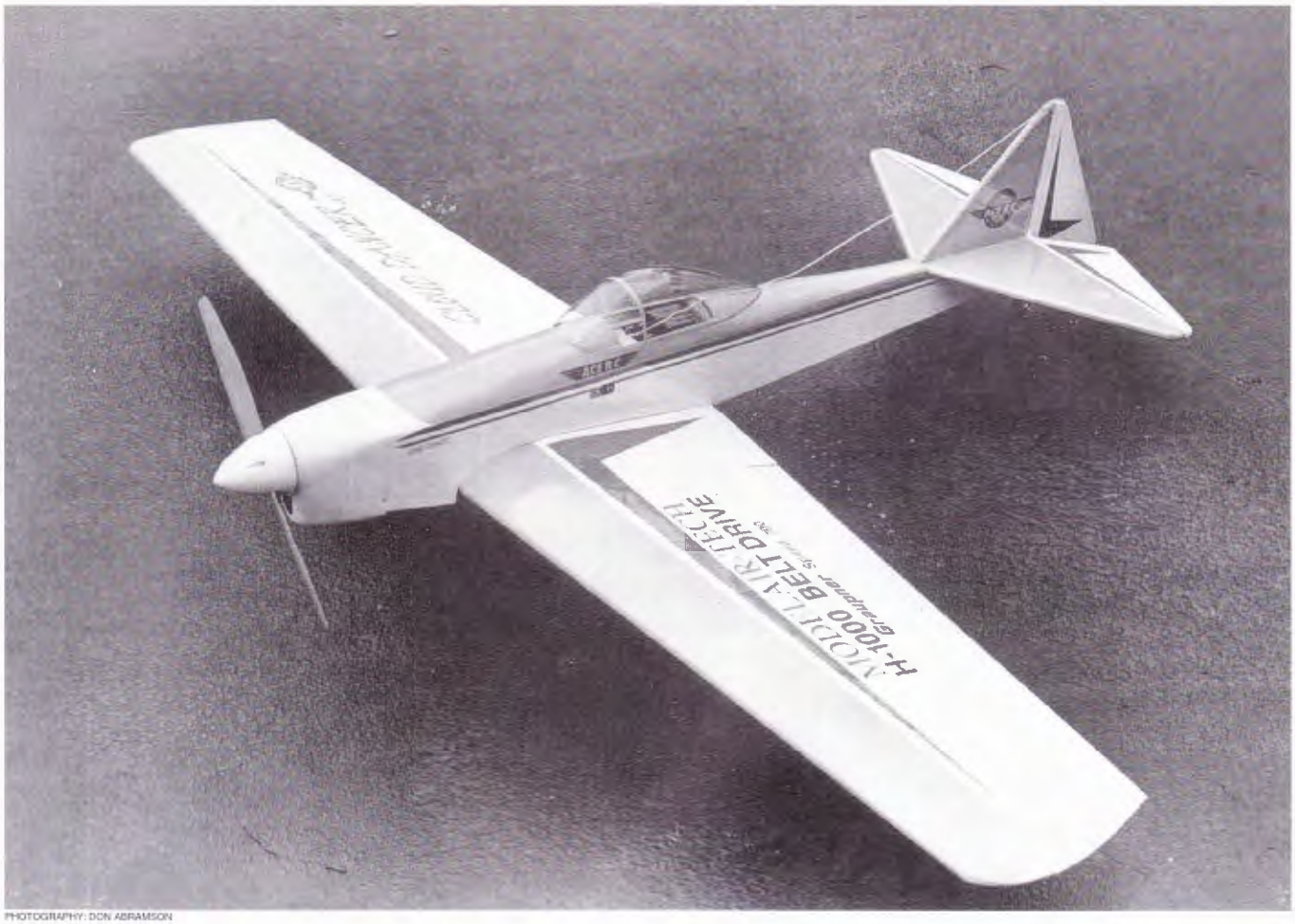
The easy thing for me to do would have been to build the *Cloud Dancer* kit and install one of the many .40 size glow engines in my personal collection. But as it happens, my two close flying friends and fellow club members, Bob Aberle and Tom Hunt, have been encouraging me to try my hand at an electric powered sport pattern type model. Tom has been preparing electric conversion overlay plans for many of the popular glow engine kit designs now on the market. He has over a half dozen of these plans prepared already and offers them free, as a promotional item, when purchasing one of his popular Modelair-Tech (PO Box 12038, Hauppauge, NY 11788-0818; phone 516-979-1475) belt reduction drive units. Being eager to both build the *Cloud Dancer* and to try my hand at a high performance electric powered model, you can guess the rest.

## About the kit

Let me start first with the plans and building instructions. I have been a fan of




**The *Cloud Dancer* has** generous amounts of wing and tail area for outstanding aerobatic performance. The custom decals were provided by AMP Graphics, Inc.



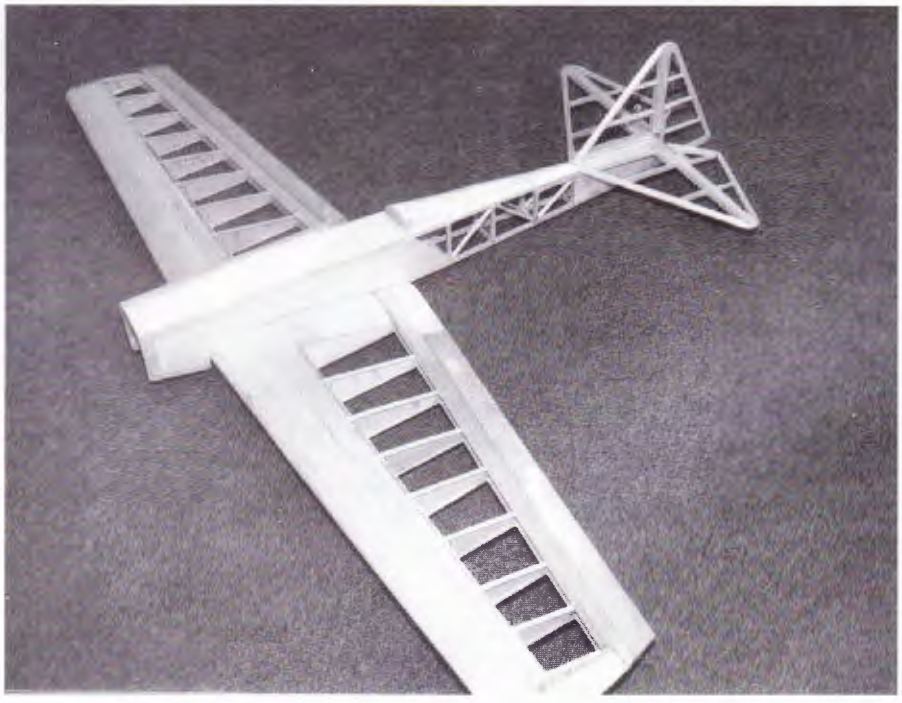
PHOTOGRAPHY: DON ABRAMSON

**Featuring a 60-inch wingspan**, this is not a small bird. It has graceful, almost classic lines and proportions. This one is converted to electric power!

Fred Reese for years. His sport, scale, and pylon racing designs have been widely published in the model press. Like this *Cloud Dancer*, many of these same designs have been kitted. Fred's plans are excellent in every respect. They are clear, easy to follow, and include every conceivable detail. Along with that, ACE R/C includes a separate 12-page assembly manual. That manual is literally loaded with sequential photos and descriptions of the entire building process. On the back cover there is even a "Diecut Parts I.D. Sheet" to help you identify all the various parts. I found the die-cutting to be of good quality. Included with the kit is a molded clear plastic canopy, tail wheel bracket, clevises, and pushrod material.

The only critical comment I might make about this entire kit is the balsa wood selection, and probably not for the reason you might think. Most of the balsa in my kit was of the hard and, therefore, heavier type stock. I certainly ended up with a strong plane when finished, but quite honestly I didn't have a chance of hitting the target weight of 4 pounds even. If I had built a .40 glow version, I would guess that it would have come out close to 4¾ or 5 pounds. At 5 pounds the wing loading still is only 18 ounces/square foot, which is certainly a respectable figure.

Knowing that I was going to have the extra weight of the power system batteries, my instinct said that I should look for ways to reduce weight in the model structure. Well, my instinct may have felt that way, but I chose not to modify a single part. I did not resort to lightening holes, nor did I substitute any lighter weight balsa wood. My final flying weight of 6 pounds, 14 ounces (110 ounces) is probably as heavy as anyone might build this *Cloud Dancer*. But the real bottom line is that it flew just great at that weight, using clean and quiet (had to say that, Bob!) electric power.



**Sound engineering** produces the outstanding kits. This framework shot shows attention by the designers to lightweight structure and also ruggedness where needed. Note the open bay fuse and built-up surfaces.

# ACE R/C's Cloud Dancer

### Covering

Just to keep the building time to a minimum I resorted to regular Top Flite Super MonoKote in a basic blue and white color scheme. The spinner was a DuBro 2½-inch diameter (white). Dave Brown 2½-inch diameter lite wheels were used originally in conjunction with the decorative wheel pants. When the pants were removed for practical reasons later on, I went to 3-inch diameter wheels. The canopy, by the way, was simply held in place with strips of trim MonoKote.

As a point of information most of the decals seen in the photographs were supplied by fellow SEFLI club member, Clyde Geist who operates a business known as AMP Graphics Inc. (42A Nancy St., West Babylon, NY 11704; phone 516-253-2702). Clyde can custom design some of the most attractive decals you could ever find. They are all computer generated on modern equipment.

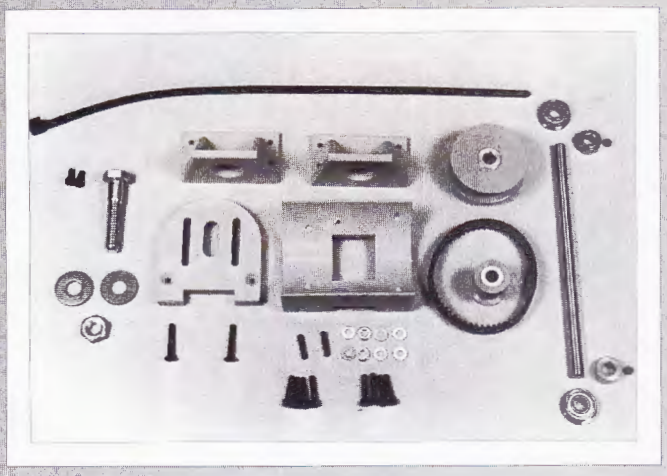
### Radio equipment

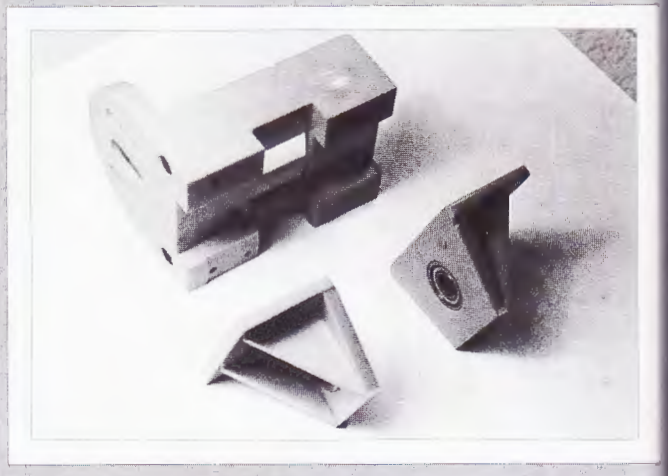
Again to prove a point for the "non-believers" I chose to use a full-size radio system. In other words I used a full-size receiver, three full-size servos (the speed controller takes the place of the fourth servo) and a 270 mAh four-cell Ni-Cd receiver battery pack. The system used was an inexpensive Airtronics Vanguard radio, with absolutely no frills. I did this to prove to myself that micro size/expensive servos were not needed. Nor was it necessary to go to a 110 mAh receiver battery with the prospects of frequent field recharging.

### Performance

Tom Hunt generally suggests that you set your combination of motor, reduction drive, prop and number of battery cells such that the total motor current is in the order of 25 amps. I was able to hit that figure right on the head, as confirmed by using the popular Astro Flight Digital Amp/Voltmeter. If you are into electrics at all, do yourself a favor and get one of these meters. Don't guess! Using 1500 mAh capacity batteries, a flight time of 4 minutes can be expected if you run the motor at full power the entire time. With normal speed reductions for certain maneuvers, that time would more realistically be 5 to 5½ minutes. For very little weight increase you could also try the new SR 1800 MAX cells which would give you a full power flight time of 5 minutes or something in

## Quiet Dancer ... a closer look at the Modelair-Tech belt drive





**Here's a complete kit of parts** for the Modelair-Tech H-1000 reduction drive unit **(above left)**. Assembly time is less than 30 minutes. The system includes clear and accurate instructions. These are the H-1000 belt drive molded parts just prior to final assembly **(above right).** Note sealed bearing shaft supports.

With the help of the overlay plans provided by Modelair-Tech, the entire electric system installation in the *Cloud Dancer* was a snap. Using the Modelair-Tech H-1000 belt drive enabled me to select a surprisingly inexpensive (like $28.00) plain bearing Graupner Speed 700 (9.6 volt) motor. You will notice in the photos that the H-1000 belt drive is supplied in kit form. There aren't that many parts, the assembly instructions are excellent and the entire job takes little more than 30 minutes.

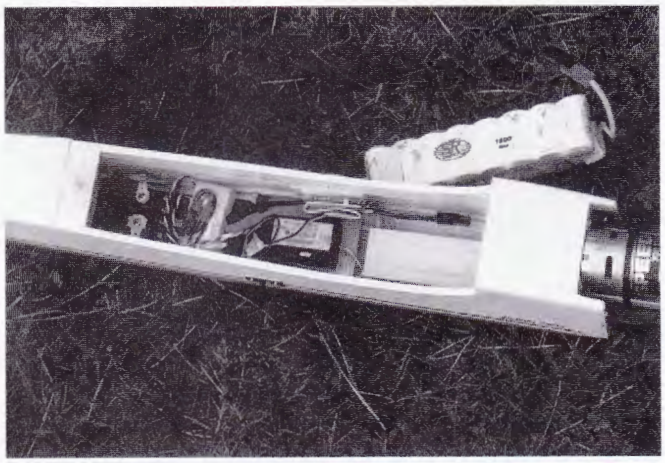
Tom Hunt (of MA-T) did his usual "consulting" job after hearing my requirements. As a result the 3.6/1 reduction ratio was chosen for this motor, along with a Top Flite 13–8 prop operating on 16 of the SR 1500 mAh MAX cells (actually two stacks of eight cells each connected in series). The final item was a Astro Flight Model 210 digital speed controller which can handle 2 to 18 cells at up to 45 amps. This controller plugs directly into the throttle port on your R/C receiver.

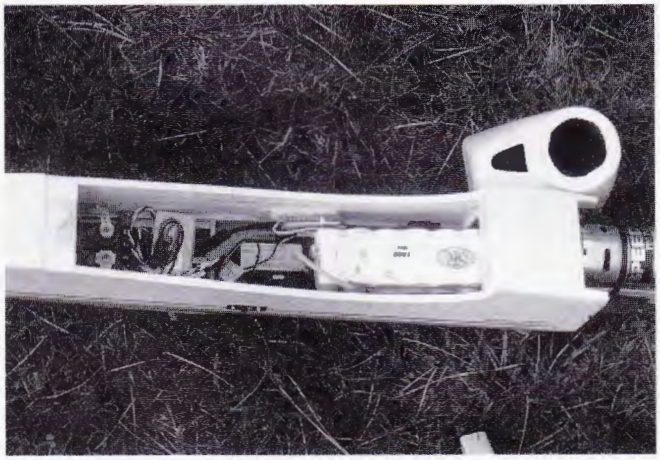
Mounting the H-1000 belt drive and Speed 700 motor was again easy, thanks to the overlay plans. A pair of Goldberg Universal Motor Mounts were used. Just drill through the sides of these mounts, and using sheet metal screws, attach the mounts to the sides of the belt drive. Next you bolt the Goldberg mount (with the belt drive and motor attached) to the regular *Cloud Dancer* plywood firewall, like you would any radial mounted engine. I think the accompanying photos show this very clearly. Because the electric motor/belt drive is slightly larger in physical size than a .40 glow engine, it was necessary to make up a new and slightly larger cowl. This vacu-formed cowl can be obtained from Modelair-Tech for a modest price. In this application it was painted white to blend in with the overall color scheme.

**With the help of a pair** of Carl Goldberg mounts, the H-1000 belt drive is easily radially mounted to the *Cloud Dancer's* firewall. A $28.00 Graupner Speed 700 motor with plain bearing is shown here.

The last thing to do is locate the 16 battery cells in such a way as to achieve the proper balance point as located on the plans. That's a nice feature of electric power. The mass of the battery pack makes it almost impossible to end up with a nose or tail-heavy model.

Many magazine reviewers tend to leave off a lot of the detailed information involving the kits they have built and that bothers me. So let me go over some of the reference weights of my *Cloud Dancer*. The all-up flying weight ended up at 110 ounces including the 16-cell, 1500 mAh battery pack. That works out to wing loading of roughly 25 ounces/square foot. The H-1000 belt drive weighs 6.0 ounces and the Speed 700 motor another 11.4 ounces. The speed controller is 1.4 ounces with connectors. Finally the particular 16-cell SR 1500 battery pack I employed weighed 31.0 ounces.





**A 16-cell SR Battery pack** fits nicely up against the back of the firewall **(above left)**. The speed controller is attached to the fuselage side with hook and loop fastener. The Airtronics FM receiver is located in about the center of the compartment **(above right)**. Just behind it is the 270 mAh receiver battery pack, and finally two standard size servos. One is for the rudder and one is for the elevator. Note, the motor battery is in place in this photo. Neat and clean!

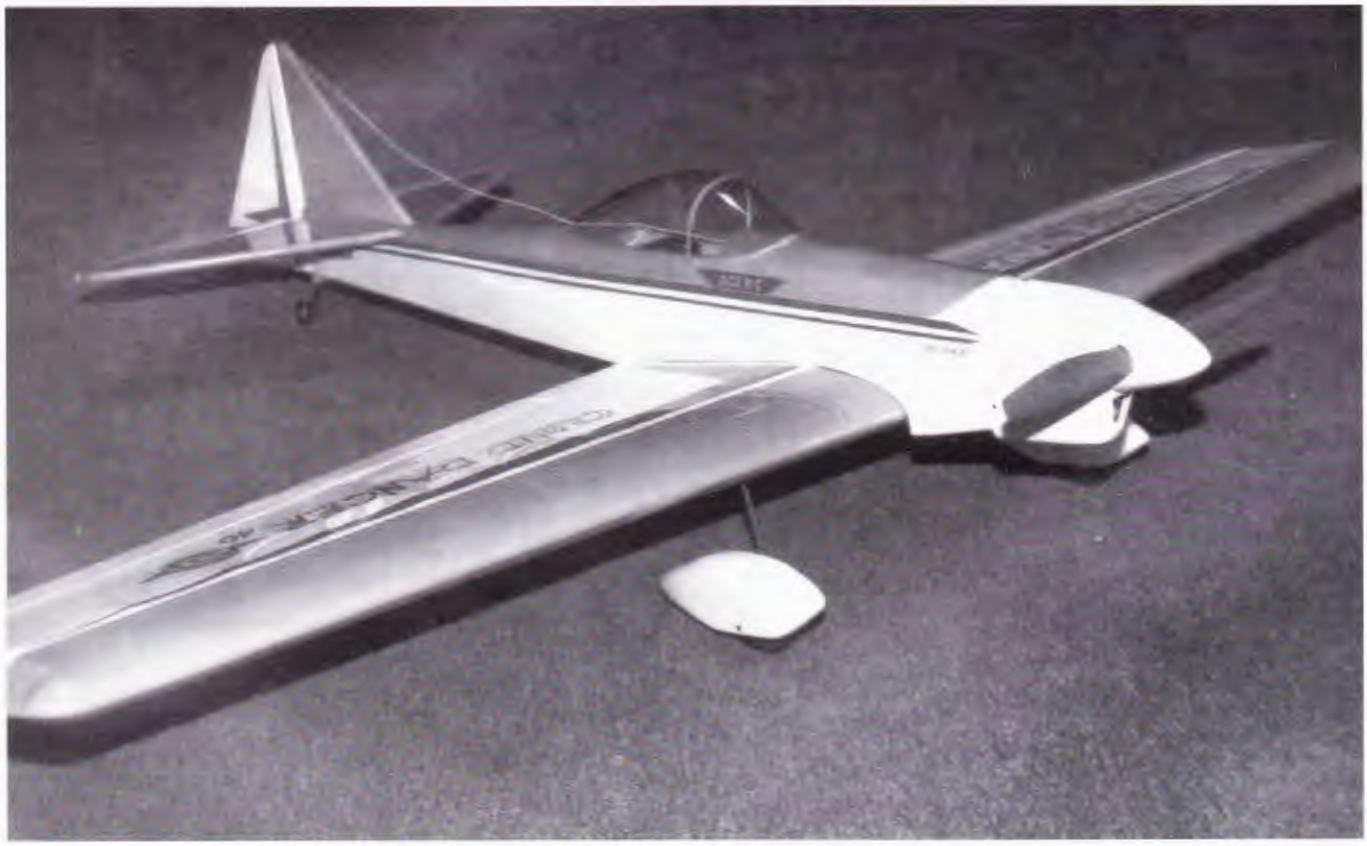
the order of 6 to 6½ minutes with some reduced throttle settings.

Flight performance with the electric power was just great! I'm certainly a believer now. We even made a series of video tapes with copies being sent to Tom Runge at ACE R/C and to the *Cloud Dancer* designer, Fred Reese out in Las Vegas, NV. Hopefully Tom will be running this tape on the trade show circuit this spring. The only problem I have to admit to is losing both wheel pants, in short order, due to our "rotten" field conditions. If you have a relatively smooth field, even low cut grass, stick with the pants. They look just right. Maneuvering wise, I have been able to do just about everything you could think of, such as loops (inside and outside), rolls, inverted flight (no clunk tank worries), Cuban Eights, stall turns and more. Best part is that I never have to worry about a "flame out" due to a bad idle adjustment on the carb.

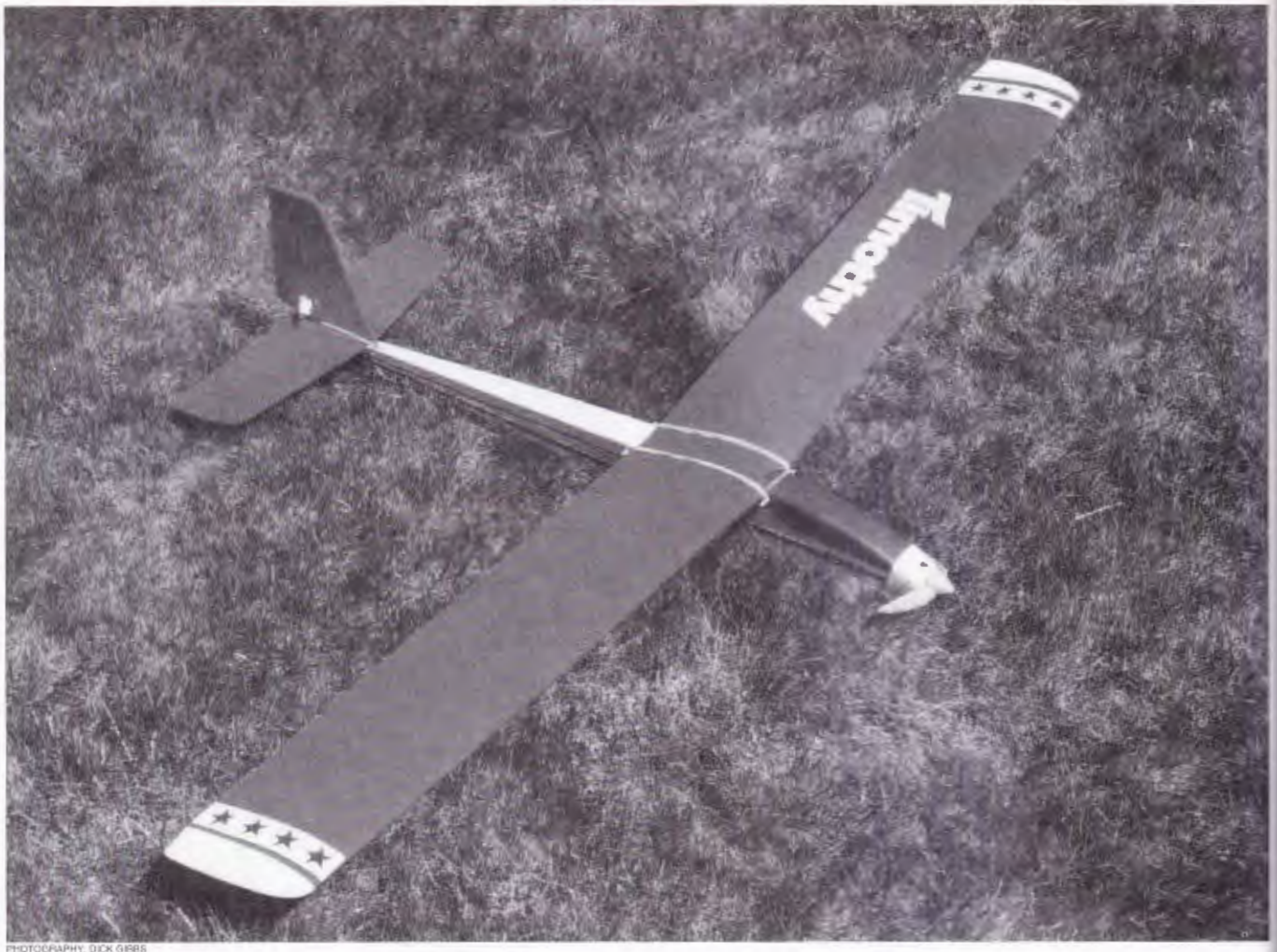
The one other observation I might make is that if I had actually started with a 4-pound typical model weight, the vertical performance might have been a shade better. In other words, the use of some lighter weight balsa wood in this kit would have proved helpful for electric powered flight. For glow power it really doesn't matter.

## Final comments

With all due respect to both ACE R/C and kit designer, Fred Reese, the *Cloud Dancer* also makes an excellent performer with its intended glow engine power. We have two such planes at our club field and they handle well. Although I love my electric powered bird, be advised that the *Cloud Dancer* is a winner regardless of the power system. I also noticed in a recent *RC Modeler* magazine that Fred Reese has come up with a much larger *Cloud Dancer* intended for 1.20 power. This is a big bird with a 96-inch wing span. If you are interested in the larger models, you might want to look this up.



**The addition of wheel pants** really dresses up this model. Don was forced to remove them, however, because of rough field conditions where he flies.




PHOTOGRAPHY: DICK GIBBS

**The all-balsa *Timothy*** is shown here covered with Oracover. It weighs only 23 ounces ready to fly.

### An *FM* Product Review:

# Hobby Lobby International's Timothy

**By Dick Gibbs**

This review gives you more for your money's with not only a review of the kit, but also the low-down on a small FM receiver, a speed controller, and a computer program for electrics.

Although this review is primarily about *Timothy* it will also touch on several other items I purchased especially for use with this kit, including a small FM receiver, a small (and very lightweight) speed controller, and a computer program which I found extremely useful for selecting the proper motor, prop, and battery pack required for best model performance.

*Timothy* is an all-balsa sailplane of Czech manufacture, with a wingspan of only 59 inches and designed for the Graupner Speed 400 motor. The structure is completely built and the entire model is covered with Oracover film by the manufacturer. The major components—separate wing panels and fuselage—fit tightly within partitions in the lightweight kit box, preventing any movement during shipping. As received, my kit had no damaged parts and the wing panels were true and unwarped. The only model assembly required is to glue the stab/elevator to the fuselage and the fin/rudder to the stab and it's time for powerplant and radio installation.

Incidentally the workmanship exhibited on this kit is first rate and the covering job is the best I have ever seen on any pre-built model, especially on the sheet balsa tail sur-

faces and the sheet balsa fuselage.

One minor problem, easily fixed, was mounting the plastic cowl (furnished) to the nose of the fuselage. The motor mounting bolts are inserted through the cowl face and the ply motor mount, thereby holding the cowl in place when the mounting bolts are tightened. On my kit there was a space, about ⅛ inch between the cowl front and the motor mount requiring a bit of sanding around the front of the fuselage in order to secure a good fit. The job required about ten minutes of work with a sanding block.

As mentioned earlier the wing panels are supplied as separate items to be joined with wooden dowels prior to flying, a space saver in transportation if that's a problem. I prefer one-piece wings since two-piece wings in storage always seem to develop warps for me while one piecers do not. Take your pick. I butt glued the wing halves together, proper dihedral being insured by the slanted root ribs, and wrapped the center section with lightweight glass cloth, then wicked CyA into the cloth for a very strong joint.

## Motor/battery installation

The installation drawings included in the kit show the radio layout of the unpowered *Timothy* sailplane on one side while the other side indicates both the radio and power system installation and both drawings offer English construction notes. As mentioned the model is designed for use with the Graupner Speed 400 motor and the ply motor mount comes predrilled to accept the motor and the holes do match the motor. Motor mounting is the easy part and some serious thought must be given as to placement of the radio gear, battery pack, and speed controller because the fuselage is quite narrow and not very deep.

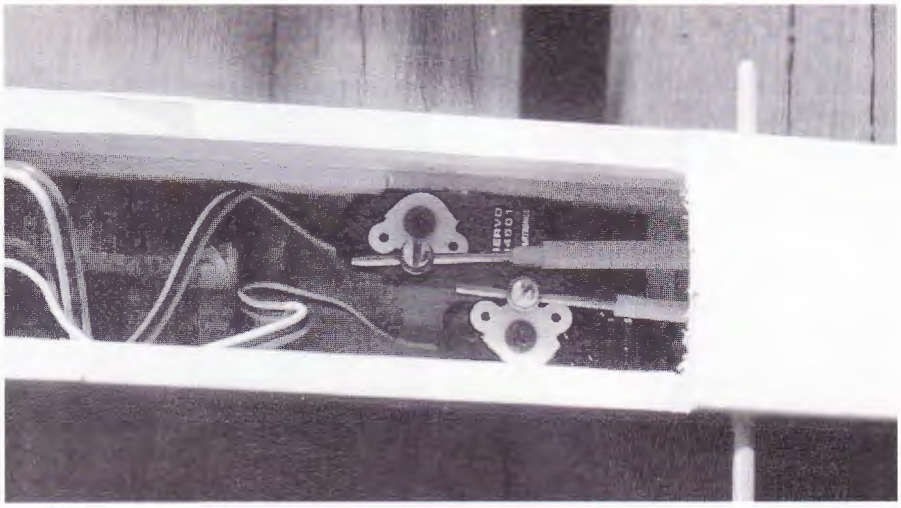
I used Airtronics 94501 micro servos and even though they are among the smallest servos available it was necessary to stagger them on opposite sides of the fuselage in order to provide clearance for the output arms. The heaviest, and largest, component of the power system is the flight battery and after a couple of false starts I settled on a 7-cell 650 mAh pack, rather than the 600 or 800 mAh cells which were my earlier choices.

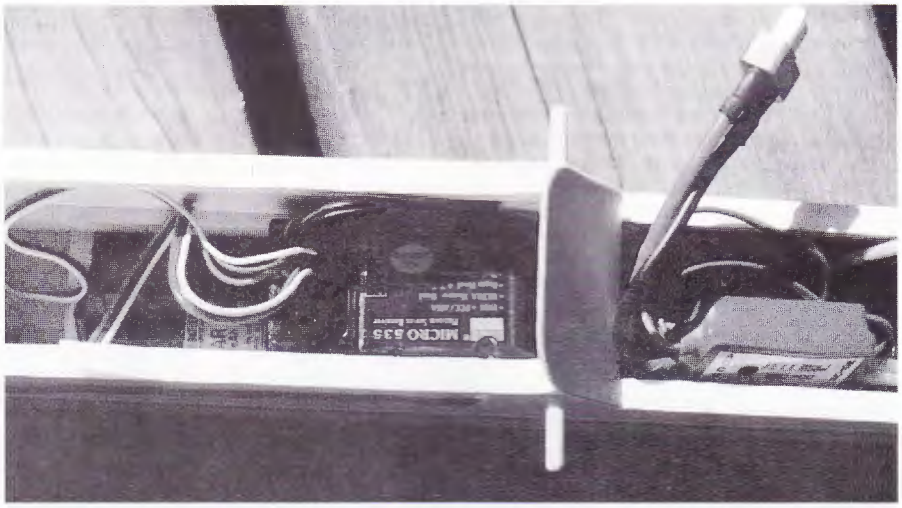
The 650s allow a bit of fore and aft movement for proper model balance when placed on the fuselage floor and there is enough space on top of the pack for the receiver if it is a micro. I bought an RCD Micro 535 FM receiver and it fit perfectly. With all of that done there isn't much room left over for the radio battery and a speed controller so I ordered a small controller with BEC and motor cut-off which eliminated the need for a separate radio pack. The controller (JETI JES 30) is small (1¼ × 1 × ⅜ inches) and weighs only ½ ounce and is perfect for small electric models. The JES 30 is wired to an on-off switch and this is the only switch that must be mounted on the fuselage. All in all, a very tidy package.

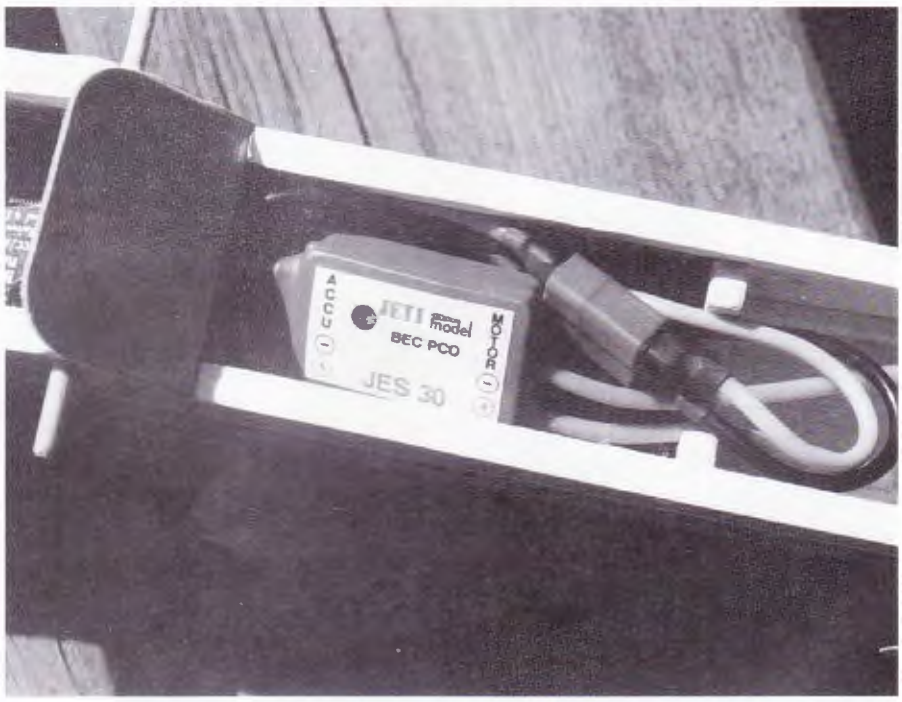
To complete the installation the ideal prop choice is the Graupner 6–3 Scimitar folding prop which is properly sized for the motor shaft of the Speed 400 (7.2-volt) motor and is complete with spinner. And even though the motor is rated for six cells I haven't had any problems to date using seven.

## The computer bit

I have used the Aero-Comp program for about a year because it is simple to use and








**The narrow fuselage** requires the use of small servos **(above)**. Staggered mounting and cut-down servo output arms are necessary for proper pushrod operation. The receiver is mounted in foam, and can be moved forward or aft for minor balance adjustments **(below)**. The *Timothy* features easy construction.

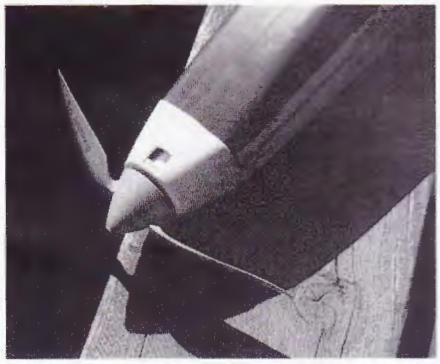
**The small motor controller** shares the space above the flight battery with a Deans Ultra connector. Charging is done through this connector by removing the hatch. Wiring is SR Batteries' 12-gauge multi strand.

# Hobby Lobby's Timothy

allows one to plug in various motors, batteries and props for a given model and see the predicted model performance spelled out on screen using all of the various combinations. When optimum performance is found the results may be printed out for a constant reference for that particular model. Most of my existing electric models have been run through the program and the predicted results are very close to real life performance.

In the case of the *Timothy* my first thought was to use the Speed 400 (4.8-volt) motor with a four-cell pack to save weight but Aero-Comp predicted a model that would not fly. Next try was the Speed 400 (6-volt) motor with a five-cell pack and that model was predicted to fly but with a maximum altitude of only 150 feet or so, not too good for a sailplane!

Final choice, the Speed 400 (7.2-volt) was much better with a six-cell pack but by adding the extra cell the altitude went to about 600 feet and total flight time to just over twelve minutes. Even with seven cells the motor is drawing only 10.1 amps at full throttle, not too much strain on the motor. Amperage draw is predicted by Aero-Comp, along with motor voltage at full throttle (8.3), flight duration at full throttle (3.9 minutes), maximum airspeed (33.8 mph), maximum rate of climb (151.7 fpm), maximum altitude at full throttle (588.5 feet), and total flight time of 12.1 minutes! Personally I think that Aero-Comp is a great program and a real time saver that removes a lot of the guesswork when selecting motor/prop/battery combinations for an electric model.



**The canopy is held** in place by sliding the front end under the rear of the cowl. It is very easy to remove for charging and maintenance. Graupner's Folding Scimitar prop cleans up the front end.

## Flying

*Timothy* is small, fast, and very responsive to control inputs; I found it best to set up the rudder linkage for maximum throw and elevator for minimum deflection to prevent over controlling. My impression is that flying speed seems to be about the same with power on or off although that cannot be true since turns at full throttle are flat whereas the nose drops slightly when turning with power off.

Most of my flying is done shortly after daybreak when there is very little thermal activity but flights average about ten minutes including a lot of time spent cruising around with the motor throttled back. Power-off stalls are gentle, with the nose dropping slightly and flying speed quickly regained. A point to remember when landing: even though the wing loading is only 10 ounces/square foot the model is fast and the glide is flat, which calls for a long, low approach, the model touching down at a fairly high speed.

## Finally

The *Timothy* kit is available from Hobby Lobby and priced at $108.00. The RCD receiver and the JES motor controller are also stock items with Hobby Lobby, as is the Aero-Comp computer software program and the Graupner motors.

Personally I wouldn't consider the *Timothy* as a beginner's project but it is an excellent value for the experienced modeler who wishes to get airborne in a hurry.

Hobby Lobby International, Inc., regularly publishes a great catalog, which is loaded with items for the electric flyer, and can be reached at 5614 Franklin Pike Circle, Brentwood, TN 37027; phone 615-373-1444.


**With a wingspan of 59 inches**, *Timothy* is not a large model as evidenced by the holder, author Dick Gibbs, who is not especially large either!

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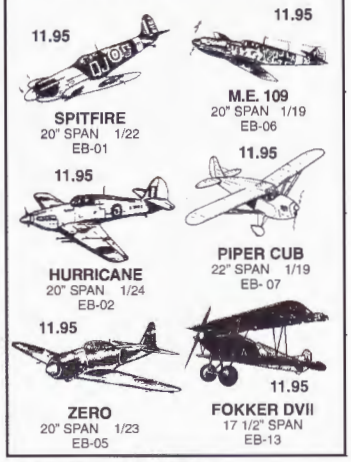


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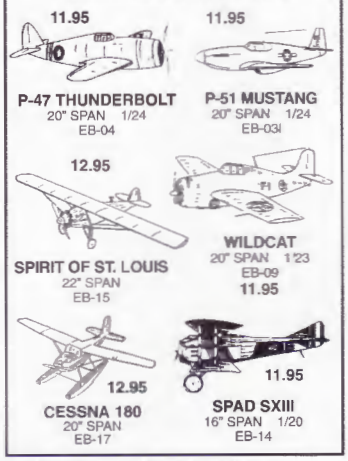


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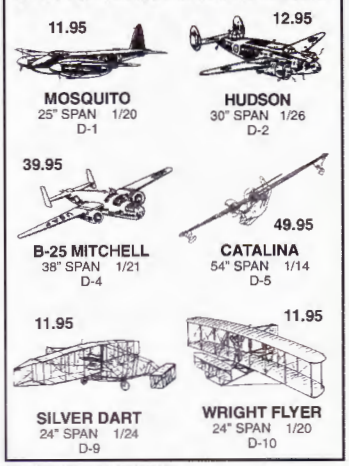


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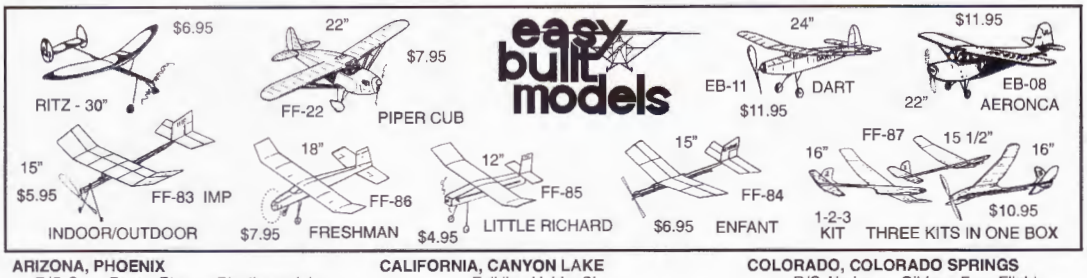


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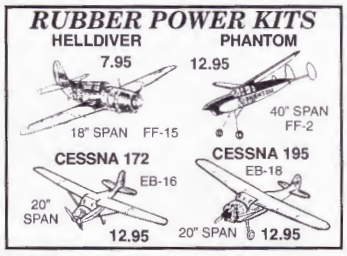


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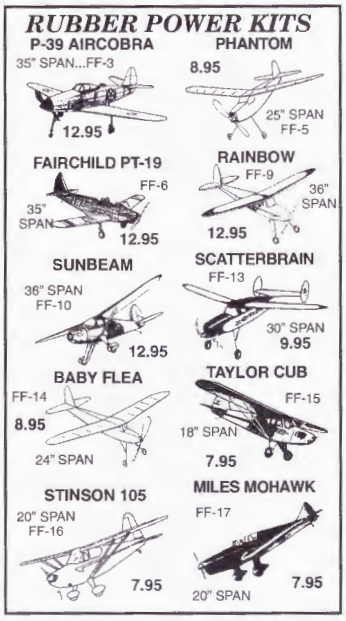


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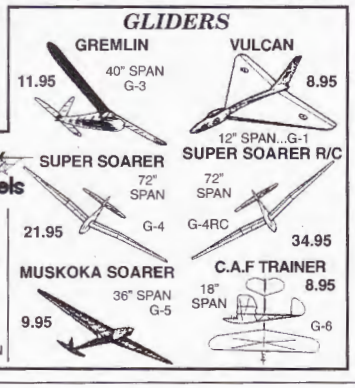


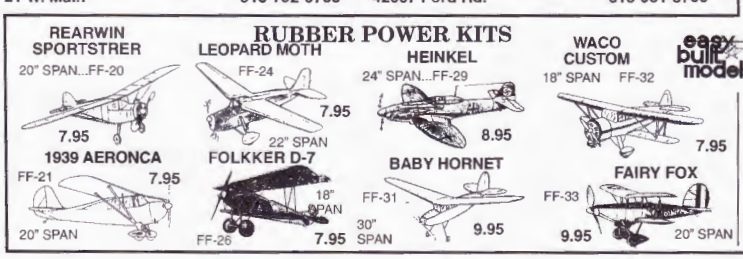


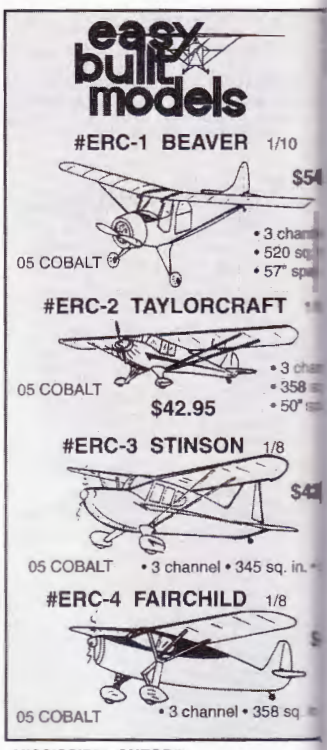


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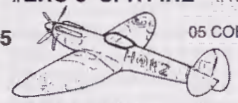

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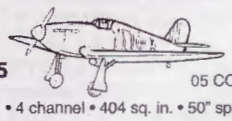

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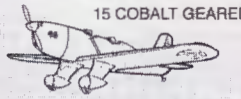

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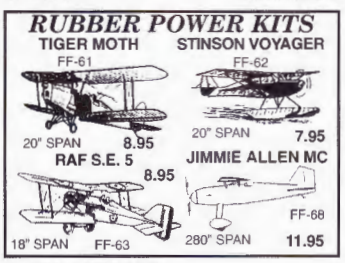

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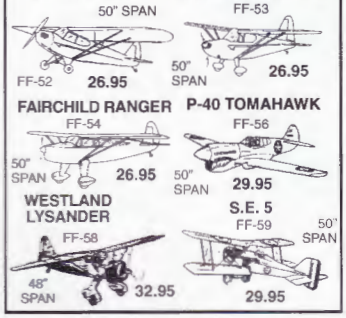

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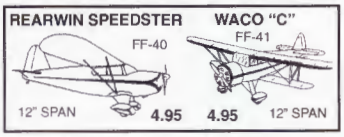

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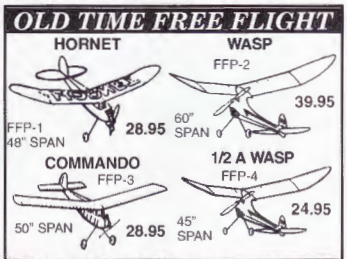

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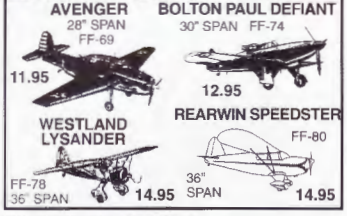

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# HODEK

# HK-101

**By Lubomír Koutný**

**Text by Bill Warner**

Here's an elegant rubber scale twin from one of the world's most renowned freeflight scale modelers.

*Lubomír Koutný needs no introduction to F/F scale modelers. His reputation has spread far beyond the borders of his native Czechoslovakia. The impressive number of wins collected by his designs in local and international meets is recommendation enough to build any of his models. When he asked me which model of his I thought the American modelers would like him to send over for publication, I immediately thought of his graceful and exciting Hodek. I hope you'll agree that is one of the classiest planes that ever graced the pages of this magazine! If the model were doubled to 30-inch span, I think it would be even more dramatic and effective.*

*The dimensions given on the plan are in millimeters. The following text is liberally adapted from Lubomír's, and I will take responsibility for any misunderstandings.—*
*BILL WARNER*

Built just after WW II, the HK-101 was designed to be a flying laboratory for cockpit instruments produced by a private firm. It soon proved itself an excellent aerobatic ship despite its small size, and could even do aerobatic figures with only one of its twin Walter Minor engines running!

It never got the chance to prove itself in international competition in Great Britain, as the government chose to send planes from the state-run AERO firm instead. These were Aero 45's, which won the competition.

Koutný's 1/20 scale model of this plane was built for the international indoor competition at Flemalle, Belgium. Most of its flights, however, have been outdoors, where Tonda Alfery won many junior events with his. The main difference between the indoor and outdoor versions is that the indoor ones are easier to trim if both props rotate in the same direction. It is a very good flier, but sensitive to flight adjustments. As it is not a model for beginners, building instructions assume that the modeler does not need to be led through the basics.

## Main airframe

Select only the best balsa—light but strong—for good results. The use of a glue such as Testors "Fast Dry" or "Duco" is recommended, thinned with acetone (1 to 1) for better penetration and weight-saving. Begin by slicing the four main fuselage longerons from 1/32-inch sheet. Glue them in place on the bulkheads. Many builders will prefer to do this "on the half-shell"—pinning the upper and lower longerons to the plan, splitting the bulkheads vertically, and making the L.H. fuselage side with the bulkhead halves perpendicular to the plan. The L.H. side longeron is then glued in and when dry, the fuselage half can be removed from the plan and the R.H. bulkhead halves and longeron can be added. Add the nose planking and rear section stringers while holding the fuselage in the air, alternating sides and being careful not to build in any twists. Of course, a fuselage jig could be constructed to hold whole bulkheads while the work is being done, and perfectionists will probably build one. The very front of the fuselage gets very soft and light 1/8 × 1/32-inch planking strips glued on and then sanded to about half thickness.

The stringers rearward from bulkhead 4 aft are closely spaced 1/32-inch square sticks. A striking feature of the Czech style of building is that they use many more bulkheads and stringers than are commonly used here, and one should always keep in mind that to use twice as many stringers requires that each one weigh half as much. A word to the wise...

The lovely parabolic planform is achieved by laminating up an outline around a form made 1/8 inch undersize all around to allow for four strips of 1/32 × 3/32-inch stock. After the glue dries, remove the outline and pin it down over the plan and add the lower sections of the sliced ribs (note the undercamber on sections "Y", "Z", and "W"). Then add the spars, made of very strong balsa.

Next add the rib tops per sections "X" through "W". Cut the wing at the center bevel for dihedral, and insert it into the fuselage in the mid-wing position shown on the plan. Be especially careful in sanding due to the thin sections and softness of the balsa!

Keep the tailplane light and strong, sand the upper surface to a camber, leaving the underside flat.

The nacelles are built like the fuselage front end, but are planked all the way back to the end. Glue them up under the wings after the wing is covered with tissue. Sand to about 1/64-inch thickness. Holding it up to the light often while sanding can help you keep from getting too thin in places.

Koutný cuts out his prop blades from 3/32-inch sheet and sands the airfoil shape in (see the January 94 issue of *Aeromodeller* if you have it). A bamboo dowel is embedded in a slot cut about 40% of the blade length starting at the root, glued in, and each side is reinforced with tissue. The helical twist in the blade is put in by holding the blade in a twist near a heat source such as the tip of a hot iron.

The bamboo dowel plugs into a rolled paper socket in the spinner to allow for pitch adjustment.

**Note:** The left prop is given about 5 degrees less pitch than the right one to give stable left circle climb and continue to glide with no problems. Check the correct pitch position on all blades using template. (I think if you are going to use plastic props it would be a good idea to scape them rather thin.)

You know the kind of plastic that melts when you get it hot? Well the Czechs make a little square sandwich which is then squeezed with pliers onto the heated prop hook. The center is then cut out and sharp edges smoothed to prevent cutting the rub-

ber. The boxy shape prevents rubber "climbing" around the hook.

The legs are made from 1/16-inch bamboo dowel with .020-inch wire for the axles . The wheels are shaped from Styrofoam®.

Lubomír's original indoor ship was covered with condenser paper, and Alfery's with Modelspan™, using thinned white glue. I would use "Gampi" or ultralight Japanese tissue for an outdoor model. Lubos sprays the covering with water to shrink the tissue, and allows that there will be a dihedral increase of 3–5mm, which will give added lateral stability. Spray with a mixture of gray/silver Humbrol™ (British plastic paint) and nitrate dope thinned with acetone. The lettering and numbers are done in black, with the trim in red.

Both seats, instrument panels,and pilot figure are made from Styrofoam®. The canopy is .002-inch "celluloid."

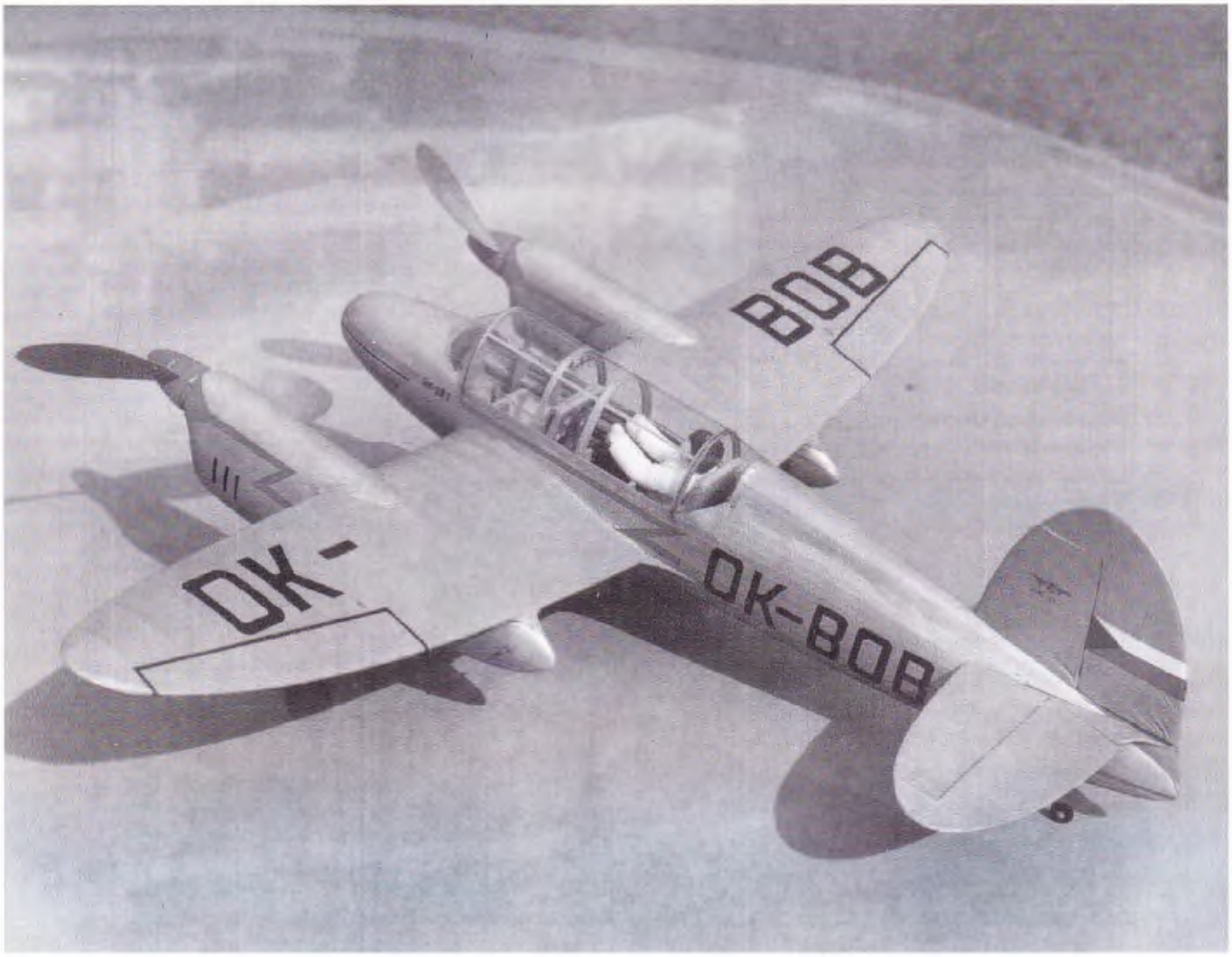
## Motors and adjustment

One loop of FAI Tan II, 2.5g/m and about 13 inches long, goes in each nacelle. Wound to 1200 turns, it flies the model nicely, and can be upped to 1500 for an R.O.G. Lubos shortens the rubber for indoor flying to 8 inches as "... 20-second flight is O.K."

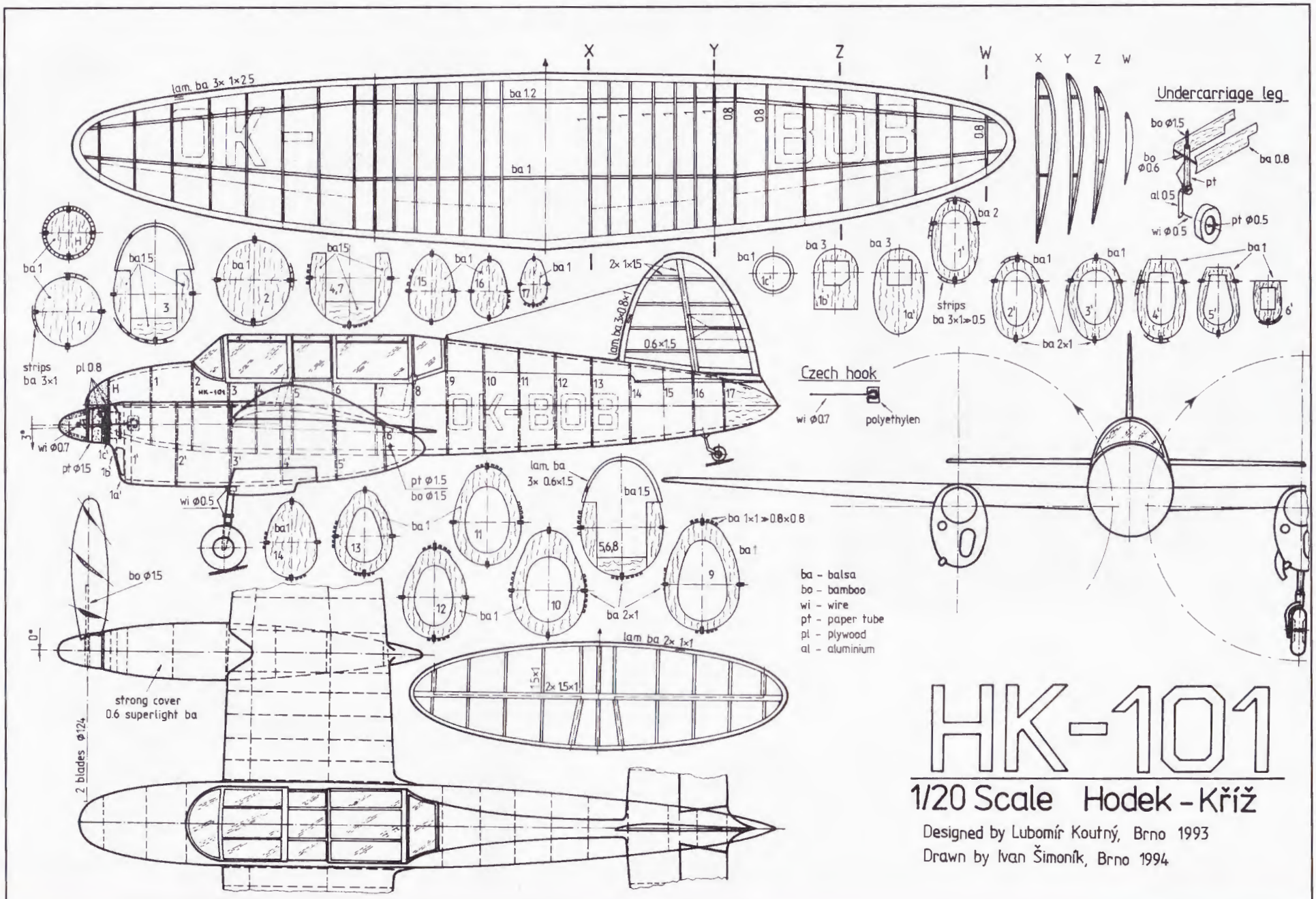
Raise the rear of the stab about 1/32 inch and give the rudder about 1/16 inch left. The glide should be adjusted with the rudder to obtain a slow L.H. turn. Testing is best done


PHOTOGRAPHY: LUBOMÍR KOUTNÝ

**Originally designed** as a flying laboratory just after WW II, the HK-101 proved itself to be an excellent aerobatic ship. The author's rubber powered model of it was built for the international indoor competition at Flemalle, Belgium. This is not a model for beginners, and it requires careful trimming for best results.




**From any view** this model has abundant character. Select only the lightest balsa for construction if you want to achieve the best flight performance.




# HK-101

## 1/20 Scale Hodek - Kříž

Designed by Lubomír Koutný, Brno 1993

Drawn by Ivan Šimoník, Brno 1994

# Hodek HK-101

**The author cuts his prop blades** from 3/32 sheet balsa, and sands the airfoil shapes in. A bamboo dowel is embedded for strength.

for this from a small hill in calm air.

Put about 500 turns in each motor and the model should climb out in a gentle L.H. turn. If it does not, give a little downthrust in the left engine. If the model turns too tightly left without climbing, add downthrust to the right engine or add a little wash-out to the right wing. Never make more than one adjustment at a time! When the climb is O.K., build up to 1,000 turns. The flight should be a left spiral about 100 feet in diameter obtaining a height of about 65 feet. Make final fine-tuning adjustments now, noting that the model flies fast, and you need precise adjustments to get the most out of this characteristic. As Lubos says, "Overuse its energy well." Next, try 1,400 turns to see what it does on full torque, with the final test being an R.O.G.

In addition to wishing you much fun from your twin, Lubos extends an invitation to visit the Czech Republic in May and enter their big annual international scale meet called Openscale, where you will find "... friendly people, perfect airfield, good food and excellent Czech beer and South Moravian wines." (as well as a lovely and historic countryside and places of historical interest.) You can contact him by writing (in English or Czech) at: Ing. L. Koutný, Záhrebská 33, 61600, BRNO, Czech Republic.

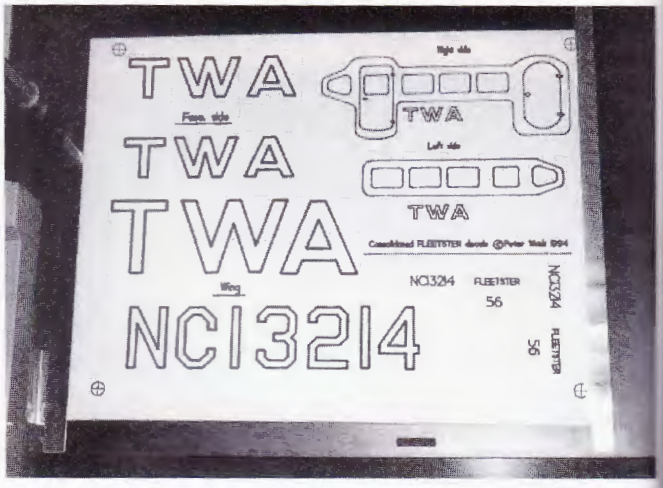
## Metric Conversion of Plan Sizes

| MM | Inches | Equivalent Size |
|---|---|---|
| 3.0 | .118 | 1/8" |
| 2.5 | .098 | |
| 2.0 | .079 | |
| 1.5 | .059 | 1/16" |
| 1.2 | .047 | |
| 1.0 | .039 | |
| 0.8 | .032 | 1/32" |
| 0.7 | .028 | |
| 0.6 | .024 | |
| 0.5 | .020 | |
| 0.3 | .012 | 1/64" |

**Note the landing gear** door detail, and the attention given to the large canopy. It's touches like these that make certain models stand out from the crowd. Twins can be a rewarding challenge to build and fly.


PHOTOGRAPHY: PETER WANK

**These Koh-I-Noor Plotter pens** use a solvent based ink, and will work very well on film **(above left).** Do not use pens which are designed for use on paper! The Koh-I-Noor pens are available in several colors and in widths from 0.18 mm to 0.70 mm. Here the completed 8½ by 11 inch decal sheet is shown in a Roland DXY-1100 Sixteen-Pen digital plotter **(above right).** The plotter is not an inexpensive piece of equipment, but modelers can find many uses for it.




## An *FM* How-To:

# Computer Aided Decal Making

**By Peter Wank**

Water slide decals are almost a cinch with this process. Uses home PCs and a plotter.


**The effect is most definitely** worth the effort! Here's Peter Wank's completed Consolidated *Fleetster* showing the wing decal. Any model of any type can be enhanced by the proper use of this technique.

With the increasing availability of low-cost, mid-range computer systems, along with associated pen-type digital plotters, the production of waterslide decals in a home office environment has become entirely feasible.

This article presents techniques, equipment, and materials that have proven successful in producing high-quality waterslide decals for model aircraft use. This process is not intended to replace conventional silk-screening methods, and is practical only for one or two of a kind, since it can become expensive if large areas are to be colored in, due to the cost of the plotter pens.

As a confirmed scratchbuilder, I'd always wanted to be able to put the finishing touches—decals—on my models. Since the necessary decals were never available (wrong size, color, era, type, etc.), I normally ended up with either an undecorated model, or one with lettering and insignias of a most unappealing nature.

Creating the necessary artwork by hand with paint and brushes is one of the many areas where I demonstrate a level of superb incompetence, so I turned to the computer where I have slightly more ability. Also with all of the computer equipment and software already at hand, it seemed that there *had* to be a way, so I started this small R&D project.

After many false starts, dead ends, and other minor disasters, a technique has been evolved that produces high-quality, waterslide decals. A brief description of the equipment, materials, and procedure is presented here.

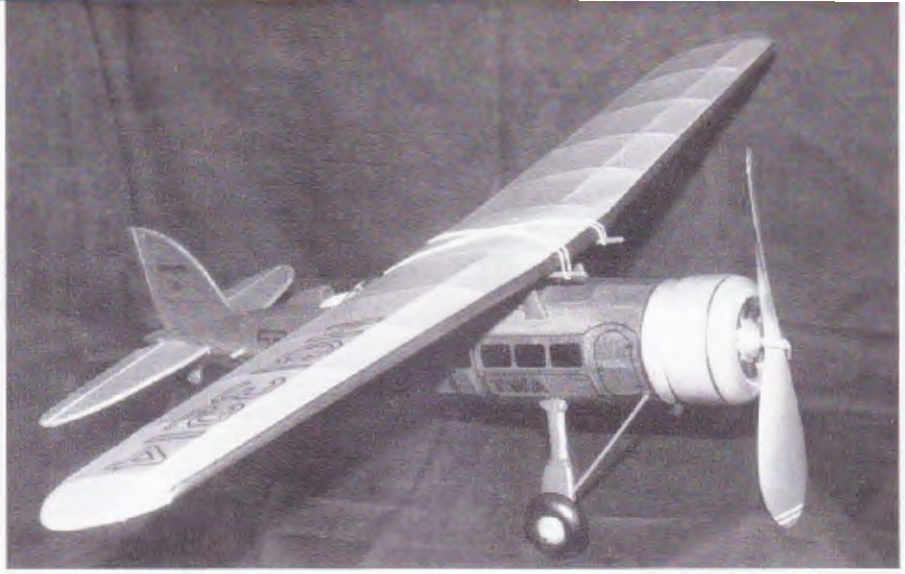
### Equipment required

With the fierce price wars going on between computer manufacturers, a very powerful PC can be had for under $2,000. An 8- or 16-pen digital plotter is available for under $1,000, and these are the two pieces of equipment needed.

Now, no one is going to spend about $3,000 just to produce *one* decal, but for the increasing number of modelers that may already have such equipment, or access to, a process for making decals, in-house, is now available. A brief description of some of these components follows.

**1. Computer System:** Any PC, or Macintosh capable of supporting a CAD program (Generic CADD, AutoCAD, or DesignCAD, for example), or a good graphics program (CorelDraw, Adobe Illustrator, or Micrografx Designer), and with the necessary drivers for the digital plotter. The artwork can be created (input) with scanner, digitizer, mouse, or trackball. If you're working with color photos and a scanner, then a program such as PhotoStyler, or PhotoShop will be needed as well.

**2. Ceramic-tip Plotter Pens:** These pens must be of the type intended for *film*, not paper, and must use solvent-based inks, not water-soluble ones. Pens supplied by Koh-I-Noor, in the "Archival DPP Plotter Pen" series, in the "E style DPP" are a direct fit into the Roland and HP plotters (and others), and produce excellent line quality. These pens, in the film type, are available in several colors (except white), and in widths from 0.18 mm to 0.70 mm. For general usage, the 0.70 mm. is preferable, unless the artwork calls for very thin lines.



**Another view** of the Consolidated *Fleetster* shows off the custom made decals on the fuselage and tail surfaces. Those are great looking simulated windows! Apply the decals carefully for best effect.

## Sources of Supply

**Computer**

Since this is an article on decal-making, and not on computer techniques, prices, or software, we suggest you read any of the popular PC or Mac magazines, and talk to knowledgeable friends to buy your machine.

**Plotter**

The Roland DXY-1100 is marketed by the Roland Digital Group, 1961 McGaw Ave., Irvine, CA 92714; 714-975-0560. You can call them and get the name of your local distributor, as well as current prices. Most computer equipment catalogs and magazines carry information relating to other brands of plotters; consult them for HP, Houston Instruments, or CalComp pricing.

**Plotter Pens**

Koh-I-Noor, Inc., 100 North St., P.O. Box 68, Bloomsbury, NJ 08804-0068; 800-877-3165, option 2), will provide a catalog sheet describing the "Archival DPP Plotter Pen" series. The pens sell through them at about $12.00 each, but your local blueprinting supply house may have them, and at substantially reduced prices. Make sure you specify pens for *film*.

**Decal Paper**

Brittains Tullis Russell, Inc., 500 Summer Street, Stamford, CT, 06901; 203-324-7536 has, in the past, supplied a large "sample" package of decal paper for just the UPS shipping charge. For normal purchases, one ream (500 sheets) of Decaflat, 11 × 17 inches, is $92.00 in less than case lots (plus shipping). This quantity would make an awful lot of decals, but is the smallest package available.

**Polyurethane varnish**

This, and the 4/0 or 6/0 steel wool, are available at any paint, hardware store, or lumber yard.

**3. Digital Plotter:** An 8- or 16-pen digital pen plotter. I have found the Roland DXY-1100 to be an excellent machine, and the 11″ × 17″ format allows the production of rather large decals. Hewlett-Packard, Houston Instruments, and CalComp also sell very good machines, but at a higher price.

## Materials required

**1. Decal paper:** This paper, treated on one side with a water-soluble adhesive, is available in several sizes, ranging from 11 × 17 inches to 25 × 36 inches. Two types, "Decaflat" and Decafix" are available, the latter being somewhat more dimensionally stable, but more expensive. For our purposes, the "Decaflat" is entirely adequate.

**2. Varnish:** Any good, clear, semi-gloss or matte polyurethane varnish is required, and forms the actual base on which the decal is plotted. Red Devil makes a good one.

**3. 4/0 or 6/0 steel wool:** After the varnish coating is completely dry and hard, it should be lightly rubbed down to remove any dust "bumps", and to provide a better "bite" for the pens.

## Procedure

Working in an area as dust-free as possible, brush a single, fairly thick coat of varnish over the adhesive-coated side of the decal paper. If you're not sure which is the coated side, cut off a small sample, and soak it in water; the slippery side is the adhesive-coated one. The varnish must be thin enough so that it's "self-leveling", and leaves no ripples or unpainted areas. The sheet can be dried overnight in the oven, under just pilot-light heat; there is very little curling. When dry, rub the varnish down with the steel wool, as described above.

Assuming that the artwork is complete, and that the computer and plotter are talking to each other, run a test sample on plain white bond paper, using inexpensive felt-tip pens to check layout, format, colors, line widths, etc.

Mount the decal paper onto the platen of the plotter, and install the pens into the holders, making sure that the proper pen color is located in the appropriate pen holder. In the photo showing the TWA decal, since the decal was all black, only one pen (black) is shown in the holder.

Plot your decal, and give the solvent-based inks a few minutes to dry. You can apply a *light* overspray of Krylon #1303 Clear Acrylic Lacquer for added protection, if you wish. Since I don't fly glow, or gasoline powered models, another type of overspray may be needed for this application.

You're finished!

In applying a large decal, you may wish to rinse off some of the excess adhesive before applying the decal to the model. I failed to do this simple step, with the result that some of the remaining adhesive is visible against the dark red background of the model.

## A word of caution

Do not attempt to make a decal by copying your master artwork onto a varnished decal sheet in *any kind* of a Xerographic or Laser printer process; the heat of the fusing rollers could melt the varnish, possibly resulting in a large repair bill for the copier, and in a very unpleasant discussion with the owner of the copy service!

As mentioned before, you're not going to buy this equipment just to make a couple of decals, but if you have a friend that already has the aforementioned, or have other access, you can now make any decals you like, whether for your SPAD VIII "Lafayette Escadrille", or that Bf-109G "Jagstaffel" of WW II. Creating the artwork depends on your level of skill with the particular CADD or graphics software, and is not covered in this short article.

For the record, the *Fleetster* decal sheet shown required about 3½ minutes to plot. As an experimental "test bed", I chose my new 25-inch Consolidated *Fleetster* model to receive the decals, with the results shown.

We would be delighted to answer any questions, or hear your comments, but *please* include a legal-size SASE if you want an answer. Please address all correspondence to: ScienText, 48 Whitney St., Westport, CT 06880-3753.

For large quantity production, the conventional silk-screen process is still the only way to go, and is a technique with which I have little familiarity. Obviously, if you're skilled in preparing the artwork with brushes and paints, you don't need the computer equipment; just prepare the decal paper as described, and paint in your designs.

PHOTOGRAPHY: MIKE STARRETT

**It's not a large** or complicated model, but it has performance to match the very best. The author attaches the line clips in preparation for another practice session with his original design C/L Stunter. He's good, too!

The concept for the *Eliminator* came to life at the end of the 1994 contest season. I had crashed a very good Stunter while practicing in July, and was forced to struggle through the rest of the season with a less than spectacular replacement. As the '94 season ended, I took the opportunity to haul out some of the relics hanging in the garage. One of these was a well-worn *Tutor*. It was this *Tutor* that had helped me through a very successful 1991 season while competing in the Beginners Class.

After about two or three flights on it, I realized it flew better than those that followed it. I realized I was flying better and my planes were getting worse.

At this point you must be wondering why I didn't just pick a proven design and go with it? Well, that's just not me. I get my kick from this hobby by designing and building planes which are different from the norm. Then I prove my ideas with contest hardware won on the midwest contest trail.

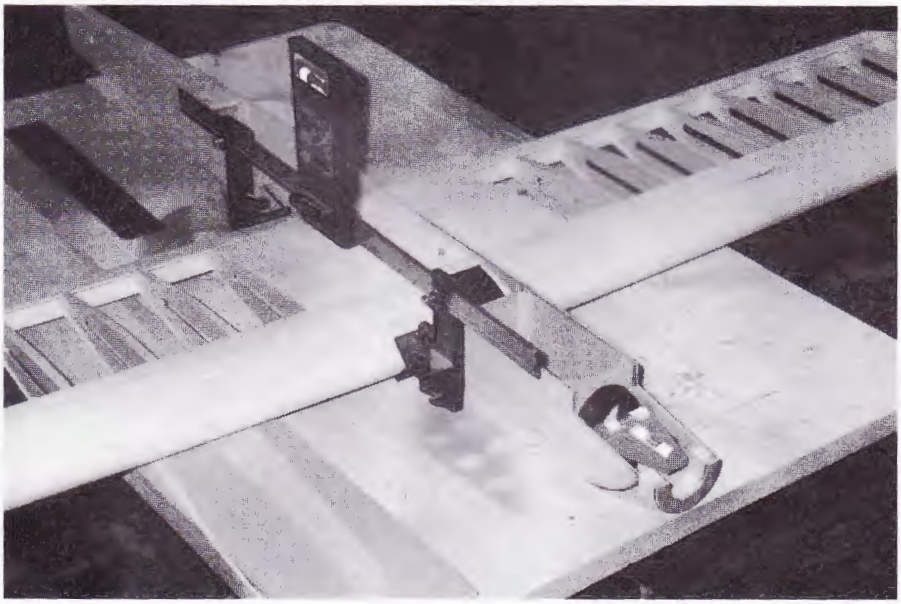
My decision on powerplant selection was taken from a well worn, and finally crashed profile *Prowler* derivative. It was powered by several engines, but I finally settled on a O.S. Max .25 FSR which used a Nering "Carbonmaster" pipe.

I started thinking about using an O.S. .25 VF while I was using the .25 FSR. I realized

# Eliminator 1

**By Mike Starrett**

Don't let its size and simple construction fool you. This is a serious Stunt machine for Advanced or Expert competition. The original used a piped O.S. .25.



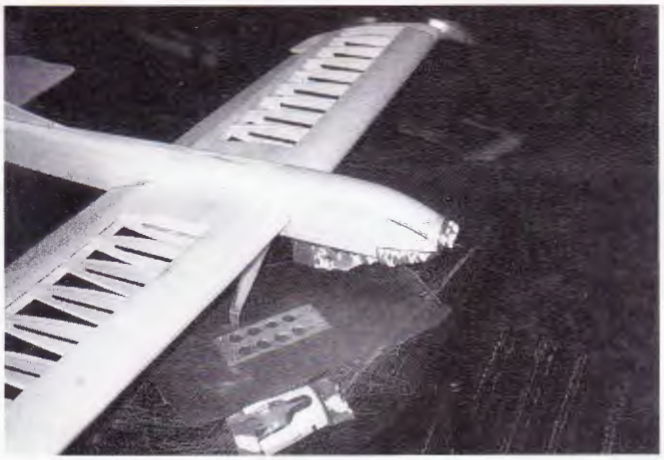
**Perfect alignment** is one of the keys to great Stunt performance. Mike uses a Robart incidence meter to insure that everything goes together with no unwanted incidence. Take extra time here; it will pay off!

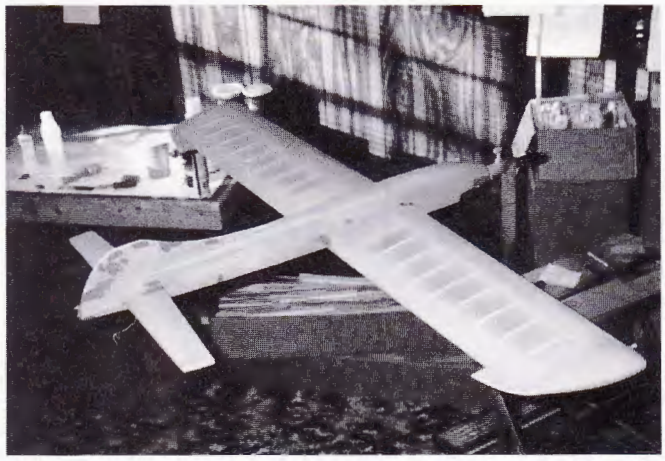
that going to the .25 VF would allow me to utilize a built-up fuselage and I could run the pipe under the fuselage.

As I designed the *Eliminator 1*, simplicity of design was a high priority. Since I was not pleased with my last design, I decided to go back to the original numbers of the *Tutor*. I didn't expect this to be a giant step forward, but more like a return to the basics. The numbers of the wing itself, are not shared with the *Tutor*. Another design consideration was to keep the drag down due to the smaller engine size. The airfoil is slightly thicker, but not so thick as to create lots of drag. It's also much thicker at the tip than the *Tutor*. It also has less leading edge taper.

## Construction

The construction of the entire airplane is straightforward and simple. No hi-tech stuff here. The wing is a C-tube design, built of ¼-inch square balsa spars, ⅜-square balsa leading edge, and the rest is all 1/16-sheet balsa. I build my wings on a homemade jig (Great Planes type) that uses two ¼-inch rods supported at either end. I utilize a ¼-inch soft balsa rib in the center to join the left and right wing panels.





**To insure a long service life**, the author glassed the front end of his model with half ounce cloth and epoxy resin **(above left)**. Nice, clean woodwork! Mike uses the CF Slattery Finishing Stand to hold his models during the painting stages **(above right)**. Note the lack of primer on the open bay areas of the wing.

Most of the center area of the rib will be removed to provide clearance for the bellcrank and leadouts. Use light balsa for this rib. Its main purpose is to provide a surface to join the wing panels. The ⅜-inch thickness allows some shifting of the panels to help align them together.

Make sure you have a true, flat surface to build the flaps and elevators. These are built by cutting the top and bottom sheeting to shape. Glue the outside edge strips to the bottom sheeting. Add the 1/16-balsa ribs at 1-inch intervals. Glue the top sheeting to the bottom assembly. Place some weight on top of this and let it set until it dries.

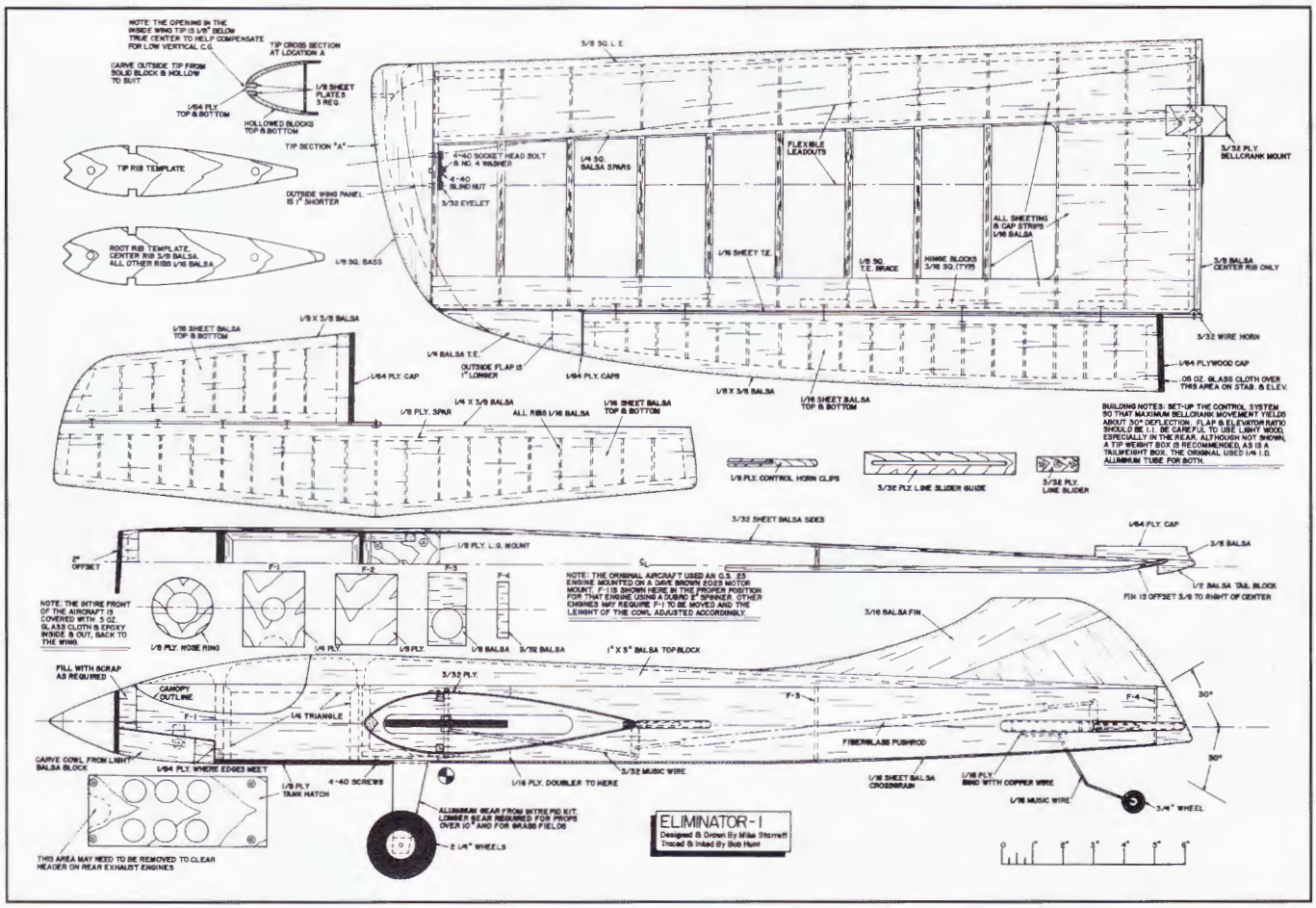
The fuselage is a simple box and block assembly. There are no engine bearers to help support the front end. A 1/16-ply doubler is used for extra strength. The original *Eliminator 1* used ¾-ounce glass cloth between the sides and the ply doublers. My new plane has carbon fiber in its place. The outside of the fuselage, back to the wing, is covered with ½-ounce glass cloth saturated with Zap finishing epoxy.

The inside of the fuselage is braced in all corners with ¼-inch triangle stock. I put glass cloth and epoxy over all the joints inside the fuselage. The engine and tank compartments are fuel proofed with two coats of Zap finishing epoxy.

When assembling the wing and stab in the fuselage, be sure to use some type of level and incidence meter. Be sure that the motor mounts, wing, and horizontal stab are all parallel (0 degree incidence). The importance of this cannot be overstressed!

## Finishing

After all the major components are assembled, I sand the entire airplane with 320 grit 3M Tri-M-Ite. I prefer to block sand where I can. Before I fill cracks or dents, add fillets, and fiberglass the front end, I brush on one coat of Minwax satin polyurethane. I

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# Eliminator 1

**The potent power system** for the *Eliminator* is this OS .25 VF (rear exhaust) engine coupled to a carbon fiber tuned pipe **(above left)**. The model can also be powered by a muffled .35 engine. A simple, functional and serviceable front end treatment **(above right)**. Note the cooling holes in the tank hatch. Smart

use it unthinned, right from the can. Don't paint this over anything except bare wood. Allow it to set for three days.

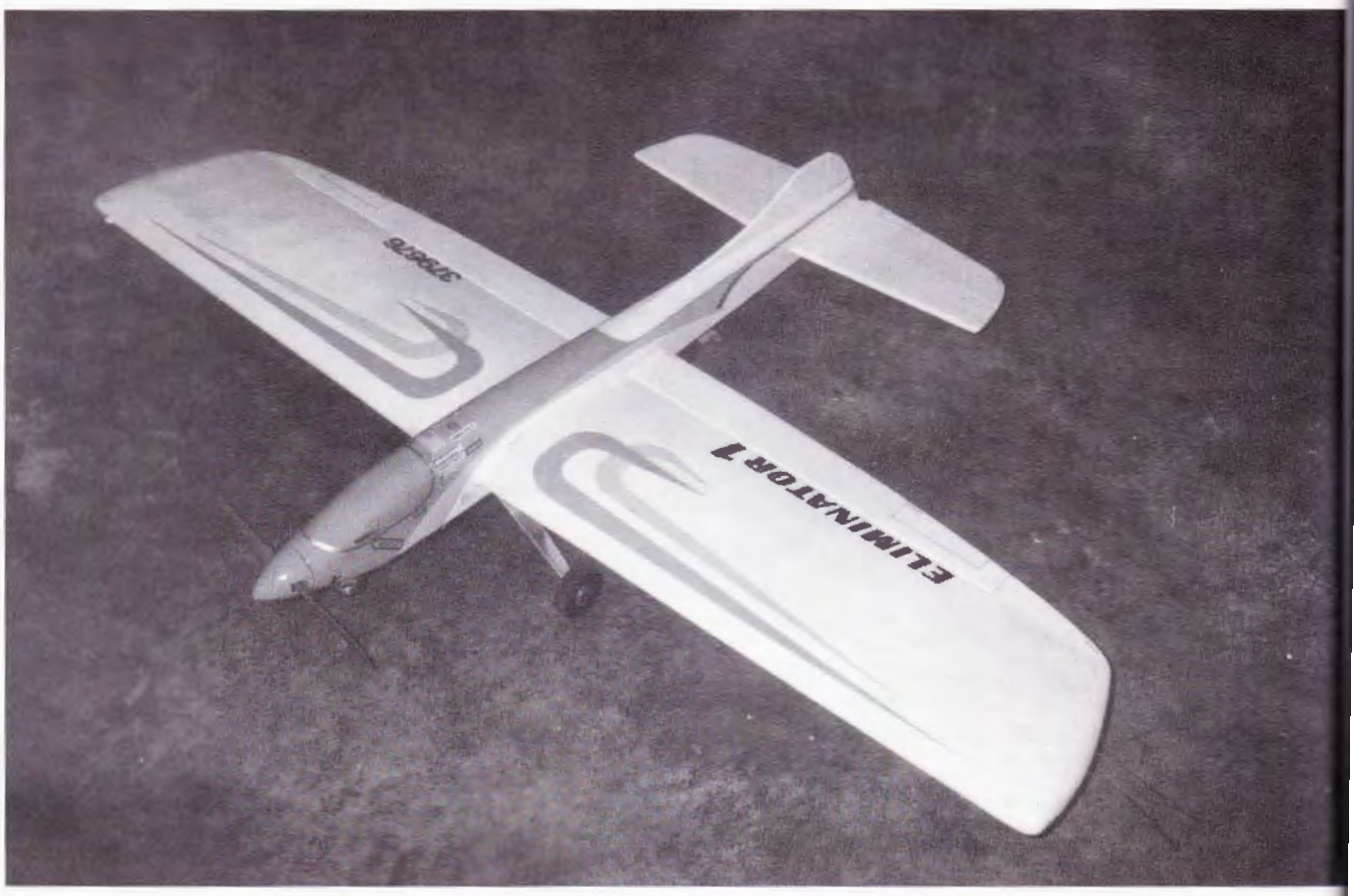
After three days, sand the entire framework smooth with 320 grit paper again. 3M Tri-M-Ite is fine for this job also. Just get it smooth. Don't sand through the polyurethane. The purpose of the polyurethane is to harden and seal the wood. This prevents dope from soaking into the wood. You can now add the fillets and cover the wing. From here on you can use your favorite methods for filling and covering all the framework. Keep your final weight goals in mind at all times.

As for color finish, I have been using automotive products for some time now. I use universal base coats for my color coats. I spray the base color with a gun. The trim colors are applied with an airbrush. These paints dry very quickly. Trim colors can be added nearly as fast as you can tape them off. Color match is very good if you need to touch it up. Put on only as much as you need to get good coverage. Paint of any kind is heavy. Universal base coats are not fuel proof.

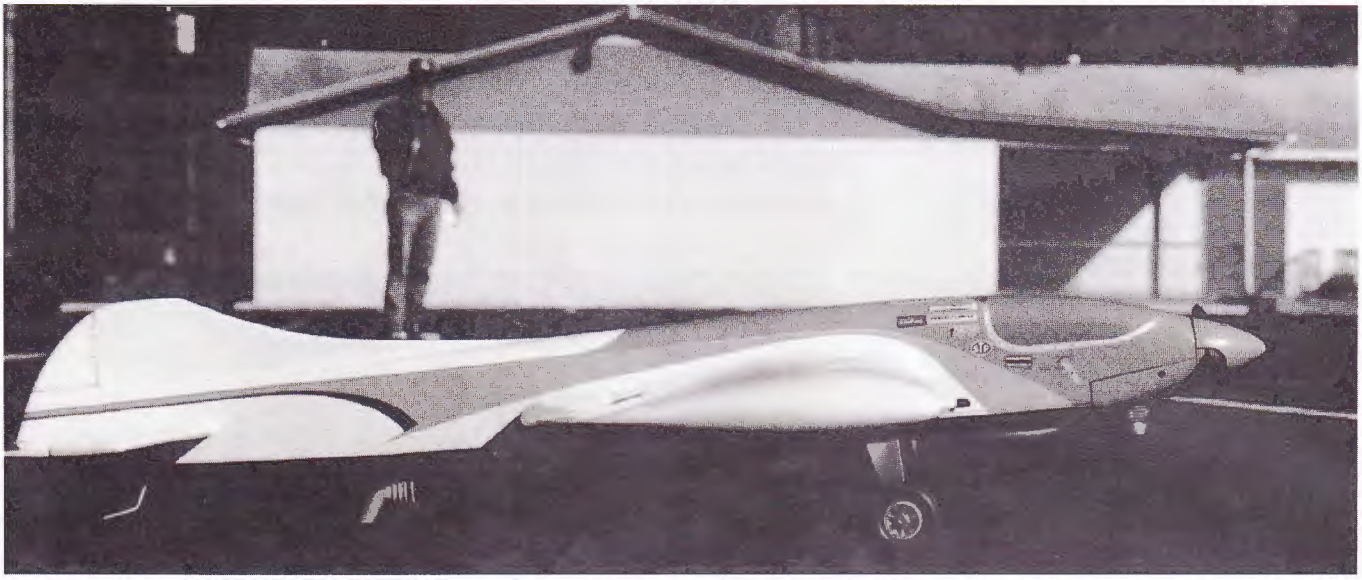
When mixing universal base coats follow the instructions on the can. The urethane may come ready to use prethinned for spraying. That's OK for cars but it's not suitable for our purpose. I use a mix of 1 part hard- ener/4 parts clear/4 parts acrylic enamel thinner. Add four or five drops of fishey eliminator for each gun full of paint.

If you put ink lines on your plane, dus over them first with the clear. Too much ra clear may dissolve the lines. Allow this t stand for about 15 minutes and then you be safe to spray away. I have frequently use "Testors PLA Enamels" (used with scal plastic models) for trim colors. These wi need to be dusted also, or they may craze.

Some kind of clearcoat is required to sea it from exposure to raw fuel and oil. Fo clearcoats I use acrylic urethane enamel




**The wing has a very pleasant shape,** with nicely raked tips and curved flaps. A painted-on canopy allows the front end to stay stiff and strong.



**The head of the engine** and the entire pipe are "out in the breeze" for good cooling and for the sake of practicality. The ship sits in a low position, and this yields great takeoffs and landings. Mike flew the ship extremely well in heavy turbulence at last year's Cleveland Stunt Championships, and won Advanced!

The manufacturers have different names for it. I've tried different kinds, all with good results. I have used this type of clear over enamel, dope, lacquers, MonoKote, decals, silk, and silkspan. All ended with good results. You can paint on rainy days with no problem. You can rub it out if you want the soft rubbed look. If your undercoats are smooth you will get a slick, shiny finish without rubbing it out. Urethane is water clear and will shine brightly from the instant it hits the plane.

A few words about safety. These paints are dangerous to your health if safety precautions are not followed. I paint in a garage separate from my house. I wear a respirator, goggles, and cover all exposed skin. I still don't stay inside with it any longer than necessary. There are safety precautions on the labels of all these products. *Read* and *heed* them.

## Setup and flying

The original *Eliminator 1* finished out at 44 ounces. That's around 11 ounces per square foot. It is powered by an O.S. .25 VF using a "MACS" over-the-cowl header. This feeds a Nering "Carbonmaster" 20–25 tuned pipe. The engine is mounted in a Dave Brown 2025 motor mount. This is bolted to F1 with an Ernst 2 degree shim between the mount and F1.

I think an O.S. .40 FP without a pipe would be an excellent second engine choice. A quick check showed almost no changes would be required to get this engine to work. Although not shown on the plans, a tip weight box and tail weight box are a must. The original *Eliminator 1* was equipped with both.

As of now I am flying the plane on 62-foot .012 solid lines (eyelet to eyelet). I am using a 10–3 APC prop and a Master Airscrew fuel filter. I am presently using a 4-ounce metal profile tank, modified for uniflow. The uniflow tube faces forward into the airstream. With straight Sig 10% Champion Fuel a setting of about 12 thousand rpm will yield lap times in the low 5-second bracket. Around three ounces of fuel are required to complete the pattern. I set the engine to run with a slight break in good conditions, and slightly faster in dead calm or windy conditions.

## Final thoughts

At 565 square inches this is not a large plane. With this in mind, you may want to select a color scheme which makes it really stand out in flight. Use ink lines and decals to help your static score.

I have done well flying this plane in the Advanced Class. So far it has garnered two first places, a second, and a third in four contests. This plane flies well in the wind despite the engine size. At Cleveland this year I was able to post a victory by flying my winning flight in winds when many people chose to pass.

I would be happy to field any questions or comments you may have about this plane. I'm in the PAMPA Directory. I would also like to thank Allen Brickhaus for his generous advice and guidance in creating this article.

**That's some nice pavement** to fly over, Mike. Can we join you for a practice session **(above left)**? The small displacement Schneurle engines produce tremendous power on the pipe, but don't use up too much fuel. A very nice combination. Caught in a wingover, the *Eliminator* looks good **(above right)**.

# Flyin' things for fledglings

More news from the gang. **By Earl VanGorder**

Hi troops! Great to get together with all of you again and, we've got a lot of items to discuss this month. Seems like that extra cold winter kept a lot of our people inside developing new products and ideas for us.

One of the nicest and most unusual items comes from Helicopter USA, a company ramrodded by Bill Heil.

Helicopter USA is producing an extensive line of rubber powered helicopter models that are divided into categories: beginner, intermediate, and advanced. The advanced line are full scale type choppers and are obviously for modelers with some experience. But, I think, the important thing is that Bill hasn't forgotten the young beginner who would like to build something that would really fly and be able to do it with minimum effort.

The "Indoor/Outdoor" is a twin rotor type, similar to what we called a "ceiling walker" some years ago. This one is quite modern, however and even the rubber motor is enclosed. That's right, it's inside an extruded transparent styrene mainframe. There are Teflon bearings on both ends along with ready installed rotor hubs and wire shafts. Rotor hubs are pre-slotted at the proper angle and all the "builder" has to do is insert the pre-cut rotor blades into the slots and there you have it—a helicopter ready to fly after about a bare minute of assembly time! I'm gonna show you a photo just in case you don't remember this type of model chopper. Now this kit is priced at $6.95 but here's some good news. You can get a free sample by requesting it and sending $4.00 for shipping.

Now, that's not really a lot of shipping cost as the "almost finished" nature of this kit requires shipping in a sturdy corrugated box. You can get yours by sending the four bucks and requesting it to Helicopter U.S.A., 555 Sloop 9, Pittsburgh, PA 15237.

PHOTO: DR. JEFF FORREST

**Except for the deadstick prop**, this could almost pass for a classic Beech *Staggerwing* in flight. This gorgeous ship belongs to Dr. Jeff Forrest. He's a great builder, and a pretty good photographer as well!

My advice is that you send an additional two bucks and request the full illustrated catalog of all the helicopter models put out by this manufacturer.

Let's move along. Last month I told you a new Lockheed *Vega* kit was coming from Scientext, but I didn't have details. Well, now I have. The kit builds a 26-inch span *Vega* model and is very complete with full size rolled plans, all sheet and stripwood, a full decal set in "Goodyear" markings and two full sheets of esaki tissue. Also included are Golden Age wheels and radial type nose bearing along with necessary wire and eight feet of Sig rubber. Best news is that this ki includes CNC-machining of all parts tha you'd normally have to cut from printwood These parts are machined, not laser cut, s you don't have to work with burned edge

All kits are shipped by priority mail an shipping cost is covered in the price o $31.00. Sounds like an all round good dea to me. I'll show you a photo of Pete Wank own prototype model of the *Vega*.

Now, while we're on the subject of kit with pre-cut parts, I've gotta tell you tha the latest two offerings in Easy Built's lase cut series are now ready for you. You'll re


PHOTO: AL BACKSTROM

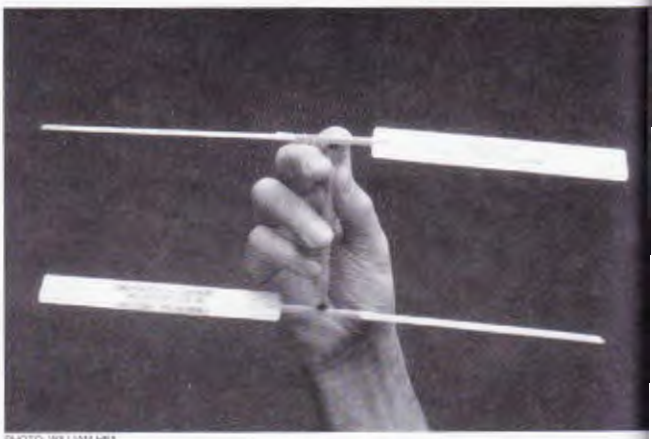


PHOTO: WILLIAM HEIL

**Hey! Where's the tail?** Al Backstrom's Fauvel AV-60 model is a tail-less design for those who enjoy a "trim" challenge **(above left).** The Indoor/Outdoor Helicopter **(above right)** comes from the manufacturer in such complete condi that you can be flying it in about two minutes after opening the kit!

member that they already offer 28-inch span models of *Spitfire Mk IX* and P-51 *Mustang* in this series.

Well, now two new 30-inch span models are ready for sale. These are a Piper *Super Cruiser* and an Aeronca *Champion*. Again all parts are laser cut using a very fast laser cutter which cuts down on the darkness of the laser burn. In fact, the slight tan burn on these parts does not need to be sanded off; it can actually be wiped off with a damp cloth!

These kits are very complete as were the first two in the series and include full-sized plan, preformed cowl, wheels, prop, rubber, tissue, and all other necessary items. These two kits retail at $30.00 and I'm gonna show you a photo of the bones of the Aeronca *Champion*.

We also heard from that "plans man", Clarke Smiley, who is now offering a lot of laser cut rib and former sets along with his plans. In addition, he has other goodies like decal sets, wheels, etc., etc. I'm not going to go into a lot of individual details since, as most of you know, Smiley sells World War I and Vintage types only, and many are very rare birds because he's heavy on triplanes and quadraplanes. The best thing to do is get his new expanded catalog which is fully illustrated. That way, you'll see what all these rare birds look like and you'll know what you're ordering.

The new catalog is five bucks postpaid and, by the way, if your present one is over six months old, it's way out of date! Send your fiver and request to: Clarke Smiley, 23 Riverbend Rd., Newmarket, NH 03857. While on the subject of plans, we have another new offering. That Domeduster gang ramrodded by Stan Fink has come out with a new book. It's Plan Packet #6 and contains thirteen different drawings for Pistachio, Peanut, and Walnut scale models. The packet sells for $12.00 postpaid. so that's less than a buck a plan which makes it a really good deal. Send your loot to Stan Fink, 1810 Pine St., Philadelphia, PA 19103. Make your checks payable to Stan Fink. Better go for this one.

There are more items I want to tell you about, but first let's go to the rest of this month's photos.

Our good flyin' dentist, Dr. Jeff Forrest, has come through again with a really great shot of his 25-inch span Beechcraft *Staggerwing*. It was developed from Skymasters plans obtained from Jim Fiorello of Golden Age Replicas. I'll have more photos of Dr. Jeff's models for you in coming months.

From Al Backstrom, who seems to like "rare birds", we have a shot of his tailless Fauvel AV-60. Al says the model is showing flight potential but serious trimming has been held up due to windy conditions. This is the first time that I've ever seen anything on this aircraft and it sure looks to me like Al forgot to put the elevators on!

While on the subject of "rare birds", Harry Brown sent us a shot of his *Pander D*, a Dutch lightplane of the 1920s. It's 26-inch span and rubber powered. The fuselage is covered with 1/32-inch sheet and the flight surfaces are stick and tissue. Landing gear is fully shock absorbing. The model was scratchbuilt from plans obtained from the Skonk Works (1890 Forestdale Ave., Beavercreek, OH 45432).

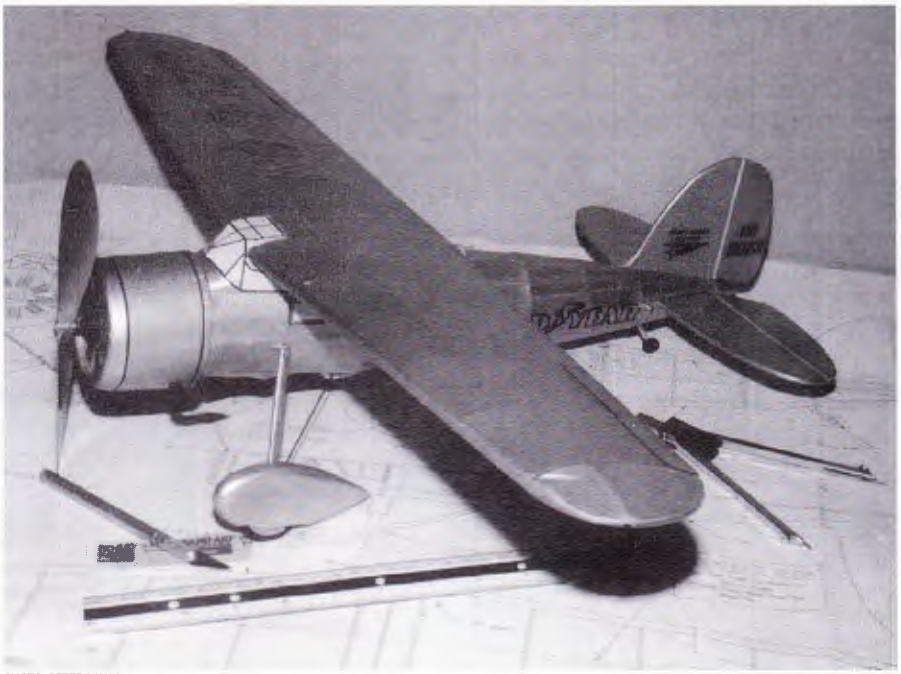


PHOTO: PETER WANK

**The latest kit from Scientext** is this 26-inch span Lockheed *Vega*. Note the cockpit, engine, and wheel pant details, all typical of the well thought out Peter Wank series of freeflight scale models. See text for more.

Finally, we have a shot of Jake Larson's Peanut scale Fokker D-VII built from a Model Aircraft Labs kit. As you can see, Jake used that great hex camouflage tissue from Rob Welles for a really authentic World War One look, and, how about all those details on the nose? Dig that scale dummy engine and all those panel markings. Wow! Hey, if you want to know more about the technique or Rob Welles tissue, don't write me! Drop a note to Jake Larson at 801 Ojai

ARTWORK: JOHN DOWNER

"Don't worry, any flight over 10 seconds and he passes out!"

# Flyin' Things for Fledglings

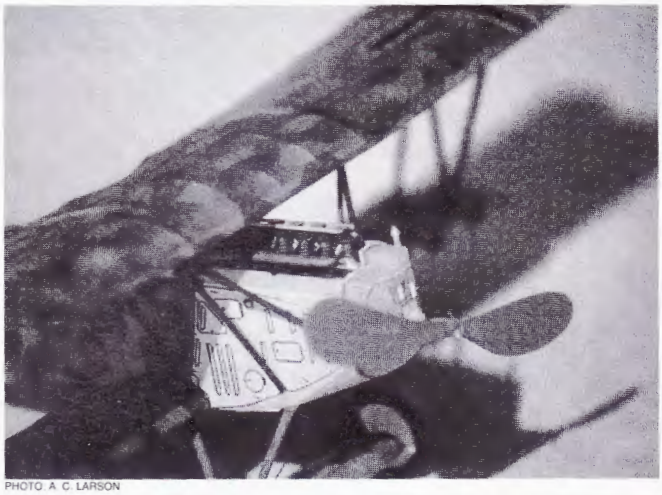


PHOTO: A. C. LARSON

PHOTO: RON WILSON

**Check out the great hexagon** camouflage tissue trim on Jake Larson's Peanut Scale Fokker D-VII **(above left)**. Note the engine detail, too! One of Easy Built's new laser-cut kits is the 30-inch span Aeronca *Champion* **(above right)**. A ni looking set of "bones". See the text for more information on the "*Champ*".

Ave., Sun City Center, FL 33573.

Now we're gonna talk a little about some available books that most of the gang are gonna want.

Especially desirable will be the new Flying Aces books which are coming out of England. Yes, troops, one of our most famous ever publications on aircraft and modeling, old copies of which are much sought after, and it took one of our English friends, David Baker, to do something about reproduction. And, what a job he has done. These are now in the form of thick books with stiff cardstock covers and each book contains several months worth of the contents of the old FLYING ACES mags of the late 1920s and 1930s. And, gang, we're not talking about just *some* of the contents... we're talking about the "works"!

You'll find loads of those great old model plans and articles from some of the designers who are practically "legends". Then you'll find the "joke" pages from the old mags. Okay, the humor may be a bit "corny" by present standards, but it'll take you back in time. There are also the articles on real aircraft of the period and it's a real nostalgia trip to read about our latest super-fast "pursuit ship" that can actually get close to 300 miles per hour!

And, of course, plenty of the great old stories of Phineas Pinkham, the WW I Spad jockey who was always in trouble. This humor is ageless and funny as ever.

Now, remember, each of these books contains the contents of a number of the old monthly magazines so they are quite thick. The price is $19.95 per copy, plus postage, and they can be obtained from Hannan's Runway, Box 210, Magalia, CA 95954, or Oldtimer Model Supply at 1924 Edinger, Santa Ana, CA 92705.

Now, you have probably noticed that the address of Oldtimer Models is different than what you might have had. As you are probably aware, Ken Sykora, who formerly operated Oldtimer, died in December 1995. The current address is that of Al Heinrich, who bought it from Ken's widow and will continue to operate it. Al also runs Aerodyne Models.

Right now, Volumes No. II and III are available. How about No. I? Well, they sta ed production with No. III and are worki out from there. No matter, you better lo into this one, especially all you lovers of t old FLYING ACES lore.

Now, also originating in "Merrie Olde" a magazine called *Flying Model Design and Constructor*. This is a slick paper ma azine about the overall size of the one you holding in your hand.

It's loaded with photos and articles on phases of model building and power uni Perhaps the best feature is an actual f size building plan that is of the fold out riety and can be removed from the mag zine giving a full size working plan in piece.

Cost of the magazine is fifteen and a h pounds Sterling for five issues. That tra lates to about twenty-three dollars in U currency so it seems well in line for a sli paper mag with a full size working drawi The address is: PAMAG Publications Ltd Lowfield Court, Sark Rd., Heeley, Sheffi S2 4HG, England.

At the time I heard about this magazi there was a U.S. agent and you might w to try that address: Wise Owl Worldw Publications, 4314 West 238th St., T rance, CA 90505-4509.

Well, gang, there were a lot of ot things I wanted to tell you about and m photos that I wanted to show you, but looks like we're again running out of t and space.

Just to whet your appetite for r month's get-together, I'll tell you that have some news for you on plan sets f the Czech Republic that are really great rather unusual since they include decal along with other goodies. Prices are pl fair, too.

In the meantime, troops, keep in t with your old buddy and let the rest o gang know what you're doing and also hear about any new ideas, or building that you might be willing to share wit rest of the troops.

Remember, if you want an answe SASE is always welcome and the old ha is still at 2 Holley Lane in Tonawanda, 14150.

Until next time, take care, pilgrims.

**This "rare bird"** is a 26-inch wingspan rubber-powered model of the *Pander D*, a Dutch lightplane of the 1920s. Harry Brown built this one, and covered the fuselage with 1/32 balsa sheet.

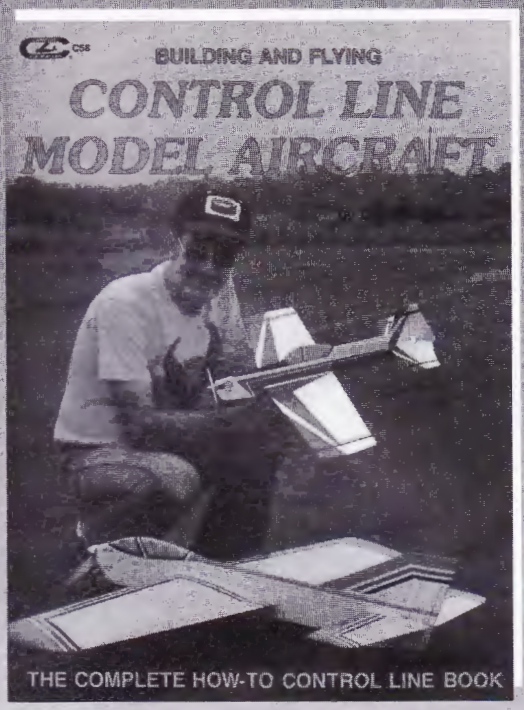
# Carstens FM BOOKS

## 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.
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.

C00058.....$7.95 + S&H





## 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 and 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.

C00019.....$7.95 + S&H


## OLD BUZZARD'S SOARING BOOK

by Dave Thornburg


This book is a collection of thirteen essays by the noted former soaring columnist for *Model Builder* magazine. This isn't just whimsy. There is a lot of insightful and practical knowledge here to find that elusive goal, the invisible thermal. The book also deals not only with soaring in general but with the increasingly popular aspect of slope soaring. This is a book with a different kind of how-to. It addresses the mental attitude "how-to" so important with soaring.

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## BASICS OF RADIO CONTROL SAILPLANES

by Alan Gornick Jr.

This is a book about having fun with radio-control gliders and sailplanes. Whether you're just starting out, are already an accomplished pilot flying for the pure joy of it, or enjoy flying in competition, you'll find plenty of information here to assist and challenge you in your pursuit of this fascinating sport and hobby.

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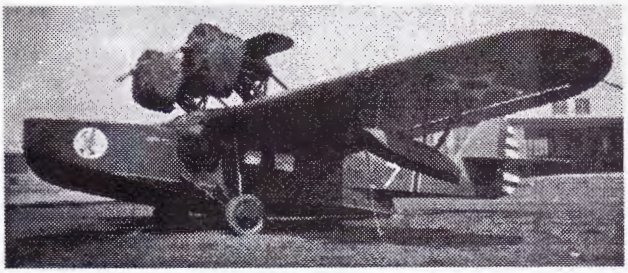
**OR FAX YOUR ORDER: 1-201-383-4064 FOR FAST SERVICE!**

# FLYING MODELS

# FLYING ACES DREAM STUFF



## DREAM STUFF FOR WINTER BUILDING

**Above:** That military twin engine amphibian brings back all wet memories of Don McGovern who designed many of them. **Right:** The Curtiss Condor biplane was obsolesced by the DC-1. Here's one in an Army Air Force uniform. Our plan is for an electric version. **Below:** The various Aeronca designs gave private pilots a very affordable private plane during the 1930s and their distinctive lines made them a natural for easy building and fun flying.

## R/C SCALE: 1

**CF9 AERONCA CHAMP.** High-wing, taildragger, 47" span. For .049 to .09 engs., 3 to 4 channel equip. P. Del Gatto. FM 10/11-64 **$7.00**

**CF51 ALPAVIA RF-3.** French sportplane requires a 3 to 4 channel R/C system, and spans 63". For .09 eng. O. Kampen. FM 9-66.**$8.00**

**CF64 GYPSY MOTH DEHAVILLAND.** Try this British biplane for some R/C flying fun. Features 68" span, requires 4 channel system, and .60 to .71 eng. Plans on 3 sheets. E. Nowac. FM 4-62. **$22.00**

**CF66 WACO N.** Tricycle gear biplane for .09 to .15 eng., and 4 channel R/C systems. Features 40" span. FM 1-67. N. Ziroli. **$8.00**

**CF126 HEATH BABY BULLET.** 1928 racer by founder of the Heath Co. Has 56" span, uses 4 channel R/C gear and .45 to .60 eng.. N. Ziroli. FM 7-68. **$9.00**

**CF143 VIGILANTE.** R/C Semi-Scale, similar to Navy AJ-3. Features 51" span. Uses .45 to .60 pusher eng. and 4 channel gear. N. Ziroli. FM 11-68. **$9.00**

**CF146 AMERICAN EAGLE.** A Scale, 1929 biplane for 4 channel R/C units and .40 to .56 eng. Features 56" span. T. Collins. FM 12-68. **$9.00**

**CF328 CULVER V.** Stand-Off Scale post-WWII classic, featuring 51" span. Uses .29 to .35 eng., and 4 channel R/C system. S. Hines. FM 4-74. **$9.00**

**CF331 MOONEY M-18.** A69" span Stand-Off Scale R/C design for .60 eng. Goldberg retract gear used in 5 channel original. S. Hines. **$9.00**

**CF348 AERONCA L.** Classic Stand-Off Scale R/C design; 72" span. For .45 to .60 eng., and 4 channel R/C unit. B. Lund. FM 10-74. **$12.00**

**CF349 HIPERBIPE.** Wild looking R/C Stand-Off Scale biplane, 45" span, 4 channel R/C gear and .40 eng. S. Hines. FM 11-74. **$9.00**

**CF350 CURTISS ROBIN.** R/C Scale monoplane. 61½" span. Requires 4 channel system, and .45 eng. B. Antoine. FM 11-74. **$15.00**

**CF353 CITABRIA PRO.** Stand-Off Scale R/C design for .60 eng. Has 63" span. Uses 4 channel equip. B. Godfrey. FM 12-74. **$15.00**

**CF364 EAA HEADWIND.** This homebuilt design makes great R/C Stand-Off Scale model. The 48" span ship uses .15 eng. and 3 or 4 channel system. A. Wolsky. FM 4-75. **$8.00**

**CF373 LINCOLN SPORT.** Scale classic with 30" span. Needs .020 eng. and micro R/C system. Can also be flown as F/F model. H.G. Bowers. FM 8-75. **$7.00**

**CF413 FARMAN 400 MONOPLANE.** An .020 powered light R/C or F/F Scale design, featuring 38" span. Uses micro R/C gear. H.G. Bowers. FM 8-76. **$7.00**

**CF418 MONOCOUPE 90A.** R/C Stand-Off Scale 1930's classic with 72" span. Uses .45 eng., and 4 channel R/C gear. F. Dellamura. FM 9-76. **$15.00**

**CF462 PORTERFIELD COLLEGIATE CP-65.** Stand-Off Scale R/C ship with 74" span. For .35 to .45 eng., and 4 channel gear. D. B. Mathews. FM 2-78. **$9.00**

**CF464 MISS COSMIC WIND.** R/C Stand-Off Scale Goodyear racer is great for everyday sport flying. Features 58" span, requires 4 channel system and .60 eng. D. Reiss. FM 3-78. **$9.00**

**CF475 AERONCA C-1 SCOUT.** Stand-Off Scale R/C design with 58" span. Uses 3 to 4 channel system and .19 to .29 eng. A. Wolsky. FM 8-78. **$9.00**

**CF478 GEE BEE MODEL D SPORTSTER.** Try a model of this legendary racer for R/C Scale. Features 56" span, and requires 4 channel radio. Uses .40 eng. H. Haffke. FM 7-78. **$9.00**

**CF488 DRUINE TURBULENT.** Stand-Off Scale R/C with 60" span for .40 eng., and 4 channel gear. D.B. Mathews. FM 11-78. **$9.00**

**CF491 1938 PORTERFIELD ZEPHYR.** 76" span R/C ship, .40-.60 eng. Uses 3 to 4 channel guidance. D.B. Mathews. FM 12-78. **$9.00**

**CF494 SPIRIT OF ST. LOUIS.** Stand-Off 2" scale R/C model of Lindbergh's classic. 93" span, .40 to .71 eng., and 4 channel radio. D. McGovern and T. Lombardo. FM 1-79. **$17.00**

**CF500 BEBE JODEL D-9.** R/C Stand-Off scale model of popular French homebuilt design. 57" span. For .35 to .40 eng., and 4 channel systems. D.B. Mathews. FM 3-79. **$9.00**

**CF502 MILES M-10/2.** R/C Stand-Off Scale ship with 58" span. For .60 eng., and 4 channel R/C equip. S. Hines. FM 4-79. **$9.00**

**CF510 MR MULLIGAN.** 1930's classic racer makes great R/C Stand-Off Scale model with 67" span. Requires .60 eng., and 4 channel R/C system. T. Lombardo and D. Palumbo. FM 7-79. **$12.00**

**CF512 LOCKHEED LITTLE DIPPER.** Stand-Off Scale R/C design for .60 eng., and 4 channel units. Features 61" span. D. Reiss. FM 8-79. **$9.00**

**CF520 PIPER TOMAHAWK.** R/C Stand-Off Scale model of popular private trainer for .19 to .30 eng., and 4 channel gear. Has 50" span. D. Sarpolus. FM 10-79. **$9.00**

**CF522 THORP T-18.** Popular homebuilt design translates well into R/C Stand-Off Scale design for .60 eng. Has 62" span, and uses 4 channel units. T. Lombardo and D. Palumbo. FM 11-79. **$9.00**

**CF523 ALEXANDER FLYABOUT.** R/C Stand-Off Scale for .09 to .15 eng. Features 57" span. Uses 3 to 4 channel units. A. Wolsky. FM 11-79. **$8.00**

**CF530 WACO 10.** 1930s vintage Scale biplane; .049 power, 3 channel R/C. Spans 30 inches. N. Kragness. FM 2-80. **$8.00**

**CF579 BONANZA.** R/C Sport-Scale version of famous Beechcraft design. For .60 eng., 4 to 5 channel systems. Spans 59", and uses foam core wings. D. Reiss. FM 10-81. **$9.00**

**CF583 NICHOLAS BEASLEY NB-8.** R/C Sport-Scale ship with 56" span parasol wing. For .09 eng., and 3 channel systems. A. Wolsky. FM 11-61. **$8.00**

**CF585 AERONCA CHAMP.** Silhouette-Scale R/C model of lightplane favorite. For .09 to .15 eng., and 3 to 4 channel systems. Spans 52½". Doc Mathews. FM 12-81. **$9.00**

**CF587 AVIAFIBER.** Sport-Scale R/C hang glider can be flown as a sailplane or with .049 eng. Uses 2 to 3 channel gear. Big 75" span. H. Applegate. FM 1-82. **$8.00**

**CF593 ROBIN HOOD.** R/C Fun-Scale model of the Curtiss Robin. Light weight construction and 51" span. For .20 to .25 size eng., and 3 to 4 channel radio. J. Maloney and D. Sarpolus. FM 3-82. **$9.00**

**CF595 HOWARD PETE DGA-3.** R/C Stand-Off Scale version of '30s classic. Designed for .60 eng, 4 channel radio, has 64" span. G. Rizkalla. Plans on 2 sheets. FM 4-82. **$17.00**

CF604 **PIPER PAWNEE BRAVE.** R/C Sport-Scale cropduster, 58" span. Uses a 4 channel radio and .40 eng. A. Heenan. FM 7-82. $9.00

CF717 **WACO SRE.** Schoolyard-Scale rendition of classic biplane. Spans 35 inches. Uses two or three channel mini or micro R/C system and .049 power. J. Kostecky. FM 2-68. **$9.00**

**CF732 PIPER PA-12 SUPER CRUISER.** The "work horse" of private aviation in 85" span R/C Giant-Scale model. For .60-1.20 eng., and 4 channel radio. B. Peru. FM 9-86. **$30.00**

## SEAPLANES R/C

**CF378 OCHROMA PYRAMIDALE.** Nordic A/2 with 70" span. D. Linstrum. FM 8-75. **$8.00**

**CF401 BACKLASH.** Catapult glider with 24½" span. L. Kruse. FM 3-76. **$4.50**

**CF408 DESPERATION.** A/1 Nordic glider with 48" span. Bruce and D.B. Mathews. FM 6-76. **$7.00**

**CF424 BOOMER BUM.** 76" span Nordic A/2 glider. J. Slovachek. FM 12-76. **$8.00**

**CF443 MOJAVE A/2 NORDIC.** A/2 Nordic freeflight; 85" span. R. Mathis. FM 6-77. **$9.00**

**CF6 SCAVENGER.** Amphibious R/C flying boat for .35 to .60 eng., Features 77" wing, and uses 4 channel systems. D. McGovern. FM 8-62. **$15.00**

**CF30 SKIPJACK.** R/C seaplane with one large float, two smaller tip floats. Has 50" span, requires .35 eng. and 4 channel system. P. Hook. FM 1-71. **$9.00**

**CF63 PIRANHA.** This 74" span seaplane uses .56 eng., and 4 channel R/C gear. D. McGovern. Plans on 2 sheets. FM 12-66. **$16.00**

**CF75 DORNIER DO-18K1.** A 66" span R/C twin flying boat for .19 to 29 engs. in tandem. Requires 4 channel system. A. Swanston. FM 4-67. Plans on 3 sheets. **$22.00**

**CF76 SEA HORSE.** R/C, twin float, amphibian features 67" span, requires .45 eng., and 4 channel guidance. D. McGovern. FM 5-67. **$9.00**

**CF86 MAKO MONSTER.** R/C seaplane, with 76" span, for .45 eng., and 4 channel equipment. D. McGovern, FM 7-67. **$17.00**

**CF94 UNSINKABLES.** Foam floats to convert big models to ROW. G. Rogers. FM 9-67. **$8.00**

**CF123 KOOKABURRA.** 72" seaplane for .45 eng., and 4-channel R/C gear. W. Aarts. Plans on 2 sheets. FM 6-68. **$9.00**

**CF132 GRUMMAN WIGEON.** R/C scale flying boat, with 70 inch span, for twin .45 engs. Needs 4 to 6 channel system. O. Weingart. Plans on 2 sheets. FM 9-68. **$17.00**

**CF150 MORAY MONSTER.** A 72" span R/C flying boat with retracting floats. For .60 eng., and 4 to 5 channel R/C gear. D. McGovern. Plans on 2 sheets. FM 1-69. **$17.00**

**CF168 SCAMPI.** A 63" span R/C flying boat for .56 eng., and 4 channel R/C gear. W. Aarts. FM 7-69. **$9.00**

**CF171 ENSIGN.** This 60" span R/C float plane uses .45 eng., and 4 channel gear. G. Rogers. FM 8-69. **$9.00**

**CF199 SAVOIA MACCHETTI.** Twin hull C/L semi-scale 1930 flying boat. Can also be flown as an R/C model. Spans 60 inches. Sarpolus & Shubel. Plans on 2 sheets. FM 9-70. **$14.00**

**CF247 LAKE BUCCANEER.** Semi-Scale R/C pusher flying boat, with 58 inch span, for .15 to .19 eng. Uses 4 channel R/C gear. D. Ramsey. FM 12-71. **$8.00**

**CF263 MADGE FLYING BOAT.** Amphibious R/C flying boat for .40 eng. eng. Has 57" wing, and uses 4 channel gear. E. Reusch. Plans on 2 sheets. FM 5-72. **$16.00**

**CF290 FALCONEER TEAL.** R/C Semi-Scale amphibian with 71" span, for .45 to .60 eng., and 4 channel gear. B. Prentice. FM 3-73, **$17.00**

**CF361 SEAWEED.** R/C seaplane with 65" span. Requires .5 eng., and 4 channel R/C system. B. Aberle. FM 3-75. **$17.00**

**CF393 VIKING.** Record setting R/C seaplane for .35 to .60 eng. Has 77" span, and uses 4 channel gear. B. Petersen. FM 1-76. **$9.00**

**CF450 THE SEE BEE.** ½A camera plane for R/C with 42" span. D. Katagiri. FM 9-77. **$8.00**

**CF539 ELECTRIC TERN.** Electric powered R/C seaplane for use with Astro Flight .020 motor, and micro 3 channel system. M. Poling. FM 5-80. **$9.00**

**CF592 ASTRO SPORT FLOATS.** Easy to build pair of floats for electric powered or ½A models. M. Poling. FM 3-82. **$4.50**

**CF600 SEAHAWK.** R/C floatplane with 47" span, .40 eng., and 4 channel R/C guidance. K. Sundqvist. FM 6-82. **$9.00**

**CF602 20-40-60 FOAM CORE FLOATS.** Three sizes of foam core floats for use with almost any R/C land plane. D. Sarpolus. FM 6-82. **$8.00**

## FREE FLIGHT GAS

**CF526 STARWORM.** Contest F/F design to use kit-built wings. D. Linstrum. FM 12-79. **$8.00**

**CF547 EASTERN STATES CHAMPION.** Replica of old-time favorite is .020 powered. A. Lidberg. FM 9-80. **$7.00**

**CF663 HIPERBIPE.** Winner of 1983 Nats F/F Gas Scale event has 18-3/8" span. Replica of aerobatic homebuilt. D. Rees. FM 4-84. **$7.00**

**CF751 LOWRIDER.** A stylish Pee-Wee 30 class design for freeflight fun. Features an inverted gull wing with a 30" span and .020 Pee-Wee eng. S. Buso. FM 6-87. **$7.00**

**CF770 BRISTOL SCOUT D.** An all sheet balsa "Fun Scale" freeflight biplane with 30" span. .049 eng. D.B. Mathews. FM 2-88. **$8.00**

**CF849 SKY PUP.** Freeflight scale rendition of a favorite ultra-light design. Features include removable plug-in wing panels. Spans 30¾ inches and requires .010 or .020 engine. E. Toner. FM 3-91. **$7.00**

## FF SOARING

**CF102 HYPODERMIC NERDEL.** A/2 Nordic with 47" span by T. Peadon. FM 12-67. **$9.00**
**CF108 LA Eng.A.** 1966 NATS winner. Hand launched. M. Allen. FM 2-68. **$4.50**
**CF118 ENILWOT.** A/1 Nordic easy to build with underslung rudder. R. Mathis. FM 4-68. **$7.00**
**CF120 AMERICAN CROW.** A/2 Nordic, with 77" wing. Different approach to competition model. R. Mathis. FM 5-68. **$8.00**
**CF127 NORDIC EXTRA LARGE.** 113" span, pod with fiber glass boom. C. Lanzo. FM 7-68. **$9.00**
**CF142 PTERODACTYL.** Hand launch light weight glider, with 20" span. T. Peadon. FM 11-68. **$4.50**
**CF152 TUMBLEWEED.** A2 Nordic, with 74" span, 2 piece wing. For windy weather. R. Mathis. FM 2-69. **$8.00**
**CF176 SCARAB.** A2 Nordic F/F with 79" span. Fiberglass fishing rod fuselage. R. Mathis. FM 10-69. **$8.00**
**CF179 U. S. KID, ZING, FLASH.** Three hand launched 18" gliders by Bay, Mathis, Peadon. Great fun. FM 7-70. **$8.00**
**CF207 GOB.** A/1 Nordic with 56 inch span Jedelsky type wing. M. Allen. FM 4-71. **$8.00**

## ELECTRIC

**CF884 VOLTSWAGON.** 72" span, low-wing R/C sportster. Power by either a 60 cobalt electric motor or .40 to .45 glow eng. Built-up construction and operating flaps. 5 channel R/C. I. Munninghoff. FM 6-92. **$12.00**
**CF879 MICRO JET.** Electric ducted fan freeflight design for some unique modeling fun. Spans 20 inches. D. Srull. FM 4-92. **$7.00**
**CF852 PBY CATALINA.** Build this 1/36 scale electric powered freeflight version of the famous amphibious patrol plane. A. Flesher. FM 4-91. **$8.00**
**CF899 AGRO-TURBO.** Try R/C electric powered crop dusting! 56 ¾" span design is powered by an Astro Flite geared 15, 6 channel radio. 2 sheets. L. Mikulasko. FM 2-93. **$16.00**
**CF902 SANDPIPER.** A 60 inch span electric R/C sportster for use with Hobby Lobby Turbo 700 motor, and 4 Channel R/C gear. Plans on 2 sheets. B. Winter. FM 3-93. **$15.00**
**CF916 SKIPPER.** Try this sporty electric R/C design with a Cox Fail Safe single channel system and a HiLine Mini-6 motor. Spans 28.5". Don Srull. FM 10-93. **$7.00.**
**CF912 CURTISS CONDOR T-32.** Historic airliner of the 1930s for twin-electric R/C. 69-1/4" span. Requires 4-channel radio, two Astro geared motors or glow engine equivalent. Laddie Mikulasco. FM 8-93. **$17.00.**
**CF402 DEHAVILLAND DH-10.** F/F Scale 49½" span, for two 02 electric motors. W. R. Strohman. FM 4-76. **$7.00**
**CF430 LOCKHEED WASP-VEGA 5.** Wiley Post's famed Winnie Mae. Model has 31" span. F/F Scale for Hytork 48 electric motor. G. Meyer. FM 2-77. **$8.00**
**CF449 VALKYRIE MODEL A NO. 1.** Freeflight Electric-Scale for 02 motor. Has 37" span. W. R. Stroman. FM 9-77. **$8.00**
**CF730 GRANDMA.** Semi-Scale R/C bipe performs fine on electric power. Has 54" span, and features a unique battery holder. E. Grummer. FM 8-86. **$9.00**

## C/L STUNT

**CF312 U-2 STUNTER.** C/L U-2 spy plane stunt ship for .35 eng., has 50" span. J. Adamusko. FM 10-73. **$9.00**
**CF835 F-9F PANTHER.** A Semi-Scale C/L stunter for .35 to .40 size eng. Spans 54". W. Hinton FM 8-90. **$12.00**
**CF825 COBRA 7.** Update of Steve Wooley's classic C/L stunter, featuring "I" beam construction. It spans 58¼ inches and requires .40 to .46 for power. M. Ditrich. FM 4-90. **$9.00**
**CF844 BOX CAR CHIEF.** Try this 1947 Walter Flicks design for C/L Old Time Stunt events. Spans 42 inches for .29 to .35 glow, or .49 to .61 ignition eng. M. Keville. FM 12-90. **$9.00**
**CF846 JUNAR.** A thoroughly developed C/L stunter for piped .40s. Spans 58", all built-up construction. B. Werwage. FM 1-91. **$9.00**
**CF856 IMPACT.** 1990 Nats winning C/L stunt design, featuring 63-inch span, and "breakapart" construction. Uses piped .40 eng. P. Walker. FM 5-91. **$12.00**
**CF862 GEMINI II.** A "V" Tail sets this high aspect ratio wing C/L Stunter apart from the norm. It spans 62 inches and is powered by an O.S. .40 FP. A. Adamisin III. FM 8-91. **$9.00**

## R/C DUCTED FAN

**CF757 PERFORMANCE PHANTOM.** An R/C, ducted fan hot rod. Balsa and foam construction. Uses Dynamax or Turbax fan, and .60 to .80 eng. Requires 4 to 5 channel gear. Plans on 2 sheets. E. Baugher. FM 9-67. **$23.00**
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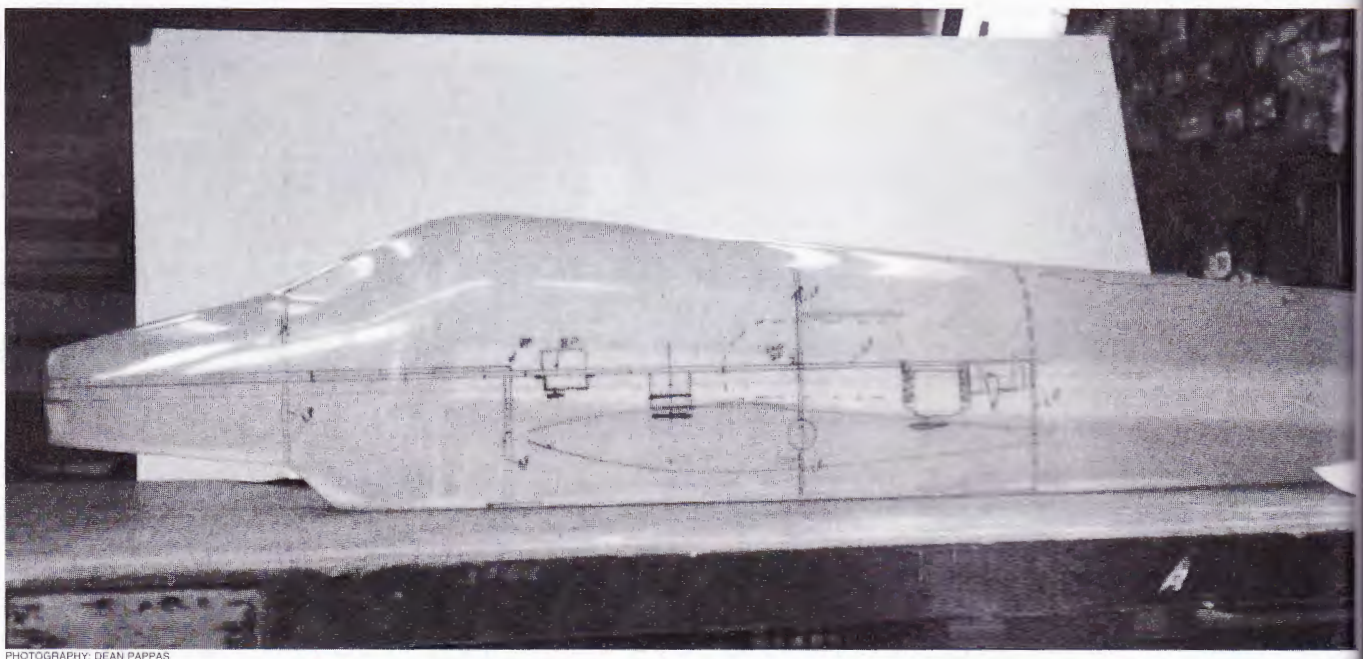
# R/C pattern

**By Dean Pappas**



PHOTOGRAPHY: DEAN PAPPAS

**The position of the planned** internal structure in Jeff Gladden's *Dr. Jekyll* is drawn on the outside of the fiberglass fuselage.

Here we are again, gathered together in a forum that technological progress has supposedly rendered obsolete. This comes to mind after just having read through the transcripts of the first two Pattern Conferences on the Internet. One of these days, I shall have to get on-line In the meanwhile, a group of flyers in my neighborhood have been talking about getting together for "Pattern Con" parties at the appropriate times. You should consult the *"K-Factor"* newsletter for the dates and times. I think that it shall be real fun, but no conference is going to take the place of the regular (technically driven) columns that appear here and elsewhere.

It's much like the difference between a one-on-one discussion and a lecture or seminar. This struck me after the series of seminars that took place at this year's WRAM show. These covered a variety of subject matters, including a nuts and bolts presentation about the "how to" of noise abatement, conducted by this writer. What jumped out at me is that the "Indianapolis Effect" had struck again. By that, I mean the scenario whereby competition leads to the development of technologies that benefit the general populace. We here in the Pattern event have taken some pains to develop our trimming skills and the "quiet" that is so common among us. It's an obligation to spread what we have learned. I hate to sound preachy, but I'll do it anyway. What's good for the hobby at large is good for this event, as well.

Time to tie up some loose ends... The first among these is one from a year ago! At last year's WRAM show, one company showed up with examples of a soft engine mount that looked simple, light, and (to this well practiced eye) *right*. My understanding was that this mount, which looked like a "swap-in" replacement for your typical "tee" type mount, was made in Germany. The 12[illegible] sized mount was not yet released, but I wa[illegible] so impressed that I ordered four of them right there at the show. They never showe[illegible] up, although it was later learned that th[illegible] importer deal fell through, and thes[illegible] mounts never came into the U.S.

**A 5-ply birch plywood crutch** is fabricated. This crutch was layed out to be ⅜ inch above the thrust line, an[illegible] is angled to coincide with the downthrust molded into the fuselage front. Note the lightening holes.

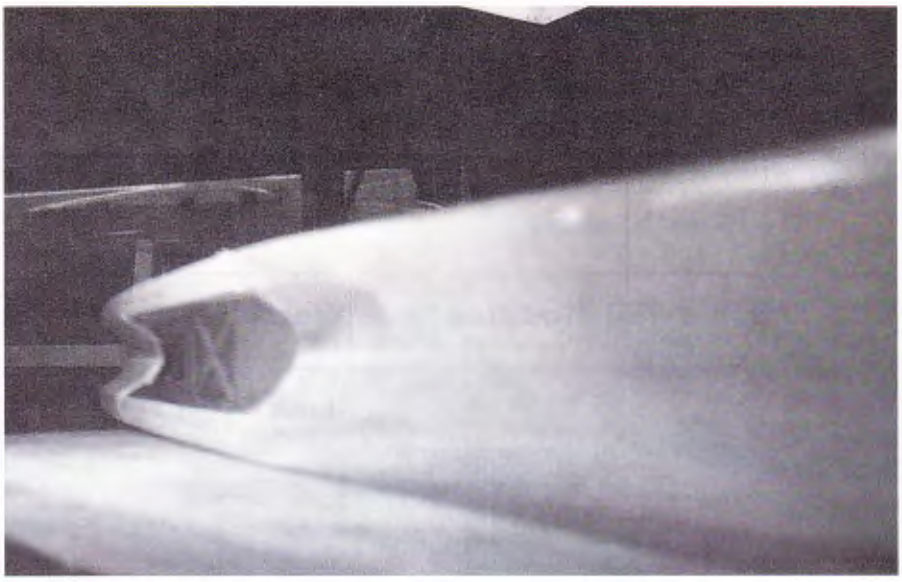
Now, Estes Corporation (yeah, the model rocket people) have gotten into the airplane hobby market in a substantial way. They *will* be bringing this mount into the country, and the larger size should be popular for both the four-cycles, and the new large two strokes. The sixty sized mount is already available. I don't have any other info, but the ads ought to be easy to find.

Two months ago (I think that's right) we ran the Webra 120 side exhaust on the test stand. Just the other weekend, my flying buddy, Jeff, and I flew the piped engine on an eleven and a quarter pound Goldberg Sukhoi. The airplane is the same one from which we pulled the engine in order to do the tests. It qualifies as a pretty good testbed: it weighs just a teeny bit over the eleven pound legal limit (of course, none of the planes that are likely to be powered by one of these setups is *ever* going to be over the limit!) and the Sukhoi is a good bit draggier than a two-meter Pattern ship is going to be.

The worst that happens is that the ideal prop for the two-stroke will have the same blade area and diameter but an inch more pitch than what we tested. In the bench tests, we got 8000 rpm on an APC 16–12 with a pipe length of twenty-two and a half inches. The pipe was a Violett ducted fan quiet pipe, hooked to a Macs Products header with a short length of pipe cut from a piece of deceased lawn furniture. Wally MacAllister at Mac Products assures me that they have an item that is very similar to the pipe they make for Violett, that is further optimized for the low rpm Webra.

We stuck with the ducted fan pipe cause we had it in hand. Jeff installed the system with a pipe length of twenty-one and a half inches, so we turned just a bit over 8300 rpm on the ground, with the needle set as rich as we could while staying on the pipe. "Over the top" was about five-eighths of a turn away on the needle. The fuel tank was located right on the c.g. and crankcase pressure was plumbed into the tank through a check valve, in accordance with the instructions that came with the Kline PCFS. Wonderful thing, instructions... If you follow them, stuff tends to work just like it's supposed to.

The PCFS is an example of something that works just like it's supposed to. It was bolted directly to the firewall, just behind the engine, and at the same height as the needle valve. The engine was mounted to the firewall courtesy of one of the new DuBro soft mounts. This mount is a little stiffer than I usually like, but then again, I've gotten used to the amount of movement necessary to isolate the lower frequency/larger amplitude vibration coming from the four cycle. It seemed to do the job admirably. Needless to say, one of the super soft mounts, such as the Hyde mount should further improve the isolation. By the way, I have heard some good things from people, who know enough to be able to tell, about the new Sullivan mount in the sixty size.



**This shot was taken** from below the installed crutch plate. The rear end of this assembly serves as a servo mount tray. See last month's R/C Pattern column for more details on this type of crutch assembly.

Back to the Sukhoi. At eighty-three hundred rpm on the regular bladed 16–13, it seemed best to fly at half throttle in level flight, cause the combo had the ponies to fly faster than was wanted. Only *after* the vertical was established did full throttle make sense. Now, about that fourteen hundred square inch bipe. Hmmm. Fuel delivery was a non-issue, as the PCFS makes the engine run as if it was suction fed with a tiny tank (the level in which never changes) located where you put the regulator. If we wanted to make the engine break leaner from a rich level flight setting, we were going to have to put the regulator further toward the back of the plane, taking care to keep the height in level flight even with the needle valve. This became obvious to us as the engine ran with no perceptible change in needle setting, going up, down, or sideways. The pull in the vertical is what everyone wants to know about this setup, right? Don't worry, there was plenty.

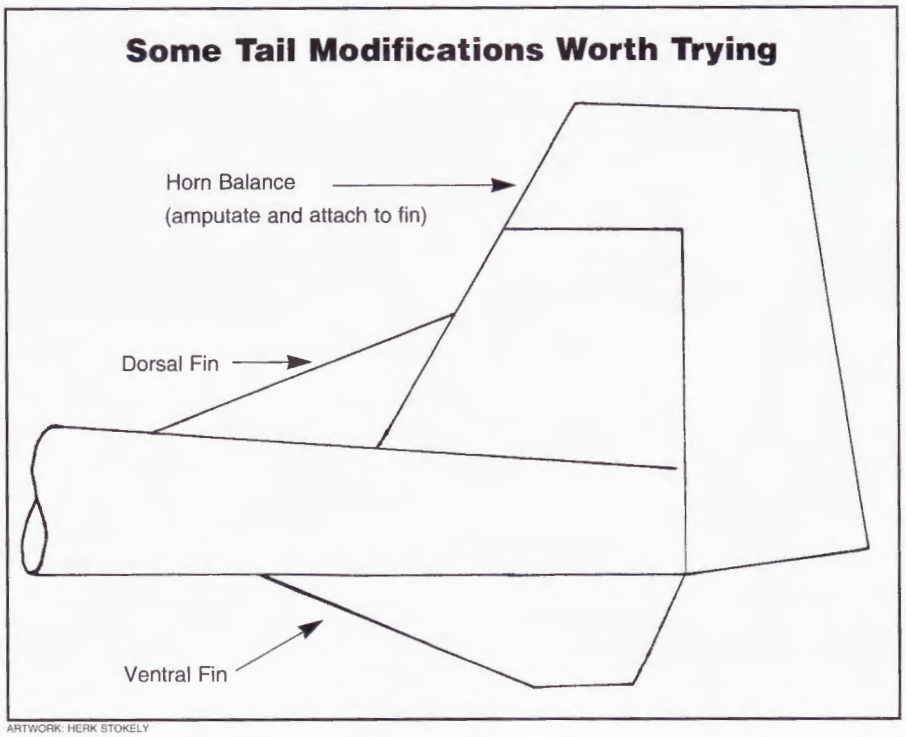
The really good news is that Webra is not the only game in town. In talking to some of the people in the trade, it has become apparent that O.S. and at least one other European (not allowed to say who) manufacturer have 120-ish sized engines in the works. Did you know that O.S. made a rear exhaust 108, but the U.S. importer didn't bother to bring the engine into the country? Thanks... a lot!

One more loose end, though: we probably won't really deal with it until next month. I don't know if it showed well in last month's pictures, but you might have noticed that we mounted the elevator servo in the *Ariel* sideways. This is an attempt to eliminate any asymmetric geometry as the servo arm swings. Next month, a geometry lesson. Bye...

**Here's a better look** at the top of the crutch assembly in Dean's *Malibu*, the subject of last month's column. The servos nestle neatly into this plate and will never shift or loosen from stress and vibration.

# R/C Soaring

**By Herk Stokely**




ARTWORK: HERK STOKELY

**Thought about the aft end** of your soaring machine lately? The author tells us that there is a lot going on back there, and offers some suggestions on modifications which help boost stability and performance.

Picking up on the discussion of modifications that I started last month, I think I'll start at the tail and work forward. Some sailplanes like to wallow, and others don't like to turn. Polyhedral models with heavy wings, oversize rudders, and short tail moments are particularly bad. Going back over the years I can think of several examples that would really benefit from some rework in the tail area.

## Mods I have known and loved

The vertical tail of an aircraft is usually split into two parts that I'll call the fin, and the rudder. There have been a few built where the whole surface moves (like the horizontal stabilizer on some R/C sailplanes). There aren't many of that kind, so this will deal only with the ordinary arrangement of separate surfaces.

The rudder works by itself to steer the model in yaw and, when combined with the fin, the two together act as the vertical stabilizer of the model. It's really a small vertical wing with a flap and the aerodynamics are similar. When the plane won't steer well enough, there isn't enough rudder power, and when it wallows, there isn't enough stabilizing effect.

Actually it's not quite that simple on models that have any significant amount of wing dihedral, because the yaw and roll response of the model get interconnected and changing one will tend to affect both. I'll try to break it down into sections to keep it from sounding complicated. It's not, but sometimes there's a lot going on back there.

## Amputate the horn

One really inappropriate thing that's seen on a lot of sailplanes is the overhanging horn balance area attached to the top of the rudder. On full-size aircraft with big rudders and unboosted controls, the rudder can be hard to move at high speed. To give the pilot some help from the airstream that he has to fight in order to move it, a "balance area" is sometimes added. This is an area that's ahead of the hinge line, but attached to the moving rudder surface. The airstream forces resist movement of the part of the rudder that's behind the hinge line, but they have the opposite effect on the part that's ahead of the hinge line—balancing the forces, and helping the pilot move the surface against the pressures of the airstream.

The problem with using this arrangement on sailplanes is: first, we don't need the assist; second, it causes a lot of extra drag; and third, if it is fairly large, it tends to make the plane wallow when the rudder control is moved. If a sailplane has one of these "horn balances", I recommend that it be cut away from the rudder and made a part of the fin. If a kit shows this kind of arrangement on the plans, the plane will almost always handle better if it's built onto the fin to start with.

I think some of the R/C sailplane designers figured that it must be a good idea because so many full scale designs use this arrangement. There was a time in the early days of flight when all of the surfaces had balance areas like this. Check out the WW I Fokker and *Albatros* designs for examples. Fortunately we've managed to get away from it on the ailerons and elevators but for some reason it seems to hang on as a "style" in rudder design.

## Diminishing returns

Some planes have a wide rudder on a narrow fin. When the chord of the rudder gets to be more than 50% of the chord of the surface, (at any point) it's getting into an area where wider isn't necessarily better. This is a place where experimentation is interesting and easy. If a plane doesn't turn well there can be several causes. Starting with the fin and rudder is a good idea—if it's a design that uses rudder and polyhedral for turning. Experimenting with the effects of modifications to those surfaces is as easy as getting some stiff paper card stock and taping extensions onto the surfaces.

I like to fold double a piece of card stock, cut out the shape I want, and attach it to the surface with Scotch tape. If it's the rudder that needs extending, the fold can face aft and the tape attach the two leaves of the extender to the opposite sides of the rudder. An extension of the fin can be done with the fold facing forward and the leaves taped to opposite sides of the fin. The effect of these kind of modifications can be pretty dramatic and educational; and if they are pursued far enough to find a better arrangement, the final configuration can be replaced with wood and made permanent.

A dorsal fin is another modification that can help both yaw stability and rudder control. A dorsal fin is that triangular surface that extends forward from the vertical fin of some aircraft. When the plane yaws, it creates a vortex over the lower part of the vertical fin and rudder. The flow field that the vortex creates makes both the fin and rudder much more effective. This is another modification that can easily be tried with card stock and tape. If it doesn't do anything for the model, peel the tape off and throw it away—no loss. If you do like what it does convert it to wood and make it permanent.

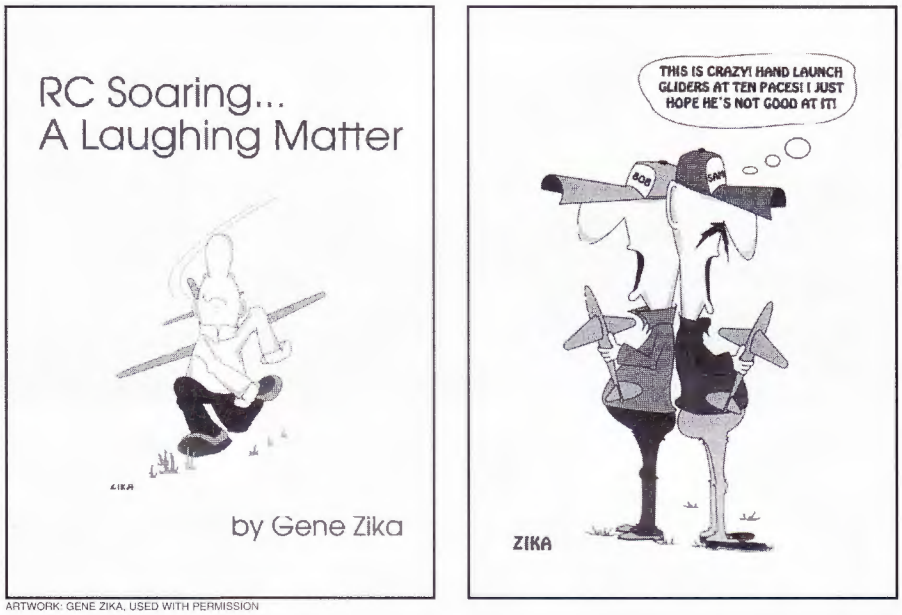
A ventral fin is similar, but it's located on the bottom of the fuselage—usually under the area where the vertical fin is mounted. It is a good modification for planes where the vertical tail tends to get a lot of "dirty" airflow from a large boxy fuselage, low-mounted horizontal tail, or other things that might disturb its airflow, particularly at high angle of attack. A ventral can be very effective in reducing a plane's tendency to "tip-stall" and enter a tailspin.

Make up a temporary ventral fin from card-stock also. They are usually about as long as the bottom of the vertical fin, and extend down from the bottom of the fuselage

about one third the height of the vertical fin. Shape it so that it looks like a small swept wing and give it a try. Landing will probably knock it loose, but by then you'll know if it helps. If not, tape it back on and try again. If you decide to make it permanent, it'll need to be fairly strong, so make sure that it's securely built onto the fuselage structure.

Because of its vulnerability, I'd try the dorsal first and only add a ventral if a reasonable looking dorsal doesn't help. One nice thing about a ventral fin on a plane with wing flaps is that it will tend to hold the tail up a bit when the plane lands, reducing the chance of damage due to the flaps hitting the ground. It'll also help the nose dig in if you are going for max competition landing points—ugh!

It's also true that some planes that suffer from a "tip stall" problem are really suffering from an ineffective or too small vertical tail. A dorsal, or ventral fin, can sometimes produce a miracle cure for this problem. However, if the problem is a warped wing or poorly balanced model, they might help a bit, but probably won't solve the problem completely.




ARTWORK: GENE ZIKA, USED WITH PERMISSION

**Sometimes we get too serious** about our hobby/sport, and need to step back and laugh at ourselves. The new book, *R/C Soaring... A Laughing Matter*, by Gene Zika helps this process along.

## Want to try a V-tail?

A V-tail isn't any better than a conventional tail when it comes to stabilizing and controlling a sailplane. In some respects it isn't as effective, so it helps to know some of the details. Just cutting off the conventional tail and slapping on a (looks about right) "V" probably isn't a good idea.

A V-tail does have some important advantages apart from stability and control, and the conversion can be a worthwhile benefit. First, it has less area and less structure than a conventional tail, so it can be quite a bit lighter. Save an ounce in the tail of a sailplane and you can probably take four or five ounces out of the nose. That's a big change and worth working for. Or, the weight saved can allow the fuselage to be extended further aft to increase stability and improve handling, without requiring more nose weight or making the plane heavier.

An advantage of the V-tail over some conventional tails is that they are less vulnerable to damage. If a model has a low mounted horizontal tail, it's likely to hit clumps of dirt, tufts of grass, and rocks anytime it is landed in rough terrain. A model like the *Spirit* or *Gentle Lady* with a lightweight built-up horizontal tail is going to actually rest on the tail every time it lands. That's not a problem on a golf course, but Mr. Murphy is still alive, so sometimes, everyone lands "in the rough". Then where the tail should be, there is a MonoKote bag full of little broken balsa sticks and the flying is over for the day. Even worse is when the tail structure cracks on landing but you don't notice it till the next launch—when it falls off!

Its lighter weight has another advantage. Landing forces put less stress on the fuselage in that area just forward of the tail surfaces. You know, right there where all of those ugly glued-up cracks are found on most older models. A T-tail is the worst for producing this kind of damage because the mass of the horizontal tail has the length of the vertical tail for a lever arm when it puts twisting and bending loads on the structure. Low mounted tails that are strong enough to resist breaking, will also often break the fuselage here when they hit something on landing.

There are some fine points to V-tail design. They aren't too fussy about the angle between them. There is about a thirty degree range from 90 degrees to 120 degrees where they will work quite well. I try to get mine close to 90 degrees, but on the high side of 90. Lining them up with the fuselage, getting the incidence set so that it's the same as the conventional tail, keeping them even with each other, and lining them up with the wing can be a tricky affair. Since I don't have to sweat the angle too much I try to get everything else right on, and let the angle drift a bit. I usually end up with about 100 degrees, but as I said, it's not critical.

Make the total area of the V-surfaces about 80% of the total area of the horizontal and vertical tail to be replaced. If it's being designed from scratch, an aileron model with a normal fuselage length should probably have a total V-tail area of about 14% of the wing area. A polyhedral model needs about 17–18%, though these can be less if the fuselage is longer than usual between wing and tail.

Make the control surfaces nice and wide. About 35 to 40% of the local chord of the surface is a good figure. I like to stop the control surfaces (elev-udders or rudder-vators?) about an inch short of the tip of the tail. This gives a theoretical drag reduction, but its real advantage is that I can see the trim setting very clearly before I launch the model.

It's also a good idea to build some differential into the rudder movement of a V-tail. The down moving control surface doesn't seem to be quite as effective as the one that is moving up. Set up the controls so that there is more down than up when pure rudder control is input. There are some computer radios that do this in the programming. It can also be done at the servo by shifting where the pushrods attach to the servo output wheel.

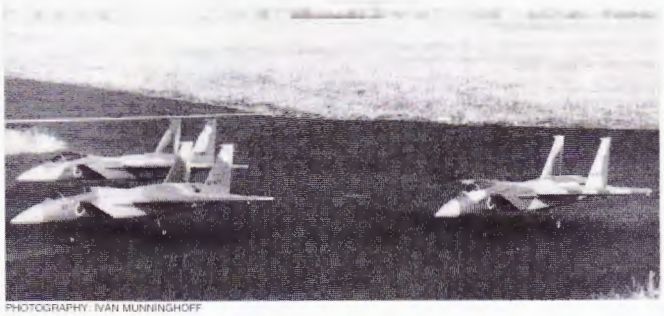
When it comes to V-tail conversions, I think it's usually a good idea to avoid it on a poly model, unless the span is short and the wings light as on a hand-launch model with a built-up open structure wing. They can be made to work well, but it can be difficult.

## Soaring humor

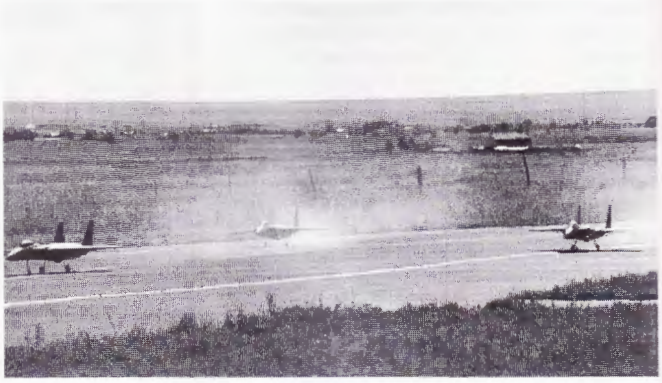
It's winter and the weather looks like it'll be cold and windy right on through the weekend. So I'm reading more than usual. This month it's *R/C Soaring ... A Laughing Matter* by Zika. This is a collection of Gene Zika's great cartoons that we have enjoyed in *R/C Soaring Digest* and other publications for many years. Bill and Bunny Kuhlman have published a book of his cartoons that kept me chuckling for hours. Contact B2Streamlines at PO Box 976 Olalla WA 98359-0976 or by e-mail bsquared@halcyon.com. The price is $15 postage included.

# Fan Facts

**By Ivan Munninghoff**



PHOTOGRAPHY: IVAN MUNNINGHOFF



**Three Top Gun *Ultra Eagles***, fitted with O.S. .91s, Byron fan units and pipes, and Spring-Aire retracts, get ready for flight **(above left).** All three *Eagles* have just lit their afterburners for a three-ship formation takeoff **(above right).** If everybody sticks to his assigned portion of the runway, everything will be fine!

There's very little that's truly new in the world of jet modeling. Sure, the upcoming turbine revolution is really neat and will spawn a whole new breed of jet realism. But, with the reliability of today's engines and radios, there's virtually no jet aircraft that cannot be modeled with some degree of success. Look at the range between Chris Gold's B-52 *Stratofortress* and Yellow Aircraft's F-117 *Stealth Fighter*. Modelers are building and flying jet airplanes that would have been considered impossible subjects just a few years back.

So where's the challenge? What new ground remains to be broken? One of the major reasons many of us fly jets is that we want to duplicate what the real ones do. We'll never be able to afford our own jet, so we have to settle for model flying. How can we make that more fun?

We think we've found the answer: formation flying. Every modeler worth his salt has drooled over the Thunderbirds or the Blue Angels or the Snowbirds or the Red Arrows. Even those of us who have been fortunate enough to have had the opportunity to actually fly close formation in military jets are envious of those demonstration teams. And we look for ways to satisfy the thirst for that sort of performance and precision as well as the audience appreciation that follows a good show. Today's ducted fan airplanes can satisfy these requirements.

Admittedly, it's not easy. If you're not comfortable flying a Goldberg *Eagle*, especially with anyone else flying at the same time, you're probably not ready for formation jet flying. But, if you don't mind having your airplane near someone else's, and if you are proficient with your jet, formation flight is well within your grasp. However, before your cluster of jets blasts off into the blue, there are a few things to consider.

When you intentionally try to keep your airplane close to another one, the danger of midair collision naturally increases. If you're not willing to expose yourself and your jet to the marginally greater risk, don't try it.

Even the highly experienced full-scale flight teams have extremely thorough briefings before every flight. Every member of the team knows exactly what is expected of him, what maneuvers will be done in what order, and what to do in every conceivable emergency. Especially in models, maneuvers don't take very long to accomplish, and there is precious little time available to thoroughly discuss how a maneuver is to be done and where it is to be placed and how big it should be, and so on and so on while the maneuver is being done. Take the time to make sure every member of the formation is well informed.

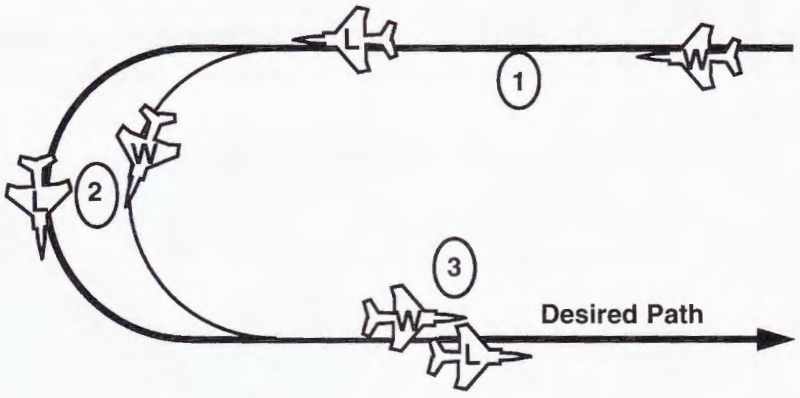
As already mentioned, formation is not for the inexperienced. If you can't make a takeoff and a landing on the center line of the runway or on whatever portion is allotted to you, you're not ready. Team members should have roughly equal skills. No maneuvers should be selected that are beyond the capabilities of any of the flight members.

Not only should the pilots have equal capabilities, so should the airplanes. We've found, through trial and error, that trying to keep dissimilar aircraft close to each other is extremely difficult. Differences in size or shape cause severe problems with depth perception. Especially if the planes are relatively far away from the pilots, telling where they are in relation to each other is nearly impossible. Differences in speed are difficult to deal with. Obviously, the faster jet can be slowed down, but how much to slow down is hard to determine. The conclusion to be reached here is to use matched airplanes.

We found that even two identical planes do not fly at the same speed. If one is a little rich or a little lean, there can be a dramatic difference in how fast they go by. Adjusting throttles to maintain relative position, which works perfectly in full-scale formation, doesn't work for beans with models. By the time the pilot can see that he's made a speed change, the change is already much too big. Relative positioning is much better maintained by using "cut-off."

**As far as model airplane formation flying** in concerned, this is a very nice three model grouping. Only try to fly this close together when you are well practiced with the other two pilots in the formation.

## Using Cutoff to Adjust Position




ARTWORK: IVAN MUNNINGHOFF

"Cut-off," while cumbersome to explain, is really quite obvious. If your jet (or car or bicycle or boat or skate-board) is too far behind the leader, all you need to do to catch up is to turn inside his turn—take the shorter route—cut him off.

The farther you're behind, the bigger slice you need to take. The same thing works backwards. If you're in front, and you don't want to be there, swing wide, and the one behind will pass you easily. Both of these position modifications will take place without changing airspeed. The simple fact that you've taken a shorter or longer path to get to the same point will make the difference. In the figure shown, the wingman is too far behind location 1. To correct, at location 2, he turns early, cutting off the leader. By location 3, he has caught up and is in position. Of course, the same principle applies in vertical maneuvering—if you're doing a vertical maneuver, you can still use cut-off to maintain and adjust your position. Actually, cut-off works any time you're not flying in a straight line. And it works much better than trying to adjust the power setting.

Back to the aircraft of choice. We've also found that, especially with jets, using very fast airplanes makes the whole process more difficult. They cover too much ground and therefore necessarily spend a greater proportion of their time a long way away from the pilots, making depth perception even more difficult. Of course, you don't want *really* slow airplanes, because jets are supposed to at least look fast. Jets running a hundred miles per hour or a little over appear to be the best compromise. We've been using Top Gun F-15 *Ultra Eagles* for our formations and have found them to be the perfect choice. They're fast enough, they look like jets ought to look, and they're extremely easy to fly with no bad habits. And spectators can easily identify with them. You can tell from the accompanying photographs how great our *Eagles* look together.

You'll also need a plane you can rely on. If it's out of trim, you'll be hard-pressed to fly formation and trim at the same time. If your engine isn't reliable, you'll have problems because three identical airplanes in close proximity to each other make just one engine sound, and it's tough to tell whose engine is starting to go lean. And, if your engine won't idle well, the ground portion of your mission will suffer. It takes a while to get all three airplanes moving, so a good idle is important. Since ground operation is an area the spectators can see clearly, your taxiing and take-off absolutely must look good.

By now you're wondering how to actually keep the planes apart. There are a few basic rules. One, always try to know where everyone is supposed to be and where they really are. In our three-ship formations, we always start out by determining who has the inside, the far side, and the middle during all the maneuvers performed close-in enough to actually see such relative positions. That way, even if you lose sight of your wingmen, you'll have a clue where they are.

Second, never allow the image of your plane to superimpose itself over that of another unless you're *absolutely* certain you have the spacing. If you always have some sky between your plane and the rest, it is physically impossible to run them together. If the silhouettes are approaching each other, the high plane should pull up a little or the low plane should descend a little. In general, power changes don't make quick enough changes in spacing.

Third, and probably most important of all, is communication. Whoever is the leader (and he may not necessarily be in front all the time) should be talking almost constantly about what he's doing and what's coming up next. If a wingman knows what's coming, he can match almost anything the leader can do. If the wingman's caught by surprise, he can be severely left out in the cold. All members of the formation, however, have the responsibility to speak up if they have any input; this is, after all, a group activity.

The leader absolutely has to be smooth in his flying. Even if he calls a turn, if he abruptly banks and yanks, the wingmen will be thrown out of position. If he's smooth and "telegraphs" his roll-ins and roll-outs, they can hang in there. He ought to attempt to use the same roll rates and turn rates all the time so the wingmen can reasonably anticipate what's happening.

Otherwise, about all you need to know to get good at formation flying is the same as what you need to know to get to Carnegie Hall—practice, practice, practice.

We've flown three-ship formation at four different jet rallies now, and the spectator response has been universally enthusiastic. Very few people are flying formation so far, and the fans love it. Give it a try.

**This *is not* a staged photograph!** The two *Ultra Eagles* are very close together in a fly-by formation. This requires supreme confidence in your flying partner, concentration, and steady nerves. Not for the timid!

# Electric Flight

## By Dick Miller

In case you haven't caught their ad, Campbell Model Supply Company, 37742 Carson Street, Farmington Hills, MI 48331 is importing the *Condenser Plane* by Union Models of Japan. It's $29.95 plus three bucks S&H. Yep! This is the one that Bill Hannan wrote up about a year ago in *Model Builder*, but it's never been available in this country before now.

And what, pray tell, is a "condenser" plane? Well, first of all, it's a misnomer. It's really an electric plane that's powered from a big, hairy "capacitor" rather than a battery. A "condenser" is an apparatus that makes substances denser, and who really wants thick electricity?

The kit comes complete with a tiny Mabuchi motor, a 3.3F (Farad) capacitor and a charger. Kenway sells the KR2, their geared version of the motor for $21.95 and the capacitor for $4.50 plus $3 S&H. The motor in the plane kit is direct drive. So they're the same but different; right? Right. Dig out my 11/95 ***FM*** column for more info on these types of power sources. The plane is a fine indoor flyer but must be kept light for good performance.

### Superior Props

A new catalog I received from Superior Props at 2412 Tucson Ave., Pensacola, FL 32526 contained some new goodies that tweaked my interest. They've got real balsa filler that you mix with water, doesn't shrink and can be sanded to a feather edge without undercutting even the softest balsa. It's $3.25 for a 2-ounce jar. For all you rope DT users, trash your punk and eliminate those embarrassing burned tail sections previously caused by other lighters; they've got a new battery operated lighter for $8.50 that's specifically designed for rope DTs! In case you forgot, Superior is the outfit that makes those gorgeous 3½-inch RH and LH props for the Micro 4; they're $3 each. Be sure and add $3.50 for S&H. A business size SASE gets you their catalog.

PHOTO: JACK REID

**That's England's Jack Reid** giving us a look at his original design *Phoebe*. It's powered by a Speed 400 motor and a 6-cell 120 mAh battery pack. The 256-inch design weighs only 8 ounces!

### Micro/Mini charger

How 'bout a $20 charger that will charge your flight pack or your Rx battery from your car cigarette lighter without melting the upholstery? You can easily modify a $17 Radio Shack DC Power Adapter, #270-15602, by cutting four printed circuit board wires, adding a resistor combo and three new wires. The whole operation will take you about an hour and when you're done, you'll have a fused one Amp constant current charger with an On-Off switch and indicator light that's capable of charging, without adjustments, 1–4 cell 50 mAh packs and 1–5 cell 110 mAh packs and larger, all in a neat case. Get the instructions, #RS/CC, for $2 with a SASE from E.M.P.S., Box 134, Robesonia, PA 19551.

Want it ready to go? Order it from Garrett Electronics, 205 Memorial Drive, Greenville, OH 45331 for $34.95 plus $3 S&H. You'll need a stop watch type with these types of chargers to prevent the possibility of overcharging your pack; they have the ability to peak charge a 50 mAh pack in three minutes, flat!

### British Stuff

In case you missed Larry Sribnick's column last month, let me reiterate that with the co-operation of their prez, Gordon Tarling, I have become the collector (call me Bruno) of the annual dues for the British Electric Flight Association (B.E.F.A.) on this side of the "pond." My intention is not to make cent one on this deal, just to collect all your $31 checks and money orders (made out to me) and then wire transfer the dough to their account, thus eliminating the dangers associated with stuffing hard cash in the mail.

The net result of this effort is that you'll get their fine quarterly journal, full of all kinds of experimental results and good info from guys all over the world. The drop-dead date for me to receive your money is 4/30/96; after this date, your dough gets returned and you're on your on; individual international money transfers go for $16 a pop. Normally their membership runs from March to March; we got an extension this year as we started late. Tee shirts? We'll talk later.

Recently received copies of the British magazine *Flying Model Design & Construc-*

PHOTO: DICK GIBBS

PHOTO: JOE SEBASTIAN

**Dick Gibbs built this *Buzzard Bombshell*** from a Lidberg partial kit **(above left).** It uses a Kenway KR1D motor fed by a 4.7F capacitor. Gets 35- to 45-second flights in dead air! Joe Sebastian's Easy-Built *Mosquito* weighs 7 ounces with two Scientext ST-2s and a 4-cell 110 mAh battery pack **(above right).**

*tor* from Ron Firth in England. If you've been disappointed in recent publications from over the pond, I recommend that you definitely try this one. It's full of plans, explanations, building tips, etc. Lots of small stuff just begging for conversion; also pure electrics, $CO_2$, F/F and R/C. Hey, it's a true overseas modelers magazine, for a change! Five issues will set you back $28 via check, Visa or Mastercard to Wise Owl Worldwide Publications, 4314 West 238th St., Torrance, CA 90505-4509; 310-374-6258.

## CETO stuff

There have been a lot of requests lately on how one might improve the pulling power of the CETO micro R/C actuator. Guys have commented that even if you stick to the one square inch requirement, there's a possibility that the actuator won't function properly in flight because of the air pressure that can develop against the movable surface, particularly with relatively fast flying planes.

Other comments go as far as to state that alone, it works fine, but doesn't when it's hooked up to the rudder. So the requests are basically for an actuator that works reliably. In defense of CETO, let me state that my two units work well. I use Scotch tape for hinge material and insure that there is absolutely no drag on the linkage. My rudder areas are a square inch or less. Further, I also make sure that the Varta cells are kept up to snuff before going out.

But, O.K., the troops need relief, so here's some suggestions on what you can do: 1) Go to a pull-pull arrangement with monofilament line or silk thread. 2) Put about 25% of the rudder area beyond the hinge. 3) Mount the actuator upside down. Rick Tenenoff tells me this frees up the mechanism which may stick in the upright position. 4) Replace the Varta cells with three 50 mAh Sanyo cells; this will result in a little more pulling power but you can fully charge them safely in minutes instead of overnight. It'll cost you 6g more in weight, though. 5) Make a new actuator by rewinding the existing coil. This may be tough for some of us, but if you're interested, send $4 to Phil Smith, 2662 Sharon Drive, Adrian, MI 49221; he'll send you instructions and info on building your own actuator along with plans for his IR receiver. George Pearce has measured the torque at 30mA of the CETO actuator at 0.67g-cm and that of Phil's at 1.65g-cm. Quite a difference!

Speaking of the CETO R/C unit, those 2-pin CETO connectors can be easily made from integrated circuit "SIP" sockets. A 20-position job, #276-1975, is available from Radio Shack for $1.59. To make a pair of connectors, separate two 2-pin segments from the socket, solder #24 to #28 stranded wire to them and cover with shrink tubing. You can also get a 10-position SIP socket with detailed instructions from E.M.P.S. for $1 and a business size SASE. John Worth puts out an excellent monthly paper called *The CETO Club Newsletter* that deals specifically with the CETO system; an annual subscription is $5. Previous issues have dealt with some of the info discussed above. John also sells the CETO system and accessories for it. Write him at Cloud Nine RC, 4326 Andes Drive, Fairfax, VA 22030.

PHOTO: TOM SEUM

**The twin "Shack" motors** powering Clive Bunyan's 40-inch span *Skylark* shut off upon landing via a clever nosewheel ON-OFF switch. Clive hails from England and seems to have some really novel ideas.

## Other stuff

Because he felt that hanging two Scientext ST-2 motors on the 29¼-inch stretched wing of his Easy Built *Mosquito* might be pushing the structural limit, particularly on sudden impact, Joe Sebantian stiffened it by making a box beam from 1/16-inch square spruce spars sheeted with 1/32-inch webs. It flies very well; I've seen it on a video tape! The motors were set with 2° of downthrust and Joe eliminated the need for offset by using 5½–3 Grish Tornado RH and LH props rotating towards the wing tips. Tip washout was later added to prevent stalls. With a 4-cell 110 mAh pack; the total weight comes in at 8 ounces.

Bill Warner is again offering the latest issue of his collection of cottage industries that are pertinent to our hobby. *Cottage Wings* is $1 a copy with a business size SASE. Bill's address is 1370 Monache Ave., Porterfield, CA 93257.

Mark down these important dates for 1996; some of them have changed, so update your calendar and reservations accordingly. The FAC NATS at Geneseo, NY: July 19–21, 1996; the AMA Electric Nats at Muncie, IN: July 20–22, 1996; KRC at Quakertown, PA: September 20–22, 1996.

In closing, let me plead with you, dear reader/correspondent, that one should really indicate what one wants in a simple note with one's SASE. Those containing only an SASE arriving at 193 Huntzinger Road, Wernersville, PA 19565 have become mysterious as some of my free-bees are apparently now being mentioned elsewhere, so I really don't know what you want if you don't tell me. Be kind, divulge your mind.

**Tom Seum's 46 square inch** *Demoiselle*, built from 3D drawings, uses a Kenway KR-1 and a 2-cell 50 mAh battery pack. These minimal material designs are naturals for electric freeflight treatment.

# small Talk

**By Randy Randolph**

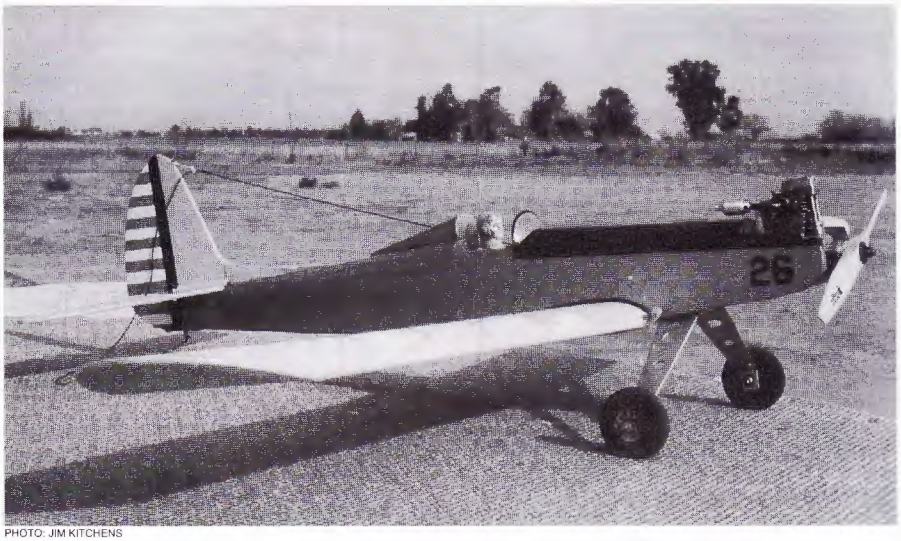



PHOTO: JIM KITCHENS

**The *Playmate* has been around** for a long time, and is still one of the best three-channel low wing airplanes around. Jim Kitchens built this O.S. .26 FS Surpass powered version some six years ago. Still looks great!

There are very few modelers who haven't had the desire to design and scratchbuild their own airplane. The really great thing about this is that when it's finished it's truly yours.

Airplanes built for the smaller engines have the great advantage of being inexpensive, uncomplicated, transportable and, most of all, quick to build. There is no better way to produce that first personal airplane than to build one powered by an engine in the .049 to .10 range. If you haven't tried it yet, here are a few things that might give you a push.

There have been numerous design articles written and all are good. Read them all if you want, but you really don't need heavy duty calculations and deep theory to produce a good flyable airplane of your own design.

Anyone who has built a few airplanes from kits knows about the structure of wings, fuselages and tails, and why they were built the way they were. Wings have spars to carry the flight loads and ribs to form the airfoil shape and sometimes ailerons for directional control—nothing new here! The fuselage has an area near the balance point that is large enough to house the radio, battery and servos and is reinforced around the engine so it will to stay with the airplane when running. Tail surfaces have rudders and elevators to control the airplane and are mounted in such a way as to present themselves to the air the airplane passed through. Kits are great things for they produce good airplanes as well as offering sugar coated education in the process.

Taking a good look at the construction articles in this, and other modeling magazines is another way to see what structure is necessary to hold all the parts of an airplane together and, best of all, the text usually describes a construction sequence that could guide you through your first project. The proportions of wing span to chord, as well as the size and location of the tail surfaces seen in these plans, offer an excellent starting point for your first project.

Now, go on and scratchbuild a nice-looking, square-sided airplane that "looks right" and I'll bet it will fly, and fly pretty good. If you build it nice and light it will fly even better!

Quite a few articles have been written about trainer type airplanes that have a wing loading of between 16 and 20 ounces per square foot of wing area. An airplane powered with a .60 size engine and with a wing span of 60 inches and a chord of 12 inches, that weighs five pounds, will make a good trainer. But, an .02 powered airplane with a 30-inch span and a six-inch chord that weighs 20 ounces and has a good landing gear will taxi pretty well on a smooth runway. If you can throw it hard enough it will fly a little, but *not* like a trainer!

It is a simple fact that an airplane wing gets its lift from the air that passes under and over it while it is in motion. The smaller the wing the less air it is able to displace and the less lift it is able to generate per unit of its area. No one, as yet, has been able to scale air to work with scaled-down airplanes. For good flying little airplanes, make them light!


PHOTO: JIM KITCHENS

**Proving that there are** a lot of airplanes which fit into the upper end of the small model category, Jim Kitchens also sent along this picture of his *Parakeet.* It is also powered by an OS .26 FS Surpass.

## The doctor replies

The mention of Oracover Clear in this column brought a response from a most respected source, Eric "Dr. Diesel" Clutton, no less. A quote from his letter will show just how light and strong that material really is. Eric writes:

"A few months ago, impressed by its light weight, I decided to recover a Bostonian fuselage with the stuff. Actually I started with the windshield and got carried away! It went on so well (1/16 inch sticks) that I had a go at the wings. I covered the bottom surface and they went like a pretzel! That Oracover

really shrinks! Anyway I salvaged the situation by holding each panel flat on the board while covering the top surface, the warps came out and stayed out! Flushed with success I covered the tail surfaces which were flat 1/16 inch sticks; not so good—it really twisted out of shape, but I was able to get them back somewhat flat. The weight of the finished model was about the same as with Peck tissue and dope..."

One of these days someone is going to cover a quarter-scale airplane with Clear Oracover, save a pound or two and declare it the best thing since microwave dinners. (?) In the meantime it sure works great on small airplanes.

## Singing praises

Jim Kitchen, of *R/C Report* fame, sent a nice letter singing the praises of a couple of old kits that are still around. Jim writes:

"... Small Models are my first love ... Enclosed are photos of my 6-year old Tidewater (now Stream) *Playmate 25* and 5-year-old *Parakeet*. Both use an OS .26 FS Surpass 4C engines. They are terrific flying models. I modified the *Playmate* by adding ailerons. Both models were designed by Dave Robelen, so the family resemblance is evident. My *Playmate 25* really got a work-out during the first few years and I still fly it occasionally.

"I recently came down with "biplane fever" and brought the *Parakeet* out of retirement. Forgot how much fun biplanes are to fly, especially the *Parakeet* with 4-cycle power."

"I was curious about the current status of *Playmate* and *Parakeet* kits, so I recently wrote Stream. They sent a catalog, price list and a note saying they still kit the *Playmate 25* and *Parakeet*. (Based on their catalog, they still kit the *Pronto 25* and the *Super Pronto 25*.) I had lots of fun flying my *Super Pronto* with an OS FS-20 engine in the late 1980's. My *Playmate 25* replaced my *Super Pronto* when I got the *Super Pronto* in a spin and couldn't get it out in time to prevent crashing.

"You might spread the word about *Prontos, Playmates* and *Parakeets* for those interested in models at the upper end of the small model range. These models with 4-cycle power are economical, quiet and realistic flyers."

For those of you young folks, the *Playmate* was one of the first small low wing airplanes that flew like a trainer. I'm glad to know that those airplanes are still available and going strong.

## Getting the last word in

Ok, ok, just one more word about the Cox *Lazy Bee*. The bottom of the kit box has a unique feature that seems to have been overlooked by a lot of people even though it is mentioned in the assembly instructions. Since the airplane is intended as an introductory step to R/C flying the new flyer needs a flight box and Cox has provided one in the form of di-dotted cardboard that is the bottom of the kit box.

A little punching-out and folding-up produces a handy box that is large enough to carry transmitter and fuel along with extra props, screw driver, pliers and a rag for clean-up. Not a bad deal at all from something that otherwise would be sent to the local trash dump. Good for you Cox!


PHOTO: L.F. RANDOLPH

**That little white box** with the COX logo on the side comes with every *Lazy Bee* kit. Instead of a throwaway, the kit box now has a useful purpose! The *Lazy Bee* continues to be immensely popular. It hit a nerve!

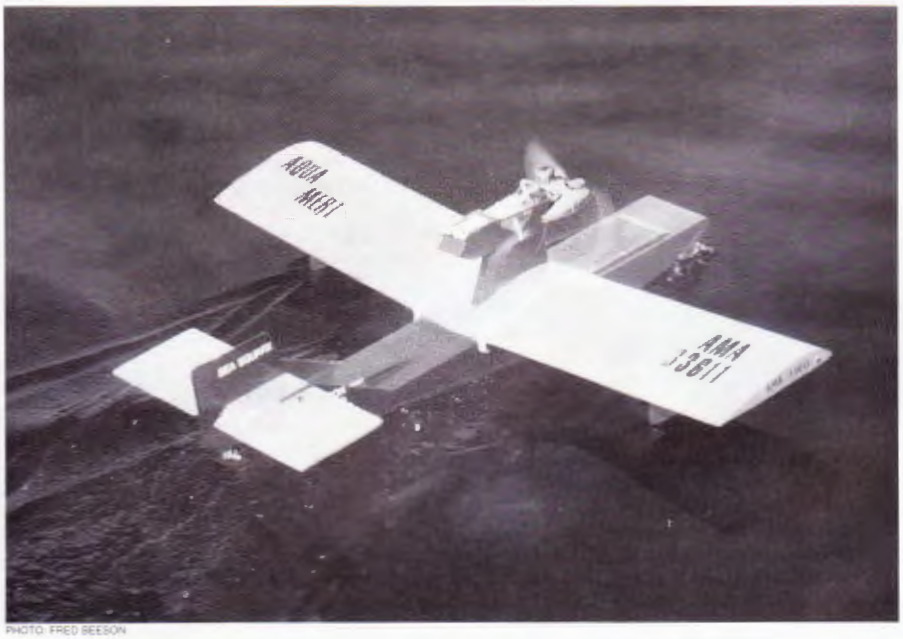



PHOTO: FRED BEESON

**Summer is nearly here**, and Fred Beeson's *Aqua Sport* is a good way to kick off the float plane season. Fred powered this one with a Fox .25 and says that it flies great. Why not try one this year?

# Old Timer Topics

**By Jim Alaback**

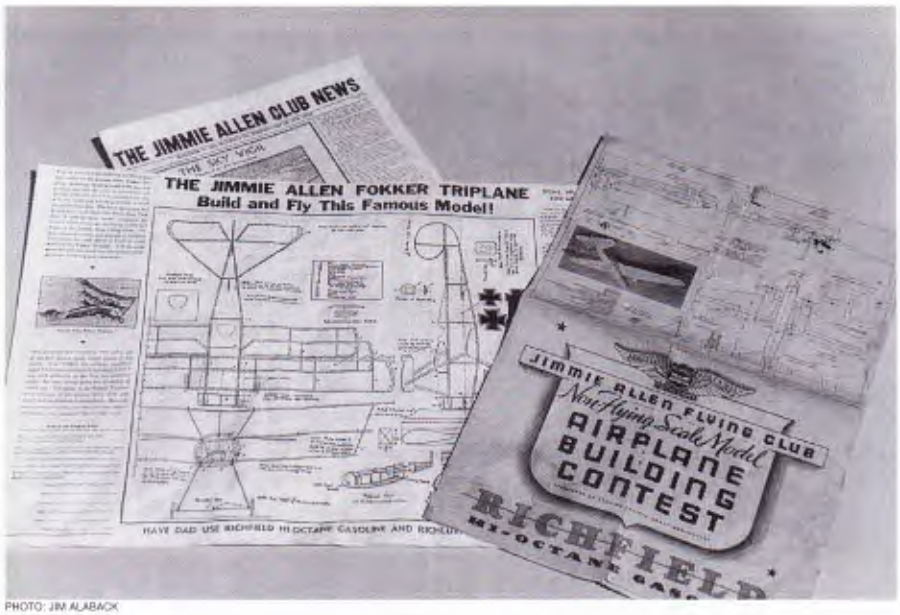



PHOTO: JIM ALABACK

**These copies of some 1935** issues of the Richfield *Jimmie Allen News* show the scale models available in their sales promotions on the East and West coasts. A popular series in its time frame to be sure.

Last February I described the computerized four-page list of 221 sources of antique engines and engine parts, repair and restoration services which is available from Bill Cohen, a member of the Model Engine Collectors Association (MECA). Bill has just written to advise of a change of address. Send a SASE and $2.00 for your copy of the engine resources list to his new address: Bill Cohen, 67-945 Foothill Rd., Cathedral City, CA 92234; phone 619-321-0148.

Last month I reported the sad news that Ken Sykora, proprietor of Oldtimer Model Supply, had died suddenly last December. I now understand that Mrs. Sykora, with the help of friends, will continue to fill orders which are sent to Oldtimer Model Supply, PO Box 7334, Van Nuys, CA 91409. This has long been an outstanding source of oldtime model supplies and plans, particularly for rubber-powered models. Their beautifully illustrated catalog is $2.00.

## 1996 Jimmie Allen Postal Championship

Information and rules for the 1996 Jimmie Allen Postal Championship are now available. This is a club championship contest and is open to any club in Canada or the United States. Basically, the contest is open to original Jimmie Allen model designs (there were a dozen or so of these rubber-powered gems). The club which has the highest total points wins the perpetual Jimmie Allen Trophy for the coming year and has their name inscribed on it.

Clubs may enter by holding a contest for their members on any date in July, August, or September of 1996. The contestants' scores are the total time in seconds of the three best of up to six flights, and the club's official entry points are the sum of the top *three* contestants' times. (Last year the club score was the sum of the top five contestants' times. The change to the total times of the top *three* contestants should enable smaller clubs to compete more equally with larger ones.)

For information, complete rules and entry form, contact last year's winner, the San Diego Orbiteers, c/o Larry Oliver, 1011 Olive Ave., Coronado, CA 92118; phone 619-437-8889.

## Jimmie Allen scale models

I grew up in the Midwest and participated in the Jimmie Allen program sponsored by Skelly Oil Co. in 1935, but I didn't know until recent years that the Richfield Oil Company's "Jimmie Allen" promotion on the east and west coasts was offering plans, kits and contests for *scale* models at about the same time. My thanks to Bill Hannan, George Armstead, the late Ken Hamilton, and Marlene King (daughter of the late Elbert J. Weathers) for my information about these programs.

On the east coast, Richfield tied in their Jimmie Allen radio program promotions with the Ideal Aeroplane and Supply Co. of New York, one of America's pioneer model supply houses. The *Jimmie Allen Club News* (sent to all Jimmie Allen Flying Club members) featured plans for a series of Ideal flying scale models in successive issues. There was also a coupon that could be mailed in to Ideal with 25¢ to get the complete construction kit. This was the regular post-paid price for the same kits as sold directly by Ideal. The only difference was that the plans in the *Jimmie Allen Club News* showed the Jimmie Allen name in the title block in place of the Ideal name.

The Ideal flying scale models had a 12-inch wingspan and represented Ideal's first

PHOTO: ELBERT J. WEATHERS

**This prize-winning**, 20-inch span, Kinner *Envoy* display model was built by Elbert J. Weathers for the Richfield West Coast scale model contest in 1935


PHOTO: HAL STEWART

**(above left).** Here's a Half-A Scale Texaco model of the Breda 15 **(above right).** Full-size plans for it are now available from Hal Stewart (see text for details).

series of balsa (not hardwood), low cost flying scale models. The kits were first advertised in *Model Airplane News* for February, 1932, as a series of six models: the Fokker *Triplane*, Fokker D-8, Sopwith *Camel*, Boeing P-12, Polish PZL fighter, and the de Havilland *Puss Moth*. During 1933 and 1934 the line was extended by the addition of six more kits: Curtiss *Sparrowhawk*, Monocoupe (15-inch span), SE.5, Heath *Parasol*, SPAD, and the Curtiss *Helldiver*. Most if not all of these were included in the Jimmie Allen program. George Armstead, who has several issues of the *Jimmie Allen News*, writes: "I used to listen to Jimmie Allen programs on WDRC (Hartford) but do not remember any contests."

On the west coast, Richfield certainly had a contest for Jimmie Allen scale models, and it was a big one. In this promotion the models were of the display scale type, to be built from plans available from Richfield. The contest ran from June 1 to July 15, 1935. There were local contests, the winners of which were sent on to semi-final judging in Seattle, Portland, San Francisco, and Los Angeles. These winners in turn went to the final round of judging in Los Angeles which determined the overall winners. The prizes amounted to thousands of depression-era dollars in cash and trophies.

The contest was divided into age groups. Group A was for Jimmie Allen Club members of any age. The Class A models ranged from 20- to 25-inch wingspan, for any of the following planes to be built from the Richfield three-view plans: Douglas DC-2, Boeing 247-D, Northrop *Gamma*, Stinson *Reliant* [SR-6], and Kinner *Envoy*.

Class B was for members 13 years of age or less and was limited to a 15-inch wingspan model of the Curtiss-Wright *Baby Bunting*, which three-view plan was also available from Richfield.

Class C was for members 8 years of age or less and was open to a model of 12-inch wingspan or less from any plan of any plane then in production.

The models all had to be painted blue and yellow to match the Richfield gas station sign colors. Models were judged for excellence of craftsmanship, finish, and attention to details.

Among the overall winners were Elbert Weathers and Ken Hamilton. As the picture of Weathers' winning Kinner *Envoy* shows, his model had movable controls and an accurate reproduction of the Kinner's two-section cabin door and complete cabin interior. Ken Hamilton's winning model, a Northrop *Gamma*, had movable controls from the cockpit. Ken used control rods rather than threads-and-pulleys which were common for such systems. The rods gave his controls much smoother, more positive action. He attributed his victory to that control system.

Richfield bought the winning model of each Class A plane for $200, which was in addition to the prizes won by the winners. The winning models then went on display in the lobby of the Richfield office in Los Angeles. As was typical of the big contests in those days there was extensive newspaper publicity at every stage of judging.

PHOTO: JIM ALABACK

**Bud Romak holds up his Arden .19 powered** Comet *Mercury* for us to see. It is a less commonly seen *Zipper* companion, designed by Carl Goldberg for 1939 Class A-B competition. Put old time wheels on it, Bud!

## Johnson .35 Stunt engines

Do you remember the Johnson .35 Stunt engines? RJL Industries holds the rights to the Johnson name and also owns the remaining tooling. They could undertake a run of the small-case engines if there is sufficient interest. The price would fall in the range of $100 to $150 each. If you would be interested in one or more of these engines, contact Bruce Brown, 1297 Milford Church Road, Greer, SC 29651; Compuserve 73450,2651; AOL Cad Reslr, or Internet Cadreselr@AOL.COM.

## Old Timer electrics

Since the present Society of Antique Modelers (SAM) old timer electric rules were finalized in 1989 electric power technology has been rapidly improving. This reminds me of the situation in gas models after about 1938: AMA rules had to be changed regularly, almost yearly, to keep pace with the advancing technology until well after WW II.

In the case of SAM, the mechanism for rule changes is very democratic, but slow and cumbersome. The rules for electric models, especially Electric Texaco, are now obsoleted by the pace of electric power advances. Motor runs of 12 to over 15 minutes are now possible in an event which has a 15-minute max flight! (The favored approach seems to be a Graupner "Speed 400" motor in combination with 6:1 or 2.5:1 gear reduction.)

Many SAM chapters are now expressing concern about the rules and some are trying various ideas in their local contests to see if something can be recommended as a new approach to national rules. Harold Reed of SAM 41 in San Diego may be typical. He recently wrote suggesting that the best approach might be to alter local contest flying rules, at the discretion of the Contest Director, to reduce the flyoffs but not change the motor or battery requirements, so that the models are still in compliance with SAM rules for regional or national contests.

Harold favors two approaches at present: eliminate the 15-minute max altogether, or double (or eliminate) it for the second flight of anyone who gets a 15-minute max on his first flight. Harold believes that with the continuing advance in electric technology that any rules changes affecting the equipment specification is likely to be obsoleted more rapidly than SAM rules can be changed under the present two-year cycle of petition and national membership voting.

I would be interested to hear how various SAM chapters may be handling the Electric rules situation locally. I'd be happy to compile your ideas and pass them on in this column and to SAM officers. Write me at the address given at the end of this column.

## Hal Stewart plans

Hal continues to turn out new full-size plans, many of them for the popular Half-A Scale Texaco class. These are very nice looking scale models which have also proved to be contest winners at every level. Prototypes are built and flown of all his designs before they are offered for sale. We have a picture this month of Hal's *Breda 15*, and he is now well along on the plans for a handsome Bellanca *Skyrocket*. For a copy of Hal's 10-page plans catalog send $1.00 to: Hal Stewart, 8198 Speach Drive, Baldwinsville, NY 13027.

Please keep your letters, pictures, and club newsletters coming. If you request a personal reply, a self-addressed, stamped envelope would be appreciated. Jim Alaback, 12366 Nacido Drive, San Diego, CA 92128.

# F/F sport

**By Larry Kruse**

The adage that "time flies" is somewhat dimensionally incomplete as it is so often quoted. What's missing is any type of comment on the *speed* at which it flies. That fine point became evident to me this past building season as I began a renewed sojourn into outdoor gas powered F/F. Some time ago I had consciously withdrawn from pure duration events in outdoor competition in order to concentrate on scale building and flying—which I very much enjoyed over the years. Just how many years became evident during a recent dinner conversation when I "guesstimated" that I hadn't flown gas events in six or eight years. Later that night, I got out some of my old flight logbooks and turned back through the pages to see just when it was that I had last flown power events. The most recent date I could find was 1976.

Aside from mourning years passing at the speed of light, there was actually a useful maintenance tip I also wanted to pass along. That involved the condition of my now decades-old engines as I took them out of their cloth wrappings. Those that had several drops of an automotive engine oil additive put into the venturi and exhaust ports prior to storage still turned over nicely and even managed to produce a satisfying popping sound as the props were flipped. Those that did not have that lubricant added did not fair so well. I'm going to have to disassemble two of them and soak the gunk off

As far as the type of lubricant to use, noted SAM flyer, Bill Schmidt, swears by "Rislone," an automotive engine oil additive available commercially at most automotive parts stores. Bill uses it after every flying session as a lubricant and of course, for winter storage purposes. I will personally guarantee you that he'll never have to disassemble his engines and soak the gunk off Anyone who has seen his engines and flown with him knows they're all in pristine condition. Based on Bill's recommendation, I've begun using a drop or two of Rislone in the venturi and exhaust ports of my engines after each flying session. Overall, I'm very pleased with how loose they feel and how easily they start, with no need to flush the Rislone out prior to starting. Time does indeed fly.

Engines, on the other hand, will not unless they're treated with more respect than we typically accord the passage of time.

PHOTO: DAVE COLLINS

**Glen Bearry did a nice job** on this replica of Art Chester's *Jeep* from Dave Collins' plans. Dave says that this is a somewhat complex project which should be tackled by experienced builders like Glen.

## No-Cal tips

No-Cal events continue their popularity, with the type and variety of aircraft rendered as skinny airplanes growing daily. Their appeal is rooted in the fact that regardless of how poorly rendered a given No-Cal might be, it can generally be made to fly in some fashion, and, perhaps more importantly in this day and age, it probably didn't take over a couple of evenings to build.

As the variety and type of aircraft increases, so does the need to approximate the colors and markings of those aircraft. Ever since I started building these little flyers, I've typically used a Magic Marker type of pen to draw in the panel lines, insignia, and assorted lettering. Tulsa Glue Dobber, Roy Harwood, goes it one better. As I was admiring the nicely rendered brown and green camouflage pattern of his latest WW II warbird, I asked him if he airbrushed the brown color prior to covering the model or after he covered it. He informed me he hadn't airbrushed it at all, but had used *orange* Magic Marker over the green tissue in order to get the authentic-looking brown color. What a simple, neat way of solving a problem.

Noting the need to find just the right prop and rubber combination for optimum flight performance, Roy also devised a special prop shaft for No-Cals that lets him try any number of props by merely slipping one off and slipping another one on. **Figure A** shows what it looks like and how it can be made with just a bit of soldering. Roy uses a small piece of friction-fit plastic tubing on the front to retain the prop; however, a small bead with a drop of glue to hold it in place would work just as well, I think.

Incidentally, the Tulsa group that Roy flies with has come up with an interesting twist on the No-Cal craze by building and flying No-Cals rendered in Peanut Scale size—no more than a 13-inch wingspan. The little planes still perform very well and would seem to be just right for the typical gymnasium flying site.

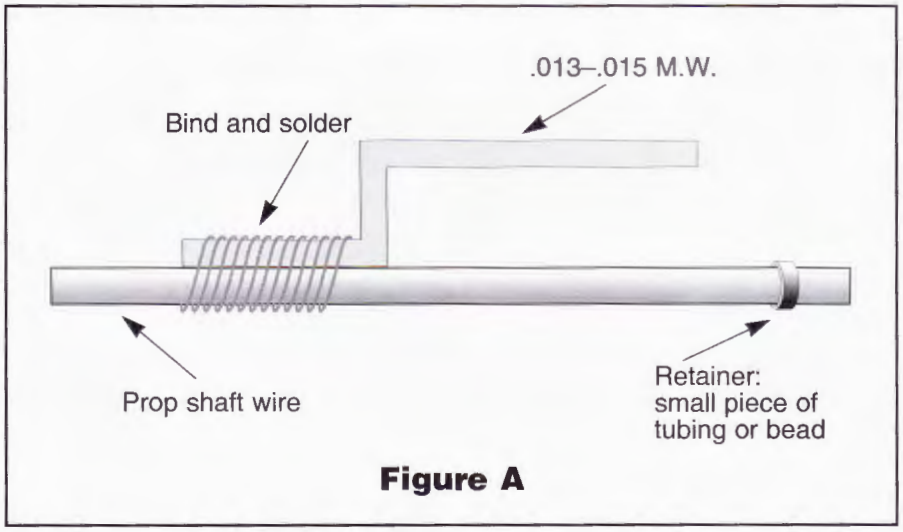



**Figure A**

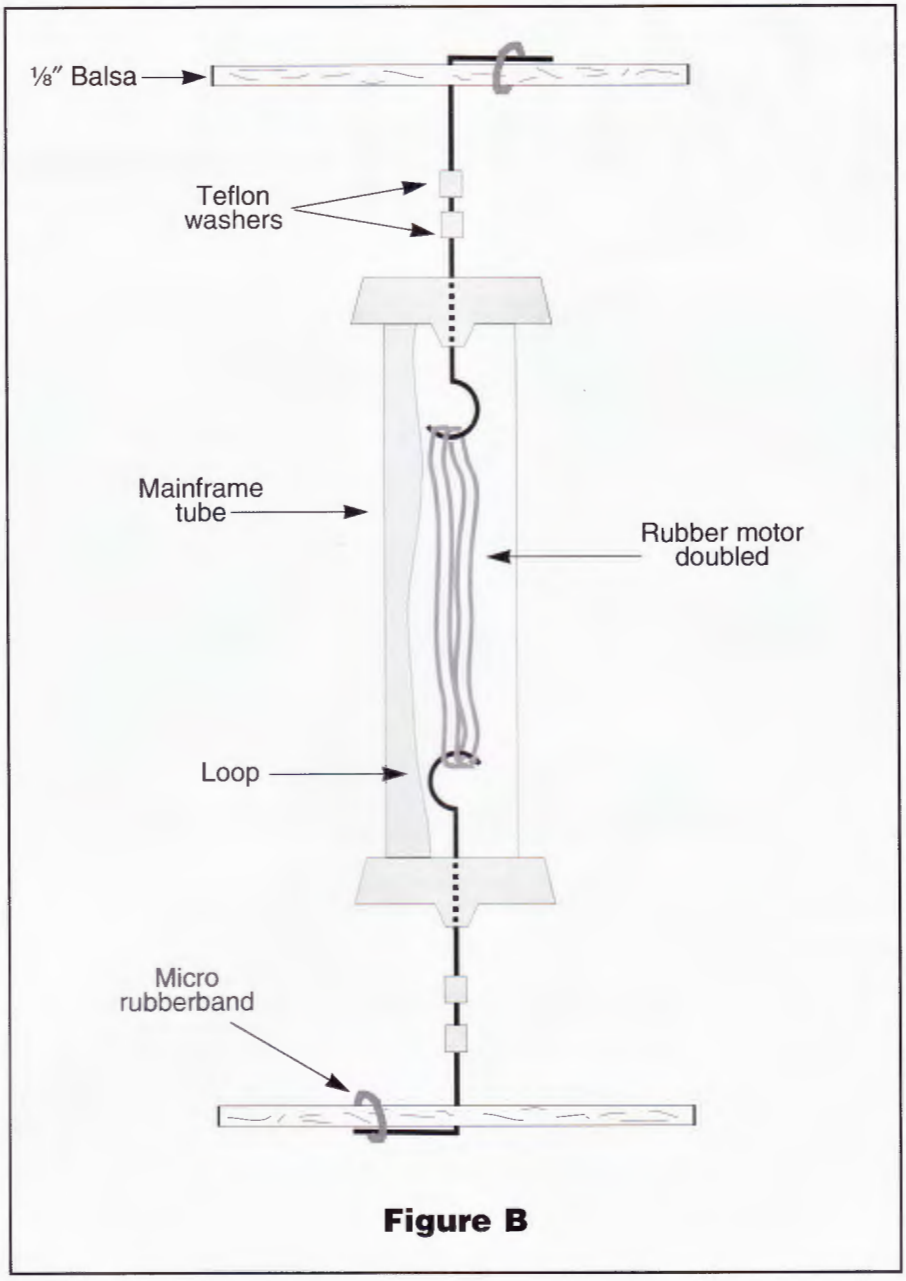



**Figure B**

### Santee's Silly Putty D/T

Back in November of last year, I mentioned a very simple silly putty D/T developed by Don Santee, 4510 N. 13th Ave., Phoenix, AZ 8 5013, which could be fabricated out of a bit of tubing, a little wire, some balsa, and a thread. The response for Don's idea has been so good, that Don now tells me he is producing the units ready to install for seven bucks, postpaid, silly putty included. The unit that he sent me is certainly lightweight and would be easy to install in any small model. It should be just right to bring that new P-30 you have on the board back to earth safely. You can order yours from the address above.

### Fuses again

My commentary a couple of issues back about inadvertently "short fusing" my P-30 during a contest brought several responses from readers who have had similar experiences. Well-known Brooklyn Sky-Scraper, Jim Bocckinfusso wrote, "I have always used the so-called 'English fuse' which, up until about five years ago, you could set your clock with. It was advertised as 3/16-inch diameter, and it burned exactly 90 seconds per mark (give or take a little according to humidity). Now I am completely amazed at how different every batch is. First of all it's not 3/16 inch any more, but rather 5/32 inch (and sometimes less). Even more unbelievable, the marks do not line up at all from batch to batch. They use different spacing, and some fuse comes with the going in the wrong direction. Quality control seems to have gone by the wayside. Anyway, as you said, always test each batch before flying."

### A helicopter freebie—of sorts

Bill Heil, doing business as Helicopter USA, recently sent me a sample of their newest offering, an indoor/outdoor job which has proven to be tons of fun, even in the living room (our cats really like it), The construction of this most simple flyer is all balsa with an extruded transparent rubber motor tube and a Teflon, brass and music wire rotor mechanism on both ends of the tube which gives contra-rotating rotor blades. A general arrangement sketch of the 'copter is shown in **Figure B**. Probably the best news is that assembling the whole unit involves slipping the four pre-cut rotor blades into four pre-cut slots—less than a minute before you're ready to fly. Bill says expected performance is about a minute outdoors, hovering consistently after climbing to about 100 feet.

Bill says, and I quote, "Free samples of indoor/outdoor helicopters are offered. Just send $4 for shipping. A fully illustrated catalog offering a large selection of helicopter plans and kits are [sic] available for $2 from Helicopter USA, 555 Sloop 9, Pittsburgh, PA 15237." While I haven't had the chance to try the little model outdoors due to weather constraints, it's great fun indoors and well worth the "shipping" price. Questions can be relayed to Bill via telephone at 412-369-8662.

### New Peanut plans

Bill McCombs, the author of *Making Scale Model Airplanes Fly* ($14.95 to Aircraft Data, Box 763576, Dallas, TX 75224), has a new set of nine Peanut Scale plans out to complement the 13 he already had available. Found among this new selection are planes such as a Cessna C-34 *Airmaster*, a Druine *Turbulent*, Art Chester's *Goon*, a Racek R-7, and a Curtiss P-6E *Hawk*. Typical of Bill's designs, these models trade a bit of scale detail for all kinds of built-in flyability. Having built several of his earlier designs, I can attest to how well they fly. The plans run $1.70 each for the first two and then a buck apiece for each additional plan, postpaid. The whole set of 22 is $16.95 from the address above and has a good sampling of Golden Age, WW I and II, modern, and experimental aircraft.

That will wrap it up for this month. Next time around we'll be looking at some ways to construct even lighter models and at some new products that will make your modeling life even easier. My address for correspondence is 1204 S. Mansfield, Stillwater, OK 74074.

### ScienText's Lockheed *Vega*

Peter Wank of ScienText has announced the full-kit version of the Lockheed *Vega* which began its life as a semi-kit a couple of years ago. The new full kit includes full-size rolled plans, good quality sheet and stripwood, a full set of decals in "Goodyear" markings, Esaki tissue, main landing gear wheels from Golden Age, a radial engine nosebearing assembly with 9-inch prop and rubber strip. One of the newer features of the kit are the "machined," laser-cut parts. Basically, what that means is that you still get the accuracy and convenience of laser cut parts, but the brown edges have gone away. The *Vega* kit comes to you by Priority Mail for $31, postpaid from ScienText, Inc., 48 Whitney Street, Westport, CT 06880-3753. Their catalog is two bucks to the same address.

# C/A Combat

**By Larry Driskill**


PHOTOGRAPHY: LARRY DRISKILL


**Sports fans are savvy** scoreboard watchers. Gene Barry's cut count markers serve the same function at a Combat contest **(above left)**. Special interest newsletters are invaluable source guides **(above right).**

Tips: I use a good deal of lightweight fiberglass cloth on all my Combat models. Foam/composite tube Combat planes especially benefit from glass cloth around the motor block and the area where the boom emerges from the trailing edge of the wing. In an effort to save weight, I go easy on the epoxy and have even tried using white glue in place of epoxy. I know folks who apparently get away with using white glue, but it never seemed to me that it was as strong or adhered as well as epoxy.

Lately I've pursued the middle ground by using slow setting epoxy and thinning it with methanol or isopropyl alcohol. Thinned to about the consistency of thick Dr. Pepper (real scientific measurement this), the epoxy will easily saturate the cloth, tightly adhere to the wood or foam and add far less weight than a high viscosity variety of epoxy. On the down side it will take lots longer for the epoxy to cure. Also, I still use unthinned epoxy in areas of severe stress and where maximum strength is required.

2. While there are some custom made metal syringes on the market designed for fueling fuel bladders, nearly everyone uses the disposable 2-ounce (60cc) plastic models. They are relatively inexpensive, fairly durable and, since they are clear, you can see the fuel in the syringe and also see if dirt or other foreign matter is in the fuel. There is, however, a downside.

With time the rubber seal on the plunger softens and when you pull on the plunger, the seal comes off and sticks in the tube. You can delay the failure by following the simple expedient of always storing the syringe with the plunger partially pulled up from the bottom and pushing down to free the rubber from the tube before you pull on the plunger to fill the syringe.

3. Sometimes finding the tools and supplies we need to build and fly Combat planes reminds you of a treasure hunt. A good deal of the material we use was not originally intended for model airplanes and most hobby shops do not stock them. For this and other reasons a number of apparently small mail order business have been formed to cater to the modeler. Three that I have used are: the Corehouse, Model Research Labs, and Micro Fasteners.

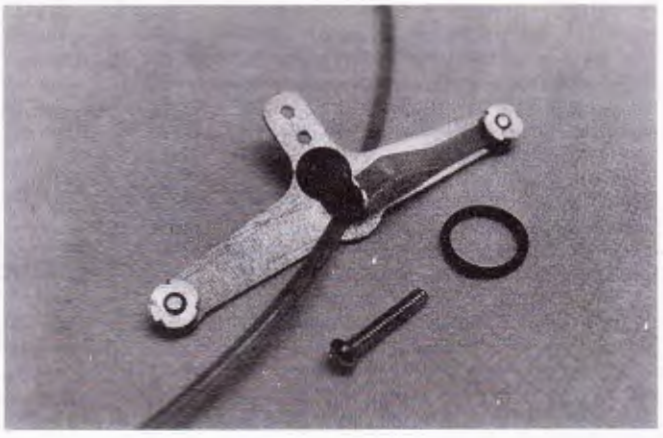
The Corehouse is run by the dude that writes this Combat column every other month. He sells kits, and also "yellow jacket" bladder tubing. It is the best most durable bladder material for Fast and FAI that I have seen. Write him at 1249 Jill Drive, Hummelston, PA 17036.

Model Research Labs sells a variety of hi-tech building materials. I use their carbon fiber tow and Kevlar thread. Their catalog also discusses appropriate uses for the various composites. The address is 25108 Marguerite #160, Mission Viejo, CA 92692.

Micro Fasteners has an extensive line of small fasteners. I use their 4–40, 2–56, and 6–32 socket head cap screws. They also have metric screws and can be reached at, 110 Hillcrest Road, Flemington, NJ 08822.

All three of these businesses have provided fast, reliable service at a fair price. I'll bet a SASE will get you a catalog. Tell them you read about them in FLYING MODELS.

While I'm passing names and addresses I think I'll plug MACA and PAMPA. MACA is the special interest group for Combat and its newsletter carries contest notifications and results, letters to the editor, technical information, how to articles. PAMPA is the special interest group for folks who fly Stunt. Sure their planes take too long to build and then go way too slow.



**Tired of pulling the rubber plunger** off of your syringe? Try storing it with the plunger pulled up from the bottom, and then push it down before trying to pull it out **(above left)**. Bob Mears, of Lubbock, Texas, has perfected his bellcrank function fuel shutoff **(above right).** See the text for details, and give it a try!

But the PAMPA newsletter is about 100 pages long and those Stunt guys have great ideas we can steal and use on our equipment quite successfully, thank you. Both newsletters take advertising and list the kind of suppliers that sell the hard to find stuff that we use. Join MACA by sending $15 to MACA, 3007 Pirates Cove, Aurora, OH 44202. Join PAMPA by sending $20 to Stunt News, 327 Pueblo Pass, Anniston, AL 36206.

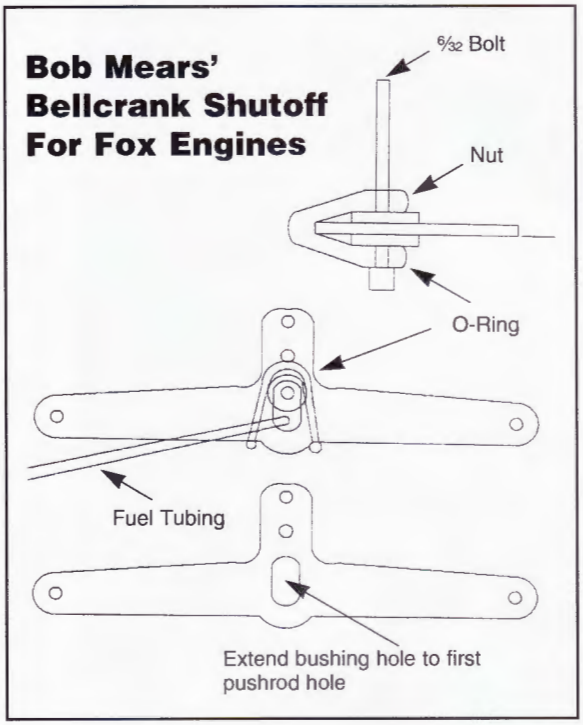
## Fuel shutoff device

In the November 1995 issue I covered the Bellcrank Bullet, a fuel shutoff manufactured by Clay Parker in Tucson. The Bullet operates on the same principle as this month's shutoff. Way back in 1993 Bob Mears of Lubbock, Texas started talking about a shutoff that would use the weight of the airplane and centrifugal force to actuate the shutoff. At that time he just had the germ of an idea and I never really grasped how it might be constructed. But he did have my attention because he pointed out that while all the then current shutoffs used a swing weight for keeping the shutoff open, his idea would use the weight of the airplane.

It was a little incongruent that we were adding weight in the form of steel or lead to airplanes that needed to be as light as possible. After all, many folks pursue such minor weight saving measures as cutting the muffler lugs off the engine exhaust, replacing the steel propeller nut and washer with aluminum models, and sanding away minute amounts of balsa and foam. Bob was correct, adding weight was a questionable activity and probably against the rules of good and proper behavior.

Still, it wasn't until the spring of 1995 that Bob had his idea perfected to the extent that he was comfortable enough with it to use it in a big buck contest. In March he used it at the Top Gun contest in Tucson and it saved him an airplane. He has since refined it a bit more and he now has a simple, reliable system that adds virtually no weight to the airplane. What's more, it complies with several other of his design rules; it is inexpensive, uses available materials, and is it does not require a machine shop to build one.

Here are Bob's instructions for constructing his device. "Take a stock Fox bellcrank and remove the bushing. Enlarge the hole the bushing was in and turn it into a slot. Keep the slot the same width as the stock hole and extend it to the first pushrod hole. Use an X-Acto knife to put a very slight radius on the slot so you do not have any sharp edges. Re-install the bushing. The bushing should freely slide back and forth in the slot.




Now you need a small (½-inch diameter) O-ring. With your bellcrank bolt mounted on the plane, install a nut on the bolt (this is a spacer for the O-ring to go around). Lay the O-ring around the nut, add the bellcrank and the top nut. Now pull the O-ring around the side of the bellcrank opposite the pushrod and put it over the top nut.

The O-ring will pull the bellcrank toward the outboard and close the slot. Line tension will pull the bellcrank to the other side of the slot and open it. Run ½A fuel tubing through this inboard side of the slot. The O-ring will now pinch the tubing and stop fuel flow if line tension is lost. I have built several locks to hold the shutoff open for launching, but they are not really necessary. Just hold a little line tension for start and launch and the shutoff will stay open. Check the O-ring often for cracks or deterioration and replace before each contest."

Thanks Bob, keep those clever ideas coming, especially those that save equipment and make this event more fun.

## Contest support equipment

Before the 1994 National Championships in Lubbock, TX a couple of us thought about setting up a match clock that would be visible to both contestants and spectators. We wanted it to function just like the game clock at a basketball or football game. We also thought about coming up with some way to display the cut count during the match. As it was, you could not tell what the score was during the match. A current cut count would help everyone by showing how many cuts each pilot had scored.

We lucked out with the clock. There was a Unitec clock in the AMA Nats support package. We discovered it, took it to the shop, got it running on 12 volts, figured out how to run the matches with it and really found it helpful. Not only did it show the official time during the matches, but was also useful for counting down between matches and keeping the contest moving.

We never did get around to displaying the cut count for that Nats. But the idea took root and last year another of the local flyers, Gene Berry, built two cut count markers and we have used them at a contest. They look like and work the same as the traditional down markers for football. In fact, down markers would work fine it you could get a pair. Gene color coded the numbers to match red and black streamers. When a cut is scored, a judge flips over the appropriate number and presto, everyone can see how the officials have scored the cuts. While I'm sure this is a worthwhile effort, we have not used it enough to have an extensive track record. It will also take a while for the contestants to become used to having the cut count displayed and available during the match. I had difficulty remembering to glance over and check the score. With experience it should prove useful to both the crowd and the pilots. By using the markers we can add to the spectator appeal of an already popular event to watch.

## MACA Top Twenty 1995

Andy Minor, Amarillo Texas, tracks contests for MACA and has submitted the results for last year:

| | |
|---|---|
| 1. Andy Mears | 11. Tommy Thompson |
| 2. Mack Henry | 12. Joe Mckinzie |
| 3. Chuck Rudner | 13. Ron Marcioni |
| 4. Andy Minor | 14. Rich Lopez |
| 5. Mark Rudner | 15. Louis Lopez |
| 6. Mike Willcox | 16. Mike Evans |
| 7. Cary Minor | 17. Bob Burch |
| 8. Steve Kott | 18. Bob Mears |
| 9. Larry Driskill* | 19. Mike Urban |
| 9. Neil Simpson* | 20. Jordy Segal |

* Tie

## Bladder Grabber XIX

Late breaking news is that the Bladder Grabber in Snohomish, WA is back on for 1996. The Bladder Grabber is the grand daddy of triple elimination contests and always offered top competition and thousands of dollars worth of Carver stereo equipment for the winners.

If you have a tip for the column, write me at 6806 Third, Lubbock, TX 79416.

# C/L Stunt

**By Fred Carnes**


PHOTO: BOB KUBEK

**Here's Bob Kubek in 1953** holding his orange, white, and dark green *Stardust* at the Rouge Park flying field. Note the pre-1950's automobiles in the background! Bob is still building "I" Beam wing stunters.

*Part 6 of the I-beam reveals some of the secrets for fuel, prop, tank and airfoil use in these classic Stunters.*

By 1952 the Fox 35 had became the dominant Stunt engine. These were usually flown out of the box, unmodified. Following George Aldrich's lead, they started being set up to run with the now familiar 4-cycle/2-cycle break. It was, and still is amazing to me, how these engines seem to have an automatic throttle, and change power setting just when needed. Raise the nose and they lean out for more power. Lower the nose and they richen up for less power.

A Forster ¾-inch engine extension worked with the old style Fox crankshaft that had a tapered shoulder for the thrust washer. Sometimes an old style crankshaft would be put in a new Fox 35 so the Forster extension could be used. Later a McCoy ¾-inch extension or Veco ½-inch extension was used with the new style Fox crankshaft. Now Fox makes both ¾-inch and ½-inch extensions for the venerable Fox 35 that is still in production.

Art Van Laken and Strathmoor Stunt flyers soon learned the Fox liked extra castor oil and would develop more power but still run cool with nitro in the fuel. Power Mist fuel, with an extra 4 ounces of castor oil per quart, was recommended by Art Van Laken. Clarence Lee, the well known Veco engine designer, says Wally Francisco was very secretive about the ingredients in his Francisco Laboratories fuels, and he never made the amounts of oil, nitro, etc., public. Clarence used Power Mist for many years and estimates the fuel had about 15% nitro and 20% or more castor oil. Assuming Clarence's estimates are correct, the added castor would change these percentages to about 13% nitro and 29% castor oil. For comparison purposes Fox Superfuel, used by Rolland McDonald and George Aldrich, had (and still has) 5% nitro and 29% castor.

Propeller of choice was typically a 10–5. At the 1954 Nationals George Aldrich, Rolland McDonald, James Ebejer, Tom Ebejer and Art Pawloski all used 10–5 Y&O propellers. Art Pawloski said he made tests with different propellers and found the Y&O 10–5 prop would out pull the others by a noticeable amount. The following quote from Steve Wooley's *Cobra* construction article in the February 1971 *American Modeler* reveals his engine, fuel and prop secrets.

"I have used a Fox 35 with one additional head gasket and an O.S. needle valve assembly for several years. I also use a 25% nitro fuel (after many years of un-nitrated fuel) and a 10–5 prop. This combination produces an rpm range in which the engine can develop its maximum power. Use light machine oil in the motor between contests.

"A Fireball long-reach cold heat range plug lights the fire and keeps it lit. If using the O.S. spray bar, don't reduce its diameter. It does restrict the venturi more than the standard Fox bar, but it also increases fuel draw. The extra power available in the nitrated fuel more than offsets the potential power loss.

"A small filter between the tank and engine is a must for most flyers, but I prefer to filter the fuel when purchased and again when filling the tank. By using this procedure, I've never had problems."

A secret on the fuel tank per Sam Dehelean is the distance between the fill and overflow goose necks that face into the air stream. This distance should be about 1¼ inch for a one-inch thick tank. At the end of the engine run there will be one burp, then the engine will run just long enough to do one loop and quit.

Most I-beam Stunt flyers soldered up their own fuel tanks. Many shapes were tried to get a steady engine run. Rolland McDonald made his wider at the back than the front and only had the wedge at the back like the *Nobler* tank. Ray Marlo had a long slender tank to try and reduce the pressure head variation during the flight as the fuel was used. Tanks were usually 3 to 3½-ounce capacity with goose necked fill and overflow vent tubes facing into the slip stream on the inboard fuselage side (Details of this tank will be on the *Atom* plans).

The really neat thing Bob Dailey did was put the tank in a plywood box behind the engine so the tank was removable. The tank was just wedged in place by soft balsa sheet scrap, pieces of cloth or Kleenex. These materials also tended to attenuate engine vibration and lesson the chance for fuel foaming. When suspected of problems, tanks could readily be taken out, cleaned, checked for leaks, and repaired as necessary. Tom Ebejer had a lucky experience while soldering a tank. One night he left the soldering iron plugged in by accident. When he returned to the basement shop the next day, he found it hanging by the electrical cord still plugged in. It had burned a hole right through the work bench without starting a fire!

## Secret airfoils

Sam Dehelean says the good flying qualities of his and Bob Dailey's I-beam Stunters was attributable to the NACA 0018 airfoil—but not everyone used it. It has been said the Classic I-beam Stunters all used the same airfoil. The reverse is more nearly correct.

The airfoil was one thing Strathmoor club members usually did not share with one another. Tom Ebejer, Rod Pharis, and Art Pawloski were good friends, but they competed fiercely against one another in both Stunt and Combat. Each tried to develop an airfoil that would give him an advantage. Rod Pharis says everybody made their own airfoils and they were closely guarded secrets. Art Pawloski's rather thick airfoil let his *Atom* and his *Lancer* Combat ship turn sharply without slowing down. One secret the boys learned was they could use almost the same airfoil for their 19-ounce Combat ships as for their 38-ounce I-beam Stunters.

I have tried to figure out how these early I-beam airfoils evolved and given up. Rolland McDonald said he started with the 10-inch NACA 0018 airfoil and just raised the trailing edge to get the ½-inch thickness he wanted. His *Detroiter* and *Challenger III* airfoil had just that and is shown in **Figure 1** along with the others. What throws me is the airfoil on Bob Randall's *Saturn Detroiter*. It has a more pointed nose than the NACA 0018. John Davis took this shape from the airplane with a flexible drafting curve and believes it is accurate. It is actually closer to the *Neptune, Ares*, and *Argus* airfoils than Rolland McDonald's *Detroiter* and *Challenger III* airfoil.

The *Neptune* airfoil has an almost football shape. I know that shape is correct. I took a root rib off the original '53 *Neptune*. Art Pawloski took a rib off his *Atom* and carefully traced it. The *Atom* airfoil has a more rounded leading edge and front end shape. In general the Dailey Wing I-beamer airfoils were relative thick (1⅞ to 2 inches at the high point and about 10 inches long at the fuselage side—less the flap. I am told that most of these airfoils were just drawn to "look right" then flight tested to see how they performed. There are two nice relationships on the *Atom* airfoil. The wing root airfoil length less the flap is exactly 10 inches, which is 20% of the wing span, and the airfoil thickness at its high point is exactly 2 inches thick or 20% of the 10-inch root chord length. I have drawn in some detail on the *Saturn* airfoil and the *Atom* airfoil to show their similarity and differences. On the others I have just shown the location of the I-beam center lines. These airfoils are all different, but similar. I thought it might be interesting to compare these with the '57 *Nobler* airfoil. It is clear the *Nobler* airfoil has a sharper nose and is thinner than the Classic I-beam Stunter airfoils. Just for the heck of it I also put the c.g. and a.c. on the *Nobler* airfoil to show the static margin.

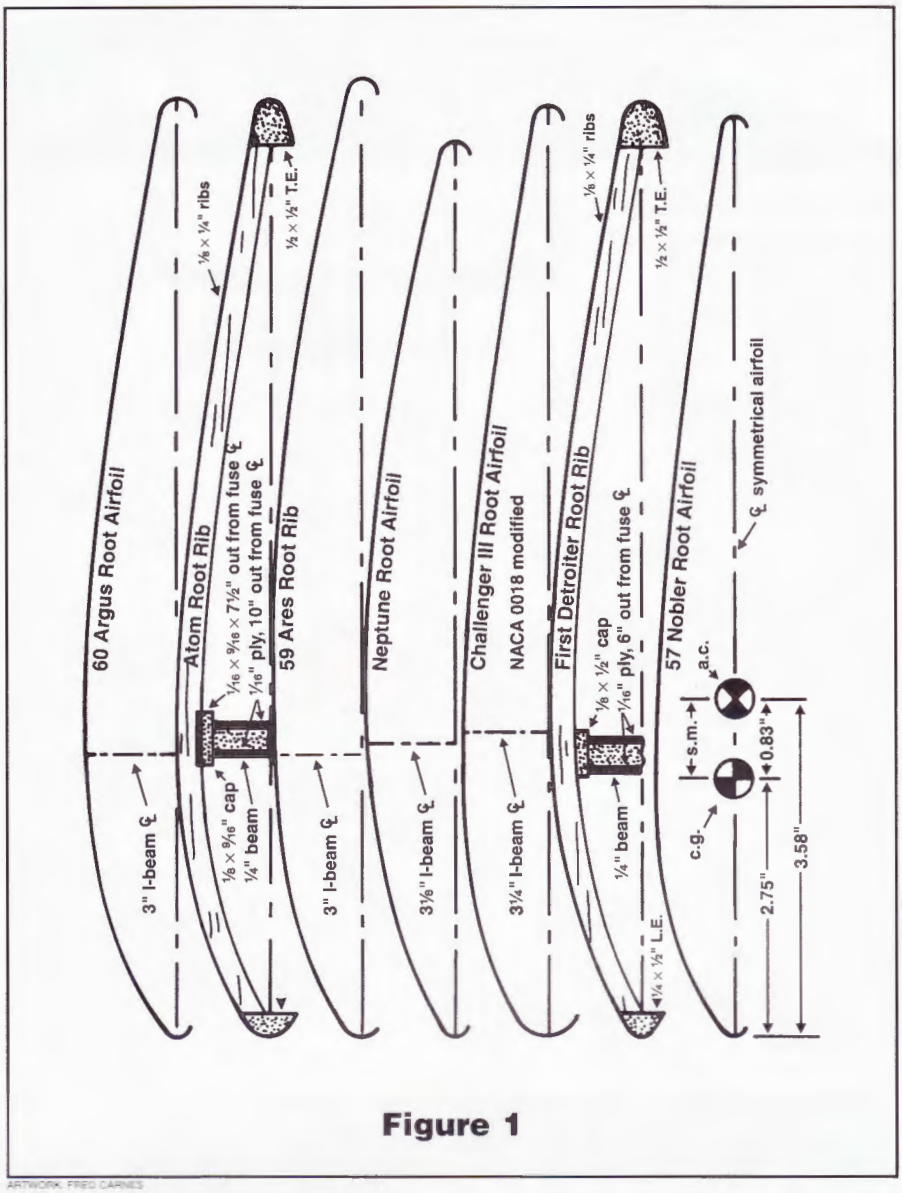



**Figure 1**

ARTWORK: FRED CARNES

**The figure above** shows all the airfoils from the famous "I" Beam designs of the 1950s and early 1960s. As you can see, there was quite a bit of difference between many of them, and many were nearly the same.

## Light weight and controls

A secret of the *Neptune, Jupiter, Atom*, and *Ares* was their light weight—38 ounces all-up. At that weight it was possible to get good, smooth maneuverability with less flap than the *Nobler* which had a 1:1 flap-to-elevator ratio. James Ebejer used plus and minus 24 degrees flap travel and plus and minus 36 degrees elevator travel. Bill Werwage used a similar ratio of 2:3 flap to elevator travel on his *Ares*. After refinishing and adding two ounces to an *Ares* that had an adjustable elevator horn, Bill found it helpful to increase the flap to elevator ratio toward 1:1 to get the performance he wanted. So if you tend to build on the heavy side, closer to 1:1 is probably better. Rolland McDonald used 1:1 on his *Detroiter* design which was heavier than the *Neptune, Atom*, and *Ares*. Rolland now believes that less than 1:1 would have been better because the big flaps on the *Detroiter* tended to give too much negative pitch which the elevator had to fight to overcome. Strathmoor club members found that heavy I-beam Stunters did not perform well. An all-up weight of 42 ounces was about the maximum for decent performance.

While on the subject of controls, James Ebejer noticed the more he flew the *Neptune*, the better it flew. Because he flew a lot, in time he observed the plane seemed to be in a groove with no tendency to hunt up or down. In fact, it seemed to fly itself. About this time he noticed the control horns had started to wear. Then it became clear, the airplane flew better if the controls were not tight. So when installing controls in a new plane keep them free, with no binding and just a small amount of play—no stiffness allowed, and Art Van Laken advised using 3&1 oil for lubrication of the metal parts.

Rod Pharis learned something about controls the hard way. He had his brand new *Jupiter II* out for test flights and had just quit his job so he could go to the 1955 California Nationals. While tweaking the controls preparing for a second flight he heard a pop. Unable to find anything wrong, he took off. *Jupiter II* never came out of the down side of the wingover. The washer soldered onto the elevator horn wire had popped off. From then on Rod filed a notch in the pushrod wire in the solder area, put on the washer, crimped a small piece of brass tubing in the notch, then soldered everything. Bob Randall also had solder problems. He had built two blue *Saturn Detroiters* for the 1958 Nationals but crashed both in reverse wingovers when elevator pushrod solder joints failed.

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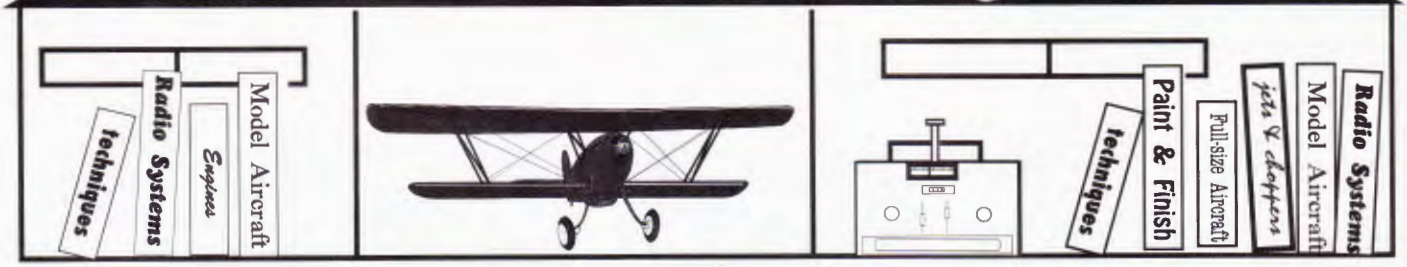


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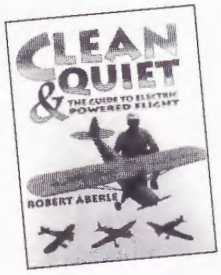


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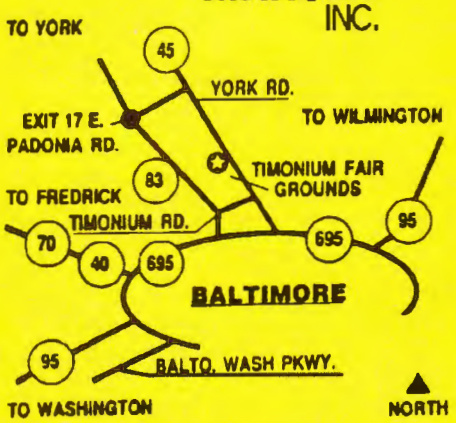


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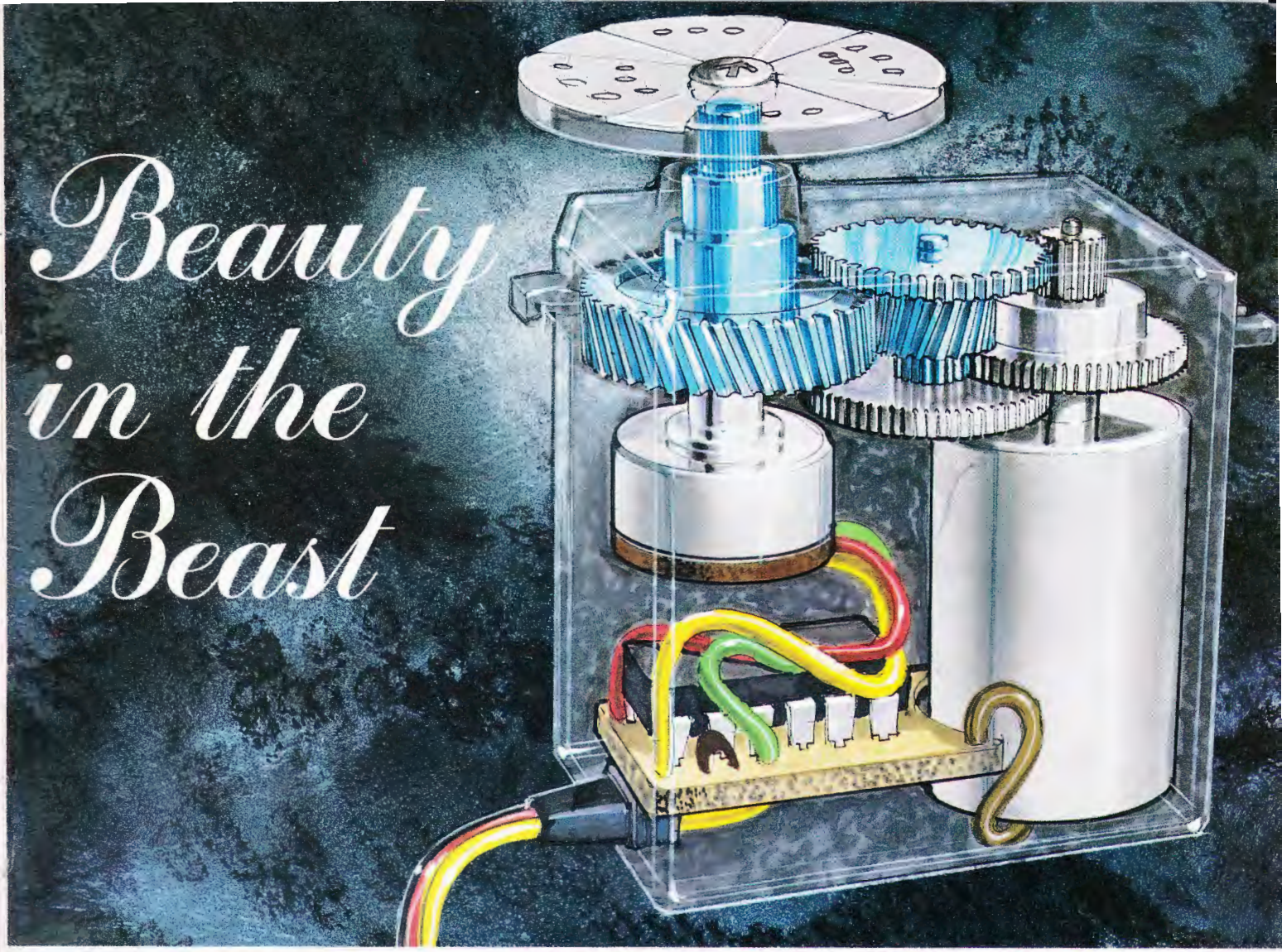


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