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CONTROL  
AIRCRAFT

RC UNLIMITEDS AT MADERA

FEBRUARY 1992

# MODEL BUILDER

WORLD'S MOST COMPLETE MODEL AIRCRAFT PUBLICATION

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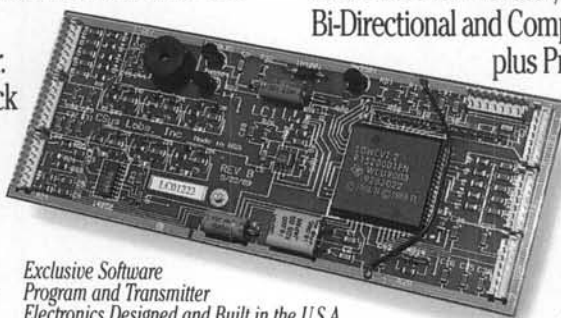
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# MODEL BUILDER

WORLD'S MOST COMPLETE MODEL AIRCRAFT PUBLICATION

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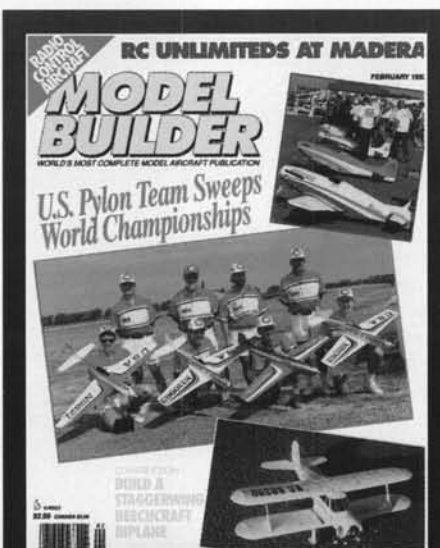
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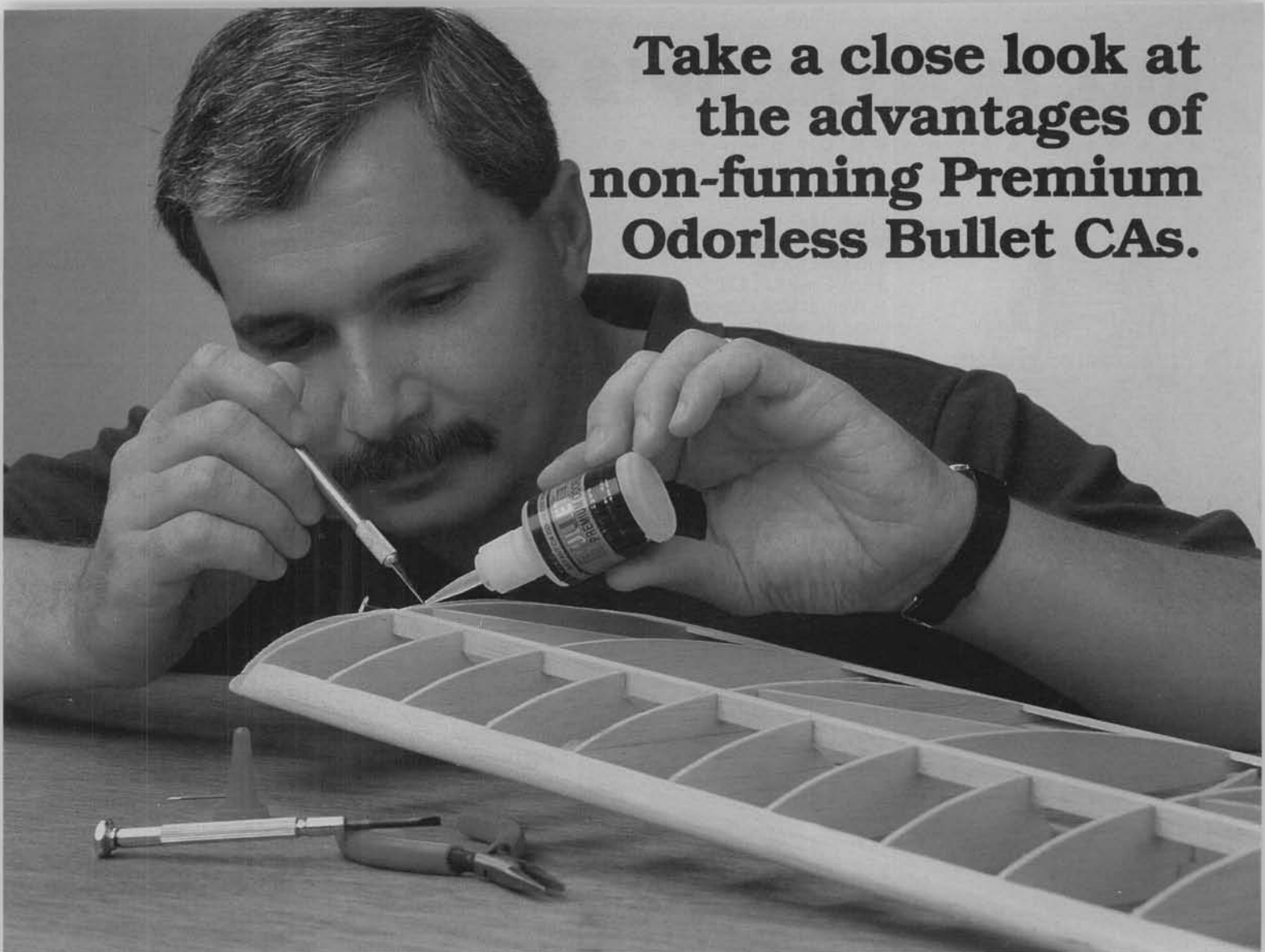
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# BILL NORTHROP'S WORKBENCH



"Hello, Joe,  
Whaddya Know?  
I just got back  
From Chee-Kah-Go!"

...Well, at least close enough to see its high-rise buildings outlined on the horizon from the top-floor restaurant of the Hyatt Regency O'Hare... on a clear day. That's 'cause we went to the annual RCHTA (which is supposed to mean Radio Control Hobby Trade Association, but there's a lot of trains, games, static-plastics, and molded figures thrown in) Show.

When one returns from one of these four-day, knock-down, drag-out affairs (especially Fri-

back to the current scene in a new package, can be kinda difficult.

In radio systems themselves, the "newest" item is the thinsi...synsithi...I have an awful time pronouncing that word...*synthesized* (I call 'em "variable-frequency") transmitter/receiver systems. The quotes around "newest" are in deference to the Kraft synth..., well, you know what I mean, transmitter that was introduced, and buried more than a decade ago, and the first practical system seen in the new Valiant radio at last year's Toledo Show in the Polk's/Aristocraft booth.

Both the Airtronics "Infinity" and the final version of the Polk's/Aristocraft "Valiant" were on display and operating at the 1992 Chicago show. In brief, the systems work as follows: A jumper cord is plugged in between the transmitter and the receiver (the receiver can be in the model, with an outside access jack). When turned on, the receiver now becomes a scanner, and the frequency it happens to be on is displayed on the transmitter computer screen (*In this mode, the transmitter is not sending out a signal*). Forward or backward movement of a particular control stick changes the "listening" frequency of the receiver, so in effect, it is able to "scan" the entire band of frequencies and discover what's currently in use. You literally get a "busy" signal when you come to a frequency that is in use. When you find a

frequency of your choice that is not busy, you pull the jumper cord, and lo and behold, you're on that frequency! While scanning, the system is re-programming frequency as you go through the numbers, so when you "pull the plug," you're there! Just imagine the convenience for race organizers who will not have to consider frequencies when working out their heat grids!

We don't recall if both systems offer this additional feature, but the Airtronics version allows switching of interchangeable band modules, so you can scan and select frequencies on any band available from the company, including 72 MHz, 75 MHz, six meters, and if you're from overseas, such bands as 35 MHz, 40 MHz, etc. Both companies expect to be able to deliver these radios around February or March of 1992.

There was something very old yet very new in Chicago. Most of us folks with a little "snow on the roof" remember being asked to "go fly a kite." Nowadays the expression is more like "take a hike," "get lost," or...well, you know what we mean. Kites have come a long way, Baby. No more are they simply two wooden sticks, with anything from newspaper to discarded bed sheets stuck on a string outline, and a mile-and-a-half of cloth strip tail, and nothing more to do but see how high you can get and then just stand there and look at it.

The modern kite is a high-tech device that is flown on about 100-foot lines...note the plural, as most are flown with either two or four lines, and controlled sort of in model airplane control line fashion, using wood, plastic, or metal handles. The maneuvers can be fast or slow, in endless variety, and with astounding precision. There is national and international competition, single and team categories, even "ballet" single and team competition flown to music, and several publications. In a nutshell, the kite hobby and industry is exploding like RC cars did just a few years ago. We recall seeing one or two kite exhibitors in Chicago last year. This year there were about eight or ten! Hobby shops and specialty kite shops are beginning to stock thousands of dollars worth of kite equipment. A representative from a company importing kites from England indicated that they are now servicing over 400 kite-only stores in the USA, and the



A radio-controlled parachute? See text for details.

day, which went from 10 a.m. to 9 p.m., non-stop), the first question from those who remained behind is... "So what's new?" This is a difficult question to answer, especially if it is asked by someone who has been in the radio control hobby for a few years. To find something that is more than just a new version of a previously known item, or something that had not faded out years ago only to come



# DEAR JAKE

## Advice for the Propworn

BY JAKE

### DEAR JAKE:

Howdy. My name's Drew Allus, but everybody calls me "Dad." My daughter Belle married Ben Karras' older boy, Ike, a couple a years ago, and me and my son-in-law has become real good buddies. Me and Ike's always been nuts about things that fly. Why, I shot me my first crow when I was only three, and Ike, he only limps on account of jumping off the barn roof with an umbrella when he was sixteen. Landed squat on a boar hog, 'cordin to Ben.

Last month, me and Ike was watchin' the birds circle over Clem Barlow's dead heifer when it 'curred to us that if they could fly, so could we. We bagged us some buzzards so's we could use the feathers. Rest made a fine pie. We melted down some beeswax and glued up two pair of wings outta the feathers.

We hiked us up to Kelly's Ridge and lit out over the edge, arms a flappin. Danged if them wings didn't work jest fine. We was a swoopin and soarin all over the county until Ike, he flew up way, way high. Then his wings come apart and he fell tailbone first into Parson's Creek. Probably be laid up still if that catfish hadn't broken his fall.

What do you s'pose we done wrong Jake?

Fly Boys in  
Fremont County, WV  
Dear Fly Boys:

Let me get this straight. Dad Allus and Ike Karras made wings of feathers and wax, but Ike Karras flew too close to the Sun and melted his wings. Sounds vaguely familiar. Speaking from a strictly Mediterranean sense, you couldn't happen to be a couple of Cretans, would you? Jake

### DEAR JAKE:

Hi, it's me, Tommy Smith, again. I hope you don't mind if I write to you about something other than airplanes this time.

I was only twelve when I started asking your advice about airplanes and stuff. But now I'm fourteen, and lately I've been noticing that there's other things in the world besides planes. Like girls.

I've had this friend who lives next door. I guess I always knew she was a girl, but she likes to build models and ride BMXs and other boy stuff, so we always just sort of treated her like one of the guys.

Hell, Jackie still likes to do all that stuff, but she sure doesn't look like a guy anymore! She was down in my basement this morning working on a Peanut Scale Bleriot, when I finally noticed that there was no mistaking her for a boy anymore. She was across the workbench from me, leaning over to super glue some wing ribs. When I saw the new her, I told her what a great shape she had.

My hypothetical question is this. If she slapped me, and if she had some glue on her hand, how would I get her hand unstuck from my face? Please answer very fast, just in case this really happens some time.

Your friend, Tommy Smith  
Dear Tommy:

Hypothetically, of course, a fourteen-year-old boy just beginning to notice girls should have more than enough zit oil to dissolve the bond in no time at all.

Jake

### DEAR JAKE:

Any idea who will be the next world champion when Hanno Prettnr finally gets beat?

Pattern Flier in Peoria, IL  
Dear Pattern Flyer:

I suspect it will be whoever it was that finally beat Hanno.

Jake

### DEAR JAKE:

I would like to build a flying scale model of George Jetson's

continued on page 86

figure is growing at a rapid rate.

We talked with Jim Hadzicki, representing Revolution Enterprises, Inc., 3089c Clairmont Drive #171, San Diego, CA 92117, phone (619) 554-1106. He had two versions of a four-string kite in his booth, along with a fascinating video demonstration of how they are flown. Using the two metal control sticks with foam handles, the kites could take off from the ground, turn and fly horizontally, stop, back up, spin at a high rate, perform Figure Eights (square or round), dive full tilt for the ground and pull up at the last instant, and on and on. To land, the kite was turned to a horizontal position, pointing up, and then gently lowered until the aft points made contact.

All of the kites now use composite graphite structures, and the cloth is either rip-stop parachute nylon or tough plastic film, with colors that knock your eyes out. The prices are up to date also, with the average fully aerobatic kite running in the \$100 to \$300 range. The sizes vary from a couple of feet wide up to as much as 15 feet and over. Fliers of the bigger ones actually have to put on a harness and tie themselves to a sturdy ground base, and even the six-footers will have you digging in your heels (golf shoes would help!) or spilling out the wind to avoid being literally carried away!

The newest thing in RC flying models was on display by the Electric R/C Corp., 5801 Magnolia Ave., Pennsauken, NJ 08109, phone (609) 486-7575. Basically, it's an electric powered, radio controlled parachute! Most everyone is familiar with the fact that the modern parachute is no longer a big cloth umbrella that simply drops you on the ground or dumps you wherever the wind may decide to put you. The modern 'chute is a ram air parachute that can be controlled to the extent that experienced jumpers can land, standing up, just about on a chosen dime. In fact, ParaPlane is the registered

trademark of the parent ParaPlane Corporation at the same address, headed up by Stephen L. Snyder. The ParaPlane is a powered, man-carrying parachute of very simple basic design. The pilot sits on a three-wheeled cart that is suspended below the parachute by the shroud lines. Altitude is controlled by the speed with which you propel it through the air, powered by two independent engines turning counter-rotating props, and direction is controlled by pulling the shroud lines connected to either side of the 'chute. It's as simple as that.

Snyder decided that if it was that easy to fly his ParaPlane, then why not apply the same principle to a model, and have something that the RC car youngster could use to transition into controlled flight without all the crashes and discouragement that could come out of going directly into fixed-wing aircraft. Don't get nervous fliers, the "ParaPlane Sport," when sold with radio, is on 27 mHz only, and can be supplied with either the typical "staple gun" transmitter used by most RC car drivers, or with a conventional two-stick transmitter. It's also available without radio so you can use your own two-channel, 27 mHz car radio or your model aircraft radio equipment. As with the full-scale ParaPlane, the only controls required are throttle and steering, just like the cars and race boats. The model three-wheeled cart is actually a cabin version that provides a safe enclosure for the radio, and the battery slides into a convenient compartment in the bottom, for easy removal and replacement between charges.

We'll be reviewing one of these in the near future. The probability of its getting everyone in the family involved in flying RC is almost assured, and that's beneficial to any sport!

### IMPORTANT NOTICE

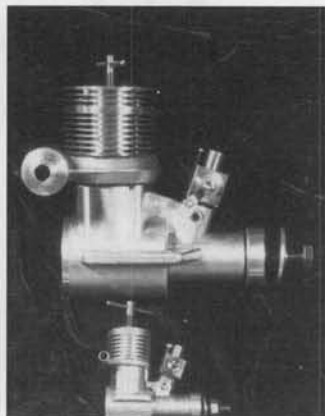
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In Orange County, Califor-  
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# over the counter

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

## BIG MAMA DIESEL

We like the way Eric Clutton describes the new British-made P.A.W. .60 TBR RC diesel he's importing: "The mother of all diesels!" It's a big one all right—the



accompanying photo shows it next to a P.A.W. .049 for size comparison. To our knowledge it's the largest purpose-built miniature diesel engine ever to be offered to the modeling public.

The .60 TBR ("twin ball race," as they say in England) weighs in at a hefty 22-1/2 ounces with muffler, will swing props up to 20-inch diameter, and is said to be extremely quiet and easy to hand start—in general, an exceptionally user-friendly engine that's guaranteed to dispel many of the myths you may have heard about large diesels. Going price is \$199.00 plus \$3.00 for shipping.

A buck will get you an info package describing the entire P.A.W. line of engines, plus some useful tips that apply to all diesels. Write to Eric Clutton, 913 Cedar Lane, Tullahoma, TN 37388.

## NORTHEAST SAILPLANES

For you RC slope glider fanatics, Northeast Sailplane Products, 16 Kirby Lane, Williston, VT 05495 is introducing two very similar medium size high-performance slopers, called the Sparrow and the Swallow. The Sparrow is the more basic and less expensive (\$99.95) of the two, featuring 65-inch, SD7080 airfoiled balsa covered blue foam core wings and epoxy glass fuselage, V-tail, and aileron/elevator controls. The Swallow is basically the same design but is a bit more high-tech, using an SD8000 airfoil and gray foam wing cores covered with



vacuum-bagged fiberglass and carbon fiber, composite tail surfaces, and camber-changing flaps. The Swallow kit is priced at \$169.95.

Also produced by NSP is the "Pinnacle" series of high-starts, which boast such features as UV-protected rubber tubing, specially made Day-Glo orange line for good visibility on the ground, and a tough, wear-resistant parachute. A capped steel stake is included and clips onto



the reel for easy carrying. The most popular of the Pinnacle high-starts is the Pinnacle-L, priced at \$69.95. Other sizes are listed in NSP's catalog.

Did we say catalog? "Encyclopedia" would be a better description. NSP's catalog is much more than just a list of their products—it's over 100 pages of useful technical and reference information that all glider pilots will want to have on hand. Copies sell for \$7.00 (first class

mail) or \$5.00 (third class); do yourself a favor and order one from Northeast Sailplane Products at the address above or call (802) 658-9482. And be sure to tell Stan or Sal that you read about their company in *Model Builder*!

## HELI BODIES

EZ Sports Aviation is marketing a couple of attractive new bodies for the popular .30-size RC helicopters made by Kalt, Kyosho and Hirobo.



One is the fast and mean-looking Black Shark 30, the other is a scale replica of the full-size Ecureuil helicopter produced in France. Both are molded of lightweight and durable "Tufflex" plastic and are right around four feet long, give or take a couple of inches. Both kits are supplied with fully cut and partially assembled plastic body parts, clear plastic windows, die-cut balsa and plywood parts, mounting hardware, decals, and instructions, for a retail price of \$200 each. Weight-wise, the Black Shark 30 comes in at 10-1/2 ounces, while the Ecureuil tips the scales at 14 ounces. Both are distributed exclusively by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728-8610.

## TOP FLITE CORSAIR

Good news for you Warbird





buffs! Top Flite has recently come out with another in its line of "Gold Edition" kits: it's the familiar Top Flite sport scale F4U Corsair, which has been completely redesigned from the ground up to be easier to build and more durable than the previous version. For example, over 100 of the earlier model's parts have been done away with, and many of the new parts are made such that they interlock with the rest of the structure for strength and ease of assembly. The airframe is all balsa and plywood; the only plastic parts are the clear canopy, the injection molded ABS cowl and vacuum-formed oil cooler air intakes. Hardware for the optional flaps and 90° rotating retracts is not supplied, but their installation is extensively detailed both on the plans and in the instruction booklet.

Spec-wise, the new Gold Edition Corsair comes pretty close to the earlier model: span is 62 inches, wing area 700 square inches, flying weight 7 to 9-1/2 pounds, and engine size range of .60 to .80 (two-stroke) or .91 to 1.20 (four-stroke).

From Top Flite Models, P.O. Box 721, Urbana, IL 61801.

## GREAT PLANES FUN-FLIER

Anyone on the lookout for a high-performance aerobatic sport RC



model, either for weekend hot-dogging or fun-fly competition, should take a good look at the "Fun-One" kit recently introduced by Great Planes Model Manufacturing, P.O. Box 788, Urbana, IL 61801. It's a racy looking but straightforward shoulder-wing design that will handle anything from a .25 to .40 two-stroke or .40 to .50 four-stroke; the folks at Great Planes consider the O.S. .32 or Supertigre .34 to be ideal

all-around choices, but we'd be willing to bet that quite a few Fun-Ones will be seen trailing behind a hot .40, particularly in fun-fly competition events.

The Fun-One is of simple all balsa and plywood construction, yielding a lightweight airframe that weighs in at 4 to 4-1/2 pounds ready to fly. Span is 53 inches, wing area 558 square inches. The kit is complete with precision-cut wood parts, fully illustrated instructions, computer drawn full-size plans, hardware, engine mount, and canopy. Also included is everything you'll need to build either trike or taildragger landing gear. And although any four-channel aircraft radio will work just fine in this model, the instructions and plans show how to install and set up one of the new-generation computer radios to take advantage of the features they offer, such as flaperons, control mixing, etc.

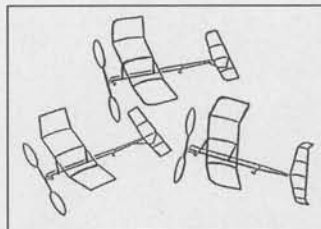
Fun-One kits are now in full production—check it out at your local hobby shop, or order direct from Great Planes Model Manufacturing.

## IMS "MINI-STICK"

Lew Gitlow, the head man at Indoor Model Supply, wrote to tell us about a new indoor rubber duration event that's gaining

popularity here and abroad. Called "Mini-Stick," the models are limited to seven-inch span, and although you might not think such miniscule models would be capable of much performance, times of up to nine minutes are not uncommon. These things really fly!

IMS is making it easy to get started in this new event by offering a \$9.95 kit that contains enough premium indoor balsa for at least



three Mini-Stick models, plus dual bearings, rubber, wire, clear Ultra Film covering, a plan sheet with prop jig templates, full instructions, and the current Mini-Stick design requirements. If ordering a kit by mail, be sure to add \$3.00 for packaging and shipping.

For indoor modelers who are heavily into Easy-B or similar size stick-type duration models, IMS sells a tool called a Motor Stick Sander Jig, which is used to put the upper tapers of a typical motor stick on a two-inch wide, 12-inch long sheet of balsa; perfectly matched motor sticks can then be baloney-sliced off as needed. Pretty clever, huh? The jig itself retails for \$11.95, a sheet of selected motor stick balsa is \$2.50, and packaging and shipping adds \$3.00 to the total.

A complete 18-page catalog of all of the IMS products is available for \$2.00 alone or \$1.00 with any order. Write to Indoor Model Supply, 1887 West Haven, N.W., Salem, OR 97304.

## HIGH-TECH COMPOSITES

Our advice to modelers wanting to experiment with composite structures, or to anyone experienced with these materials and who is looking for a dependable, reputable source of supplies, is to try Composite Structures Technology, Dept. D111, P.O. Box 4615, Lancaster, CA 93539; phone (800) 338-1CST. They've made some improvements in carbon laminate production such that excess epoxy (which only adds weight, not strength) is removed during the curing process, leaving a finished sheet that is lighter and has a higher



carbon/epoxy ratio than what was available before. The surface actually ends up being finely textured (the weave of the material showing through) instead of perfectly smooth as is commonly seen.

CST offers this high-density carbon laminate in 76 different sizes to meet every need. They've also got tapered spar caps that go from either .030 or .060-inch at the root to .014-inch at the tip, which concentrates the strength where it's needed most.

All of CST's products can be purchased through your local hobby dealer, or you can order direct... assuming you know what you want beforehand. If you need help or just would like to know about all of the items CST stocks, send \$3.00 for a complete composites information package to the above address. And don't forget to mention *Model Builder* when placing your order!

## VACUUM FORMING

Douglas E. Walsh has written what has to be the most comprehensive booklet on do-it-yourself plastic vacuum forming ever published. Called, oddly enough, *Vacuum*



*Forming*, it's 128 pages of clear, easy-to-understand text and illustrations that explain how to make custom or reproduction parts out of a variety of plastics, using equipment made from ordinary hardware store and household items—no special skills required. A very interesting and well-done presentation, well worth the \$9.95 asking price. Order your copy by writing to Vacuum Form, 272D Morganhill Dr.—Dept. 100, Lake Orion, MI 48360.

# AIRPLANES SHOULD FLY SKY HIGH,

## Join The Sport Flyers Association. Get Complete Coverage For \$25.00 A Year, And A Lot More.

### Sport Flyers Association

Sport Flyers Association was created by modelers for modelers to provide the best insurance coverage for model flying at the lowest possible cost.

No politics, elections, or hassles. Our goal is to save our members money, build and support flying clubs, and make model flying fun again!

### Our Policy on Model Flying Insurance

- \$1,000,000 Liability Coverage
- Member to Member
- Over \$70 Million in liquid assets plus an "A" rating from the A.M. Best Co. backs our insurance coverage
- Just \$25 per year for full Adult Membership
- Just \$15 per year for Non-Powered Free Flight and Youth Membership

### Fly safely and earn Zero Claims Awards

Everyone benefits from safe model flying, and we believe in rewarding our members for flying safely. Members earn points for safe flying, continued membership, and completing an annual safety check. Additional points can be earned for recruiting new members to Sport Flyers Association and the Zero Claims safety program.

All Sport Flyers members can use their Zero Claims points for:

- Cash Rebates
- Product purchase discounts
- Travel awards

The top 5% of Sport Flyers members with the best safety and recruiting records can earn free hobby and R/C products, travel awards, air show trips, and much more.

### The Sport Flyers Flying Club Program

Our goal is to build your flying site, not ours. The Sport Flyers Flying Club Program is designed to generate money and members for your club. We've created a Flying Site Development Fund to build your flying sites, and sponsor events to build your club treasury.

Being a member club of the Sport Flyers Association allows you to maintain affiliation with any other association or modeling organization. Now you can provide the best available coverage at the lowest price to your members, and still participate in your traditional club events. Being a member club of the Sport Flyers Association means you'll receive more—not less, including:

- Flying Clubs and site owners insured free for the first year
- Daily membership passes
- National advertising to publicize your club events
- Club money making programs including "Dial-An-Expert", "Fly 'n Try", product demos and air shows
- Certified Flight Instructor Program

### The Sport Flyers Travel Club

Become a member of the Sport Flyers Association, and save up to 70% on your full scale flying as well. Use our members only 1-800 number for reservations and greater discounts on air show and hobby event travel.

Save enough on your first trip to pay for your membership for the next five years! Even better, each time you fly we make a contribution to the Flying Site Development Fund.



# NOT INSURANCE.



# 1-800-745-3597

REMOVE BEFORE FLIGHT

REMOVE BEFORE FLIGHT

## 1992 SPORT FLYERS ASSOCIATION SAFETY CODE

1. I will not fly my model aircraft over spectators.
2. I will not fly my models in the presence of spectators until I have learned to fly safely.
3. I will not use metal propellers.
4. I will not buzz, tail, or harass any aircraft, car, animal, or any object in the air or on the ground.
5. I will not fly my model aircraft in a reckless or dangerous manner.
6. I will abide by all safety rules established at any field where I fly and any state or local regulations governing model flying. I will always obtain prior permission from property owners before flying. I will not fly any models in a careless, reckless or dangerous manner.
7. I will not use hazardous fuels nor fuels containing tetranitromethane or hydrazine.
8. I will not fly my models in the vicinity of airports, airfields, or any other aircraft in the air, or on the ground. Rockets will be flown in accordance with the Safety Code(s) of the National Association of Rocketry. A fire extinguisher must be present when using pyrotechnic smoke candles. Authorization may be secured from the SFA for special events.
9. I will not power my models with turbojet engines.
10. I will not fly my model higher than 400 feet unless I am flying at an authorized radio control flight field.
11. I will not fly my model aircraft within three miles of any airport unless I have received permission from the FAA or I am flying at an authorized radio control flight field.
12. I will always perform a ground check of my model before flight.
13. The maximum permissible take off weight of models is 55 pounds.
14. I will not use any fuel or power source that is not approved by the Federal Aviation Commission.
15. I will not launch any model until I have received permission from the Free Flight model upon completion of function.
16. I will only launch Free Flight models at least 100 feet downwind of spectators, cars, or anyone not directly involved with the flight.
17. I understand that SFA insurance does not cover activities related to the flying of Control Line models.
18. I will retrieve any lost model with great caution, considering all circumstances thoroughly before proceeding, and will never attempt to recover a model from a power line.

**Sport Flyers Association**  
4145 Travis, Suite 202, Dallas, TX 75204

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY/STATE/ZIP: \_\_\_\_\_

CHECK ENC. ☐ \$25 Adult ☐ \$15 Youth or Non-Powered Free Flight

☐ VISA ☐ MASTERCARD Exp. Date: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

## SAFETY CODE COMPLIANCE AND WAIVER STATEMENT

I will comply with the 1992 SFA Safety Code and my Flying Site Safety Code for all model aircraft operations and the NAR Safety Code(s) for all sport rocket operations including any changes or additions which may occur during my membership period. I understand that my failure to comply with the codes will result in loss of liability coverage for any damages or claim. I understand that written notice must be provided immediately upon the occurrence of any incident of bodily injury and/or property damage. I also understand that no claim will be accepted sixty (60) days after the expiration of my policy. I indemnify the Sport Flyers Association, Incorporated trade membership organization for any personal injury, property damage or wrongful death which may occur.

Applicant or Parent or Guardian of Applicant under sixteen years of age.  
MUST BE SIGNED FOR ACCEPTANCE

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## TESTING CELL CAPACITY

I finally found some time to get the new Sanyo 1800 SCR cells and test them. I mentioned these cells in previous columns; they are the same diameter as the sub-C cells we are accustomed to, 23mm (0.91 in.), but are slightly longer, 50mm (1.97 in.) as compared to 43mm (1.69 in.), and weigh 58 grams (2.05 oz.) as compared to 52 grams (1.84 oz.). These cells have been quite successful here in Europe in duration flying, giving over ten-minute flights in helicopters.

Keith Shaw has used them with very good results in his high performance scale planes in the U.S. These cells are available in Europe from Multiplex, and cost 16 DM (about \$10) apiece here. They are sold in the U.S. by C.S. Flight Systems, 31 Perry St., Middleboro, MA 02346, phone (508) 947-2805 (after 6 p.m. EST), for \$6.55 a cell, order number N-1800SCR. I think availability is limited, so you might check first before ordering.

Before I get into the test results, a word about the standards used for testing cell capacity. The American National Standards Institute (ANSI) standard for capacity is the one most commonly used for rating cells. The capacity is measured at a current equal to the capacity rating C of the cell. The cell is first charged at 0.1C for 20-24 hours, then discharged at 1.0C at 23 degrees Celsius. This is done for five cycles, then the sixth cycle is done to measure the exact capacity. The cell is discharged to an end-of-discharge voltage of 0.9V. As an example, a cell under test that is rated at 1.2 AH (1200 mAh) would be charged at 0.12 amperes for 20-24 hours, and discharged at 1.2 amperes for the capacity test. Under these conditions, the cell should deliver 1.2 amperes for one hour.

The ANSI standards are fine for lower power applications, such as cordless appliances, VCRs and so on, but they do not tell us what to expect for current drains that are from six to twenty times the rated capacity of the cell. As you can imagine, the capacity of the cell at the higher drains will be less. Bob Kopski's rule of thumb is that cells which are run at ten amperes show about 90% of the label capacity. This is certainly a good point to start from. Sometimes manufacturers do use a higher current to rate their packs. I

think G.E. and perhaps Sanyo did some ratings at a 4C discharge rate. Those cells did better than the 90% rule. It is too bad that the manufacturers do not state on the labels what the test discharge rate is, it would help clear up some confusion.

I test packs or cells at a ten ampere rate, using up to six auto headlight bulbs in parallel. I have tested packs at a twenty ampere rate when I use a motor and prop as a load, with no problems. However, if I use lightbulbs as a load, the packs get very hot at twenty amperes . . . hot enough to melt a solder connection in one case! So, I have settled on using ten amperes with light bulbs. I do not try to keep the current constant . . . it probably is not constant in flight either. Anyhow, here are the results on a test run for an eight cell Multiplex/Sanyo 1800 SCR pack, peak charged with a TRC Impulse Six charger:

Minutes	Volts	Amperes	Ampere-Minutes
0	10.45	10.3	0
1	9.63	9.9	10.1
2	9.40	9.8	19.95
3	9.40	9.8	29.75
4	9.37	9.8	39.55
5	9.31	9.8	49.35
6	9.24	9.8	59.15
7	9.16	9.8	68.95
8	9.07	9.7	78.70
9	8.84	9.6	88.35
10	8.53	9.4	97.85
10.5	8.20	9.2	102.50
10.75	7.60	8.8	104.75

For Ah, divide ampere-minutes by 60 minutes in an hour,  $104.75/60=1.75$  Ah, or 1750 mAh. This is 97% of the stated capacity, which is quite good. I often see some increase in capacity as time goes on, so this may well become 1.8 Ah in a few more cycles. This pack has only had four cycles on it so far.

I like the ANSI method for testing the resistance of the pack, as outlined in last month's column. Load the pack at a current ten times its capacity, and wait until the voltage stabilizes. Read the voltage and current. Then load the pack at one times its capacity and read the voltage and current again. The resistance of the pack is the change in voltage divided by the change in current. The numbers I got for this method were 8.53 volts at 19.3 amperes (six headlight bulbs in parallel) after two minutes of discharge from a peak charge, and 9.80 volts at 3.4 amperes when the pack was reconnected to a load of one headlight bulb. This works out to a pack resistance of 0.0799 ohms, or 0.00998 ohms (9.98 milliohms) per cell (eight cells in the pack). I got 8.15 milliohms per cell for a Sanyo 1200 mAh SCR pack using the same method. However, the 1200 pack had copper straps soldered over the steel straps; the 1800 mAh pack has only steel straps. I think the resistance will be the same if I install copper straps on the 1800 pack.

My conclusion is that the 1800 SCR

Science teacher Darian Quattlebaum provides an attractive size reference for George Beaver's scaled-up Ultra Mk IV, originally an 86-inch, 05-powered ship designed by Mike Charles.





packs look very good. If you want the durability and high current ability of SCR cells, and the duration of SCE cells, then these are for you. By the way, Sanyo does not admit officially that these cells exist! They say that the only 1800 SCR cells they make are C sized, not sub-C. The C size cells are wider, 26 mm (1.02 in.) and heavier, 80 grams (2.83 oz). Interesting! I wonder why Sanyo is keeping these cells a secret?

Hobby Lobby sent me catalog #18, which is free; write them at 5614 Franklin Pike Circle, Brentwood, TN 37027, or call (615) 373-1444. The cover of the catalog is unique, featuring a little robot flying an RC plane, titled "Electric Flight"! There are lots of electric goodies in this catalog, several of which have been mentioned in this column recently. A new item is the Elektro-Akrobat made by Aeronaut. The Elektro-Akrobat is quite popular in Europe, and was the winner of the 1988 Electric Aerobatic Championships. I have seen this plane perform with 14 to 21 cells. My recommendation is to fly it with an Astro 40 for really good pattern performance. Fourteen cells and an Astro 40 would be adequate for sport pattern. It has a span of 67 inches, wing area of 589 sq. in., and flying weight of 84-102 ounces. The fuselage is fiberglass, the wing is balsa covered foam.

Hobby Lobby has devoted two very full pages to electric motor performance charts; this alone makes the catalog worth obtaining. The first page lists the watts output of the motors, the no-load rpm and voltage, the rpm at maximum load, and thrust at maximum load. The second page sorts the motors into thrust categories and aircraft weight ranges for each thrust category. This is very helpful. The rule given by the chart is that if the plane weighs four times the thrust, it is hand launch. Three times the thrust is take-off from grass, 30-degree climb from hand launch. Twice the thrust is instant takeoff,



An AP-29 provides the thrust for Jaime Colley's Guillow Hellcat. Guillow kits, with their lightweight construction, should make excellent fliers with small electric power systems.

45-degree climb from hand launch. If thrust is equal to the plane's weight, you don't need wings!

George Beaver sent photos of his latest electrics. George and I flew electrics together way back in 1973. Back then we used

switch. George is very happy with the "big" Mk IV. He averages 21 minutes per flight, and has had up to a 40-minute flight.

The small plane is a Fast Eddie, which is sold as a kit from Midway Models for \$39.95. The Fast Eddie flies on a Graupner Speed 600 motor (550 size) and six 900 SCRs. The radio is a Futaba MCR-A. George says he likes the Fast Eddie, and it sure lives up to its name!

George also sent photos of Scott Dragoo and his Astro cobalt 035 powered Schoolmaster, and Jaime Colley and his AP-29 powered Guillows Hellcat. I wonder where Scott found a Schoolmaster? It was designed by Ken Willard and used to be kitted by Top Flite. I flew one with the original Astro 05



The ultimate in schoolyard electric RC? Scott Dragoo and his Astro 035-powered Schoolmaster.

rewound windshield washer motors! The model holding the model is Darian Quattlebaum, who teaches science in middle school. There were some photos of George holding the planes too, but sorry, George, no contest! The big plane is a scaled-up Ultra Mk IV. The original Mk IV is 86-inch span, and an excellent flier. The plans are available from *Model Builder* (1831, \$10.00) or the kit from Midway Model Company, P.O. Box 9, Midway City, CA 92655, for \$59.95. The kits from Midway are very high quality, by the way.

George scaled the Mk IV to 101-inch span, 1050 sq. in., with a geared Astro cobalt 15 turning a 12x8 Master Aircrow prop, carrying twelve 900 mA SCRs for a flying weight of 69 ounces. George uses a Futaba Attack 4 and a High Sky on-off

system back in 1974. George did not say how these planes flew; the Schoolmaster flew well for me back then. The Guillow kits have been very popular for electric U-control as demonstrated by the Black Sheep Squadron at the IMS Pasadena show. Thanks, George, for the photos!

I like to include fun-fly and fly-in announcements; and the only problem is the long lead-in time. This column is being written in early October, for the February issue. You can count up the months! I need announcements at least four months in advance, by the first of the month. I am happy to have dates even earlier than that; I can put them on my calendar and then in the column at the right time. Until next time, have fun, fly electric! My USA postage address is: Mitch Poling, 7100 CSW/MC, Box 734 PSC 2, APO NY 09220. My overseas address is Normannenweg 20 D-6200, Wiesbaden-Biebrich, Germany. **MB**

Ms. Quattlebaum again, this time with George Beaver's Fast Eddie, a Midway Models kit.



# CONTROL LINE

BY JOHN THOMPSON

## CL CANARD? CAN-DO!

**C**ertain basic principles of aviation are inviolable. In control line flying, the unbreakable rules include: Don't let go of the lines, reverse the controls when inverted, avoid "Figure 9" maneuvers, don't pick up the handle upside-down, don't fly near power lines, and so forth.

But if a model aviator can find a way to vary the basic design of any airplane or style of flying, he will. One such restless soul, who never saw an airplane design he couldn't modify, is John Hall, of Sumner, Washington.



John Hall with his control line canard, the "Canary," on a practice circle at Stuntathon '91 in Kent, Washington. Photo by John Thompson.

That's why it was only a momentary shock to look across the field towards a practice circle during a recent contest in Kent, Washington, and see John at the handle of a plane that appeared to be flying backwards. Not clockwise like some old-timers, speed fliers and stunt mavericks (you guys know who you are!), but *backwards*!

And doing a pretty nice set of stunt maneuvers, too.

The mandatory trek across the field for closer inspection revealed a plane called the Canary, and the name nearly tells it all. It was a canary-yellow canard.

John reveals that it's not quite yet what he was looking for, and another version will be along presently, but this airplane has been flown numerous times, with virtually no trimming done to it yet. That means that John was able to figure out the basic concepts, such as where the plane should balance, on the first try.

John wisely preceded his project with some research, and he found the information he needed in a book called *RC Model Airplane Design*, by A.G. Lennon, published by Motor Books International.

The main drawback to Canary No. 1 is that it's a little underpowered with its Fox .35 stunt, and the main change for a future version will be the increase in engine size to a .40. The Canary weighs 42 ounces and has a wing area of 500 square inches, counting the canard surfaces, with a span of 40 inches. The wing is foam, based on cores from a fast combat airplane design by Tom Strom. There are no wing spars, but it is sheeted with 1/64-inch plywood.

The Canary has an "elevator" on the rear of the front canard surface as well as a fully-moving elevator surface at the tail.

John wasn't satisfied with just one unusual aircraft, so he also built his version of "Otto the Gyro," which has been mentioned in this column in the past. He increased the engine to a .40 and increased the rotor size, resulting in an excellent flying throttled gyro that John would like to develop for Navy carrier flying (yes, there is documentation for a carrier gyro!). He also added a canopy to replace the original design's open cock-



John Hall goes for the unusual . . . here's another version of "Otto the Gyro," with .40 power, enlarged rotor, and throttle. Flies great!

pit. Otherwise, the plane is faithful to *Model Airplane News* plans from the early 1970s.

Otto, as built by John, will take off with about a two-foot roll, climbs and dives smartly, and can be brought to a virtual stop and hover. With just a little practice, I was able to glide down to about one foot off the ground, bring Otto to a hover and settle it neatly onto a chosen spot.

It was interesting to discover that application of down elevator increases Otto's airspeed considerably. Eventually, you can administer enough down to make the plane dive under power, but the first response is for the plane to speed up as the rotors level out.

I asked John's permission to attempt inverted flight, but the request was denied. But Otto is definitely an enjoyable change of pace and a fairly simple building project.

Any mention of autogyros in this column generates letters that indicate that there's quite a bit of interest in this type of unusual modeling project. I hope John's canard project will spark some correspondence that will add to our knowledge about canards.

### SAFETY ITEMS

Safety is always a matter of concern to model aviators, and most experienced builders and fliers long ago adopted as standard practice many techniques designed to prevent accidents, or at least to minimize



the unpleasant results of accidents. However, since new people take up the hobby every day, it's never a bad idea to review some basic safety topics.

The accompanying photograph shows three safety items that no modeler should be without:

**Ear protectors.** Those shown are the highly efficient type used by target shooting enthusiasts and in some industrial facilities. There are alternatives, many of which are less cumbersome, such as foam earplugs. I have several varieties in my field box, and use whichever ones seem most convenient at the moment. Prolonged exposure to loud noises, including unmuffled model airplane engines, can cause hearing damage... and you won't notice until it's too late. The inconvenience of earplugs is well worth the preservation of hearing acuteness.

**Safety glasses.** I wear spectacles all the time (all the better to see your streamer with!) but even if I didn't, I would routinely wear safety glasses in my workshop. A few years ago, I was cutting something with my Dremel Moto Shop jigsaw when the small blade broke, and I heard the distinct *tink* of a piece of that blade bouncing off my glasses. One experience like that... and there have been others since... makes one a believer in safety glasses. There are dozens of ways to injure your eyes in the workshop, including metal and wood dust, flying bits of grinding wheels, cutting wheel chips, and chemical splashes. Did you know that a single drop of the catalyst for polyester resin will lead almost instantly to irreversible blindness? Safety glasses such as those shown are virtually unbreakable under normal workshop conditions, and have shields to protect from objects coming from the side.

**A respirator mask.** This item is an absolute requirement for anyone spraying epoxy paints, automotive paints, and similar fin-

ishing materials. Many compounds in common use in model workshops have a cumulative effect on the body. The rule with these types of paint is: If you can smell the paint, it is doing you some harm. Before I learned this lesson, I once spent five minutes spray painting a small fuselage with a common hobby epoxy... and was ill for a full day afterward. People who have worked unprotected for longer periods have suffered serious long-term medical consequences. Respirators such as the one shown, available in paint and hardware stores, have special replaceable filters that protect the wearer from the fumes in a way that a common dust mask cannot. They may seem expensive, but they are not only worth the price, they are a must!

An anecdote sent along by David Thompson of Wenatchee, Washington, illustrates a safety matter not covered in the photograph. The safety thong is now required in most competitive control line events, but many fliers don't bother with them in their local Sunday flying. The tale is told in a copy of a letter from David to Tom Dixon, who had been helping David with his first stunt project:

"My flying skills were improving weekly with only minor mishaps like broken fins, torn wings, etc. Then it happened. On a beautiful Saturday morning, as I remember, I was flying upright, inverted, loops, eights. The motor sputtered, lines slacked, I ran back, —jerk!

"We all learn lessons in life. I learned that I should have

put a strap on my new handle. Of course my other handle had a strap, but, well, yeah, it slipped out of my hand.

"That moment when your happy little CLer becomes an awkward free flyer, many thoughts rush through your mind. Why, heck, I'll just reach out and grab the handle; no, I'll run after it; no, I can't catch it. Well, I'll just wait a fraction of a second and go pick up the pieces! The only question is how many!

"There was no whomp, no sounds of a motor grinding out sod, just my Fox .40 running strong... anyway, my Fokker red Twister, with an almost new motor and four ounces of fuel headed east at a gentle rate of climb, dragging 70 feet of .018-inch cables and a new strapless Sullivan handle.

"I stood there totally helpless and watched as my pride and joy missed two light poles on the ball field and headed out over the Columbia River... about 1,200 or so feet out and at least 300 or 400 feet high, the Twister went into the most beautiful roll I've ever seen a CLer do. At the end of the roll it headed straight down and hit the water with a tremendous impact.

"As it floated downstream, a boater scooped up the remains and deposited the pieces on the shore. As I walked back to my truck, each hand holding several pieces, I reflected back to earlier that morning when I had decided to use my new unstrapped handle."

As David learned, an unexpected jerk on the handle, of the type caused by slack lines, for example, will snatch the handle away from any flier. Since the safety thong became mandatory in combat, I have seen it save several planes from flying away, including one of my own when the handle was jerked away from me in a midair "bump." Many times, as in my own example above, the handle can be retrieved and the plane brought back under control without even a crash.

...

In the "By the Way" department, David Thompson's letter, mentioning correspondence with Tom Dixon, came about the same time as a note from Tom himself, accompanying his latest control line products catalog.

Tom offers a wide range of kits, plans,



Workshop safety products... ear protectors, safety glasses, respirator. Photo by Jim Cameron.



Bill Darkow of Tacoma, Washington, also likes unusual planes. Here are two World War II biplanes, both with diesel engines and throttles. Seen flying with John Hall at Stuntathon. Photo by John Thompson.

engines, engine parts and accessories, tanks, props, etc. He specializes in items not normally found in hobby shops, and advises: "For routine items, see your local hobby dealer first."

For a copy of the catalog, write Tom Dixon at P.O. Box 671166, Marietta, GA 30066. Tom charges \$3 per catalog, which just covers the cost of printing and mailing.

Tom offers stock and custom reworked engines in the Magnum, K&B, Fox, and Merco lines, as well as custom parts for some other engines. As an engine expert, he also can pass along some valuable advice. His latest note to *Model Builder* includes this nugget:

"Something you might emphasize in the column is the importance of proper lube in fuel. A lot of it out there is blended by weight percentage rather than volume percentage. So, if the manufacturer says it is 23 percent oil (by weight) it is only about 19 percent by volume. Same holds true for nitro, especially in this 'shortage.'

"All the 'old technology' engines, such as Fox .35s, Merco .30 to .40, O.S. .35 stunt, and even the FP series, need at least 24 percent oil by volume to run properly in stunt, and transition from four-cycle to two-cycle and back, as they should. There is a reason Fox put 28 percent castor in Fox Superfuel!

"I'd say 90 percent of engine problems in CL are due to fuel which works OK in RC, but cannot stand the thermal load, 'wide open throttle,' and low air speeds we have in CL."

### THE RINGMASTER

Carl Holzwarth of C.E.H. Products, Inc., a wholesale hobby business in the Northeast operated by Carl and his brother, provides hobby shops with quite a variety of hobby products, and he observes the same happy trend we hear of from many quarters:

"Since we are Sterling Hobbies distribu-

tors, we have seen an increase in the sales of control line kits. Remember the Ringmaster? We also sell quite a few of Sterling's 1/2A kits."

Remember the Ringmaster? It must be the most recognizable control line airplane ever designed. Your columnist has built at least nine of them for Northwest Sport Race! But

**"I'd say 90 percent of engine problems in CL are due to fuel which works OK in RC, but cannot stand the thermal load..."**

apparently some people do forget, and that's something Carl Holzwarth wants to rectify.

"My dad started a model airplane club in 1970," Carl writes. "The club still exists, but they really have forgotten their 'roots' in control line. Some of the founding members were of national caliber, Doug Twaits (fast and slow combat) and John D'Attavio (precision stunt).

"My brother and I are going to start another control line club for the kids in the neighborhood near our warehouse. We would like to correspond with any other control line clubs across the nation, and we will keep you up to date as things progress."

Clubs that would like to send a newsletter to this new group can contact Carl E. Holzwarth in care of C.E.H. Products, 112 E. Blackwell St., Unit C, Dover, NJ 07801; telephone (201) 328-3545.

Speaking of new and renewed model clubs, here's an update on the Portland Fireballs (or Portland Aeroliners?). The Aeroliners last summer were planning to change their name to the Fireballs in 1991. Dave Royer advises fliers in the Portland,

Oregon, and Vancouver, Washington, areas that the club flies regularly at Delta Park in north Portland. For fliers traveling in their cars on Interstate 5, the circle is visible from the northbound lanes of the freeway just south of the Columbia River Bridge (take the Delta Park exit to get to the field). The club gathers at noon on the first and third Sundays, and at other unscheduled times.

For information, contact the Northwest Aeroliners, in care of Dave Royer, 1705 N.E. 86th Ave., Portland, OR 97220; telephone (503) 254-3173.

### NEWSLETTER PROFILE

The Norfolk Aeromodelers, of Norfolk, Virginia, couldn't have picked a more appropriate title for their publication, *Aeromail*, which is this month's featured newsletter.

*Aeromail* (Vol. 5, No. 8 in August) is edited by Terry Bull, who throws in an ample sampling of control line news and technical information. This issue includes an event calendar, an obituary on a longtime club member, a diagram of the AMA beginner precision aerobatics pattern, a detailed report on the club's month of activities, and a report on how club members did at the 1991 Nats.

There also is an article on model airplane landing gear, an extremely useful feature from a 1956 *American Modeler* magazine on "Twenty Reasons Why Your Engine Won't Start," cartoons, three-views of the Boeing P-26A, and a contest flyer. The technical tips regularly make *Aeromail* a publication to keep and use for reference.

The club meets regularly at the Lafayette Branch Library, 1610 Cromwell Road, Norfolk. For specific dates, contact Terry Bull at 1428 Woodside Court So., Chesapeake, VA 23320.

As always, letters, questions, photos, technical tips, club news and contest information is welcome. Write John Thompson, 1145 Birch Ave., Cottage Grove, OR 97424. **MB**



**JEKYLL**

Wing Span: 66" Weight: 8.0-8.5 Lbs.  
Wing Area: 770" Engine: .60



**CONQUEST VI**

Wing Span: 66" Weight: 8.0-8.5 Lbs.  
Wing Area: 840" Engine: .60

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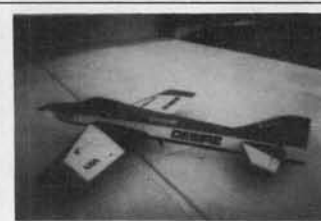
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**TYPHOON**

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LA-1  
Phoenix 8  
Phoenix 8/45  
Punch  
Skybolt  
Summit III  
Sunderner  
Typhoon  
Vortex



**DESIRE**

Wing Span: 66" Weight: 8.5-9.0 Lbs.  
Wing Area: 920" Engine: 1.20



**SKYBOLT**

Wing Span: T/77" B/66" Weight: 20-25 Lbs.  
Wing Area: 1625" Engine: QUADRA



SALE PRICES end January 31, 1992! All items are pictured and described in Hobby Lobby CATALOG 18

## Graupner Electric Flight Systems

(Include Motor, folding prop, wiring)

GR297	Drive for UHU	33.00
GR1162	SPEED 600 8.4V	34.00
GR1165	SPEED 700 TURBO	48.70

## Electric Flight Gear & Belt Drives

GR1166	Motor/Prop Drive, 2M	93.00
GR1167	Motor/Prop Drive, 3M	93.00
HLH785	Mini Olympus	24.00

## Hobby Lobby and Graupner Race Boats

GR2000	Electro-Vee	147.00
	<b>SALE! \$129.00</b>	
GR2010	Monster-Vee	177.00
	<b>SALE! \$147.00</b>	
GR2118	SYSTEMS Catamaran	89.00
GR2166	Cobra	52.00
GR2171	Key West	49.00
GR2173	Eco-Speed	59.00
GR2174	Key Biscayne	99.00
GR2175	"Taifun"	99.00

## Sailplanes

HLA120	Topaz II, 3.5M	97.00
HLA303	MFA High Sierra	132.00
GR4203	Graupner Ventus C	416.00
GR4204	ASW B 270	259.00
GR4240	Discus 4 Meter	499.00
	<b>SALE! \$449.00</b>	
GR4273	Cherry SE A-R-F	225.00

## Electric Powered Sailplanes

HLA130	Freshman	39.00
HLA131	Graduate	59.00
GR4201	Chip	129.00
GR4207	Elektro-UHU, 1.9M	88.00
GR4208	Pink 2 Meter	105.00
GR4213	ASW 22B (E) 3 Meter	340.00
GR4264	ASW 22 B 270 EP	279.00
	<b>SALE! \$229.00</b>	
GR4266	ET 200 R-T-F	127.00
	<b>SALE \$109.00</b>	
GR4268	ASW 22 BE "Vario"	414.00
GR4269	Chili	279.00
	<b>SALE! \$229.00</b>	
GR4270	Elektro Junior A-R-F	179.00
GR4271	Cherry A-R-F	238.00
GR4272	Cherry II	258.00
GR4274	Solar-UHU	128.00
GR427420	Solar Cells, 20	278.00
GR427421	Solar Cell, 1	14.75

GR4275	SB-13 Flying Wing	299.00
HLA1324	Sinus	296.00
HLA1328	Sunfly	389.00
HLA1329	Aerofly	138.00

## Telemasters, Funster

HLA010	Telemaster 66	69.90
HLA105	Telemaster 70 A-R-F	174.00
HLA105E	Telemaster 70 Electric	278.00
HLA107	Senior Telemaster	135.00
HLA108	RCM Funster	79.80
HLA111	Telemaster 40	76.50
HLA112	12"6" Telemaster	339.00

## Sport and Scale RC Airplanes

HLA121	1:4 Scale Piper Cub	228.00
	<b>SALE! \$178.00</b>	
HLA128	DH 82A Tiger Moth	209.00
HLA3731	Golden Eagle Biplane	226.00

## Hobby Lobby Helicopters

HLA400	SPORT 500	199.00
HLA401	SPORT 500, Collective	285.00
HLA402	Collect. Pitch Conv.	132.00
	<b>SALE! \$119.00</b>	
HLA403	Auto-Rotation Kit	40.60
HLA404	SPORT 500, Assembled	412.00
	<b>SALE! \$379.00</b>	
HLA410	Hughes 500E Conv.	113.00

## Hobby Lobby's ORACOVER Plastic Covering

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HLOR22	Red	8.97
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HLOR92	Gold Buff	8.97
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HLOR21	Fluor. Red	12.97
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HLOR31	Fluor. Yellow	12.97
HLOR41	Fluor. Green	12.97
HLOR51	Fluor. Blue	12.97
HLOR64	Fluor. Orange	12.97
HLOR65	Signal Orange	12.97
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HLORSOCK	Ora-Sock, Iron cover	2.95

## Hobby Lobby Engine Starter

HLFK111	Kavan Starter	25.90
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## "P.F.M." Adhesive-sealant

HLIMP001	"P.F.M." Adhes. Seal.	9.95
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## Steamboats and Steam Engines

HLKK2026	Victoria w/engine	587.00
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HLKK2027	Mark Twain w/engine	589.00
	<b>SALE! \$529.00</b>	
HLKK2028	Alexandra w/engine	568.00
HLKK2232	Complete Med. Eng.	421.00
HLKK2262	Complete Large Eng.	459.00

## Hobby Lobby's SCORPIO pre-built kits

HLSC232	Taurus Plus	309.00
HLSC233	Due	84.00

## Hobby Lobby VIDEOs

VIDEO1	UHU, Elektro Jr., Pink	9.00
VIDEO2	Sunfly, Race Rat, Hi-Speed	9.00
VIDEO3	Freshman, Graduate	9.00
VIDEO4	Key West, System, Cobra	9.00
VIDEO5	Telemasters	9.00

## Hobby Lobby's MERCOR RC Airplane Engines

MER30RC	Merco 30 RC	60.00
MER35RC	Merco 35 RC	62.00
MER40RC	Merco 40 RC	64.00
MER50RC	Merco 50 RC	111.00
MER61RC	Merco 61 RC	112.00

## Hobby Lobby's Merco Control Line Engines

MER30S	Merco 30 Stunt	60.00
MER35S	Merco 35 Stunt	62.00
MER40S	Merco 40 Stunt	64.00
MER50S	Merco 50 Stunt	111.00
MER61S	Merco 61 Stunt	112.00

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# ELECTRONICS CORNER

BY ELOY MAREZ

## Erroneous Precision!

The proliferation of digital electronic test instruments has brought to us a degree of readability not obtainable with the older analog instruments, i.e., those with a needle type meter. Unfortunately, though the readability is not in question, the precision is. This is a matter which I have wanted to discuss here for some time, as I know from my mail that some of you have run into confusing readings from your test gear. Unfortunately, a lot of misinformation has made its way into the model

neighborhood. Additionally, inexpensive test equipment seldom comes with any guarantee, or even data, as to its accuracy. True precision equipment, on the other hand, is furnished with complete accuracy figures, is spec'd to definite parameters, and is furnished with guaranteed calibration which can be tested and corrected periodically by its maker. As a matter of fact, for certain applications, test equipment has to be calibrated periodically by a laboratory which must meet certain government established standards.

Knowing all these facts and feeling decidedly uncomfortable with such vague and often confusing data, I finally decided to take the plunge and change to something I could depend on. As a result, the face of my not-always neat and clean workbench was changed with the addition of a Fluke 8840A Digital Multimeter. Since then, the results of my precision testings have been such that I feel almost as if I had been using a battery/lightbulb to check continuity and gauging the temperature of wires with my fingers to measure current flow. The Fluke 8840A is the type of highly calibrated and certified test instrument mentioned, and while it does not replace my dependable analog Simpson 260 for all applications, I can certainly depend on what it is telling me. You can expect that from a \$1200 DVM!

Let's look at the two most prevalent test areas we read about, tests in which any inexpensive meter cannot be telling us the truth, but which are often presented to us a cold, accurate, believable fact, in spite of being ill conceived from the word go. These areas are current and resistance readings; let's take the common current tests first.

In this case, we often read about the rate of a particular charger having been "measured" at so many mils, and might even be accompanied by a picture of the charger, battery, and a \$19.95 digital wonder. Now, take a look at Figure 1A, a representative RC system battery

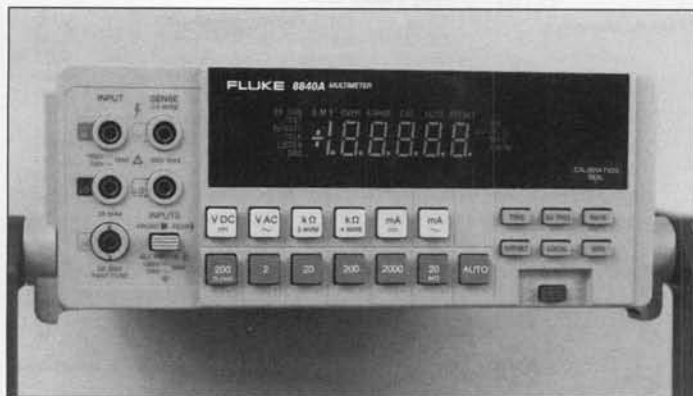
charging circuit consisting of a transformer, rectifier, current adjusting resistor  $R_a$ , and the battery. In most chargers,  $R_a$  will also include an LED and a resistor that limits its current, but circuit-wise it amounts to one resistor of unchanging value. In such a circuit, current will flow according to Ohm's Law,  $I=E/R$ ; the voltage at the rectifier's output, divided by the combined circuit resistance including  $R$  and that of the battery.

To read current, we have to insert our meter in series with one of the leads—the negative one is recommended, and we show that in Figure 1B as  $R_m$ ; the resistance of the meter. That is exactly what we have done—we have added another resistor in series, increasing the total circuit resistance, and solving for  $I=E/R$  will give us a completely different and lower figure.

To understand why, we have to look into our meter. An analog meter is in all cases a current reading instrument, the basic instrument having a sensitivity relative to its price, usually somewhere from 0 to 50 microamps, to 0 to 1 milliamp. Different fixed resistors are connected in parallel to provide different current ranges, therefore the effective resistance of the instrument will vary from one range to another. This explains why your analog meter will often give one reading in a test situation such as that depicted, with a completely different reading resulting simply by switching the meter to another range; the additional meter resistance introduced into the circuit has changed.

Digital meters, on the other hand, are basically voltage reading instruments, in which current is read by placing an internal resistance in series with the current, and reading the voltage drop across it. In any event, an additional resistance is introduced into the circuit being tested, and unless compensated for in the design and calibration of the instrument, will result in erroneous readings.

The better quality meters do



A digital multimeter one can believe in: the Fluke 8840A, latest addition to the Electronics Corner workbench, has the kind of accuracy and precision that unwarranted faith leads many to believe exists in their \$29.95 instruments.

press—some of it caused by digital meters, some of it caused by general test equipment shortcomings, all aided by a lack of awareness of proper test procedures, and blind faith in the instrument in use.

To start with, you don't really expect that \$29.95 meter you have, digital or analog, to be the epitome of precision, do you? Think about it. Compare it to whatever other equipment or apparatus you may own or use in your work, and think about what precision costs these days. Not \$29.92. Take a look inside and see how many 1% components you find and whether they are marked for tolerance (if at all). For a product that had to cost its maker less than ten dollars, you can't expect that a lot of time was spent calibrating it to Bureau of Standards specifications. As a matter of fact, all inexpensive instruments have one calibration adjustment only, on one band; all other bands being expected to only fall somewhere in the proper neigh-



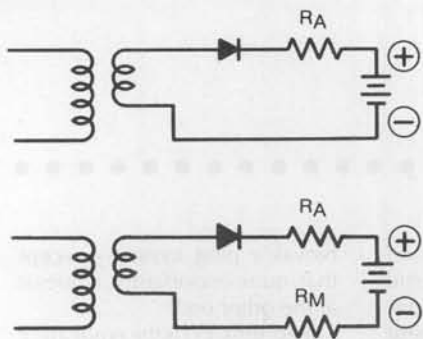


Figure 1. Representative schematic of an average RC system charger (a) in which the rectifier, adjusting resistor  $R_A$  and battery combine into the total circuit resistance. Adding a current meter, shown as  $R_M$  increases total and lowers current.

include features that allow you to compensate for the insertion of the instrument in a live circuit; the effect is referred to as a "burden voltage." Calculating for and compensating for this burden voltage is not all that difficult, though it does require measuring (accurately) the source voltage, the load resistance, and the internal resistance of the meter. As you might have guessed, the latter figure is seldom, if ever, published for any but the higher quality instruments.

Now for the resistance readings that we read about and are supposed to be impressed by, often having to do with conductors and connectors. Not only do the meters themselves introduce an error, but quite often the methods used are so, but I won't go on; it'll only get censored anyway. Let us just say that these methods are often far from professional, and though they might yield comparative results between two different connectors, the ohms figures themselves should not be accepted as accurate.

Review time: Resistance reading meters, both digital and analog, take measurements by introducing a current source to the resistor under test. In the analog instrument, the current source, a simple dry cell or battery, and the meter itself are in series with enough resistance being added to keep the meter reading at maximum. The resistance being measured is also connected in series; it reduces the current flow through the circuit and thus through the meter, which is marked to show the reduced current as resistance. Crude but effective, and reason-

ably accurate if the meter scale and calibration are properly done.

The digital instrument also provides a current source, either a battery in the portable units, or a well-regulated source in AC-powered bench instruments like the Fluke 8840A. In this case however, the voltage drop across the unknown resistor is measured, translated and displayed as resistance.

This can be a fairly accurate method with a high quality instrument, if the resistances being tested are relatively high. However, in the case of low resistances, like those referred to, the system is highly unreliable. For one thing, the test leads themselves can add as much as half an ohm to the readings, and the contact resistance between the probes or clips being used further increases that error. Add the rather common practice of sticking pins into wires to which test leads are clipped and accuracy becomes a myth indeed. Instruments of the caliber of the 8840 include compensation for lead resistances. Before making low resistance measurements, the test leads are shorted together, at which time the instrument will display their resis-

tance. There is a control, in this case marked "OFFSET," which when depressed returns the reading to zero, so that any further measurements will be those of any resistor under test, without including that of the leads.

However, that does not provide any compensation for the test probe or clip resistance, which can vary widely from one test to another. So, another method, called 4-Wire Ohms Measurement, has been devised. This method, on the Fluke, automatically compensates for both test lead and contact resistances, and though only slightly more involved than normal measurements, does insure that correct readings are obtained.

As stated earlier, the measuring of an unknown value of resistance requires that a known current be passed through it, and in the case of a digital instrument, the voltage drop across it can then be read. For 4-Wire Ohms Measurement, different sets of leads are used for each of these chores (see Figure 2). The first pair of leads carries the current to and through the resistor, with a second set of leads, to read the voltage drop, being connected right at the resistor leads. The important point is

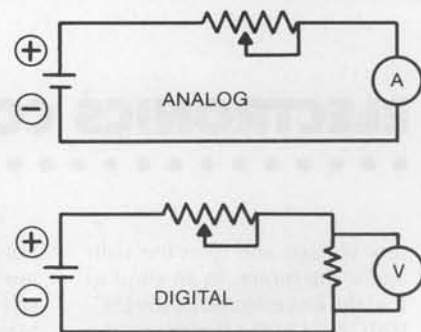


Figure 2. The common way to measure resistance with analog and digital instruments; the analog meter is actually a low range ammeter, while the DVM reads the voltage drop across a resistor. Both methods are affected by meter lead and contact resistance.

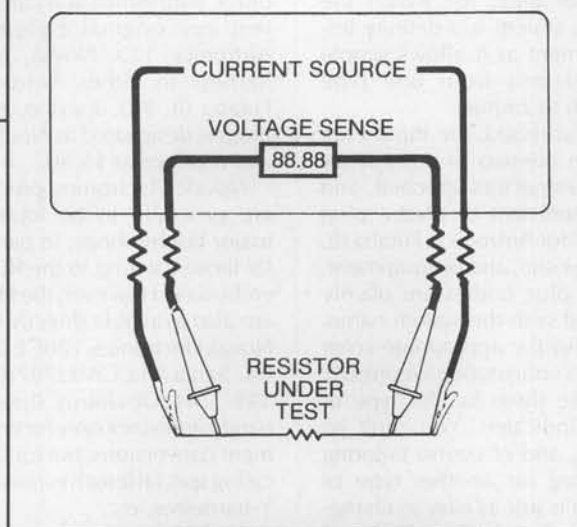


Figure 3. The Fluke 8840A 4-Wire Ohms Measurement method virtually eliminates test lead and contact resistance error, which can lead to completely erroneous readings, especially when measurements of very low values are being made.

that the second pair of leads, called the Sense leads, carry only a negligible amount of current, and thus the voltage drop within them—and any error introduced by them—is also negligible.

This is the most accurate practical method for measuring small resistance values, and as you might expect, is another feature not found in any cheap electronics equipment.

There are yet other factors involving multimeter tests that can lead to errors in the readings obtained. One is meter sensitivity, one of the few specs commonly published. For example, one of the more popular inexpensive multimeters is rated at 20K per volt, which means that at its low range of 0-3 volts, a range commonly used for semiconductor circuit testing, it has an internal resistance of 60,000 ohms. It further means that anytime you touch the probe to a live circuit, you are adding that much resistance to it, from the test point to ground. In high resistance circuits, the error introduced will be significant.

Probably greater errors can occur in AC voltage measurements, for which there are three considerations, with specifically adjusted and calibrated instruments being available to measure each one. These are peak, peak-to-peak, and RMS (Root Mean Square, also erroneously referred to as "average") voltages. Unless one knows what type of meter is being used and correctly interprets the readings obtained, gross errors can appear.

A related case in point is the testing of high-frequency speed controls, by measuring the bat-

## ELECTRONICS CORNER

tery voltage and then the voltage at the motor, in an effort to find the loss effected by the ESC. **WRONG!** In the first place, the voltage applied to the motor is a pulsating DC, at something like 2.5KHz. The meter is not calibrated for it, and will instead be reading something of an average value. (Voltage ON to Voltage OFF, plus instrument lag time.) Additionally, all meter calibration is done with "clean" voltages, while that at the motor terminals is extremely "dirty" with very high motor generated spikes that will completely fool the meter.

Plugs, male and female, are next on this month's agenda. First, let's look at the Novak Electronics innovative universal Input Plug System, as used on it's extensive line of electronic speed controls and servos, but which are also avail-

able separately. In this case, we are talking about the male servo style of plug, for which the Novak system is a definite improvement as it allows simple conversions from one type (brand) to another.

As furnished, the Input Plug System consists of three wires with connectors attached, and an assortment of plastic plug bodies for Airtronics, Futaba (J), KO, Kyosho, and JR equipment. These plug bodies are plainly marked with the system name, and also the appropriate color wiring configuration to correctly polarize them for the type of radio indicated. You can't go wrong, and of course tailoring the plug for another type of system is just as easy as changing the plug. A kit consisting of a wiring harness and one each of the listed plugs is designated as No. 5300 and is priced at \$7.25.

An auxiliary Plug Conversion Kit, containing only the plastic plugs, with which you can convert any original equipment Airtronics, KO, Novak, or JR harness to either Airtronics, Futaba (J), KO, Kyosho, or JR plugs is designated as No. 5350 and is priced at \$5.50.

Novak Electronics products are generally to be found at major hobby shops, in particular those catering to the RC car enthusiast. However, the above are also available directly from Novak Electronics, 128CE Dyer Rd., Santa Ana, CA 92707; (714) 549-3741. Obviously, these are handy items, not only for equipment conversions, but for fabricating special length extensions, Y-harnesses, etc.

A related product, one which will come in equally handy, is the Custom Electronics Universal (CEU) connector, which does pretty much the same thing as

Novak's plug system—except that, quite importantly, it does it at the other end!

Yep, the CEU is the equivalent of a female connector, one that will mate with Airtronics, Futaba (J), JR, Hitec, and one listed as "new style World Engines," which I am not familiar with at all. It is a solder-on type of fitting, to which you can attach your own wires, though it is also available with an eight-inch harness already installed. It is priced at \$3.00 with \$2.50 without the wires, and is being distributed and available both from Ace RC and Custom Electronics. Ace's address is certainly not difficult to obtain; Custom Electronics can be contacted at P.O. Box 1332, Alta Loma, CA 91701, (714) 980-4244.

Eloy Marez, 2626 W. Northwood, Santa Ana CA 92704. **MB**

### Alcyone \$149.95



The Alcyone is a high performance 121" thermal plane designed to offer the thermal pilot a competitive ship without the need to buy a computer radio and several servos. Alcyone is a three-servo airplane (ailerons mixed with rudder, elevator, and flaps), and features a unique mix of the SD7032 and SD7037 airfoils allowing for the advantages of full camber changing without the cost. The Alcyone is a perfect plane for the flyer looking to enter the world of high performance thermalling.



### Pinnacle Hi-Start \$69.95

The pinnacle is simply the finest Hi Start made! It features UV-protected rubber, specially made DAY-GLO ORANGE line (no more hunting for your line!), a custom-designed no-tangle chute, the highest quality fittings, a metal stake, and a strong high speed reel. We designed the Pinnacle based upon feedback from our customers on what would make "the best Hi-Start". We'll refund your money if you don't agree it's the best Hi-Start you've ever seen. Call us for information on the sizes offered.

## Northeast Sailplane Products

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The Sparrow is a highly refined slope soarer designed to offer incredible versatility. Due to its high performance SD7080 airfoil and it light (9 oz.) wing loading this plane will fly in very light to very strong conditions (ballasted). The Sparrow features a sleek fiberglass fuse, balsa-sheeted blue foam core wings, a balsa V-tail, and a complete hardware package. The control system on this 66" sloper is aileron-elevator, and construction is simple. If you enjoy slope soaring then the Sparrow is a must-have airplane!



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## STAGGERING AROUND MAUI

*An EEE-Z-FLI Oldie*

BY AL WHEELER



Full-size Staggerwing can be found in many different colors, so just about any realistic scheme you can come up with could be considered authentic. Author's prototype is powered by an O.S. 25FP swinging a 9x5 Master Airscrew prop, the covering is Monokote, and the radio is a Futaba. The cowl and windshield both came from a two-liter plastic soft drink bottle.



We present here a tribute to a Golden Age airplane, a nostalgic trip to visit with a beautiful aircraft, one built when biplanes were king, engines were big, round and strong, and the little wheel was in the back. And no one had heard of ARFs! The Beechcraft Staggercraft was one of the most luxurious and aesthetically appealing aircraft of that wonderful age, admired and sought after today by restorers, antique buffs and modelers alike.

Presented here is an inexpensive, easily built model of that fabulous aircraft, one that looks great in the air and on the ground, flies well and has that certain appeal that turns heads at any flying site.

In the "recognizable" scale category, the EEE-Z-FLI version is a basic fun-fly aircraft that may be detailed to suit the builder's taste. So, if your choice runs to sleek biplanes with big round engines and good looks, shake the termites out of your balsa pile, sharpen your hobby knife and start cuttin'.

Development of the model Staggerwing has followed the basic EEE-Z-FLI criteria of ease of construction without requiring hard-to-get materials; reasonable scale appearance and good flight characteristics. As always, ease of repair was a basic consideration. The size of the model and the use of a .25 size engine keep the Staggerwing in the affordable

range for the novice scratch builder.

Extensive flight testing (and just plain fun flying) has indicated good performance without any of the peculiar quirks sometimes associated with semi-scale models. Ground handling is good, tracking is well within the ability of the rudder to keep it straight, and general flight characteristics are normal, loops and rolls and their various combinations precise, and approaches and landings are routine. Slow flight is normal with docile stall performance.

The Staggerwing is not considered a difficult building project, however, some prior experience would be helpful. Initial flights should be accomplished with the help of an experienced airplane driver.

### GENERAL NOTES

1. It is easier to cut out all the parts prior to the start of construction; then, like a kit, it goes faster.

2. It is important that the wings be built flat, as this type of construction resists corrective warping!

3. Numerous choices are for the builder, engine brand, fuel tank make, covering material and general hardware selection. Equipment and materials used on the prototypes are noted on the plans and/or in the photo captions.

### FUSELAGE

Select matched sheets of 1/8 medium balsa. Cut out and edge-join FS1 and FS2 on a flat surface. Cut D1, D1A and D2 and cement to the sides in the locations shown on the plans. Install the vertical 1/8x1/4 strips in the aft fuselage. Mark and cut the elevator pushrod slot in the aft fuselage left side. Install B2, B3 and B4 to one of the fuselage sides, making sure that they are vertical to the fuselage side. Join the fuselage sides by cementing B2, B3 and B4 onto the remaining side. Do this on a flat surface and use a square to align the fuselage sides at the aft end. Install B1 (firewall) using epoxy. Fit and install D3 (right and left)



and formers F2 through F6.

The aft ends of the fuselage sides may now be joined. Pull together, align and hold with clothespins while cementing. Install the cross braces at the rear fuselage vertical members, as well as the stabilizer support pad. The upper side supports from the firewall to F3A may now be installed and the stringer on each side from the firewall back to F2. Mark the side stringer locations and cut notches for them in F4. Taper the rear end of the stringers as shown and install. Make M1, M2, M3 and M4 and the M1 and M2 triangular supports and install with epoxy.

Fit and install the hardwood tail support block and the nyrod guide for the tail wheel wire. Servo rails may now be installed, the rear one as shown and the front one to accommodate the servos being used. Install the upper stringer from the firewall back to F6. Cover the top of the fuselage from the firewall back to F3A with 1/16 balsa, and continue sheeting back to B3 on both sides. The top and bottom of the fuselage can now be sheeted (cross grain) and the bottom of the nose covered with the grain running fore and aft. Using a piece of 1/8 scrap balsa to simulate the stabilizer, form the aft fuselage top block from a soft balsa block. The upper windshield block may be carved to fit, but leave the rear cut-out for the wing leading edge until the wing is completed and can be fitted.

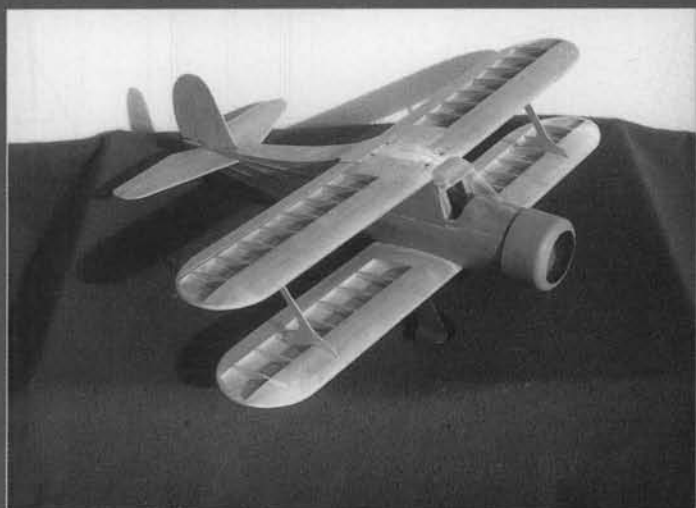
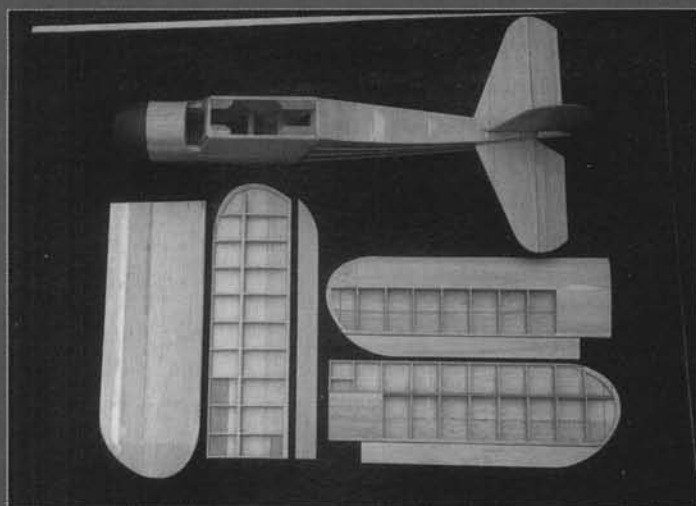
The hardwood cowl supports may be epoxied to the firewall at this time and the engine mount holes drilled and blind nuts installed. Position your engine on the mount and locate and drill the throttle control cable hole and the fuel and vent line openings in the firewall. The fuel tank may be installed and the servos trial fitted at this time.

## TAIL SURFACES

All surfaces are medium-hard 3/16 balsa. Elevators are joined with 3/16 dowel as shown. Do this on a flat surface, and be sure the leading edge is straight and trailing edges aligned. Cut the hinge slots and cement the hinges into the stabilizer and fin only. Slot the fuselage sides as required for the stabilizer to fit as shown on the plan. To fit the aft fuselage top block, mark and slot the center of the block for

the fin, which fits onto the top of the stabilizer, and cement the block to the stabilizer top. Sand the edges of the block to contour with the top fuselage corners.

bottom skin. Cut the pre-formed trailing edge material to length and cement it to the rear edge of the bottom sheet; assure that the rear sheet and the trailing edge



(Top) Construction is pretty much all sheet balsa, with just enough open structure on the fuselage and wings to retain the look of a fabric-covered aircraft. (Above) The Staggerwing is the latest in the author's series of EEE-Z-FLI model designs, several of which have been featured here in MB.

Sand all tail surfaces and put them aside for covering.

## WINGS

Note that the rib requirement differs between the upper and lower wings; R1 is the same for both, but R3 and R4 for the upper wing are shorter due to the aileron spar, and are designated as 3U and 4U.

Starting with the lower wing panels, select four matching sheets of 1/16 medium balsa, cut to length and edge-join to form the bottom wing sheet. Cut the tips to shape and, working on the plans, transfer the spar and all rib locations to the bottom wingsheet with a ballpoint pen. Install the main spar, assuring that it is vertical to the

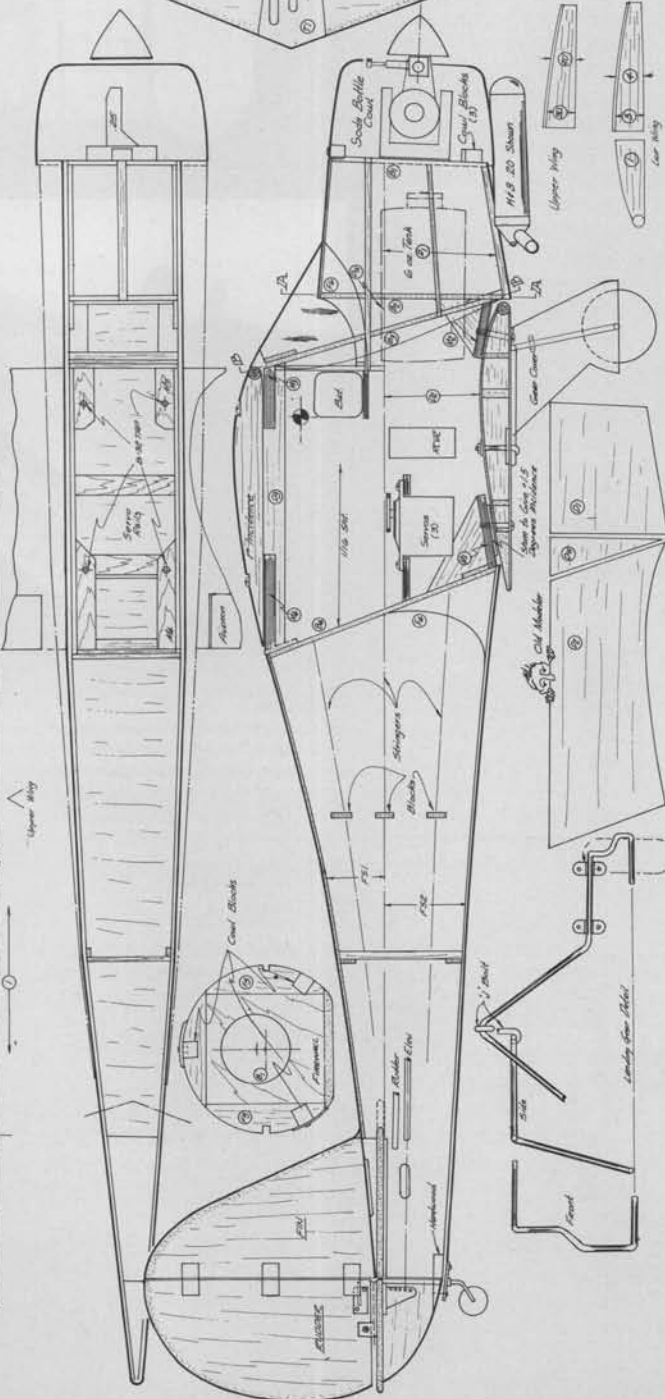
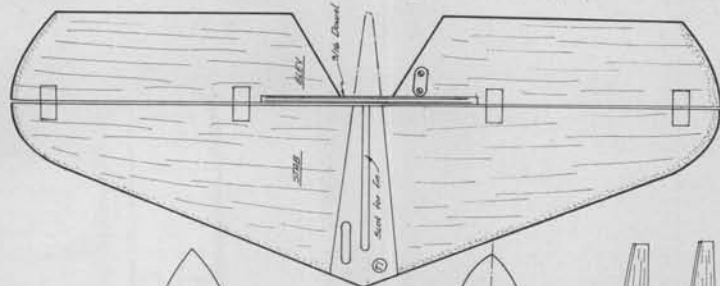
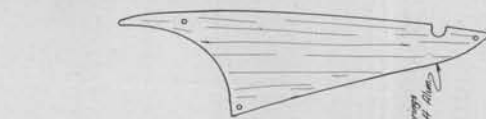
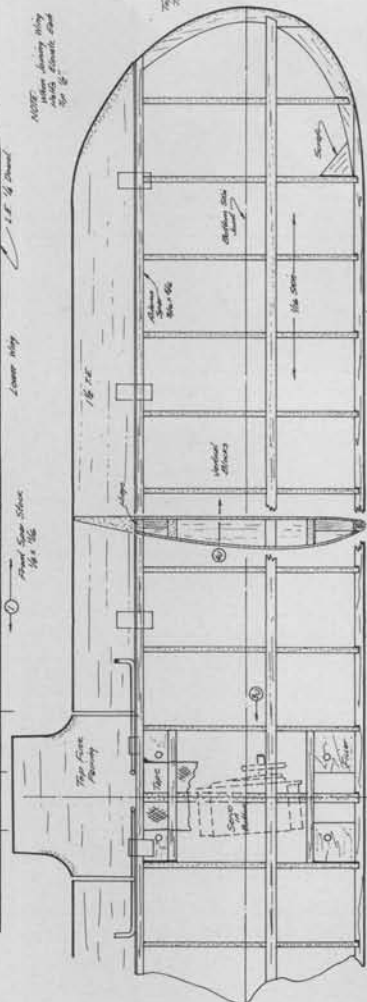
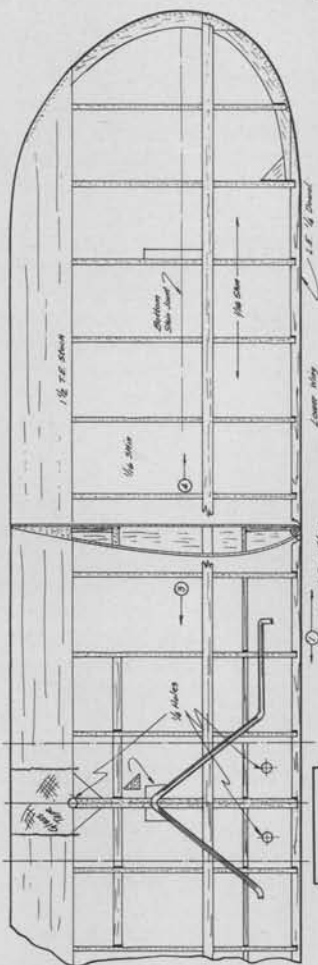
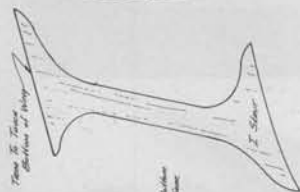
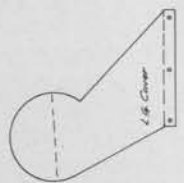
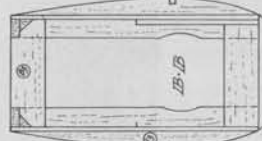
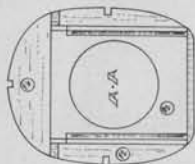
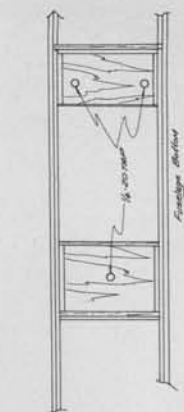
stock are flat on the work surface and that the joint is well cemented. Install all No. 1 leading edge ribs. Note that the four inboard ribs must be notched to fit over the landing gear support pad. The vertical members between the four inboard ribs are fitted between the ribs. The landing gear support pads may be slid into position from the inboard end prior to joining the two wing halves.

Install the No. 3 and No. 4 ribs, fitting them carefully to the forward edge of the trailing edge stock to assure a positive glue joint. With the wing held flat on the building surface, use a rat-tail file and open up the leading edge ribs to accommodate the 1/4-inch leading edge dowel.

Plan the cut so that the dowel rests firmly on the bottom sheeting. Cut the dowel to length, taper the tip end and install, assuring a good bond to the skin and each rib. Cut the tip pieces from 3/16 balsa, trim and install.

Make and install the two supports for the landing gear J-bolt on the outboard face of the butt ribs, also install the two plywood pads at the aft end of the inboard ribs against the front edge of the trailing edge stock. Install the upper balsa skin at the center section from the butt rib to the fourth rib outboard, extending from the spar center line to the trailing edge front edge. The leading edge may now be sheeted with 1/16 balsa from the rear face of the spar to the leading edge dowel; trim the sheet to fit the center section skin at the spar center line. Wet the sheet prior to attaching and use tape to hold it in place as the glue dries. Sand the entire wing, use filler as required, and prepare to join the two halves. Sand the butt ends to obtain a good flush fit with one tip elevated one-inch. When satisfied with the fit, puncture several holes in each butt rib for better adhesive penetration and join the halves with epoxy. Allow to dry, sand as required and apply glass tape to the center joint. Install strut mounting pads as shown. Trial fit landing gear using hardware as shown in drawing. Drill three 5/32-inch wing mounting holes at the locations shown. The 5/32-inch holes will act as guides for fitting to the fuselage and will be opened to 1/4-inch after the fuselage guide holes are drilled. Sand the entire wing in preparation for covering.

Basic construction of the upper wing is the same as the lower with the exception of the addition of the aileron spar. Cut the ailerons from 1-1/2 inch standard aileron stock, fit and cut the hinge slots and control arm holes. Cut matching hinge slots in the aileron spar and install hinges in the spar only. Slot the spar for the torque rod support, then trial fit the ailerons and torque rods. Fit and join the wing halves in the same manner as the lower wing. Drill four 3/16-inch wing mounting holes as shown on the plan. The aileron servo may be mounted with servo mounting tape or with a commercial servo mount.



STAGGER WING BEECH

From BOMBS '87  
Designed by C.E. Zalkow

MODEL BUILDER  
magazine  
Plan No. 2721



Check over the entire wing and sand in preparation for covering.

### COVERING

Sand all surfaces a final time—a little effort here will do much to avoid those unsightly little lumps that detract from an otherwise good covering job. Covering may be done in the builder's choice of materials, color and trim. The prototypes were covered with Top Flite Monokote, as it applies easily, provides a lasting finish and contributes considerable strength to the completed structure. Monokote is a standard with all the EEE-Z-FLI series. Mark and cut away the covering from all assembly joints to assure good wood-to-wood cement joints.

### ASSEMBLY

Trial fit and attach the stabilizer to the fuselage, checking for proper alignment. Position the vertical fin with the rudder attached into the slot on the top of the stabilizer. Check for fit and clearance under the rudder for the tail wheel steering arm and related U-clamp. Install and bend the tail wheel wire at this time (rudder removed), and reinstall the rudder for a final check. Install the elevators, cementing in place, then install the fin and the rudder. Position the lower wing on the fuselage and check for alignment by measuring from a set point on the tail to the same point on each wing tip. When satisfied with the alignment, drill the three 5/32-inch holes through the fuselage mount pads.

Tap the bottom fuselage holes 1/4-20 and open the holes in the lower wings to 1/4-inch. Using the same alignment method, position the upper wing and mark through the four 3/16-inch mounting holes onto the fuselage supports, remove the wing, and drill and tap the four holes 8-32. All servos, the fuel tank and engine may now be installed and hooked up. Prior to remounting the wings, the landing gear may be installed on the lower wing complete with wheels and "doors." Cut a two-liter soda bottle bottom to form a cowl. Provide openings for the cylinder head, exhaust and needle valve, then drill mounting holes through the cowl into the cowl mounting blocks to accommodate #3 screws.

Install the lower wings with three 1/4-20 nylon screws. Mark and provide holes for the struts, then install the struts for a trial fit and trim the tops so that they just touch the bottom surface of the top wing as it is installed on the fuselage. Allow for wing seating tape if you intend to use it. Once satisfied with the fits, cement the strut pins into the lower wings. The soft aluminum wing fairings may be fitted; roll them around a piece of PVC tubing until they give a satisfactory fit, then attach with #3 screws. The top fuselage fairing at the wing trailing edge may be cemented to the wing with a single #3 screw holding it to the fuselage top. Location of the antenna outlet, switch and charge plug are up to the builder. Before you throw away the rest of that two-liter

soda bottle, make a cardboard template and cut out a windshield (The green looks good in the more sunny climes).

### RIGGING

Starting with the throttle, it should be rigged to provide full throttle with the trim advanced and cut off with the throttle closed and the trim all the way back. Idle should be determined by the trim setting. The ailerons should have 3/16-inch travel up and down, the elevators 3/8-inch up and down, and the rudder 1/2-inch right and left. These are good starting points and may be changed later to suit individual taste. The tail wheel should be adjusted to provide straight tracking with the rudder at neutral—a little wire bending may be needed here. With the aircraft leveled so that the stabilizer top is at 0 degrees, the upper wing should read 1 degree positive incidence and the bottom wing 1-1/2 degrees positive. Three degrees down thrust is good for the engine, with no right thrust.

### FLYING

A few minutes taken to check things out and make required corrections will help assure that your new airplane makes it past the first flight! Check all control movements for proper amount of throw and in the correction direction! Reversed ailerons will really give you a case of the staggers. If your engine is new, run at least two tanks of fuel through it prior to flying and run it a bit rich. The writer, sometimes known as "Chicken Al," dislikes the combination of a new airplane and a new engine. If possible, the first flight is better made with a well-used, good-running engine of the same type; that way you can concentrate on flying the airplane and not worry about sudden engine stoppage and the resulting sudden lesson in how your new airplane glides and lands dead-stick. (Not to worry, the prototype quit on the initial flight and the glide and landing were without incident.) So, if everything checks out in the green, go fly!

Check rudder (tail wheel) response and check neutral rudder position for straight tracking. Add power slowly and anticipate the need for right rudder. The tail will lift with neutral elevator and once speed is attained, a little up elevator will produce a gentle liftoff. The prototype required only minor nosedown trim and flew with good stability in pitch, roll and yaw. There is very little nose drop in turns and aileron control is positive. In a nose-high, reduced power stall attitude the nose will drop straight forward and recovery is quick. Power-off glides are stable with a nose-down attitude and the flare and landing are straightforward. So is the rollout as long as you keep an active rudder thumb.

As you get used to your Staggerwing you will find that rolls, loops and any of their combinations are easily accomplished. The airplane is an attention getter in Cuban and reverse Cuban 8s. Somehow, biplanes just look better staggering around the sky! **MB**

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# RC AEROBATICS

BY RICK ALLISON

## JUDGING PATTERN EVENTS

**D**uring the time that I've been doing this column, we've covered a fair amount of ground concerning pattern. We've talked about all kinds of stuff, including at least a half dozen things I can't think of right now, but there is one large subject that we really haven't done much more than brush up against. Never

getting through a pattern career without spending some time in the chair are slim and none. At some point, you are going to be asked to judge, and whether it is fly and judge, or fly rather than judge, the situation will be such that you can't really wiggle out of it. And you shouldn't beg off even if you can.

they don't have a lot of pre-programmed prejudices and opinions, and they tend to grade pretty objectively against what they perceive perfection to be.

Beginning judges who are experienced pattern pilots tend to be overly confident of their own grasp of the rules, and they tend to grade very subjectively according to per-



(Left) Chuck Smith, from Casper, Wyoming, and his very nice Summit III. O.S. powered, Futaba 1024. (Above left) Canadian Jeff LeBouthillier, with his Legend, at 8 lbs., YS LS, JR PCM-10. Jeff flies jets for the Canadian Air Force, when he isn't flying FAI. (Above right) Rich Taylor and his Tipo +. O.S. power, Futaba.

fear; I plan to get to it right now. Judging is the topic of the month. The number of strictly dedicated, non-competing pattern judges has never been large, and does not appear to be growing. The number of pattern contests and the number of participants in those contests is unmistakably growing.

The result is that more and more contestants are being asked to judge. Many contests could not run without contestant judging, and at others, the chairs may be filled with people who normally would be competing, but who have opted to judge instead. In some areas, clubs forbid the local pilots to enter, and use them as judges. Even the Nationals has had to resort to contestant judging to fill the chairs in recent years.

The conclusion is this: The odds of you

Again, the reasons are several. First, it's your turn to pick up the check. Second, sitting in that chair can be a fascinating and enlightening experience that can't help but improve your own performance as a pilot. I don't want to shock anybody, but a fair number of people actually enjoy judging, and I count myself among them.

Since a judging experience is probably in your future, then maybe we need to look at how to prepare for this semi-inevitable event. Usually, you will have a little notice of the happy occasion, but last minute emergencies do happen.

What I'm going to say now comes strictly from my personal experience, both as a C.D. and judge, and from running judging schools and seminars. Beginning judges may be divided into two types: Those who have flown pattern and those who have not. Both groups have their special problems, strengths, and weaknesses.

Beginning judges who do not fly or have not flown pattern tend to interpret the rules very literally. Most often, they aren't aware of the degree of difficulty of a maneuver (good) or of the effect of wind on aircraft track and attitude (bad), and they often miss very obvious mistakes. Until they get a little experience, they have only the descriptions in the book as a guide. The good thing is that

ceived improvement and their own prejudices as to style and how well the pilot "should" be flying under the conditions. The good thing here is that they have usually watched a lot of pattern, are familiar with the standard mistakes, and miss seeing very little. This is the group that is more likely to be reading this column, so what follows is slanted that way.

I could tell you to read the rulebook with special attention to the Judge's Guide, but as an active and dedicated competitor, you've already done that several dozen times, just to see where you might pick up an edge on the competition.

The best way to pet this rattlesnake is probably with a short catalog of common judging mistakes; sort of a "Pitfalls to Avoid" primer. First up on the list would have to be what I call the old "Buttermilk Sky Con."

By that, I mean that a majority of beginning judges from both groups, along with a considerable number of judges of both types who have had more than enough experience to know better, tend to grade smoothness much, much higher than precise geometry or positioning. An extraordinarily smooth flight which contains a large number of major uncorrected defects in geometry and positioning will nearly always score higher than a well-positioned and geometrically



correct flight which contains a few minor but obvious "bobbles," which result in easily seen corrections.

The reason that smoothness sells so well is simple: a thumb glitch, jerk, or obvious correction is like an alarm bell going off in the judge's mind, and it disrupts his or her concentration on the precision and positioning of the maneuver elements and their interrelationship, which is a much more complex, multiple part observation. Often the rest of the maneuver following the obvious mistake is looked at as a mere afterthought while the judge ponders about how many points to take off for the boo-boo. Just as straight and level flight on a heading parallel to the flightline is the most important and most commonly disregarded pattern flying skill, learning to maintain concentration through the whole maneuver before judging it is the most important and most commonly disregarded pattern judging skill.

ing pitfall is something we might call the "Severity of the Defect Trap."

All mistakes are not the same size and shape. This seems a simple enough concept

*Beginning judges who are experienced pattern pilots tend to be overly confident of their own grasp of the rules...*

to understand when you first read it or hear it in a seminar or school, but it sure gets abused on the flightline, especially by the inexperienced.

Without a doubt, the most common question asked by beginning judges in training is,

sion making workload.

The AMA approach has been looser, merely making a distinction in the Judge's Guide between "severe" and "minor" defects, with some extra adjective like "noticeable" and "slight" tossed in for good measure. It's noted that the possible downgrades are legion and that most can be repetitive, resulting in many negative scores if a strict "points per defect" approach is used. Scoring examples are again provided, but they are for the most part fairly generic. You might call this a relative or subjective approach. The intent is to more closely mirror the task as it exists in the real world, and not tie up the judge's thought processes with a multitude of mandated downgrades to remember.

Which approach is the best is still open to debate, but for '92 and '93, the FAI "One Point Per 15 Degree Rule" has been adopted by the AMA book, so it seems that more



The happy group at the '91 Montana State Pattern Championships. Author Allison is in the center of the back row, next to Chuck Smith, who beat Allison in FAI. Chuck is the guy with the "horns" on his hat!

Even if the judge sees the rest of the maneuver, the smoothness defect will draw a more severe penalty than the precision defect in most cases, simply because deviations from the assigned maneuver geometry are much harder to see, remember, and score. This is the way it is, but according to the rules, this is not the way it should be. The present book rates precision and smoothness as equal partners, and the new rulebook for '92-93 is even more emphatic: smoothness is only number two on the list of judging criteria, after precision. This was done to establish a single standard for both AMA and FAI flying.

Probably the second most common judg-

"How much do I take off for that?" The answer is not really very simple, as the differences to be found between the past AMA and FAI approaches to the problem illustrate.

The FAI approach has been and is to mandate specific downgrades: 15 degrees of deviation from the assigned geometry equals one point off, no line between maneuvers is two points off the next maneuver, each clearly seen segmentation of a loop is one point off, and so on. Specific scoring examples are provided, and this is pretty clearly what one would call an absolute or objective approach. The intent is to make the judge's task easier by reducing the deci-

objectivity and less subjectivity is the coming thing at the moment.

The problem is that what is noticeable or obvious is not always severe, and what is severe is not always obvious.

Whether you favor the FAI or AMA slant on the matter, the reality is that the average judge on the line at the average contest tends to use the local standards he (or she) sees being applied around himself (ditto), rather than the book, per se. Human beings are social animals. If it is the common thing for three points to be deducted instead of the mandated one point for a 15-degree oversnap in the Avalanche in Botswana, Idaho, then you will see that from the judges in Botswana

about 90% of the time.

Actually, that particular downgrade on that particular maneuver is common in a lot more places than just Botswana, Idaho. For another example, consider that a Figure M with 1/2 Rolls has three partial loops, eight vertical line segments, four rolls, and two stall turns, plus an entry and an exit, for a total of 19 judgeable elements. A minor but obvious error on just one of those elements will often fetch a 3-point downgrade. The problem comes when the next flier up presents the same maneuver with three minor errors. If one minor error is worth three points, then three minor errors must be worth nine points off, right?

What generally happens with an inexperienced judge is that the first guy gets a seven, the second guy gets a six, and the guy after them who flops both stall turns and nearly crashes gets a five, when the scores probably should have been nine, seven and one, respectively. The judge has ranked the fliers correctly, perhaps, but the contest is artificially close because the assigned scores don't truly reflect the quality of the flying.

Even worse is an equally common situation where the first guy comes away with a seven for the one obvious defect (say, a visible rudder correction of five degrees on a vertical line), and the second guy smoothly misplaces two of four rolls by ten meters each, pulls out ten meters higher than he went in and gets a seven or even an eight. In this case, the fliers have actually been misranked because the judge confused "obvious" with "severe."

This leads into our next trap, which I call "The Doctrine of Compressibility." As judges, we are given a 10-point scale. In AMA pattern, it can even be argued that this is a 20-point scale, since half points are available. Beginning judges are taught that tens are quite rare. They soon learn that anything below a six for a recognizable maneuver is going to make them slightly unpopular with



(Top) Justo Sierra, from Guadalajara, Mexico (El. 4,500 ft.), sent this photo of his latest design, which he calls "Sierra, the Heir." Has 67-1/2 inch wingspan, weighs 6.6 lbs., with 760 sq. in., YS power. Justo is 61 and has been a modeler for 54 years! (Above) Kaos seen at Montana State Champs; builder unknown. Look at the slick canopy/switch arrangement. Whole airplane was immaculate.

the pilots. Pilots who are judging for the first time don't even have to learn this. As I said above, human beings are social animals.

The result is that as judges, we are given

the Nats seems to generally run about two points a maneuver lower than at local contests around the country. I can't believe that the judges get together and consciously

a 10-point scale, but it takes a strong mind and a lot of self-confidence for the human being inside of the judge to actually use more than four points of the scale, as in six, seven, eight and nine. The digits below six get shoved into the mental basement and are hauled out only to impale maneuvers that are so obviously misshapen that they leave lumps on the judge's eyeballs. Many judges even fall into a pattern where they are using only a three-point scale, because experience has taught them that no one is going to become upset or complain. They know that six, seven and eight is a safe "low" range, and seven, eight and nine is a safe "high" range.

Obviously, this leads to injustice on both ends of the scale, but it is such a persistent phenomenon that more corrective effort probably gets expended here than on any other judging problem. Computer tracking programs have been devised, curves and charts have been drawn, and articles have been written, but the problem is stubborn and lies very close to the bone. There isn't an easy answer, because very often, the pilots go out and fly a bunch of sixes, sevens and eights, and you can judge an entire contest without seeing a four or a ten. The trick is to be ready to give that four and that ten to the same pilot in the course of the same flight, if that's what happens in the sky.

Once asked a very good judge how he avoided the trap, and he replied that he "scored the bad stuff kind of low and the good stuff sort of high." In lieu of any better advice at hand, I think I'll leave you with that.

As a sort of an aside on the matter, and a comment on the effects of peer pressure, the scoring at



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decide to do that. Go figure.

Our last big judging black hole is what you might call "The Name Game," or name familiarity bias. As a pilot, you would know it by the term "Halo Factor." Pilots who judge are especially susceptible to this trap, because they tend to be highly aware of their own "pecking order." If you were to ask the average pilot to list the competitors in each class in his competitive area in order of ability, he probably wouldn't have the slightest difficulty in doing so. The odds are that his opinion, with slight variations, will be shared by most of his peers.

Obviously, when our average pilot sets up to judge, he's going to be looking at the sky with some solid expectations about what he is going to see from each competitor, because he's used to pulling into the parking lot and thinking, "Hey, Jonesy and Smitty are both here, that should be a real battle in Advanced, but nobody else will have a chance", or "There's old Ted's van . . . no contest this week in Sportsman, I guess."

If all those prejudices get transferred directly to the scoresheet from our judge/pilot's brain, the contest is pretty much over before it starts. This problem is the largest and most valid argument against the use of pilots as judges, but non-competing judges are also far from immune, especially where nationally known competitors are concerned.

All of us operate with a certain amount of built-in bias. For instance, I am very biased

about crossing a busy street against the light, because I know that statistically speaking, I have a good chance of denting some innocent person's fender with my face. If old Ted has finished first in Sportsman at the last seven contests in a row, it might be reasonable to suspect that he has a good chance of doing it again. It might also be reasonable to expect old Ted to move up, but that isn't the

***Beginning judges who do not fly or have not flown pattern tend to interpret the rules very literally.***

point. The point is that it isn't realistic to expect human beings to wipe their minds clean of all preconceived notions before they climb into the judge's chair.

It is realistic to expect and even demand that a judge of any sort will not bring his preconceptions into the judging/scoring process.

The easiest way to accomplish this is simply to concentrate on the airplane. No matter who holds the transmitter, the airplane must perform the maneuvers. The best of pilots will sometimes foul up. The worst of pilots will sometimes catch fire and totally

naïl a maneuver. The judge's job is to see that both get accurately paid, and the best way is to pay the airplane on the spot for the goods as delivered, and save your amazement about what happened or didn't happen until later.

There is another side to this matter. Very often, a pilot who is judging (or any sort of judge, for that matter) will notice that a competitor he is familiar with is flying either significantly above or below his perceived ability level. Maybe the guy has been practicing like crazy, or maybe he stayed out too late the night before. In this case the tendency is to grade on improvement, or against that flier's established personal standard, instead of against an absolute standard. Plainly, this can lead to some large inequities. Again, the thing to do is to pay the airplane, not the pilot.

There are more sins to avoid, such as holding each class to a separate standard (where the same Immelman that got a nine in Advanced is worth a seven in FAI, for instance), or changing judging standards during the course of an event, but the ones I've outlined seem to be the biggies where contestant judges are concerned. If you can sneak through the mine field above and hold on to all your toes, you'll be doing a solid job as a judge. And in the process, you might find out a few things about yourself and your sport. Think of it as an opportunity for personal growth, plus a place to sit down. See ya at the field. **MB**

# RC SOARING

BY BILL FORREY

## VISALIA FALL SOARING FESTIVAL • PART II

**T**his month we continue our coverage of that "Tournament of Soaring Champions," the 18th Annual Fall Soaring Festival held at Visalia, California, October 5th and 6th, 1991. If you are an avid reader and faithful collector of *Model Builder*, you no doubt still have ready access to Part I of this report in your January 1992



Keith Finkenbinder and his mighty Mueller Comet 89T about to do battle! This fine German kit is quite often seen at Southern California contests in spite of its high cost and its fly-fast, high performance RG-15 airfoil.

issue, so go fetch her out and turn to Soaring on page 54 for possible photo reference!

Besides the rising popularity of the new Legend kit, Airtronics had plenty more with which to impress the troops at Visalia. Tim Renaud circulated a newsletter (Volume 1, Number 1) called the *Soaring Exchange*, the

first mailing of which will be made directly to soaring clubs or individuals who have had direct dealings with Airtronics and are known soaring enthusiasts. If you don't fall into these two categories, you are welcome to request a subscription free of charge, by sending your name and address to Airtronics, 11 Autry, Irvine, CA 92718.

Inside V1/N1, the biggest news was the formation of a new division of Airtronics called the Specialty Division (ASD). The ASD will produce kits and other specialty products which will be marketed directly to the consumer (retail) or hobby dealer (wholesale). The products marketed through ASD will be of such a nature that it is believed the mass marketing establishments will not be interested in distribution.

The first ASD product will be the "Whisper," a full-blown competition 2-meter (first release) that will also come out as a 100-inch (second release). A third version will be an electric powered motorglider. One or two other undisclosed kits will follow.

One Whisper was flown at the FSF by Chris George. The Whisper looks a lot like a miniature Legend. Chris claims the 95-inch span Whisper seems to have as much performance as the bigger unlimited class ships. Obviously this can't be true, but his enthu-



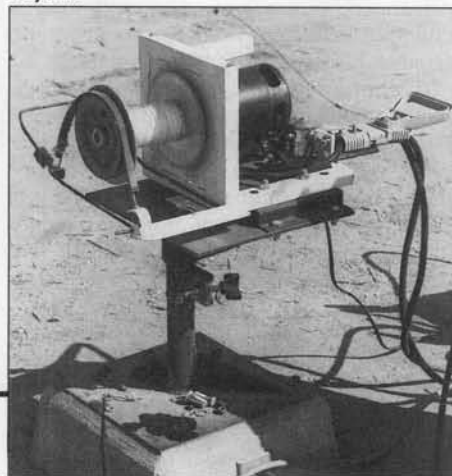
Landings at the Fall Soaring Festival are always tough! This year a six-foot circle did the (dirty) trick for most fliers. Here Brad Clasen makes his first spot ... on the second day!

siasm for the new design undoubtedly comes from some very impressive performance observations.

The Whisper is a conventional wood kit. Anyone who has already built at least two other gliders should have no trouble building a Whisper.

The specs for the Whisper 2M are: wing-span, 78.25 inches; wing area, 620 square inches; airfoil, Selig 3021; length overall, 44.75 inches; fuselage size, ample for standard size gear with 700 mAH battery; flying weight, 47 ounces; horizontal stabilizer area, 85.4 square inches; vertical stabilizer area, 38.8 square inches; and ailerons, flaps, rud-

After 18 years of Festivals, the CVRC has winch launching down to a science! FSF winches were, as usual, flawless. Line was 300-pound diamond braid nylon on the ground and 185-pound in the air. Line breaks were very rare!



Airtronics' new "Whisper" in Standard Class form. Newly created Airtronics Specialty Division will sell kits like the Whisper, plus hard-to-get soaring items, consumer and hobby dealer direct.



der and elevator controls.

Kit prototypes are available as you read this. Full production kits will be available in the spring of 1992. The prototype kit price is \$89.95 (plus shipping) and can be purchased directly only from ASD.

## FLITE LITE FALCONS

The Flite Lite Composites Falcon 800 and 880 are becoming almost commonplace at club and national contests. The Falcon 880 is a very high performance model that has less wing area than a Legend, slightly higher wing loading, and the same S-3021 airfoil. The Falcon 800 is a reduced span 880 that fits the Standard Class span limitation of 100 inches.

As you may know, Falcons have foam core wings. A recent change from earlier Falcons, however, is that they now have obechi veneer skinned wings instead of balsa. Obechi is a slightly denser wood than balsa, but it goes on with a thinner veneer, so there is a net savings in weight. Also, there are no edge-glue seams in obechi skins, unlike balsa, so the obechi skins tend to be smoother.

The two versions of the Falcon are available in deluxe pre-fab or economy kit form. The pre-fab Falcons are ARF with the spars in place inside the cores

**Landings at the Fall Soaring Festival are always tough! This year a six-foot circle did the (dirty) trick for most fliers.**

Retrievers were outfitted with 45-pound Owen Mills Dacron line. Handle actuates pick-up wire to keep fingers away from whipping retriever line. Motor's weight tensions V-belt automatically as its mounting plate pivots on the same rod as line pick-up.

fuselage and all the balsa you need to finish the plane.

More news: Flite Lite Composites has a possible successor to the very popular Falcon series. Called the Thermal Eagle, it is a sister ship to the new World Champion F3B Eagle flown by Joe Wurts and second place WC finisher Daryl Perkins.

I spoke with a Thermal Eagle (TE) owner, Myles Moran, who finished in sixth place at the FSF (only 38 points behind first at 1914). He said the TE "goes up like gangbusters," and, "In three or four turns it'll go up through anyone in a thermal." He continued, "You can hang it on a wing tip while thermalling. It's very impressive." He also claims that it "...doesn't drop off in a downwind turn."

After flying the TE and out-performing everything in its path, Miles' beliefs about mean camber and thermalling ability were in need of revision. "More camber is not necessarily better," is his new way of thinking. The TE uses the new SD-8000 air-

foil as published in *Soartech* #8. This airfoil has only 8.86% thickness and 1.71% camber, very thin and very nearly symmetrical compared to most "thermal" sections. When I asked about penetration ability, Miles replied, "It penetrates great. In winds up to 20

mph, I don't need to add ballast."

As with the new Falcons, the new Thermal Eagle has obechi skinned foam core wings. Miles chose simply to coat the obechi with lacquer as a sealant rather than hide all that pretty wood grain under a plastic covering material. The TE fuselage is the same as the F3B Eagle, very narrow and long, and molded from Kevlar reinforced epoxy and fiberglass.

You can contact Mark Allen directly for further details regarding the Thermal Eagle, F3B Eagle, or the Falcon series (600, 800, and 880), by calling (707) 792-9174. The address is Flite Lite Composites, 466 Primero Court, Suite E, Cotati, CA 94931.

## ON-FIELD DEMOS

Speaking of composites, Matt and Gail Gewain, of CST (Composite Structures



Joe Rodriguez launches Todd Billman's no-wood, all-composite Vector. Todd finished 10th this year, but with the exception of his first FSF try, he has always been in the top ten!

Technology, P.O. Box 4615, Lancaster, CA 93539) were present with an on-field demo of vacuum bagging tools, materials, and techniques.

Of particular note for the glass-and-bag-it crowd was the all new Mighty Mini-Vac.

Ahhh ... the classic lines of the Bird of Time! Dave Thornburg, BOT designer, has crossed back over to the right side of the proverbial tracks and can be seen flying the major soaring meets once again!



As the smile indicates, Stan Boyd loves his new original design sailplane for full-house control. Stan is from host club, CVRC.

and the cores pre-sheathed with obechi. You choose the pushrods and aileron horns, but most other hardware items are included. The economy kit is for do-it-yourself types who prefer to do their own building all the way. In either case you get the fiberglass



SFVSF flier, Lowell Norenberg, always appears with an original design at the FSF. This year's plane was last year's fuselage and tail with a new 119 in., S-3021 airfoiled, 1,008 sq. in. wing.



Randy Bratrud of Anaheim, CA, has always flown Sagitta 900's (or so it seems). It pays to really know your plane if you want to be your best as a pilot.

The Gewains have this unit custom made exclusively for CST. It is a small vacuum pump that is as quiet as an aquarium pump and just about the same size. (I had to touch it to assure myself that it was indeed on!) It is self-regulating, therefore you need no separate vacuum regulator. It is designed for continuous useage, therefore you need no vacuum reservoir bottles to give the pump a rest, or to help the pump get back up to speed after a rest. And it is simple to use, just set up the bag and switch on the Mighty Mini-Vac! The regulator is factory pre-set for a level of vacuum that can't damage white foam wing cores (those of 1.0 to 1.5 lb.

density foam), so it is literally set-and-forget.

CST offers complete vacuum bagging sets for those just starting out with composite model building, all the way up to those thinking of making a business out of composite model building. They range in price from \$74.95 for the Mighty Mini-Vac System, all the way up to \$199.95 for the Professional System. Of course, CST offers all the supplies you could conceivably need in the pursuit of your high-tech hobby.

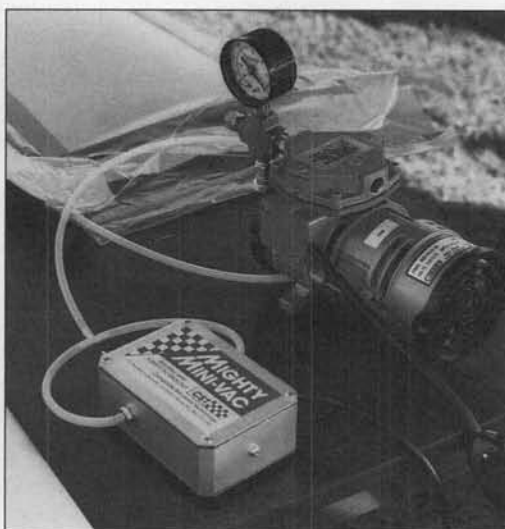
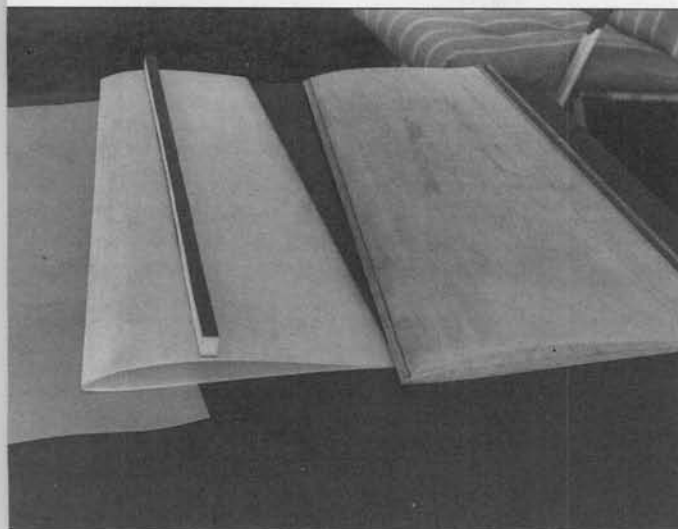
Also of extreme interest, CST demonstrated how to make a hollow-core, fiberglass and Rohacell sandwich skin, molded wing without the female mold! It might

sound impossible to do, but Matt Gewain discovered a way that is faster and less costly. It's a male mold!

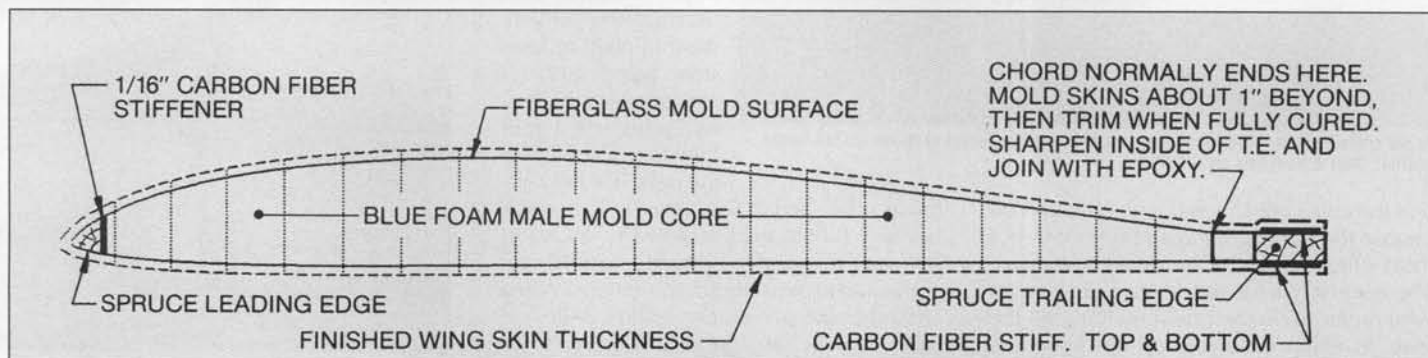
Using Cygnet's Foiled Again airfoil plotting program, Matt selected the S-3021 airfoil, subtracted the skin thickness of 1.5mm Rohacell and four layers of light fiberglass (2.0mm total), and thickened up the trailing edge of the airfoil to about 1/4 of an inch on a 10-inch chord. The Foiled Again program does this very easily and automatically.

Templates were then made and blue foam cores were hot-wire cut with this thickened trailing edge airfoil. Next, a strip of 1/16-

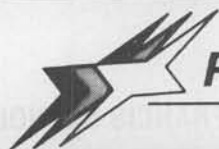
*continued on page 36*



(Far left) See text for details, but this is how you make a hollow core wing the quick and easy way! From left: Mylar sheet outer mold surface, the actual wing before C/F spar insertion, and the male mold with C/F stiffeners. (Left) CST's Mighty Mini-Vac in operation. So quiet you won't believe it's running till you touch it! Note that it is pulling down the V-bag in the background. Pump at right is the Professional (heavy duty) model. (Below) Details of the male mold used to make hollow-core Rohacell/glass vacuum-bagged wings. More in text.







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## HINGES

**H**inging control surfaces used to be one of the least enjoyable model building activities for me. I tried most of the commercial hinges on the market and found all of them troublesome to use properly. I didn't like the chore of cutting thin slots all in an exact straight line, I didn't like getting all the hinge pins lined up or all the flexure areas centered, and I didn't like pinning or gluing the hinges in. I usually got CA or epoxy in the pins or flexure area in some of the hinges. I also didn't like the separate operation of sealing the gap.

For years I used a variation of the old control line baseball-stitch hinge on my RC models. I didn't sew this over-and-under hinge the full length of the surface, but put in discrete figure-eight hinges of monofilament nylon only where they were needed. I have advocated this type of hinge in this column in the past, and still like it; but now I like something else better.

### MONOKOTE HINGES

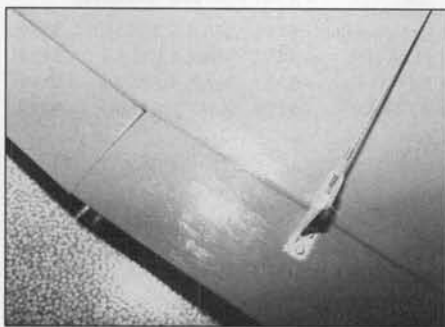
There have been two basically different types of hinges used which are made from iron-on plastic model covering films or fabrics. In the first of these a strip of film is ironed across the hinge joint on the top of the wing or tail, and the control surface. Some small ready-to-fly electrics iron a hinge on the top side only, but to prevent possible peeling due to control surface forces, after the upper hinge is applied the control surface should be folded back and another strip ironed underneath and bonded to the upper strip, so as to make a narrow laminated flexure area.

When fabric is used, the two strips may be sewn together with a seam down the middle, then separated at the edges and ironed onto the surfaces top and bottom.

For best performance we should always seal the hinge line gaps on our models. Note that the covering-film flexure hinge does that for us for free. No extra operation required.

I have used this configuration of film hinge once or twice, on small models. I do not recommend it for anything bigger than a light .19-powered model. These thin flexure hinges could contribute to control surface flutter if the flexure area is too wide, and the inherent floppiness of the hinge could contribute to erratic control. Possibly these hinges would stand up and be satisfactory on a .60-size sport model, but one of you will have to do the testing to find out.

There is a much better type of covering-film hinge. It is the rolling or "over/under" hinge. (The baseball-stitch or figure-eight hinge is also a rolling hinge.) See the drawing. Half of the hinge segments start at the top of the main surface and go through the hinge line to the bottom of the control surface, and the other half start at the bottom of the main surface and end up on top of the control surface. Rolling hinges are made stable and free of play by opposing tensions in these



Flap and aileron rolling hinges on the author's sport model are practically invisible. See text.

up-to-down and down-to-up strips. Highly precise and strong thin metal-strap rolling hinges are used in certain high-tech equipment. The concept is excellent.

The hinge "friction" is very low in rolling hinges, because the material being rolled or flexed is only a couple thousandths of an inch thick. The force required to move a good rolling-hinged surface in still air is comparable to, or less than, the friction on a well-done conventionally hinged surface.

Model covering-film rolling hinge segments are usually made by bonding two strips of the iron-on material together over a narrow area, adhesive side to adhesive side. Then the adhesive side on one half of each pre-made hinge strip is ironed onto the main surface and the opposite-facing adhesive side of the other half is ironed to the opposite side of the control surface.

In connection with covering-film flexure hinges, observe that the hinge line gap is automatically sealed for us. The same thing applies to covering-material rolling hinges, if we leave little to no gap between the up-to-down and the down-to-up segments, and run them alternately for the full length of the hinge line. We would want to do that anyway, because it will give us the strongest, most stable hinge.

The subheading reads "MonoKote

Hinges." I used the trademarked name on purpose, because Top Flite promotes the rolling hinge in their literature; and MonoKote is a strong non-stretching film which is better suited for covering-film hinges than a stretchy, weaker material.

I have Top Flite's videotape "MonoKote I and II," which, among other good MonoKote use tips and demonstrations, gives detailed instructions for the proper fabrication of rolling hinges of MonoKote. They taught me some things. For example, I merely used to iron my rolling hinges on after I had covered all the surfaces. The MonoKote video shows the hinge segments ironed on first, then the surfaces are covered, covering the hinges. This seals down the hinge edges from any possible peeling forces or solvents, and provides adhesive bonding of each end of each hinge segment on both the top and bottom!

I have never lost a single-bonded MonoKote hinge on a hot .60-powered aerobatic model, or any other model. I'm certainly never going to lose a double-bonded one. Make sure you get the temperature high enough and thoroughly iron down the hinges for a complete bond, however. Don't worry about the MonoKote film itself failing in a rolling hinge. It is more than tough enough for the job, especially if you hinge the full length of the surface to seal the air gap.

Also, the covering over the top of the rolling hinges almost completely hides them. This is as close to an invisible hinge system as there is. I love them. They are straight forward and non-frustrating to install. I doubt if I will ever again use any other type of hinge.

The only configuration of rolling or over/under hinge I have used personally to date is the Type 1 shown in the sketch, which has a rounded trailing edge on the main surface and a rounded leading edge on the control surface which is hinged to it; most common on elevators and rudders. This is also the configuration shown in the MonoKote videotape. There are two other over/under configurations we should discuss, however. This time I avoided saying "rolling hinge," because the hinge film in these additional configurations bends more than rolls.

The point is, we don't have to have the big radii shown in the first sketch. I wouldn't hinge the cutting edges of two razor blades together with the over/under film method, but balsa is soft so it can't cut the MonoKote, and we couldn't really get a sharp edge on



it if we tried. Also, the MonoKote is tough and thin, and will not fatigue if flexed repeatedly in a fairly sharp bend.

Many modelers are therefore very successfully using over/under hinges of the second type shown in the drawing, which is the usual shape of the mating edges with inset ailerons. I just learned, to my surprise, that some modelers are also successfully using over/under hinges of the third configuration in the drawing.

I had first a letter from, then a telephone conversation with, Dan Fulmer of San Francisco. Dan, as you may recall, is one of the pioneers in the development of the slip-off wing mount. Dan and his buddies fly big slope soarers, many of which use this third type of over/under MonoKote hinges on the ailerons. The reason is obvious. These guys are looking for performance, including speed and the ability to stay up in light lift. Therefore low drag is important, and Type 3 is clean.

Note that whenever little or no aileron deflection is required, the surface is almost completely smooth across the hinge line, on both top and bottom! No big valleys or interruptions to air flow to cause turbulence and put on the brakes. When the aileron is deflected up, the hinge line is at the top, but when the surface goes down, the hinge line shifts to the bottom. Sneaky and almost creepy. As before, in up, down, or neutral, the gap is always sealed.

I was surprised that this clever over/under Type 3 hinge configuration is durable, because, as you can visualize, when the control surface is at neutral, it is suspended in midair by rather wide opposing bands of MonoKote in tension in the hinge plane. If we were to tug back on the aileron in this neutral position, the MonoKote hinges would tend to stretch slightly, and the hinge would seem to be a bit springy.

That causes no problem, says Dan. They have never lost this kind of hinge on these big, fast birds; and the hinges work fine if they are careful to align the surfaces and install the hinge strips tightly so there is no floppiness. I just built a Type 3 hinge test sample from half-inch balsa. It works fine and seems solid enough.

And it doesn't wear out. I rigged a test setup on my drill press and flexed the heck out of this sample Type 3 hinge. A crank chucked in the drill press was rotated at 430 rpm, with a pushrod setup to the "control surface," adjusted so the surface was deflected 45 degrees in each direction or 90 degrees total.

The weight of the wide untapered hinged piece is far greater than the weight of an equal length of actual control surface would be. The high cycling rate, combined with a drive radius far less than the radius of gyration of the surface, imposed high inertia forces on the hinges; probably far exceeding the aerodynamic forces imposed on control surface hinges in flight (except in the case of flutter). Also, 45 degree deflection is much more than we normally use, with the possible exception of rudder.

At any rate, I didn't succeed in wearing out the over/under MonoKote hinges. I ran the test for four hours (103,200 cycles). The drill press could well have worn out before the hinges did. I was worn out waiting for something to fail. There was no detectable change or wear in the hinges. Depending on what kind of RC flying you do, this four hours of testing was equivalent to at least 200 and maybe as many as 2000 ten-minute flights.

## AILERON DIFFERENTIAL WITH TYPE-3 HINGES

Dan Fulmer was worrying about another aspect of this hinge, which had nothing to do with its structural adequacy. He observed that since the hinge line shifts from top to bottom and back, the effective aileron horn length also changes. The effect of this is to automatically give the aileron differential we strive for (more up than down, to reduce

adverse yaw), when the aileron horns are installed on top of the wing. Dan wasn't satisfied to get the free aileron differential... he was griping because the differential was in the wrong direction when he flies inverted. Some people are never satisfied.

Seriously, Dan, you are right of course. Differential aileron does degrade our inverted performance in turns, but that is true whether we get the differential by Type 3 over/under hinges, or by any of the several other methods we use.

If you are using rather short aileron horns, and if the wing is quite thick at the leading edge of the ailerons, then you may be getting a lot more differential than you need, and causing the problems you see when inverted. The thicker the wing at the aileron L.E., the longer the aileron horns and servo arms must be to keep the differential from being excessive.

If you don't want any significant differential in the aileron control and still want to use the Type 3 hinge, you can have that too. Just install your usual aileron differential system (uncentered arm or nonvertical horn), but phase it backward so that this "wrong" differential cancels out the "right" differential of the Type 3 hinging.

At any rate Dan, thanks for the information. I find the Type 3 over/under hinging configuration appealing, especially for applications where streamlining is important.

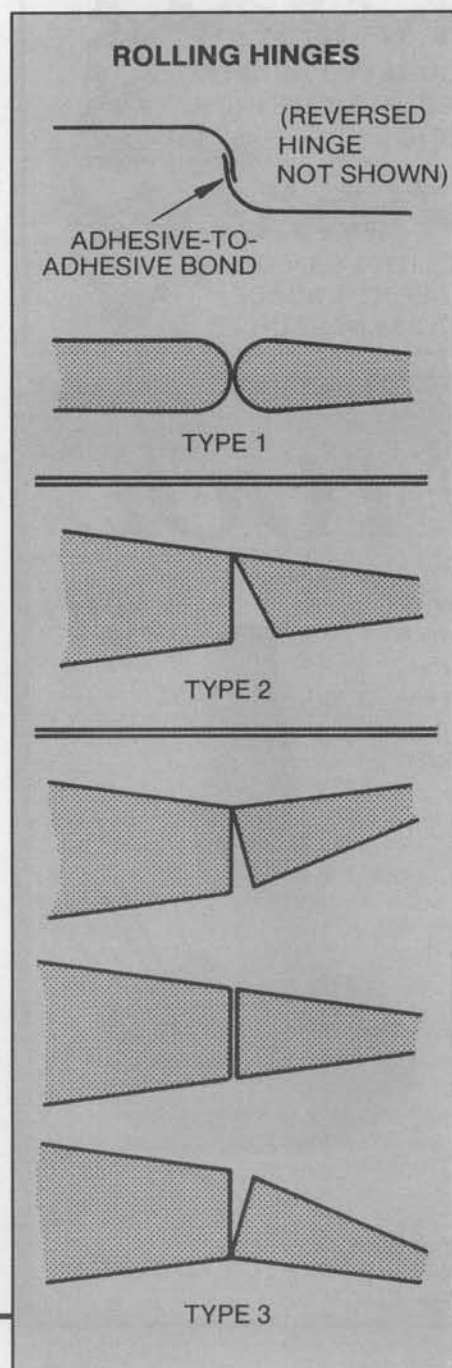
## ANOTHER VIEWPOINT

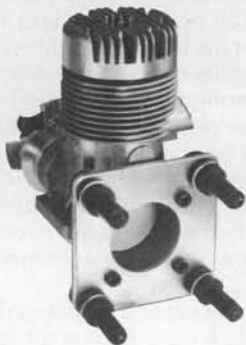
In his September 1991 "RC Precision Aerobatics" column, Rick Allison told us to "Avoid hinges made of covering material on pattern airplanes." Is one of Bill Northrop's helpers writing one thing, and another the opposite? That kind of help Bill doesn't need. I just phoned Rick (about ten miles away) to explore our differences, if any. No differences, just different emphasis.

Rick mostly doesn't like the old flexure type, and I agree. He thinks the rolling or over/under type is much better. He said they are OK on sport .40s, but not on pattern .60s. He pointed out that his negative comments on covering material hinges applied only to pattern airplanes, where there is a requirement for exact alignment of surfaces, low backlash, and general precision. I'll buy that. Where Rick wouldn't use MonoKote rolling hinges on a pattern .60, I have used them on hot sport .60s with excellent success, and will continue to do so.

Rick made another good point to me. When we recommend a method in a column, we believe it is something the average builder, or even a below average builder, can do well enough to stay out of trouble. Rick feels that some modelers would have difficulty in getting the control surfaces aligned well enough with the airfoils for a good true pattern ship, with this kind of hinge.

Maybe so, on a pattern ship. My method, on sport jobs, is to hold the wing or stab and the control surface against a flat surface while ironing home the hinges, but, agreed,





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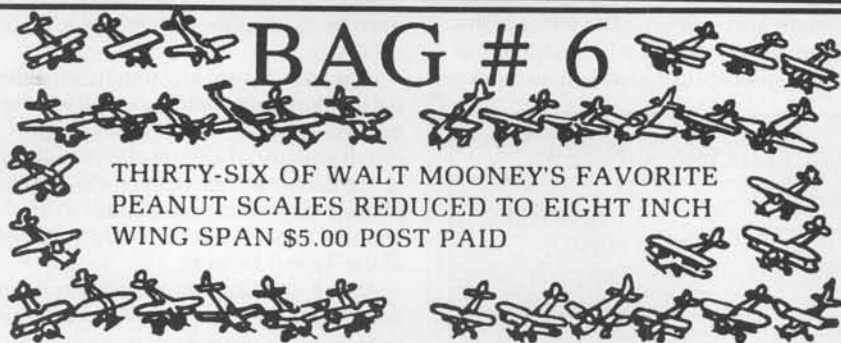
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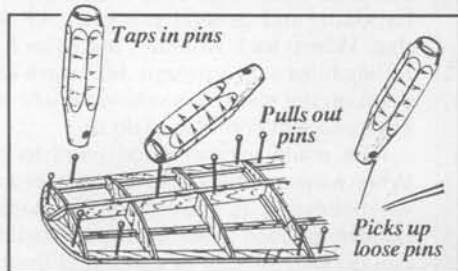
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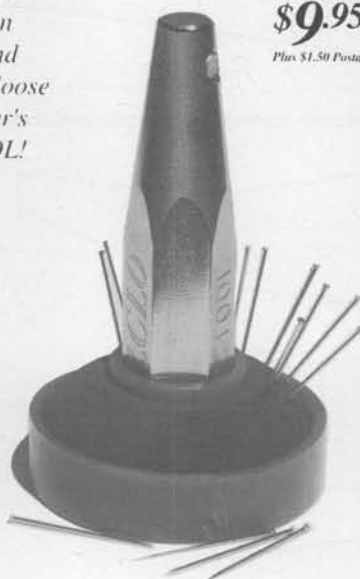
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it takes some care. Rick also commented, "So do regular hinges take some care."

If I have sparked any interest in over/under hinges, get yourself a copy of the video, MonoKote I and II. The instruction sheet enclosed in rolls of MonoKote tells how to get the videos.

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

## RC SOARING continued from page 32

inch precured carbon fiber was epoxied onto the leading edge of the core, then a spruce leading edge was epoxied in front of the C/F and sanded to shape. Next, a 1/4 x 1/2 spruce trailing edge was epoxied to the core and topped off with C/F strips top and bottom. The spruce and carbon help insure that the final male mold is absolutely stiff and very strong. Finally, the core was draped top and bottom with 1.5 oz. fiberglass cloth and epoxy, mylar sheets, and the whole enchilada was then vacuum bagged. After a lengthy cure, the mold flashing was cleaned off and the leading edge reshaped. The male mold is virtually ready. But how is it used?

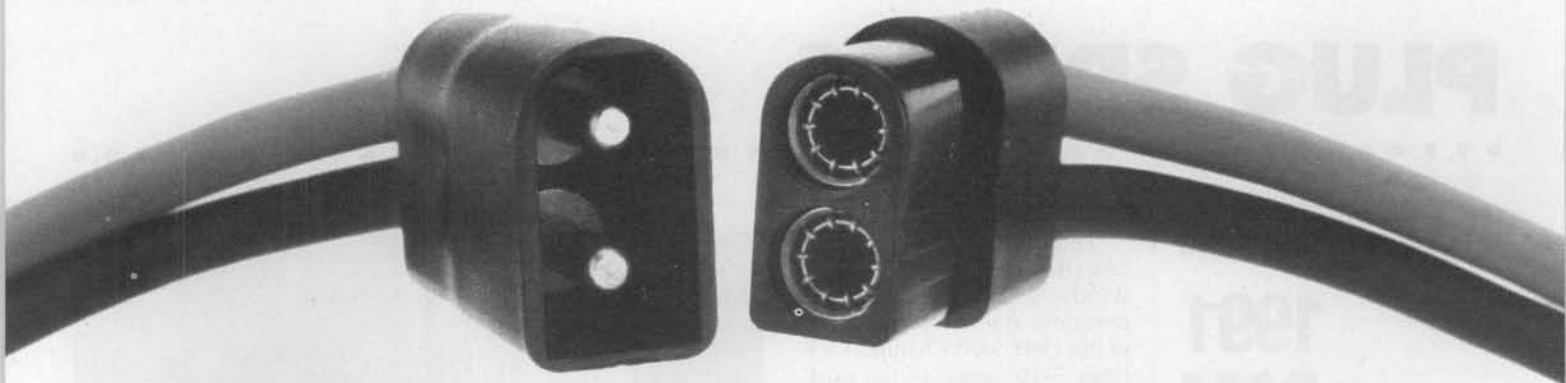
The idea is to mold the top and bottom skins together as a single unit around the male mold. The first step is getting the Rohacell skin to bend around the mold's L.E. This is accomplished by passing a heat gun back and forth at the L.E. radius as the Rohacell is bent. This prevents wrinkling and cracking of the Rohacell. Once bent to shape, you proceed with the glass-and-bag operation.

Using CST "Freecote 700" mold release and a thin plastic release film (bag material) prevents the inside two layers of 2-oz. epoxy-fiberglass from sticking to the mold. Next, the pre-shaped Rohacell wraps around the wet glass inner layers. A strip of one-inch glass tape is laid up with epoxy along the outer L.E., then the outer two layers of 1.5-oz. glass are laid up. The mylar sheets and vacuum bag take care of the smooth finish of the outer fiberglass skin. The whole production is then vacuum-bagged and left to cure.

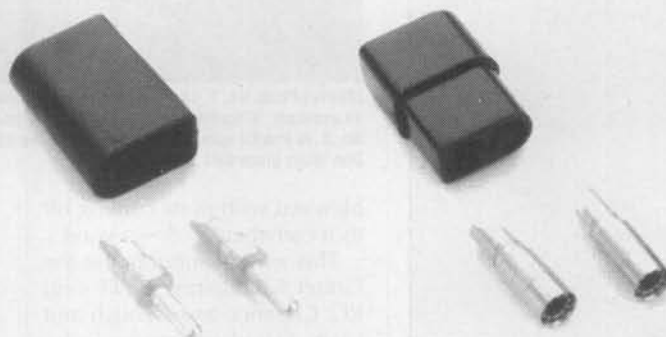
When done, the skins are removed from the mold, cleaned up with sandpaper, the trailing edges are sanded to a knife edge shape on the inside, and then the top and bottom skins are joined with epoxy. Whatever spar arrangement you have is then slid into place from the root side of the wing. If you want flaps or ailerons, you'll need a full-depth Rohacell stringer at the hinge line to maintain the airfoil shape after these surfaces are cut away. End ribs are fashioned and glued into place at the root and tips. Servos and linkages are installed and you are basically done.

Drop me a line if you have something to share with the world of soaring. Bill Forrey, 3610 Amberwood Court, Lake Elsinore, CA 92530, (714) 245-1702, 6:30-9:00 p.m. PST. Thermals! **MB**





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# PLUG SPARKS

BY JOHN POND

## 1991 SAM Champs

"Dust Bowl II": That about best describes the field and windy weather conditions prevalent at Jean, Nevada, site of the 1991 SAM Champs, October 7-10. Some of the dust devils resembled tornados or cyclones reaching heights of well over 1,000 feet. Impressive!

Regardless of the foregoing, most modelers showed their mettle in flying under trying conditions. The free flight boys



took the biggest beating as the drift into the foothills posed serious recovery problems. The RC boys soon found out that they had to post one or two assistants to grab a landing model before it made like tum-



(Above) Photo No. 1. Larry Davidson, high point winner in RC, with his ever-faithful Elaine as assistant. Workmanship on all of Larry's models is absolutely flawless. (Left) Photo No. 3. In Pond's opinion, this is probably the hottest ignition powered FF Playboy around. Don Weitz place first in Class C Pylon.

bleweed with parts coming off as it cartwheeled down wind.

This writer cannot praise the Grand Champions of FF and RC, Clarence Myerscough and Larry Davidson respectively, enough for their dogged determination to win despite weather and keen competition.

Photos of winners like this are difficult to find, especially of Myerscough, who is usually either engaged in serious flying or retrieving his models.

We are fortunate to have Photo No. 1 (from this writer's voluminous photo file) showing Larry Davidson and his wife, Elaine, with his Class A Glow Lanzo Bomber. Larry's winning points of 23 were five more than

Don Bekins. When you have beat a competitor the caliber of Bekins, you have worked for it!

On the free flight end of things, we have no photos of Myerscough. This is an extremely elusive guy to get on film. Maybe those old wanted photos are still on display at the post office? Haw-w!

Instead of Myerscough, we present his old traveling buddy, Sal Taibi, seen in Photo No. 2 with a Comet (Goldberg) Interceptor. Sal, of late, has been building and flying designs other than his own, the Playboy Cabin coming to mind based on his many successes with Elgin's design.

When it comes to hot en-

(Right) Photo No. 2. Sal Taibi seen with a design not his own; an Ohlsson 23 powered Comet Interceptor. (Far right) Photo No. 4. Art Watkins flew a 1933 Gordon Light "Miss America" Wakefield design in the four-ounce class.





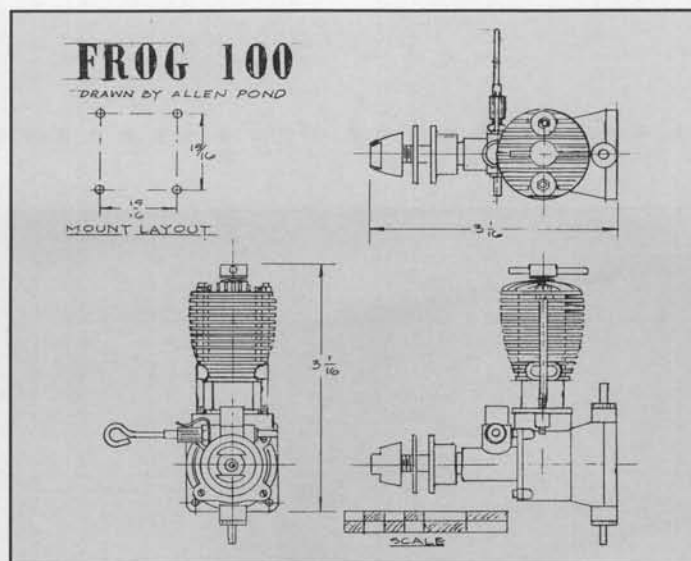
First off, to handle the large crowd of entries, the Champs headquarters were at the Nevada Landing, located across the road from the Gold Strike (1989 Champs headquarters). This appeared to take care of the



initial rush, but in the last analysis, rooms were hard to find, even at the Gold Strike. This was particularly noticeable

Representing the USA in the Wakefield events is Art Watkins of Mt. View, California, seen in Photo No. 4 with a Gordon Light 1933 Wakefield model. When it came to having his models proxy-flown in England, Gordon was always thorough, testing extensively, putting models in shipping boxes and supply-

An interesting article by J. Pelly-Fry, the proxy flyer for Light, appeared in the Decem-



## ENGINE OF THE MONTH



Pelly-Fry found the model in excellent trim but before the duration flights, found that there was a requirement for a 200-yard steering test; in other words, having to fly in a straight line. As Fry put it, this was quite difficult to obtain as Light had carefully designed the model for right-hand circles. Once this was completed after numerous attempts, then came the crusher: the same tired rubber motor had to be used! The writer feels Light got the shaft twice in a row, 1932 and 1933!

## ENGINE OF THE MONTH

However, in the beginning,

Best part of all, when inverting the engine, there seems to be very little difference in overall performance. According to tests, the engine showed great

# PLUG SPARKS



Photo No. 7. Eut Tileston's Taylor Cub is an outstanding model for RC 1/2A Texaco.

flexibility between 1,000 and 9,000 rpm. Regardless of load imposed, the engine would not run over 9,600 rpm. This is typical of the old "stroker" type diesel engines.

For the technically minded, the engine featured a bore of .375 in. and a stroke of .55 in., giving a displacement of .06 cu. in. Compression ratio varied from 8:1 to 16:1. Weight was a surprising 3.75 ounces. Most all castings were aluminum alloy (die-cast) with steel cylinder and mehanite piston. The price was 48 shillings, which gave a price of a little better than \$10.00 at the rate of exchange then.

## MECA GRAND COLLECTOGETHER

MECA has held a Collecto at the SAM Champs longer than this writer can remember. This has always been the opening highlight of the SAM Champs where everyone gets together to buy, sell, or swap engines of all types.

Dick Dwyer, the new Head Coordinator of MECA, is to be congratulated on the excellent turnout at the Grand Collecto at Jean. The place was practically wall-to-wall tables and people. A tremendous amount of interest was detected in all participants at this Collecto.

Generally, most Collectos

wind down sometime after lunch. Not so this time. The meeting was just like the old days, with groups of collectors and modelers holding bull sessions to well after 6 p.m. The interest was amazing! Needless to say, Dwyer pronounced the

what of a repeat of the calm conditions in 1989. Wrong! The wind promptly started at 10 o'clock and got progressively worse until noontime, when flying a model was an invitation to disaster.

Dust storms were something

sour grapes, as this writer also had his problems, losing his good electric model to whims the of the wind, which tossed it about like a tumbleweed.

Regardless, the competition was great. In many cases, the boys have found how to make ignition powered models outclimb their glow plug counterparts. In both camps (FF and RC) there was a tremendous outpouring of flying, flying, and more flying! Despite the wind, no one won with a cheap flight. Times were extraordinary!

Full credit should be given to the overall contest management: Mike Fields, SAM Champs Contest Manager, and Assistant Manager Art Grosheider; RC C.D. Ed Hamler and his helpers, Don Bekins, Dale Bowers and Ned Nevels; FF C.D. Art Hillis and his assistant C.D., Ed Smull (who did a terrific job of getting the FF results compiled and into us in time for publication); and the many others too numerous to include here. A job well done by one and all! Art Hillis wanted us to give special thanks to Jack



Photo No. 8. Tlush Texaco Winner was built by Cliff Silva, another die-hard free flihter who got his feet wet in RC!

"Grando" a great success!

## THE CONTEST

Things got rolling promptly; however, some (including this columnist) held back, feeling the weather would be some-

else, as several king-sized dust devils resembling small tornados came ripping through the assembled models. It was only the most dedicated (and lucky) who made all of their flights. The foregoing is not meant as

Phelps, who came all the way from Kansas just to help out a the FF headquarters. Also, the contest was honored by having Herbert "Hank" Greenberg as the honorary RC C.D. How

*continued on page 74*



# 1991 SAM CHAMPIONSHIP RESULTS

Larry Davidson of Northport, New York, and SAM 75, won the overall RC Grand Champion award, winning all LER ignition events, and placing second in 1/2A Texaco and Antique for 23 championship points.

Free Flight Grand Champion was Clarence Myerscough of Wickenburg, Arizona, who placed first in C Cabin; second in A Pylon, A Cabin, and B Cabin; third in C Pylon; and fourth in B Pylon, totalling 22 championship points.

## RADIO CONTROL

### Class A LER Ignition (27 entrants)

1. Larry Davidson	356/Playboy Jr./Elfin 2.49	21:00
2. Don Bekins	310/And. Pylon/Elfin 2.49	18:46
3. Ed Shilen	380/Yankee/Elfin 2.49	18:28
4. Bob Angus	334/Gas Champ/Elfin 2.49	17:31
5. Gary Westland	345 Ranger/Burford 50 diesel	16:41

### Class A LER Glow (39 entrants)

1. Eut Tileston	468/Scorpion/K&B 3.25	22:15
2. Fred Mulholland	455/Bomber/K&B 3.25	21:08
3. Jim Kyncy	441/Kerswap/K&B 3.25	20:56
4. Joe Percy	480/Bomber/K&B 3.25	19:39
5. Don Barrick	500/Viking/K&B 3.25	18:09

### Class B LER Ignition (40 entrants)

1. Larry Davidson	472/Bomber/Torp 29	27:49
2. Don Bekins	492/Foo2U2/Torp 29	26:39
3. Art White	430/Bomber/Forster 29	19:06
4. M.R. Lipsey	564/Playboy Cabin/Torp 29	19:04
5. Walt Geary	550/Soaring Eagle/Torp 29	17:46

### Class B LER Glow (39 entrants)

1. Fred Mulholland	653/Playboy Sr./K&B 29	27:33
2. Eut Tileston	683/Taylor Cub/ST 29	26:48
3. L.A. Johnston	562/Blitzkrieg/HB 25	20:57
4. Tom Empey	808/Playboy Sr./K&B 4.9	20:29
5. Don Bekins	658/Playboy Sr./K&B 4.9	20:25

### Class C LER Ignition (62 entrants)

1. Larry Davidson	703/Playboy Sr./Orwick 64	32:03
2. Ed Shilen	1185/Bomber/Edco 65	30:51
3. Joe Percy	710/Josephine/O&R 60	30:50
4. Mike McLaughlin	903/Playboy Sr./Edco 65	30:24
5. Don Blackburn	800/Bomber/Anderson 65	30:22

### Class C LER Glow (37 entrants)

1. M.R. Lipsey	800/Playboy Cabin/Torp 32	30:39
2. Eut Tileston	903/Taylor Cub/ST 40	30:06
3. Art White	900/Bomber/K&B 6.5	28:14
4. Tom Empey	808/Playboy Sr./K&B 5.8	27:48
5. Fred Mulholland	875/Bomber/K&B 35	26:50

### Texaco (62 entrants)

1. Don Bekins	1196/Bomber/O&R 60	51:20
2. Joe Percy	1460/Bomber/O.S. 60 Ign	50:42
3. Jim Kyncy	1489/And. Pylon/O.S. 60 FS	50:03
4. Stan Lane	1431/And. Pylon/O.S. 60 FS	49:57
5. Tom Smith	1482/Dallaire/O.S. 61 FS	35:00

### Electric Texaco Special Event (27 entrants)

1. George Joki	Bomber/Kyosho	52:47
2. Fred Mulholland	Bomber/Leisure	51:38
3. Peter Rafferty	Bomber/Leisure	50:43
4. Jack Allen	Bomber/Kyosho	49:48
5. Hardy Benson	Bomber/Leisure	48:02

### 1/2A Texaco (85 entrants)

1. LaMoine Schrock	273/New Ruler	50:00
2. Larry Davidson	292/Anderson Pylon	49:36
3. Walt Geary	300/MG II	48:27
4. Stan Lane	249/Anderson Pylon	47:45
5. Art White	277/Sailplane	42:51

### Pure Antique (33 entrants)

1. Don Bekins	Bomber/Edco 65	30:00
2. Ed Shilen	Bomber/Edco 65	28:06
3. Fred Mulholland	Thor/Spitfire	26:23
4. Ed Smull	Westerner/Atwood	19:48
5. LaMoine Schrock	Dallaire/Hornet	19:28

### Antique (32 entrants)

1. Jim Kyncy	Anderson Pylon/O.S. 61	40:09
2. Larry Davidson	Bomber/Orwick 64	38:12

3. Mike McLaughlin	Bomber/McCoy 60	30:00
4. Joe Percy	Cumulus/Rossi 60	28:47
5. L.A. Johnston	Dallaire/60	26:49

### Ohlsson Sideport Special Event (29 entrants)

1. Don Bekins	1196/Bomber	23:16
2. Eut Tileston	683/Taylor Cub	12:52
3. Walt Geary	671/Clipper Mk 1	11:45
4. Don Blackburn	671/Torpedo II	9:32
5. Hardy Robinson	1000/Schmaedig Stick	9:13

### Ohlsson 23 Special Event (20 entrants)

1. Don Bekins	489/Bomber	13:34
2. Walt Geary	488/Zipper	11:14
3. Stan Lane	450/Anderson Pylon	7:48
4. James Buice	452/Brigadier	7:25
5. Howard Osegueda	456/Bomber	7:22

### Electric LMR Special Event (26 entrants)

1. Gary Westland	Bomber/Astro	20:42
2. Peter Rafferty	Bomber/05 Cobalt	20:35
3. Roland Boucher	Anderson Pylon/Leisure	20:24
4. Fred Mulholland	Bomber/Astro	20:20
5. George Joki	Bomber/Kyosho	19:45

### 1/2A Scale Duration Special Event (21 entrants)

1. Jim Lang	370/FW-47	24:35
2. Eut Tileston	281/Taylor Cub	24:16
3. Walt Geary	300/Cessna AW	24:10
4. George Patrick	312/Interstate Cadet	12:49
5. James Alaback	288/Taylor Cub J-2	9:57

## FREE FLIGHT

### CLASS A PYLON

1. Charles Atkinson	Interceptor/Elfin 2.49	13:58
2. C. Myerscough	Ranger/Elfin 2.49	13:43
3. Mike Poorman	Westerner/O.S. 15 Conv.	11:36
4. Abe Gallas	Ranger/Arden 19	10:51
5. Tom Moriarty	Ranger/Arden 19	10:25

### CLASS B PYLON

1. Don Weitz	Swoose/O.S. 25 Conv.	20:00
2. Sonny Soto	Swoose/O.S. 25 Conv.	13:54
3. Leon Nadolski	Sailplane 350/ED	12:33
4. C. Myerscough	Zipper/O.S. 25	12:28
5. Bud Romak	Zipper/Torp 29	12:08

### CLASS C PYLON

1. Don Weitz	Playboy/O.S. 40 Conv.	24:52
2. Leon Nadolski	Sailplane/Orwick	15:21
3. C. Myerscough	Playboy/K&B 40 Conv.	14:16
4. Bob Oslan	Sailplane/Dooling 61	14:11
5. Al Rasmussen	Zipper/O.S. 35 Conv.	12:53

### CLASS A CABIN

1. John Bortnak	So-Long/O.S. 15 Conv.	11:48
2. C. Myerscough	Ascender/Elfin 2.49	11:26
3. Sonny Soto	So-Long/Elfin 2.49	10:38
4. Bruce Chandler	Bombshell/Blk Knight	9:31
5. Sal Taibi	Dodger/Elfin 2.49	9:08

### CLASS B CABIN

1. John Bortnak	So-Long/O.S. 25 Conv.	11:32
2. C. Myerscough	Dodger/O.S. 25	10:26
3. Bob Edelstein	So-Long/O&R 23	8:34
4. Leon Nadolski	Yates AB/Torp 29	7:30
5. Jim Robinson	Dodger/Forster 29	6:58

### CLASS C CABIN

1. C. Myerscough	Playboy/O.S. 40 Conv.	15:00
2. John Bortnak	So-Long/O&R 33	14:02
3. Sal Taibi	Dodger/Orwick	13:50
4. Don Weitz	Playboy Cab./O.S. 40 Conv.	12:23
5. Walt Bowers	Clipper/Madewell 49	11:51

### CLASS .020 REPLICA

1. Joe Foster	Interceptor	12:00
2. Charles Atkinson	Interceptor	11:21
3. Jim Belson	Strato Streak	8:48
4. Jerry Rocha	Strato Streak	8:39
5. Abe Gallas	Strata Streak	8:33

### 30 SECOND ANTIQUE

1. Larry Clark	Tr. Terror/Madewell	8:13
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2. Larry Boyer	Clipper/Bunch Tiger	8:04
3. Dick Lyons	Kloud King/Madewell	7:48
4. Abe Gallas	Kloud King/Bunch 45	7:12
5. R. Reinarz	Zenith/OK 60	7:07

### 1/2A TEXACO

1. Bob Dittmer	Miss Philadelphia	40:45
2. Susan Rocha	Powerhouse	37:04
3. Bill Gibbons	Powerhouse	33:17
4. Bill Hanmer	Lanzo Record Breaker	31:15
5. Walt Bowers	Powerhouse	30:54

### FUEL ALLOTMENT

1. Walt Bowers	And. Pylon/Fors. 99	10:13
2. Bill Hanmer	Riser Rider/K&B 29	8:30
3. Don Nordlund	Ehling/Anderson	8:30
4. Cliff Silva	Ehling/Brown	8:25
5. Dick Seifried	Valkyrie/Cyke	8:04

### GAS SCALE

1. Jim Robinson	Curt. Robin/O.S. 25	32:58
2. Sonny Soto	Taylorcraft O-57/Cox	18:36
3. Larry Clark	Rearwin/Cox 049	12:55
4. Dick Seifried	Taylorcraft/Webra	11:24
5. Ken Sykora	Viril/06 diesel	11:00

### SMALL RUBBER STICK

1. Joe Foster	Korda C	16:01
2. Ed Konefes	Cassano	13:18
3. Bill Cushenbery	Korda	12:54
4. Mike Burns	Gollywock	12:22
5. Bob DeShields	Hammer C	11:47

### SMALL RUBBER CABIN

1. Gordon Reid	Double Feature	13:00
2. Joe Foster	Schumacher C	12:31
3. Bud Romak	B.G. Special	12:11
4. Ed Konefes	Crusader	7:55
5. George Perryman	Jabberwock	7:38

### LARGE RUBBER STICK

1. George Perryman	1940 Lanzo	14:51
2. Bob DeShields	Championship Stick	13:04
3. Peter Michel		13:01
4. Ed Wallenhorst	1940 Record Stick	12:59
5. Jerry Murphy	Lamb 1941 Champ	12:43

### LARGE RUBBER CABIN

1. George Perryman	1940 Lanzo	14:19
2. Ed Wallenhorst	Lanzo Duplex	13:07
3. Gordon Reid	Dethermalizer	12:58
4. Ed Konefes	Lanzo Classic	10:07
5. Jerry Murphy	1939 Wakefield	8:00

### COMMERCIAL RUBBER

1. Bill Cushenbery		8:38
2. Ben Strauss		8:28
3. Ed Konefes	Convertible	7:29
4. Bob DeShields	Struck Diamond	6:54
5. Bob Dittmer	Stahl Cabin	6:32

### RUBBER SCALE

1. George Perryman	Lanzo Puss Moth	2:26
2. Mik Mikkelsen	Curtiss Robin	2:03
3. Ed Wallenhorst	Lanzo Puss Moth	1:58
4. Bill Gibbons	Rearwin Speedster	1:03
5. Tim Bucher	Corben Super Ace	1:02

### HAND LAUNCH GLIDER

1. Jim Persson	Huguelet	3:58
2. Bob DeShields	Hervat Zoomer	3:30
3. Frank Roberge	Hervat Zoomer	2:42
4. Jim Kutkuhn	Hervat	2:37
5. Steve Roselle	Hervat	2:24

### TWIN PUSHER

1. Ron Boots	1931 Burnham	3:14
2. George Perryman	Burnham	2:28
3. Dick Thompson	Manulkin	2:02
4. Loren Schmidt	Schmaedig	1:54
5. Bob Dittmer	Burnham	1:37

### COMPRESSED AIR

1. Jim Kutkuhn		2:50
2. Ed Konefes	Jonathan	2:41

# ALL ABOUT ARFS

BY ART STEINBERG

## MONOKOTING & RTC'S

A lot of experienced and well established RC modelers who have been building ARFs for the past few years have become quite skillful at what they do. These ARF builders are composed of all types of modelers, from those who have never built a plane from scratch, or even from a kit, to those who are top-notch builders in their own right, able to put together a model on a par with almost anyone in the hobby.

But the sad fact is that the more talented among us get kind of bored and dissatisfied with a steady diet of ARFs.

We are quite happy with the fact that most ARFs are well constructed, and we certainly don't mind not having to glue together airframes and get all covered with balsa dust. We like knowing that the average ARF is built straight and true without warps and other imperfections that detract from flying characteristics. But what tends to bother a good many of us is that many ARFs have finishes that leave a great deal to be desired. The finishes available in

these prefabricated RC aircraft are comprised of two main types, the foam board variety with a factory-printed color scheme, and the shrink film covered models, also with printed-on designs. The foam board type is super smooth and looks really nice, but of course one has no choice as to what color design one gets, as there is no choice available. Therefore, one must sacrifice individuality when flying ARFs. Repairing dings in these foam board finishes also presents a problem, as the structure can be mended,

but it is nearly impossible to restore the surface to its original beauty.

Those ARFs which come covered with a form of shrink film are far easier to repair, and can more readily be restored to a near factory new appearance. However, the material used to cover the vast majority of

and the choice of colors is almost mind-boggling. Therefore, for our purposes, whenever we use the term "MonoKote," we will be actually referring to any good quality shrink covering in use today.

One distinct advantage of flying ARFs which have a shrink film covering is that

such airplanes can readily be stripped down to the bare wood and recovered with MonoKote. As the original shrink coverings are largely inferior to MonoKote, a modeler of average skill can usually turn out a covering job which is far superior to the original. We are not advocating here that the covering should immediately be removed from a new ARF and be replaced with MonoKote, but when the model has been flown to the point where the original covering has a lot of patches and repairs, and the seams are so worn and tattered that they are coming apart, a recovering job should be considered.

The vinyl type covering used on ARFs comes off

rather easily, and when the framework is exposed, the wood joints should be carefully examined for strength and integrity. Loose joints should be reinforced with an appropriate glue, either cyano, epoxy, or white glue. Examination of the woodwork under the typical ARF covering will reveal the fact that the factory sanding job leaves a lot to be desired, and in fact, the wood may never have been smoothly sanded in the first place. A little effort at this point with various grades of sandpaper, plus the use of a good



(Above) The multi-hued color scheme is not only distinctive as well as attractive, but it affords excellent visibility of the airplane. (Right) Every color on the Safir is composed of a separate piece of MonoKote. All that's needed is a colorful imagination, and a lot of skill. (Below right) The Safir leaps into the air on its maiden flight. Buck claims it flies better than any pattern plane he has ever owned. (Below) Buck Faure shows the Safir pattern plane from Robbe, as it comes out of the box, ready to be covered with Super MonoKote. All surfaces are balsa except for a fiberglass belly pan.



these models is a poor substitute for the materials available at any hobby supply outlet. At this point we must discuss what is an accepted premise by virtually all RC builders; that one of the finest shrink film coverings available to the modeling fraternity today is Super MonoKote. This in no way means that there are no other products the equal of this covering, for there certainly are, but Super MonoKote was the pioneer in its field. Be that as it may, no other covering can surpass it in durability and appearance,



filler will properly prepare the surface for the application of MonoKote. Don't forget that minor dings and dents are easily removed by applying a little alcohol or water and then steaming the wood for a few seconds with a hot MonoKote iron.

From here on, the rest is up to you when it comes to selection of basic colors and color schemes. MonoKote can be applied in anything from a simple solid color to an intricate pattern which requires a great deal of time. But more on the time aspect later.

For those who want an attractive color scheme, there are some companies such as Midwest Products and Eagle Products who now furnish stick-on pattern sheets in a number of attractive designs. These are tough, fuel proof, and easy to use, and they certainly produce nice results in a minimum of time. Having done all this, the final result should produce an RC model based on an ARF which is truly customized and should be far more attractive and durable than the original airplane. Any sags will now be easier to tighten, and repairs will be almost invisible, as the color matching of MonoKote patches is just about perfect.

When one thinks about the relationship between ARFs and conventional kit built models, the conclusion is eventually reached that the best of all worlds may be a factory framed-up model which is jig-built, with straight surfaces, complimented with a custom-tailored covering job. Some of my finest models are those which I obtained in a framed up state, and which I covered myself. Up until now there have been few ready-to-cover models on the market, but more and more are appearing as the ARF industry gains maturity. Back in January of 1991, this column reviewed a particularly outstanding example of an RTC model from Kingsway Hobby Supply of Houston, Texas, called the Shark LT. The frame was built in Mexico, and the wood quality and smooth finish were top notch. I covered it myself in MonoKote, and the whole project turned out beautifully, far nicer than a factory finished airplane. Another company offering some eye-catching RTC models is Altech Marketing, which is presently listing a Zlin Akrobat, and a magnificent Super Stearman biplane, in their growing list of RTC air-

planes.

Sitting on my workbench at the present time is an RTC Ultimate biplane, complete with a Saito 120 four-stroke engine. I intend to do as good a covering job as my skill will allow, and expect the task I have in mind to take around 100 hours! There once was a time when in my ignorance I thought I knew all about Monokoting airplanes, but since associating with Buck Faure of Encinitas, California, I have begun to learn what a good MonoKote job is all about. Buck flies pattern planes, and his birds are as beautiful as they come, with intricate multicolored

framed up and ready for final assembly and covering. This model is certainly not intended for the novice builder or pilot, because even though it is an RTC airplane, a good deal of work is required to complete the project.

Buck did his usual sparkling MonoKote application to the Safir, and installed a powerful YS .60 long-stroke engine and one of his trusty Futaba radios. As expected, it turned out to be an absolutely superb model in the flying department, and Buck claims that it flies better than any airplane he has ever flown.



Custom built ready-to-cover Goldberg Ultimate owned by the author. This is one way to go, for those who like to finish their own models.

MonoKote designs that dazzle the onlooker. He also professionally builds and covers airplanes for other pattern fliers, and occasionally puts on covering seminars for vari-

*The final result... an ARF which is truly customized and should be far more attractive and durable than the original airplane.*

ous clubs. So when Buck talks, I listen. Buck's also an advocate of starting with an RTC model, even though he is a highly accomplished builder. For his latest pattern plane, he chose a "Safir" from the well-known European manufacturer, Robbe. This is a state-of-the-art pattern plane designed by the world famous pattern competitor, Wolfgang Matt, and comes completely

So now we have seen that the field of ready-to-cover airplanes is a logical path for the accomplished builder to follow, especially if one is no longer satisfied with having an assembly line ARF with no individuality built in. It's my favorite way of putting my own stamp on models, while I still avoid the work required to assemble an entire airframe. Anyway, before I met Buck I felt satisfied with my covering jobs which only took a few evenings for the average plane, but now I have come to realize that a good finish cannot be rushed, and I allow as much as ten days to do a really fine job.

#### FUN WITH PROPELLERS

Having been in modeling for far more years than I like to think about, I enjoy my informal collection of various reminders of the "good old days." It seems that almost everything from the early days of RC flying is becoming collectible. Of course, we are familiar with the hobby of collecting old engines and obsolete kits, but lately people

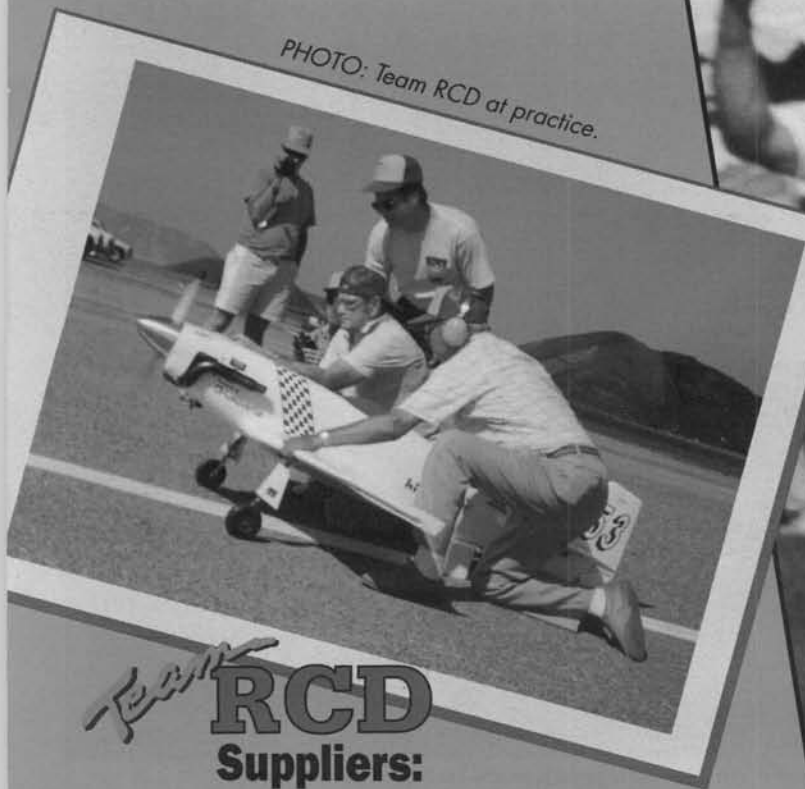
*continued on page 84*

# THANKS TO:

## R/C Unlimited Racing, Inc;

Tom Easterday, Cliff Adams, Loraine, Bonnie & Gail, Doug Wilber John Elliot, Cal Orr, George Steiner, Madera R/C Club, City of Madera, CA., and all the valuable volunteers.

PHOTO: Team RCD at practice.



## Team RCD Suppliers:

The following equipment performed **FLAWLESSLY** in a total test of all odd and even R/C frequencies used under the most grueling temperatures and physical abuse possible.

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\*Products purchased and used by sponser for race

*We'll See You Next Year in the  
WINNER'S CIRCLE!*



PHOTO: "Team RCD" immediately after winning two of top five places in the final, fastest, "Gold Trophy Race".

## Team RCD

(Shown from left to right.)

David Abbe- RCD/Sponser, Larry Kosta- Handler,  
Bob Dible- Caller (kneeling), Jim Kelly- Manager,  
Jim Miller- Builder #53 & #053 Stiletos, Tom  
Strom- Pilot #53(kneeling), J.R. Wilbur- Caller,  
Carlos Grageda- Crew, Brian Richmond- Pilot  
#053 (kneeling), Dan Abbe- Crew (kneeling)





**Team RCD**

**Design Team:**

David Abbe  
Jim Miller  
Allen Stanford  
Bob Obenberger  
Jim Kelly

**Practice Field  
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**YOU ARE ALL WINNERS!**

As a sponser & participant, RCD proudly salutes  
Team RCD and ALL of our fellow competitors for  
your contributions to the TOTAL SUCCESS of the  
first R/C Unlimited Air Races.



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BY BRUCE EDWARDS & AL TUTTLE  
PHOTOS BY BRUCE EDWARDS, AL TUTTLE & BILL NORTHROP

# RC UNLIMITED RACING PREMIERES AT RENO



Scale modeling is alive and well! And not only is it alive and well, it is growing at a rapid rate. Want proof? Witness the unqualified success of the first running of the RC Unlimited Pylon Races in Madera, California, October 3-6, put on by a new organization called RC Unlimited Racing, Inc. The airplanes were smaller, but the excitement ran

every bit as high as at Reno! Tom Easterday and Cliff Adams have both witnessed the Tournament of Champions and the Reno Air Races. At some point, these two gentlemen must have asked the question, "What if we combined Giant Scale and Pylon Racing in the Reno Air Races format?" Together they formed RC Unlimited Racing, Inc., and began spreading the word.

The resulting First Annual Championship R/C Unlimited Race led us off to a very fine start, and is now history. The prize money has been handed out and the winners have



# MADERA

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**1.** P-39 Airacobra was flown to 3rd place in the Gold Trophy Heat by Ken Trainor. It weighed 34 pounds, spanned 100 inches and was powered by a Sachs 5.8 cu. in. engine.

**2.** John Eaton, hobby shop owner in Gardena, CA, piloted his P-51 to second place in the Bronze category using a Sachs 5.8 cu. in. engine and Airtronics radio. The 39-pound plane was scratch built and used Gene Barton retracts.

**3.** Stinger Wallace and his mean-looking P-51, "Stihl-Born," gave the competition fits every time he flew. Stinger had a gust of wind nose him over on takeoff for the Gold Trophy Heat and had to retire.

**4.** Nice rendition of Bob Hoover's P-51 by California modeler Reno Clark, who really made the Canadians work for their 3rd place win in the Silver Trophy Heat; he was less than one plane length behind.

**5.** Pilot Frank McCordle, of Canada, flew his P-51 to third place in the Silver Trophy Heat. Homemade landing gear had some Robart parts.

**6.** Richard Verano (left), pilot, and Dave Bridi, builder, pose with their F7F Tigercat. After some major rework, the plane was a scant one ounce under the 55-pound weight limit. Futaba radio and Sachs 4.2 cu. in. engines.

**7.** Garland Hamilton built this very nice looking Spitfire and two others to use as pace planes to start each heat. Used an O.S. 300 twin for power, JR x-347 radio, and weighed 19 pounds.

**8.** Ken Sterner ran out of preparation time with his Pond Racer, wisely deciding to save this beautiful plane until next year. The plane weighs 37 pounds and is powered by two Sachs Dolmer 4.2 cu. in. engines turning in opposite directions. An Airtronics Vision radio guides it around the pylons.

**9.** John Krohn and crew, Bill O'Belmito, Bill Miller and Frank Walther, pose with their "Blind Man's Bluff" Sea Fury. An Aerrow 196cc twin powered this blazing beauty.

**10.** Second place in the Silver category went to Cliff Adams and his very clean P-51. Mike Adams was crew chief, and the engine was a four-cylinder, four-stroker by Bill VanLeeuwen. The 31-pound plane had a clipped span of 86 inches.

big smiles. Many pilots, even those who did not finish in the money, were anxious for next year to roll around so that they might have a chance to compete again.

The event was administered in a very professional, fair manner. The entrants were greeted at the event's main hangar by a registration crew that consisted of Loraine Hartranft (event coordinator), Gail Bushnell, Bonnie Wilber, Terri Parola, Narlene Crumley, Diane Pendergrass and several others. All of these ladies worked very hard, but Loraine Hartranft had the most difficult job of any person at the event, as she coordinated security, flight line activity, judging, inspections and any problems that arose. Well done, Loraine, every participant from Tom and Cliff to the ticket takers owes you a vote of thanks.

Even though this was a first-time event,

there were many entries. The souvenir book listed 105 competitors who had registered as of August 27, 1991. Of these, approximately 45 to 50 showed up. This is a guess, as we didn't attempt to count those present.

After registration was completed, each pilot was ushered to the inspection area where his plane faced a very tough inspection by personnel who knew what they were looking for, based on the rules set down by R/C Unlimited Racing, Inc. The inspectors were not there to spout rules and regulations, they were there to assist the entrants in every way to meet the rules and qualify to race. Each team or pilot had to sign a statement verifying that his race plane had flown a minimum of four flights.

To enter the race at Madera, the aircraft requirements are as follows: Each entry must be a scale representation of any full-size aircraft that qualified to race in the Unlimited Class during any year at the Reno Na-

tional Championship Air Races. The aircraft must be in proper scale proportion to its original wingspan. Modification to the airframe is allowed only to the extent that the full-size subject was modified and may not be exaggerated. The minimum wingspan before modification is 100 inches. The weight of the aircraft is not to exceed 55 pounds. All aircraft must be propeller driven.

The event was very well run with safety heading the list of priorities. Not only did the planes have to pass a rigid safety inspection, the pilot had to get a competition license prior to any flying or qualifying attempts. To receive a competition license, pilots were asked to take off, fly no more than three laps around the course above racing altitude, and when the pilot felt comfortable he could ask race control for permission to fly down on the course for two laps at racing speed. After the two laps, the pilot landed his plane. During the takeoff, fly-bys, course flying and landing, the pilot was evaluated by two RC

Unlimited judges and two licensed unlimited pilots. If three of the four individuals agreed that you were competent, a competition license was issued.

The pilots who received their competition licenses then were allowed to enter time trials to establish whether they would race in Bronze, Silver or Gold Class. Ten planes that qualified but were not fast enough to make a class were put in the Medallion program. This allowed them to take the place of higher qualifiers who could not make their heat, due to missing launch windows or failure to arrive for the heat due to other reasons.

The ultimate goal of each pilot was to be one of the top five point winners in his class so that he could compete in the Trophy Race. That was where the money could be won!

Each entrant or group was assigned a pit area where shade tents could be erected and ve-

hicles could be parked. Shade was very necessary with temperatures as high as 115 degrees on the flight line.

Activity was at fever pitch in every pit area, with last-minute equipment adjustments and repairs going on at a furious pace. Sportsmanship was of the highest caliber with everyone helping the other fellow. These Big Bird Racers wanted to win in the air in hot competition, not because the other fellow could not make a heat because he needed a small bolt or other piece of equipment.

There was activity aplenty at many of the sites. One group had an F8F Bearcat strewn around the area that appeared to have not been finished prior to arrival. In talking with team member



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for 244cc total displacement and approximately 20 horsepower. These guys did get the airplane finished and through inspection, but I believe they ran out of time and were not able to put in the required qualifying flight. This was a shame, for they worked night and day on it.

Theirs wasn't the only plane that came in

over the weight limit. David Bridi's 1/5-scale F7F Tigercat was three pounds, three ounces over. They tore out everything they could to get it down to the 55-pound limit, including the pilot and other sundry items. They did manage to get it down to the maximum allowable weight limit, but unfortunately this magnificent airplane was later totally destroyed during one of the Silver Trophy races.

John Bolle, designer and builder of the Sea Fury "Dreadnought," had the best cowl of any plane at the race. Not a single screw



Richard Coombs, who was from Bone Island, British Columbia, he stated that the airplane was over the maximum weight limit by three pounds, two ounces.

Richard and the other two team members, John Letson and builder Mickey Stiffon, were performing a massive weight reduction program. They stripped all the paint from the airframe and were recovering it with a heat-shrink mylar covering. Engines were two Stihl 122s coupled together

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WASH

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**11.** Bob Heitkamp out-piloted faster planes to take first place in the Bronze category with his Sea Fury, "Red Dog Saloon."

**12.** Tracy McKenna with hubby Kent's P-51, "Wild thing." Their P-51 had one of the best finishes at the race. Kent used a Futaba Super 7 radio and a Sachs 5.8 cu. in. engine to pull his 33-pound plane.

**13.** Bill Hempel's winning A-26 "Hobby Barn" Invader. First place in Gold category; 1.8 cu. in. Moki engines, Futaba radio, weighs 27.75 pounds, 100-inch span.

**14.** Bob McClung piloted P-51 "Dago Red" and won \$175 in heat money, but did not make the final trophy heat. Plane is powered by an A&M Sachs 5.8 cu. in. engine and uses an Airtronics Spectra radio; weighs 38 pounds.

**15.** Dan Santich came all the way from North Carolina to compete with his well-detailed P-51, "Precious Metal."

**16.** Canadian pilot Mickey Stiffon used two Stihl 122cc engines driving a single shaft to power his F8F Bearcat. Prop is a short-blade version of the ground adjustable pitch unit commonly used on ultralight aircraft.

**17.** Oops! Collapsed landing gear was an all-too-common sight throughout the four-day event.

**18.** Check out the huge 342cc engine in the nose of Mark Smith's Mustang. It's an English-made 30-hp powerplant originally designed for drones and ultralights.

**19.** Pretty P-63 was one of two King Cobras entered by the Taylor Racing Team; Bill Schonemann was the pilot.

**20.** Beautiful "Dreadnought" Sea Fury was the work of John Bolle; pilot was Walt Hale. Full-size Dreadnought was also on display at Madera.

had to be undone to gain access to his engine from either side. Unfortunately, John's plane, piloted by Walt Hale, ran out of preparation time, altitude, air-speed and ideas all at the same time, crashing minutes before the full-size "Dreadnought" arrived at the Madera Airport.

Kerry Sterner worked on his Pond Racer until just hours before qualification trials ended, wisely deciding to wait until next year when his plane would be fully prepared. Kerry was receiving parts from Mayher Industrial Tooling, red label U.P.S., right up to the last moment.

Garland Hamilton had three beautiful Spitfires, constructed from Yellow Aircraft kits, for the pace planes. After the racers in the heat were fairly well lined up behind Garland, the start would be announced,

Garland would peel away, and the big racers would dive for the #1 pylon. It was very exciting, to say the least.

When the dust settled, Bob Heitkamp, flying his Sea Fury "Red Dog Saloon," #61, was first in the Bronze class. John Eaton was second in Bronze, flying a P-51, #52, and Bill Coulter took third in Bronze with a P-51, "American Spirit," #96.

Sadly, Ralph Braun's P-51 lost a wing when he and Larry Sutherland, also flying a P-51, made contact. We all felt the blow to these two fine competitors, because Ralph Braun sponsored an entire team of three P-51s that worked and competed so well, overcoming many obstacles, as did Sutherland, who was pretty much his own crew and pilot.

Heitkamp flew the course as well as it could be flown, winning against two faster planes that were in the race all the way. Top lap speed in the Bronze class was 104 miles

per hour.

Cliff Adams was first place winner in the Silver class, flying P-51, #2; second place was won by Bob Walensa, flying P-51, #13. Third place was won by Frank McCrondle, flying the "Pride of Canada" P-51, #24. Reno Clark, piloting P-51, #05, was fourth and Tom Cone was fifth, flying P-51, #9.

Silver class was an outstanding race, Cliff and Roger battling away for first and second place. Canadian flier Frank McCrondle flew a very tight course with Reno Clark all over him on every lap. Reno was faster, Frank was steadier. Tom Cone hung right in there; had any one of the other four pilots blinked, Tom would have placed higher. Top lap speed in the Silver class was 129 miles per hour.

The Hard Luck Trophy could have been shared between Stinger Wallace and Mark Smith. These two fellows were qualified for the Gold final heat. Mark's P-51 was so close to the weight limit that last-minute repairs put him over weight and he was

disqualified. Stinger Wallace nosed over on takeoff, breaking the prop and ending his hopes of taking a trophy and some cash back home to Texas.

The Gold Heat was a hot number to be sure. These were the fastest qualifiers. With Smith and Wallace out of the heat, Tom Strom and John Krohn stepped in. Bill Hempel, flying an A-26 Invader, #06, "Hobby Barn," was the first place winner. Second place went to John Krohn, flying a Sea Fury, #88, "Blind Man's Bluff"; Ken Trainor piloted #87, a P-39 Airacobra, to third place. Tom Strom piloted #53 P-51, "R.C.D.," to fourth, while teammate Brian Richmond flew his P-51, #053, "R.C.D.," into fifth place.

Hempel's A-26 was really fast. It had two Moki 1.8 engines and weighed 27.75 pounds, making it just about the lightest plane to qualify. While the A-26 had the 100-inch minimum wingspan, it was

physically smaller than the Sea Furys and P-51s that it raced against. A lesser pilot than Hempel would have had a difficult time keeping this speedy plane on the course. Top lap speed in the Gold category was 132 miles per hour.

First through third place winners of each heat received cash for their efforts, so Mark Smith did not go home emptyhanded. He won \$300. Bill Hempel won \$275 in heat money. Cliff Adams, Bob Heitkamp, and Roger Grotheer each won \$250 in heat money. There was a lot more money passed out, but these are the top five heat money winners.

The biggest problem that was evident had to do with landing gears. If a pilot made a success-



pounds, so they were not all that heavy. Here is an opportunity for some enterprising manufacturer to come out with a good, reliable, inexpensive gear. The problem was such that several teams left their gears down and locked, particularly during the heat races.

The Airshow Competition suffered from lack of participation, however, the four teams

that did fly were very good and everyone enjoyed watching the team aerobatics. First place went to Greg Okert and Joe Alban, who won \$2500 for their efforts. Second place was won by the team of Dennis Crooks and Chuck Fuller. They took \$1500 second place money. Tony Ahren's team won third place and took home \$700. Sorry, Tony, I did not get your team member's name or your aircraft.

Dennis Crook's model won awards for Best Finish and Best Scale Plane. The favorite overall plane was John Krohn's Sea Fury, #88, "Blind Man's Bluff." In addition to the



ful landing, nine times out of ten the gear would fold during rollout. There were very few good landings. Most were "arrivals," and when a pilot did make a good landing without collapsing the gear or nosing over, he received an ovation from the crowd. The P-51 models had a tendency to ground loop during rollout, which may have been an indication of the gear being in the wrong location. Most of the planes weighed between 35 and 45

24

28

## RACE RESULTS

RACE	PILOT/TEAM	PLANE	TIME	PLACE	MONEY
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### GOLD CLASS

88	J. Krohn, CA	Sea Fury	35.17	2nd	\$2700
83	M. Smith, CA	P-51	36.36		
06	B. Hempel, AZ	A-26	38.92	1st	\$4500
47	S. Wallace, TX	P-51	40.49		
87	K. Trainor, CA	P-39	40.80	3rd	\$1800
053	B. Richmond, WA	P-51	41.40		
45	K. McKenna, CA	P-51	41.83		
7	J. Creagh, CA	P-51	42.26		
53	RCD Team, CA	P-51	43.43		
31	R. Oliver, TX	P-51	43.92		

### SILVER CLASS

66	S. Broughton, TX	P-51	45.80		
12	H. Young, AZ	P-47	46.04		
2	C. Adams, CA	P-51	46.99	1st	\$2700
68	R. Braun, IN	P-51	41.42		
75	B. Schonemann, AZ	P-63	48.20		
9	T. Cone, CA	P-51	49.86		
05	R. Clark, CA	P-51	50.27		
62	R. Verano, CA	F7F	50.47		
24	F. McCordle, CN	P-51	51.08	3rd	\$800
13	R. Walensa, CA	P-51	51.45	2nd	\$1,200

### BRONZE CLASS

61	R. Heitkamp, AK	Sea Fury	52.56	1st	\$1,200
4	R. McClung, CA	P-51	53.36		
78	R. Braun, IN	P-51	53.54		
52	J. Eaton, CA	P-51	55.44	2nd	\$500
20	R. Braun, IN	P-51	56.05		
44	R. Sizer, MN	P-51	58.10		
00	C. Rosen, CA	P-51	50.56		
54	R. Grenga, AZ	YAK	59.58		
90	L. Sutherland, CA	P-51	59.63		
96	W. Coulter, CA	P-51	61.32	3rd	\$300

**21.** Racers lined up in the staging area in preparation for a Bronze heat race.

**22.** These guys really came prepared; the Braun Racing Team, from Indiana, brought three identical P-51s...plus a spare! Ralph Braun, second from left, flies #20.

**23.** The props that Mark Smith was using cost him something over \$100 apiece and he was down to his last one before the end of the heat racing. Mark's brother, Brian, is seen here carving a spare, "just in case."

**24.** The production plug for Glass Tech Unlimited's F8F Bearcat, which will be of all-composite construction; details in text.

**25.** This is as close as it comes to the real thing! Bob Heitkamp's "Red Dog Saloon" Sea Fury captured during race qualifying.

**26.** Photo taken at the start of the Gold Trophy Race shows Bill Hempel's A-26 already in the lead; he stayed there to win first place and \$4500 in prize money.

**27.** Bronze Trophy Race action with Ralph Braun's P-51 leading Bill Coulter's Mustang and Bob Heitkamp's Sea Fury around pylon #1.

**28.** Four teams participated in the Airshow Competition at Madera; the three Sukhois in the foreground belong to G.L. Hamilton, Tom Easterday and Cliff Adams, who call themselves the R/C Aero Flight Team.

fly-  
ing, there were  
a number of vendors and  
manufacturers showing their wares.

One vendor was the irrepressible Art Gross from Washington. Art has those real useful sanding blocks and other goodies which, incidentally, are now being distributed by Dave Brown. Duane Sanders, owner of Model Aviation Products, from San Bernadino, California, had some interesting goodies. One of these he calls "Secure Wrap" and is used to wrap your receiver, battery pack, gyro, or whatever. Comes with self-adhesive Velcro, foam and two Velcro straps. He also had another handy gadget that he calls "The Balance Bug," used for balancing your model.

A manufacturer called Glass Tech Unlimited was displaying a plug of their F8F Bearcat. In talking with Bill Berle, who works at GTU, it was evident that this was to be a uniquely

constructed model. The plug shown was the production plug that the kits will be pulled from. According to Bill, the kit is going to be the absolute highest tech kit that the RC world has ever seen. Sample features: The entire surface of the airplane, i.e., the wing skins, top and bottom, the fuselage skins, the empennage skins, etc., are all sandwich construction, vacuum formed in a mold. The spar assemblies for the wing and the empennage will be carbon filament. The control surfaces will either be partial or full carbon, depending on what it takes to statically and dynamically balance them. The kit is going to come pretty much pre-assembled, which means the top and bottom wing skins will be joined to the spar and the leading edges joined at the factory. All hinging will be completed.

The bulkheads will be installed in the fuselage. The tail will be assembled the same way as the wing. The retracts used will

be up to the kit purchaser. Repairs can be made using the standard fiberglass repair techniques. The model will not use high-temperature resins or carbons; the modeler will be able to make his own repairs without having to return the plane to the factory. The wingspan is 103 inches. Removing ten inches at each wing tip will bring it to the "Rare Bear" span for the Unlimited event. The kit will be available within the next six months. Projected price of the kit will be approximately \$2000.

Glass Tech Unlimited is located at Fantasy Haven Airport, Tehachapi, CA 93561. They build, repair, race prep and fly full-size composite aircraft, have over fifteen years experience and are avid modelers to boot.

We would like to say again what a well-managed event this was. Tom Easterday and Cliff Adams and their crew did a wonderful job, as did all the volunteers from the Madera and Fresno RC Clubs. **MB**

# FREE FLIGHT

BY BOB STALICK

## Getting Ready for the New Season

Wintertime planning is upon us. Last month, I suggested some things you could do to prepare your models and equipment for winter storage. This month, it's time to look at the needs you may have to get you ready for next season's competition.

If you are like me, you have already developed a list of those models that you have been hankering to build. As a consequence, you may already be building one or more of them. However, if you have not planned this far in advance, let me tell you how I go about constructing this list.

I look over my current inven-

ships for this purpose.

The next step is to locate the design that I want to build for a particular event. It may be someone else's design or it might be an "original." Then, I order the plans or draw them up, assemble the needed hardware (engine, timers, engine mount, etc.), and check my wood and covering materials to determine if I have everything I need to complete construction. If not, it's time to visit the local hobby shops and spend a few dollars.

I am invariably hooked by some old visions and memories that change my choices of what models to build. An example in my own case was the 14-year project, the Megow Flying Quaker, which I detailed in a column a few months back. The other interruption in my building schedule is when someone decides to add an event to the upcoming season that piques my curiosity. Pee-Wee 30 did that to me when it first came out, and last year, I was distracted by Payload, which was sponsored at two different local meets in 1991.

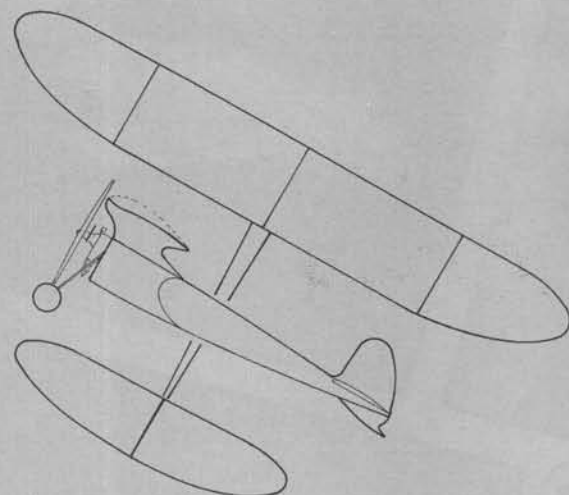
Another factor that occasionally sparks my interest is when a fellow club member issues some sort of challenge to hold a private competition among club members. Last year, some of the club members held a little competition in C Gas, as an example. However, these diversions are temporary, and I soon get back onto my schedule.

Now that you have chosen a design and have it under construction, you should be able to use your winter preparation months to good advantage. What is important is that you get started, and distractions aside, you should persevere until

completion. This is how you will be ready for the upcoming flying season

### FEBRUARY MYSTERY MODEL

This month's design is one of those "tweener" models. It is more like the pre-war designs of



FEBRUARY MYSTERY MODEL



Bill Harburg took the Mini-Rod, featured as a three-view several years ago, and built the wing and stab with egg-crate style construction. Model was entered in the Pee Wee 30 event at the Fall Annual.

tory of models. Some I will decide to retire, others are still competitive, and still others need some trimming time to determine whether they will do the trick. Usually, after this review, I discover a few "holes" in my fleet. There are some events that I will have a model to use during the upcoming season. If I want to compete in those events, I will need to have one or two

the Old Timer period, but it was published during the post-war Nostalgia period. So, if it looks like a Zipper to you, it's because it owes much of its heritage to that design.

The area of the wing is 300 sq. in., and the original was powered by a .19 to .23 engine. The engine featured an inverted mount and a sliding ignition tray. Because it shows an ignition engine on the plans, it is approved for the Nostalgia Ignition event.

So, now you have all of the clues you need in order to send to Bill Northrop at *Model Builder* your best educated guess as to this model's name. For the winner comes a free one-year subscription to *Model Builder*. How are winners chosen, you ask? Well, Bill takes all of the cards and letters he gets, tosses them into a hat and draws them out until one appears with the correct model name. That lucky person gets the subscription. So, there you have it. Give it your best shot.



## DARNED GOOD AIRFOIL—DEBORE 70-53-66

I don't know much about this airfoil, but A. DeBore is a long-time FAI flier from Europe, and this section is one that he has used in the past. This airfoil should be a fine gliding section—probably best used on Wakefields. It has a hooked trailing edge undercamber, which would not serve you well if you were considering it for Nordic with a zoom launch. For straight tow, however, it would be a fine section. The Phillips entry would help with stall recovery and ease of trimming the model for different flying conditions.

So, if you are interested in experimenting with wing sections, give this one a try.

### THREE-VIEW: THE SHOC-KING

This three-view comes directly from the pages of *Flyoff*, newsletter of the Skyscrapers, edited by Bob Hatschek. Here's what the designer, Jean Paillet has to say about it: "Just as the name 'SHOC-King' is derived from the name of Mel Schmidt's SHOCer (Mel was a member of the Sky Hoppers of Orange County [SHOC]), so too, this design is derived from Mel's SHOCer 280. The similarities are in the force and moment arrangements. The distinctions are in the shapes—both outlines and cross sections—the wing area, and in the structural design. The intent was to increase the wing area (I favor the floater type models over the smaller buzzbombs) and, by re-



(Left) Fred Guilfoyle built Murphy's Pay-Triot Payloader (see August 1991 MB) but renamed it the Airborne Express. (Above) Fred Guilfoyle launches his Airborne Express on an official flight.

designing their structures, to lighten the wing and horizontal tail without sacrificing strength.

"The results are evidenced by the SHOC-King's 1988 and 1989 contest achievements: a total of seven firsts, two seconds, and five thirds. These wins include firsts at the '88 and '89 Eastern U.S. Free Flight Championships in Galeville, New York; at the '88 and '89 Delaware Valley Federation's championship meet; and a third at the '88 NFFS Outdoor Free Flight Nationals.

"No appreciable changes were made to Schmidt's fuselage design, which is essentially a 1/16-inch sheet box with balsa block cheeks. However, the pylon, fin and sub-fin profiles were altered—for aesthetic reasons only—while their areas remain unchanged. The wing and horizontal stabilizer airfoils were altered, both to accommodate their new structures and to facilitate construction. The wing area was increased to 322 sq. in. and the wing and tail structures now both utilize an I-beam spar with diagonal rib bracing aft of the main spar. In spite of the increase in wing area, stabilizer area was left

unchanged.

"My original SHOCer was built per the kit plans, using the original kit wood including hardwood spars. The SHOC-King was built as shown on the accompanying three-view drawing using carefully selected balsa. Both models were covered with Japanese tissue and were given essentially the same finish (clear epoxy or other fuel proofing over three coats of nitrate dope).

The comparative weights are:

	SHOCer	SHOC-King
Fuselage with engine, tank, timer	154	135
Wing	79	58
Stabilizer	21	16
TOTALS	254gm 8.96 oz.	209gm 7.37 oz.

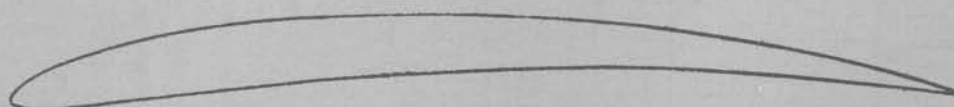
"Obviously, the weight reduction program was successful—especially considering that the significantly lighter model was also slightly larger. None of this, however, should be construed as overt criticism of the SHOCer design. Even at its heaviest, my original SHOCer 280 was very successful during

the 1987 contest season, and had the same stringent wood selection process been applied as it was on the SHOC-King, my SHOCer would have been considerably lighter and a lot tougher to beat. In fact, I think the SHOCer, as a kit, ranks with the most competitive models around. I've still got mine, and to this day, I still fly it as a backup airplane.

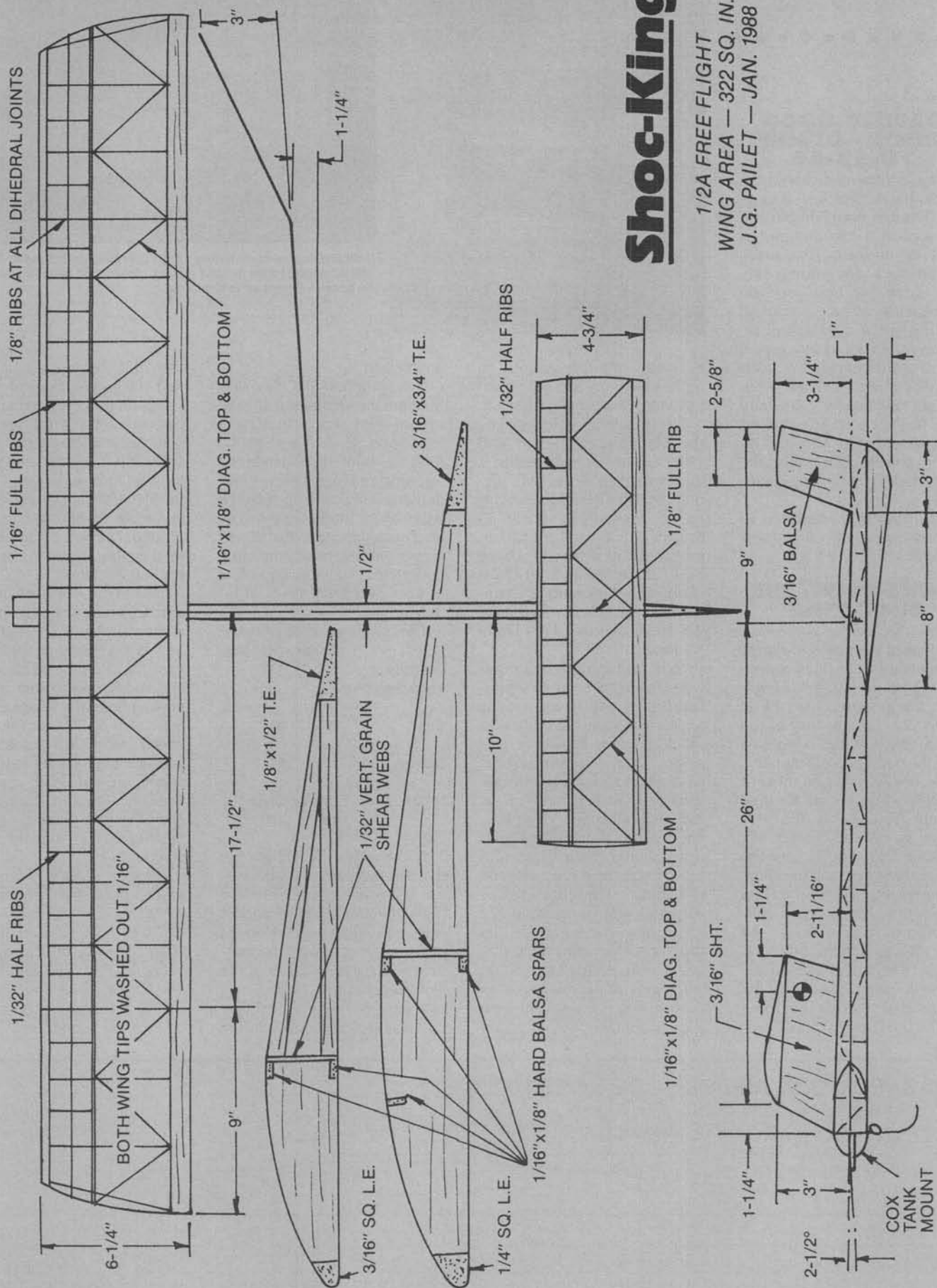
"The SHOC-King uses a standard Cox red plastic tankmount without pressure. The flight pattern is right/right, using stabilizer tilt to get the glide circle and rudder tab to trim for the power phase. The balance point is located at 80% of the wing chord. Wing tip panels are washed out 1/16-inch and center panels are flat. With a potent Tee Dee .049, Cox Racing Fuel and a Cox gray plastic 6x3 prop, the flights are consistent and competitive."

(Model Builder Plan No. 1721, published in January 1972, is for Mel Schmidt's SHOCer 560. Plan includes a chart showing critical dimensions for 290, 500, 560, 680, and 800 sq. in. versions. Price is \$8.50. See ordering directions on page 84.) continued

## DARNED GOOD AIRFOIL — DE BORE 70-53-66



STA	0.00	1.25	2.50	5.00	7.50	10.0	15.0	20.0	25.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	95.0	100.
UPR	1.00	2.61	3.56	4.81	5.53	6.40	7.53	8.29	8.74	9.24	9.68	9.56	8.97	7.84	6.04	3.65	3.06	0.42
LWR	1.00	0.14	0.16	0.01	0.22	0.50	1.02	1.51	2.06	2.41	3.07	3.54	3.78	3.41	2.71	1.40	0.74	0.40



# Shoc-King

1/2A FREE FLIGHT  
 WING AREA — 322 SQ. IN.  
 J.G. PAILET — JAN. 1988



# FREE FLIGHT

## TWO NEW KITS

As usual, when Lee Campbell comes out with a new kit, I usually receive a sample for my perusal. His latest is the new "Souper Coupe." The ship is a 38-inch span, pylon-type Coupe, and the kit features all pre-cut parts from premium

Send to Indoor Model Supply, Box 5311, Salem, OR 97304.

## CHEEPER BEEPER II

Several months ago, I featured information submitted by my old modeling buddy, Stan Fink, about "Cheeper Beeper" model finder. Stan recently sent along

with a three-volt NiCd instead of the N battery. The NiCd is louder and higher pitched than the N, but it won't run as long. The main advantage is weight saving. The N battery and holder weighs 11 grams, and the NiCd and holder is three grams. I have also eliminated the switch and extra wiring for it. The total sys-

partment. Rubber band the NiCd into the battery holder and it's buzzing. Since no switch is used, you have to remove the battery after each flight to turn it off.

"If you have a pylon model, you can cut a slot into the side of the pylon for the battery holder, easing installation and removal of the battery. If you do this, be sure to tape the battery in place with masking tape before each flight. If you can stand a little extra weight, go ahead and put the switch in. This will add about three grams. Always carry extra NiCds, since they don't last as long as N batteries."

## BRAINBUSTERS 50TH ANNIVERSARY CELEBRATION

The Brainbusters MAC publishes a free flight newsletter that I really enjoy reading. Ed Sullivan, from Newport News, VA, recently contacted me to let me know that his club is holding its 50th anniversary celebration April 24, 25 and 26, 1992 in Hampton, VA. All current and former Brainbusters and friends are encouraged to attend this big affair. For further information, contact Ed at 19 Frederick Dr., Newport News, VA 23601. Call him at (804) 596-6104.

## NEW (GAS) MODEL TRIM TIPS

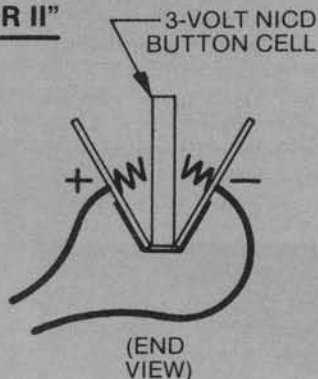
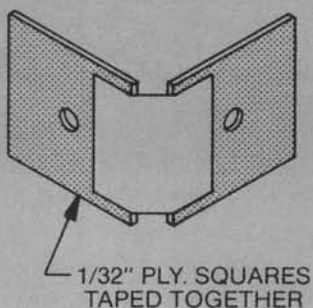
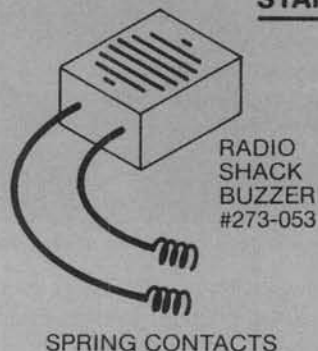
Terry Thorkildsen has been a frequent contributor to this column, sent this to me for all gas model fliers who are nervously contemplating that first test flight:

"At the Free Flight Champs, I helped two of my friends trim in new AB Astro-Stars that they had built. Dialing these models in, I thought it might be nice to write up some of the trimming techniques that seasoned fliers have acquired through the school of hard knocks. Ralph Prey's articles that appeared in the July and August, 1979 issues of *Model Aviation* are excellent on this and they go into much more depth. The following is

*continued on page 82*

George Oldershaw ROGs his payloader at the Fall Annual. Model is twin-finned and is an original design by George.

## STAN FINK'S "CHEEPER BEEPER II"



hand-selected balsa. It comes complete with formed blades and hub assembly. The model features a sheet balsa front with built-up rear to keep the balance in the optimum location. Lee tosses in 10 grams of FAI tan rubber so that you can get started when the model is completed. Also featured in the kit is real Japanese tissue.

I can vouch for the quality of this kit. It is first-rate, as are all the models in Lee's classy kit line. Campbell's Custom Kits also carries a full line of free flight kits and supplies. For your own Souper Coupe kit, send Lee \$29.98 plus \$3.50 postage. Send to Campbell at 401 Executive Center Drive, Suite H-108, West Palm Beach, FL 33401. When you do, ask for a copy of Lee's 24-page catalog.

The second kit that has come to my attention is Indoor Model Supply's "Mini-Stick" kit. For \$9.95, you get a kit that will build three seven-inch span indoorstick models. This kit comes complete with UltraFilm covering, and all materials except adhesive. Plans, prop jig templates, and full illustrations are part of the deal. Enclose \$3.00 to cover postage and handling.

the following update:

"First, I have a testimonial from Nat Comfort as to the effectiveness of the system as he uses it on power models. In summary, he ran the buzzer for over seven hours with an 'N' battery and then flew the plane into a three-foot deep hay field. He found the plane by means of hearing the buzzer. Obviously, there is no problem with the sound dying if the model is lost for several hours.

"I have recently developed a secondary system for use in lighter planes such as Wakefield, Coupe, A-1, 1/2A gas, .020 gas, and even P-30. It uses the same buzzer (Radio Shack #273-053)

tem weighs 12 grams. I recently built a Coupe that totalled 65 grams, and so with the buzzer unit, it will be 77 grams, only seven grams overweight.

"The best way to construct this system is to solder two small spring contacts to each lead on the buzzer. I used 1/4-inch lengths of spring from a ballpoint pen. Make a battery holder out of 1/32-inch plywood. Two one-inch squares of plywood are taped together at one end. Drill a 1/8-inch hole in the center of each plywood square and insert the spring contacts, which have already been soldered to the wires, into the holes so that they protrude into the battery com-



# HANNAN'S HANGAR



BY BILL HANNAN

**"The human spirit cannot be put down, held down, or spiritually imprisoned."**

Our lead-in line this month, by Dorothy Pierson, applies nicely to model builders worldwide, who in spite of political and financial uncertainties continue to enjoy their hobby and share ideas freely with like-minded people, regardless of geographical location.

## THAT ROCKETEER AUTOGIRO

The fascinating Pitcairn PCA-2 Autogiro is largely the work of Mike Fulmer. The 1/8-scale model, based upon Hannan Graphics drawings from a Williams Brothers kit, features a fiberglass fuselage, silk-covered balsa wings and tail surfaces.

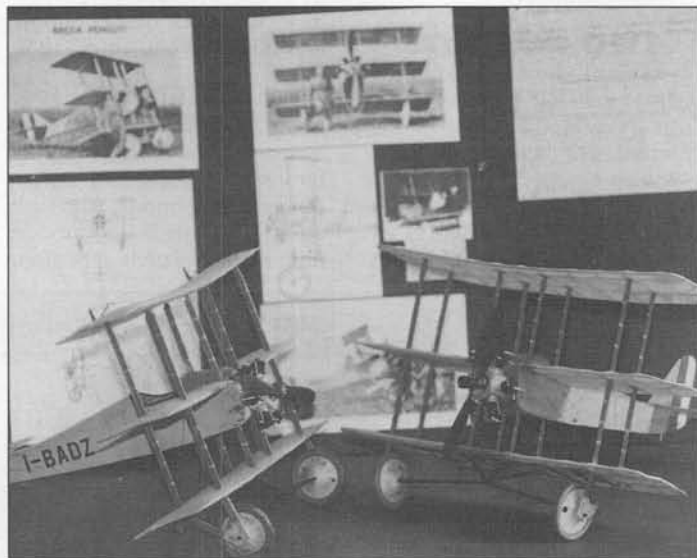


Pitcairn PCA-2 Autogiro model with electrically-driven rotor and propeller was featured in "The Rocketeer" movie. Photo via Mike Fulmer.

The combination of this excellent model and Industrial Light & Magic special effects expertise produced convincing results in the rescue scene of "The Rocketeer" movie. The film is no longer being shown locally, and one wonders if the Walt Disney Studios may be planning a video release?

## BETTER BALLAST

It seems remarkable that common modeling clay has been employed for so many years to balance models, considering its drawbacks. For instance, it seldom sticks tightly, is subject to melting in the sun and generally leaves greasy



Two Pensuti-Capronis, by John Blagg, of England, and their comprehensive documentation.

stains.

Jake Larson, of Treasure Island, Florida, suggests an alternative solution, inspired by golfers! It is lead adhesive tape used in balancing golf clubs, and is available at reasonable prices by mail from the Longhorn Golf Company, 7000 Harwin Drive, Houston, TX 77036; telephone (713) 952-1550; or write for price list. Note: Lead is considered a toxic material, so exercise suitable precautions with it.

George Benson, of Mill Valley, California, has discovered another material adaptable to ballasting small models. Marketed by the Super Glue Corporation under the registered trade name Handi-Tak, the substance is a reusable adhesive packaged in narrow strips about 1/8-inch thick by two inches long. Small segments of it may be cut or torn off for use as ballast. The material sticks well, yet may be removed. It is claimed to not dry out, and is clean and non-toxic.

## STEALTH ADJUSTMENTS?

Adding trim tabs to wing or tail surfaces is an ancient shortcut to offsetting shortcomings in model aircraft. However, some builders seem to feel a bit guilty about the esthetic detractions of such appendages,

especially on scale models. One partial solution involves clear plastic tabs to render these "fixes" less obvious.

According to Frank Scott, of Dayton, Ohio, this practice has spread to fliers of full-size flying machines. He has seen clear-plastic trim tabs on ultralights, and even on a gyroplane, which employed an entire horizontal tailplane fabricated from clear plastic!

Along similar "fool the eye" approaches, Frank spotted a homebuilt biplane decorated as an old Navy fighter. At a glance it appeared to have authentic wheel spats. But, upon closer examination, they turned out to be ordinary wheel pants with tires cleverly painted on their outsides! The visual result was quite convincing, and doubtless much simpler to produce than the real McCoy.

## SUPER SPITFIRE

Bell Model Aircraft Company has recently released a Spitfire Mk. XIV rubber-powered flying scale model kit. Featured are finely-drawn construction plans, top-quality building materials, a molded canopy, rubber, matt-finish decals, five-view proof-of-scale documentation and complete instructions. Priced at \$24.95, the Spitfire is one in a series of kits and plans offered. Why not send \$1.50 for an illus-



trated catalog? Bell Model Aircraft Co., 650 Pine Crest Drive, Largo, FL 34640.

## READER RESPONSE

Joe Wagner, of New Wilmington, Pennsylvania, says he doesn't consider overcoming "inertia" (a body at rest tends to remain at rest) the most difficult aspect of model building. Rather, he feels, it is "indecision," and adds: "Again and again in my 56 years of modeling, I've re-enacted the same scenario. I feel a fierce desire to do some work on models—but what? The latest magazine contains a 'must build' project; but I just bought an irresistible kit last week (and also have several others purchased earlier); and I've got three or four partly finished airplanes that I really must get busy on...then there are the repair jobs I've put off! However, a new design concept on the drawing board still needs completing; and two engines require running-in..."

"Faced with these choices, what do I end up doing? Usually nothing more constructive than picking through another stack of old magazines, looking for still another 'must do' project or two—or perusing catalogs searching for the ideal model kit (or engine or radio system)..."

Guess most of us can identify with that syndrome?



Fine DeHavilland Beaver from *Model Builder* plans is powered by an Astro 05 electric system, and its cowling was once an aluminum saucepan! Builder is M. Andre, of France. Photo by Roger Aime.

## DOCUMENTATION DIFFICULTIES

Also sounding familiar, aero historian/modeler Herb Kelley writes: "All is going well, even though my 'rememberer' seems to be weakening a bit. I am going to stop collecting, and go through my library to index it, so I don't spend much time finding the information I want. I could have 20 years yet, and with the way time passes increasingly fast, that should be almost enough!"

## NEW PUBLICATION

Ron Firth, of England, has recently launched *Flying Model Designer & Constructor*, to help maintain enthusiasm for "one of the most interesting activities... that has ever been devised." Firth's personal involvement

with the hobby extends back some 55 years, and has included virtually every facet of aeromodeling, including many years as publisher of magazines devoted to display models. As Ron put it: "...lately I have concentrated on plastic non-flying models, (however) my interest in flying models remains undiminished, and I still build and fly small rubber-driven models, duration, scale and A1 gliders."

The new magazine will be devoted to free flight, control line and radio control. The first issue includes articles on cross-country model flying (RC models with pilots following on foot!), a glider kit review, nostalgia about free flight helicopters, the "Living Room Stick Insect" (a tiny indoor model), tips on fuselage construction, fold-out plans for the 1937 "Northern Star" rubber-powered duration model by Bob Copeland, a brief history review concentrating on the work of Otto Lilienthal, plans for a simple control line stunt model and more.

Full subscription information is available from PAMAG (Publications) Ltd., Unit 308, J.C. Albyn Complex, Burton Road, Sheffield S3 8BZ, England. Or in the U.S.A. or Canada, contact: J.J. Daileida, 4314 West 238th St., Torrance, CA 90505.

Reg Boor inspects damage to Michael Green's CO<sub>2</sub> powered Peanut Mitsubishi Raiden. Photo by Tonda Alfery.

## NEW BOOK

Authored by Mr. Beverly Butler, *Piper Cub Era* deals with one man's experiences in lightplane aviation. From the title, I had expected a time-span in the 1930s and 1940s, however most of it concerns the 1950s and 1960s. Butler was an instructor



Pete Redhead's Hawker Hurricane Pistachio, which took part in the Interscale '91 international contest.

who managed a small airport not far from Oshkosh, Wisconsin, and the book reflects his adventures there with a variety of people and aircraft.

Somehow, the very nature of aviation nurtures memorable happenings, some of which might seem like fiction to non-enthusiasts. Although this is a "quietly written" volume, it offers real insights into the writer's feelings—one can share his minor triumphs and sympathize with his problems. He even documents how he managed to give up smoking, after 29 years.

Encountered near the end of the book was a passage in which Butler mentions having built hundreds of rubber-powered



# HANNAN'S HANGAR

models for himself and other kids, while he was still a youngster. So, like many if not most pilots, Butler had models as an

senting three countries; and Pistachio scale: 21 entries representing six countries. Proxy entries were permitted in Pistachio.



Colorful full-size Pietyenpol Air Camper in the Canadian British Columbia Aviation Museum. Photo by George Benson.

influential factor in inspiring his life's work. This is not a gung-ho story at all, but rather a nostalgic look at lightplanes and their fliers of some thirty years ago. Priced at \$14.95 plus postage, *Piper Cub Era* may be ordered from Hickory Grove Publications, 12503 Hickory Grove Road, Maribel, WI 45227.

## INTERSCALE '91

Thanks to reports from Reg Boor, John Blagg, Nick Peppiatt, Pete Redhead and Doug McHard, we can share some of the flavor of this truly international, important indoor flying scale model meet conducted in Nottingham, England. Officials from Czechoslovakia, Finland, Netherlands and the USSR were involved, in addition to those from the United Kingdom. Contestants were also from diverse locations, namely Czechoslovakia, France, Latvia, New Zealand, Sweden, the Soviet Union and the USA.

Scale categories included CO<sub>2</sub> and electric, rubber-power, Peanuts and Pistachios, plus some racing and mass launches. Participation by class was as follows: CO<sub>2</sub>/electric scale: 22 entries representing five countries; Rubber scale: 24 entries representing seven countries; Peanut scale: 20 entries repre-

Variety in subjects, one of the chief attractions of most scale model meets, was exceptional, as witness this more-or-less random sampling: Bristol F2B, Spad 13, ABC Robin, Curtiss Owl, Yak 12A, Waco UKC-5, Puss Moth, Corben Super Ace, Breda Pensuti, Voisin Hydro, Vought V-173, etc. There were also numerous less exotic designs, including Pipers, three of which scored very well indeed.

Among stand-out attractions

were Stefan Gasparin's sub-miniature CO<sub>2</sub> engine, displayed by Otakar Saffek; Doug McHard's twin compressed-air motored Antonov, confined to a carefully-balanced tether which permitted it to virtually free-flight around in the hall; and Tonda Alfery's great armada of meticulously-detailed miniatures. As Doug McHard put it: "His vac-formed (from thin dense foam sheet) examples were superb—flew extraordinarily well—particularly the Peanut Spitfire. It 'sat' right, and flew at a believable speed—not too fast. But the most impressive, in my view, was Tonda's Spad 13, which just seemed to hang in the air by some miraculous invisible thread, seemingly forever!"

Pete Redhead summed the meeting up nicely: "So many outstanding memories crowding each other out." And John Blagg: "A splendid weekend, good venue and marvelous company," noting how well the multi-national modelers got along with each other in spite of language barriers. Especially touching to me was the banquet menu and program sent to the Hangar, autographed by many of the participants and officials.

We look forward to more international events!

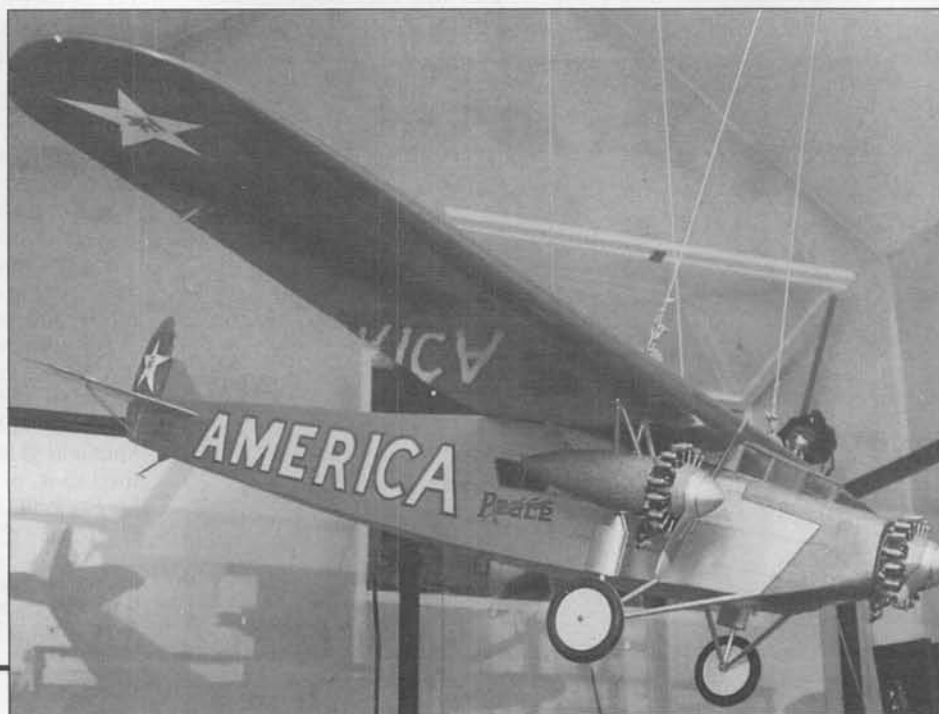
## NEW INDOOR ADMINISTRATOR

Retiring National Free Flight Society indoor Contest Director, Tony Italiano, has announced that his post has been assumed by Chuck Slusarczyk for the 1992 U.S. Indoor Championships. Chuck will be seeking willing assistants. Any volunteers? Contact him at (216) 526-8613, or 4200 Royalton Road, Brecksville, OH 44141.

It is hoped that increased participation in the Johnson City, Tennessee contest will help offset anticipated increased expenses. Plan to share this wonderful flying site!

## AIRCRAFT MUSEUM

A small but significant museum has recently been opened in France, dedicated to Admiral Byrd and the crew of the Fokker trimotor "America" which flew from Roosevelt Field in New Jersey to Ver-sur-Mer, France during July of 1927. The "Musee America" is housed in an ancient building which has been painstakingly restored, largely by volunteers. Centerpiece of the display is a large scale model of the "America" which is dramatically illuminated. The model was constructed from Fokker factory-supplied draw-



Fokker Trimotor model suspended in the "Musee America," Ver-Sur-Mer, France, features Williams Brothers engines.



ings by Bernard Pregre, assisted by Jacques Houze and Leonard Jarvis.

Additional memorabilia relating to the flight is solicited, as are donations to assist the museum's operation. Enquiries may be directed to Jean-Pierre Dupont, Vice President, Musee America, Place Admiral Byrd, Ver-Sur-Mer, Calvados, France.

Visitors to British Columbia, Canada, may wish to see the fine aviation museum located on the west side of the Victoria International Airport. George Benson recently returned from there and reported it well worth the time and modest admission. The museum operates from 10 a.m. to 4 p.m. daily during the summer months. Among the aircraft on view are an Avro Anson, Curtiss P-40 Kittyhawk, Pietenpol Air Camper, Bell P-39Q Airacobra, Beechcraft 18, 1932 Lincoln Sport, Noorduyn Norseman, a rare 1919 Eastman Sea Rover seaplane, and a unique 1910 Gibson powered by a six-cylinder inline air-cooled engine mounting a propeller on each end. For visitor information, phone (604) 655-3300.

## CREATIVE COUPLE

The *Lydia Chronicles* is a semi-autobiographical book about one woman's belief that age should not be allowed to interfere with life and living. Although its author, Doris Read, has published short stories previously, this is her first novel. What does all this have to do with model building or aviation? Nothing, really, except this: Doris Read's husband is none other than artist-historian William Wylam! Our thanks to George Noreen for sharing this information.

## MORE ON THAT MODEL TURBOJET

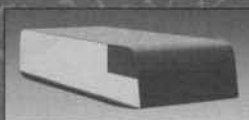
A few columns ago we discussed a model turbojet engine designed in France by a hobbyist (not a committee!). Well, according to Georges Chaulet, it is actually now on the market. The 12-inch long, 3-1/2 pound jet generates 11 pounds of thrust at 100,000 (!) rpm, and most remarkably creates minimal noise (72 dBA), which is probably comparable to some four-stroke conventional powerplants.

After some ten years in development, the turbojet is successful enough to merit other applications in addition to models. Oh yes, the price: \$3200. Although that may seem steep, please be aware that a small-size commercial turbojet would cost about 25 times that amount.

## SIGN-OFF TIME

Credit model airplane book connoisseur John Brown with this parting comment: "Everything you don't save becomes a collector's item!" **MB**

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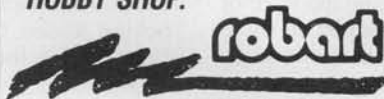
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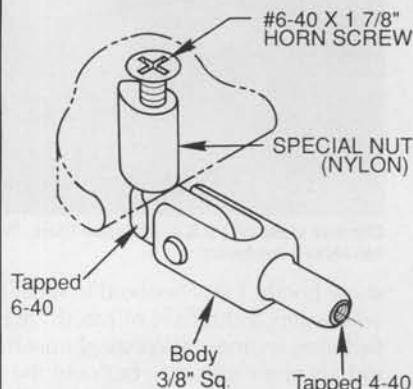


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## Chopper Chatter

BY JAMES M. WANG

**M**odelers who have followed model helicopter contests since 1984 have probably heard of Cliff Hiatt. He won the 1984, 1988, and 1990 U.S. Nationals in RC helicopter competition. He was also the team manager for the U.S.A. F3C helicopter team that competed in the 1989 World championships. Cliff himself was a team member on the 1987 U.S. team, and placed 7th among the best from all over the world.

I first met Cliff at the 1989 Toledo Show. He was serving as a Miniature Aircraft rep at that time, so he was helping out at their

and practice, and win contests. Other top competitors are just naturally talented. Cliff doesn't just practice, he *tinkers* with his models. He mixes components from different manufacturers or he makes his own parts to get the control feel he wants. I asked him how much time he spends on model helicopters. He responded, "Too much!" He was the president of the TORCH club in Orlando, Florida, where he lives with a wife and kids, and holds down a regular 8 to 5 job. He practices two flights of FAI before work every morning, and two flights after work. He works on his models at night. Weekends are saved for the family.



Cliff Hiatt at the 1991 U.S.A. F3C Team Trials. He flew Kalt helicopters with Kalt Epsilon fiberglass fuselages. The number one ship had Omega mechanics, while the backup had Alpha II mechanics.

show booth. I was honored to meet the U.S. National champ, who is very technically oriented. He is an electric-optics manufacturing engineer at Westinghouse. He may not be an engineer in helicopter research, but over the years, he has collected a wealth of hands-on technical knowledge. If you ever meet him in future contests, have a chat with him. He has a solution for almost every model helicopter problem. That's because over the years he seems to have tried every trick pertaining to model helicopters. He is a tinkerer. He plays around with Bell-Hiller mixing ratio, flybar length, paddle weight, engine mods, rotor heads, gear ratios, etc. I think he must have picked up some helicopter books and read them, too, because he can explain very well *what* and *why* he's doing certain things.

Some top competitors fly stock machines and just practice

If you have ever seen his models, you will immediately know that this chap has paid his dues. His models are immaculately clean and neat. The paint jobs are flawless, with his name painted on the side. Even the wooden airline shipping crates that he built are clean and solid.

Cliff first started competition flying with Schluter machines in 1984. He flew the Superior and champion. From 1988 to 1990, he flew the X-Cell 60. Starting in 1991, Cliff became a sponsored pilot for Kalt. He flew the Kalt Excalibur and Omega at the 1991 U.S.A. F3C team trials. He came in fourth, only half a point behind Robert Gorham. The technical specs for Cliff's Kalt Omega were listed in the December 1990 "chopper chatter" column.

**MB:** You used to fly RC planes?



**CH:** Yes, I was flying pattern planes.

**MB:** How competitive did you get?

**CH:** I won the '78 Nats Advance class, '79 Nats Expert class, 11th in Masters in '80, and 6th at the '81 Masters Tournament.

**MB:** When and why did you start RC helicopters?

**CH:** In July 1982, because airplanes were just getting too boring. So I sold all my airplanes and bought a Schluter Heliboy.

**MB:** What machines did you use in contests?

**CH:** I won the '84 Nats with a Schluter Superior, the '88 and '90 Nats with an X-Cell 60.

**MB:** Were these machines modified?

**CH:** The Superior was stock, but the X-Cells were highly modified.

**MB:** In winning contests, how much importance do you believe is in the machine and in the pilot?

**CH:** 50% is in the machine and 50% is in the pilot. In the machine part, 60% is in setting up, and 40% is the machine itself. The manufacturer's brand is not critical.

**MB:** The Kalt Omega that you are presently flying, is it highly modified?

**CH:** Yes.



Cliff says that for good cooling on fuselage models, the air outlet should be about twice the area of the inlet. The inlets can be seen on the side, while the big holes on the bottom are air outlets and also provide access to the glow plug and radio and gyro switches.

**MB:** What are the strong points of the Kalt Omega and the X-Cell?

**CH:** The Omega is light and has nice push/pull controls. The X-Cell 60 is also lightweight, and has very good manufacturer support. You can call Miniature Aircraft and get good service.

**MB:** What engine do you use now?

**CH:** A special Japanese version of the O.S. 61 SF Long Stroke from Great Planes. (Before readers start calling Great Planes wanting to buy Long Stroke 60 Heli motors, be advised that they are no longer available in the U.S. You can only get the O.S. 61 SFN and RFN Short Stroke motors in the U.S. jw.)

**MB:** Are the engines extensively modified?

**CH:** Yes.

**MB:** Can you reveal what the engine modifications are?

**CH:** The O.S. 61 Long Stroke in the Kalt Omega is modified in Japan. The O.S. 61 in the Kalt Alpha is one I modified myself. Four things are done: Exhaust timing is raised; Crankshaft duration is altered; an O.S. Hanno Special, high speed, stainless steel rear crankshaft bearing is installed; and a Super Tigre ST75 carburetor is used. It's designed for Super Tigre 60 to 90 motors.

**MB:** You raised the exhaust timing to how many degrees?

**CH:** I really don't know. I just cut the top of the exhaust hole in the sleeve flush with the crankcase exhaust port. I don't measure it, and every crankcase is cast a bit differently.

**MB:** What glow plugs do you use, and how do you select them?

**CH:** Enya 3. Temperature and humidity do not affect the choice of glow plug. The plug you need depends on the engine, setup, and fuel.

**MB:** How does weather affect flying?

**CH:** Hot weather reduces engine power. Wind affects hover, but not forward flight.

**MB:** Do you use engines with a pump?

**CH:** No. They flood the midrange and make hover inconsistent. They are more for the airplane guys.

**MB:** Muffler versus tuned pipe?

**CH:** Tuned pipes produce more power, but mufflers make engines run more consistently. You can get good power using tuned pipes by using 30% nitro fuel to make up. Weather affects the tuning of tuned pipes.

**MB:** You helped develop the Morgan/Magna heli fuel after the '89 World champs. Why?



Inside the Epsilon fuselage. There is a JMW five-volt voltage regulator in front of the fuel tank. A five-cell, six-volt battery pack is used for the receiver and servos, then the regulator drops it down to a steady five volts.

**CH:** It is modeled after the fuel used by the Japanese team. It has 23% oil and 30% nitro. It is designed for FAI flying. It has lots of oil for cool running, plenty of nitro for top speed, and delivers the torque needed for hovering with low rpm.

*continued on page 66*



The Kalt 10 of II underslung, teetering rotor head design. All-metal construction with a rubber bushing at the center for controlling rotor flapping stiffness. The stiffness is adjustable by compressing the rubber, just like on GMP Pro and Elite heads. The swashplate is fixed; the washout unit slides up and down for collective pitch change.

# U.S. Team Sweeps FAI F3D Pylon World Championships

BY WAYNE YEAGER



John Shannon and Dub Jett hoist the "Sopwith Cup" symbolic of pylon racing's World Champions.



The entire U.S. team (front, l-r): World Champion Dub Jett, 1st; Lyle Larson, 4th; Dave Shadel, 3rd; and Henry Bartle, 2nd. In rear (l-r) is Dub Jett's caller, John Shannon, team manager Wayne Yeager; Shadel's caller, Bruce de Chastel; and mechanic, Tom Melton.



**S**uspense! Joy! Drama! Sorrow! All ingredients of your favorite soap. How about World Championship Pylon Racing too? This year's version contained all of the above and was very similar to the previous two with only the names and places changed—or at least, some of the names. Suspense? You betcha! Not until the very last round was the winner decided, with three guys having a shot at it. Drama? Yes indeed! How's this for a suspenseful and dramatic finish?

Reigning World Champion, Dave Shadel, had only to walk to the line, make sure his engine would start, tune it for the Australian air, take off with no interference from the others in his heat, and equal the current world record time if he was to remain Champ!

Nothing to it, right? Easy for you to say. He needed to better a 1:08.9 and as in the past, no one handles pressure better under this type of circumstance. He recorded a super 1:08.4, touching off a starting line celebration that was soon dashed when he was informed the time wouldn't stand because he had cut the number two pylon.

In the meantime, a simultaneous celebration was in progress in the pits and Dub Jett was being hoisted up on shoulders for a victory ride, after the call came in from the line announcing Shadel had cut. But hold on—we're getting ahead of ourselves.

The trip really began on October 16, when the entire U.S. team, consisting of pilots Dub Jett, Henry Bartle and Lyle Larson, caller John Shannon, mechanic Tom Melton, Team Manager (me), plus defending World Champion Dave Shadel, and two wives, Donna Bartle and Diane Melton, all met in Los Angeles for the trip to Australia, the land of friendly people and FAI World Champion-Pattern and Helicop-

Bartle and Larson each other. Shannon Shadel had to pick up a tute in Australia's Bruce his partner of 17 years,

## Pylon World Championships

### FINAL STANDINGS

1. D. Jett	U.S.A.	854.6
2. H. Bartle	U.S.A.	860.1
3. D. Shadel	'89 W.C.	860.6
4. L. Larson	U.S.A.	920.2
5. N. Chujo	Japan	940.1
6. H. Sagemuller	Germany	972.1
7. T. Thompson	New Zealand	977.0
8. R. Langham	Australia	987.2
9. G. Mathews	Australia	989.4
10. K. Soeda	Japan	993.2
11. J. Danks	New Zealand	999.7
12. E. Graef	Germany	1022.4
13. D. Mitchell	So. Africa	1037.0
14. K. Reid	England	1038.7
15. S.G. Cox	So. Africa	1040.2
16. Y. Sato	Japan	1046.4
17. P. Board	England	1053.6
18. P. Sherliker	So. Africa	1068.6
19. A. Laurie	England	1191.1
20. R. Whalley	New Zealand	1303.3
21. J. Muller	Germany	1396.1
22. J. Wenbourne	Chile	1529.6
23. G. Brouquieres	France	1685.6
24. R. Phelan	Australia	1789.0

under doctors orders to

The check-in at L.A. because each guy had boxes, plus starting and all their personal the team was really well Qantas Airlines had team's official airline. ported all of our large baggage charge, both big help financially. ranged by Nini travel agent, who deserves a lot of credit for the bang-up job he did. We also can't say enough about Qantas, which fed us constantly, gave us free movies, filled us with liquids, and gave us blankets, pillows, sleep masks, slippers, and ear plugs at no charge!

From L.A., it's 13-1/2 hours to Sydney and another 1-1/2 to Melbourne, so "boring" is a well-used word although I did manage to watch three previously unseen movies.

After Health and Immigration, it was Customs and baggage inspection, which no one was looking forward to. The supervisor in charge asked me if we were the "modeling team that had just arrived," and with my "Yessir," marched us right through inspection and into the outer lobby where we were met by old friend David Axon, President of MAAA (Australia's AMA), who just happens to be a pylon racer and who just happens to work at the Melbourne airport and who just happens to love American Peppermint Schnapps, which we just happened to have in a suitcase and presented immediately!

Every box and piece of luggage had arrived with no damage except for one suitcase that had a very distinct tire track on it. It had no look of being run-over, but this tire track was imbedded. We think it hung over the edge of a cart being towed and rubbed a tire, because the tire mark is burnt-in and there to stay!

After inspecting the rental vehicles, we hit the road in a four-mini-bus caravan to Wangarrata, site of the World Championships, and our home for ten days. This alone was an experience. Imagine nine people who have been up forever (it seemed), no sleep to speak of and now we're driving strange vehicles, all with the steering and controls on the right side and we're driving these vehicles on the left side of the road! I don't know why we're all not dead!

site of this year's ships for Pylon, ters. were calling for was Jett's caller. last-minute substitute Chastel because Jim Shinohara, was

stay home.

was an experience two large model boxes, tool boxes luggage. However, taken care of, as been chosen as the Qantas trans-boxes at no extra-ways, which was a This was all ardiRonza, AMA's worked hard and



Dave Shadel and caller Bruce de Chastel going through their pre-race routine of checking plug, bolts, etc.



Juan Carlos Wenbourne was the only representative from Chile. He indicated he would be very happy to finish anywhere but last; he got his wish by finishing 22nd out of 24.



The U.S.A.'s Lyle Larson going through his pit routine. His plane is resting on a magnificently painted stand that matched the finish of his airplanes.



Henry Bartle (right) watches the clock while Lyle Larson prepares for engine start.



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Next morning it was breakfast at a local gas station (that's what I said, a gas station, which had a little room on the side and served great bacon and eggs), then off to the practice site to see if anything would run in the Aussie atmosphere.

The temps were a little cool in the morning and T-shirt by noon, or in other words, just lovely! Most everyone brought four airplanes, so they all were flown and trimmed plus engines were run, props checked, etc.

Sunday morning it was back for some more practice and then clean-up and to the field for opening ceremonies. The flag for each participating country was raised and the Australian national anthem was played. At the last two World Champs they played a shortened version of the national anthems for every country, which went on forever. I must admit, this was much better.

After this, we went back to the practice field for some more tune-ups, then it was back to the motel once more to get cleaned up and into our best bib and tucker for a welcoming reception hosted by the city and held at the Council Chambers. We all met the Mayor, and we all had a chance to mingle with everyone—and I mean everyone. The place was packed and it was certainly a very nice way to get acquainted.

On Monday and Tuesday, official practice was conducted at the Champs site. Our guys got in a few flights, but nobody pushed it because everyone seemed ready for the games to begin. We also had our worst weather on Monday, as it rained ever so lightly but hardly enough to stop things. It quit before we were finished and we never saw another drop the entire time we were there.

The planes were processed on Monday afternoon and everyone came through with flying colors, so again, things were going well for us.

On Wednesday morning it began. The flying schedule called for us to fly from 7:30 to 10:30 a.m., Wednesday through Friday. The C.D., Keith Harvey, scheduled three rounds each morning (for a total of nine full rounds through Friday) and five more rounds on the final day, Saturday.

The flying hours were short because we were sharing the site with Pattern, which moved into our area as we vacated each day. I rather liked this type of format because if something wasn't running right, you could stop after a few rounds and attempt a fix. You don't get that opportunity in many of the meets we attend, so this writer was in favor of the whole idea.

From there all the preparation would be tested and all I can say from this point was "LOOK OUT," 'cause we started cooking and never stopped. Unless something drastic happened, it was obvious from day one that the only unanswered question was, "Which Yank will win?"

Shadel was in the first heat of round one and he started the ball with a very nice 1:13.1. Jett followed with a 1:15.3, Lyle had a 1:20.5 and Henry a 1:15.1. Henry's time was penalized because he started with a cut



As the new World Champion Dub Jett talks to the crowd, the remainder of the U.S. team is uncorking and priming champagne bottles for the inevitable victory bath.



And this was the result!

pylon, however his adjusted time was only 1:22.6, so we were in good shape after round one, finishing 1st, 2nd, 4th and 8th.

(In F3D, a cut pylon results in a ten percent penalty being added to your score, and two cuts is a zero. The scoring system is: time in seconds equals points and the lowest score wins, therefore, a 1:15.1 is 75.1 points. Anyone receiving a zero is awarded 200 points, which is a healthy penalty.)

In round two, Dub Jett stroked a very nice 1:11.4, Henry had a 1:13.3, Lyle Larson a 1:13.6 and Dave Shadel a 1:14.9. All four flights were within 3.5 seconds, so the guys were settling down quick and the round ended with Jett 1st, Shadel 2nd, Larson 3rd and Bartle 4th.

In the third round, Shadel turned the day's fast time with a 1:10.9. Larson recorded a zero when his engine flamed out. However, F3D is the one event where there is some forgiveness, because this event allows competitors to dump their worst score after four rounds and their second worst score after flying nine rounds, so we were not depressed. Concerned maybe, but not depressed.

At the day's end, Dave Shadel was in first with 218.9 points, Dub Jett was second with 221.1, Henry Bartle was third with 229.0, Soeda of Japan was fourth with 247.6, and Cox of South Africa was fifth with 253.7. The other U.S. team member, Larson, was 16th with 354.1. However, this would all change dramatically after round four with the dropping of a bad score.

On day two, the fourth round started with Henry Bartle in the first heat against Soeda of Japan, Whalley of New Zealand and Mitchell of South Africa. Henry again turned another

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1:13.6, followed by Jett's 1:11.6 in the second heat, Larson's 1:16.9 in heat three and Shadel's 1:13.2 in heat four.

After dropping each flier's worst score, the U.S. team was one-two-three-four, with Shadel a whisker in front of Jett, 217.2 to 217.4. Two tenths of a second! Can you imagine? Four rounds flown and two of our guys are only the difference of thumbs on a stopwatch apart. Bartle was at 220.0, just 2.8 seconds back from the lead, and Larson was fourth with 231. Close behind Lyle at 231.9 was Chujo of Japan, and from there on was a big gap with Soeda of Japan at 247.6, or 16 seconds behind Larson.

Round five ended with another glitch for the U.S. team as Bartle zeroed when his pressure fitting broke off his tuned pipe shortly before the flag drop. This resulted in Henry having to pick up his cut time in round 1 so he could drop the cut score. However, a penalty of 82.6 points was much better than 200.

At the round's finish, Dub Jett was in the lead with 289.5 points over Shadel with 291.4. This is still less than two seconds in five whole rounds! Henry was not far behind at 302.6, Lyle was at 307.5 and Chujo remained close at 309.8.

Round six ended day two of competition. Dave Shadel turned in another lovely flight of 1:10.9 to match his round three time. He had a lead of 3.9 seconds over Jett, who got a bad call. Several of us on the sideline were timing all the fast guys and we all were very close in timing Dub at 1:13. This included one of the Jury members, who sat two chairs from me. However, the official time came in as 1:16.3, which immediately brought me out of my chair for a visit to the C.D. because this was more than just a slow thumb.

He rechecked with the line; 1:16.3 was the time recorded by Dub's timer and would stand as official. The C.D., Keith Harvey, admitted there probably was a mistake, but he was powerless to do anything about it unless someone on the line would express some doubt, and as that didn't happen, we were stuck with it.

Our guess was that the timer mistakenly started his watch with the first flag because

The official starter, Gary Davidson, is dressed in the official Australian sporting colors and used an Aussie flag for starting. That smile was on his face all week, which made it pleasant for all the fliers.



John Shannon (left) and Dub Jett show that "the lean" is how to get around numbers two and three pylons.

Dub was in the number four position and his clock should have started three seconds later. In defense of the C.D., I would have rendered the same decision if in his shoes, so we hoped it wouldn't have an effect on the final score and we forged ahead. As Dub and Shadel were trading places by a couple of seconds each round, I was concerned that this score would rear its ugly head in the end, but that's another story.

Henry kept his string of 1:13s going with another in round six and Lyle stayed in the hunt with a 1:15.6, so day two ended with Shadel in the lead with 362.3 points over Jett's 364.8, a difference of 2.5 seconds. Bartle was in third with 375.8, Larson in fourth with 383.1 and Chujo of Japan was still close with 394.8.

Some other notables were not sharing our luck. Ranji Phelan of Australia, who may have been the fastest of the Aussies, was having a terrible contest with a mixture of radio problems and unexplained flameouts. After six rounds, poor Ranji had recorded four zeroes, which is not normal for him, and unfortunately, it didn't end there as problems continued to plague him.

Langham and Mathews, the other Aussie team members, each had two zeroes, Thompson of New Zealand had two, as did Sagemuller of Germany. Guy Brouquieres of France had three, so we were very fortunate to only have two between the four of us.

Friday morning it was back for day three and round seven. Shadel was in heat one and turned in a respectable 1:13.4 to get things going. Jett's 1:12.5 was penalized because of a cut pylon, so his official time was 1:19.7, which in the end would be his slowest time. Bartle found some horsepower because from here out his times all got better. He recorded a 1:12.4 for his best so far and Larson recorded a 1:15.6.

It was starting to look like Larson was just a bit down in power from the rest because he flew well and very consistently, but was off the other guys' pace by a few seconds each round. However, Lyle indicated that winning the team championship was important and he would not take a chance on cutting by pushing harder, so it was gratifying to see a team player, which is definitely Lyle.

continued on page 76



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**MB:** Do you prefer a synthetic lubricant or castor oil in the fuel?

**CH:** Synthetic lubricant. It cools the motor just as much and does not varnish the motor.

**MB:** When doing loops, do you correct with left/right cyclic and tail rotor?

**CH:** No. The model corkscrews in loops because the swashplate timing needs to be advanced. Ideally, we want an inflight adjustable swashplate timing. About four degrees of advancement is needed in forward flight and none in hover. I use two degrees. Washout blades seem to need more.

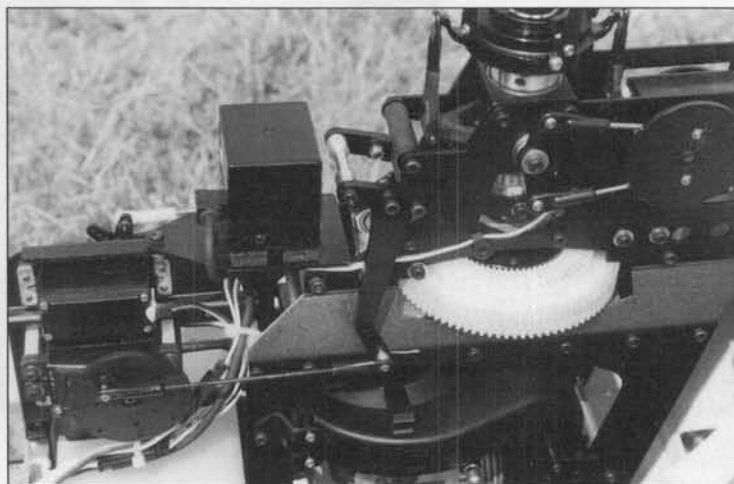
**MB:** Can you notice it with only two-degree advancement?

**CH:** Yes.

**MB:** Why do you say the swashplate advancement is not needed in hover?

**CH:** Because the rpm is very low.

*(Cliff does FAI hover maneuvers at around 1250 rotor rpm. If you don't understand swashplate advancement, don't worry. Model Builder will have an article on why swashplate advancement is needed in an*



Left side of the Omega, showing a closeup of the swashplate control. Top right servo controls fore/aft cyclic. The swing arm is for collective pitch. The swashplate is reserved for cyclic control only. Collective control is via a sliding collar that moves a steel wire along the side of the main shaft.

*upcoming issue. jw.)*

**MB:** How do you like the fiberglass Zig-Saw blades that you are using now?

**CH:** They are worse in hover, but give better forward flight speed. I will try some 60-lamination, 3.5-degree JRC washout blades soon.

**MB:** What are the white paddles that you are using on the Omega?

**CH:** They are 48-gram paddles made by MSK in Japan, but they don't work too well on the X-Cell 60. It's best to use the X-Cell Pro paddles on the X-Cell.

**MB:** How do you like the Kalt rotor head?

**CH:** I am using the metal 10 of II head. I will be using the new 10s II head because it is lighter. It will be stock on the Kalt Alpha II.

**MB:** Is more speed better for aerobatics?

**CH:** Yes, more speed is better. But I'm beginning to think my model is too fast now. You get rushed. You do a turnaround and it is here. You need time to set up. More speed needs less correction, but the correction becomes more evident.

**MB:** Let's talk about the radio setup. How do you use the different throttle/pitch curves?

**CH:** I use normal for all the hover maneuvers and entry into autorotation. Idle-up 1 is used for all the forward flight maneuvers. Idle-up 2 is only used for rolls and entry into the rolling stall turn. I switch off idle-up 2 as soon as the half-roll is completed in the rolling stall turn.

**MB:** Why enter the autorotation in normal? Don't you want to rev up the rotor before the auto?

**CH:** No, you don't want the extra rpm because it's synthetic. And, my throttle hold pitch curve is set up more like the normal pitch curve.

**MB:** What are the settings for the curves? Give us the numbers at low stick, mid-stick, and full stick positions.

**CH:** Normal is -1, 6, 11. Idle-up 1 is -1.5, 4, 8.5. Idle-up 2 is -2.5, 4, 8.5.

**MB:** What radio do you use?

**CH:** Futaba nine-channel with 153 gyro and 9201 servos.

**MB:** Do you use all four programmable mixes in the nine-channel?

**CH:** Yes.

**MB:** These four programmable mixes are

all activated only when idle-up is on?

**CH:** Yes.

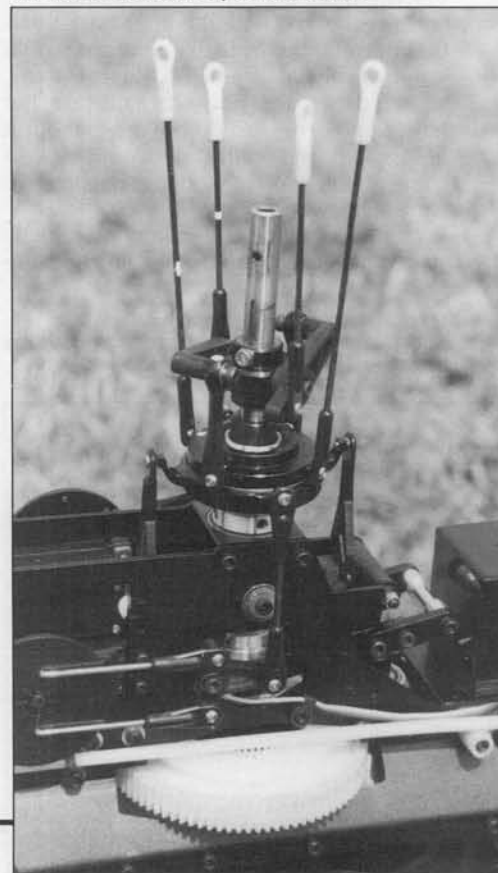
**MB:** Why not have the U-shaped throttle-tail rotor mix on all the time?

**CH:** Because I don't need the U-shape in hover. But I do need a lot of torque compensation for the pitch curve in normal.

• • •

On behalf of all the readers and myself, we would like to thank Cliff for this educating interview. We will have our interview with Don Chapman next, as he shares his secrets of tuned pipe design, his V-Tech and Whisper Tech design concepts, and why he uses the double tail rotors and curved-tip blades on his Schluter champion. **MB**

Right side of the Omega. Both the fore/aft and roll servos are mounted directly on the metal side frame behind the main rotor shaft. The roll control is a push-pull bellcrank with ball bearings. Notice the groove on the main shaft; it is slotted for the collective pitch control wire.



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2nd-Wayne Mann-X-Cell .60

#### 1991 USA Nationals

FAI- 1st-Curtis Youngblood-X-Cell .60

2nd-Wayne Mann-X-Cell .60

Int-

1st-Robert Akers-X-Cell .60

2nd-Eulace Mallory-X-Cell .60

3rd-Kent Officer-X-Cell

#### 1991 Kyosho .30 Challenge

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## THE NEW ENGLAND FAN-FLY

New England has some of the most beautiful scenery in the country; rolling hills with quiet valleys, pristine lakes and cool streams... plus some of the hottest ducted fan flying anywhere! Last August, the Mohawk Valley Modelers held the club's 3rd Annual Ducted Fan-Fly, at the Orange Airport in Orange, Massachusetts.

There were entrants from the U.S., Canada, and as far away as England, with the usual

fly. But fly it did. It's no speed demon; I estimated its speed to be about 70 mph, and because of its size, it looks to be going even slower. Still, it managed a couple of rolls and an inverted fly-by. I don't think it could have managed a loop. It was very stable, though, and never looked unmanageable. Landings were very pretty.

I talked to Josh about the giant. He said that he built the plane out of stock hobby shop balsa, with no attempt to keep it light,

*...the usual complement of Starfires, Vipers, and Eagles, along with a number of new and unusual aircraft.*

just to see if the new fan could handle a 20-pound-plus plane, which it did. I can see that if you upped the engine to a 91 and cut down on some of the weight, it could be a great jet trainer.

Josh plans on developing giant scale jets as well. He also told me he has two conditions for his planes: One, that they are affordable and easy to build; Two, that the selection of models appeals to the people who build jets. For a limited time, he is offering a set of full-size Spartan plans, a Propfan unit complete with hardware, and S&H, for \$99. He also offers a videotape of the Red Giant for \$20. If you are interested,



John Whitmore's diesel-powered Barracuda.

call Josh at (203) 732-0532.

John "Diesel" Whitmore is at it again. This time he has dieselized a Parkinson Barracuda. Completed in just three weeks, it features a dieselized K&B 82 and Dynamax fan. By using B&D retracts and MonoKote, John was able to keep the weight down to 10-1/2 pounds. John was pleased with the



Tony Ray's J.H.H. F-9F Cougar, described in text.

complement of Starfires, Vipers, and Eagles, along with a number of new and unusual aircraft. One grabbed my attention just because of its sheer size...the largest single-engine, fan-powered plane I've ever seen, called "Red Giant." Josh Harel, of Derby, Connecticut, started a company called Giant Jets. Red Giant is the testbed used to prove the feasibility of his Propfan power system, which uses a single DF engine driving a three-bladed prop in a shroud. He chose the popular K&B 82 DF engine. The fan has a shroud diameter of eight inches and turns a cut-down Grish three-bladed prop.

He then designed a plane to test the Propfan's capabilities. Officially called the Spartan Giant Jet Sport Model, it is 95 inches long, with a 75-inch wingspan, and weighs 22 pounds. That's big! When I first saw it, I was skeptical as to whether or not it would

Eric Mey proudly poses with his new A-6 Intruder.







One of many low inverted fly-by's of Joe Bedford's Starfire. Won Best Performance award.

performance of the plane, as the diesel pushed the plane to about 140 to 150 mph. He said, "It flew like it was on rails." The diesel is really putting in some respectable performances. John declined to say what his next project would be; all he would say was, "You'll be impressed."

While we're talking about the Parkinson Barracuda, Bob himself showed up at the Fan-Fly with his new 'Cuda. I introduced you to Bob's newest 'Cuda last month, with its unique purple camouflage paint scheme. Well, Bob was not happy with its performance at Rome, so he took it back to the shop and made some modifications... plus gave it a new aluminum paint job. Whatever he did worked, because it really moves now, using a stock O.S. 61 rear exhaust pattern engine. Bob managed to get the plane into the 130 mph range. That's fast for a plastic plane. For those real speed freaks, Bob will offer a 'Cuda that will use a Dynamax fan. Bob will still offer the larger 90-sized Barracuda for those who prefer balsa planes.

Bob has discontinued the Regal Eagle



Ed Estabrook flew this camouflage Aggressor. Weighed 11 pounds and used a KBV 72 Violet fan. He also employed the use of inlet covers. Nice touch.

Classic in favor of the newer Supreme kit, and gave it a new, lower price of \$199. He also redesigned his Vector fan, giving it a new rail mounting system, as well as a new, low price of \$88. How often do you see a company lower its prices? For a complete update, give Bob a call at (705) 436-7041.

Contest director Dwight Aube liked the frequency system used at the Rome Fan-Fly so much he decided to use it at this rally. There were a few crashes this weekend and two were due to radio interference, not by some one accidentally shooting them down. The rest were caused by pilot error. Up to four planes was allowed in the air at one time, which kept things going fairly well. *cont.*



(Left) Richard Dunn and his Yellow Aircraft F-4E. Weight is 11-1/2 pounds, and uses O.S. 91 Dynamax fan system. Features retracts and operating tail hook. (Above) Doug Ives proudly kneels behind his first jet, a Parkinson Hornet. Has Vector fan and O.S. 91 engine, plus B&D retracts. He test flew it Sunday and upon his successful landing, was loudly cheered by his family and friends. It's nice to see his family get behind his hobby.



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Most jet rallies use one of two systems for frequency control. The first is to select time slots to fly in that are frequency selected. The second is the honor system, where you sign up under your frequency. When it's open, you're next to fly. Unfortunately some fliers tend to hog the pin, usually by accident; starting the engine is the most common problem.

Four out of the six rallies I attended in 1991 used the second system, which I personally like. I don't like selecting time slots. One reason is that if, for some reason, you're forced to give up your slot (say for engine trouble), you have a hard time getting a new one, because all the slots are usually taken. With the other system, usually your name is just moved down the list a little, to give you a chance to fix the problem. I was lucky at this rally. Two of my frequencies landed on one common pin, and there were only two other guys on this pin with me. The three of us had no problem getting the pin, consequently, we did a lot of flying.

Tony Ray, from Massapequa, New York,



Josh Harel designed and built the "Red Giant." Here's how you transport a giant one-piece jet. See more for details.

flew his J.H.H. F-9F Cougar. It featured a popular white with red striped lacquer paint scheme. Tony opted to install a Dynamax/O.S. 77 fan system. This new setup worked very well, considering the kit originally used a K&B 7.5 and a Turbax 1. The additional power provided by the new system was considerable. A Futaba radio with nine servos, and Rohm-Air retracts, rounded out this classic semi-kit. Some of you may remember that a number of years ago veteran builder, Charlie Chambers, built one which won numerous scale awards. Of course, I remember when this kit first came out back in the 70s. I had one, but I foolishly traded it for something else. Hey, I'm sorry! It seemed like the thing to do at the time.

There were a couple of twin-engine planes at the event. Charlie Lines, of Rome, New York, brought his 1/8th-scale JMP F-4 Phantom. Unfortunately, he managed to tear off the left-hand wing panel on a bounced landing, which cut down on its flight time for the weekend. Prior to this flight, I noticed some primer in that same spot, possibly indicating that it had happened before. One



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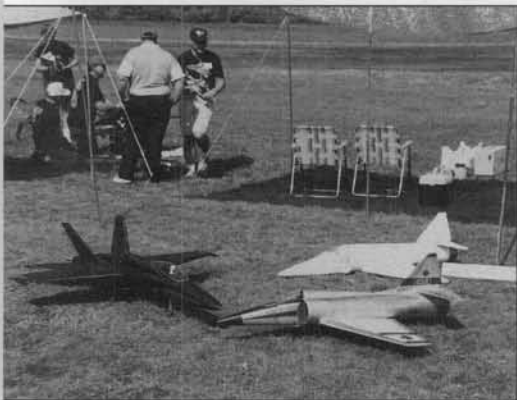


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RK-720 \$99.50  
THRUST 3.5 LB





The Parkinson pits. The black plane is Bob's Hornet with Vector fan and O.S. 91, and the silver one is his new 'Cuda kit, which hit 130 mph. The unfinished white one in the background is the one in which Bob later installed the Dynamax fan and hit 214 mph!

of the biggest and most impressive planes at the meet had to be John Klawin's Byron F-15 twin. These 1/7th-scale monsters are always a sight to see fly. John's camouflage gray plane tipped the scales at 28 pounds, and used twin O.S. 91s for power. As far as I can remember, each of the twins only flew once during the event.

I saved my favorite plane for last. Eric Mey, of Stormville, New York, brought a beautiful 1/10th-scale Grumman A-6 Intruder, just like the ones used in the movie "Flight of the Intruder." As they said in the movie, "The A-6 was the U.S. Navy's medium attack bomber during the Vietnam conflict. It flew at tree-top level, in any weather, at night, and alone."

The aircraft had no defensive weapons. It also more recently flew in the Gulf War. This little attack aircraft filled a number of roles, striking targets such as radar units and SAM sites, as well as providing electronic countermeasures. There is even a tanker version that refuels other A-6s. I find it amazing that these missions were flown with no defensive weapons. It takes a special kind of pilot to fly those kind of missions.



The pits at the Ducted Fan-Fly in Orange, Massachusetts. Note the safety barrier.

Squadron/Signal Publications has produced a book on the plane, called *Modern Military Aircraft: the Intruder*. I've already ordered my copy. If you would like one,

*continued on page 78*

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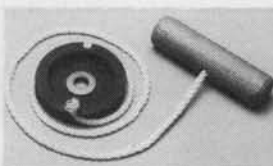
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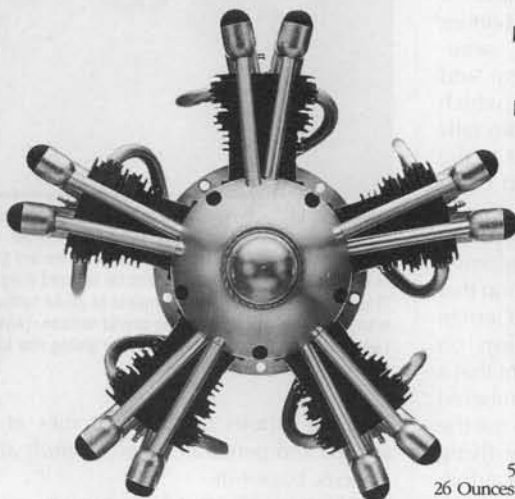


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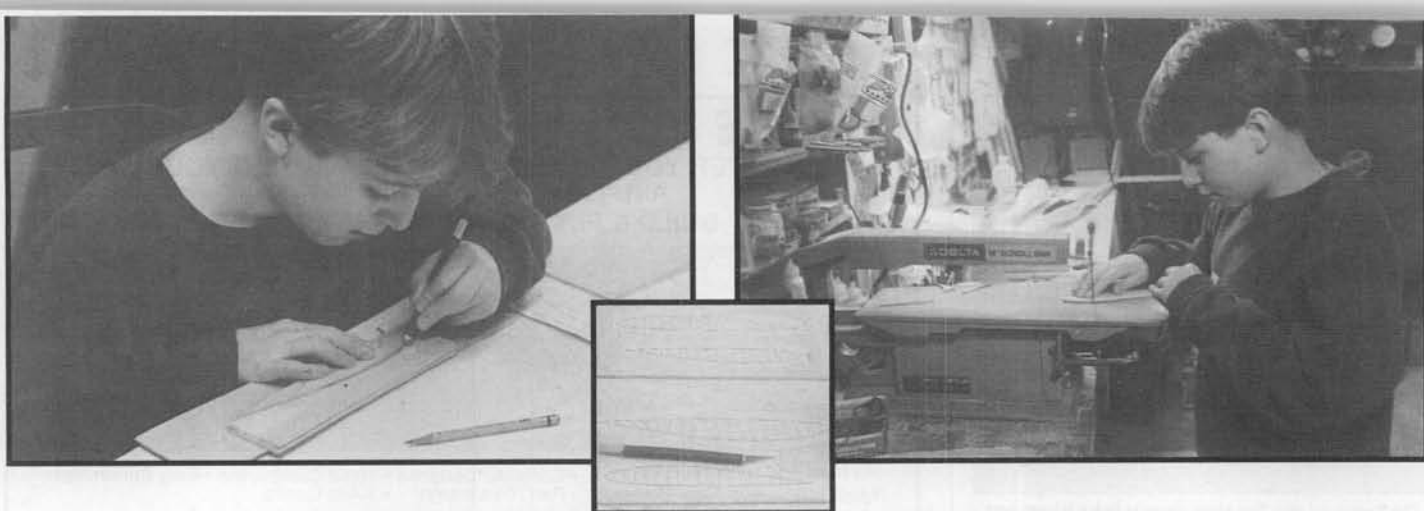
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# EXPERIMENTS WITH AIRFOILS

BY LOUIS GARWOOD

I'm 13 years old and in the 7th grade at Burnt Hills Middle School. I competed in a science fair at Rensselaer Polytechnic Institute in Troy, New York, with a project on airfoils. The science project required research, an experimental design, data collection, and conclusions from the data. We had to prepare a five-page paper and a five-minute speech. My project received an honorable mention award. This article is a result of the paper I did with the project.

## PROBLEM TO SOLVE

The problem is that many airfoils have been designed, but which design works the best with a particular model sailplane?

Of the three basic designs: flat bottom (shaped like half of a rain drop), semi-symmetrical (convex on top and bottom), and under-cambered (shaped like a bow), which works the best for lifting the model aircraft? The shape of the airfoil is important to the design and flight of the aircraft, and especially in sailplanes.

When the Wright brothers invented the airplane, they didn't have a lot of information to go by. They did have information that was recorded in England by Sir George Cayley, who published information on building a flying machine. He thought that a flat wing was just as good as a cambered (curved) one. The Wrights decided to use the cambered airfoil, and almost every flying machine after that also used a curved airfoil.

## WHY I PICKED THESE AIRFOILS

**AQUILA** - I picked this one because according to *Airfoils at Low Speeds*, page 53, it

is a good thermal airfoil and had a winning record in competition. It is very flat on the bottom.

**EPPLER 374** - I chose it because it is supposed to be one of the best semi-sym-



(Top right) Lou cuts ribs for wing center section, using plywood template. (Top center) Plots from Cygnet Software **FOILED AGAIN!!!** computer program are glued to balsa as a guide for cutting ribs for tapered wingtips. (Top left) Lou cuts plywood template to guide cutting the many equal length ribs in wing center section. (Above) Lou constructs wing center section by gluing ribs to lower spar and trailing edge.

metrical airfoils designed. It flies at high speeds and penetrates well (*Airfoils at Low Speeds*, page 60).

**GERONIMO 10** - I picked this because of the dramatic under-cambered look on the **FOILED AGAIN!!!** computer airfoil plotter program. The advantage of an under-cam-

ber airfoil is it produces high lift.

I viewed many airfoils and picked these three because they look very different to the naked eye.

## THEORY

Bernoulli's principle states that the faster moving air on the top surface of a curved wing causes lower pressure than the slower air on the under surface, therefore the wing will lift. My theory was that the under camber would trap the air and circulate it under the wing, therefore it would cause lots of air pressure under the wing. I thought the under camber airfoil would lift the best.

## EXPERIMENT

My experiment was to build one fuselage and three wings, and then to fly the three different wings on the same fuselage, testing for lift developed by each wing by timing many flights with a stop watch. The fuselage and wings were built from plans, but the airfoil plots were made with Cygnet Software's **FOILED AGAIN!!!** airfoil plotting program.

## FLIGHT TESTS

I tested the wings by going to flat, open fields and using a high-start to propel the glider into the air. I took 25 steps back and launched the glider. When the glider released the line, my helper started the timer. When the airplane touched the ground my helper stopped the timer. I recorded the time of each flight in a lab notebook. Since I didn't have a wind tunnel, the aircraft was affected by down drafts and thermals.



I threw out the extra long times and the very short times for each wing, figuring that long times were affected by thermals and short flights were affected by down drafts.

## RESULTS

Over ten launches for each wing, flight times for the semi-symmetrical airfoil averaged 20.74 seconds, the under camber 31.01 seconds, and the flat bottom 24.60 seconds.

I found that the under camber had the longest flights. This proved that my theory was correct. During my testing, I flew in some wind and found that the semi-symmetrical penetrated the best. I think an un-

der-cambered wing would work best for thermal flying to make best use of the lift, and semi-symmetrical wing would work best for slope flying where penetration into the wind is important.

## REFERENCES AND SOFTWARE

John F. Donovan, David B. Fraiser, and Michael S. Selig, *Airfoils at Low Speeds*, Soartech 8, 1989.

Orville Wright, *How We Invented the Airplane*, Dover Publications, Inc. 1953.

**FOILED AGAIN!!!** airfoil plotting software program, Cygnet Software, 24843 Del Prado, Suite 141, Dana Point, CA 92692; (714) 496-6961. **MB**

## COMPARISON OF FLIGHT TIMES IN SECONDS

FLIGHT NUMBER	SEMI-SYMMETRICAL	UNDER-CAMBER	FLAT BOTTOM
1	11.2	28.8	27.0
2	16.9	27.6	28.2
3	8.0	34.2	22.3
4	11.0	34.2	22.0
5	7.20	34.3	23.4
6	26.6	26.6	18.7
7	45.5	38.1	26.3
8	33.8	28.2	13.2
9	28.5	28.9	27.3
10	18.7	29.2	37.6
AVERAGE	20.74	31.01	24.6



(Above) Lou prepares glider for flight by mounting wing with rubber bands. (Above inset) Take off! Glider is launched on small high start. (Below) Lou explains project to other exhibitors at RPI science fair. The most common question was, "Where's the motor?" (Right) Three RPI science fair exhibitors from Burnt Hills Middle School: (left to right) Aaron Krueger, Louis Garwood, Joanne Josefak.



## PLUG SPARKS cont. from page 40

about that? Hank was tickled pink and thoroughly enjoyed himself mixing among the modelers.

### ANNUAL WELCOMING "BEAN FEED"

This is now a far cry from the original idea of having an informal dinner on the field. These things have gotten so popular that over 400 people registered and bought tickets at this year's Champs. To handle this



Photo No. 9. This Hollinger "Nomad" by Daryl Rodgers is powered with a K&B 6.5.

many people, the Bean Feed was staged in two parts. It was also found the Victory Banquet had to be served in two shifts for the same reason.

Despite the crowd, it was a great way to renew old acquaintances and make new friends. The bar located at the head end of the banquet room was a good place to wait on dinner and listen to the quick contest comments by the Contest Directors. It was a great way to start a contest.

### ANNUAL BUSINESS MEETING

With so much going on every night, it was inevitable that this writer would eventually miss one of the functions. The transaction of business and discussion by the membership has pretty well been curtailed, as the major issues are first discussed by the SAM Board of Directors. Sort of like the way many unions operate: the Executive Council proposes, the membership (generally) rubber stamps its approval.

The biggest item in the business meeting is the induction of new members into the SAM Hall of Fame. This year there were ten inductees again:

1. Jerry Stoloff, designer of the Yehudi, Swami, Spearhead, etc.
2. Dick McCoy, designer and founder of McCoy engines.
3. John Brodbeck, noted modeler and engine manufacturer.

4. Tim Dannels, Editor of the MECA Journal and founder of the first SAM Champs.

5. George Perryman, noted rubber model designer.

6. Jim Bohash, outstanding Wakefield flier.

7. Vic Cunyngnam, longtime modeler, designer, organizer, and AMA official.

8. Claude McCullough, outstanding free flight gas modeler.

9. Mickey DeAngelis, longtime promoter of O.T. flying.

10. J.T. "Bud" McNorgan, first SAM Director; organized SAM into separate chapters.

Before closing out the meeting, it was announced that the 1992 SAM Champs would be held at Lawrenceville, Illinois, starting on Monday, June 8 and running to June 11. Don Sachjen will run the meet with Bill Brenchley as RC Contest Director; the FF Contest Director is yet to be named. The Grand Collectogether will probably be on Sunday.

### PHOTOS, PHOTOS

This is what you read this column for...to see who and what the modelers are doing and the designs being used.

Up to now, we have failed to acknowledge the unselfish work by Harold Johnson of Minneapolis, Minnesota. Harold has been the official "unofficial" SAM photographer. Seen in Photo No. 5 is Mike Hetherington, well-known British modeler, with his rubber powered 1929 Stinson Detroiter, built from Joe Ott plans. Ott's plans may not always have been perfect for scale but it was amazing to this writer how he got them as close as he did, in many cases working from photos and very vague three-view drawings.

In that same line, Ken Sykora is seen in Photo No. 6, trying to start his Czech diesel, an .06 size engine. The model is an obscure Finnish homebuilt called a Viri. With a tough starting diesel, it was no fun in the hot sun and powdery dust.

Jumping over to the RC part of things, Eut Tileston has come up with a Taylor Cub (Photo No. 8) for the 1/2A Texaco Scale and 1/2A Texaco duration events. His goal is to prove that flying scale models can be made to fly as well as contest designs. Proof is in the results; second in 1/2A Scale and 19th in 1/2A Texaco (a tough event, with 57 entries!).

Tileston is one of those innovative modelers who delights in building offbeat models and proving you can beat Lanzo Bombers at their own game.

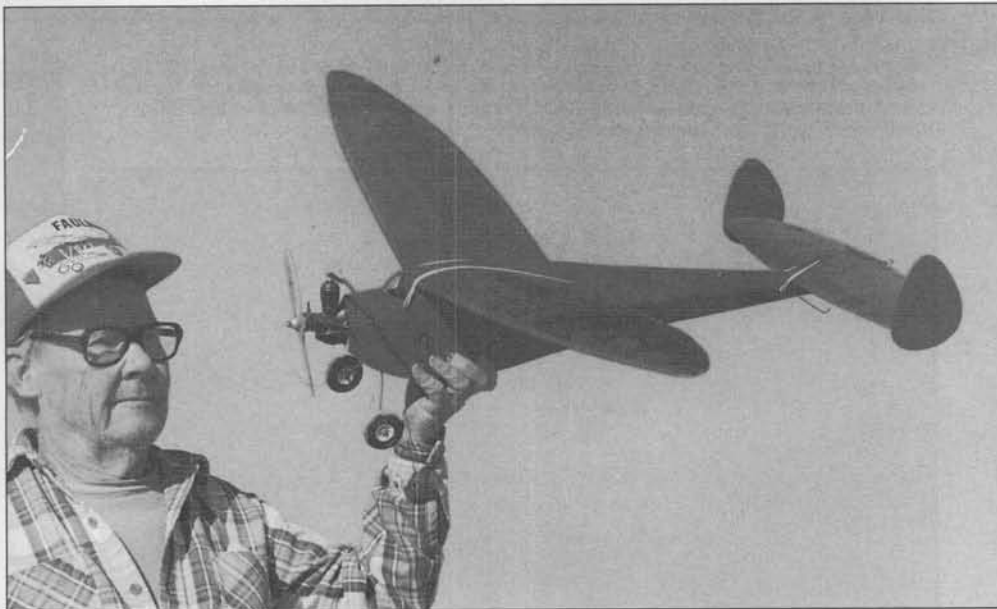
When Eut first started it was with a scaled Weathers Westerner. This was followed by the large and small Lancer series which were sensational performers. For plain out-and-out beauty, Tileston then built and flew the "Big Gull," a 13-ft. design by Winnie Davis. This was followed by several good performing cabin jobs, including the Bunch "Scorpion Major" and the Megow "Cadet." Last year, it was flying wings of various sizes. Now it is flying scale models for the 1/2A Texaco event. His Art Chester Jeep did not fly as well as he had hoped, but his Taylor Cub has been a real winner. Next year should be full of new surprises.

Another quick look at the Texaco RC entries and of all things die-hard F/F Cliff Silva entered a Tlush Texaco Winner in the RC Texaco event. See Photo No. 8 if you don't believe it.

Couldn't resist Photo No. 9, showing Daryl Rodgers of Duncanville, Texas with his K&B 6.5 powered Chuck Hollinger "Nomad." Placed 13th in Class C Glow. Not bad for a first time!

We'll wrap up this report with Photo No. 10, showing a quite rare design, "Punkin Seed," as built by Alfie Faulkner, formerly of San Diego, now living in Shelton, Washington. This model, originally designed for an Elf engine, is just right for an Arden 19. The model design can be seen in Zaic's 1934/39 Year Book. **MB**

Photo No. 10. "Punkin Seed" built by Alfie Faulkner from Zaic's 1934-39 Yearbook. Interesting design!





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## Pylon Championships *cont. from page 65*

Jett's round seven cut required dropping this score and picking up his questionable time score from round six. The round ended with the biggest gap between the top five thus far. However, the gap between the U.S. team and everyone else was getting wider.

At this point, let me digress by explaining that this article was not intended to have a "the U.S. did this and the U.S. did that" theme but, in all honesty, our team took the lead early in the meet and never looked back. They recorded "teen" times consistently where few others were having the same success. Chujo of Japan and Sagemuller of Germany were the only others recording sub-20 times with any consistency, whereas our guys were not only hitting the "teens," they were starting to hit sub-10s, which in fact is smokin'!

It appeared as though our guys still have it in certain areas, especially flying ability, because we noted several people with equal speed who just plain were not able to fly the same tight course. The question was not whether we would win, but rather, who among us would be World Champ?

In round eight, Shadel recorded his only zero when he flamed out a few laps into his heat. Jett hit a nice 1:10.1, and not to be outdone, Bartle almost matched it with a very nice 1:10.5. Larson kept the ball rolling with a 1:14.6.

In round nine, where another bad score would be dropped after completion, Jett and Bartle both hit 1:11s with Larson and Shadel recording 1:14s. The standings after round nine were: Jett at 505.9, Bartle at 507.6, and Shadel at 509.8. The top three were now just 3.9 seconds apart and all this after *nine full rounds*. This was truly amazing!

At this point, Dave Shadel decided he was not satisfied with his scores, so he and his caller, Bruce de Chastel, sat in Dave's room rebuilding some engines, then went off to the practice field for some flight tests. Whatever they did was correct because David was in the first heat of round ten and turned in a new World Record time of 1:06.8! This is *two full seconds* faster than the current record held by Dub Jett, set at the '91 Nats.

Jett followed Shadel's flight and it appeared Dub was determined to beat the time, which he did with an excellent 1:05.27, however, it was all for naught because he double cut in the attempt and a zero was added to his score.

Round ten ended and the lead changed hands again with Shadel on top by a mere tenth of a second over Bartle, 576.6 to 576.7! Jett was in third and Larson continued his consistent flying by upping his lead over Chujo to 18 seconds.

In round 11, all of the U.S. team members hit excellent times. Jett led with a 1:09 flat, followed by a pair of 1:11s from Bartle and Shadel. In round 12, it continued as Jett and Shadel both recorded 1:09s, followed by

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Bartle with 1:12.1 and Larson with 1:16.5.

We now were down to the last two rounds, and close to the point where the team could start racing each other because a zero would not hurt anyone too badly, so the top three guys went after it knowing they could be conservative in the last round if necessary and still finish on top.

And what a round it was! Shadel turned in a 1:08.7, Bartle a 1:09.9, and Jett a 1:06.6 to break Shadel's previously set World Record!

The stage was now set for the final round. Each U.S. flier had only one zero, so a second would not change things; they already were the team champs. It was now a race between themselves for all the marbles, and the three on top all had a shot at it.

Everyone in the crowd was standing as Jett led off with a super 1:07.6. Everyone had their calculators out and figured that Shadel must beat a 1:08.9 to retain his World Champ status. He did indeed beat Jeff's time, but cut a pylon in the process, in a magnificent effort. Dub Jett is the new World Champ! Not to be outdone, Henry Bartle stayed in the hunt with a 1:10.3, and as Shadel's cut time would end up being a throwaway, he had to pick up the next slowest time, which moved him down one more notch into third place, just one-half second behind Bartle.

So at the end it still was a close race. The top three were separated by a measly six seconds, which is hard to grasp when you realize that these are only seconds and they are spread out over 14 rounds! Heck, this is nothing more than slow or fast thumbs on a stopwatch!

The U.S. Team is the World Champion, and I have to tell you, I have never had a greater pleasure than working with these guys. We had a ton of fun, they got along great and this writer will always be grateful for their picking me as Team Manager. Believe me guys, the pleasure was all mine and you guys done good.

I also wish to go on public record by thanking the magnificent Aussies for hosting an excellent contest. Keith Harvey and his crew were nothing short of great. The hospitality from the people "down under" is beyond anything ever seen by this writer.

The motel owners, Alan and Vivian Jones, called us by our first names all week and had a barbecue for us. The wonderful Box family, who Henry Bartle stopped on the street because Paul Box was driving a Corvette (which just happens to be Henry's business interest), took us out to a golf course to show us some wild kangaroos, and invited us over to their house for a steak-fry with several of their friends. Great people!

I also want to extend my personal thanks to Brian Green, the overall Contest Director; to Chris Greenwood, FAI's Federal Secretary; to David Axon, MAAA President and "Schnapps buddy"; and especially to Leo O'Reilly, who every day made it a point of telling me how great he thought our team was doing even though I know his heart was with the Aussies, his countrymen. Thank you Australia! **MB**

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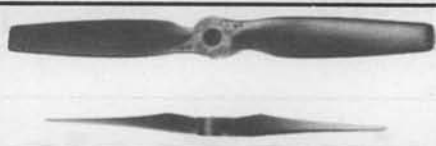
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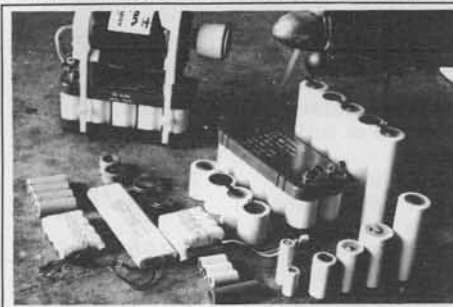
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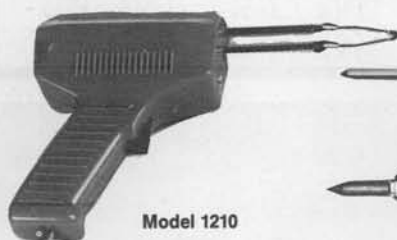
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## JET TRAILS continued from page 71

write to SSP or check with your local hobby store for a copy.

Eric has started his own company, called Mey's Hitech Hobby, Inc., and is producing a line of kits called Acuscale, of which the A-6 is the first. The one he brought to the event had a wing span of 63 inches and was 65 inches long. Weight was 10-1/2 pounds, with a single Dynamax/O.S. 91 fan system. It uses bifocated inlets and thrust tubes. Other features include a fiberglass fuselage with plug-in foam core wings and molded glass wing skins. Retracts were Rohm-Air 90-degree rotating mains, with a Spring Air nose gear.

Future options include machined aluminum wheels, functioning scale struts, full cockpit detail with ejection seats and pilots, scale decals and molded bomb racks with bombs. Radio problems plagued the plane all weekend, consequently, it made only one flight on Sunday. Sadly, it was shot down and destroyed, but the short time it flew, it was inspiring. Eric later showed me a video of its first three flights, flown without incident. It's very frustrating to work so hard to produce a kit, only to be racked with radio problems on its public debut. The problems were clearly local, as Eric said he had no such problems at home. I can confirm this problem, because one of my aircraft was glitched twice in the same area as Eric. Radio problems aside, I was impressed enough that I ordered an Intruder for myself. I hope to do a construction article on it in a future issue.

Later on Sunday, awards were handed out. The Best Military Plane award went to Greg Garneau, of Canada, for his Golden Hawks F-86, built from a BVM kit. Best Sport Model was awarded to Dan Fish with his Gray/Navy Starfire. Best Performance was very deservedly given to Joe Bedford, flying his Gray "Slimmer" Starfire. Joe did practically every trick in the book with this plane, including low, inverted, high-speed passes, spins and slow flight maneuvers. Way to go Joe!

The Worst Crash award went to Alan Delena, who put in his Yellow Aircraft F-4, full bore from about 500 feet. This happened early Saturday, and I saw contest director Dwight Aube making off with one of the wing panels. I now know why. He glued part of the wing onto a plaque for the awards on Sunday. It was awarded to Alan by last year's winner, Lou Lugero. The trophies were very unique... a hand-carved bald eagle statue perched on a plaque with an engraved brass plate. Dan Fish's wife was pleased with the awards. She said it was something nice to display around the house, instead of just another trophy. I agree that Dwight out-did himself with the awards. In addition to the awards, the numerous and generous sponsors provided a host of products for the door prizes. Thanks to the sponsors for their contributions. **MB**



# New book "briefings" from H.A.

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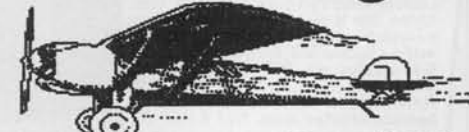
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## FREE FLIGHT cont. from page 55

written for a modern pylon gas model without auto surfaces.

"1. Decreasing incidence will make the model go more to the left under power and also make the model go flatter in the climb. Taking out too much incidence will make the model go over the top or 'zero-out' under power.

"2. Increasing incidence will make the model more loopy in the climb and go more to the right under power.

"3. Thrust changes only the initial portion of the pattern and has no effect in the latter portion of the power pattern. Because of this, the earlier and latter portions of the power pattern should be examined to see if thrust changes are necessary.

"4. Adding tail weight will have the same result under power as taking out incidence. The model will go flatter in the climb and go more to the left.

"5. Adding trailing edge stock at the rear of the rudder for a tab has a strong influence under power with minimal effect on the glide. This is one of the most effective trimming tools that you can use.

"6. Looking from the rear of the model and adding stab tilt, the model will turn to the higher side in the glide with minimal effect in the climb.

"7. When adding stab tilt to the front of the stab platform only, you are taking out incidence. To avoid incidence changes, replace half of the amount that was removed at the trailing edge of the stab.

"8. Looking from the rear of the stab, a warp that raises the stab trailing edge will cause the model to turn to that same side under power.

"9. Models with tall rudders have a tendency to weathervane in the glide. Too small a rudder (and fin) will cause a Dutch roll. The height of the rudder is more critical than the actual size.

"10. Unwanted warps in a model tend to

be amplified by speed, so the faster you go, the more pronounced the effect.

"11. Wide glide circles do better in dead air, but do not let the model center into a thermal as easy as a smaller glide circle."

Those are the trim tips that Terry uses with his Astro-Stars and any other pylon gas model. The assumption is that the model flies to the right under power and glides to the right as well. I would offer one more suggestion, and that is that you should only use a fin size that is adequate to handle the power pattern. The smaller the fin, the better the model will center in lift. Too small, as Terry notes above, will cause the model to Dutch roll under power. Copy the above tips from this magazine and tape them to the inside of your model box, so you can refer to them the next time you are at the field with that new ship.

That wraps it up for another month. If you want to send materials directly to me, send to Bob Stalick, 5066 NW Picadilly Circle, Albany, OR 97321. **MB**



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## ALL ABOUT ARFS cont. from page 43

have been accumulating early radios, and escapements. And there are other fields which are still in their infancy, where prices haven't started to climb out of sight yet. For example, a collection of fuel cans which are out of production is quite interesting and very colorful. Collecting spark and early glow plugs is also becoming popular, and I have seen one or two displays of model airplane wheels and fuel tanks of the metal variety, which were very impressive.

As for me, I try to keep everything old and interesting that turns up, usually throwing such things in a box to be properly displayed someday. My real specialty is old propellers, and I must have a couple of hundred of these discontinued airscrews.

Recently I was in urgent need of an 11x6

prop for a nice little standoff scale Corsair powered with a Saito .50 Golden Knight engine, and I couldn't find one anywhere in the workshop. As it was still early in the morning and the hobby shop hadn't opened yet, I went to my antique collection and found the right size prop. This one was a long discontinued Kavan nylon propeller in a bright Cub-yellow color, and it really dressed up the dark blue Corsair.

*Many years ago it was decided that nylon props could be dangerous under certain conditions... cold or freezing temperatures...*

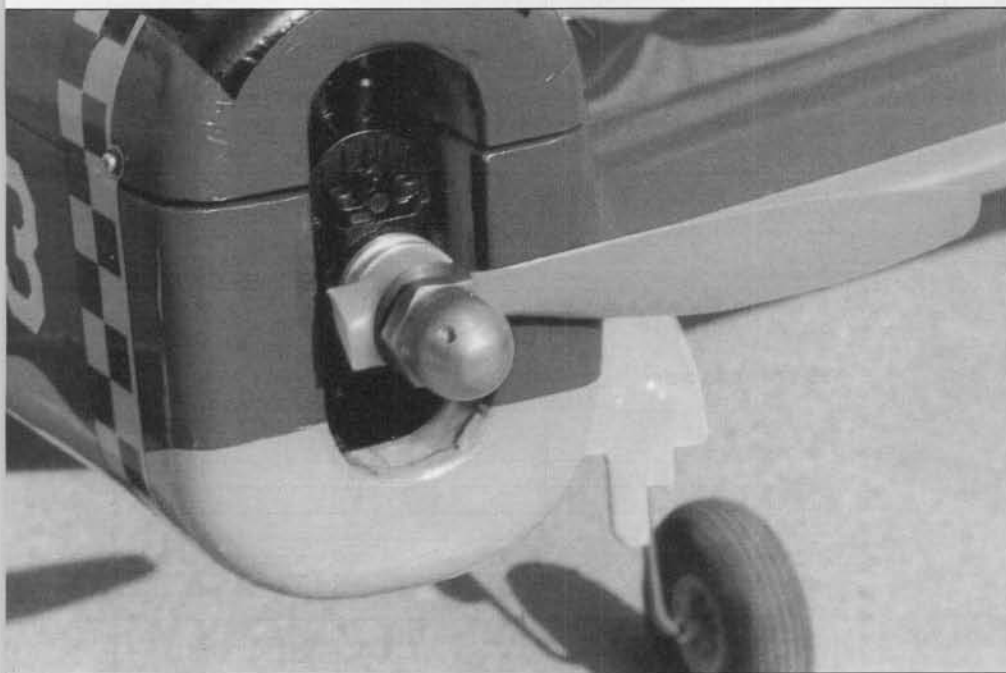
While warming up the engine at the field, my companions pointed out to me that the tips were visibly bending back and forth at full throttle, but it seemed to me that was normal behavior for flexible nylon props. Now, many years ago it was decided that nylon props could be dangerous under certain conditions, especially if used in cold or freezing temperatures, as they often became brittle and snapped while rotating. For that reason we used to boil them in water to reduce this tendency, but nylon props were always a problem until the modern reinforced props came along.

Anyway, you can now add to our knowledge of nylon propellers that they will also snap when they are old, even when used on a warm summer day. On my fourth or fifth flight we heard a horrendous crack, and one of the blades ripped its way through the right wing at an altitude of about 150 feet. The deadstick landing was downwind and uneventful, but that is the last time I'll use one of my antique props. One of these days I'll sort them all out and display them on a board, as that is really all they're good for. Don't make my mistake and fly with them. Your accident may be far worse than mine.

These days I'm spending more time answering letters, phone calls and FAXes from my readers than I devote to preparing this column, and it's hard to say which I enjoy doing more. So I'm grateful to have the opportunity to help answer any questions or just exchange comments. Write to me at 2267 Alta Vista Drive, Vista, CA 92084 (include an SASE if a personal reply is desired). Late afternoons and evenings (Pacific Time) you can phone me at (619) 726-6636 (or whenever I get home from flying) or send me a FAX at (619) 726-6907. Let's get together next month for some more ARF talk.

**MB**

Here's how this antique nylon prop looked after snapping during a flight. The author managed to land with a badly lacerated wing.





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nia, a portion of Mile Square Park in the city of Fountain Valley is currently being used by car, rocket, and aircraft modelers as a site for their hobbies. We have received information that the Harbors, Beaches and Parks Department of Orange County plans to take title to the present airstrip (hobby) area in about two years. Previously, the county has received title to the perimeter area and developed it into a fine park with picnic and athletic areas, a full-size golf course and small pitch and putt golf course. Now the Department is planning to replace the entire airstrip (hobby) area with an income producing activity such as a golf course.

"The Anaheim Model Airplane Club, Flying Falcons of Saddleback Valley, Joint Military Flyers of Camp Pendleton, Orange Coast Radio Control Club, and Sky-Nauts of Saddleback Valley have joined together to form the Orange County Association of Model Clubs so as to:

1. Represent the modelers of Orange County.
2. Develop a larger community and political presence in Orange County.
3. Deal with the Orange County Parks and the County from a stronger, consolidated position on Mile Square and other existing hobby sites.
4. Deal with other city, county, state, and federal organizations and private parties to acquire additional sites for model cars, boats, planes, and rockets.
5. Promote the different facets of modeling.
6. Encourage youth participation to fight delinquency, gangs and drug use.

"We are in the initial stages of organization. We have adopted a temporary constitution and set up bylaws pending a larger meeting of interested club representatives in March of 1992. The organizing group is composed of airplane clubs, because we

know each other, not because we wish to exclude anyone.

"We intend to become a chartered chapter of the Academy of Model Aeronautics; we hope our Association can also become a chartered chapter of the national car and boat organizations. We need all interested car, boat, airplane and rocketry organizations in and near Orange County to join us in this major effort.

"We will be happy to attend your club or board meetings to discuss the Association. Please contact Joe Richardson, Sky-Nauts of Saddleback Valley, telephone (714) 492-1587; or Loren Nicholson, Orange Coast Radio Control Club, 10881 Thorley Road, Santa Ana, CA 92705, telephone (614) 44-4550."

## T.O.C. REPORT

It has been announced by Bill Bennett, Chairman of the Board of Circus Circus Enterprises, Inc., that Steve Rojecki, a past contestant and also winner of the 1984 Tournament of Champions, has been named the Contest Director for the 1992 Eleventh International T.O.C. The event will take place October 22 through 25, 1992. As in the past Tournaments, twenty top-ranking competitors will be invited; ten from the US and ten from other nations. The total purse will again exceed \$100,000. **MB**

## DEAR JAKE cont. from page 7

Astro Car. Do you know where I could obtain scale drawings of the actual full size one. I don't think I'll have any trouble getting the model to fly, but getting it to fold up into a briefcase may be difficult.

While you're at it, I would also like to know where to get drawings of several other historical aircraft, such as Flash Gordon's ship, Phineas Phogg's balloon, Baloo Bear's Sea Duck, and Hans Solo's Millenium Fal-

con. Thank you.

Oliver in Oxnard, CA

Dear Oliver:

*I thought you were putting me on, but I built a Sea Duck myself, so I think I can help you. The drawings you need, and the licensing rights you will need to use them, are only available from the original designers. So you'll have to contact the Prop Departments at Warner Brothers, Walt Disney, and Lucasfilm.*

Jake

## DEAR JAKE:

I'm taking a Basics of Aircraft Design short course. The professor said that when sizing the tail surfaces and moment arms, a designer has to be careful to arrive at a stable neutral point. What's a "neutral point"?

Student in Steubenville, OH

Dear Student:

*It's that little 'N' on your gearshift knob.*

Jake

## DEAR JAKE:

You probably won't print this, but—

Anonymous

Dear Anonymous:

*You were right. There's no way I'd print your offensive opinions of me. But I run this column, so I can say whatever I want about you. (Right, Bill?) So listen up, Pal! You're a—*

Jake **MB**

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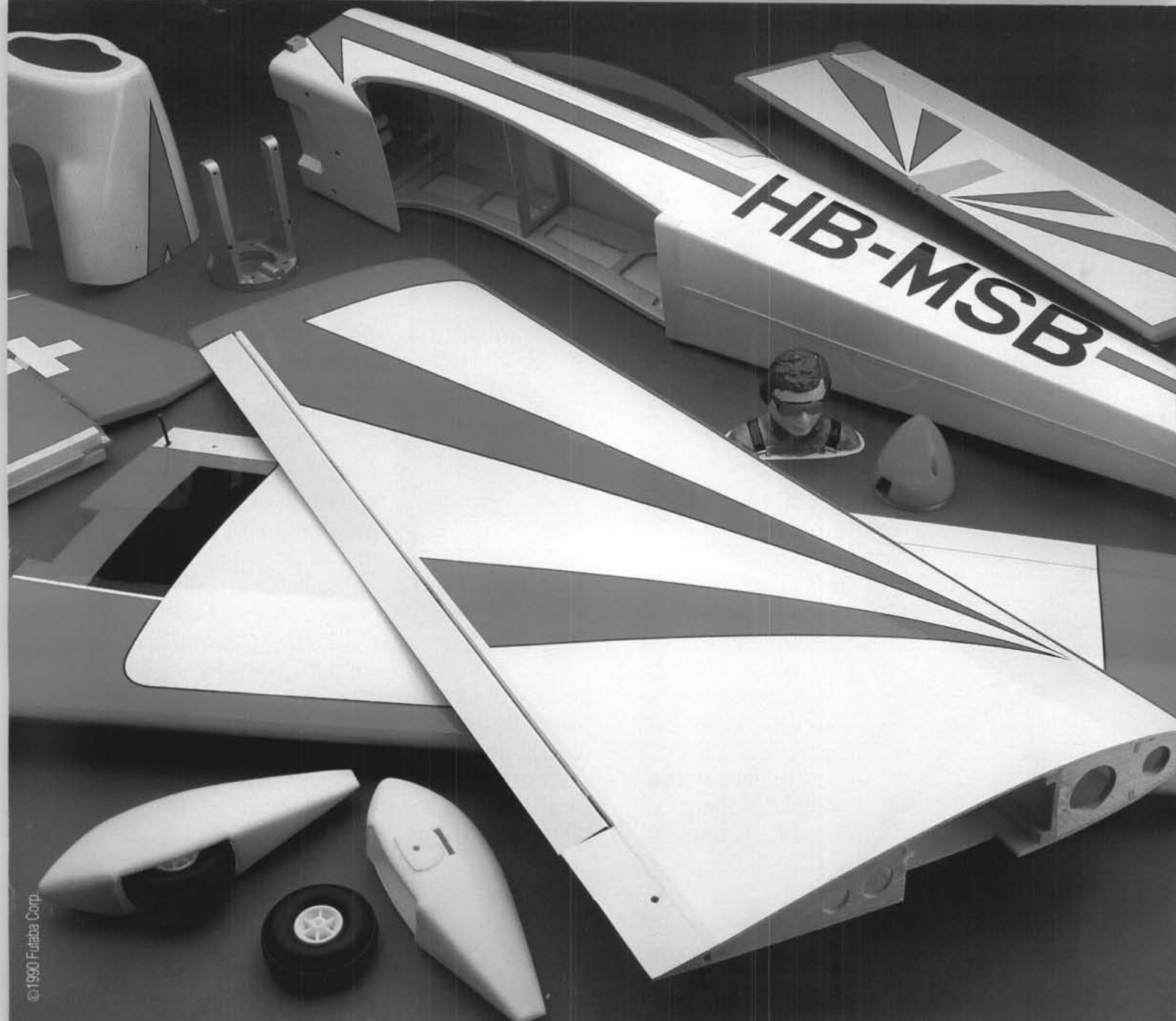
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